

SGA AND SG DOSER GROUP



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Read this manual before installing or commissioning the product and keep it at hand for later reference.

DOSER GROUPS

(Original Operating and Service Manual according to EU Directive 2006/42/EC)

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APPENDICES 22 pcs.

DOSER GROUPS

1 GENERAL

The installation, operating and maintenance instructions in this manual conform to the EU Directive 2006/42/EC on machinery. The Operating and Service Manual is an integral part of operating the unit. Store it for subsequent use.

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Oy SKF Ab Muurame reserves the right to make changes to the content and technical specifications in this manual.

2 MAINTENANCE

If you have any technical questions, please do not hesitate to contact us:

Oy SKF Ab

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www.skf.com

3 SKF SAFETY INSTRUCTIONS

This operating and service manual contains basic information which must be observed when installing, operating and maintaining the unit. It is necessary for the installer and operator to read these instructions before installation and commissioning. Ensure that these instructions are always accessible to operating personnel.

In addition to these general safety instructions, the special safety instructions provided in other sections of this document must be followed.

Safety signs

Symbol	Meaning
	General risk of injury and damage
	Voltage
	Hot surface
	Risk of slipping

Warnings and their meanings

WARNING	Meaning
DANGER!	Indicates risk of injury to people
WARNING!	Indicates danger to buildings, machines or environment
NOTE!	Indicates additional information

3.1 Safety instructions for the operator

Electricity-related risks must be prevented by following the current electrical safety regulations.

3.2 Safety instructions for maintenance, inspection and installation

The operator must ensure that all maintenance, inspection and installation work is carried out by authorized and qualified specialists. This operating and service manual must be available to these staff members.



DANGER! Electrical connections must only be made by qualified electricians. Operating voltage must be shut off before touching any parts with power supply. Operating voltage must be shut off before opening any parts of the unit.



DANGER! Ensure that power to the unit is switched off during maintenance. Smoking and producing open flames and sparks while working on or in the vicinity of hydraulic systems is forbidden.



DANGER! Ensure that the unit is not pressurized during maintenance.



WARNING! Oils and water-polluting fluids must not be allowed to enter the soil, water courses or sewer systems. Ensure that oils are disposed of safely and without harming the environment. The relevant regulations in the country must be observed with regard to water pollution and oil disposal.

3.3 Warranty and liability

Oy SKF Ab Muurame will not assume any liability, nor will the warranty provided for the product cover any loss in the following cases:

- The unit has not been used for its intended purpose.
- The unit has not been appropriately installed, de-commissioned or operated.
- The unit has been operated using impure lubricants or materials that have not been approved.
- The unit has been maintained or repaired incorrectly.
- Parts other than Oy SKF Ab's original spare parts have been used in the unit.
- The unit has been altered in ways that Oy SKF AB Muurame has not approved.
- Instructions for transportation and storage have not been followed.

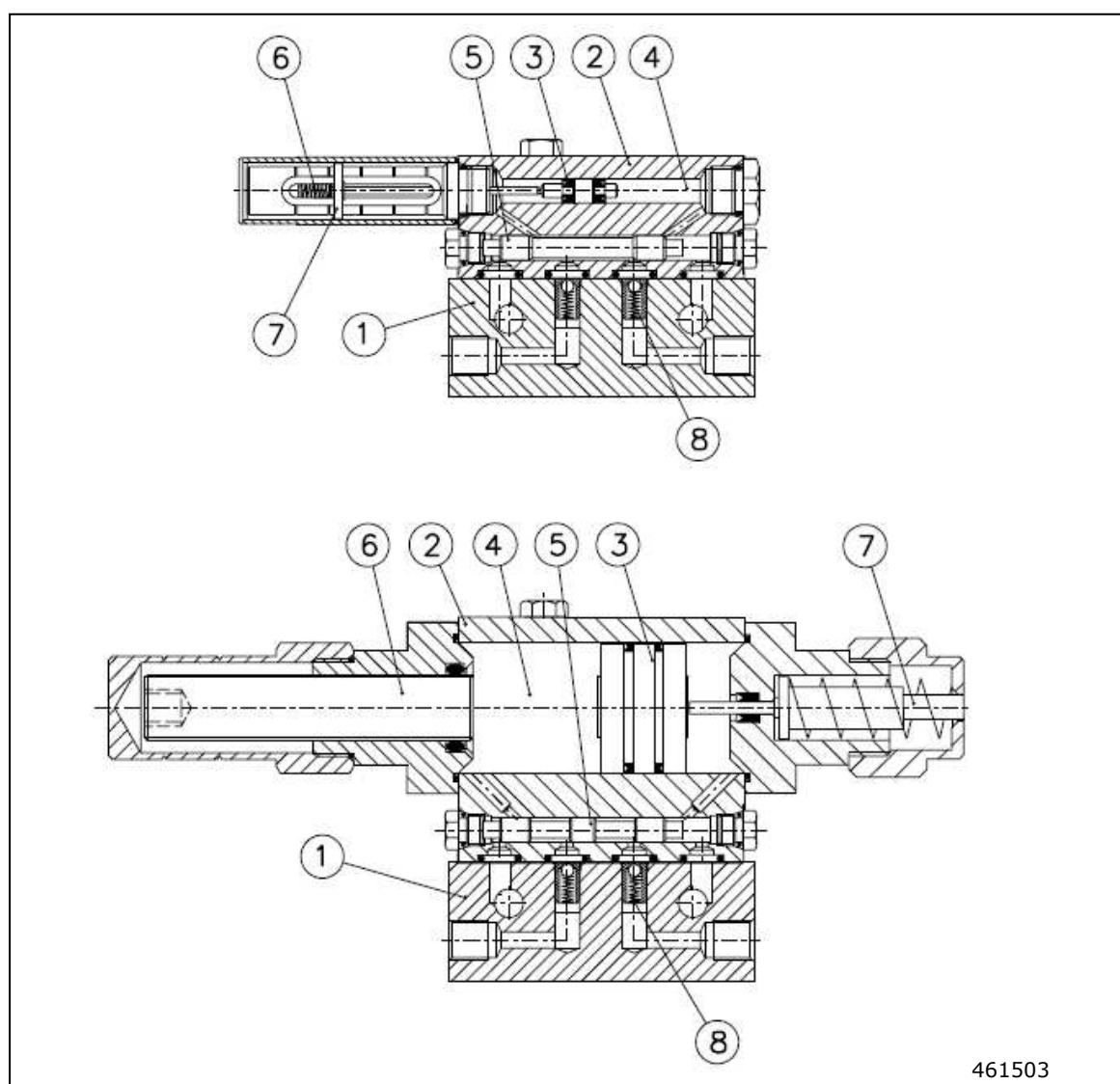
4 GENERAL DESCRIPTION

A doser group consist of a base plate (pos. 1) and one or more dosers attached to it (pos. 2). The base plate divides the lubricant to the dosers, which feed the preset amount of lubricant to the lubrication points.

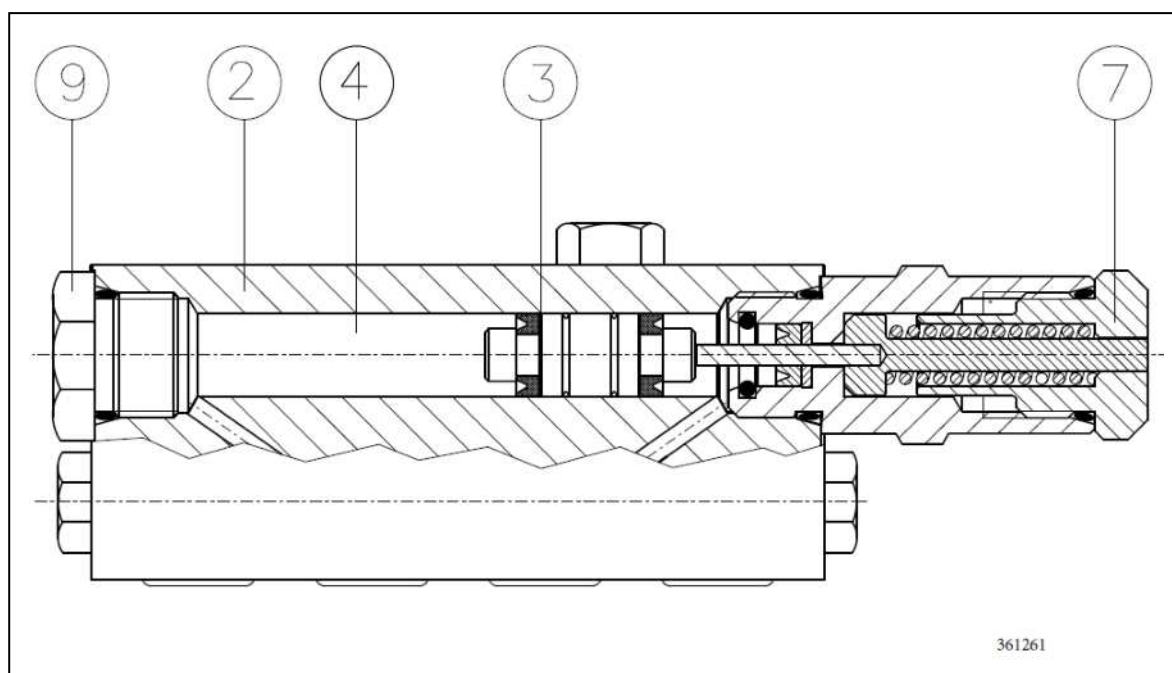
5 DESIGN, SG DOSERS

The man components of the doser are the body (2), double-seal piston (3), pilot valve (5), adjustment screw (6) and indicator (7). Piston movement is controlled with the adjustment screw, and the indicator indicates doser adjustment and functioning.

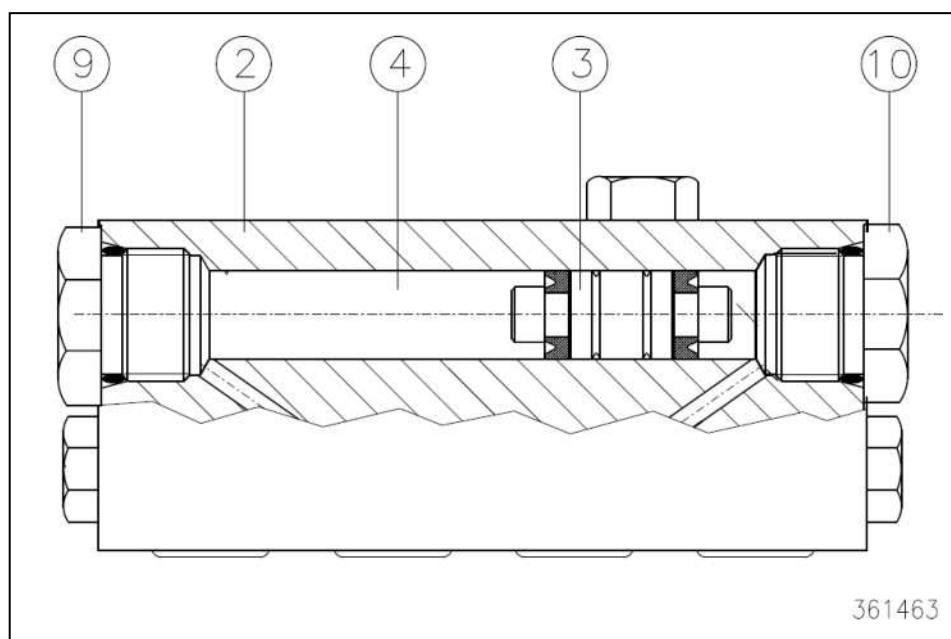
The lubrication outlet connections of the base plate are equipped with check valves (pos. 8). The design allows dosing of small lubricant volumes from the doser because backflow is prevented.



The indicator and adjustments in an SGA-xxx-WI -type doser are different from standard SG2 -type doser. The indicator has no plastic cover and adjustments are made with adjusting plugs of varying sizes (pos. 9).



The indicator and adjustments in an SGA-xxx-NI -type doser are different from standard SG2 -type doser. The indicator is replaced with a plug (pos. 10) and adjustments are made with adjusting plugs of varying sizes (pos. 9).



6 OPERATION

6.1 Dosers with two outlets

Dosers with two outlets alternate dosing between opposite outlet connections between lubrication cycles.

The pressure in the line increases during pressurization and the doser pilot valve moves to its extreme position, whereupon the lubricant moves the dosing piston. When the dosing piston moves, it pushes the lubricant through the base plate check valve to the lubrication pipe or lubrication hose and further to the lubrication point.

When the pumping starts again, the directional valve directs the lubricant to another main line whereupon the doser pilot valve directs the lubricant to the opposite side of the dosing piston. When the dosing piston moves, it pushes the lubricant through the base plate check valve and further to the lubrication point.

6.2 Dosers with one outlet

During normal sequential operation, dosers with one outlet always feed lubricant to the same outlet connection.

The design of the doser with one outlet is different from the doser with two outlets only by the design of the pilot valve, which makes it possible to choose the outlet connection from the base plate. The opposite outlet on the base plate must be plugged. The operation of the doser with one outlet is similar to the operation of doser with two outlets.

6.3 Unfastening and fastening dosers

The dosers are removed from the base plate by loosening the two M6 hex head screws on top of the doser.



WARNING! When replacing dosers, make sure that there is no pressure in the system.

The dosers are fixed to the base plate with the M6 hex head screws delivered with the doser. Make sure that the O rings between the doser and the base plate are in place before fixing the dosers.



WARNING! If the doser fastening screws are tightened too much, the operation of the doser might be prevented. The maximum tightening torque is 8 Nm.



WARNING! When changing the doser, make sure that the type marking on the doser and the number of outlets are identical. The last number on the doser type marking shows the number of outlets.

7 ADJUSTMENTS

7.1 General

Lubricant dosage is adjusted by changing the piston's range of movement from the adjustment screw or by changing the dosing plug.

The SGA dosers are adjusted by twisting the adjustment screw with a hex key.

Adjust SG dosers by turning the hex screw under the metallic protective cap. The other end of the screw is inside the doser cylinder and, when adjusted, it directly changes the piston's range of movement.

The WI & NI doser's lubricant dosage is adjusted by changing the movement of the piston using adjusting plugs of varying lengths.

During both pressurizations of the lubrication cycle the doser with one outlet always feeds the lubricant to the same lubrication point. The doser with two outlets feeds the lubricant to two different lubrication points. This has been taken into account in the adjustment tables.

Table 1. Drawing numbers for adjustment values

Doser types (ZN, SS)	Drawing number
SGA-011, SGA-012	460120
SGA-11, SGA-12	460122
SGA-21, SGA-22	460123
SG-31, SG-32	460124
SG-41, SG-42	460126
SG-51, SG-52	460128

Adjustment of SGA dosers

1. Remove the protective plastic cap.
2. Make sure that the indicator is inside the doser body.



WARNING! The SGA doser is damaged if the adjustment screw is adjusted against the indicator.

3. Twist the adjustment screw into the basic position where it touches the indicator lightly.
4. Check the adjustment value table for the correct number of adjustment screw turns for the required lubricant dose.
5. Twist the screw as many times away from the doser body as specified in the table. The indicator body has dosage grooves to facilitate adjustments.
6. Screw the protective cap back in its place.

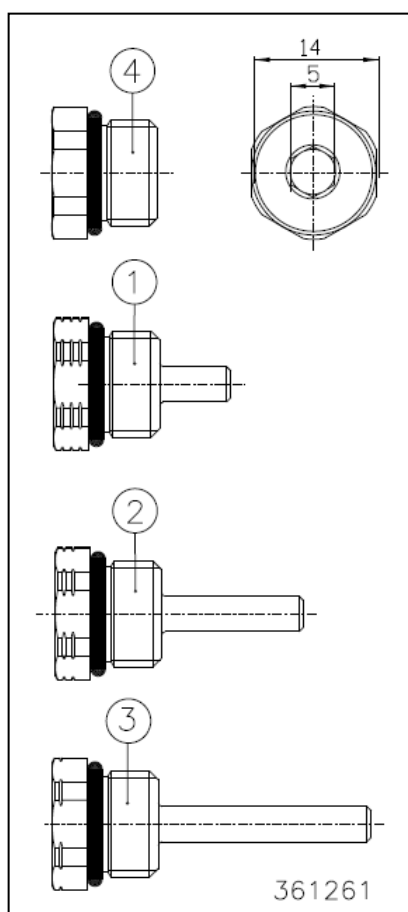
Adjustment of SG dosers

1. Remove the protective metal cap from the top of the hex head screw.
2. Twist the hex head screw into the basic position at the level of the front surface of the thread on the body.
3. Check the adjustment value table for the correct amount of turns for the required lubricant dose.
4. Twist the hex head screw as many times away from the doser body as specified in the table. If the number is negative, the screw is twisted into the doser. The protective cap has dosage grooves to facilitate adjustments.
5. Screw the protective cap back in its place.

