HEDEMORA

One (1) DISC FILTER Ø 5000 X 9/14

CTMP

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SLF from CTMP

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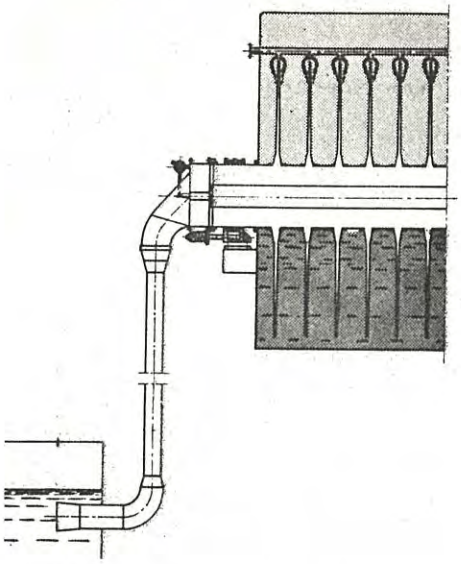
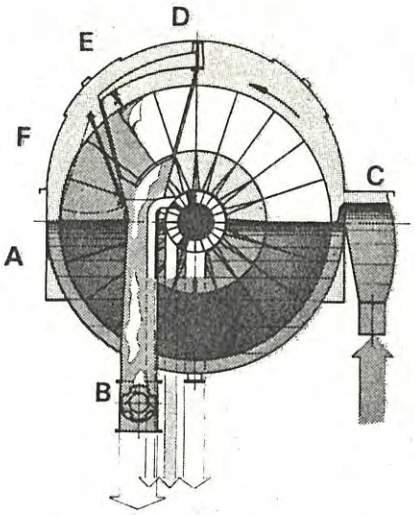
HEDEMORA



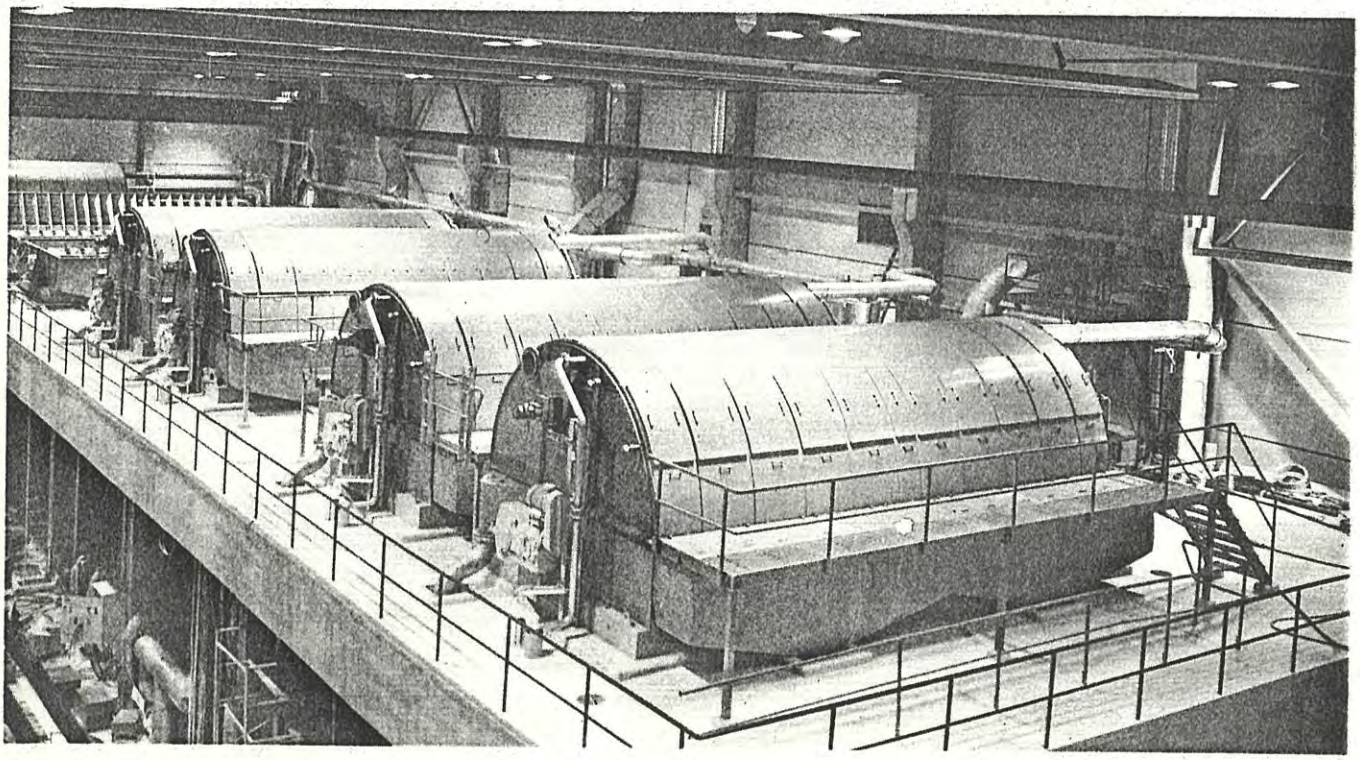


The filter is built around a horizontal shaft with internal axial filtrate channels leading to one end of the shaft (or both ends if the filtrate quantities are very large). A number of filter discs are mounted on the shaft, each disc consisting of 20 sectors, connected to corresponding channels in the shaft.

50—70 % of the disc area is submerged in a vat, containing the suspension to be filtered.

The open end of the shaft is connected to a filtrate valve, which opens and closes the channels to a vacuum created by means of a barometric leg and/or vacuum pump.

A. The filter sector enters the suspension in the vat. The fibre mat starts to form under atmospheric pressure, which optimizes the dewatering properties of the bottom layer. Cloudy filtrate is drawn through the filtrate valve.
B. The valve flap changes from the cloudy to the clear filtrate zone.
C. The sector is drained as air is sucked through the pulp mat to displace the filtrate, drying the cake.
D. Vacuum is shut off by a bridge in the valve.
E. The fiber cake is discharged by shower.
F. The filter cloth is cleaned by oscillating showers.



HEDEMORA

CTMP

Dimension data

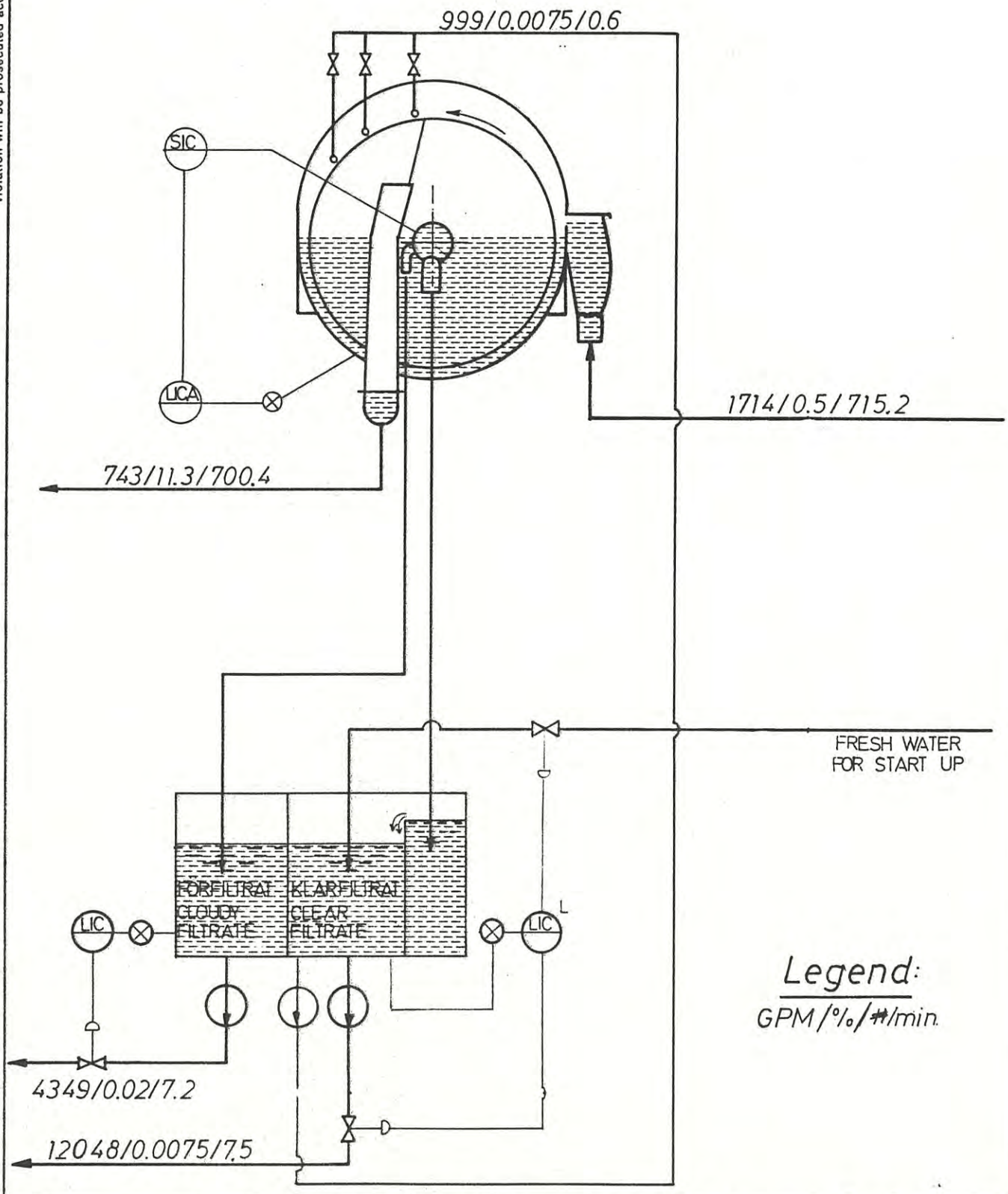
Pulp Furnish	SLF from CTMP
Wood species (all purchased chips)	
- Hemlock & Fir	30 - 70 %
- Lodgepole, White & Ponderosa Pine	70 - 30 %
Discharge tonnage - Present	219 BDSTPD
- Future	290 BDSTPD
Design temperature	170 °F
Temperature range	130 - 170 °F
Feed consistency	0.5 % B.D.
Discharge consistency	11 - 12 % B.D.
Feed freeness	90 - 140 CSF

HEDEMORA

Dimension data

Pulp Furnish	CTMP
Wood species - Hemlock & Fir	30 - 70 %
- Lodgepole, White & Ponderosa Pine.	70 - 30 %
Discharge tonnage - Present	408 BDSTPD
- Future	600 BDSTPD
Design temperature	170 °F
Feed consistency	0.5 %
Discharge consistency	11 - 12 %
Feed freeness	90 - 120 CSF

Main Line: Future capacity 509 BD STPD out.

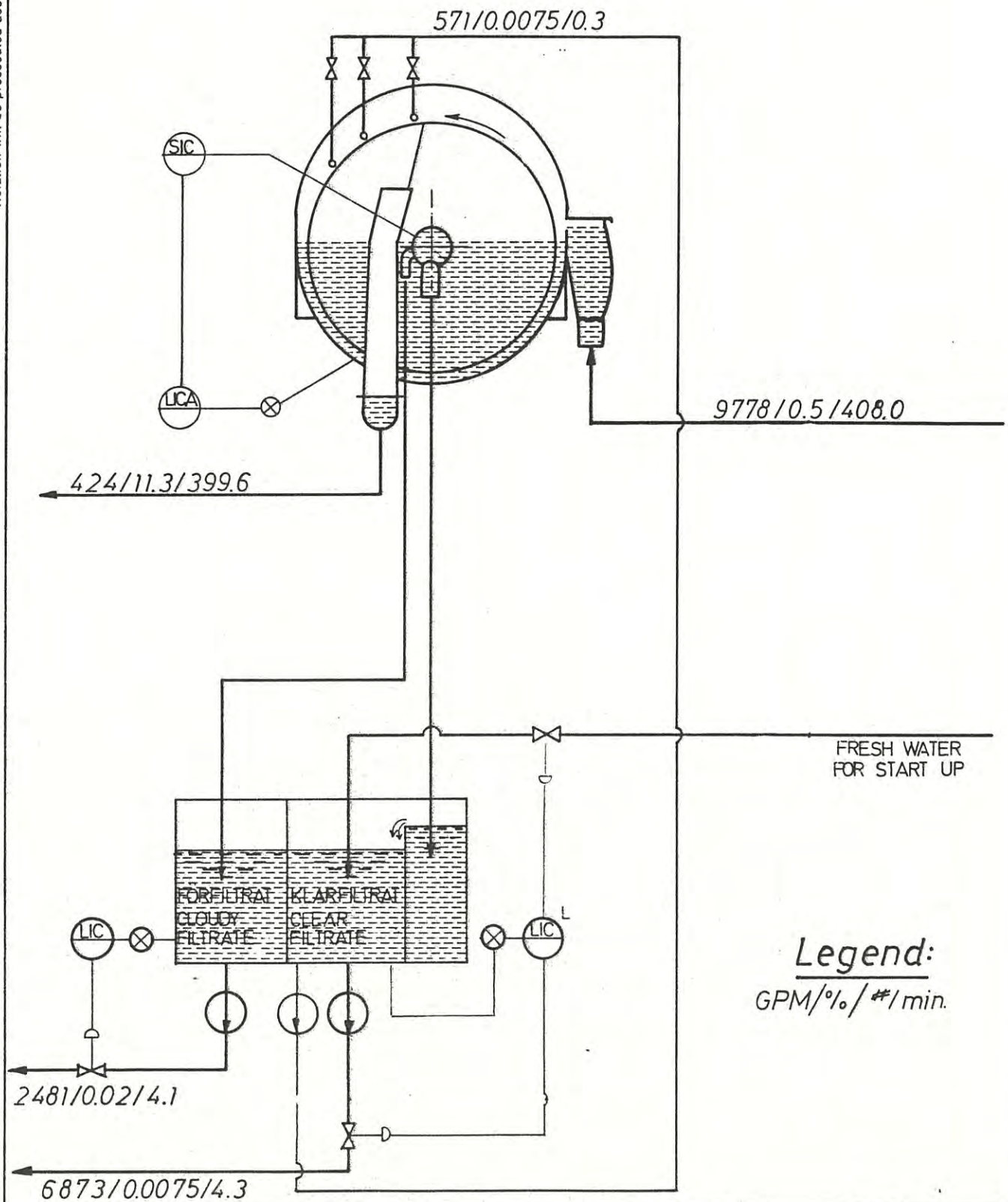


Legend:

GPM/%/#/min.

Ritad / Drawn: 87.09.29.	DISC FILTER THICKENER PONDERAY NEWSPRINT FLOW DIAGRAM	Total vikt / Total weight	Ersatt av / Replaced by
Kontr. / Checked		Ersätter / Replaces drwg.	Reg. av / Reg. by
Godk. / Approved			
Skala / Scale	HEDEMORA ☆ AB HEDEMORA VERKSTADER SWEDEN		4-85674

SLF-Pulp Line: Future capacity 290 BD STPD out.



Legend:

GPM/%/#/min.

Ritad / Drawn: 87.09.29.	DISC FILTER THICKENER PONDERAY NEWSPRINT FLOW DIAGRAM	Total vikt / Total weight	Ersatt av / Replaced by
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Skala / Scale	HEDEMORA ☆ AB HEDEMORA VERKSTADER SWEDEN		4-85674

LUBRICATION INSTRUCTIONS

CLEANING SHOWER BEARING

The bearing on the drive side of the oscillating cleaning shower is an articulated bearing of steel, equipped with automatic grease arrangement, wich means the bearing is maintenance–free during 12 months at an ambient temperature of 25°C.

To calculate the length of function of the grease cartridge, the temperature at the grease point should be measured.

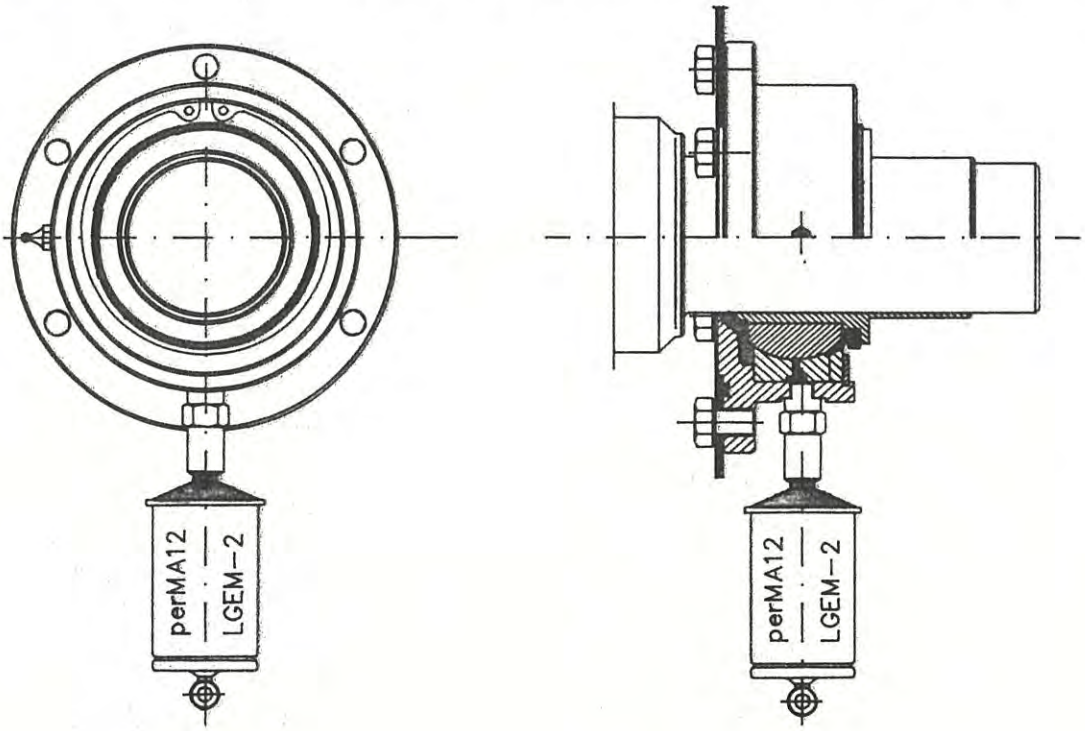
Temperature increase of 10°C will decrease length of function with 3 months (i.e. 25°C + 35°C = wear life 9 months).

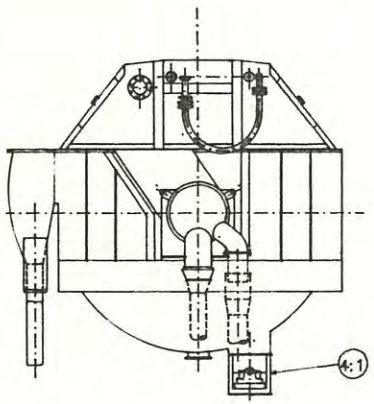
When installing a perMa grease arrangement the bearing must first be filled with LITIUM grease.

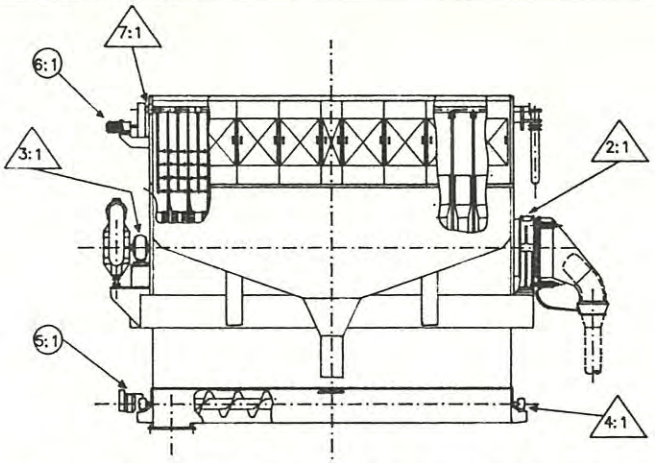
If there is a hose or a piping between the bearing and the grease arrangement they must also be filled with grease.

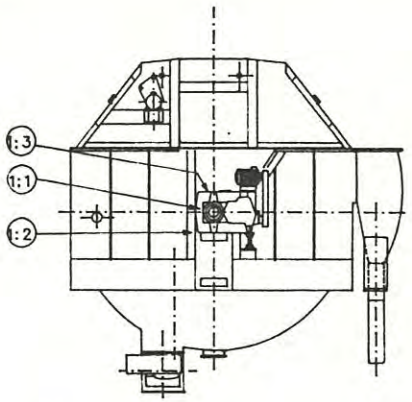
The perMa grease cartridge is activated by turning the grey screw on top of cartridge completely to a stop.

Type of grease: perMa 12 LGEM 2 order No. 2–82780/14









SMÖRJSTÄLLE NAME SCHMIERSTELLE	BESKRIVNING DESCRIPTION SCHMIERMETODE		Nr	ANTAL NUMBER ANZAHL	INTERVALL FÖR KONTROLL OCH SMÖRJNING INTERVAL FOR CONTROLL AND LUBRICANT INTERVALL FÜR KONTROLLE UND SCHMIERUNG	OLJEKVALITET LUBRICANT ÖLSORTE	OLJEMÄNGD QUANTITY ÖLMENDE	ANMÄRKNING NOTE ANMERKUNG
Tappväxel.Shaftgear.Getriebe Separat instruktion se instruktionsboken Separate operating instruction in the manual Separat instruktion siehe instruktionsbuch	Kontroll oljenivå Oil level control Kontrolle Ölstand	Nivåglas Level glass Niveaglas	1:1	1	1 gång/vecka Every week Jede Woche	Shell Omala Oil 460 Mobilgear 634 BP Energol GR–XP 460	~100 l ~150 l	
	Oljebyte Oil change Ölwechel	Dränering Draining plug Dranerung	1:2	1	Första oljebytet efter 500 drifttimmar. Därefter var 6:e mån. The first oil change after 500 operatinghours, then every 6th month. Erste Ölwechsel nach 500 betriebstunden, dann jede 6 Monat.			
		Påfyllning Oil fill plug Einfüllung	1:3	1				
Glidlager Plane bearing Gleitlager	Fettsmörjning Grease lubricating Fettschmierung	Smörjnippel Lubrication nipple Schmiernippel	2:1	4	1 gång/vecka Every week Jede Woche	Shell Retinax AM Mobilgrease Special BP Energrease L21–M		
Sfärisk rullager Roller bearing Pendelrollen lager	Fettsmörjning Grease lubricating Fettschmierung	Smörjnippel Lubrication nipple Schmiernippel	3:1	1	1 gång/vecka Every week Jede Woche	Shell Retinax EP Grease 2 Mobilux EP2 BP Energrease LS–EP2	4,4 kg 5,5 kg	
	Fettbyte Grease change Fettwechsel	Demontering Dismantling Demontierung			Var 6: månad Every 6th month Jede 6 Monat			
Sfärisk rullager Roller bearing Pendelrollen lager	Fettsmörjning Grease lubricating Fettschmierung	Smörjnippel Lubrication nipple Schmiernippel	4:1	2	1 gång/vecka Every week Jede Woche		0,85 kg	
	Fettbyte Grease change Fettwechsel	Demontering Dismantling Demontierung			Var 6: månad Every 6th month Jede 6 Monat			
Tappväxel Shaftgear Getriebe	Se separat instruktionsbok See separate operating manual Sehen Sie separate Instruktionsbuch		5:1	1		Shell Omala Oil 460 Mobilgear 634 BP Energol GR–XP 460	~1,6 l ~2,4 l ~3,0 l	
Kuggväxelmotor Geared motor Zahnradg.motor	Se separat instruktionsbok See separate operating manual Sehen Sie separate Instruktionsbuch		6:1	1		Shell Tellus Oil C 220 Mobil DTE Oil BB BP Energol HLP 220	~10 l	
Dukspritslager Cleaning shower bearing Tuchspritzlager	Se separat instruktionsbok See separate operating manual Sehen Sie separate Instruktionsbuch		7:1	1		perMA 12 LGEM 2		Patron Cartridge Patrone

HEDEMORA
HEDEMORA AB
SWEDEN

SKIVFILTER ø5000
DISC FILTER ø5000
SCHEIBENFILTER ø5000
Smörjschema
Lubrication chart
Schmierschema

START UP

a) Check the level in the clear filtrate tank. Water should be filled up automatically to a minimum level for start-up purpose.

b) Start the filter with associated equipment. The motors should be interlocked for right start sequence. The order should be as follows:

1. The shower water pump
2. The motor for the oscillating cleaning shower
3. The main drive of the filter
4. The pump for pulp to the filter.

If some motor stops, all the other ones later in the sequence should stop as well. For service purposes it should be possible to operate the oscillating shower and the main drive from local switches at the filter.

c) The level in the filter vat is controlled automatically by the speed of the filter. The speed range is 0.3-2.0 rpm. The set point of the level should be as high as possible Start the filter with the level control in automatic position.

d) When the vat level has stabilized, a vacuum is created by means of a barometric leg. The vacuum is indicated on the filtrat valve. Normal values are 10-40 kPa.

e) Check the four shower systems:

1. Discharge shower
2. Wire cleaning shower
3. Two Sluicing showers.

All the nozzles should be open and adjusted to right positions. (See "inspections during normal operation".) Use maximum valve openings for the discharge and wire cleaning shower (7 bars).

SHUT DOWN

a) Stop the pulp flow to the filter.

b) Stop the filter drive, the oscillating shower, the shower water pump and the screw conveyor.

c) For a short shut down (shorter than 24 hours) the remaining pulp could be left in the filter vat.

When shutting dwon for extended periods, the vat has to be drained and the filter carefully cleaned. Use the wire cleaning shower for the discs and a water hose for the rest of the filter.

INSPECTION DURING OPERATION

PLEASE CHECK ONCE PER SHIFT

A. DICHARGE SHOWER

Check that all nozzles are open. The nozzles can be cleaned during operation. There is an on–off valve for each pair of nozzles. The nozzles are equipped with a bayonet socket and are dismantled by turning 90°. Close the on–off valve, remove the plugged nozzle for cleaning with a wire and reinstall it.

B. WIRE CLEANING SHOWER

Check that all nozzles are open and that the entire disc area is cleaned by the showers from periphery to the sector throat. If necessary, adjust the connection between the header pipe and the shower pipes (See maintenance instructions). The motor for the oscillating header pipe is equipped with a brake, which makes it possible to stop the shower pipes at their outer position. In this position the nozzles can be reached for cleaning.
The nozzles are of the same type as on the dicharge shower, and they are cleaned in the same way.

C. FILTRATE VALVE

The filtrate is split in one cloudy– and one clear fraction. The proportion between these fractions can be adjusted by moving a bridge between the two filtrate zones. This bridge is locked with a screw against the wear plate, and it can be reached through an inspection in the valve housing. When the bridge is moved downwards, the proportion of cloudy filtrate is increased and the solids content in the clear filtrate will be reduced.

The solids content in the two filtrate fractions should be checked regularly. Solids contents above normal can be caused by holes in the filter cloth (See separate instructions for change of filter cloth.)

D. LEAKAGE

The following points should be checked for leakage:

* Stuffing boxes between filter vat and centershaft. A few drops of leakage is normal, but the gland should be tightened up if the leakage is more pronounced.
  Note: Do not tighten the nuts too much as this can damage the centershaft.
  Renew the seal rope, when necessary.

* The flexible rubber connection between the filtrate valve and the dropleg.
  Leakage at this point will reduce the vacuum.

* The seal between filtrate valve and centershaft. Any water leaking from this seal is collected in a circumferential ring around the valve and led to the dropleg through a rubber hose.

* The rubber hose feeding shower water to the oscillating cover cleaning shower pipe.

HEDEMORA SEPARATION

CHANGE OF FILTER BAGS, CASSETTE SECTOR

1. Take out the damaged sector from the filter, work from the feed box side. Use a key for the nuts at the peripheri.

2. Remove the flat bars at the bottom of the sector and cut clear the old bag.

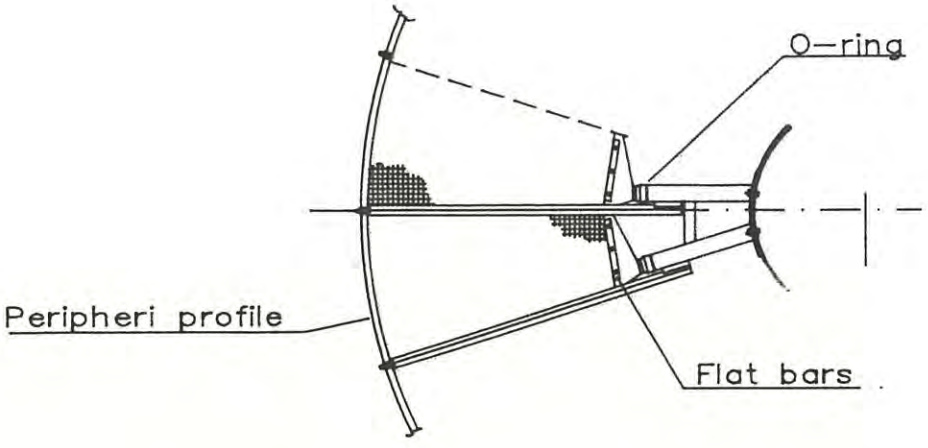
3. Check that no sharp edges may damage the new bag.

4. Open the zip fastener. Put the filter bag on to the sector. Pull down the zip fastener and take away the zip joint. Melt the zip fastener on a length of about 20 mm with a not too hot soldering iron. Fold the zip fastener under the bag.

5. Check if the bag is in correct position all around. Melt holes in the cloth for the screws to the flat bars. That can be down with a 2 mm pin which is moved around until the required hole diameter has been obtained. The pin must be heated so that the threads will melt. A small soldering iron could be used. Then fasten the flat bars with its screws.

6. Immerse the sector in a water bath (temp. about 85–90°C during 5–6 minutes) until the bag shrinks and is stretched close to the sector, without folds. Also steam can be used to shrink the bag.

7. Change O–ring if necessary, put the sectors back, mount the peripheri profile and tightened the nuts.

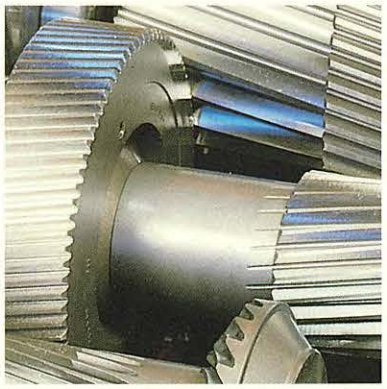


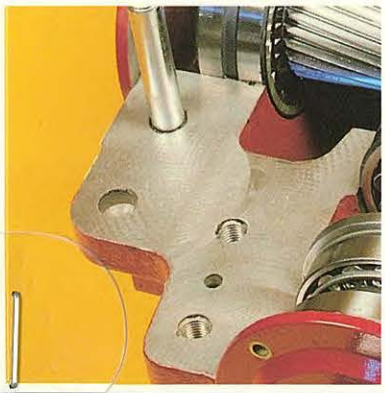
SAVE ALL DRIVE





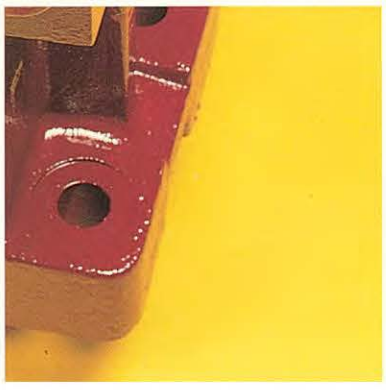







SANTASALO DOCUMENTS



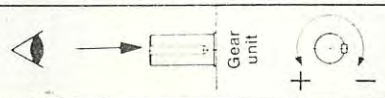


SANTASALO-GEARS LTD
JOT-COMPANIES

TECHNICAL SPECIFICATION

						Order confirmation No.				Item. No	
1. Customer	Hedemora AB			2. Work No.		5	2	0	0	1	0
3. Order No., date	31501	14.04.1988		4. Delivery week						8	3 5
5. Quotation No., date				6. Issued by date	ly	16.6.88					

PARTS BEING SUPPLIED TO ORDER

7. Type, spec.code	5TKC355	8. Quantity	1
9. n_1/n_2	209-1393/0,3-2 min^{-1}	10. Shaft position	03 V
11. Ratio i	696,5:1	12. Voltage	V
13. Running power P_{K1}	kW	14. Frequency	Hz
15. Running torque M_{K2}	44 kNm	16. Service factor K_A	1,57
17. Rotation direction of output shaft	☐ Tick off ☐ + — 	18. Hollow shaft ø d2	180H8
		19. Drg No. of driven shaft	C3.911
20. Parts lists No.	L 3592	21. Manuf. Nos.	52531
22. Assembly drg. No.	2744332		
23. Dimension drg. No.	C3.351	24. Weight of gear unit	1450 kg
25. Additional equipment included in the supply, special design and materials, special painting etc.	- anchoring rod HA = 413		
26. Painting	☒ standard ☐ special TM 333		
27. Name plates	☒ universal ☐ special	28. Transport packing	☒ pallet ☐ crate ☐ seaworthy packing
29. Designer date	HEJ 1.6.88		
30. Documents	12 sets in english w 824	31. Customer's drawings	

ALTERATIONS

a)	c)
b)	d)

Note. Delivery time is subject to all relevant technical details being supplied with order.

OPERATING CONDITIONS

32. Driven machine	Filter ø 5,0		33. Moment of inertia J	kgm^2
34. Max. load	during start kNm; time s	during operation kNm; time		min/h
35. Shaft connection	High speed shaft connection	Slow speed shaft connection		
36. Driving machine		P_{N1} kW	n_1=	min^{-1}
37. Starting frequency	times/h	☐ fully loaded	☐ partly loaded	
38. Hours of operation	24 h/d h/a	39. Ambient temperature	° C; tmax =	° C; tmin = °C
40. Other operating conditions				
41. Oil recommendation	ISO VG 460	42. Lubrication method	splash lubrication	43. Grease nipples pcs
44. Oil level	132 mm from joint face ☐ down ☒ up			45. Oil quantity l

MARKETING
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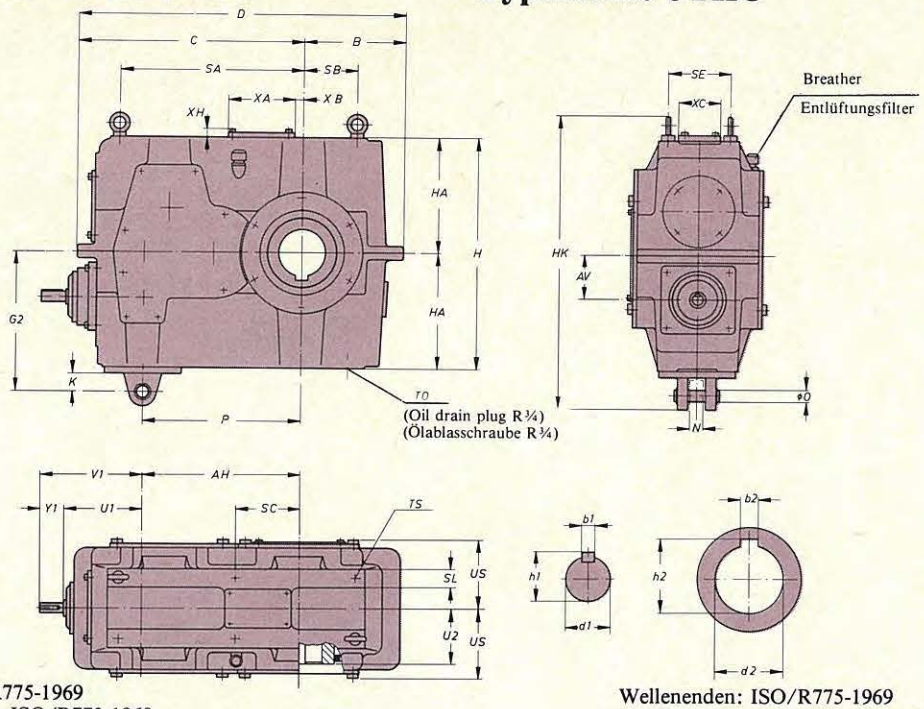
SANTASALO
5TKC
C 3.351U-1
10.85

Quintuple reduction bevel-helical hollow shaft gear units series 5TKC

Fünfstufige Kegel-Stirnrad-Aufsteckgetriebe Typenreihe 5TKC



Shaft ends: ISO/R775-1969
Keys and keyways: ISO/R773-1969
Shaft height deviations: ISO/R496-1966
The dimensions of the hollow shaft hole and anchoring rod: sheet C3.911U.

Wellenenden: ISO/R775-1969
Passfedern und Passfedernuten: ISO/R773-1969
Wellenhöhendifferenzen: ISO/R496-1966
Die Abmessungen der Bohrung der Hohlwelle und der Drehmomentstütze: Blatt C3.911U.

Gear unit / Getriebe	Gear case dimensions in mm / Abmessungen des Gehäuses in mm																		
	AH	AV	B	C	D	G2	H	HA	HK	K	N	O	P	SA	SB	SC	SE	SL	TS_{max}	US
5TKC160	285	80	175	404	579	243	400	200	521	28	20	22h9	285	334	96	165	116	30	M12x18	129
5TKC180	320	80	205	450	655	273	450	225	585	28	20	22h9	320	360	111	170	120	35	M16x24	137
5TKC200	360	80	225	500	725	298	500	250	635	28	20	22h9	360	408	132	210	130	35	M16x24	147
5TKC225	405	80	255	555	810	343	560	280	729	38	32	32h9	405	450	145	185	148	40	M20x30	165
5TKC250	450	90	281	606	887	346	560	280	729	38	32	32h9	450	497	164	230	164	40	M20x30	185
5TKC280	505	100	308	671	979	383	630	315	804	38	32	32h9	505	558	188	185	174	40	M20x30	204
5TKC315	565	110	353	758	1111	437	710	355	932	52	45	45h9	565	619	217	201	188	50	M24x36	231
5TKC355	635	125	400	863	1263	487	800	400	1027	52	45	45h9	635	705	245	230	216	50	M24x36	254
5TKC400	715	140	448	946	1394	542	900	450	1132	52	45	45h9	715	782	280	251	250	50	M24x36	284

Gear unit / Getriebe	Shaft dimensions in mm / Wellenabmessungen in mm																			
	Input shaft / Antriebswelle																Hollow shaft / Hohlwelle			
		160... 180: 106 < i ≤ 530 200... 400: 106 < i ≤ 475					160... 180: 530 < i ≤ 1185 200... 400: 475 < i ≤ 1185					1185 < i ≤ 2975								
	U1	Y1	V1	d1	b1	h1	Y1	V1	d1	b1	h1	Y1	V1	d1	b1	h1	U2	d2	b2	h2
5TKC160	170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	118	80H8	22JS9	85,4
5TKC180	170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	125	90H8	25JS9	95,4
5TKC200	170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	135	100H8	28JS9	106,4
5TKC225	170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	154	110H8	28JS9	116,4
5TKC250	170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	172	120H8	32JS9	127,4
5TKC280	190	58	248	30k6	8h9	33	36	226	22k6	6h9	24,5	28	218	16k6	5h9	18	192	140H8	36JS9	148,4
5TKC315	212	58	270	35k6	10h9	38	42	254	25k6	8h9	28	28	240	18k6	6h9	20,5	218	160H8	40JS9	169,4
5TKC355	236	82	318	40k6	12h9	43	58	294	30k6	8h9	33	36	272	20k6	6h9	22,5	240	180H8	45JS9	190,4
5TKC400	265	82	347	45k6	14h9	48,5	58	323	35k6	10h9	38	36	301	22k6	6h9	24,5	270	200H8	45JS9	210,4

Gear unit / Getriebe	Inspection cover / Inspektionsdeckel				Mass of gear unit / Masse des Getriebes	Quantity of oil / Ölmenge
	XA	XB	XC	XH	kg	l
5TKC160					160	9
5TKC180					220	12
5TKC200					300	17
5TKC225	170	55	100	14	410	23
5TKC250	170	90	120	14	550	26
5TKC280	170	95	120	14	780	36
5TKC315	200	120	135	16	1070	49
5TKC355	200	135	135	16	1450	66
5TKC400	250	150	180	17	2000	90

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Nominal mechanical power ratings P_{N1} in kW — Mechanische Nennleistungen P_{N1} in kW

Gear unit / Getriebe	n_1 min^{-1}	Nominal ratio i_N / Nennübersetzung i_N													
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500
		112	140	180	225	280	355	450	560	710	900	1120	1400	1800	2250	2800
5TKC160	1500	8,4	6,7	5,1	4,3	3,1	2,7	2,2	1,8	1,3	1,0	0,82	0,65	0,51	0,41	0,32
	1000	5,7	4,5	3,4	2,9	2,1	1,8	1,5	1,2	0,90	0,69	0,55	0,44	0,34	0,28	0,22
	750	4,3	3,4	2,6	2,2	1,6	1,4	1,2	0,94	0,68	0,52	0,42	0,34	0,26	0,22	0,17
	500	2,9	2,3	1,8	1,5	1,1	0,98	0,78	0,63	0,46	0,36	0,29	0,23	0,19	0,15	0,12
5TKC180	1500	11,6	9,4	7,8	6,5	5,1	3,9	3,2	2,5	2,0	1,5	1,2	0,95	0,73	0,54	0,42
	1000	7,8	6,4	5,3	4,4	3,4	2,6	2,1	1,7	1,4	1,0	0,81	0,64	0,50	0,37	0,29
	750	5,9	4,8	4,0	3,3	2,6	2,0	1,7	1,3	1,0	0,77	0,61	0,49	0,39	0,29	0,22
	500	4,0	3,3	2,7	2,2	1,7	1,3	1,1	0,88	0,69	0,52	0,43	0,34	0,27	0,20	0,16
5TKC200	1500	14,5	12,5	8,7	7,6	6,3	4,9	3,7	3,0	2,5	2,0	1,5	1,2	0,97	0,76	0,54
	1000	10,3	8,3	5,9	5,0	4,2	3,3	2,5	2,0	1,7	1,3	1,0	0,82	0,65	0,51	0,38
	750	7,7	6,2	4,5	3,8	3,1	2,5	1,9	1,5	1,2	1,0	0,77	0,61	0,49	0,38	0,29
	500	5,1	4,2	3,0	2,5	2,1	1,7	1,3	1,0	0,83	0,67	0,51	0,41	0,32	0,25	0,20
5TKC225	1500	17,4	14,9	11,5	11,4	8,1	7,4	5,9	4,7	3,6	3,0	2,4	1,5	1,5	1,2	0,89
	1000	13,1	11,2	8,3	7,7	5,3	4,9	3,9	3,2	2,5	2,0	1,6	0,99	0,99	0,80	0,62
	750	10,6	8,8	6,3	5,7	4,0	3,7	2,9	2,4	1,9	1,5	1,2	0,75	0,75	0,61	0,48
	500	7,3	6,1	4,2	3,8	2,8	2,5	2,0	1,6	1,3	1,0	0,81	0,53	0,50	0,40	0,32
5TKC250	1500	21,2	21,2	18,4	16,7	8,1	8,1	7,5	4,8	4,8	4,4	3,5	1,5	1,5	1,5	1,1
	1000	14,0	14,0	12,8	11,3	5,3	5,3	5,2	3,2	3,2	3,0	2,4	0,99	0,99	0,99	0,79
	750	10,6	10,6	9,8	8,5	4,0	4,0	4,0	2,4	2,4	2,3	1,8	0,75	0,75	0,75	0,61
	500	7,5	7,5	6,6	5,8	2,8	2,8	2,8	1,7	1,7	1,5	1,2	0,53	0,53	0,53	0,43
5TKC280	1500	27,4	27,4	26,1	21,3	11,8	11,8	10,5	5,9	5,9	5,3	4,2	2,8	2,7	2,1	1,6
	1000	18,6	18,6	17,9	14,2	7,7	7,7	7,1	3,9	3,9	3,6	2,8	1,9	1,8	1,4	1,1
	750	14,1	14,1	13,4	10,6	5,8	5,8	5,3	2,9	2,9	2,7	2,1	1,4	1,3	1,1	0,83
	500	9,5	9,5	9,0	7,1	4,1	4,1	3,5	2,1	2,1	1,8	1,4	1,0	0,89	0,71	0,56
5TKC315	1500	35,3	35,3	35,3	31,2	16,3	16,3	16,3	11,7	10,1	8,1	6,6	3,2	3,2	3,2	2,0
	1000	23,3	23,3	23,3	20,8	10,7	10,7	10,7	7,7	6,8	5,4	4,4	2,1	2,1	2,1	1,4
	750	17,7	17,7	17,7	15,6	8,1	8,1	8,1	5,8	5,1	4,1	3,3	1,6	1,6	1,6	1,1
	500	12,4	12,4	12,4	10,4	5,7	5,7	5,4	4,1	3,4	2,7	2,2	1,1	1,1	1,1	0,74
5TKC355	1500	59,8	59,8	55,6	48,1	27,2	27,2	23,6	16,1	14,9	11,6	9,3	4,8	4,8	4,4	3,2
	1000	39,6	39,6	39,2	32,1	17,9	17,9	15,9	10,6	9,9	7,7	6,2	3,1	3,1	3,0	2,2
	750	30,0	30,0	29,6	24,1	13,5	13,5	11,9	8,0	7,4	5,8	4,6	2,4	2,4	2,2	1,7
	500	21,1	21,1	19,8	16,0	9,5	9,5	7,9	5,6	5,0	3,9	3,1	1,7	1,7	1,5	1,2
5TKC400	1500	85,3	85,3	72,5	62,0	42,0	38,9	32,7	25,6	20,1	16,3	12,8	8,8	8,0	6,1	4,1
	1000	58,1	58,1	52,2	41,3	27,7	27,0	21,8	16,9	13,7	10,9	8,6	5,8	5,3	4,1	2,9
	750	44,0	44,0	39,1	31,0	20,9	20,5	16,4	12,7	10,3	8,2	6,4	4,4	4,0	3,1	2,2
	500	29,7	29,7	26,1	20,7	14,6	13,6	10,9	8,5	6,8	5,4	4,3	3,1	2,7	2,0	1,6