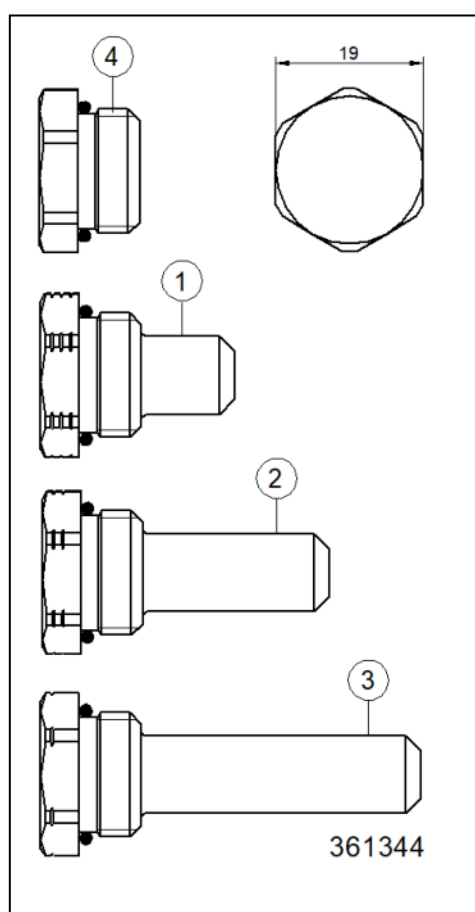
Adjustment of WI and N dosers and dosages

1. Remove the doser's end plug (pos. 9)
2. Place an end plug corresponding to the desired dosage on the doser and tighten it to 22.5 Nm.

Adjustment plugs SGA-01/1



Adjustment plugs SGA-2x


GREASE DENSITY 0.88 g/cm³

NO.	NAME	SGA 01/1 DOSER		DOSAGE g/series ±5 %	
		SGA-012-ZN-WI 12387520	SGA-011-ZN-WI 12387470	SGA-12-ZN-WI 12387620	SGA-011-ZN-WI 12387570
4	PLUG SGA-01/1	0.8	1.6	1.41	2.82
1	ADJUSTMENT PLUG-3 SGA	0.6	1.2	1.06	2.12
2	ADJUSTMENT PLUG-2 SGA	0.4	0.8	0.7	1.4
3	ADJUSTMENT PLUG-1 SGA	0.2	0.4	0.35	0.7

NO.	NAME	SGA 2 DOSER		DOSAGE g/series ±5 %	
		SGA-22-ZN-WI 12387720	SGA-21-ZN-WI 12387670		
4	PLUG SGA-2	4.54	9.07		
1	ADJUSTMENT PLUG-3 SGA 2	3.34	6.68		
2	ADJUSTMENT PLUG-2 SGA 2	2.15	4.29		
3	ADJUSTMENT PLUG-1 SGA 2	0.98	1.98		

8 TECHNICAL SPECIFICATIONS

8.1 Technical data

Table 2. Technical specifications for doser group

Quantity	Value	Unit	Description
t	-25...+80	°C	Operating temperature range
p _{max}	250 300	bar	max. pressure, 01-dosers max. pressure, other dosers
M	8	Nm	doser tightening torque to the base plate

8.2 Connections

Inlet and outlet connections are in the base plate.

Inputs

- lubricant (2 pcs), header piping inlets, female thread R 1/4" or NPT 1/4"

Outputs

- lubricant (2 pcs), header piping outlets, female thread R 1/4" or NPT 1/4"
- lubricant (2-12 pcs), lubrication piping outlets, female thread R 1/8" or NPT 1/8"

8.3 Legend

Table 3. Doser designation

SGA-xy-zz-ww	Abbreviation	Description
SG:	SG	Lubrication system type: SKF DuoFlex
A:	A	small doser (sizes 01, 1 and 2)
	no symbol	small doser (sizes 3, 4 and 5)
xx:	01	doser size 01
	1	doser size 1
	2	doser size 2
	3	doser size 3
	4	doser size 4
	5	doser size 5
y:	1	one outlet
	2	two outlets
zz:	ZN	doser material: zinc-coated and yellow-passivated steel
	SS	doser material: acid-proof steel AISI-316
ww:	no symbol	standard doser
	WI	doser with a steel indicator
	NI	doser without indicator

Example:

SGA-012-SS

	Doser material: acid-proof steel AISI 316
	Outlet number: 2 outlets
	Doser size: size 01
	Small doser
	Lubrication system type: SKF DuoFlex

Table 4. Symbols of base plates

BPSG-xx-yy-U	Abbreviation	Description
BP:	BP	Base Plate
SG:	SG	Lubrication system type: SKF DuoFlex
xx:	01	1-place base plate
	02	2-place base plate
	03	3-place base plate
	04	4-place base plate
	05	5-place base plate
	06	6-place base plate
yy:	AL	Base plate material, anodized aluminium
	SS	Base plate material, acid-proof steel, AISI-316
U:	no symbol	connections, BSP G threads
	U	Connections, NPT threads

Example:

BPSG-03-AL

	Base plate material, aluminium
	Base plate size, 3 doser slots
	Lubrication system type, SKF Dual line
	Base Plate

Connections: BSP G threads

8.4 Base plate dimensioning and codes

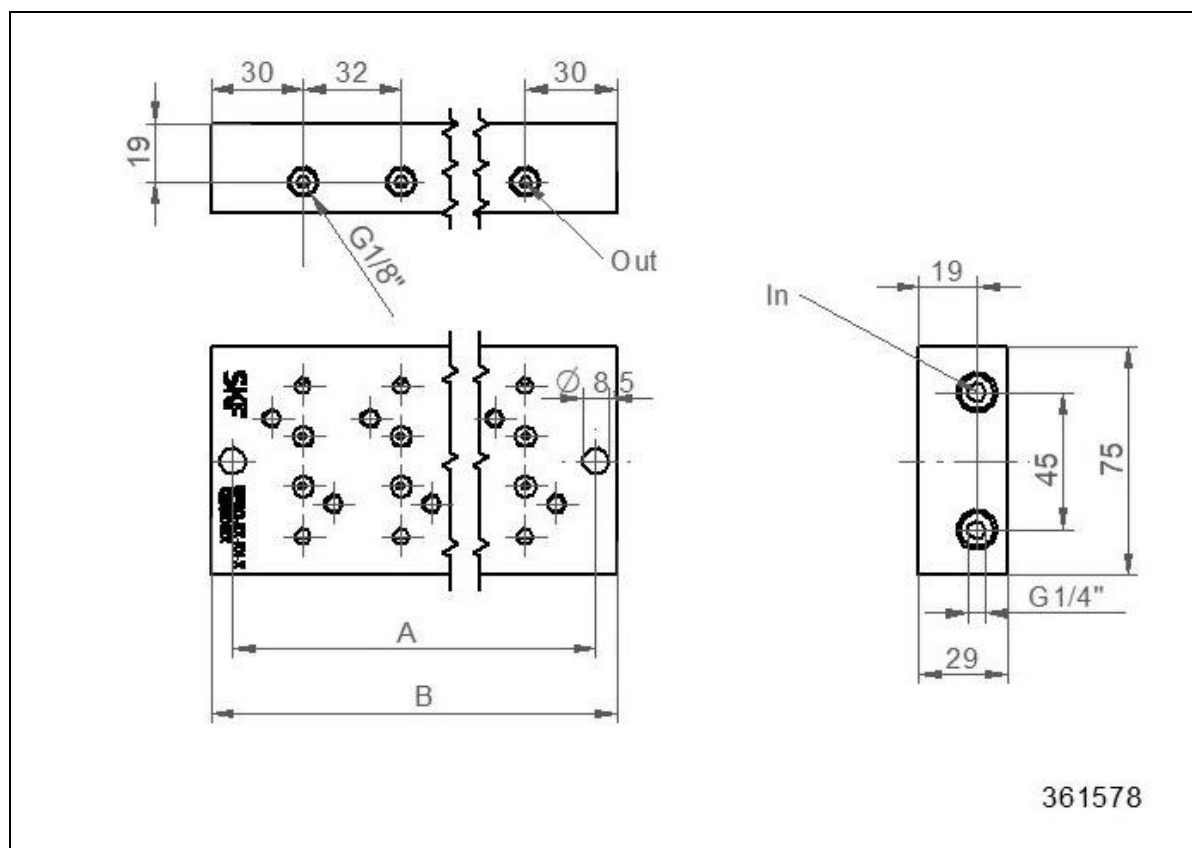


Table 5. Base plate dimensioning

Model	A	B	Number
BPSG-01-AL	46	60	12383250
BPSG-02-AL	78	92	12383300
BPSG-03-AL	110	124	12383350
BPSG-04-AL	142	156	12383400
BPSG-05-AL	174	188	12383450
BPSG-06-AL	206	220	12383500
BPSG-01-SS	46	60	12384300
BPSG-02-SS	78	92	12384350
BPSG-03-SS	110	124	12384400
BPSG-04-SS	142	156	12384450
BPSG-05-SS	174	188	12384500
BPSG-06-SS	206	220	12384550

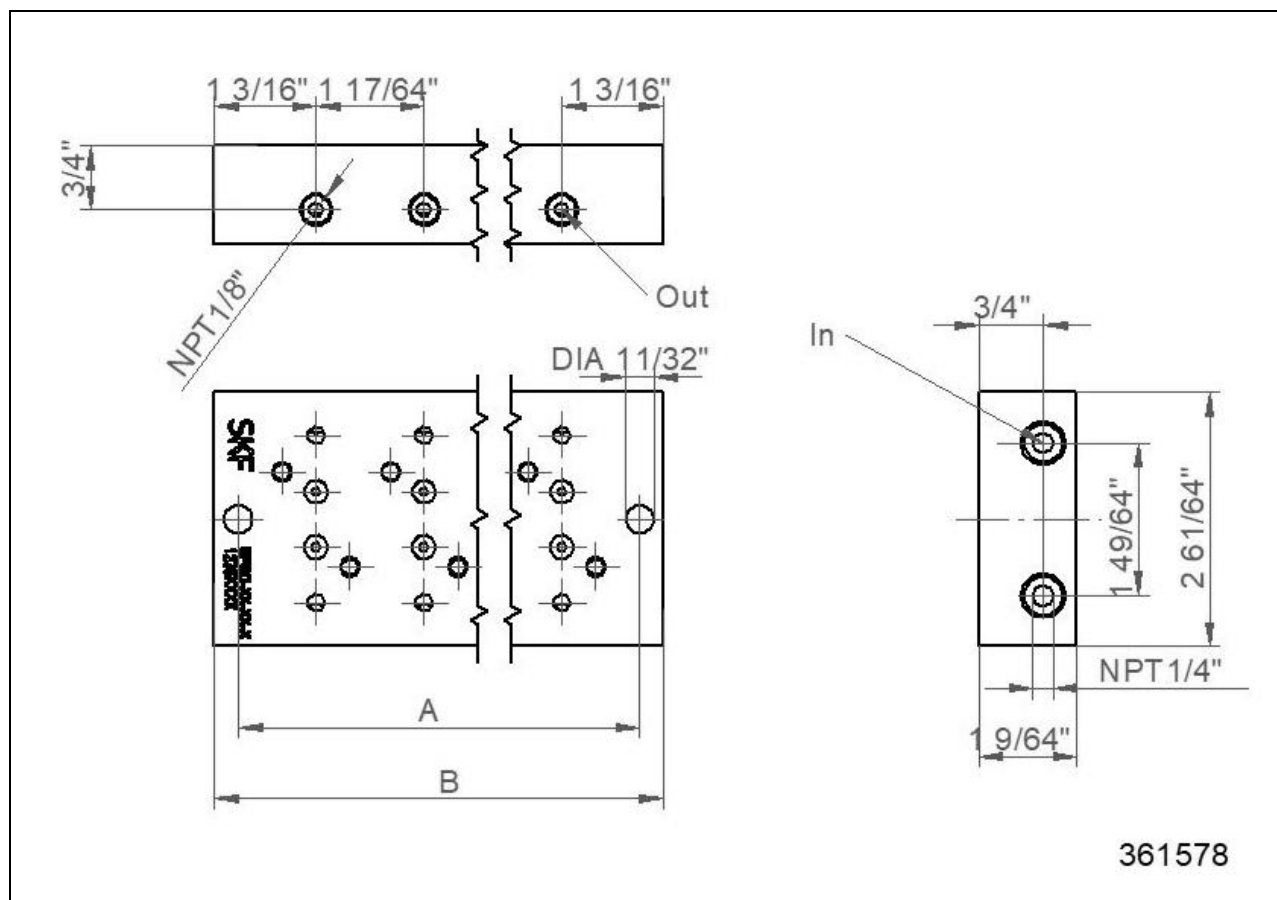
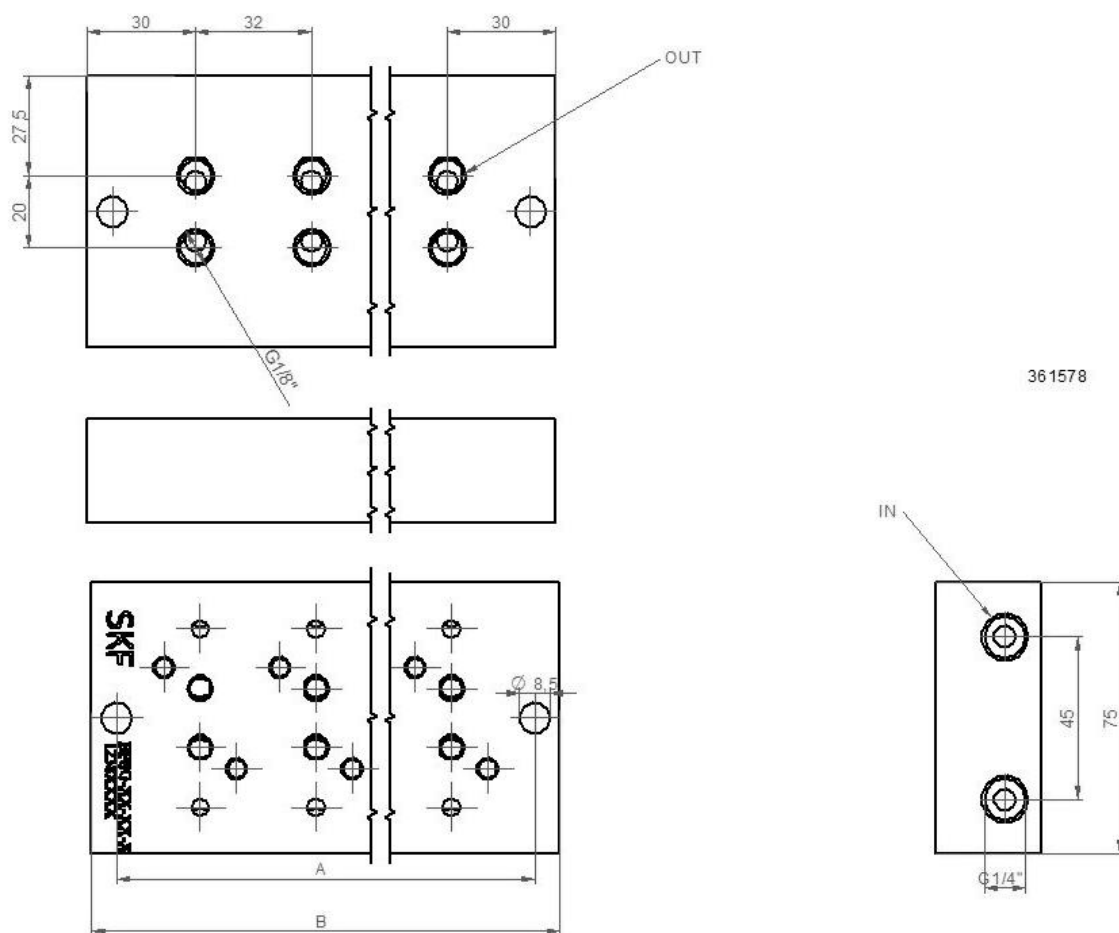


Table 7. U model dimensions

Model	A	B	Number
BPSG-01-AL-U	46 (1 13/16")	60 (2 23/64")	12384000
BPSG-02-AL-U	78 (3 5/64")	92 (3 5/8")	12384050
BPSG-03-AL-U	110 (4 21/64")	124 (4 7/8")	12384100
BPSG-04-AL-U	142 (5 19/32")	156 (6 9/64")	12384150
BPSG-05-AL-U	174 (6 27/32")	188 (7 13/32")	12384200
BPSG-06-AL-U	206 (8 7/64")	220 (8 21/32")	12384250
BPSG-01-SS-U	46 (1 13/16")	60 (2 23/64")	12384600
BPSG-02-SS-U	78 (3 5/64")	92 (3 5/8")	12384650
BPSG-03-SS-U	110 (4 21/64")	124 (4 7/8")	12384700
BPSG-04-SS-U	142 (5 19/32")	156 (6 9/64")	12384750
BPSG-05-SS-U	174 (6 27/32")	188 (7 13/32")	12384800
BPSG-06-SS-U	206 (8 7/64")	220 (8 21/32")	12384850

**Table 8.** B model dimensioning

Model	A	B	Number
BPSG-01-AL-B	46	60	12383550
BPSG-02-AL-B	78	92	12383560
BPSG-03-AL-B	110	124	12383570
BPSG-04-AL-B	142	156	12383580
BPSG-05-AL-B	174	188	12383590
BPSG-06-AL-B	206	220	12383600

9 REMOVING FROM SERVICE

9.1 Temporary removing from service

The system can be temporarily shut down by disconnecting it from electrical, pressurised air and hydraulic outlets. For further information, see section "General description" of this manual. For temporary removal from service, see also section "Storage". To restart the system, see the "Operation" and "Technical specification" sections.

9.2 Final removing from service

All relevant country-specific instructions and regulations regarding the decommissioning and disposal of contaminated equipment must be followed when decommissioning the product.



WARNING!

Lubricants can contain chemicals that can contaminate the soil and the water system. Lubricants must be disposed of correctly. Follow the national instructions and regulations for disposal and recycling.

Oy SKF AB will receive products it has delivered and take care of their appropriate disposal. Oy SKF AB has the right to charge for expenses that are not related to disposal and recycling.

10 STORAGE

The products must be stored as follows:

- The storage space must be dry, dust-free and well ventilated
- The maximum storage time is 24 months
- The storage temperature must be 10–40°C
- Avoid exposure to direct sunlight and thermal radiation
- Store the products clear of the ground or floor
- Protect the products from mechanical shocks, corrosion and dust

11 SPARE PARTS

11.1 Seal kits

See SGA-01 doser seal kit (drawing 460670).

See SGA-1 doser seal kit (drawing 460671).

See SGA-2 doser seal kit (drawing 460672).

See LG-3-4-5 doser seal kit (drawing 360502).

11.2 Repair kits

See SGA-01-ZN doser repair kit (drawing 460508).

See SGA-01-SS doser repair kit (drawing 460509).

See SGA-1-ZN doser repair kit (drawing 460510).

See SGA-1-SS doser repair kit (drawing 460511).

See SGA-2-ZN doser repair kit (drawing 460512).

See SGA-2-SS doser repair kit (drawing 460513).

See SGA-3-4-5-ZN-SS doser repair kit (drawing 360739).

11.3 Other spare parts and dimensional drawings

See SGA and SG doser group spare parts (drawing 461505).

See WI dosers SGA-011, SGA-012, SGA-11 & SGA-12 dimensions and spare parts (drawing 361261)

See WI dosers SGA-2 dimensions and spare parts (drawing 361344)

See NI dosers SGA-011, SGA-012, SGA-11 & SGA-12 dimensions and spare parts (drawing 361463)

See WI dosers SGA-2 dimensions and spare parts (drawing 361462)

12 CONTACT INFORMATION

Oy SKF Ab

P.O. Box 80

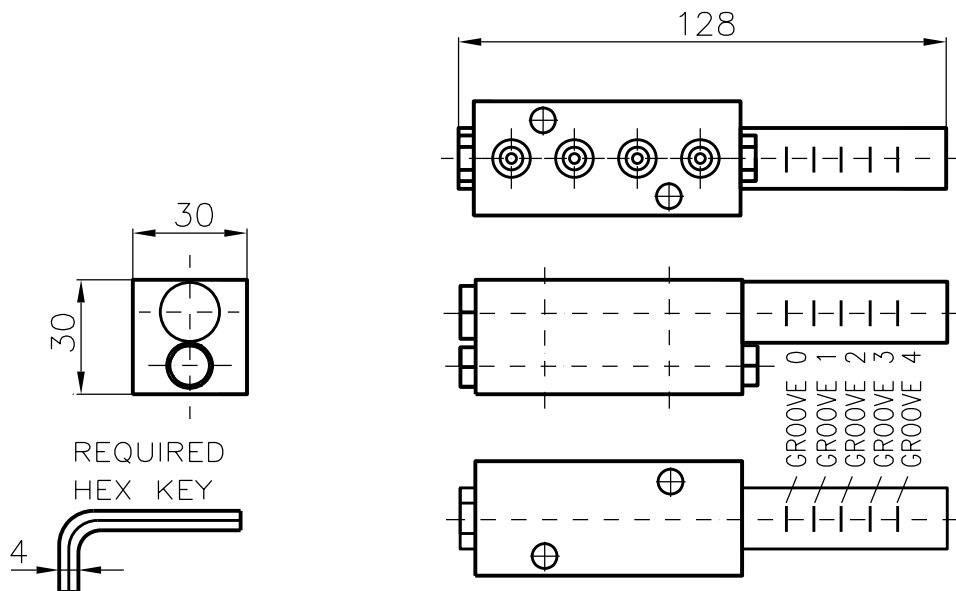
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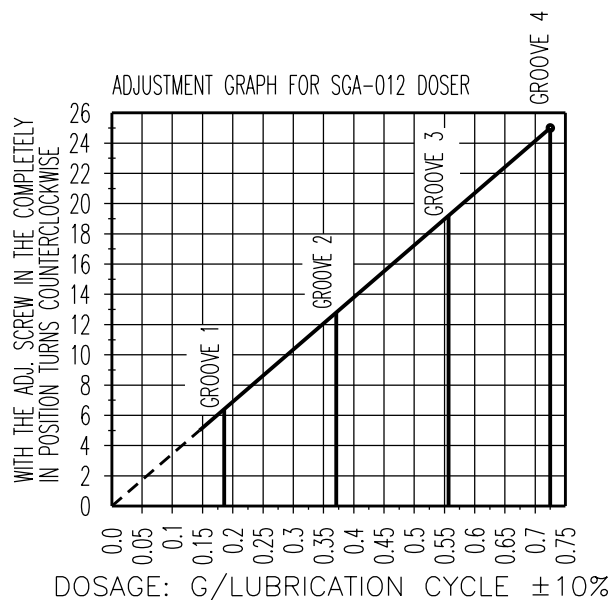
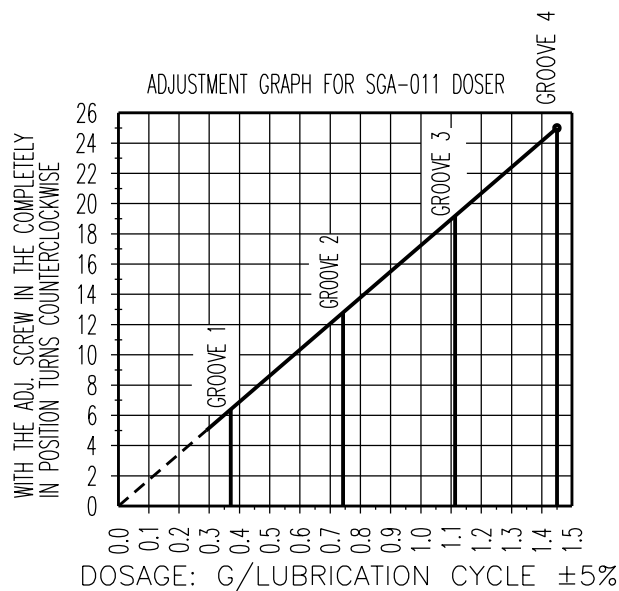
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CODE	TYPE	DESCRIPTION	DOSAGE RANGE
12387460	SGA-011-ZN	ONE LUBE POINT DOSER ZN	0.30-1.45 G/CYCLE
12387510	SGA-012-ZN	TWO LUBE POINT DOSER ZN	0.15-0.70 G/CYCLE
12386560	SGA-011-SS	ONE LUBE POINT DOSER SS 316	0.30-1.45 G/CYCLE
12386610	SGA-012-SS	TWO LUBE POINT DOSER SS 316	0.15-0.70 G/CYCLE
12388800	SGA-01-KIT1	SAFE-R SEAL KIT	
12388840	SGA-01-ZN-KIT2	REPAIR KIT FOR ZN DOSERS	
12388850	SGA-01-SS-KIT2	REPAIR KIT FOR SS 316 DOSERS	

DOSERS INCLUDE ALL NECESSARY FASTENING SCREWS AND PLUGS

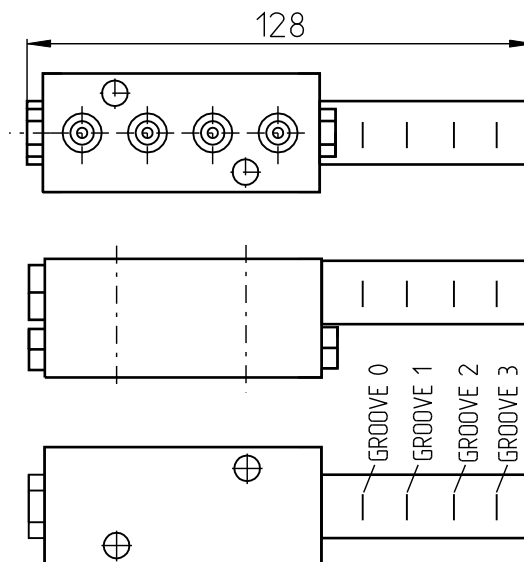


GREASE DENSITY 0.88g/cm³

ITEM	DESCRIPTION			DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART		QTY		
		MATERIAL DESCRIPTION				(WEIGHT KG)					
		SPECIFICATION OF PART									
DESIGNED		DRAWN	LeL	CHECKED	HeH		SGA-011-ZN,SGA-012-ZN		PREVIOUS DRG	FUTURE DRG	
 Oy SKF Ab MUURAME FINLAND						SGA-011-SS,SGA-012-SS		DATE	3.2.1998	SHEET/SHEETS	1/1
						DOSER		SCALE	DRAWING NUMBER		

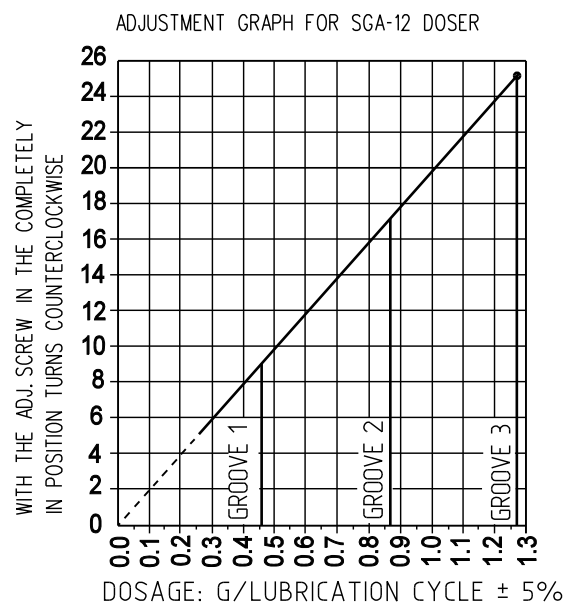
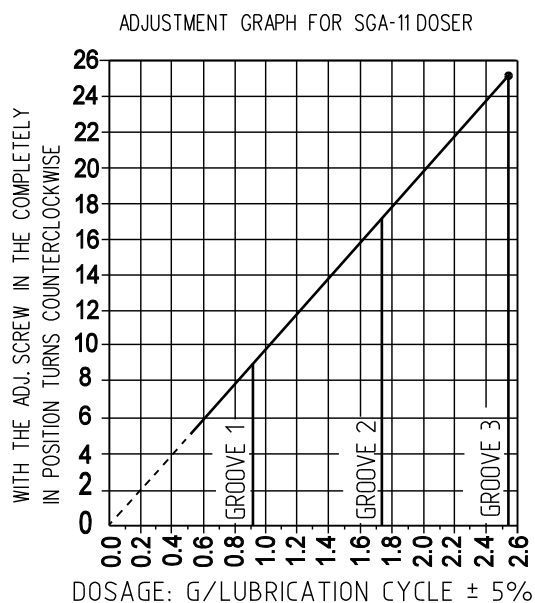
SKF

Oy SKF Ab
MUURAME
FINLAND



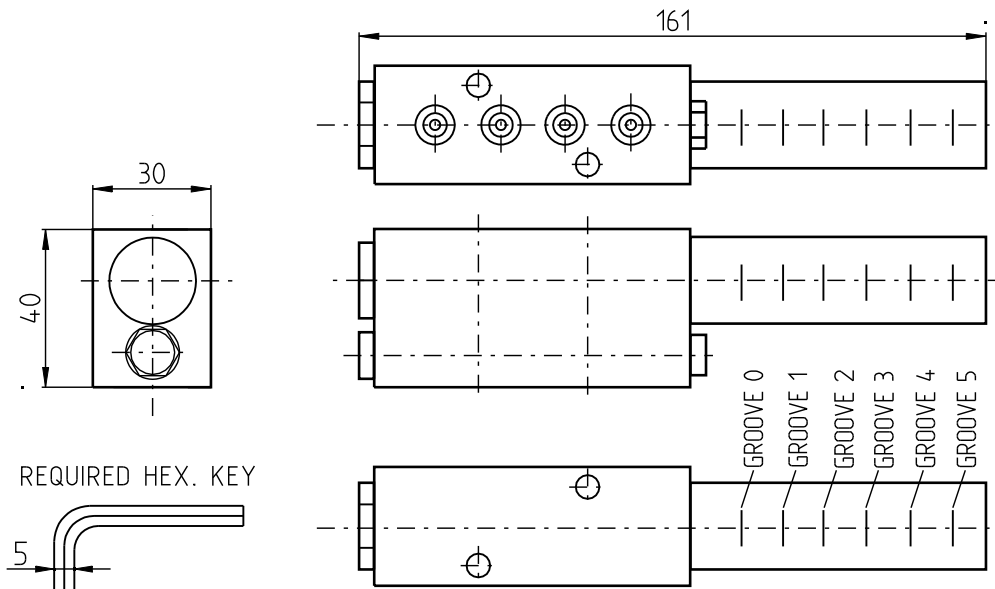
CODE	TYPE	DESCRIPTION	DOSAGE RANGE
12387560	SGA-11-ZN	ONE LUBE POINT DOSER ZN	0.50-2.55g/ CYCLE
12387610	SGA-12-ZN	TWO LUBE POINT DOSER ZN	0.25-1.25g/ CYCLE
12386660	SGA-11-SS	ONE LUBE POINT DOSER SS 316	0.50-2.55g/ CYCLE
12386710	SGA-12-SS	TWO LUBE POINT DOSER SS 316	0.25-1.25g/ CYCLE
12388810	SGA-1-KIT1	SAFE-R SEAL KIT	
12388860	SGA-1-ZN-KIT2	REPAIR KIT FOR ZN DOSERS	
12388870	SGA-1-SS-KIT2	REPAIR KIT FOR SS 316 DOSERS	

DOSERS INCLUDE ALL NECESSARY FASTENING SCREWS AND PLUGS



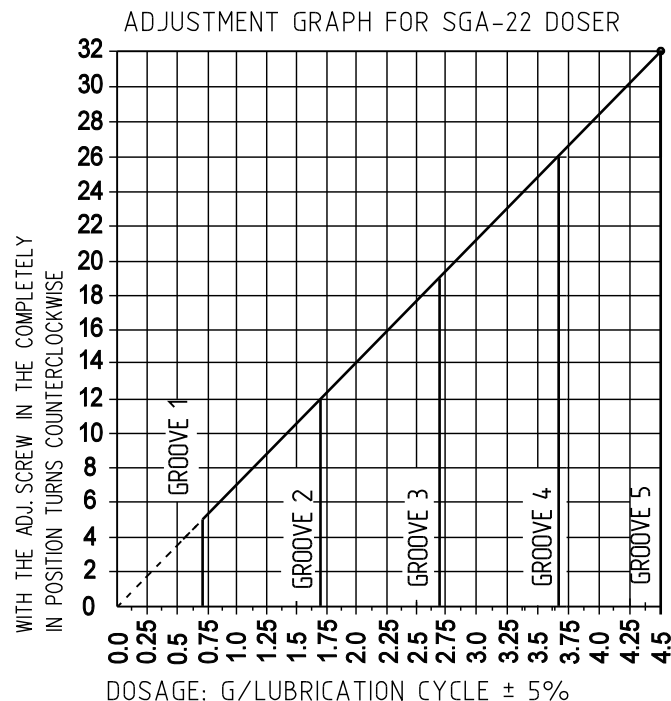
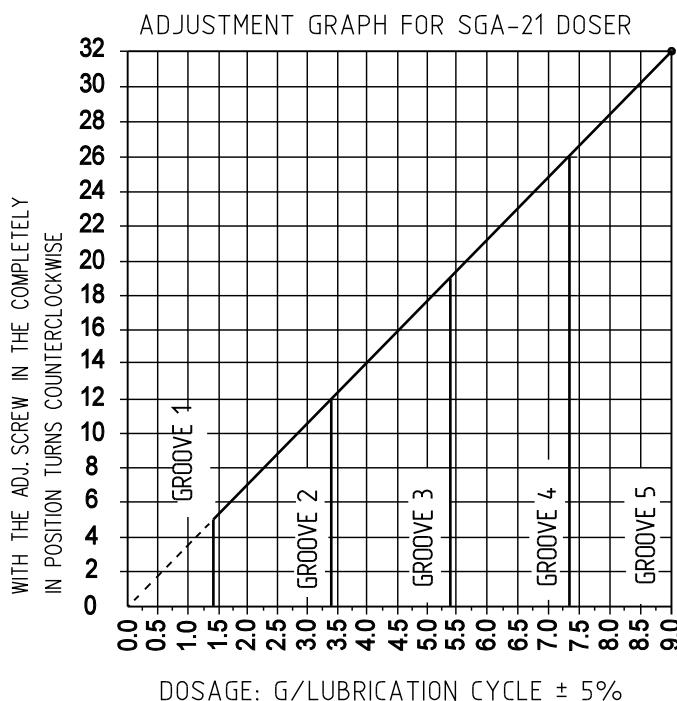
GREASE DENSITY 0.88g/cm³