Nominal mechanical power ratings P_{N1} in kW — Mechanische Nennleistungen P_{N1} in kW

Gear unit / Getriebe	n_1 min^{-1}	Nominal ratio i_N / Nennübersetzung i_N																	
		450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000	2250	2500	2800	3150
5TKC500	1500	45.4	37.7	32,9	29,3	26,3	24,2	20,6	19,0	19,0	16,2	14,8	11,8	10,5	10,5	8,4	8,4	7,1	6,1
	1000	30,7	25,4	22,2	19,8	17,8	16,4	13,9	12,8	12,8	11,0	10,0	8,0	7,2	7,2	5,8	5,8	5,0	4,0
	750	23,2	19,3	16,8	15,0	13,4	12,4	10,6	9,7	9,7	8,4	7,6	6,1	5,5	5,5	4,4	4,3	3,8	3,0
	500	15,7	13,0	11,3	10,1	9,1	8,4	7,1	6,7	6,7	5,6	5,3	4,2	3,7	3,7	3,0	2,9	2,6	2,0
5TKC560	1500	55,7	49,8	44,8	40,2	36,0	32,0	28,7	25,7	23,1	23,1	19,8	17,0	14,1	14,1	12,1	12,1	8,5	8,5
	1000	37,7	33,6	30,2	27,2	24,3	21,6	19,3	17,3	15,6	15,6	13,3	11,4	9,6	9,6	8,3	8,2	5,9	5,8
	750	28,5	25,5	22,9	20,6	18,4	16,4	14,6	13,1	11,8	11,8	10,2	8,8	7,5	7,5	6,4	6,2	4,5	4,3
	500	19,3	17,2	15,4	13,9	12,4	11,2	10,0	9,1	8,2	8,2	7,1	6,1	5,0	5,0	4,3	4,1	3,1	2,9
5TKC630	1500	88,1	79,9	69,8	54,4	54,4	43,3	43,3	38,5	38,3	32,1	27,3	24,2	19,5	19,5	17,2	17,1	14,1	12,1
	1000	60,6	54,8	47,7	36,7	36,7	29,2	29,2	26,0	26,0	22,3	18,4	16,3	13,3	13,3	11,9	11,9	9,9	8,1
	750	45,9	41,5	36,1	27,8	27,8	22,1	22,1	19,7	19,7	17,2	14,1	12,6	10,3	10,3	9,1	9,1	7,5	6,1
	500	31,0	28,0	24,4	18,8	18,8	15,0	15,0	13,3	13,3	11,6	9,8	8,6	7,0	7,0	6,1	6,0	5,1	4,0
5TKC710	1500	105,0	94,8	92,8	84,1	69,4	67,8	57,0	48,7	44,0	39,3	34,6	34,6	28,0	24,6	19,1	19,1	19,1	17,6
	1000	71,2	64,0	64,0	57,5	46,8	45,8	38,5	32,9	29,7	26,5	23,3	23,3	19,1	17,0	13,3	13,3	13,3	11,7
	750	53,9	48,5	48,5	43,5	35,5	34,6	29,2	24,9	22,5	20,2	17,9	17,9	14,8	13,1	10,1	10,1	10,1	8,7
	500	36,4	32,7	32,7	29,4	23,9	23,4	19,7	17,2	15,6	14,1	12,4	12,4	10,0	8,8	6,8	6,8	6,8	5,8

Power ratings: The ratings are nominal, service factor f = 1.0. Selection of gear unit: see instruction A.31. Gear units with bigger ratings are also manufactured.
Lubrication: Splash lubrication is used, except in those cases when pressure lubrication is necessary dependent on the pitch line velocity of the gears.
Cooling: Artificial cooling is required if the mechanical power actually transmitted, is bigger than the thermal rating.

Leistungen: Die Leistungswerte sind Nennleistungen. Betriebsfaktor f = 1.0. Wahl des Zahnradgetriebes: siehe Instruktion A.31. Getriebe mit grösseren Leistungen werden auch hergestellt.
Schmierung: Normalerweise haben die Getriebe Tauchschmierung. Druckschmierung kommt lediglich dann zur Anwendung, wenn es Zahnrad-Umfangsgeschwindigkeit erfordert.
Kühlung: Zusätzliche Kühlung ist dann erforderlich, wenn die tatsächliche Betriebsleistung über der thermischen Leistung liegt.

Gear unit / Getriebe	Thermal ratings in kW / Thermische Leistungen in kW P_{TN}	
	106 < i ≤ 530	530 < i ≤ 2975
5TKC160	10	12
5TKC180	13	16
5TKC200	16	19
5TKC225	20	24
5TKC250	23	28
5TKC280	29	34
5TKC315	36	43
5TKC355	44	52
5TKC400	55	66

Thermal ratings in kW / Thermische Leistungen in kW	
Gear unit / Getriebe	P_{TN}
5TKC500	75
5TKC560	95
5TKC630	119
5TKC710	150

Notes
P_{TN} = nominal thermal rating relating to an ambient air temperature of +20°C.
Gear unit fitted with fan: see instruction A.31.

Bemerkungen
P_{TN} = thermische Nennleistung auf eine Umgebungstemperatur von +20°C bezogen.
Getriebe mit Lüfter: siehe Instruktion A.31.

SANTASALO
5TKC
C 3.351U-2
10.85

C

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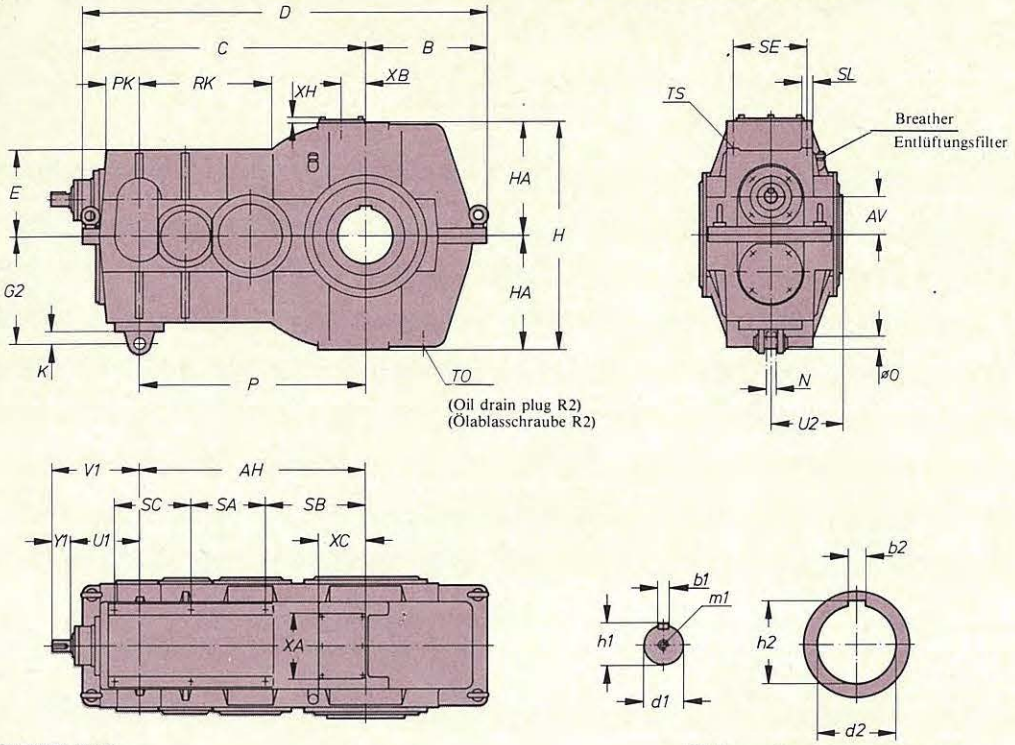
Quintuple reduction bevel-helical hollow shaft gear units series 5TKC

Fünfstufige Kegel-Stirnrad-Aufsteckgetrieb Typenreihe 5TKC



Shaft ends: ISO/R775-1969.
Keys and keyways: ISO/R773-1969.
Shaft height deviations: ISO/R496-1966.
The dimensions of the hollow shaft hole and anchoring rod: sheet C3.911U.

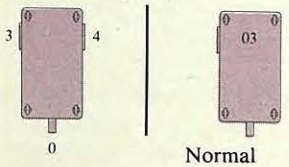
Wellenenden: ISO/R775-1969.
Passfedern und Passfedernuten: ISO/R773-1969.
Wellenhöhendifferenzen: ISO/R496-1966.
Die Abmessungen der Bohrung der Hohlwelle und der Drehmomentstütze: Blatt C3.911U.

Gear unit / Getriebe	Gear case dimensions in mm / Abmessungen des Gehäuses in mm																				
	AH	B	C	D	E	AV	G2	H	HA	K	N	O	P	PK	RK	SA	SB	SC	TS_{max}	SE	SL
5TKC500	980	537	1232	1769	370	160	487	980	490	75	60	63	980	140	570	320	460	315	M24x36	310	50
5TKC560	1100	628	1398	2026	410	180	530	1126	563	75	60	63	1100	162	615	345	535	345	M30x45	340	65
5TKC630	1235	704	1578	2282	460	200	585	1242	621	75	60	63	1235	180	703	405	580	400	M30x45	400	65
5TKC710	1390	775	1767	2542	510	225	639	1402	701	75	60	63	1390	202	781	450	660	450	M30x45	450	65

Gear unit / Getriebe	Shaft dimensions in mm / Wellenabmessungen in mm																	
	Input shaft / Antriebswelle																	
		425 < i ≤ 755						755 < i ≤ 1700						1700 < i ≤ 3350				
	U1	Y1	V1	d1	b1	h1	m1	Y1	V1	d1	b1	h1	m1	Y1	V1	d1	b1	h1	m1
5TKC500	300	82	382	50k6	14h9	53,5	M16x36	82	382	40k6	12h9	43	M16x36	42	342	25k6	8h9	28	M10x22
5TKC560	335	82	417	55m6	16h9	59	M20x42	82	417	45k6	14h9	48,5	M16x36	58	393	30k6	8h9	33	M10x22
5TKC630	375	105	480	60m6	18h9	64	M20x42	82	457	50k6	14h9	53,5	M16x36	58	433	35k6	10h9	38	M12x28
5TKC710	425	105	530	65m6	18h9	69	M20x42	82	507	55m6	16h9	59	M20x42	82	507	40k6	12h9	43	M16x36

Gear unit / Getriebe	Shaft dimensions in mm / Wellenabmessungen in mm				Inspection cover / Inspektionsdeckel			
	Hollow shaft / Hohlwelle							
	U2	d2	b2	h2	XA	XB	XC	XH
5TKC500	310	240H8	56JS9	252,4	280	100	200	18
5TKC560	345	280H8	63JS9	292,4	280	110	200	18
5TKC630	400	320H8	70JS9	334,4	350	125	250	20
5TKC710	440	360H8	80JS9	375,4	350	140	250	20

Shaft positions
(looked from above)



Normal

Normal

Wellenausführungen
(von oben gesehen)

Special Spezial

Gear unit / Getriebe	Mass of gear unit / Masse des Getriebes kg	Quantity of oil l / Ölmenge l	
		Splash lubrication / Tauchschmierung	Pressure lubrication / Druckschmierung
5TKC500	2350	260	90
5TKC560	3110	350	120
5TKC630	4180	530	180
5TKC710	5760	700	230

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SANTASALO

C3.911U-1
03.86

Hollow shaft bore and driven shaft end for hollow shaft gear units types TC, TKC and TKCV

Standard mounting
Normale Montage

Sizes
Grössen 90-250

The same diameter at both ends of the hollow shaft.

Gleicher Durchmesser an beiden Enden der Hohlwellenbohrung.

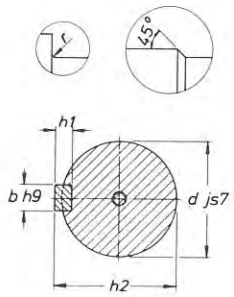
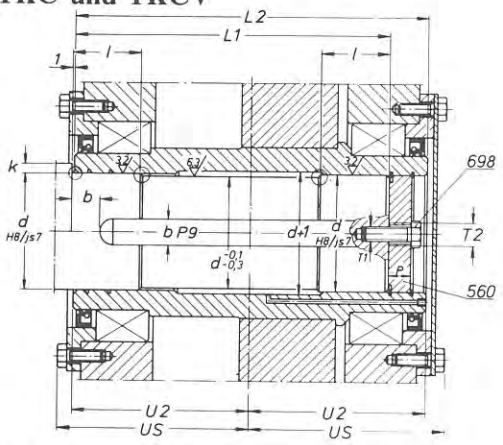


Fig. 1
Abb. 1

Hohlwellenbohrung und Wellenende der Arbeitsmaschine für Aufsteckgetriebe Type TC, TKC und TKCV



Dimensions in mm — **Abmessungen in mm**

Gear unit size Getriebe Grösse	d	b	h1	h2	k (1 min	k (1 max	r max	l	L1 2TC 3TC 4TC 3TKC(V) 5TKC(V)	L1 2TKC	L2 2TC 3TC 4TC 3TKC(V) 5TKC(V)	L2 2TKC	P	T1 SFS 5037 DIN 332	T2	U2 2TC 3TC 4TC 3TKC(V) 5TKC(V)	U2 2TKC	US 2TC 3TC 4TC 3TKC(V) 5TKC(V)	US 2TKC	Screw item Schraube Pos. 698 (2 Size Grösse	Qty Stck.
90	45	14	9	48,5	4	18	3	25	-	172	-	200	16	M16 x 36	M20	-	100	-	115	M16 x 50	1
110	60	18	11	64	4	23	3	30	-	209	-	244	20	M20 x 42	M24	-	122	-	135	M20 x 60	1
140	70	20	12	74,5	4	23	3	35	165	229	200	264	20	M20 x 42	M24	100	132	114	146	M20 x 60	1
160	80	22	14	85	4	23	3	40	201	-	236	-	20	M20 x 42	M24	118	-	131	-	M20 x 60	1
180	90	25	14	95	4	33	3	45	208	278	250	320	24	M24 x 50	M30	125	160	139	175	M24 x 70	1
200	100	28	16	106	6	33	4	50	228	-	270	-	24	M24 x 50	M30	135	-	149	-	M24 x 70	1
225	110	28	16	116	6	33	4	55	266	366	308	408	24	M24 x 50	M30	154	204	167	217	M24 x 70	1
250	120	32	18	127	6	38	4	60	302	400	344	450	24	M24 x 50	M30	172	225	187	240	M24 x 70	1

Keys and keyways: ISO/R773-1969.

Passfedern und Passfedernuten: ISO/R773-1969.

Standard mounting
Normale Montage

Sizes
Grössen 280-400

Smaller diameter at the outer end of the hollow shaft.

Kleiner Durchmesser am geschlossenen Ende der Hohlwellenbohrung.

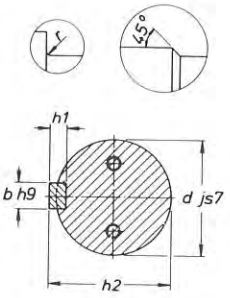
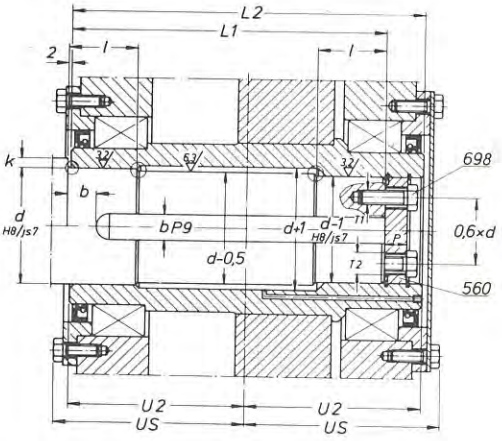


Fig. 2
Abb. 2



Dimensions in mm — **Abmessungen in mm**

Gear unit size Getriebe Grösse	d	b	h1	h2	k (1 min	k (1 max	r max	l	L1 2TC 3TC 4TC 3KTC(V) 5TKC(V)	L1 2TKC	L2 2TC 3TC 4TC 3TKC(V) 5TKC(V)	L2 2TKC	P	T1	T2	U2 2TC 3TC 4TC 3TKC(V) 5TKC(V)	U2 2TKC	US 2TC 3TC 4TC 3TKC(V) 5TKC(V)	US 2TKC	Screw item Schraube Pos. 698 (2 Size Grösse	Qty Stck.
280	140	36	20	148	6	38	4	70	342	470	384	516	24	M20 x 42	M24	192	258	206	272	M20 x 60	2
315	160	40	22	169	7	43	5	80	394	530	436	582	24	M20 x 42	M24	218	291	233	306	M20 x 60	2
355	180	45	25	90	7	43	5	90	430	580	480	634	30	M24 x 50	M30	240	317	256	333	M24 x 80	2
400	200	45	25	210	7	48	5	100	490	660	540	722	30	M24 x 50	M30	270	361	286	377	M24 x 80	2

Keys and keyways: ISO/R773-1969.

Passfedern und Passfedernuten: ISO/R773-1969.

1) Shoulder required only for through going shaft
2) Item 698 screws are not included in normal delivery.

1) Wellenansatz nur für durchgehende Welle erforderlich.
2) Die Schrauben Pos. 698 sind nicht im normalen Lieferumfang inbegriffen.

Dimensions are not binding.

Massangaben unverbindlich.

erg Corporation
0101 Helsinki 10
6491
117 strsv sf
-5642874

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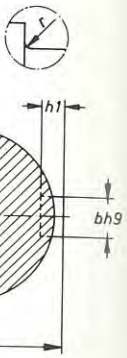
Mounting on through going shaft
Montage auf durchgehende Welle

Sizes
Grössen 90-250



The same diameter at both ends of the hollow shaft.

Gleicher Durchmesser an beiden Enden der Hohlwellenbohrung.

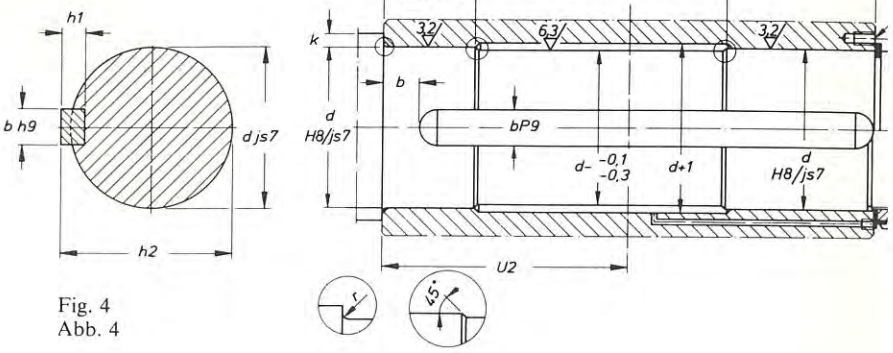


Fig. 4
Abb. 4

Dimensions in mm **Abmessungen in mm**

Gear unit size Getriebe Grösse	d	b	h1	h2	k min	k max	r max	l	L1 2TC 3TC 4TC 3TKC(V) 5TKC(V)	L1 2TKC	L2 2TC 3TC 4TC 3TKC(V) 5TKC(V)	L2 2TKC	U2 2TC 3TC 4TC 3TKC(V) 5TKC(V)	U2 2TKC	DP	ZP
90	45	14	9	48,5	4	18	3	25	-	147	-	200	-	100	55	6 x M
110	60	18	11	64	4	23	3	30	-	179	-	244	-	122	73	6 x M
140	70	20	12	74,5	4	23	3	35	130	194	200	264	100	132	85	6 x M
160	80	22	14	85	4	23	3	40	161	-	236	-	118	-	95	6 x M
180	90	25	14	95	4	33	3	45	163	233	250	320	125	160	110	6 x M
200	100	28	16	106	6	33	4	50	178	-	270	-	135	-	120	6 x M
225	110	28	16	116	6	33	4	55	211	311	308	408	154	204	130	6 x M
250	120	32	18	127	6	38	4	60	242	340	344	450	172	225	145	6 x M

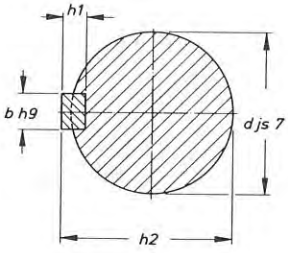
Keys and keyways: ISO/R773-1969.

Passfedern und Passfedernuten: ISO/R773-1969.

	Screw item Schraube Pos. 698 (2	
	Size Grösse	Qty Stck.
172	M24 x 80	2
316	M30 x 90	2
-	M30 x 100	2
-	M36 x 100	2

Mounting on through going shaft
Montage auf durchgehende Welle

Sizes
Grössen 280-710



Smaller diameter at the outer end of the hollow shaft.

Kleiner Durchmesser am geschlossenen Ende der Hohlwellenbohrung.

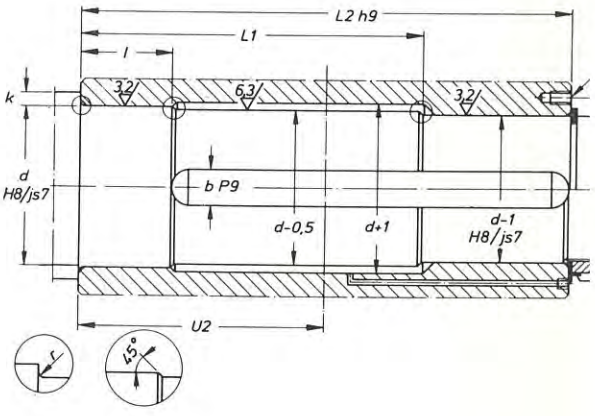


Fig. 5
Abb. 5

Dimensions in mm **Abmessungen in mm**

Gear unit size Getriebe Grösse	d	b	h1	h2	k min	k max	r max	l	L1 2TC 3TC 4TC 3TKC(V) 4TKC(V) 5TKC(V)	L1 2TKC	L2 3TC 4TC 4TKC(V) 5TKC(V)	L2 2TC 3TKC(V)	L2 2TKC	U2 3TC 4TC 4TKC(V) 5TKC(V)	U2 2TC 3TKC(V)	DP 2TKC	DP	ZP
280	140	36	20	148	6	38	4	70	272	400	384	384	516	192	192	258	165	6 x M
315	160	40	22	169	7	43	5	80	314	450	436	436	582	218	218	291	190	6 x M
355	180	45	25	190	7	43	5	90	340	490	480	480	634	240	240	317	210	6 x M
400	200	45	25	210	7	48	5	100	390	560	540	540	722	270	270	361	230	6 x M
500	240	56	32	252	8	-	6	120	395	730	610	670	930	310	340	470	280	6 x M
560	280	63	32	292	11	-	8	140	435	790	676	738	1018	345	375	515	340	6 x M
630	320	70	36	334	11	-	8	160	510	-	785	847	-	400	430	-	390	6 x M
710	360	80	40	375	11	-	8	180	565	-	863	952	-	440	485	-	430	6 x M

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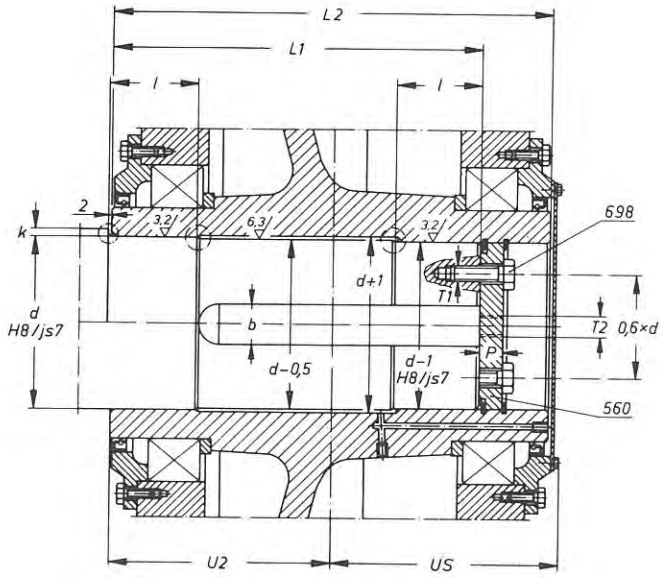
Standard mounting
Normale Montage

Sizes
Grössen **500-710**



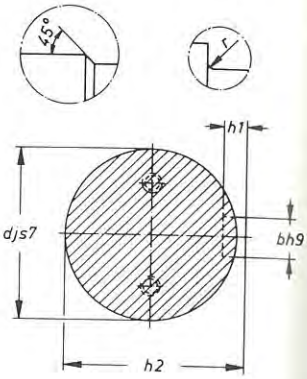


Fig. 3
Abb. 3

Dimensions in mm

Abmessungen in mm

Gear unit size Getriebe Grösse	d	b	h1	h2	k (1	r	l	L1		L2			P	T1	T2	U2			US			Screw item Schraube Pos. 698 (2	
	stand.				min	max		2TC 3TC 4TC 3TKC(V) 4TKC(V) 5TKC(V)	2TKC 2KCT	3TC 4TC 4TKC(V) 5TKC(V)	2TC 3TKC(V)	2TKC 2KCT			2x180°	3TC 4TC 4TKC(V) 5TKC(V)	2TC 3TKC(V)	2TKC 2KCT	3TC 4TC 4TKC(V) 5TKC(V)	2TC 3TKC(V)	2TKC 2KCT	Size Grösse	Qty Stck.
500	240	56	32	252	8	6	120	515	850	610	670	930	32	M24 x 48	M30	310	340	470	315	345	472	M24 x 80	2
560	280	63	32	292	11	8	140	575	930	676	738	1018	36	M30 x 60	M36	345	375	515	345	377	516	M30 x 90	2
630	320	70	36	334	11	8	160	670	-	785	847	-	40	M30 x 60	M36	400	430	-	400	432	-	M30 x 100	2
710	360	80	40	375	11	8	180	745	-	863	952	-	45	M36 x 72	M42	440	485	-	438	482	-	M36 x 100	2

Keys and keyways: ISO/R773-1969.

1) Shoulder required only for through going shaft
2) Item 698 screws are not included in normal delivery.

Dimensions are not binding.

Passfedern und Passfedernuten: ISO/R773-1969.

1) Wellenansatz nur für durchgehende Welle erforderlich.
2) Die Schrauben Pos. 698 sind nicht im normalen Lieferumfang inbegriffen.

Massangaben unverbindlich.

Mounting of hollow shaft gear unit

1. Remove the cover of the hollow shaft. Coat the shaft end of the the driven machine with a noncongealing anti-corrosive oil.
2. Lift the hollow shaft gear unit to the level of the shaft end of the driven machine.

   The hollow shaft of the gear unit can be heated to between 60° and 70°C, using e.g. a soft flame.
3. Fit the gear unit to the shaft by means of a shaft stud bolt(s) and nut(s), which are tightened against the end plate between the seeger-rings. Finally secure the gear unit against the shaft shoulder with locking screws.
4. Fasten the protective cover.
5. When using shrink discs, separate instructions should be consulted. It is extremely important that the hollow shaft bore and the driven shaft is thoroughly cleaned of oil or grease, in order to provide sufficient friction between the surfaces in contact.

Dismantling of the hollow shaft gear unit

1. Drain the oil from the gear unit.
2. Remove the protective cover of the hollow shaft.
3. Fasten a lifting device to the gear unit and remove the gear unit from the anchoring rod.
4. The dismantling is carried out by means of nuts and threaded holes in the end plates.
5. If, in spite of preventive measures, the contact surface has been affected by rust, the removal can be assisted by pumping (see fig. 1...3) a rust solvent (e.g. Caramba) through a hole made for this purpose into the clearance between the contact surfaces. The releasing agent will thus spread over the surfaces.

Montage des Aufsteckgetriebes

1. Schutzdeckel der Holwelle abnehmen.
   Das Wellenende der Arbeitsmaschine mit einem nicht erstarrenden Rostschutzöl schützen.
2. Das Aufsteckgetriebe auf das Niveau des Wellenendes der Arbeitsmaschine heben.

   Die Hohlwelle des Aufsteckgetriebes darf auf 60°...70°C erwärmt werden.
3. Das Getriebe wird gegen die Endscheibe zwischen den Sicherrungsringen mit Hilfe der Stifschraube(n) und der Muttern auf die Welle montiert.
4. Schutzdeckel befestigen.
5. Bei Montage mit Schrumpfscheiben Sonderinstruktionen befolgen. Sorgfältige Reinigung des Hohlwellenlochs und der Welle der Arbeitsmaschine vom Fett ist äusserst wichtig, um genügend hohe Reibwerte zu sichern.

Demontage des Aufsteckgetriebes

1. Das Getriebeöl ablassen.
2. Den Schutzdeckel der Hohlwelle demontieren.
3. Ein Hebezeug an das Getriebe befestigen und die Drehmomentstütze lösen.
4. Das Getriebe mit Hilfe der Schrauben und der Gewindelöcher in der Endscheibe abziehen.
5. Wenn sich trotz Schutzmassnahmen auf den Berührungsflächen Rost gebildet hat, lässt sich die Demontage leichter durchführen, wenn druch die Axialbohrungen an der Hohlwelle ein Lösungsmittel wie z. B. Caramba-Öl eingepresst wird (siehe Abb. 1...3).

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Mounting with shrink disc
Montage mit Schrumpfscheibe

Sizes Grössen 90-400

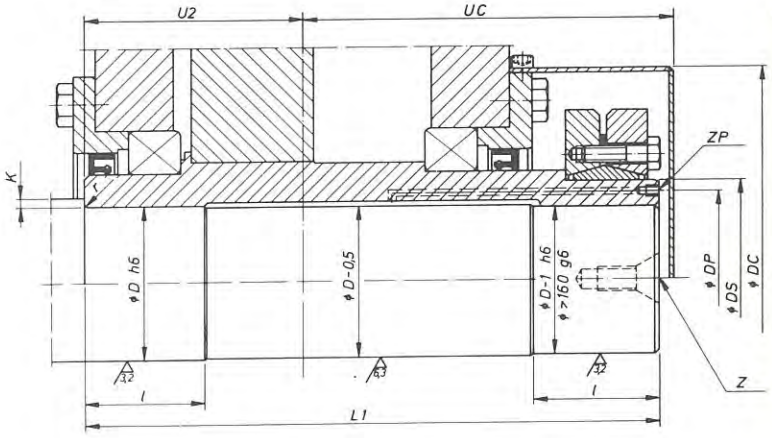


Fig. 6
Abb. 6

Dimensions in mm — **Abmessungen in mm**

Gear unit size Getriebe Grösse	Shrink disc Schrumpfscheibe: Size Grösse (1	DS	Ma (2 Nm	Shaft end of driven machine Wellenende der Arbeitsmaschine: D stand (min)	L1: 2TC 3TC 4TC 3TKC(V) 5TKC(V)	L1: 2TKC	l	k: min	k: max	r: max	U2: 2TC 3TC 4TC 3TKC(V) 5TKC(V)	U2: 2TKC	Z: SFS 50 37 DIN 332	Hollow shaft Hohlwelle: DP	ZP	Cover Deckel: UC 2TC 3TC 4 TC 3TKC(V) 5TKC(V)	UC 2TKC	DC
90	55-72	55	12	45	-	244	28	4	18	3	-	100	M16	-	-	-	152	134
110	75-72	75	29	60	-	290	30	4	23	3	-	122	M20	-	-	-	177	174
140	90-72	90	29	70	263	327	35	4	23	3	100	132	M20	80	6 x M6	172	204	194
160	100-72	100	29	80	301	-	40	4	23	3	118	-	M20	90	6 x M6	194	-	204
180	110-72	110	58	90	324	394	45	4	33	3	125	160	M24	100	6 x M6	214	250	244
200	125-72	125	58	100	349	-	50	6	33	4	135	-	M24	112	6 x M8	227	-	254
225	140-71	140	100	110	393	493	55	6	33	4	154	204	M24	125	6 x M8	250	300	264
250	165-71	165	240	120...(115)	441	547	65	6	38	4	172	225	M24	142	6 x M8	280	333	306
280	175-71	175	240	140...(135)	478	614	70	6	38	4	192	258	M30	157	6 x M8	298	364	324
315	200-71	200	240	160...(150)	551	697	85	7	43	5	218	291	M30	180	6 x M10	345	418	364
355	220-71	220	240	180...(160)	616	770	100	7	43	5	240	317	M30	200	6 x M10	390	467	384
400	240-71	240	470	200...(180)	680	862	110	7	48	5	270	361	M36	220	6 x M10	427	518	436

Mounting with shrink disc
Montage mit Schrumpfscheibe

Sizes Grössen 500-710

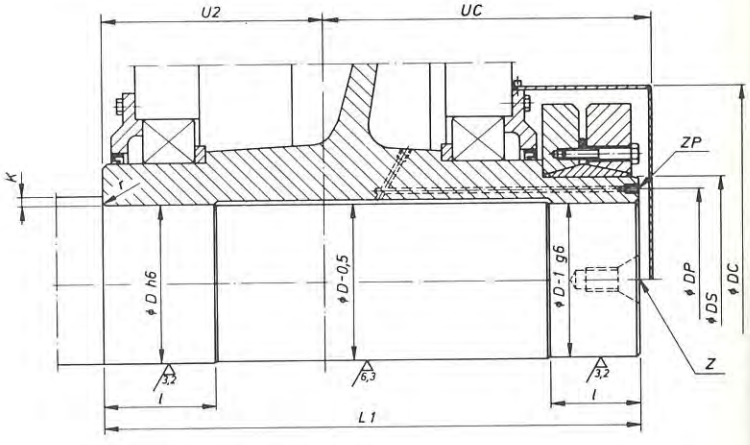


Fig. 7
Abb. 7

Dimensions in mm — **Abmessungen in mm**

Gear unit size Getriebe Grösse	Shrink disc Schrumpfscheibe: Size Grösse (1	DS	Ma (2 Nm	Shaft end of driven machine Wellenende der Arbeitsmaschine: D stand (min)	L1: 3TC 4TC 4TKC(V) 5TKC(V)	L1: 2TC 3TKC(V)	L1: 2TKC	l	k: min	k: max	r	U2: 3TC 4TC 4TKC(V) 5TKC(V)	U2: 2TC 3TKC(V)	U2: 2TKC	Z: SFS 50 37 DIN 332	Hollow shaft Hohlwelle: DP	ZP	Cover Deckel: UC 3TC 4TC 4TKC(V) 5TKC(V)	UC 2TC 3TKC(V)	UC 2TKC	DC
500	300-71	300	470	240...(220)	770	830	1090	140	8	6		310	340	470	M42	270	6 x M16	495	525	652	528
560	350-71	350	470	280...(260)	859	919	1199	160	11	8		345	375	515	M48	315	6 x M16	540	572	712	600
630	390-71	390	820	320...(300)	975	1035	-	165	11	8		400	430	-	M48	355	6 x M20	600	632	-	708
710	440-71	440	820	360...(340)	1084	1174	-	195	11	8		440	485	-	M48	400	6 x M20	670	714	-	758

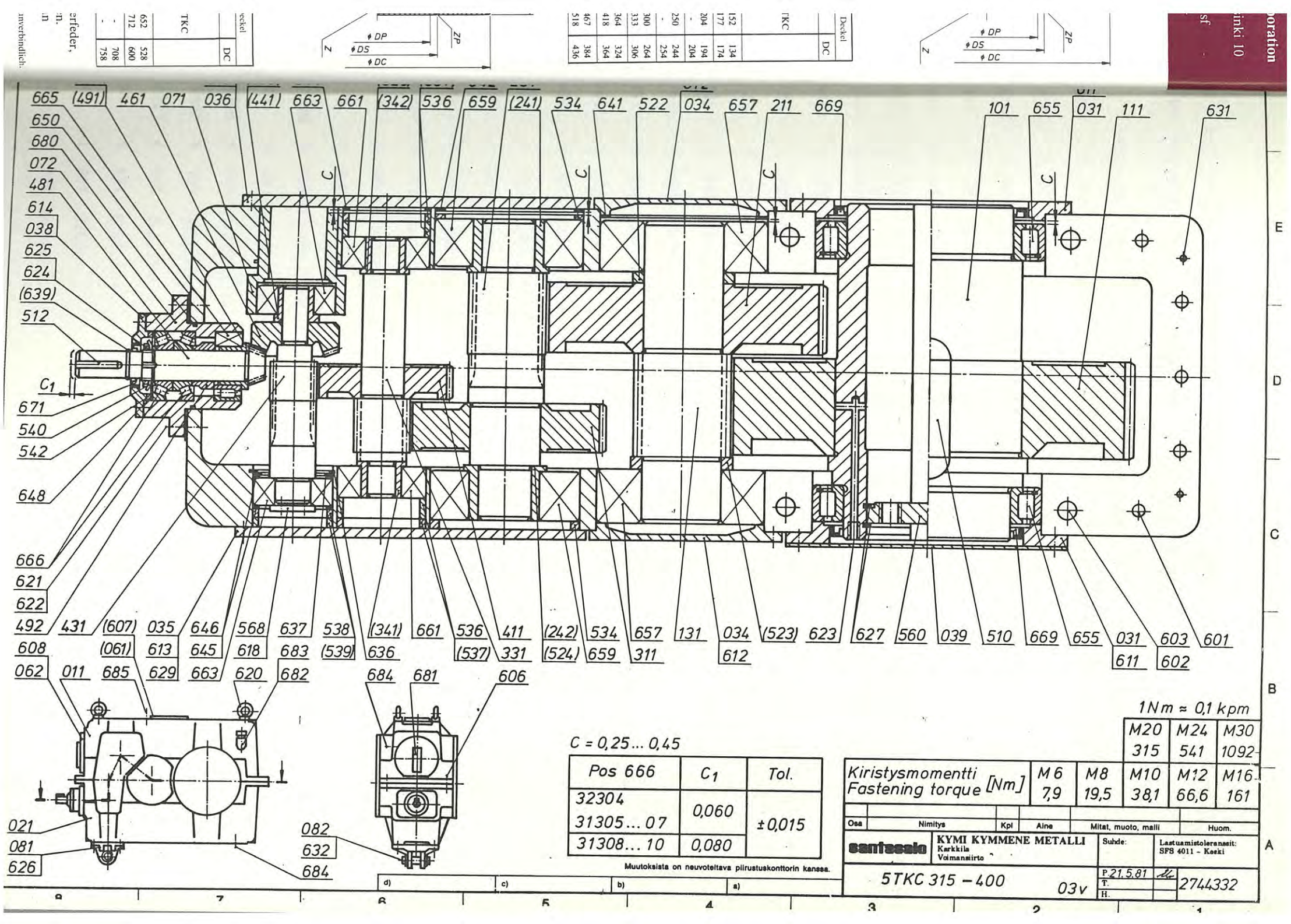
1) Schaefer (TAS), Ringerfeder, Stüwe SD or Stüwe HSD shrink discs can be used.
2) Tightening torque of shrink disc screws.

Dimensions are not binding.

1) Schrumpfscheiben der Marken Schaefer (TAS), Ringerfeder, Stüwe SD oder Stüwe HSD können verwendet werden.
2) Erforderliches Anzugsmoment der Spannschrauben an der Schrumpfscheibe.

Massangaben unverbindlich.

631 111 611 031 655 101 669 211 657 612 034 522 641 534 (241) 231 642 659 (537) 536 (526) (342) 661 644 663 (528) (441) 613 036 071 461 (541) (491) 665 650



C = 0,25 ... 0,45

Pos 666	C_1	Tol.
32304	0,060	±0,015
31305 ... 07		
31308 ... 10	0,080	

Muutoksista on neuvoteltava piirustuskonttorin kanssa.

1Nm ≈ 0,1 kpm

Kiristysmomentti Fastening torque [Nm]	M6	M8	M10	M12	M16
	7,9	19,5	38,1	66,6	161

Osa	Nimitys	Kpl	Aine	Mitat, muoto, malli		Huom.

santasalo	KYMI KYMMENE METALLI Karkkila Voimansiirto	Suhde:	Lastuamistoleranssit: SFS 4011 - Keski
5TKC 315 – 400 03v		P. 21.5.81	2744332
		T.	
		H.	

d)	c)	b)	a)

9 7 6 5 4 3 2 1

E D C B A

NO	PCS	DESP	TYP	MANUF.NO	ASSEMBLY DRG.NO
010	1	822	5TKC355	52531	2744332

	PCS	POS	NAME	MODELL	DIMENSIONS			
009	1	011	GEAR CASE		H=-69			
41802	1	011	CASTING					
41801	1	021	CASTING					
479	2	031	COVER					
532	2	031	CASTING					
492	2	034	COVER					
542	2	034	CASTING					
445	1	035	COVER					
133	1	035	CASTING					
425	1	036	COVER					
133	1	036	CASTING					
669	1	038	COVER					
941	1	038	CASTING					
489	1	039	COVER					
890	1	061	INSP.COVER					
469	1	062	INSP.COVER					
293	1	071	BEAR.SLEEVE					
483	1	072	BEARING COVER					
19202	1	072	CASTING					
831	1	081	ANCHOR.PLATE					
106	1	081	CASTING					
595300	1	082	ANCHOR.PIN					
414	1	101	HOLLOW SHAFT		0.00	0	286	480
08701	1	101	CASTING					
538107	1	111	WHEEL		7.00	77	563	142
32103	1	111	CASTING					
5141	1	131	PINION		7.00	-22	176	444
5270	1	211	WHEEL		4.50	-84	396	100
5678	1	231	PINION		4.50	24	123	418

NO	PCS	DESP	TYP	MANUF.NO	ASSEMBLY DRG.NO
110	1	822	5TKC355	52531	2744332

	PCS	POS	NAME	MODELL	DIMENSIONS
245	1	311	WHEEL	2.75	104 299 72
328	1	331	PINION	2.75	-23 73 378
058	1	341	BEARING BUSH		
058	1	342	BEARING BUSH		
225	1	411	WHEEL	2.00	-97 204 50
057	1	431	PINION	2.00	24 55 301
006	1	441	BEARING BUSH		
029	1	461	BEVEL WHEEL	2.75	28 0 0
028	1	481	BEVEL PINION	2.75	-9 0 0
081	1	492	INTERM.PIPE		
00142	1	510	KEY	SFS2636 B	63 32 142
00050	1	512	KEY	SFS2636 B	8 7 50
04114	1	522	DIST.RING		145 110 17
02821	1	524	DIST.RING		110 95 21
03723	2	534	DIST.RING		200 180 23
03142	2	536	DIST.RING		140 120 42
02635	1	538	DIST.RING		100 90 35
05409	1	539	DIST.RING		100 90 3
05307	1	540	DIST.RING		44 35 5
06628	1	541	DIST.RING		50 40 10
035	1	560	END PLATE		
079	1	568	END PLATE		
0	7	601	HEXAGON SCREW	SFS2064	M16 50 8.8
0	8	602	HEXAGON NUT	SFS2067	M30 8
0	8	603	STUD BOLT	DIN939	M30FOX170 6.8
0	5	606	6.S.C.SCREW	SFS2219	M16 35 8.8
0	6	607	HEXAGON SCREW	SFS2064	M8 20 8.8
0	6	608	HEXAGON SCREW	SFS2064	M12 30 8.8
0	12	611	HEXAGON SCREW	SFS2064	M12 35 8.8

NO	PCS	DESP	TYP	MANUF.NO	ASSEMBLY DRG.NO
10	1	822	5TKC355	52531	2744332

	PCS	POS	NAME	MODELL	DIMENSIONS	
0	10	612	HEXAGON SCREW	SFS2064	M12 35	8.8
0	18	613	HEXAGON SCREW	SFS2064	M12 35	8.8
0	4	614	HEXAGON SCREW	SFS2064	M8 20	8.8
0	2	618	HEXAGON SCREW	SFS2064	M8 20	8.8
0	4	620	LIFTING EYE BOLT	DIN580	M24	
0	4	621	HEXAGON NUT	SFS2067	M16	8
0	4	622	STUD BOLT	DIN976	BM16X60	5.6
0	2	623	LOCKING SCREW	DIN913	M10 10	
0	1	624	NUT	SKF KM	7	
0	1	625	TAB WASHER	SKF MB	7	
0	4	626	HEXAGON SCREW	SFS2064	M20 60	8.8
0	2	627	LOCKING RING	DIN472	180 4	
0	4	631	TAPER DOWEL	DIN1	10X50	
0	2	632	LOCKING RING	DIN471	45 1.75	
0	1	636	LOCKING RING	DIN472	100 3	
0	1	637	SUPPORT RING	DIN988	SS 80X100X3.5	
194	2	641	SHIM			
180	2	642	SHIM			
123	2	644	SHIM			
0	1	645	SHIM			
082	2	646	SHIM			
0	1	648	SHIM			
0	4	650	SHIM			
8	2	655	BEARING		NCF2948V.C3	
223	2	657	BEARING		22322EC3	
193	2	659	BEARING		22319EC3	
133	2	661	BEARING		22313EC3	
093	2	663	BEARING		22309EC3	
083	1	665	BEARING		22308EC3	

NO	PCS	DESP	TYP	MANUF.NO	ASSEMBLY DRG.NO
10	1	822	5TKC355	52531	2744332

	PCS	POS	NAME	MODELL	DIMENSIONS
0	2	666	BEARING		31307
0	2	669	OIL SEAL		A 240 270 15
1	1	671	OIL SEAL		AS 32 50 10
2	1	680	O-RING		119.5X3
2	1	681	OIL GLASS		ML-170
0	1	682	BREATHER		R3/4
0	1	683	L-PIECE	LVI 5140	R3/4
0	2	684	PLUG	DIN906	R3/4
4	2	685	PLUG	DBI	38

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SANTASALO

Lubrication of gear units 9.111U-1

10.87

1. General

Lubrication, inspection and planned maintenance are of prime importance to ensure trouble free running of gear units. These instructions are designed to help achieve this end. For special gear units and gear units operating in exceptional conditions individual lubrication instructions are supplied by us.