ITEM	DESCRIPTION		DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY	
				MATERIAL DESCRIPTION (WEIGHT KG)				
			SPECIFICATION OF PART					
DESIGNED	DRAWN	LeL	SGA-11-ZN, SGA-12-ZN SGA-11-SS, SGA-12-SS DOSER		PREVIOUS DRG		FUTURE DRG	
 Oy SKF Ab MUURAME FINLAND					DATE 3.2.1998		SHEET/SHEETS	
					SCALE		DRAWING NUMBER	
					460122 A			

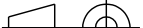
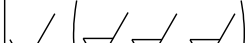


CODE	TYPE	DESCRIPTION	DOSAGE RANGE
12387660	SGA-21-ZN	ONE LUBE POINT DOSER ZN	1.5–8.75 g/ CYCLE
12387710	SGA-22-ZN	TWO LUBE POINT DOSER ZN	0.7–4.35g/ CYCLE
12386760	SGA-21-SS	ONE LUBE POINT DOSER SS 316	1.5–8.75 g/ CYCLE
12386810	SGA-22-SS	TWO LUBE POINT DOSER SS 316	0.7–4.35 g/ CYCLE
12388820	SGA-2-KIT1	SAFE-R SEAL KIT	
12388880	SGA-2-ZN-KIT2	REPAIR KIT FOR ZN DOSERS	
12388890	SGA-2-SS-KIT2	REPAIR KIT FOR SS 316 DOSERS	

DOSERS INCLUDE ALL NECESSARY FASTENING SCREWS AND PLUGS

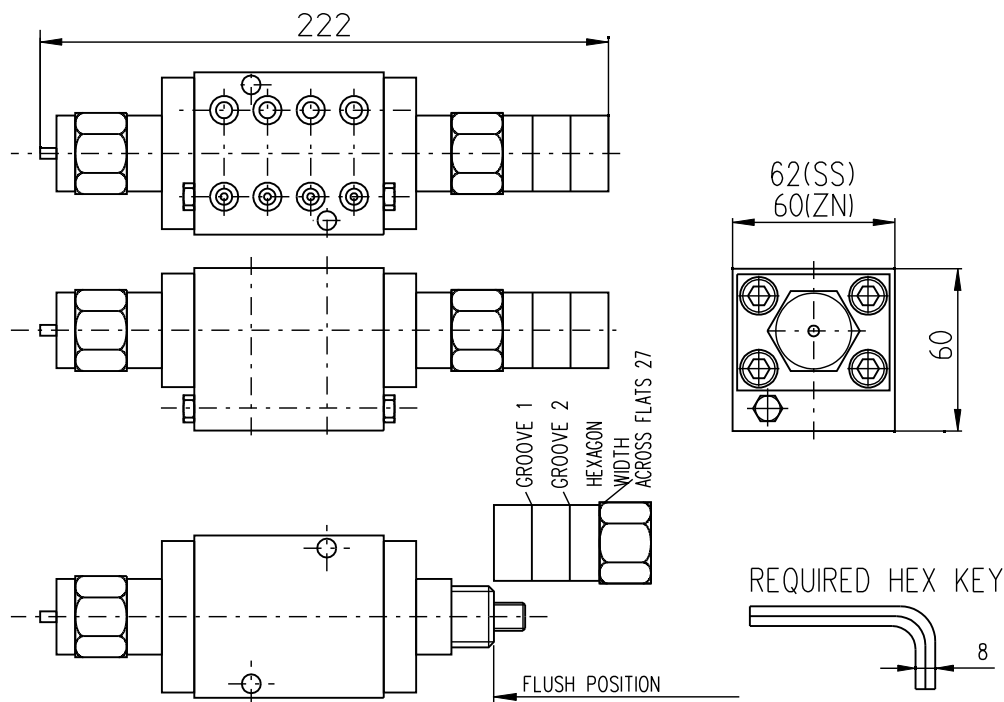


GREASE DENSITY 0.88g/cm³

ITEM	DESCRIPTION			DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY	
					MATERIAL DESCRIPTION				(WEIGHT KG)
				SPECIFICATION OF PART					
DESIGNED		DRAWN		SGA-21-ZN,SGA-22-ZN SGA-21-SS,SGA-22-SS DOSER		PREVIOUS DRG		FUTURE DRG	
		Oy SKF Ab MUURAME FINLAND				DATE		SHEET/SHEETS	
						SCALE		DRAWING NUMBER	
						4.2.1998		460123 C	

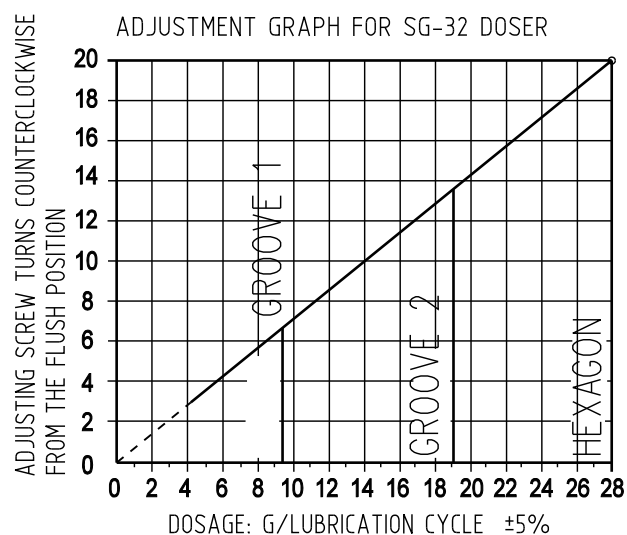
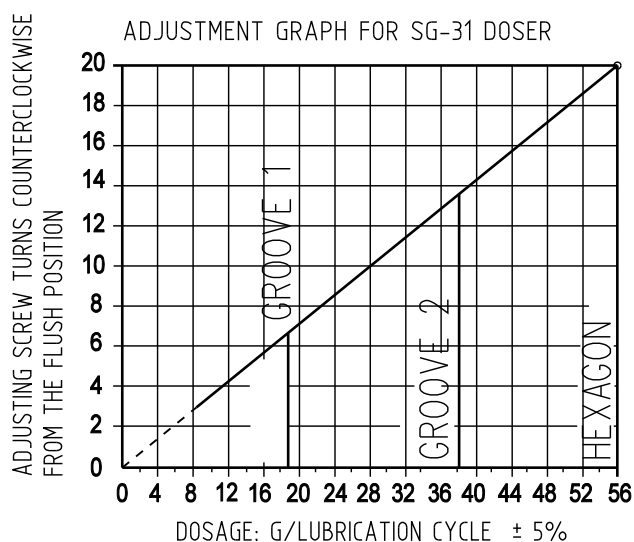
SKF

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MUURAME
FINLAND

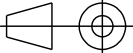


CODE	TYPE	DESCRIPTION	DOSAGE RANGE
12388110	SG-31-ZN	ONE LUBE POINT DOSER ZN	8.5-56g/CYCLE
12388160	SG-32-ZN	TWO LUBE POINT DOSER ZN	4.3-28g/CYCLE
12387160	SG-31-SS	ONE LUBE POINT DOSER SS 316	8.5-56g/CYCLE
12387210	SG-32-SS	TWO LUBE POINT DOSER SS 316	4.3-28g/CYCLE
12388830	SG-3-4-5-KIT1	SAFE-R SEAL KIT	

DOSING MODULES INCLUDE ALL NECESSARY FASTENING SCREWS AND PLUGS

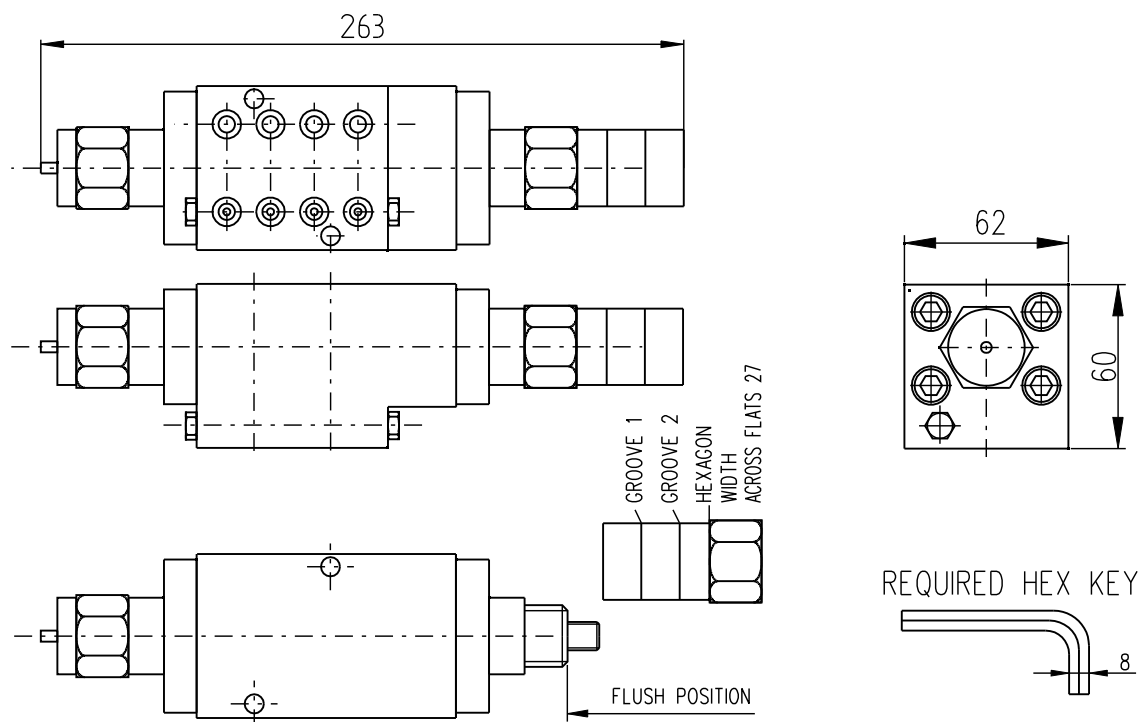


GREASE DENSITY 0.88 g/cm³

ITEM	DESCRIPTION			DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY
							MATERIAL DESCRIPTION (WEIGHT KG)	
				SPECIFICATION OF PART				
DESIGNED	DRAWN	MKU	SG-31-ZN,SG-32-ZN SG-31-SS,SG-32-SS DOSER			PREVIOUS DRG	FUTURE DRG	
 Oy SKF Ab MUURAME FINLAND						DATE 17.9.1992	SHEET/SHEETS	
						SCALE	DRAWING NUMBER 460124 B	

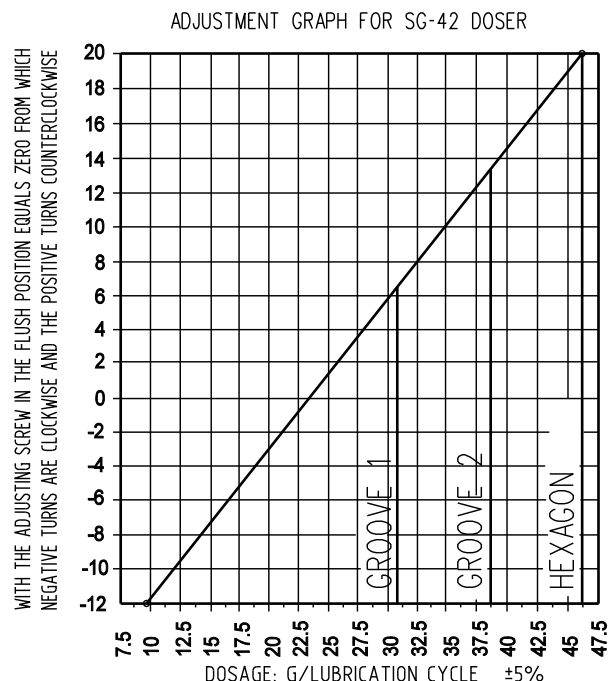
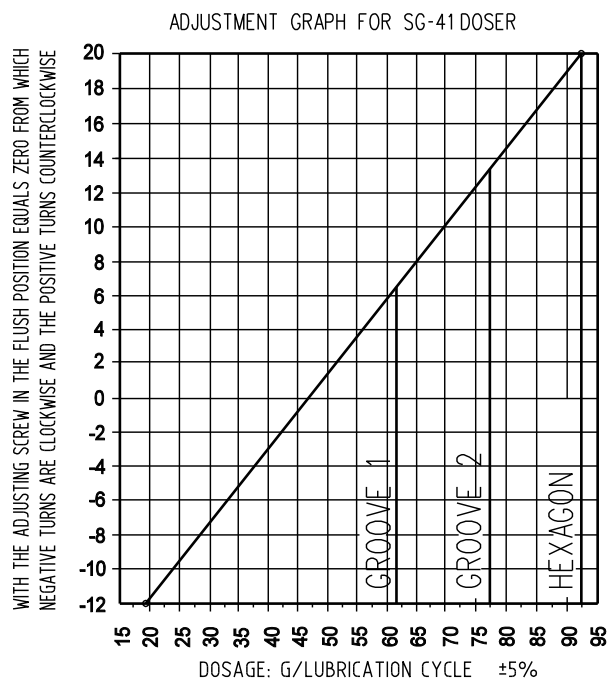
SKF

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MUURAME
FINLAND

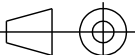


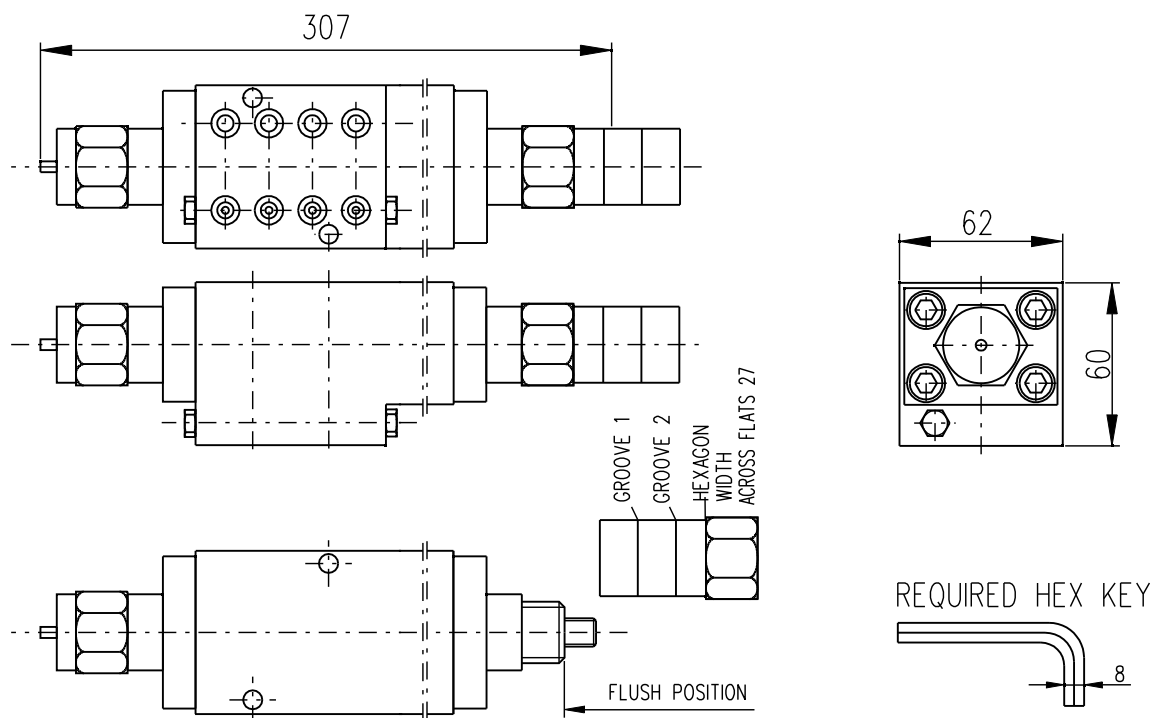
CODE	TYPE	DESCRIPTION	DOSAGE RANGE
12387260	SG-41-SS	ONE LUBE POINT DOSER SS-316	19.3-92 g/CYCLE
12387310	SG-42-SS	TWO LUBE POINT DOSER SS-316	9.65-46 g/CYCLE
12388830	SG-3-4-5-KIT1	SAFE-R SEAL KIT	