2. Lubrication principles

The purpose of lubrication is to provide a film of oil which prevents direct metal to metal contact between the working flanks. At the same time the oil lubricates the bearings and seals. The purpose of lubrication is also to:

— reduce friction
— dissipate heat
— minimize wear
— remove wear particles
— inhibit corrosion.

The thickness of the film of oil depends on the following factors: the surface stress of the tooth, the viscosity and quality of the oil, pitch line velocity etc. The working flanks of the teeth will be damaged if the film repeatedly breaks during operation.

3. Lubrication methods

3.1 Choice of lubrication method

The lubrication method depends in the first place on the pitch line velocity. Design, type and size of the gear unit must also be considered.

The lubrication method depends on the pitch line velocity (v) of the gears as follows:

— bath lubrication can be used when $v < 4\ ms^{-1}$ (The size and type of gear unit determine the limit)
— splash lubrication is used at pitch line velocities $v < 14\ ms^{-1}$
— pressure lubrication is used if bath or splash lubrication are not possible.

3.2 Bath lubrication

When using bath lubrication the oil level is raised so that the gears are deep immersed in oil. In order to secure the lubrication of bearings it is often necessary to raise the oil level to the level of bearings.

3.3 Splash lubrication

The most commonly used method is splash lubrication. Parts of the gears immersed in the oil contained in the oil sump, lift the oil as they rotate and splash it around, lubricating the gears in mesh and the bearings. Generally a pitch line velocity of $v = 14\ ms^{-1}$ sets the limit for splash lubrication. However, with special arrangements splash lubrication can be applied with higher pitch line velocities.

3.4 Pressure lubrication

Selection of the correct type of pressure lubrication equipment is governed by several factors e.g. type/size of gear units, complexity of the required surveillance devices and the method of cooling. We manufacture two standard pressure lubrication unit types, if required both types of unit can be supplied with a water cooled oil cooler, see instruction 9.112.

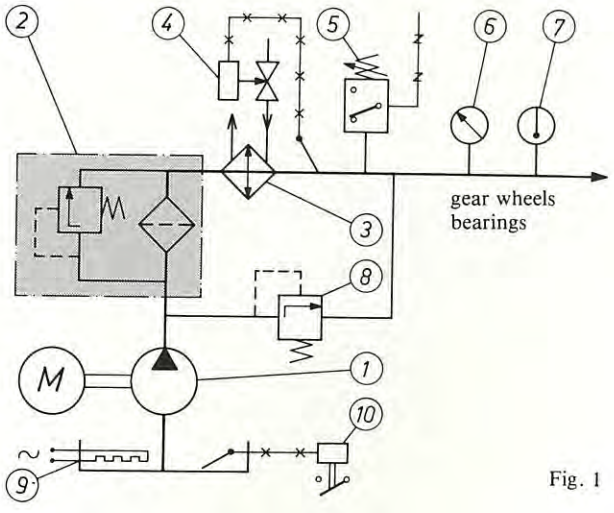

Fig. 1

The pressure lubrication system is built up from the following standard equipment (fig. 1):

— pump, driven by an electric motor (1). The pump may also be driven by a shaft (usually input shaft) of the gear unit. We recommend the electric motor of the pump to be so connected that it has to be started before the drive motor of the gear unit can be started and to have the pump motor protected with an overload relay
— pressure gauge (6)
— built-in pipe system leading the oil to tooth contacts and bearings.

Lubrication units for complex drives also include:

— filter (2)
— pressure switch (5) connected to the control circuit of the main motor to prevent start up before the oil pressure reaches a minimum set value. In the same way the pressure switch stops the main motor should the oil pressure drop below the set value. This value has already been preset at our factory and is recommended to be 60 % of the oil pressure under the normal operating temperature.

If the gear unit requires external artificial cooling, lubrication unit should also included:

— water-cooled oil cooler (3) or air-cooled oil cooler
— thermostatic water valve (4)
— thermometer (7)
— relief valve (8)

At low ambient temperatures:

— oil heater (9), regulated by thermostat (10) may be necessary.

The lubrication units can also be equipped with other surveillance devices according to customer's requirements.

Usually the pressure lubrication devices are fitted at the slow speed shaft end of the gear unit. Should this method prove to be unsatisfactory because of the size of gear unit or other space limitations, the pressure lubriction system is supplied as a separate unit.

The pressure lubrication unit can be either foot mounted or wall mounted, see instruction 9.112.

Standard delivery includes an oil suction hose of 800 mm max. length and an oil pressure hose of 1500 mm max. length.

The pressure lubrication unit should preferably be placed below the oil level of the gear unit and as close to it as possible.

3.5 Grease lubrication

Grease lubrication is employed for lubrication of bearings and seals almost exclusively in such cases where pressure lubrication is not necessary and bearings and seals do not get lubrication by any other means.

4. Oil heating

We should be informed of details about ambient temperature and its changes at the quotation stage. This information will help us to assess whether the oil should be heated. See also items 6.3 and 6.4.

The oil heater is a resistor element, which is placed in the oil sump of the gear unit and fastened to the wall of the gear case. If required, the resistor element can be removed for cleaning, in which case the oil has to be drained from the gear unit.

The oil heater is controlled by thermostat (10). The thermostat must be so set that the oil heater is switched on when

— the oil temperature of bath or splash lubricated gear units drops below the pour point of the oil
— the oil temperature of pressure lubricated gear units drops below the following temperatures:

ISO VG Class	680	460	320	220	150
Minimum temperature °C	25	20	15	10	5

The upper limit of the thermostat is so set that the oil heater is switched off at temperatures 8...10°C higher than the above mentioned switching-on temperature.

5. Oil cooling

The gear unit's maximum permitted operating temperature measured in the oil sump is generally +80°C; in some special cases (for example at high ambient temperatures) the permitted operating temperature may rise up to max. +100°C. If the running load of the gear unit is higher than the thermal rating, the gear unit needs increased cooling to prevent the temperature exceeding the above mentioned normal temperatures.

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Increased cooling of the gear unit is achieved by:
— inserting a cooling coil in the oil sump of the gear unit
— mounting one or two fans at the input shaft of the gear unit
— external water-cooled oil cooler
— external air-cooled oil cooler

The employment of fans or an air-cooled oil cooler is not recommended for dusty conditions.

The use of water cooling coil or fans makes it possible to keep the driving temperature of the gear unit within the allowed limits , to enable the running load to exceed the thermal rating by 1,7...2 times. This limit being exceeded, an external water- or air-cooled oil cooler must be used in connection with a pressure lubrication system.
On the inlet side of the cooling coil and the water-cooled oil cooler a regulating valve has to be fitted which is opened when the oil temperature is +45...+50°C. To avoid manual control we recommend the use of a thermostat controlled water valve for the oil cooler. The maximum pressure of water is 1 MPa (10 kpcm^{-2}). The flow direction of water in the cooling water coil is not important, whereas the flow direction indicated on an external oil cooler must be strictly observed.
The water flow in the cooling water coil must be so regulated that the temperature in the oil sump of the gear unit does not exceed +70°C. Therefore, the oil sump is equipped with a thermometer. In an external water-cooled oil cooler the water flow is so regulated, that the temperature of the oil inlet to the gear unit is +45...+55°C.
The coolers are intended for clean fresh water. For salt water or unclean fresh water, cooler elements made from special materials are necessary. Therefore, information concerning the water quality should be supplied with the order.
Max. allowed water quantities must not be exceeded, see instruction 9.112.
In cases where the gear unit is equipped with an air-cooled oil cooler this is also provided with a thermostat to control the function of the motor driving the cooling fan.

6. Lubrication oils

6.1 Selection of lubrication oil

The viscosity of oil is important but not the only decisive factor in the selection of lubrication oil
In addition to the required viscosity, the oil must have a high viscosity index and include antioxidant, anti-rust, anti-foam and anti-wear additives.
Because of the high tooth pressures which occur in gear units, the oil should contain pressure resistant additives (mild EP-additives). If, due the operation temperatures or change intervals, synthetic oils are selected, it is recommended that hydrocarbon based oils are used.
A separate recommendation concerning synthetic lubricating oils will be delivered if required.

6.2 Lubrication oil classes

With consideration to the above mentioned requirements the oils are grouped in viscosity classes according to the standard ISO 3448-1975, on which our lubrication oil recommendation in the enclosed table 1 is based. Also lubricant No according to the standard AGMA 250.04-1981 is listed.

6.3 Selection of viscosity

All of our units have a plate indicating the recommended lubrication oil corresponding to a certain ISO VG class in table 1 and which is valid at normal temperatures (+5...+35°C). In case the gear unit is working in the open, it has two plates, one of which indicates the recommendation for normal temperatures (+5..+35°C) and the other for winter temperatures (—30°C...+5°C). If the gear unit is equipped with an oil heater it is generally possible to manage with the same oil both summer and winter.
In connection with incoming orders on gear units we sometimes receive information not fully conforming with the real facts; therefore, our lubrication instructions include a nomograph (fig. 4) which makes it possible to determine the viscosity of the oil required at **operating temperature.** The situation at cold-starting has to be checked (item 6.4) before the final oil class selection is made.
If the back stops (where fitted) are equipped with a separate oil chamber, the lubrication oil group ISO VG10/15 — operation temperature range —40°C...+50°C is used. It is not permissible to use oils with EP-additive in back stops.

6.4 Cold-starting

At cold-starting the temperature and viscosity limits are the following:
— bath and splash lubricated gear units: starting temperature higher than the oil's pour point (table 1)
— pressure lubricated gear units: viscosity of lubrication oil below 2000 cSt at starting temperature (see also table item 4).

If the viscosity of the oil selected exceeds the allowed viscosity at starting temperature, the nearest thinner oil group (Table 1) must be selected. When doing so, it must be checked that the viscosity limit is not lower than 40 cSt at operating temperature. If this is impossible there remain two alternatives
— to use different oil for winter and summer conditions, or
— to employ an oil heater.
When the starting temperature drops temporarily (for example at standstill) the difficulties in starting pressure lubricated gear units can be facilitated by having the electric motor pump running during the standstill period.
Should table 1 not include a lubrication oil meeting the above mentioned requirements (e.g. exceptionally cold ambient), the gear unit manufacturer or the oil company should be consulted.

7. Operation

7.1 Preparation for use

If the gear unit has been stored for a long period before use, 1/2—2 years, depending on the storage conditions, all roller bearings should be lubricated with a suitable hand lubricating device e.g. through inspection opening. The shafts are then manually rotated,to spread the lubricant throughout the bearings.

7.2 The first oil filling

For the first filling, it is very important that the oil quality is one recommended by us (note starting temperatures, items 6.3 and 6.4) or fully equivalent and that the quantity is correct. Gear units have a plate indicating the recommended qualities and quantity of oil in litres. Gear unit is also provided with an oil level indicator, e.g.a graduated glass on which an arrow indicates the correct oil level when the gear unit is at rest and the oil pump running if pressure lubricated. It is absolutely necessary that the oil filling is made according to the oil level indicator; the quantity of oil stamped on the plate is a guiding value only. In general, it is impossible to judge the correct quantity of oil when the gear unit is running.

7.3 The importance of correct oil quantity

The correct quantity of oil is especially important in splash lubricated gear units whose running load is close to the thermal rating. For instance, the operating temperature of a single reduction helical gear unit may rise 15—20°C above normal simply because 15 % too much oil has been added. The result is a reduction in the lubrication capability of the oil, at worst, damage to the gear unit.

7.4 Start and overhaul

Before starting pressure lubricated gear units the pressure lubrication system has to be checked by a test run. It is important that the rotational direction of the pump motor is correct and the current overload relay is suitable. Also check that the interlock between the main drive motor and the pump motor (via the pressure switch) operates satisfactory.
Starting is the most critical moment for lubrication. Therefore, it is extremely important to check the function of the pressure lubrication system. We refer to item 8.1 and instruction 9.211 and 9.112.

8. Control and service

8.1 Measures during operation

The pressure lubrication system:
— if the system includes a maximum pressure valve it opens on start with cold oil, when the oil pressure exceeds the set value 600 kPa (6 kpcm^{-2}) and closes when the running temperature of the gear unit becomes steady. The functioning of the pressure relief valve can be checked by lifting the lever, this opens the valve.
— the oil pressure at operating temperature is 80...250 kPa (0.8...2.5 kpcm^{-2}) depending on the design of the pipe system
— if the gear unit is fitted with a water cooling coil or external water cooled oil cooler, the water flow has to be so regulated that the temperature does not exceed the normal temperature (see item 5).

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8.2 Maintenance

8.2.1 Cleaning of the filter

The filter must be thoroughly cleaned at each oil change. The filter is opened and the filter chamber cleaned. The filtering element can be washed with a suitable solution. If clogged, the filtering element must be renewed.

Filter maintenance

- drain the filter reservoir through the drain plug
- open the filter by unscrewing the cover top of the filter
- remove the filter with the holder from the reservoir
- take the cartridge out of the holder by removing the wing nut
- wash the filter cartridge and clean the magnetic rod
- check condition of the cartridge and seals and replace with new original spare parts when needed
- assemble the filter in reverse order
- check the filter for any possible leaks

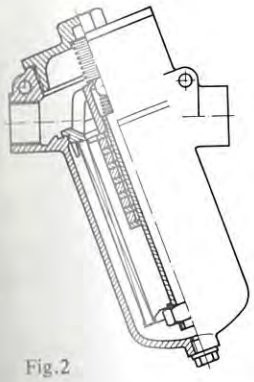


Fig.2

8.2.2 Oil changes

The first oil change must be made after 400...500 operating hours. The oil must be still warm when removed. If necessary, both the gear unit oil chamber and pressure lubrication system should be thoroughly rinsed with flushing oil during the oil change. Subsequent oil changes are performed after 4000 operating hours or once a year in case annual operating hours are less than 4000. If running temperature is 80°C or higher, the oil should be changed after every 2500 h.

With correctly selected synthetic oil, the intervals between oil changes can be doubled.

If necessary the gear unit should be rinsed during oil changes. For large gear units demanding substantial volumes of oil, it is possible to depart from the above general rule and to make the oil change only when regular inspection (at intervals of abt 4000 operating hours) of the oil quality shows it to be required. This procedure is adopted only if the inspection is carried out by a reliable specialist.

If the back stop (where fitted) has a separate oil chamber, the oil should be changed at the same time as the gear unit oil change (item 6.3.). The oil heater must also be removed and cleaned (item 4).

8.2.3 Subsequent greasing of grease lubricated bearings

The necessity for repeated greasing of grease lubricated bearing limited, because the grease cannot escape into the oil sump. The itial greasing of these bearings is performed at our works. recommended qualities of grease are indicated on the plate fixec the gear unit. Table 2 shows roller bearing greases.

For grease application there is a grease nipple on the bearing hous or cover denoted by a red painted triangle. In most cases add grease in connection with the oil change is sufficient. Precauti must be taken, as excessive greasing raises the operating temperat of the bearing.

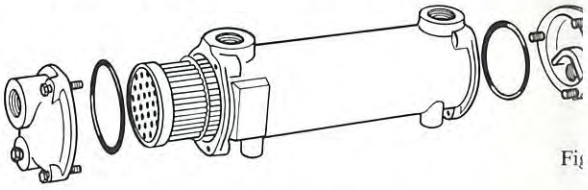
Lime soap based greases do not withstand temperatures exceed 60°C, which are normal in bevel bearings.

8.2.4 Cleaning of the outer surfaces

The outer surface of the gear unit must be kept clean, as accumula dirt on this surface raises the operating temperature. The sa reason for cleaning the outside surfaces also applies to the auxili equipment e.g. the pump motor, the air-cooled oil cooler, the cool fans etc.

8.2.5 Cleaning of the oil cooler

The water-cooled oil cooler must also be cleaned. The quality of cooling water determines how often this is carried out. In any cas should be cleaned at least when the oil change takes place.



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Removal of the screws around the periphery at each end will all the end covers and the seals to be removed. Following this operati the tube stack can be withdrawn from either end of the body.

If the tube stack requires cleaning it should first be degreased wh will clean the oil side of the tubes. The inside of the tubes which ha water passing through them may require mechanical cleaning. If t is the case they can be cleaned by pushing a length of 3 mm diame steel rod down the tubes in the opposite direction to that in which t water flows. The other components of the oil cooler should be cle ed before assembly and as these contain no hidden surfaces, spec instructions are not required.

When assembling the oil cooler, new '0' seals should be fitted and t end screws must be tightened to the torque settings: — EC types 8N and FG types 22Nm.

8.2.6 Cleaning of the Breather

During oil change the breather in the filling plug should be removed a checked to ensure that the air flows freely through it. If the breathe blocked, it must either be replaced or cleaned with a suitable solve

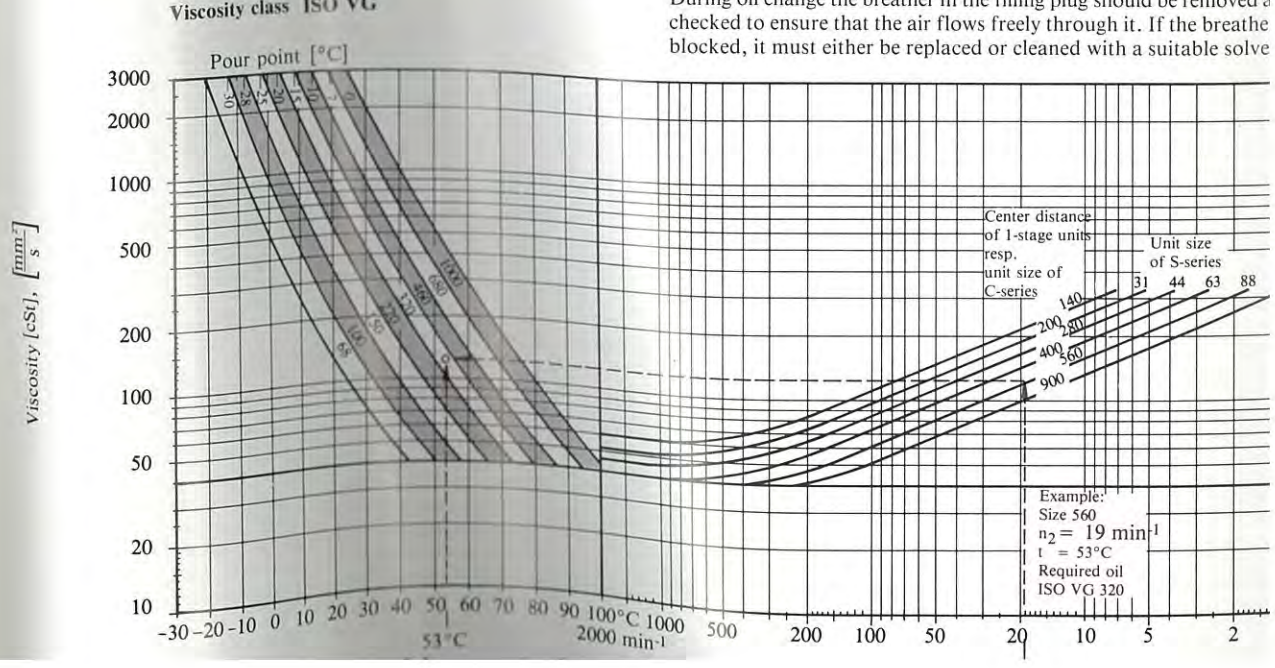

Table 1: Lubricating oils grouped according to ISO VG classes

ISO VG class	AGMA Lubricant No	Company	Oil	Viscosity cSt/40°C	Pour point °C
10/15 *)		BP	Energol HLP 10	8.6	—51
		Esso	NUTO H 15	14.5	—45
		Mobil	Arctic Oil Light	13	—45
		Nynäs	Nynäs TD 10 EX	9.8	—54
		Shell	Tellus Oil R 10	10	—54
		Texaco	Rando Oil HDZ 15	16	—60
46 41.4— 50.6cSt (40°C)	**1 EP** 193— 235SUS (100°F)	Mobil	Mobil DTE 25	44	—31
		Nynäs	Nynäs TD 46 EX	47	—30
		Shell	Tellus Oil S 46	46	—33
		Texaco	Rando Oil HD 46	43	—30
		BP	Energol HLP 46	46	—30
		Esso	NUTO H 46	45	—33
68 61.2— 74.8cSt (40°C)	**2 EP** 284— 347SUS (100°F)	Nynäs	Nynäs GL 68	68	—27
		Shell	Omala Oil 68	68	—32
		Texaco	Meropa Lubricant 68	65	—34
		Chevron	EP Industrial Oil 68	68	—24
		BP	Energol GR—XP 68	65	—30
		Esso	Spartan EP 68	65	—33
		Mobil	Mobilgear 626	64	—33
100 90— 110cSt (40°C)	**3 EP** 417— 510SUS (100°F)	Shell	Omala Oil 100	100	—32
		Texaco	Meropa Lubricant 100	91	—31
		Chevron	EP Industrial Oil 100	100	—15
		BP	Energol GR—XP 100	96	—30
		Esso	Spartan EP 100	95	—30
		Mobil	Mobilgear 627	100	—29
		Nynäs	Nynäs GL 100	100	—24
150 135— 165cSt (40°C)	**4 EP** 626— 765SUS (100°F)	Texaco	Meropa Lubricant 150	140	—27
		Chevron	EP Industrial Oil 150	150	—15
		BP	Energol GR—XP 150	140	—27
		Esso	Spartan EP 150	140	—27
		Mobil	Mobilgear 629	142	—24
		Nynäs	Nynäs GL 150	150	—24
		Shell	Omala Oil 150	150	—25
220 198— 242cSt (40°C)	**5 EP** 918— 1122SUS (100°F)	Chevron	EP Industrial Oil 220	220	—12
		BP	Energol GR—XP 220	210	—27
		Esso	Spartan EP 220	225	—21
		Mobil	Mobilgear 630	209	—23
		Nynäs	Nynäs GL 220	220	—18
		Shell	Omala Oil 220	220	—18
		Texaco	Meropa Lubricant 220	198	—21
320 288— 352cSt (40°C)	**6 EP** 1335— 1632SUS (100°F)	BP	Energol GR—XP 320	305	—24
		Esso	Spartan EP 320	337	—18
		Mobil	Mobilgear 632	304	—18
		Nynäs	Nynäs GL 320	320	—12
		Shell	Omala Oil 320	320	—15
		Texaco	Meropa Lubricant 320	290	—18
		Chevron	EP Industrial Oil 320	320	— 9
460 414— 506cSt (40°C)	**7 EP** 1919— 2346SUS (100°F)	Esso	Spartan EP 460	440	—12
		Mobil	Mobilgear 634	437	—18
		Nynäs	Nynäs GL 460	460	— 9
		Shell	Omala Oil 460	460	— 9
		Texaco	Meropa Lubricant 460	420	—17
		Chevron	EP Indutrial Oil 460	460	— 9
		BP	Energol GR—XP 460	450	—15
680 612— 748cSt (40°C)	**8 EP** 2837— 3467SUS (100°F)	Mobil	Mobilgear 636	646	— 9
		Shell	Omala Oil 680	680	— 9
		Texaco	Meropa Lubricant 680	620	—15
		BP	Energol GR—XP 680	630	— 9
		Esso	Spartan EP 680	645	— 9

*) Oils employed for lubrication of back-stops

A separate recommendation concerning synthetic lubricating oils will be delivered if required.

Table 2: Roller bearing greases

General recommendation			
Company	Grease	Penetration	Dropping point °C
Chevron	Dura-Lith EP2	265/295	185
BP	Energrease LS-EP2	265/295	180
Esso	Beacon EP2	270/280	185
Mobil	Mobilux EP2	265/295	177
Nynäs	Nynäs Alexol L42	265/295	190
Shell	Alvania EP2	265/295	180
Texaco	Multifak EP2	265/295	186
Lubrication of warm (>80°C) running tapered roller bearings			
Beverol	Licol		
Optimol	Longtime PD2		
Shell	Lub 2370E		
Klueber	Isoflex LDS18 SA		
Lubrication of slow running thrust bearings			
Klueber	Unimoly GL 402		

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Lubrication of gear units 9.111U-4

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SANTASALO

Mounting of gear units 9.211 W-1

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1. GENERAL

Every gear unit is test run at our works. During the test run special attention is paid to tooth contacts, running noise and temperature. The minimum tooth contact required for a pair of helical gears is 80 % of the tooth facewidth. The vertical contact of the teeth must be at least 50 % of the active flank of the tooth. Bevel pinions and wheels are lapped in pairs after the teeth are cut, and during assembly the tooth contacts are adjusted accordingly.
As manufacturers of gear units we always try to maintain the high quality of our products, but this alone is not enough to guarantee perfect operation. We therefore expect that the mounting, operation and maintenance service are carried out in accordance with our instructions before our guarantee for the product becomes effective.
In addition to these instructions we ask you to study our instructions 9.111 for lubrication of gear units and 6.311 for fitting and lubrication of gear couplings.
Mounting of hollow shaft gear units should be carried out in accordance with our instruction 9.231.

2. GEAR UNIT FOUNDATIONS

2.1 Types of foundation

In order to ensure a quick and successful mounting the type of foundation should be correctly selected and the mounting carefully planned in advance, viz. foundation drawings with construction details should be available.
We recommend the foundation methods shown in figures 1, 2 and 3. A customer's own foundation method must be equally adequate. When mounting a gear unit onto steel framework, special attention should be paid to the rigidity of this framework in order to prevent destructive vibrations and/or oscillations. Within the actual steel construction, the mounting bed for the gear unit must also comply with the quality requirements as for machine beds. Small gear units weighing below 250 kg are mounted by using foundation screws as shown in figure 1. For gear units weighing 250—4000 kg we recommend the foundation type in figure 2, which is equipped with separate machined foundation brackets. For gear units weighing more than 4000 kg as well as for turbine and high speed gear units, a bedplate of either fabricated steel or cast iron is recommended according to figure 3. If the foundation brackets or the bedplate are ordered from us, our supply includes all the parts to be mounted above the supporting girders.

2.2 Concrete reinforcement

The concrete base for the foundations must be adequately interlocked and reinforced by the use of steel clamps or rods or steel sections embodied in the concrete. The base concrete should be clad with grout as shown in figures 1—3.
The base concrete must withstand at least the same load as the weld joints of the foundation screws (see table).

2.3 Base concrete and supporting girders

Fastening plates with a sufficient number of anchor bolts may also be used instead of supporting girders.
Type and dimensions of the supporting girders are guiding values. The adjusting of supporting girders is done most easily by drilling a couple of holes of ø 3—5 mm in each girder through which the girders are nailed to the shuttering. The mounting precision with respect to the supporting girders should be ± 10 mm in all directions. The top planes of girders to be horizontal in order to make the actual mounting easier.
When several gear units have to be mounted in the shortest possible time, the shuttering for the base concrete bed must be prepared and equipped with fittings for setting up the supporting girders beforehand.

2.4 Grouting

When grouting, it is absolutely necessary to avoid tamping or vibrating the concrete, as this may have a bad effect on tooth contact and could impose an unnecessary stress on the gear case. By using the recommended types of foundation the density of the grout is not significantly important.

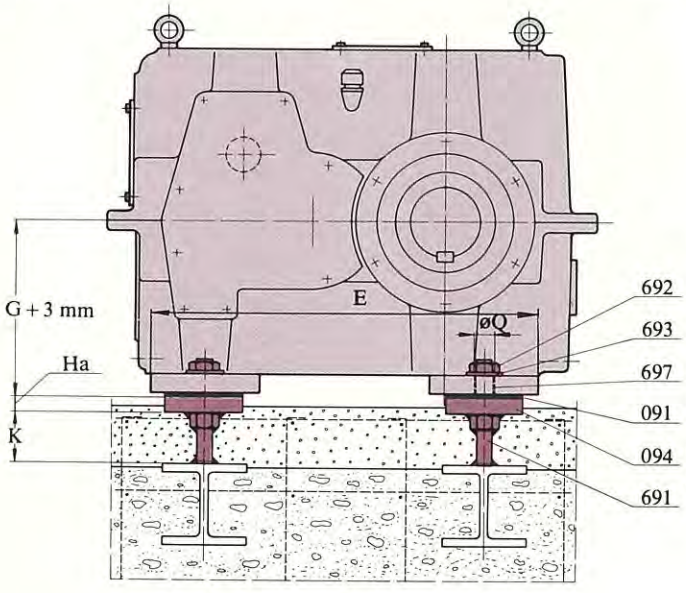
3. PREPARATIONS FOR MOUNTING

3.1 Checking

Prior to mounting it is advisable to check the foundation dimensions with those of the drawings in order to avoid major corrections later on.

3.2 Fitting of couplings etc.

Fitting of coupling halves or pulleys or chain- or gear-wheels on the shaft ends is carried out either before or after installation of the gear unit, depending on the type of coupling or wheel. When preheated to about 80 to 90°C — preferably in an oil-bath — they can be fitted by hand. Before this however, the tolerances of the shaft and the coupling half must be checked, and it must be seen that the key fits. **Fitting by force must be avoided, because it may result in damage to the bearings.**



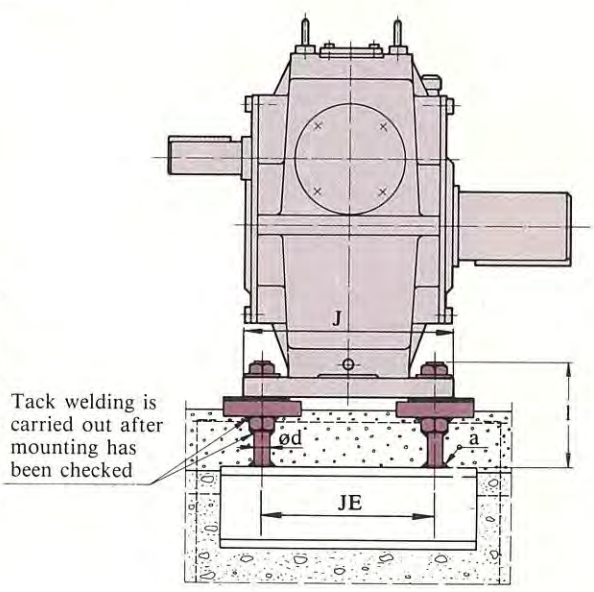


Fig. 1. Dimensions in mm

ø M	Foundation screw				Washer	Supporting girders DIN 1025 Fe 37 B
	ød	l	a	K	Ha	
15	M12	100	5	40	20	HE 100×100
19	M16	120	5	50	20	HE 100×100
24	M20	120	6	50	20	HE 100×100

Dimensions øQ, E, G, J and JE are given in the leaflet of the gear unit.

Part. No	Description
091	Fitting plate
094	Washer
691	Foundation screw
692	Nut
693	Washer
697	Centralizing bush

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SANTASALO

Mounting of gear units 9.211 W-3

01.88

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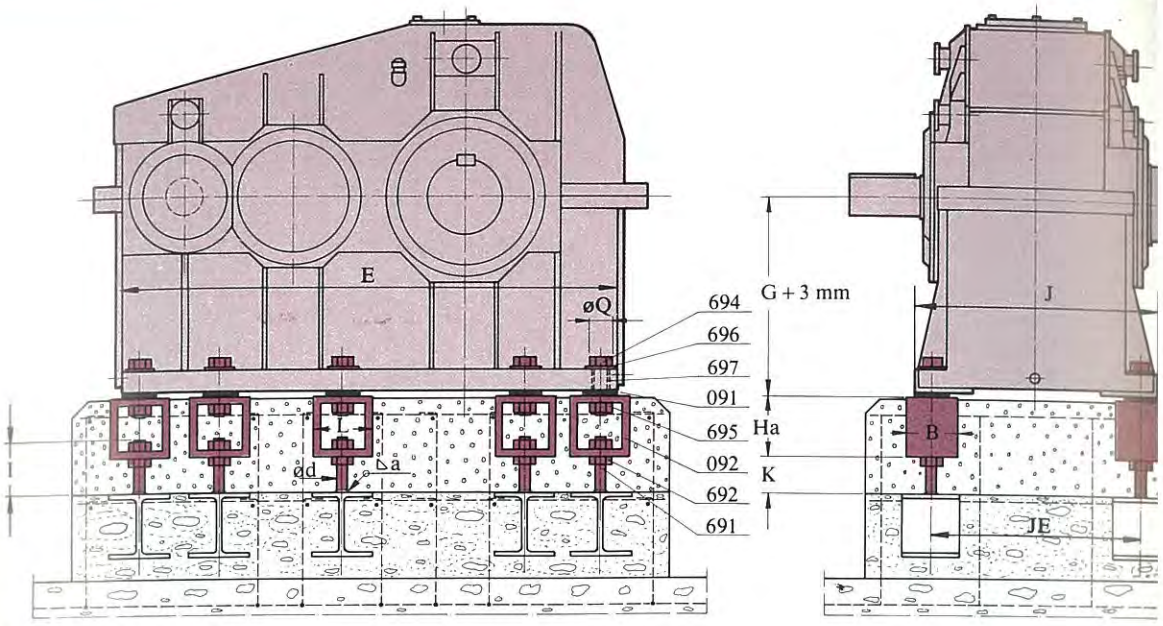

Fig. 2. Dimensions in mm

øM	Foundation screw						Foundation bracket			Supporting girders DIN 1025 Fe37B
	ød	l	a	K	f*)	n*)	B	L	Ha	
12	M24	100	8	50			80	120	120	HE100×100
15	M24	100	8	50			80	120	120	HE100×100
19	M24	100	8	50			80	120	120	HE100×100
24	M24	100	8	50	31		80	120	120	HE100×100
28	M30	140	10	70	46		120	150	140	HE140×140
35	M36	150	10	70	41		120	150	140	HE140×140
42	M42	180	10	90		22	150	185	180	HE180×180
48	M48	200	10	110		34	150	185	180	HE180×180

*) See figure 4.
Dimensions ø Q, E, G, J and JE are given in the leaflet of the gear unit.

Part. No	Description
091	Fitting plate
092	Foundation
691	Foundation
692	Nut
694	Hexagon scr
695	Nut
696	Washer
697	Centralizing

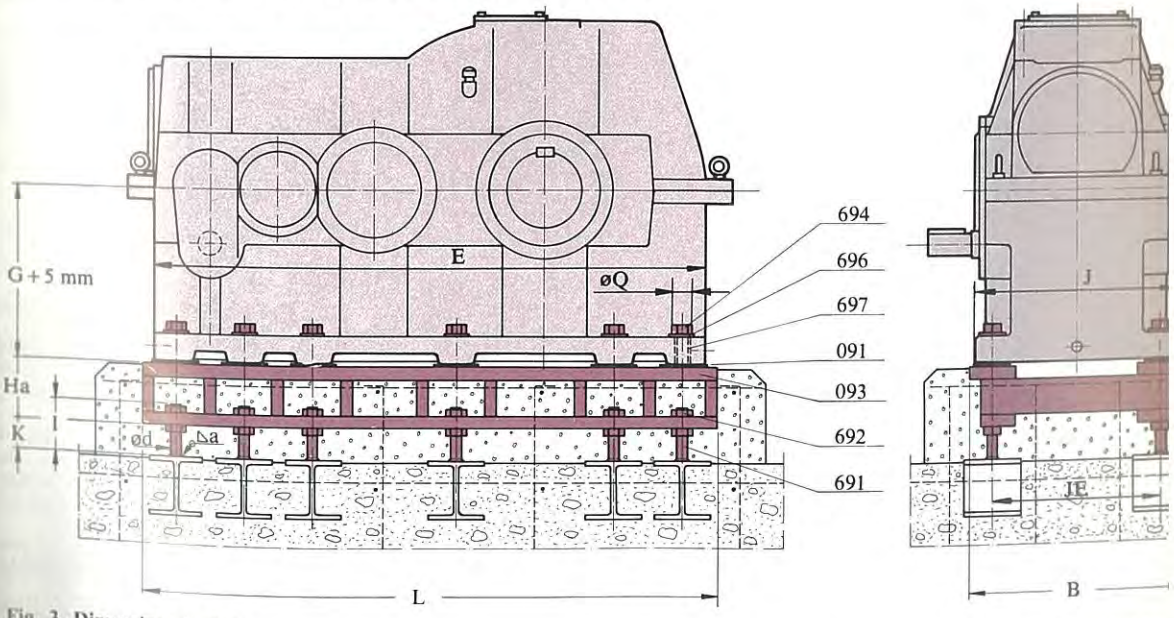

Fig. 3, Dimensions in mm

øM	Part.No. 694	Foundation screw						Bedplate			Supporting girders DIN 1025 Fe37B
		ød	l	a	K	f*)	n*)	B	L	Ha	
35	M30	M36	160	10	80	41		J + 40	E + 40	160	HE180×180
42	M36	M42	180	12	90		22	J + 40	E + 40	180	HE180×180
48	M42	M48	200	10	110		34	J + 40	E + 40	180	HE180×180
56	M48	M48	200	10	110		34	J + 40	E + 40	180	HE180×180

*) See figure 4.
Dimensions øQ, E, G, J and JE are given in the leaflet of the gear unit.

Part. No.	Description
091	Fitting plate
093	Bedplate
691	Foundation
692	Nut
694	Hexagon scr
696	Washer
697	Centralizing

									265/295	190
	Nynäs	Nynäs Alexol L42							265/295	180
	Shell	Alvania EP2							265/295	186
	Texaco	Multifak EP2								
		Lubrication of warm (>80°C) running tapered roller bearings								
		Beverol	Licol							
		Optimol	Longtime PD2							
		Shell	Lub 2370E							
		Klueber	Isoflex LDS18 SA							
		Lubrication of slow running thrust bearings								
		Klueber	Unimoly GL 402							

	Shell	Omala Oil 150							150	—25
	Chevron	EP Industrial Oil 220							220	—12
	BP	Energol GR—XP 220							210	—27
	Esso	Spartan EP 220							225	—21
	Mobil	Mobilgear 630							209	—23
	Nynäs	Nynäs GL 220							220	—18
	Shell	Omala Oil 220							220	—18
	Texaco	Meropa Lubricant 220							198	—21
220	**5 EP**									
198—242cSt (40°C)	918—1122SUS (100°F)									

*) Oils employed for lubrication of back-stops

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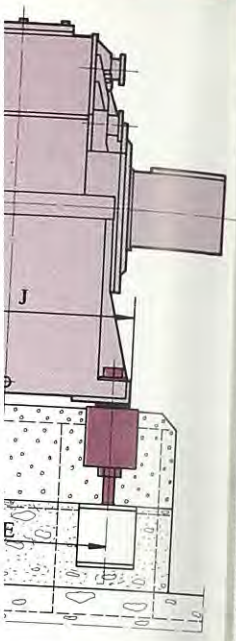
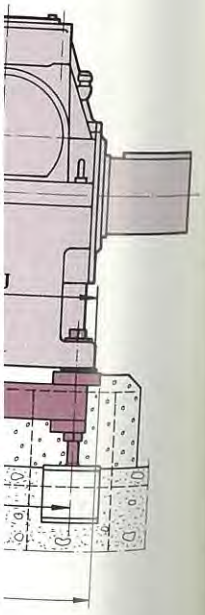


Description
Fitting plate
Foundation bracket
Foundation screw
Nut
Hexagon screw
Nut
Washer
Centralizing bush



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lizing bush

MOUNTING OF GEAR UNITS

ndation details of small gear units (below 250 kg) are shown in re 1, and of larger gear units in figures 2 and 3. For dimensions efer to the tables in connection with the figures. The checking edure mentioned in paragraph 3 having been completed, mount- is carried out in the following order:

The parts shown in figures 1, 2 or 3 are fastened to the gear unit. The fitting plates 091 and centralizing bushes 697 are used to make t possible for later adjustments and for instance, make mounting of a replacement gear unit easier.

The gear unit is supported at the selected position on the support- ng girders by means of three maximum spaced foundation screws two on one side of unit, one on other side)

- vertically by lifting, lowering and tilting, using the nuts of the foundation screws
- horizontally by tapping the foundation screws lightly in the required direction.

A spirit level and a straightedge or optic measuring devices are used for setting up purposes.

When the correct vertical and horizontal position and shaft line of the gear unit has been reached, the nuts on the three foundation screws are locked, and the other foundation screws are carefully lowered on to the girders and locked. The position of the gear unit must then be rechecked in case any disturbance in the setting has occurred. If so this must be rectified.

The ends of the foundation screws are first tack welded to the supporting girders, each screw at three points at least. The screws should be tack welded in pairs on each side of the centre line of the gear unit, starting from the middle. This makes it possible to avoid any movement due to welding.

When all screws have been tack welded, they must be welded all the way round in the above mentioned order.

Mounting to be checked and grouting to be carried out according to instructions in paragraph. 2.4. Before grouting the lower ends of the screws should be protected, for example, by tape.

When the grouting concrete has set, the mounting must be checked and (if necessary) finely adjusted after removing the centralizing bushes from the fastening holes of the gear unit.

The mounting is finalized by securing with two tapered dowel pins. By this means, the gear unit can be moved (e.g. for coupling fitting) and refitted accurately by locating with the dowel pins. The top end of the pins to be fitted with nut for easy withdrawal.