DOSING MODULES INCLUDE ALL NECESSARY FASTENING SCREWS AND PLUGS



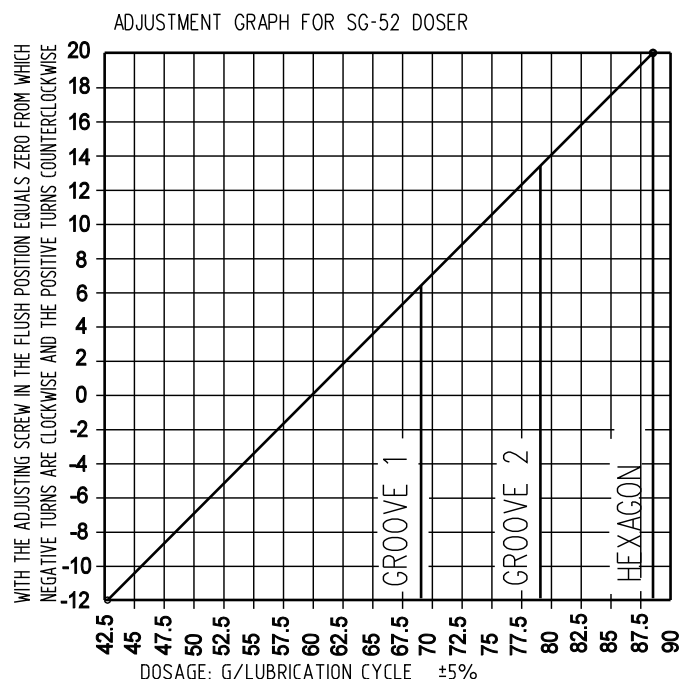
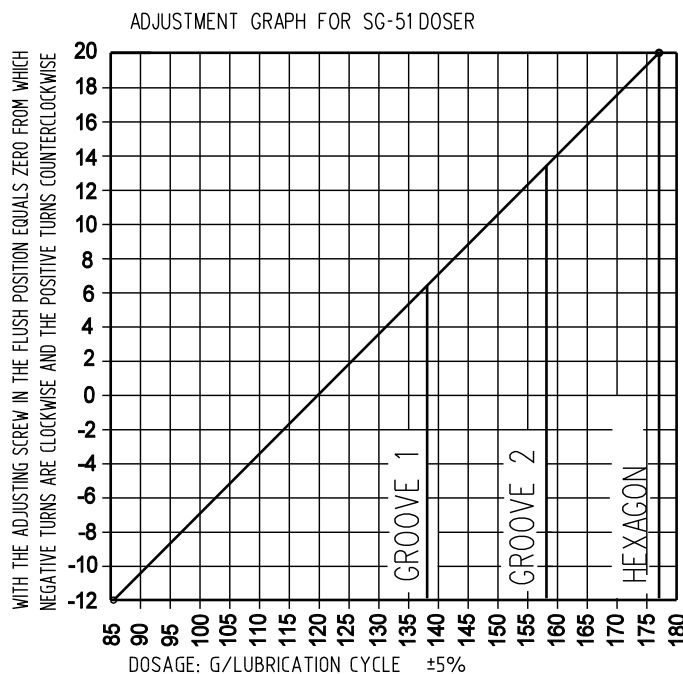
GREASE DENSITY 0.88 g/cm³

ITEM	DESCRIPTION			DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY	
			 (  )		MATERIAL DESCRIPTION				(WEIGHT KG)
				SPECIFICATION OF PART					
DESIGNED		DRAWN		SG-41-SS,SG-42-SS DOSER		PREVIOUS DRG		FUTURE DRG	
		MKU				DATE		SHEET/SHEETS	
		Oy SKF Ab MUURAME FINLAND				SCALE		DRAWING NUMBER	
								460126 A	



CODE	TYPE	DESCRIPTION	DOSAGE RANGE
12387360	SG-51-SS	ONE LUBE POINT DOSER SS-316	86.3-177g /CYCLE
12387410	SG-52-SS	TWO LUBE POINT DOSER SS-316	43.1-88.4 g/CYCLE
12388830	SG-3-4-5-KIT1	SAFE-R SEAL KIT	

DOSERS INCLUDE ALL NECESSARY FASTENING SCREWS AND PLUGS

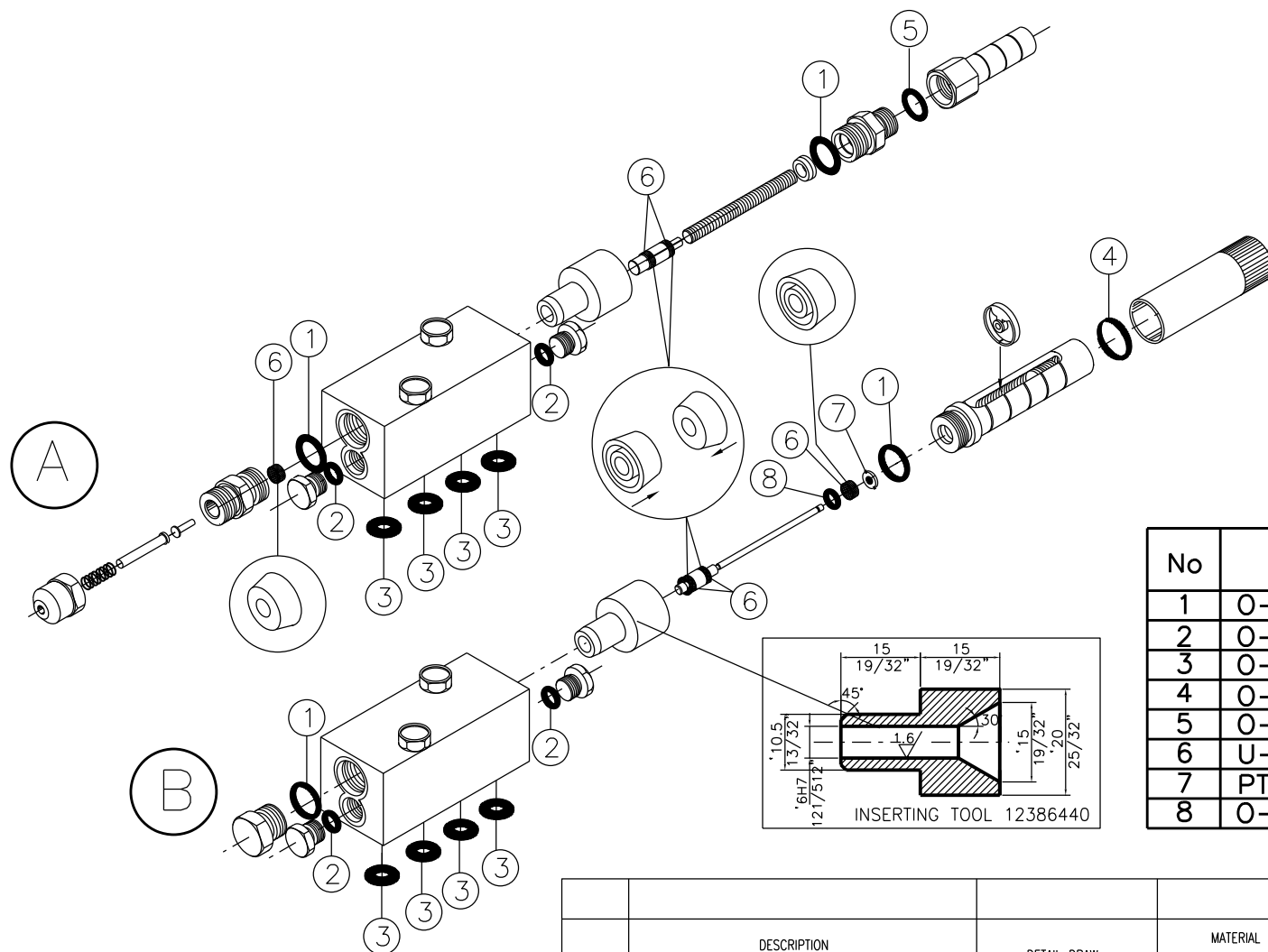


GREASE DENSITY 0.88 g/cm³

ITEM	DESCRIPTION			DETAIL DRAW		MATERIAL	DIM,PATT	CODE / QTY / PART	QTY	
		MATERIAL DESCRIPTION					(WEIGHT KG)			
		SPECIFICATION OF PART								
DESIGNED		DRAWN MKU		SG-51-SS, SG-52-SS DOSER			PREVIOUS DRG		FUTURE DRG	
 Oy SKF Ab MUURAME FINLAND							DATE 9.12.2004		SHEET/SHEETS	
				SCALE		DRAWING NUMBER 460128 B				

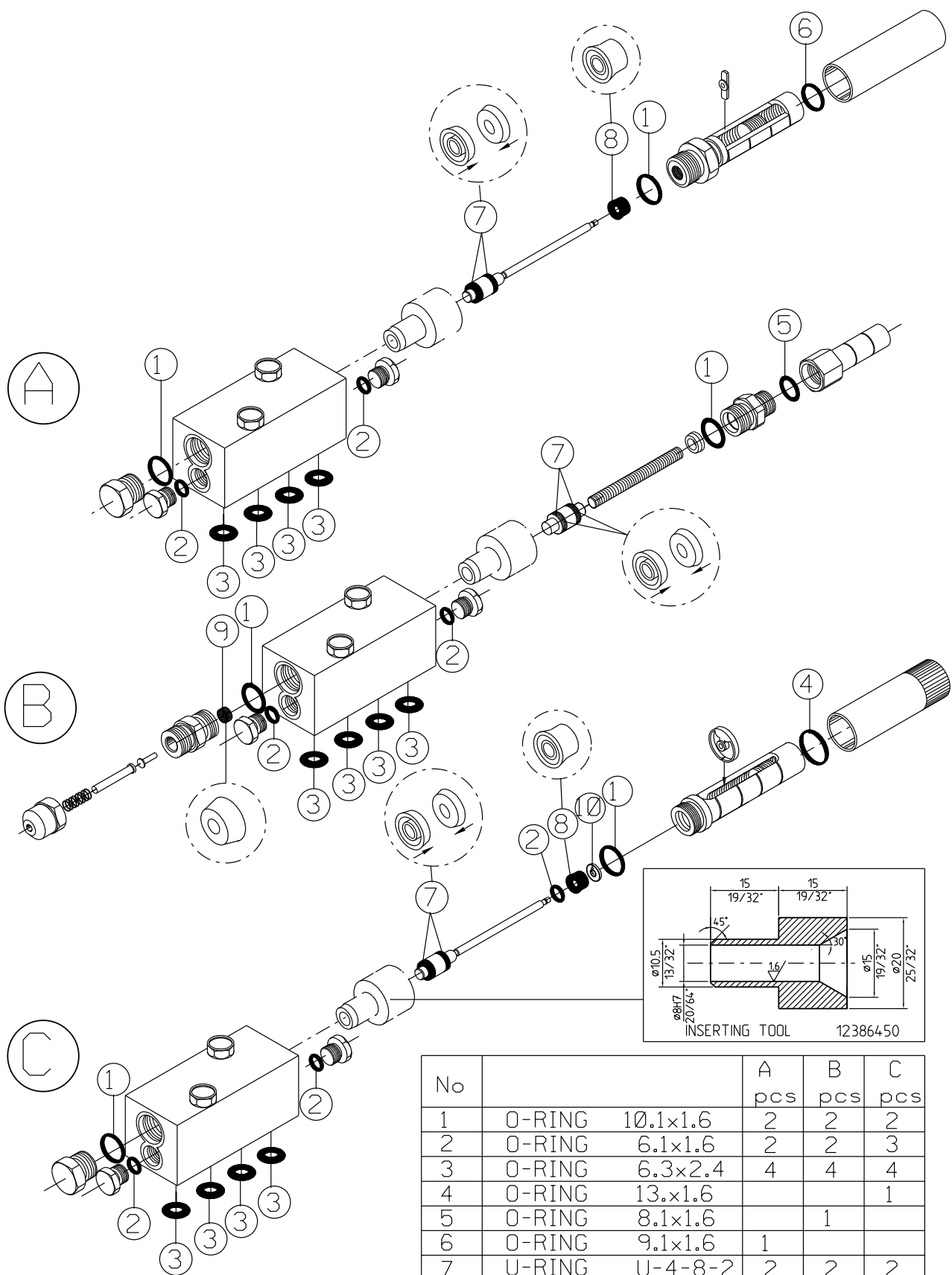
SKF

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MUURAME
FINLAND



No		A pcs	B pcs
1	O-RING 10.1 x 1.6	2	2
2	O-RING 6.1 x 1.6	2	2
3	O-RING 6.3 x 2.4	4	4
4	O-RING 13.1 x 1.6		1
5	O-RING 8.1 x 1.6	1	
6	U-RING U-2-6-2.5	3	3
7	PTFE-RING		1
8	O-RING 5.1 x 1.6		1

ITEM		DESCRIPTION	DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY
				MATERIAL DESCRIPTION (WEIGHT KG)			
			SPECIFICATION OF PART				
DESIGNED	DRAWN	LeL	SGA-01-KIT1		PREVIOUS DRG		FUTURE DRG
SKF Oy SKF Ab MUURAME FINLAND			12388800		DATE 21.10.2004		SHEET/SHEETS
					SCALE 1:2.5		DRAWING NUMBER 460670 E



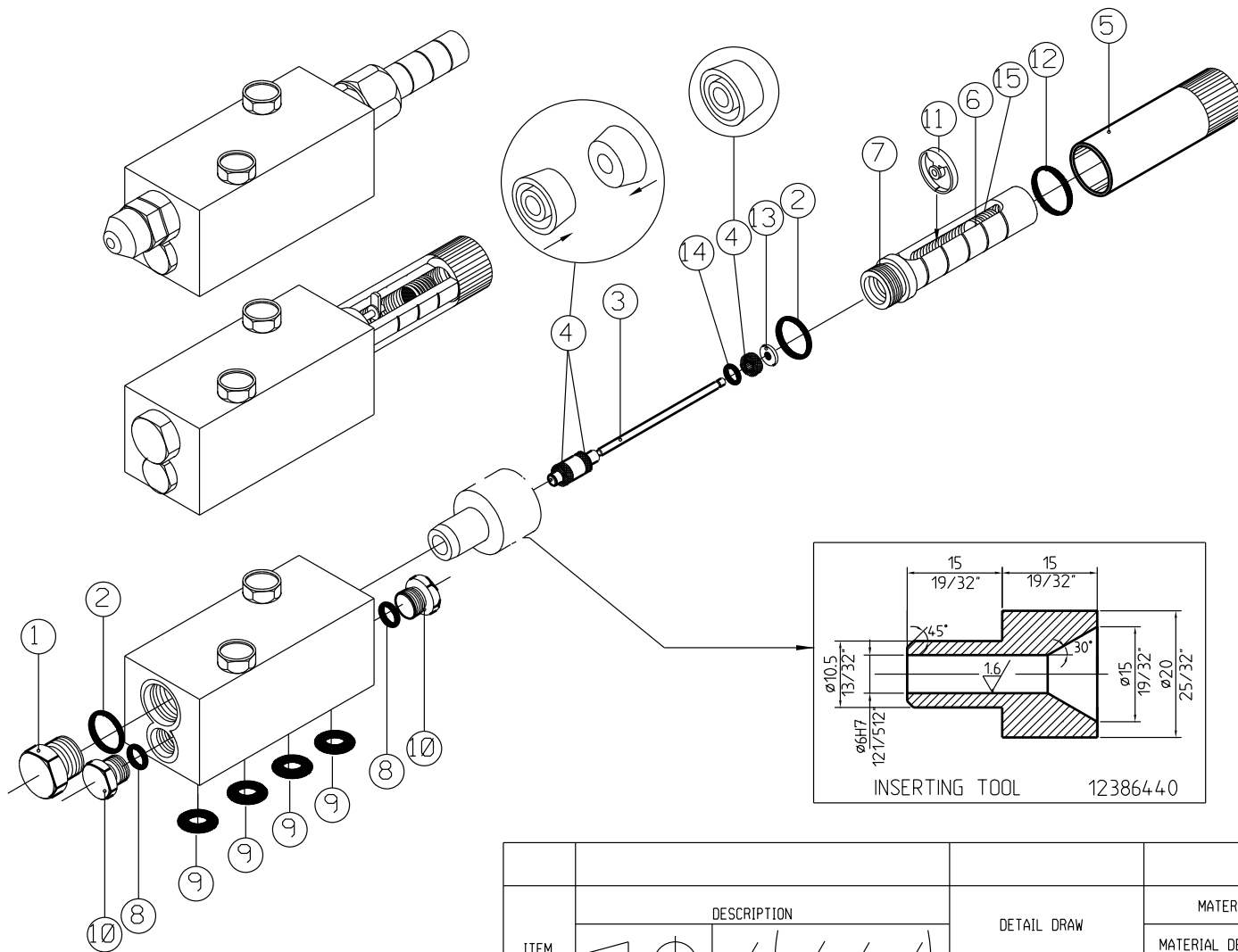
No			A pcs	B pcs	C pcs
1	O-RING	10.1×1.6	2	2	2
2	O-RING	6.1×1.6	2	2	3
3	O-RING	6.3×2.4	4	4	4
4	O-RING	13.×1.6			1
5	O-RING	8.1×1.6		1	
6	O-RING	9.1×1.6	1		
7	U-RING	U-4-8-2	2	2	2
8	U-RING	U-3-7-5	1		1
9	U-RING	U-2-6-2.5		1	
10	PTFE-RING				1