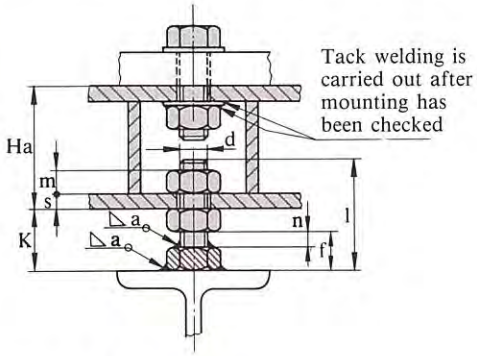

Fig. 4, **Dimensions in mm**

d	Ha	K	s	m	l	n	f	Note!
M24	120	50	16	19	100		31	see. fig. 2
M30	140	70	20	24	140		46	see. fig. 2
M36	140	70	20	29	140		41	see. fig. 2
M36	160	80	20	29	160		41	see. fig. 3
M42	180	90	20	34	180	22		see. fig. 2 and 3
M48	180	110	20	38	200	34		see. fig. 2 and 3

5. MOUNTING PRECISION

5.1. General

The mounting precision of to the driven and driving machines de- ends on the coupling method, type of coupling or of some other po- er transmission device (pulleys, chain wheels, open gears) and rota- ion speed.

Although the manufacturers usually give guiding values for the maxi- um misalignment tolerances, this does not mean that these are al- ays allowable in practice. Inaccurate lining up has the following consequences: excessive vibrations (especially in the high speed

5.2. Couplings

With reference to the mounting of flexible pin-couplings we refer to the table below (mounting precision for pin-couplings) and figures 5—8.

Mounting precision of flexible pin couplings
Dimensions in mm.

Outer diameter D	n < 500 min^{-1}		500—1500 min^{-1}		> 1500 min^{-1}	
	a_1—a_2	b	a_1—a_2	b	a_1—a_2	b
⩽ 100	0,05	0,05	0,04	0,04	0,03	0,03
> 100 ⩽ 200	0,06	0,06	0,05	0,05	0,04	0,04
< 200 ⩽ 400	0,12	0,10	0,10	0,08	0,08	0,06
< 400 ⩽ 800	0,20	0,16	0,16	0,12	(0,12)	(0,10)

a_1—a_2 = maximum angular misalignment
b = maximum offset misalignment

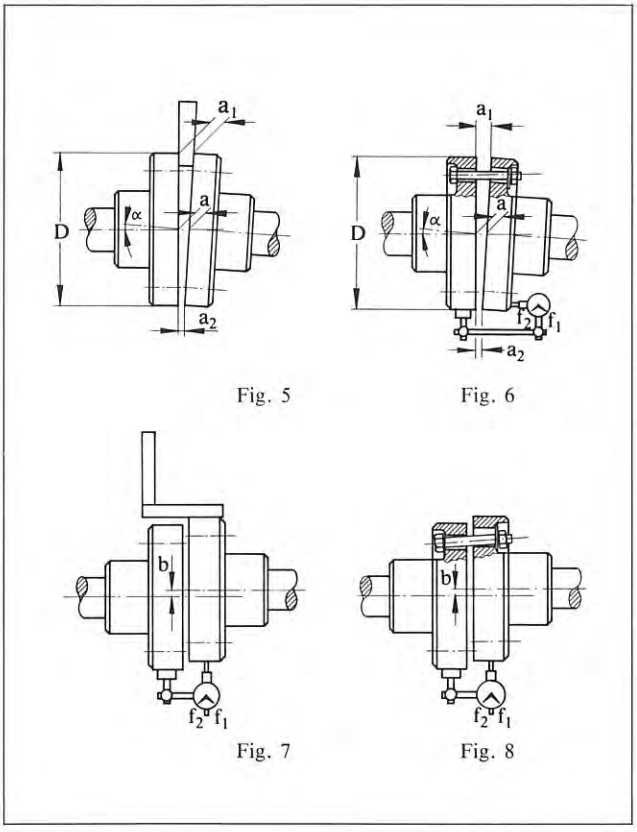

Fig. 5 Fig. 6

Fig. 7 Fig. 8

In fig. 5 is shown how the angular misalignment ($\sphericalangle \alpha$) is measured using a key or a feeler gauge. When using this method, an accurate result is achieved only if the error of the faces is eliminated by turning both coupling halves 180° and then calculating the average of the two differences ($a_1 - a_2$).

In fig. 6 the same result as above is obtained using a dial micrometer. The coupling halves are forced to rotate together (e.g. with one coupling pin) so that the point of the micrometer does not move noticeably on the measuring surface. This method assumes shaft bearings which do not allow the shafts to move axially when rotating. If this cannot be achieved, the axial movement must be eliminated by placing a wooden key of the dimension a_1 between the faces opposite the micrometer. The key must be kept in position while the coupling is rotated during the measuring procedure.

In fig. 7 the offset misalignment is checked using a rule. The off-centre values permitted are usually so small that sufficient accuracy is best achieved with a micrometer. When the coupling half is rotated together with the micrometer, the misalingment b, in which is also included the error in the outside diameter of the other coupling half, is obtained from the variation shown on the micrometer.

Fig. 8 shows a more accurate method. The coupling halves rotate together and the point of the micrometer does not move noticeably on

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6. REMOVAL OF THE HOLLOW SHAFT GEAR UNIT

6.1 Drain the oil from the gear unit.

6.2 Remove the cover top of the hollow shaft.

6.3 Fix the lifting devices to the gear unit and disconnect the gear unit from the anchoring rod.

6.4 Removal is carried out using tapped holes in the end plate by pushing with screws. Gear unit sizes 90–250. When removing, the thread on the shaft must be protected e.g. with screwed plug. Gear unit sizes 280–400. Before removing the end plate must be turned 90 °.

6.5 If in spite of all precautions, rust has formed on the contact surface, removal can be made easy by pumping rust (see fig. 2 . . . 5) dissolving fluid (e.g. Caramba) through a special inlet hole so that it can spread to the contact surfaces.

6.6 When removing, a hydraulic cylinder and suitable removing tools can also be used.

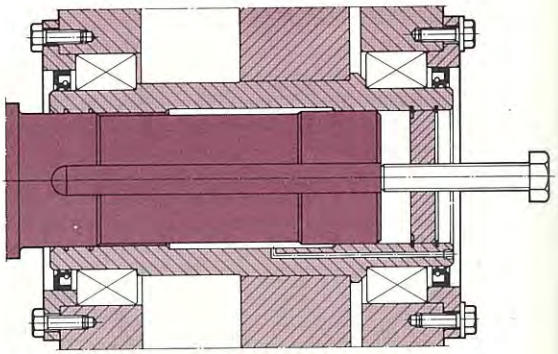
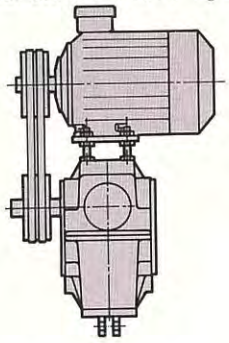


Fig. 7.

7. MOTOR SIZES ALLOWABLE FOR DIRECT MOUNTING TO C-TYPE GEAR UNITS

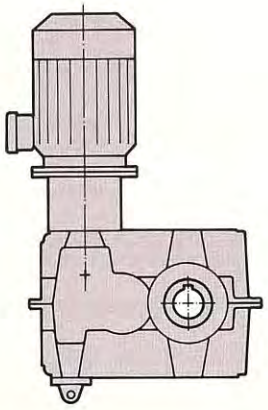
Without separate investigation a motor can be flanged to the gear unit as follows $n_1 \leqq 1500\ min^{-1}$.



$G_M \leqq 1{,}5 \cdot G_{gear\ unit}$

Fig. 8

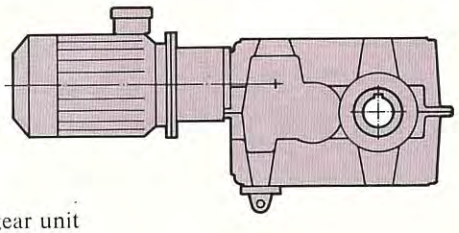
7.1 Motor on the gear unit standing on motor bracket for V-belt use



$G_M \leqq 1{,}5 \cdot G_{gear\ unit}$

Fig. 9

7.2 Flanged motor in vertical position on the gear unit



$G_M \leqq 1{,}5 \cdot G_{gear\ unit}$

Fig. 10.

7.3 Flanged motor to the input shaft end with bevel gearing

Foot mounted gear units
$G_M \leqq 1 \cdot G_{gear\ unit}$

Hollow shaft gear units
$G_M \leqq 0{,}4 \cdot G_{gear\ unit}$

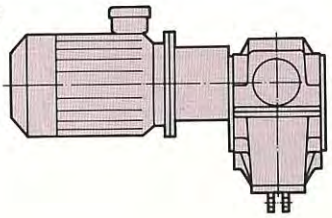


Fig. 11.

7.4 Flanged motor gear unit with normal coupling

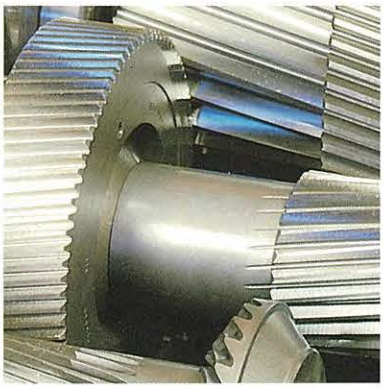
If more powerful (and heavier) motors than in this instruction are required, each case must be investigated separately. In cases where motors weigh over 1000 kg an investigation is necessary. The required details for investigation:

1. Dimensions, weight of the motor and position of centre of gravity from motor flange.
2. The type and size of coupling
3. The shaft dimension, material, bearings and service factor of the driven machine on which the hollow shaft gear unit is to be fitted
4. The shaft position



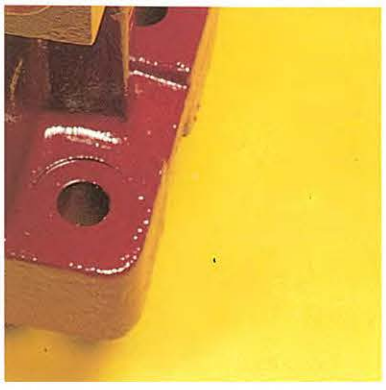







SANTASALO DOCUMENTS





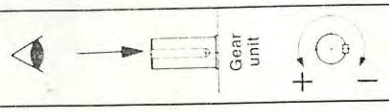
SANTASALO-GEARS LTD
JOT-COMPANIES

TECHNICAL SPECIFICATION

Order confirmation No.	Item. No
5 2 0 0	1 0

1. Customer	Hedemora AB	2. Work No.	
3. Order No. date	31501 14.04.1988	4. Delivery week	8 3 5
5. Quotation No., date		6. Issued by date	ly 16.6.88

PARTS BEING SUPPLIED TO ORDER

7. Type, spec.code	5TKC355	8. Quantity	1
9. n_1/n_2	209-1393/0,3-2 min^{-1}	10. Shaft position	03 V
11. Ratio i	696,5:1	12. Voltage	V
13. Running power P_{K1}	kW	14. Frequency	Hz
15. Running torque M_{K2}	44 kNm	16. Service factor K_A	1,57
17. Rotation direction of output shaft	☐ Tick off ☐ + — 	18. Hollow shaft ø d2	180H8
		19. Drg No. of driven shaft	C3.911
20. Parts lists No	L 3592	21. Manuf. Nos.	52531
22. Assembly drg. No.	2744332		
23. Dimension drg. No.	C3.351	24. Weight of gear unit	1450 kg
25. Additional equipment included in the supply, special design and materials, special painting etc.	- anchoring rod HA = 413		
26. Painting	☒ standard ☐ special TM 333		
27. Name plates	☒ universal ☐ special	28. Transport packing	☒ pallet ☐ crate ☐ seaworthy packing
		29. Designer date	HEJ 1.6.88
30. Documents	12 sets in english w 824	31. Customer's drawings	

ALTERATIONS

a)	c)
b)	d)

Note. Delivery time is subject to all relevant technical details being supplied with order.

OPERATING CONDITIONS

32. Driven machine	Filter ø 5,0	33. Moment of inertia J	kgm^2
34. Max. load	during start kNm; time s	during operation kNm; time	min/h
35. Shaft connection	High speed shaft connection	Slow speed shaft connection	
36. Driving machine		P_{N1} kW	n_1= min^{-1}
37. Starting frequency	times/h	☐ fully loaded	☐ partly loaded
38. Hours of operation	24 h/d h/a	39. Ambient temperature	° C; tmax = ° C; tmin = °C
40. Other operating conditions			
41. Oil recommendation	ISO VG 460	42. Lubrication method: splash lubrication	43. Grease nipples pcs
44. Oil level	132 mm from joint face ☐ down ☒ up		45. Oil quantity l

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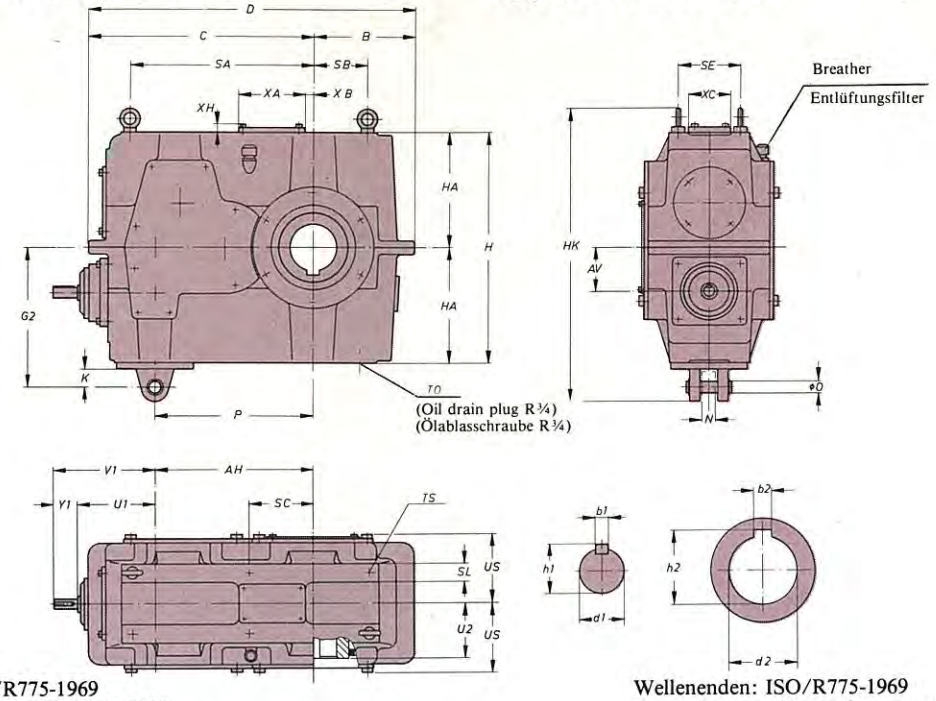
C SANTASALO
5TKC
C 3.351U-1
10.85

Quintuple reduction bevel-helical hollow shaft gear units series 5TKC

Fünfstufige Kegel-Stirnrad-Aufsteckgetriebe Typenreihe 5TKC



Shaft ends: ISO/R775-1969
Keys and keyways: ISO/R773-1969
Shaft height deviations: ISO/R496-1966
The dimensions of the hollow shaft hole and anchoring rod: sheet C3.911U.

Wellenenden: ISO/R775-1969
Passfedern und Passfedernuten: ISO/R773-1969
Wellenhöhendifferenzen: ISO/R496-1966
Die Abmessungen der Bohrung der Hohlwelle und der Drehmomentstütze: Blatt C3.911U.

Gear unit / Getriebe	Gear case dimensions in mm / Abmessungen des Gehäuses in mm																		
	AH	AV	B	C	D	G2	H	HA	HK	K	N	O	P	SA	SB	SC	SE	SL	TS_{max}	US
5TKC160	285	80	175	404	579	243	400	200	521	28	20	22h9	285	334	96	165	116	30	M12x18	129
5TKC180	320	80	205	450	655	273	450	225	585	28	20	22h9	320	360	111	170	120	35	M16x24	137
5TKC200	360	80	225	500	725	298	500	250	635	28	20	22h9	360	408	132	210	130	35	M16x24	147
5TKC225	405	80	255	555	810	343	560	280	729	38	32	32h9	405	450	145	185	148	40	M20x30	165
5TKC250	450	90	281	606	887	346	560	280	729	38	32	32h9	450	497	164	230	164	40	M20x30	185
5TKC280	505	100	308	671	979	383	630	315	804	38	32	32h9	505	558	188	185	174	40	M20x30	204
5TKC315	565	110	353	758	1111	437	710	355	932	52	45	45h9	565	619	217	201	188	50	M24x36	231
5TKC355	635	125	400	863	1263	487	800	400	1027	52	45	45h9	635	705	245	230	216	50	M24x36	254
5TKC400	715	140	448	946	1394	542	900	450	1132	52	45	45h9	715	782	280	251	250	50	M24x36	284

Gear unit / Getriebe	Shaft dimensions in mm / Wellenabmessungen in mm																			
	Input shaft / Antriebswelle																Hollow shaft / Hohlwelle			
		160... 180: 106 < i ≤ 530 200... 400: 106 < i ≤ 475					160... 180: 530 < i ≤ 1185 200... 400: 475 < i ≤ 1185					1185 < i ≤ 2975								
	U1	Y1	V1	d1	b1	h1	Y1	V1	d1	b1	h1	Y1	V1	d1	b1	h1	U2	d2	b2	h2
5TKC160	170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	118	80H8	22JS9	85,4
5TKC180	170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	125	90H8	25JS9	95,4
5TKC200	170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	135	100H8	28JS9	106,4
5TKC225	170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	154	110H8	28JS9	116,4
5TKC250	170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	172	120H8	32JS9	127,4
5TKC280	190	58	248	30k6	8h9	33	36	226	22k6	6h9	24,5	28	218	16k6	5h9	18	192	140H8	36JS9	148,4
5TKC315	212	58	270	35k6	10h9	38	42	254	25k6	8h9	28	28	240	18k6	6h9	20,5	218	160H8	40JS9	169,4
5TKC355	236	82	318	40k6	12h9	43	58	294	30k6	8h9	33	36	272	20k6	6h9	22,5	240	180H8	45JS9	190,4
5TKC400	265	82	347	45k6	14h9	48,5	58	323	35k6	10h9	38	36	301	22k6	6h9	24,5	270	200H8	45JS9	210,4

Gear unit / Getriebe	Inspection cover / Inspektionsdeckel				Mass of gear unit / Masse des Getriebes	Quantity of oil / Ölmenge
	XA	XB	XC	XH	kg	l
5TKC160					160	9
5TKC180					220	12
5TKC200					300	17
5TKC225	170	55	100	14	410	23
5TKC250	170	90	120	14	550	26
5TKC280	170	95	120	14	780	36
5TKC315	200	120	135	16	1070	49
5TKC355	200	135	135	16	1450	66
5TKC400	250	150	180	17	2000	90

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Getriebe

Gear unit / Getriebe	n_1 min^{-1}	Nominal mechanical power ratings P_{N1} in kW — Mechanische Nennleistungen P_{N1} in kW Nominal ratio i_N — Nennübersetzung i_N 112	125 140	160 180	200 225	250 280	315 355	400 450	500 560	630 710	800 900	1000 1120	1250 1400	1600 1800	2000 2250	2500 2800
5TKC160	1500	8,4	6,7	5,1	4,3	3,1	2,7	2,2	1,8	1,3	1,0	0,82	0,65	0,51	0,41	0,32
	1000	5,7	4,5	3,4	2,9	2,1	1,8	1,5	1,2	0,90	0,69	0,55	0,44	0,34	0,28	0,22
	750	4,3	3,4	2,6	2,2	1,6	1,4	1,2	0,94	0,68	0,52	0,42	0,34	0,26	0,22	0,17
	500	2,9	2,3	1,8	1,5	1,1	0,98	0,78	0,63	0,46	0,36	0,29	0,23	0,19	0,15	0,12
5TKC180	1500	11,6	9,4	7,8	6,5	5,1	3,9	3,2	2,5	2,0	1,5	1,2	0,95	0,73	0,54	0,42
	1000	7,8	6,4	5,3	4,4	3,4	2,6	2,1	1,7	1,4	1,0	0,81	0,64	0,50	0,37	0,29
	750	5,9	4,8	4,0	3,3	2,6	2,0	1,7	1,3	1,0	0,77	0,61	0,49	0,39	0,29	0,22
	500	4,0	3,3	2,7	2,2	1,7	1,3	1,1	0,88	0,69	0,52	0,43	0,34	0,27	0,20	0,16
5TKC200	1500	14,5	12,5	8,7	7,6	6,3	4,9	3,7	3,0	2,5	2,0	1,5	1,2	0,97	0,76	0,54
	1000	10,3	8,3	5,9	5,0	4,2	3,3	2,5	2,0	1,7	1,3	1,0	0,82	0,65	0,51	0,38
	750	7,7	6,2	4,5	3,8	3,1	2,5	1,9	1,5	1,2	1,0	0,77	0,61	0,49	0,38	0,29
	500	5,1	4,2	3,0	2,5	2,1	1,7	1,3	1,0	0,83	0,67	0,51	0,41	0,32	0,25	0,20
5TKC225	1500	17,4	14,9	11,5	11,4	8,1	7,4	5,9	4,7	3,6	3,0	2,4	1,5	1,5	1,2	0,89
	1000	13,1	11,2	8,3	7,7	5,3	4,9	3,9	3,2	2,5	2,0	1,6	0,99	0,99	0,80	0,62
	750	10,6	8,8	6,3	5,7	4,0	3,7	2,9	2,4	1,9	1,5	1,2	0,75	0,75	0,61	0,48
	500	7,3	6,1	4,2	3,8	2,8	2,5	2,0	1,6	1,3	1,0	0,81	0,53	0,50	0,40	0,32
5TKC250	1500	21,2	21,2	18,4	16,7	8,1	8,1	7,5	4,8	4,8	4,4	3,5	1,5	1,5	1,5	1,1
	1000	14,0	14,0	12,8	11,3	5,3	5,3	5,2	3,2	3,2	3,0	2,4	0,99	0,99	0,99	0,79
	750	10,6	10,6	9,8	8,5	4,0	4,0	4,0	2,4	2,4	2,3	1,8	0,75	0,75	0,75	0,61
	500	7,5	7,5	6,6	5,8	2,8	2,8	2,8	1,7	1,7	1,5	1,2	0,53	0,53	0,53	0,43
5TKC280	1500	27,4	27,4	26,1	21,3	11,8	11,8	10,5	5,9	5,9	5,3	4,2	2,8	2,7	2,1	1,6
	1000	18,6	18,6	17,9	14,2	7,7	7,7	7,1	3,9	3,9	3,6	2,8	1,9	1,8	1,4	1,1
	750	14,1	14,1	13,4	10,6	5,8	5,8	5,3	2,9	2,9	2,7	2,1	1,4	1,3	1,1	0,83
	500	9,5	9,5	9,0	7,1	4,1	4,1	3,5	2,1	2,1	1,8	1,4	1,0	0,89	0,71	0,56
5TKC315	1500	35,3	35,3	35,3	31,2	16,3	16,3	16,3	11,7	10,1	8,1	6,6	3,2	3,2	3,2	2,0
	1000	23,3	23,3	23,3	20,8	10,7	10,7	10,7	7,7	6,8	5,4	4,4	2,1	2,1	2,1	1,4
	750	17,7	17,7	17,7	15,6	8,1	8,1	8,1	5,8	5,1	4,1	3,3	1,6	1,6	1,6	1,1
	500	12,4	12,4	12,4	10,4	5,7	5,7	5,4	4,1	3,4	2,7	2,2	1,1	1,1	1,1	0,74
5TKC355	1500	59,8	59,8	55,6	48,1	27,2	27,2	23,6	16,1	14,9	11,6	9,3	4,8	4,8	4,4	3,2
	1000	39,6	39,6	39,2	32,1	17,9	17,9	15,9	10,6	9,9	7,7	6,2	3,1	3,1	3,0	2,2
	750	30,0	30,0	29,6	24,1	13,5	13,5	11,9	8,0	7,4	5,8	4,6	2,4	2,4	2,2	1,7
	500	21,1	21,1	19,8	16,0	9,5	9,5	7,9	5,6	5,0	3,9	3,1	1,7	1,7	1,5	1,2
5TKC400	1500	85,3	85,3	72,5	62,0	42,0	38,9	32,7	25,6	20,1	16,3	12,8	8,8	8,0	6,1	4,1
	1000	58,1	58,1	52,2	41,3	27,7	27,0	21,8	16,9	13,7	10,9	8,6	5,8	5,3	4,1	2,9
	750	44,0	44,0	39,1	31,0	20,9	20,5	16,4	12,7	10,3	8,2	6,4	4,4	4,0	3,1	2,2
	500	29,7	29,7	26,1	20,7	14,6	13,6	10,9	8,5	6,8	5,4	4,3	3,1	2,7	2,0	1,6