DESIGNED	DRAWN	LeL	SGA-1-KIT1	PREVIOUS DRG	FUTURE DRG
ITEM	DESCRIPTION	DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART
	✓ (✓✓✓✓)		MATERIAL DESCRIPTION		(WEIGHT KG)
		SPECIFICATION OF PART			QTY
DATE	19.10.2004		SCALE	1:2.5	SHEET/SHEETS
			DRAWING NUMBER		460671 E

SKF

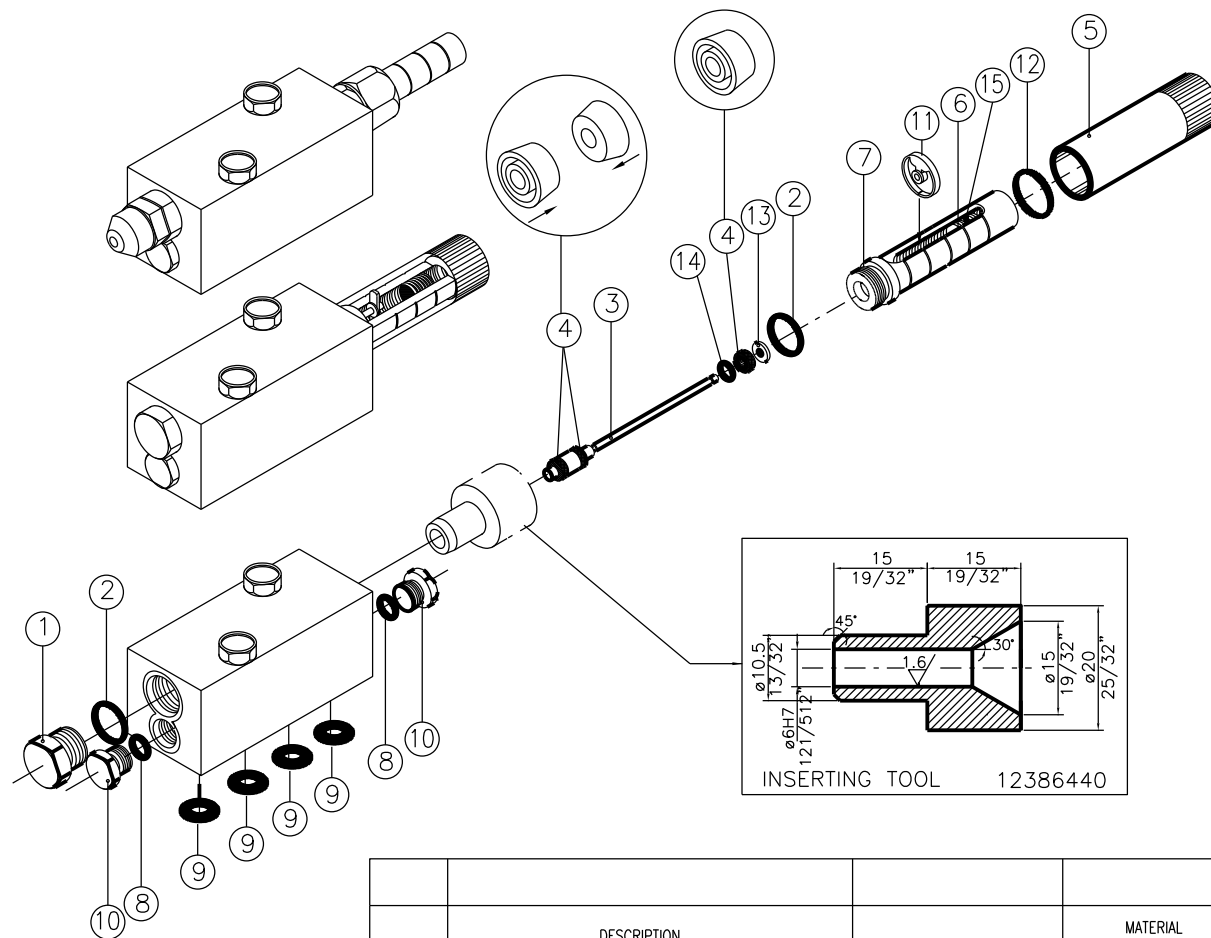
Oy SKF Ab
MUURAME
FINLAND

12388810

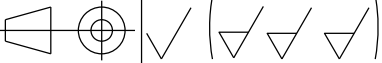


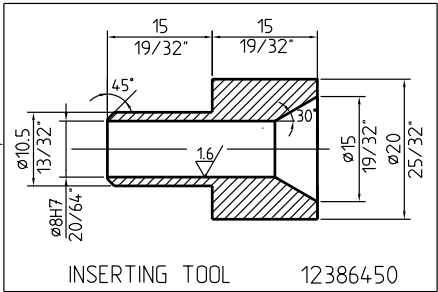
1	PLUG SGA-1-ZN-M12x1,25
2	O-RING 10.1x1.6
3	PISTON ASSEMBLY SGA-01
4	U-RING U-2-6-2.5
5	CAP SGA-01,SGA-1
6	SET SCREW M8 M _s
7	INDIC.BODY SGA-01-S
8	O-RING 6.1x1.6 (PART 10)
9	O-RING 6.3x2.4
10	PLUG SGA-1-ZN-M8
11	INDICATOR RING-01
12	O-RING 13.1x1.6
13	BACK-UP RING SGA-01
14	O-RING 5.1x1.6
15	LOCK STRING Ø2,4-10

ITEM	DESCRIPTION			DETAIL DRAW		MATERIAL	DIM,PATT	CODE / QTY / PART	QTY	
						MATERIAL DESCRIPTION				(WEIGHT KG)
						SPECIFICATION OF PART				
DESIGNED		DRAWN LeL		SGA-01-ZN-KIT2			PREVIOUS DRG		FUTURE DRG	
 Oy SKF Ab MUURAME FINLAND							DATE 27.8.2004		SHEET/SHEETS	
				SCALE 1:2.5		DRAWING NUMBER 460508 H				
				12388840						

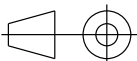


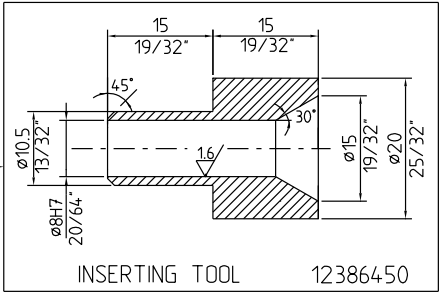
1	PLUG SGA-1-SS M12x1,25
2	O-RING 10.1x1.6
3	PISTON SGA-01 ASSEMBLY
4	U-RING U-2-6-2.5
5	CAP SGA-01,SGA-1
6	SET SCREW M8 Ms
7	INDIC.BODY SGA-01-S
8	O-RING 6.1x1.6 (PART 10)
9	O-RING 6.3x2.4
10	PLUG SGA-1-SS-M8
11	INDICATOR RING-01
12	O-RING 13.1x1.6
13	BACK-UP RING SGA-01
14	O-RING 5.1x1.6
15	LOCK STRING Ø2,4-10

ITEM	DESCRIPTION			DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY	
					MATERIAL DESCRIPTION (WEIGHT KG)				
				SPECIFICATION OF PART					
DESIGNED		DRAWN LeL		SGA-01-SS-KIT2		PREVIOUS DRG		FUTURE DRG	
 Oy SKF Ab MUURAME FINLAND						DATE 27.8.2004		SHEET/SHEETS	
						SCALE 1:2.5		DRAWING NUMBER 460509 H	
				12388850					

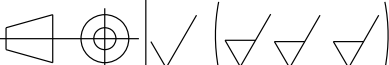


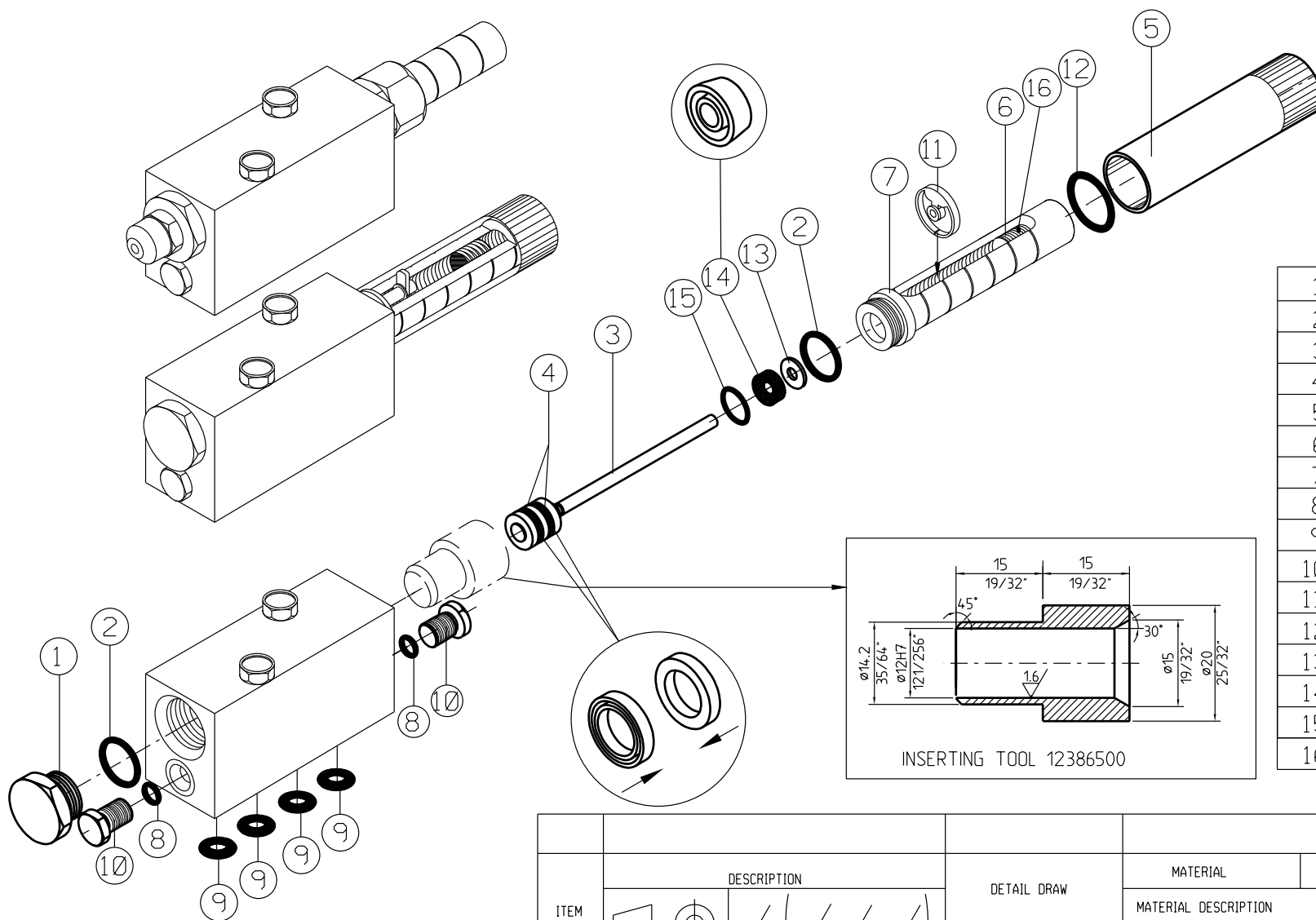
1	PLUG SGA-1-ZN-M12x1,25
2	O-RING 10.1x1.6
3	PISTON SGA-1 ASSEMBLY
4	U-RING U-4-8-2
5	CAP SGA-Ø1,SGA-1
6	SET SCREW M8 M _s
7	INDIC.BODY SGA-1-S
8	O-RING 6.1x1.6 (PART 10)
9	O-RING 6.3x2.4
10	PLUG SGA-1-ZN-M8
11	INDICATOR RING-1
12	O-RING 13.1x1.6
13	BACK-UP RING SGA-1
14	U-RING U-3-7-5
15	LOCK STRING Ø2,4-10

ITEM	DESCRIPTION			DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY	
	 				MATERIAL DESCRIPTION (WEIGHT KG)				
				SPECIFICATION OF PART					
DESIGNED	DRAWN	LeL	SGA-1-ZN-KIT2 12388860			PREVIOUS DRG		FUTURE DRG	
 Oy SKF Ab MUURAME FINLAND						DATE 19.10.2004		SHEET/SHEETS	
						SCALE 1:2.5	DRAWING NUMBER 460510 H		



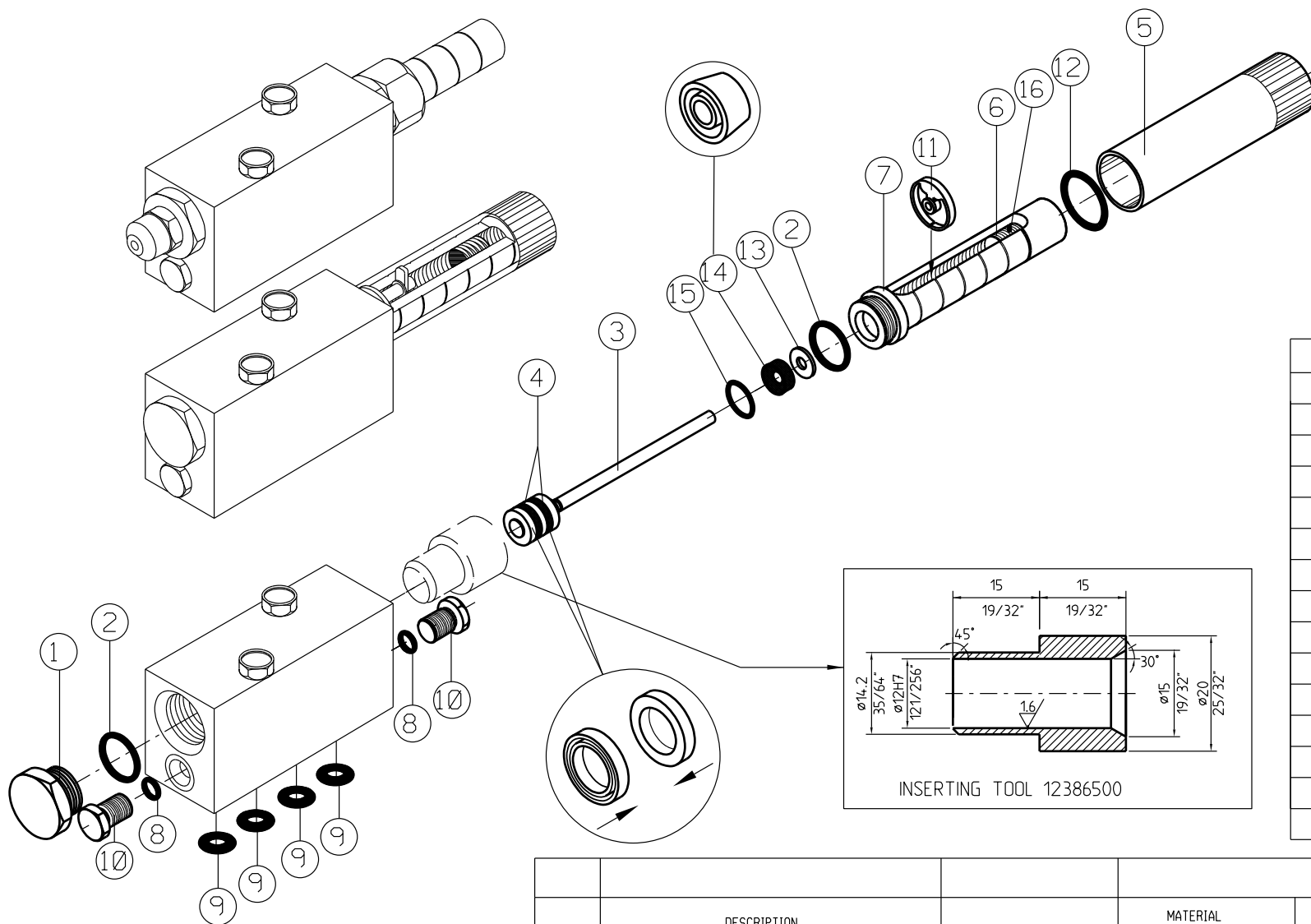
1	PLUG SGA-1-SS-M12x1,25
2	O-RING 10.1x1.6
3	PISTON SGA-1 ASSEMBLY
4	U-RING U-4-8-2
5	CAP SGA-Ø1,SGA-1
6	SET SCREW M8 M _s
7	INDIC.BODY SGA-1-S
8	O-RING 6.1x1.6 (PART 10)
9	O-RING 6.3x2.4
10	PLUG SGA-1-SS-M8
11	INDICATOR RING-1
12	O-RING 13.1x1.6
13	BACK-UP RING SGA-1
14	U-RING U-3-7-5
15	LOCK STRING Ø2,4-10

ITEM	DESCRIPTION		DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	
				MATERIAL DESCRIPTION		(WEIGHT KG)	
			SPECIFICATION OF PART				
DESIGNED		DRAWN LeL	SGA-1-SS-KIT2		PREVIOUS DRG		FUTURE DRG
 Oy SKF Ab MUURAME FINLAND			12388870		DATE 19.10.2004		SHEET/SHEETS
					SCALE 1:2.5		DRAWING NUMBER 460511 H

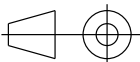


1	PLUG SGA-2-ZN-M16x1,5
2	O-RING 14.1x1.6
3	PISTON SGA-2 ASSEMBLY
4	U-RING U-8-12-2
5	CAP SGA-2
6	SET SCREW M10 M _s
7	INDIC.BODY SGA-2-S
8	O-RING 6.1x1.6
9	O-RING 6.3x2.4
10	PLUG SGA-2-ZN-M8
11	INDICATOR RING-2
12	O-RING 17.1x1.6
13	BACK-UP RING SGA-2
14	U-RING U-4-10-4
15	O-RING 9.1x1.6
16	LOCK STRING Ø2,4-10

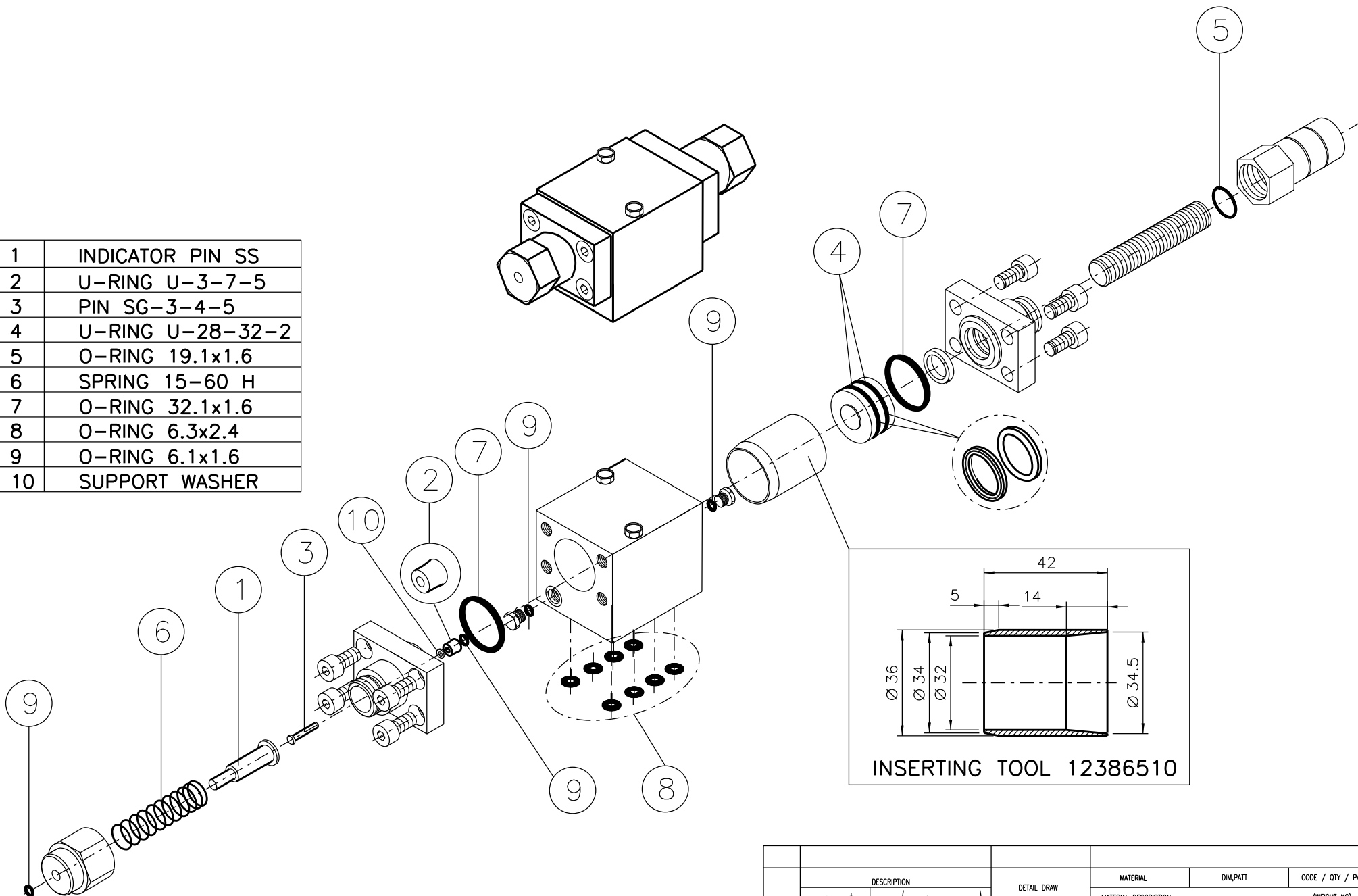
ITEM	DESCRIPTION		DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART		
				MATERIAL DESCRIPTION		(WEIGHT KG)		
			SPECIFICATION OF PART					QTY
DESIGNED		DRAWN	LeL		SGA-2-ZN-KIT2		PREVIOUS DRG	FUTURE DRG
 Oy SKF Ab MUURAME FINLAND				12388880		DATE 19.10.2004		SHEET/SHEETS
						SCALE 1:2.5		DRAWING NUMBER 460512 H

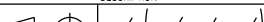


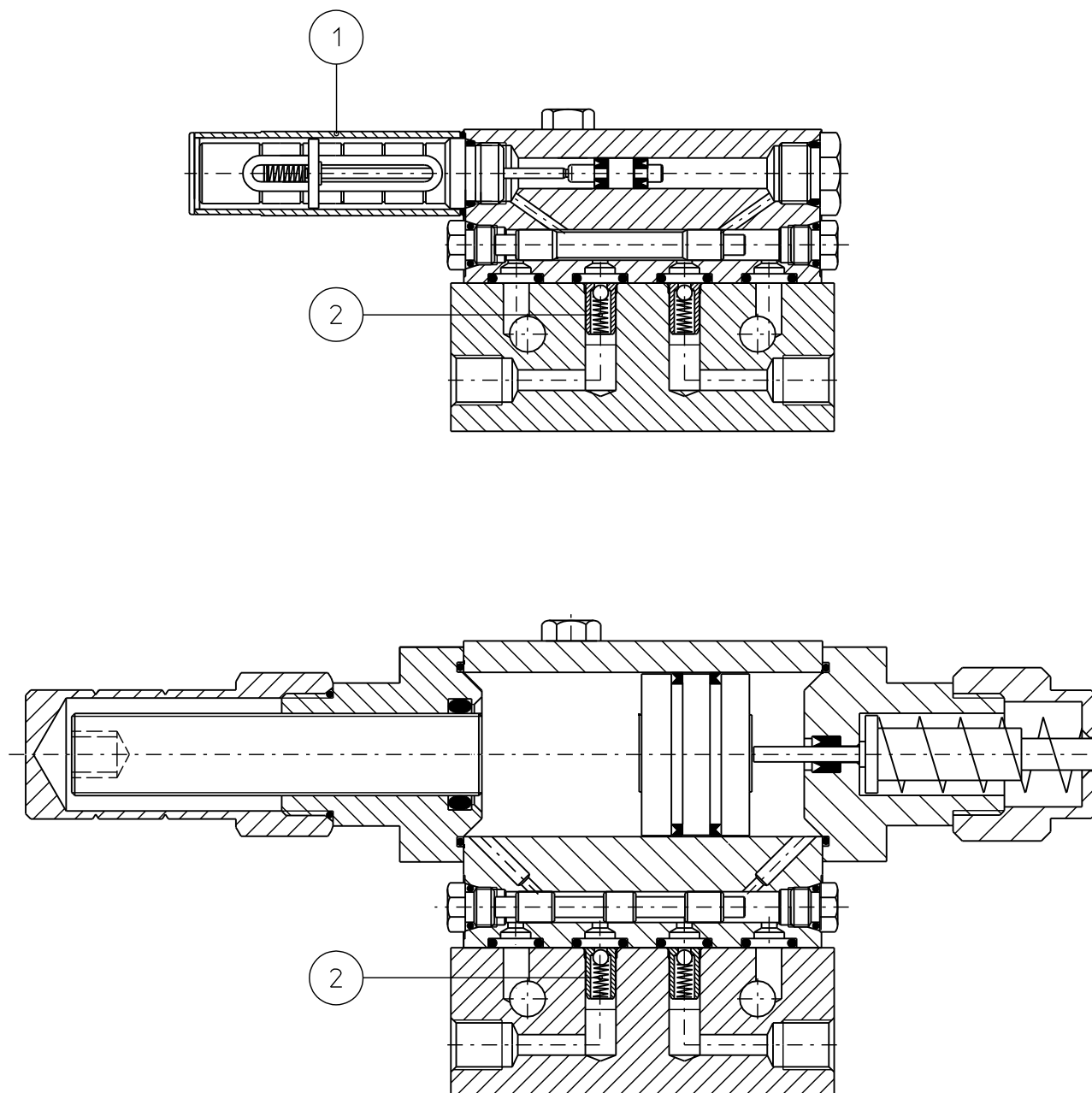
1	PLUG SGA-2-SS-M16x1,5
2	O-RING 14.1x1.6
3	PISTON SGA-2 ASSMBLY
4	U-RING U-8-12-2
5	CAP SGA-2
6	SET SCREW M10 Ms
7	INDIC.BODY SGA-2-S
8	O-RING 6.1x1.6
9	O-RING 6.3x2.4
10	PLUG SGA-2-SS-M8
11	INDICATOR RING-2
12	O-RING 17.1x1.6
13	BACK-UP RING SGA-2
14	U-RING U-4-10-4
15	O-RING 9.1x1.6
16	LOCK STRING Ø2,4-10

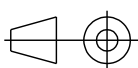
ITEM	DESCRIPTION		DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART
				(WEIGHT KG)		
				SPECIFICATION OF PART		
DESIGNED		DRAWN LeL	SGA-2-SS-KIT2		PREVIOUS DRG	FUTURE DRG
 Oy SKF Ab MUURAME FINLAND			12388890		DATE 23.3.2004	SHEET/SHEETS
					SCALE 1:2.5	DRAWING NUMBER 460513 H

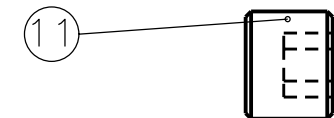
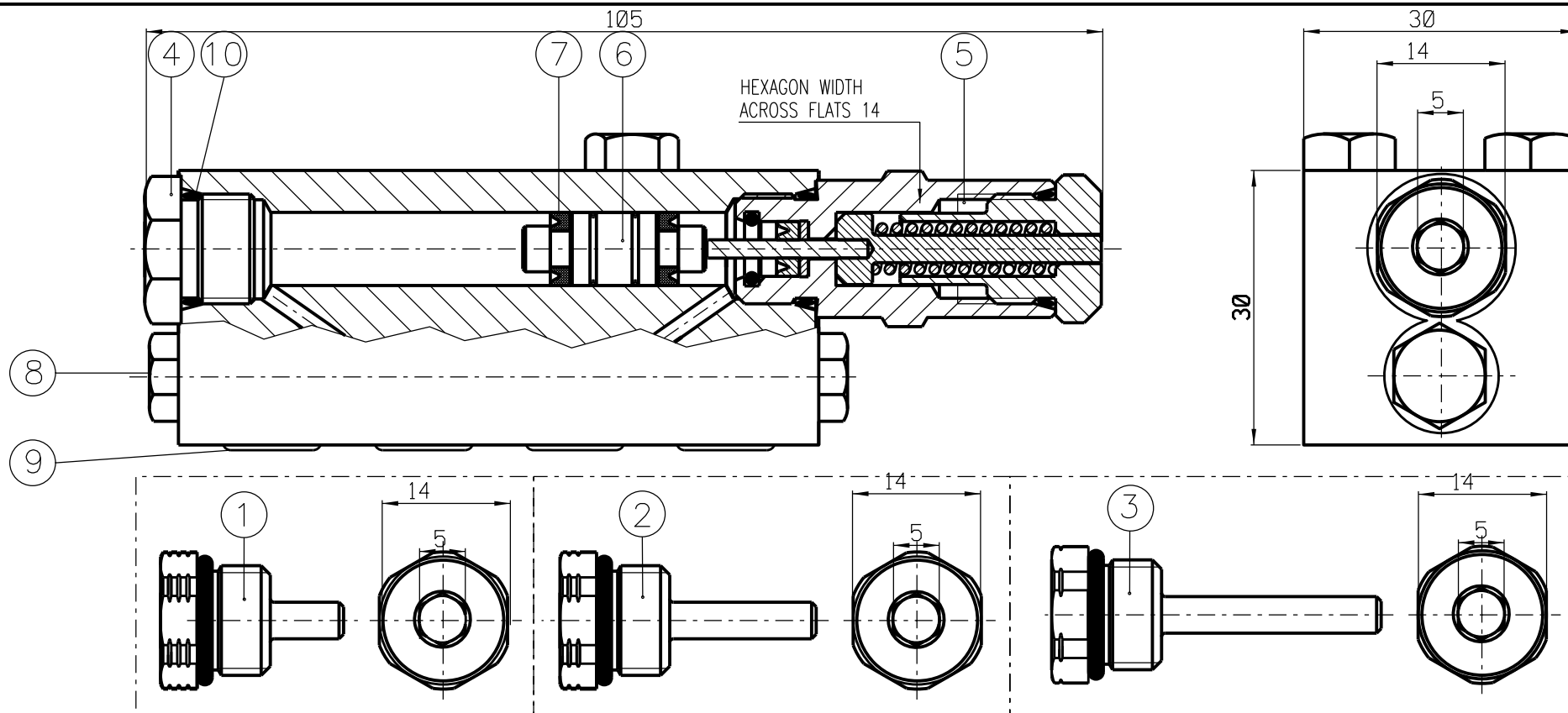
1	INDICATOR PIN SS
2	U-RING U-3-7-5
3	PIN SG-3-4-5
4	U-RING U-28-32-2
5	O-RING 19.1x1.6
6	SPRING 15-60 H
7	O-RING 32.1x1.6
8	O-RING 6.3x2.4
9	O-RING 6.1x1.6
10	SUPPORT WASHER



ITEM	DESCRIPTION			DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY
					MATERIAL DESCRIPTION (WEIGHT KG)			
				SPECIFICATION OF PART				
DESIGNED	DRAWN	LeL	SG-3-4-5-ZN-SS-KIT2			PREVIOUS DRG		FUTURE DRG
 Oy SKF Ab MUURAME FINLAND				12388895		DATE		SHEET/SHEETS
						8.11.2004		
						SCALE		DRAWING NUMBER
						~	360739	E



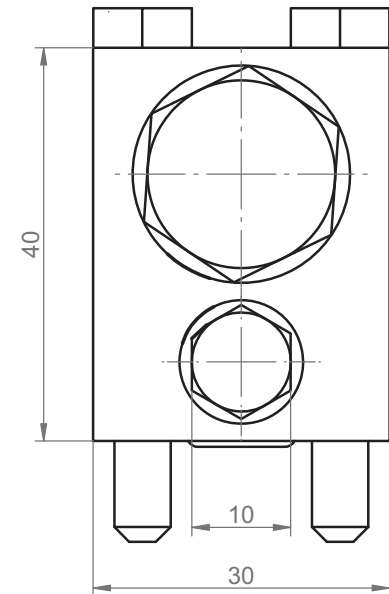
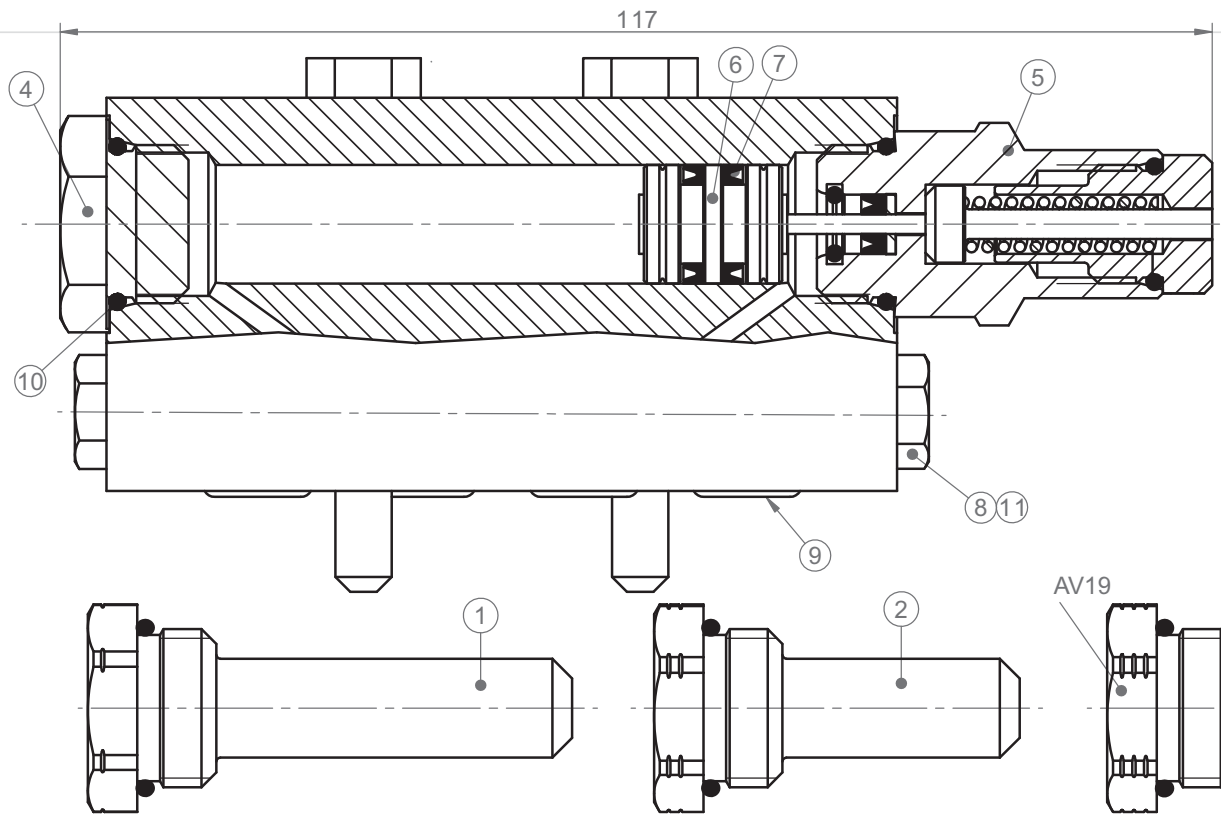
	REPAIRING KIT		460508, 460509, 460510, 460511, 460512, 460513, 360739						
	SEALING KIT			460670, 460671, 460672, 360502					
2	CHECK VALVE		460196				12383240	1	
1	SHIELD SGA-2		460044				12770650	1	
1	SHIELD SGA-01, SGA-1		460029				12770850	1	
ITEM	DESCRIPTION		DETAIL DRAW		MATERIAL	DIM,PATT	CODE / QTY / PART	QTY	
	 				MATERIAL DESCRIPTION		(WEIGHT KG)		
			SPECIFICATION OF PART						
DESIGNED		DRAWN	LeL			SGA, SG DOSERS		PREVIOUS DRG	FUTURE DRG
		Oy SKF Ab MUURAME FINLAND			SPARES		DATE		SHEET/SHEETS
							4.12.1998		
							SCALE	DRAWING NUMBER	
							461505		



GREASE DENSITY 0.88g/cm³

NO		DOSER DOS g/CYCLE ±5%			
		SGA-012-ZN-WI 12387520	SGA-011-ZN-WI 12387470	SGA-12-ZN-WI 12387620	SGA-11-ZN-WI 12387570
4	PLUG SGA-01/1	0.80	1.60	1.41	2.82
1	ADJUSTING PLUG-3 SGA	0.60	1.20	1.06	2.12
2	ADJUSTING PLUG-2 SGA	0.40	0.80	0.70	1.40
3	ADJUSTING PLUG-1 SGA	0.20	0.40	0.35	0.70

11	PLUG 1/8 ZN			12660380	1		
10	O-RING 10,1X1,6			12680150	5		
9	O-RING 6,3x2,4			12680400	4		
8	PLUG SGA-1-ZN-M8	460026		12407000	2		
7	U-RING U-2-6-2.585SH			12681365	2		
7	U-RING U-4-8-2 85SH			12681375	2		
6	PISTON SGA0-WI	462031		12403263	1		
6	PISTON SGA1-WI	461687		12403265	1		
5	INDICATOR SGA-WI	462033		12388170	1		
4	PLUG SGA-1-ZN-M12x1,25	460025		12406960	1		
3	ADJUSTING PLUG-1 SGA-0-1-WI	462034		12403325	1		
2	ADJUSTING PLUG-2 SGA-0-1-WI	462035		12403330	1		
1	ADJUSTING PLUG-3 SGA-0-1-WI	462036		12403335	1		
ITEM	DESCRIPTION 	DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY	
			MATERIAL DESCRIPTION (WEIGHT KG)				
		SPECIFICATION OF PART					
DESIGNED		DRAWN		PREVIOUS DRG		FUTURE DRG	
 Oy SKF Ab MUURAME FINLAND				DOSER SGA-ZN-WI DIMENSIONS, ADJUSTMENTS, SPARE PARTS 12388920			
				DATE 10.6.2005		SHEET/SHEETS	
				SCALE		DRAWING NUMBER	
				361261 F			

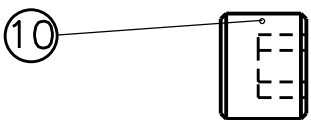
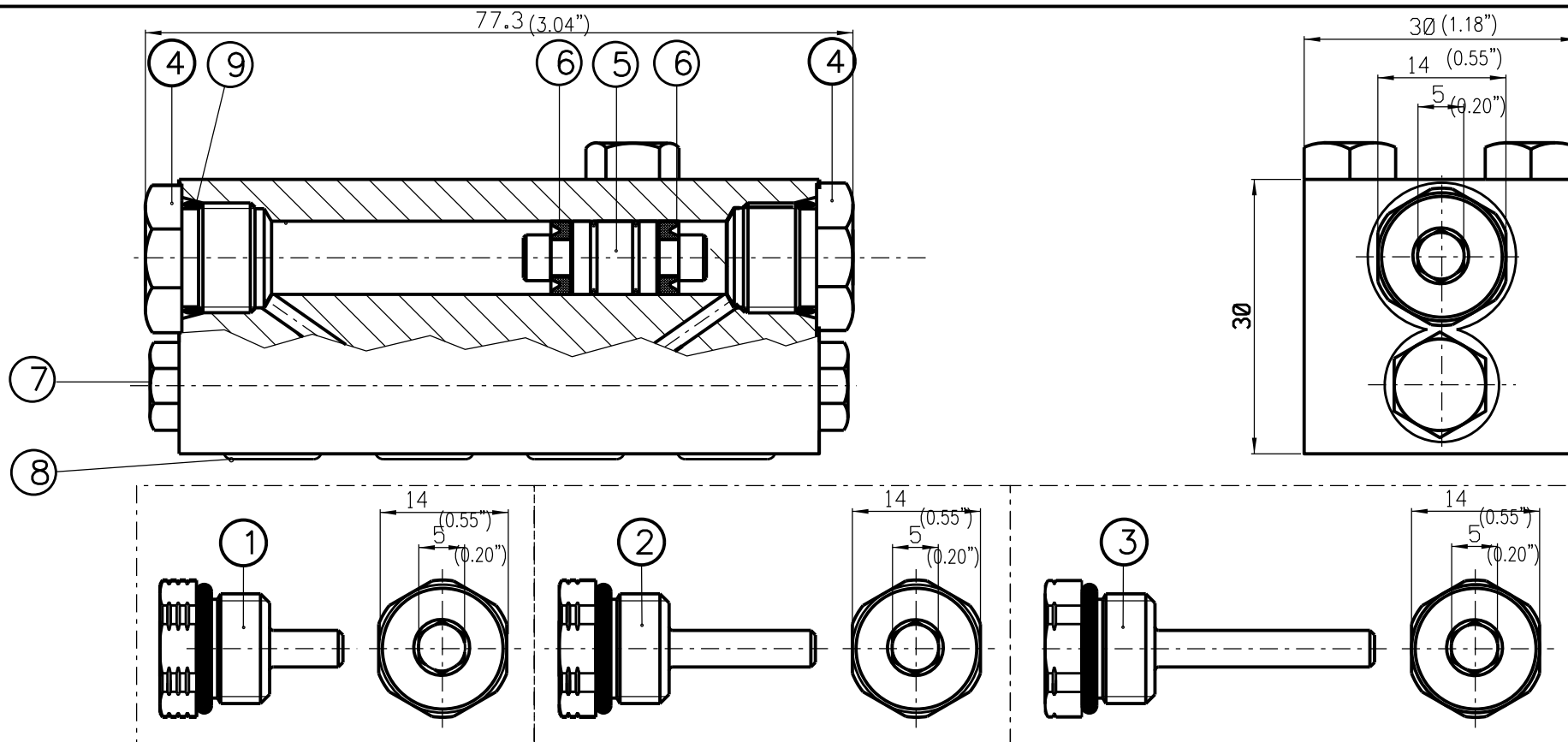


SGA-2-ZN-WI-KIT2 12388930

GREASE DENSITY 0.88g/cm³

DOSER DOS g/CYCLE ±5%		
NO	SGA-22-ZN-WI 12387720	SGA-21-ZN-WI 12387670
4	4,54	9,07
3	3,34	6,68
2	2,15	4,29
1	0,98	1,97

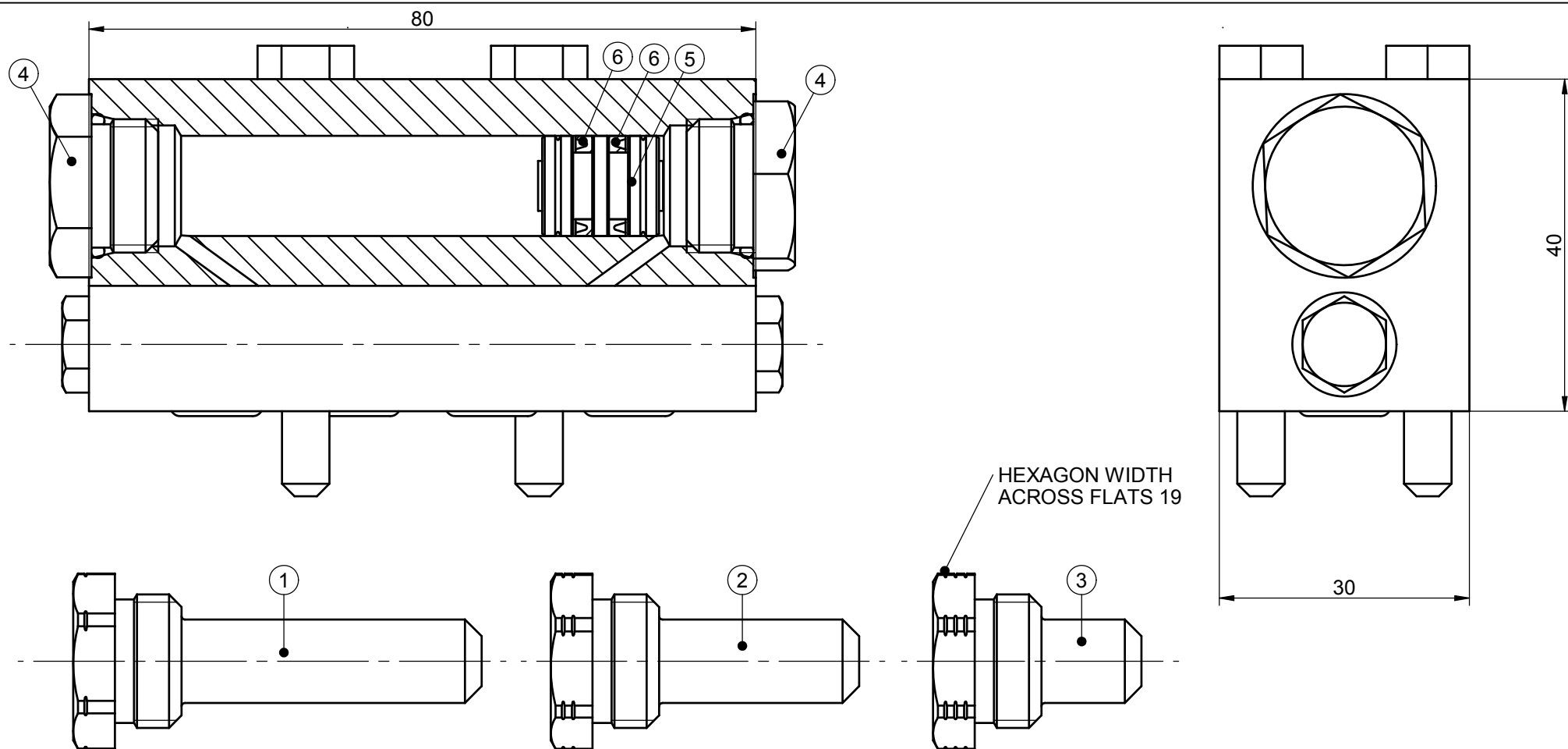
11	O-RING 6,1x1,6			12680100	2	
10	O-RING 14,1x1,6			12680300	5	
9	O-RING 6,3x2,4			12680400	4	
8	PLUG SGA-2-ZN-M8	460045		12407150	2	
7	U-RING U-8-12-2			12681385	2	
6	PISTON SGA-2-WI	462203		12403267	1	
5	INDICATOR SGA-2-WI	462199		12388172	1	
4	PLUG SGA-2-Zn-M16x1,5	460047		12407100	1	
3	ADJUSTING PLUG-3 SGA-2-ZN-WI	462202		12403337	1	
2	ADJUSTING PLUG-2 SGA-2-ZN-WI	462201		12403332	1	
1	ADJUSTING PLUG-1 SGA-2-ZN-WI	462201		12403327	1	
ITEM	DESCRIPTION 	DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY
			MATERIAL DESCRIPTION (WEIGHT KG)			
		SPECIFICATION OF PART				
DESIGNED	Ilm	DRAWN				DOSER SGA-2-ZN-WI, DIMENSIONS, ADJUSTMENT , SPAREPARTS
 Oy SKF Ab MUURAME FINLAND			PREVIOUS DRG		FUTURE DRG	
			DATE	2/16/2007	PROJECT	
			SCALE	DRAWING NUMBER 361344		



GREASE DENSITY 0.88g/cm³

NO		DOSER DOS g/CYCLE ±5%			
		SGA-012-ZN-NI	SGA-011-ZN-NI	SGA-12-ZN-NI	SGA-11-ZN-NI
		12387530	12387525	12387630	12387625
4	PLUG SGA-01/1		1.60	1.41	2.82
1	ADJUSTING PLUG-3 SGA	0.60	1.20	1.06	2.12
2	ADJUSTING PLUG-2 SGA	0.40	0.80	0.70	1.40
3	ADJUSTING PLUG-1 SGA	0.20	0.40	0.35	0.70

10	PLUG R1/8 ZN			12660380	1		
9	O-RING 10,1X1,6			12680150	5		
8	O-RING 6,3x2,4			12680400	4		
7	PLUG SGA-1-SS-M8	460026		12407000	2		
6	U-RING U-2-6-2.585SH			12681365	2		
6	U-RING U-4-8-2 85SH			12681375	2		
5	PISTON SGA0-WI	462031		12403263	1		
5	PISTON SGA1-WI	461687		12403265	1		
4	PLUG SGA-1-ZN-M12x1,25	460025		12406960	2		
3	ADJUSTING PLUG-1 SGA-0-1-WI	462034		12403325	1		
2	ADJUSTING PLUG-2 SGA-0-1-WI	462035		12403330	1		
1	ADJUSTING PLUG-3 SGA-0-1-WI	462036		12403335	1		
ITEM	DESCRIPTION		DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY
				MATERIAL DESCRIPTION (WEIGHT KG)			
			SPECIFICATION OF PART				
DESIGNED		DRAWN		DOSER SGA-ZN-NI		PREVIOUS DRG	FUTURE DRG
 Oy SKF Ab MUURAME FINLAND				SGA-011, SGA-012, SGA-11, SGA-12		DATE 10.6.2005	SHEET/SHEETS
				DIMENSIONS, ADJUSTMENTS		SCALE	DRAWING NUMBER
				SPARE PARTS		361463 E	



GREASE DENSITY 0.88g/cm³

DOSER		DOSAGE g/cycle ±5%
NO	SGA-22-ZN-NI 12387685	SGA-21-ZN-NI 12387680
4	4,54	9,07
3	3,34	6,68
2	2,15	4,29
1	0,98	1,97

6	U-RING U-8-12-2			12681385	2		
5	PISTON SGA-2-WI	462203		12403267	1		
4	PLUG SGA-2-Zn-M16x1,5	460047		12407100	2		
3	ADJUSTING PLUG-3 SGA-2-ZN-WI	462202		12403337	1		
2	ADJUSTING PLUG-2 SGA-2-ZN-WI	462201		12403332	1		
1	ADJUSTING PLUG-1 SGA-2-ZN-WI	462200		12403327	1		
ITEM	DESCRIPTION	DETAIL DRAW	MATERIAL	DIM,PATT	CODE / QTY / PART	QTY	
			MATERIAL DESCRIPTION (WEIGHT KG)				
		SPECIFICATION OF PART					
DESIGNED	RJI	DRAWN					
 Dy SKF Ab MUURAME FINLAND			DOSERS SGA-2-ZN-NI		PREVIOUS DRG	FUTURE DRG	
			DIMENSIONS, ADJUSTMENT, SPARE PARTS		DATE	2.7.2008	PROJECT
					SCALE	DRAWING NUMBER 361462	