Gear unit / Getriebe	n_1 min^{-1}	Nominal mechanical power ratings P_{N1} in kW — Mechanische Nennleistungen P_{N1} in kW Nominal ratio i_N — Nennübersetzung i_N 450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000	2250	2500	2800	3150
5TKC500	1500	45,4	37,7	32,9	29,3	26,3	24,2	20,6	19,0	19,0	16,2	14,8	11,8	10,5	10,5	8,4	8,4	7,1	6,1
	1000	30,7	25,4	22,2	19,8	17,8	16,4	13,9	12,8	12,8	11,0	10,0	8,0	7,2	7,2	5,8	5,8	5,0	4,0
	750	23,2	19,3	16,8	15,0	13,4	12,4	10,6	9,7	9,7	8,4	7,6	6,1	5,5	5,5	4,4	4,3	3,8	3,0
	500	15,7	13,0	11,3	10,1	9,1	8,4	7,1	6,7	6,7	5,6	5,3	4,2	3,7	3,7	3,0	2,9	2,6	2,0
5TKC560	1500	55,7	49,8	44,8	40,2	36,0	32,0	28,7	25,7	23,1	23,1	19,8	17,0	14,1	14,1	12,1	12,1	8,5	8,5
	1000	37,7	33,6	30,2	27,2	24,3	21,6	19,3	17,3	15,6	15,6	13,3	11,4	9,6	9,6	8,3	8,2	5,9	5,8
	750	28,5	25,5	22,9	20,6	18,4	16,4	14,6	13,1	11,8	11,8	10,2	8,8	7,5	7,5	6,4	6,2	4,5	4,3
	500	19,3	17,2	15,4	13,9	12,4	11,2	10,0	9,1	8,2	8,2	7,1	6,1	5,0	5,0	4,3	4,1	3,1	2,9
5TKC630	1500	88,1	79,9	69,8	54,4	54,4	43,3	43,3	38,5	38,3	32,1	27,3	24,2	19,5	19,5	17,2	17,1	14,1	12,1
	1000	60,6	54,8	47,7	36,7	36,7	29,2	29,2	26,0	26,0	22,3	18,4	16,3	13,3	13,3	11,9	11,9	9,9	8,1
	750	45,9	41,5	36,1	27,8	27,8	22,1	22,1	19,7	19,7	17,2	14,1	12,6	10,3	10,3	9,1	9,1	7,5	6,1
	500	31,0	28,0	24,4	18,8	18,8	15,0	15,0	13,3	13,3	11,6	9,8	8,6	7,0	7,0	6,1	6,0	5,1	4,0
5TKC710	1500	105,0	94,8	92,8	84,1	69,4	67,8	57,0	48,7	44,0	39,3	34,6	34,6	28,0	24,6	19,1	19,1	19,1	17,6
	1000	71,2	64,0	64,0	57,5	46,8	45,8	38,5	32,9	29,7	26,5	23,3	23,3	19,1	17,0	13,3	13,3	13,3	11,7
	750	53,9	48,5	48,5	43,5	35,5	34,6	29,2	24,9	22,5	20,2	17,9	17,9	14,8	13,1	10,1	10,1	10,1	8,7
	500	36,4	32,7	32,7	29,4	23,9	23,4	19,7	17,2	15,6	14,1	12,4	12,4	10,0	8,8	6,8	6,8	6,8	5,8

Power ratings: The ratings are nominal, service factor f = 1.0. Selection of gear unit: see instruction A.31. Gear units with bigger ratings are also manufactured.
Lubrication: Splash lubrication is used, except in those cases when pressure lubrication is necessary dependent on the pitch line velocity of the gears.
Cooling: Artificial cooling is required if the mechanical power actually transmitted, is bigger than the thermal rating.

Leistungen: Die Leistungswerte sind Nennleistungen. Betriebsfaktor f = 1.0. Wahl des Zahnradgetriebes: siehe Instruktion A.31. Getriebe mit grösseren Leistungen werden auch hergestellt.
Schmierung: Normalerweise haben die Getriebe Tauchschmierung. Druckschmierung kommt lediglich dann zur Anwendung, wenn es Zahnrad-Umfangsgeschwindigkeit erfordert.
Kühlung: Zusätzliche Kühlung ist dann erforderlich, wenn die tatsächliche Betriebsleistung über der thermischen Leistung liegt.

Gear unit / Getriebe	Thermal ratings in kW — Thermische Leistungen in kW P_{TN} 106 < i ≤ 530	530 < i ≤ 2975
5TKC160	10	12
5TKC180 5TKC200	13 16	16 19
5TKC225 5TKC250	20 23	24 28
5TKC280 5TKC315	29 36	34 43
5TKC355 5TKC400	44 55	52 66

Thermal ratings in kW — Thermische Leistungen in kW	
Gear unit / Getriebe	P_{TN}
5TKC500	75
5TKC560	95
5TKC630	119
5TKC710	150

Notes
P_{TN} = nominal thermal rating relating to an ambient air temperature of +20°C.
Gear unit fitted with fan: see instruction A.31.

Bemerkungen
P_{TN} = thermische Nennleistung auf eine Umgebungstemperatur von +20°C bezogen.
Getriebe mit Lüfter: siehe Instruktion A.31.

SANTASALO 5TKC

C 3.351U-2

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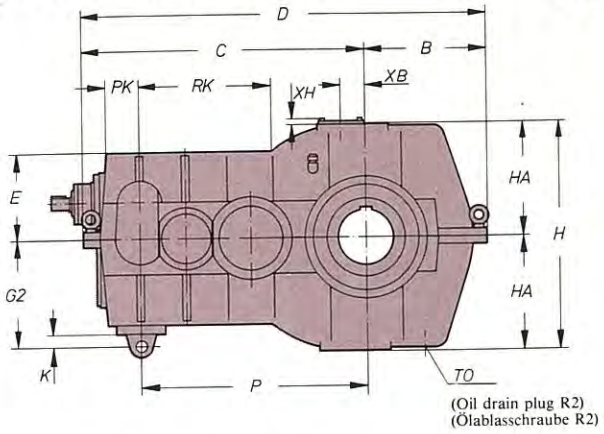
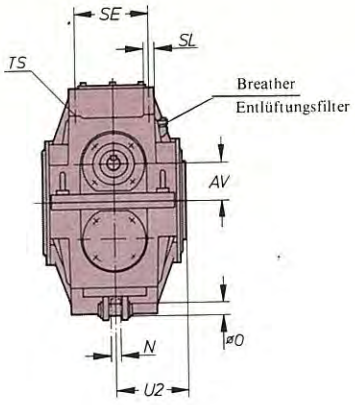
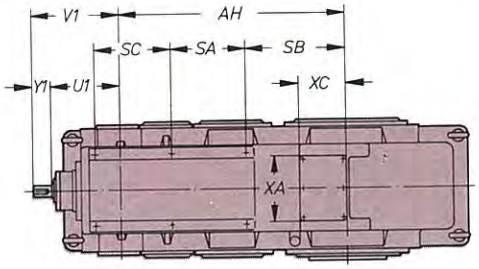
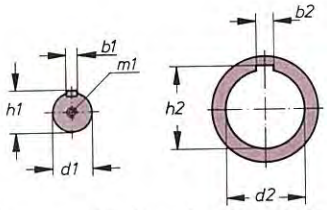
Quintuple reduction bevel-helical hollow shaft gear units series 5TKC

Fünfstufige Kegel-Stirnrad-Aufsteckgetriebe Typenreihe 5TKC









Shaft ends: ISO/R775-1969.
Keys and keyways: ISO/R773-1969.
Shaft height deviations: ISO/R496-1966.
The dimensions of the hollow shaft hole and anchoring rod: Sheet C3.911U.

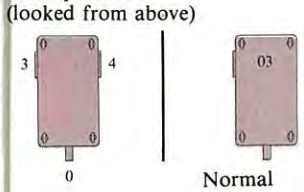
Wellenenden: ISO/R775-1969.
Passfedern und Passfedernuten: ISO/R773-1969.
Wellenhöhendifferenzen: ISO/R496-1966.
Die Abmessungen der Bohrung der Hohlwelle und der Drehmomentstütze: Blatt C3.911U.

Gear unit / Getriebe	Gear case dimensions in mm / Abmessungen des Gehäuses in mm																			
	AH	B	C	D	E	AV	G2	H	HA	K	N	O	P	PK	RK	SA	SB	SC	TS_{max}	SE	SL
5TKC500	980	537	1232	1769	370	160	487	980	490	75	60	63	980	140	570	320	460	315	M24x36	310	50
5TKC560	1100	628	1398	2026	410	180	530	1126	563	75	60	63	1100	162	615	345	535	345	M30x45	340	65
5TKC630	1235	704	1578	2282	460	200	585	1242	621	75	60	63	1235	180	703	405	580	400	M30x45	400	65
5TKC710	1390	775	1767	2542	510	225	639	1402	701	75	60	63	1390	202	781	450	660	450	M30x45	450	65

Gear unit / Getriebe	Shaft dimensions in mm / Wellenabmessungen in mm																	
	Input shaft / Antriebswelle																	
		425 < i ≤ 755						755 < i ≤ 1700						1700 < i ≤ 3350				
	U1	Y1	V1	d1	b1	h1	m1	Y1	V1	d1	b1	h1	m1	Y1	V1	d1	b1	h1	m1
5TKC500	300	82	382	50k6	14h9	53,5	M16x36	82	382	40k6	12h9	43	M16x36	42	342	25k6	8h9	28	M10x22
5TKC560	335	82	417	55m6	16h9	59	M20x42	82	417	45k6	14h9	48,5	M16x36	58	393	30k6	8h9	33	M10x22
5TKC630	375	105	480	60m6	18h9	64	M20x42	82	457	50k6	14h9	53,5	M16x36	58	433	35k6	10h9	38	M12x28
5TKC710	425	105	530	65m6	18h9	69	M20x42	82	507	55m6	16h9	59	M20x42	82	507	40k6	12h9	43	M16x36

Gear unit / Getriebe	Shaft dimensions in mm / Wellenabmessungen in mm				Inspection cover / Inspektionsdeckel			
	Hollow shaft / Hohlwelle							
	U2	d2	b2	h2	XA	XB	XC	XH
5TKC500	310	240H8	56JS9	252,4	280	100	200	18
5TKC560	345	280H8	63JS9	292,4	280	110	200	18
5TKC630	400	320H8	70JS9	334,4	350	125	250	20
5TKC710	440	360H8	80JS9	375,4	350	140	250	20

Shaft positions
(looked from above)



Normal Normal Special Spezial

Wellenausführungen
(von oben gesehen)

Gear unit / Getriebe	Mass of gear unit / Masse des Getriebes kg	Quantity of oil l / Ölmenge l	
		Splash lubrication / Tauchschmierung	Pressure lubrication / Druckschmierung
5TKC500	2350	260	90
5TKC560	3110	350	120
5TKC630	4180	530	180
5TKC710	5760	700	230

SANTASALO C
5TKC
C 3.351U-4
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Exact ratios i_{ex}

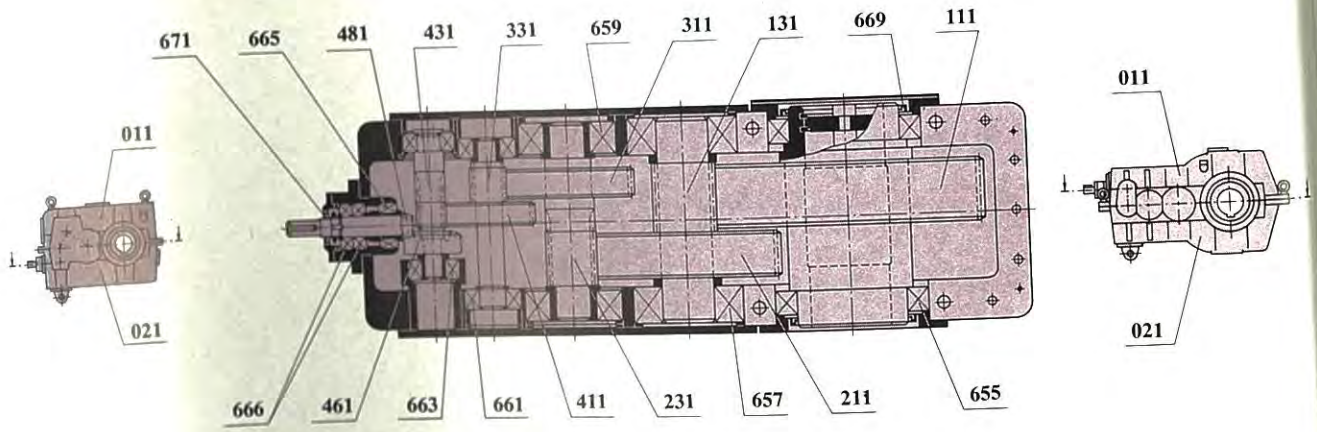
Moments of inertia J in kgm² reduced to input shaft

Istübersetzungen i_{ex}

Trägheitsmoment J in kgm² reduziert a die Antriebswelle

Gear unit / Getriebe	i_N 112	140	180	225	280	355	450	560	710	900	1120	1400	1800	2250	2800
5TKC160	110,9978	140,5265	179,0583	219,5727	273,3467	340,1531	427,3273	531,7852	666,2422	874,6307	1104,0115	1413,3436	1770,7977	2225,1797	2765,0872
	0,00114	0,00107	0,00106	0,000553	0,000536	0,000533	0,000517	0,0003	0,000298	0,000296	0,000289	0,00014	0,000137	0,000137	0,000137
5TKC180	112,6889	139,3521	178,6020	216,5570	279,0656	343,1729	420,6075	543,9776	697,1094	884,4811	1114,1460	1426,3177	1859,1267	2314,7888	2896,0769
	0,00128	0,00117	0,00109	0,000625	0,000563	0,000545	0,000529	0,000305	0,000304	0,000302	0,000293	0,000143	0,000139	0,000138	0,000138
5TKC200	112,1133	138,6404	184,3057	228,4623	274,1698	347,7275	453,5648	577,8751	690,5581	864,8701	1127,3105	1407,3444	1774,9904	2260,9998	2875,9028
	0,00135	0,00122	0,00111	0,0011	0,000574	0,000567	0,000557	0,000326	0,000312	0,000303	0,000293	0,000144	0,00014	0,000139	0,000139
5TKC225	113,0883	140,3437	181,7366	227,2664	278,6884	353,7199	443,0024	551,5517	691,1520	862,2327	1073,4219	1382,9924	1744,7433	2155,9092	2715,1433
	0,00157	0,00138	0,00122	0,00119	0,000618	0,000606	0,000591	0,000349	0,000327	0,000315	0,000303	0,000149	0,000144	0,000143	0,000143
5TKC250	110,8960	140,4350	174,4769	217,4986	275,6078	353,1924	434,6394	555,1937	686,000	885,3954	1119,9512	1432,1372	1866,4707	2329,1147	2917,7683
	0,00218	0,00181	0,00158	0,00153	0,000769	0,000722	0,000699	0,000393	0,000384	0,000361	0,000339	0,000171	0,000162	0,00016	0,00016
5TKC280	113,8757	138,3054	180,0753	227,2077	276,5091	350,6945	454,4155	571,7637	728,9988	907,2570	1153,9952	1399,0137	1802,1075	2260,9995	2898,1968
	0,00357	0,00306	0,00255	0,00247	0,0012	0,00112	0,00108	0,000587	0,000573	0,000537	0,000497	0,000297	0,00028	0,000277	0,000276
5TKC315	117,5899	143,9188	183,3807	228,6878	281,0856	356,7625	438,9152	568,3199	705,3687	876,9141	1089,6844	1438,5824	1785,7509	2240,1987	2824,0962
	0,00596	0,00504	0,00426	0,00412	0,00211	0,00196	0,00189	0,00105	0,00102	0,00096	0,000902	0,000449	0,000428	0,000422	0,000421
5TKC355	112,4882	141,8179	174,8704	215,5092	274,5319	350,5464	435,0342	556,0953	696,4943	895,4927	1120,3683	1442,1522	1847,2289	2307,5459	2865,0664
	0,0114	0,00953	0,00827	0,00802	0,00393	0,00365	0,00354	0,00201	0,00197	0,00185	0,00173	0,000886	0,000841	0,000832	0,00083
5TKC400	117,5028	142,0869	183,7777	231,8200	273,2173	351,2794	439,5872	562,0471	700,6474	880,1180	1119,4756	1465,0715	1803,1648	2340,2261	2944,2000
	0,0188	0,0161	0,0137	0,0132	0,00685	0,00633	0,00613	0,00355	0,00348	0,00326	0,00307	0,00141	0,00134	0,00132	0,00132

Gear unit / Getriebe	i_N 450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000	2250	2500	2800	315
5TKC500	417,2294	472,8600	544,6334	614,2211	685,6422	756,2230	834,9962	946,3291	1065,170	1228,821	1372,075	1561,326	1739,842	2007,149	2283,998	2595,452	2883,835	3280,3
	0,00973	0,00964	0,00942	0,00892	0,00881	0,00546	0,0054	0,00538	0,00537	0,00531	0,0053	0,00529	0,00231	0,00228	0,00227	0,00227	0,00227	0,002
5TKC560	444,8470	513,7983	573,6967	640,4166	716,7827	800,5208	897,7355	1004,785	1122,057	1262,314	1422,101	1581,887	1820,289	2047,825	2277,918	2531,020	2857,241	3238,2
	0,0169	0,0167	0,0164	0,0157	0,0156	0,00971	0,0096	0,00956	0,00948	0,00948	0,00945	0,00944	0,00424	0,00424	0,00423	0,00423	0,00422	0,004
5TKC630	440,7377	489,1113	564,2578	651,5834	729,7734	789,9610	912,2169	1015,664	1095,518	1229,414	1405,045	1572,313	1875,786	2023,265	2264,130	2546,405	2817,299	3297,2
	0,03	0,0294	0,0275	0,0271	0,027	0,0164	0,017	0,0168	0,0168	0,0166	0,0166	0,0166	0,00724	0,00724	0,00722	0,00722	0,00721	0,007
5TKC710	451,7419	504,4048	566,7470	632,8940	714,5344	801,1635	911,6688	1029,269	1143,633	1276,613	1436,190	1607,165	1811,156	2037,551	2307,068	2581,719	2914,191	3290,9
	0,0485	0,0476	0,0475	0,0452	0,0449	0,0281	0,0277	0,0276	0,0274	0,0273	0,0273	0,0272	0,0126	0,0126	0,0126	0,0125	0,0125	0,012



List of spare parts

Ersatzteilliste

Part. No Pos.	Number off Anzahl	Description		Benennung		Part. No Pos.	Number off Anzahl	Description	Benennung
011	1	Gear case, upper half		Gehäuse, Oberteil		655	2	Roller bearing	Wälzlager
021	1	Gear case, lower half		Gehäuse, Unterteil		657	2	Roller bearing	Wälzlager
111	1	10. wheel	5. stage	10. Zahnrad	5. Stufe	659	2	Roller bearing	Wälzlager
131	1	9. pinion		9. Ritzel		661	2	Roller bearing	Wälzlager
211	1	8. wheel	4. stage	8. Zahnrad	4. Stufe	663	2	Roller bearing	Wälzlager
231	1	7. pinion		7. Ritzel		665	1	Roller bearing	Wälzlager
311	1	6. wheel	3. stage	6. Zahnrad	3. Stufe	666	2	Roller bearing	Wälzlager
331	1	5. pinion		5. Ritzel		669	2	Oil seal	Dichtung
411	1	4. wheel	2. stage	4. Zahnrad	2. Stufe	671	1	Oil seal	Dichtung
431	1	3. pinion		3. Ritzel					
461	1	2. wheel	1. stage	2. Zahnrad	1. Stufe				
481	1	1. pinion		1. Ritzel					

We recommend the use of above part-numbers and descriptions when ordering spare parts.

Bei Bestellung von Ersatzteilen bitte die o.g. Pos. Nummern und Benennungen verwenden.

ne-Strömberg Corporation
lo
x 118 SF-00101 Helsinki 10
. +358-0-556491
nt. +57-121117 strsv sf
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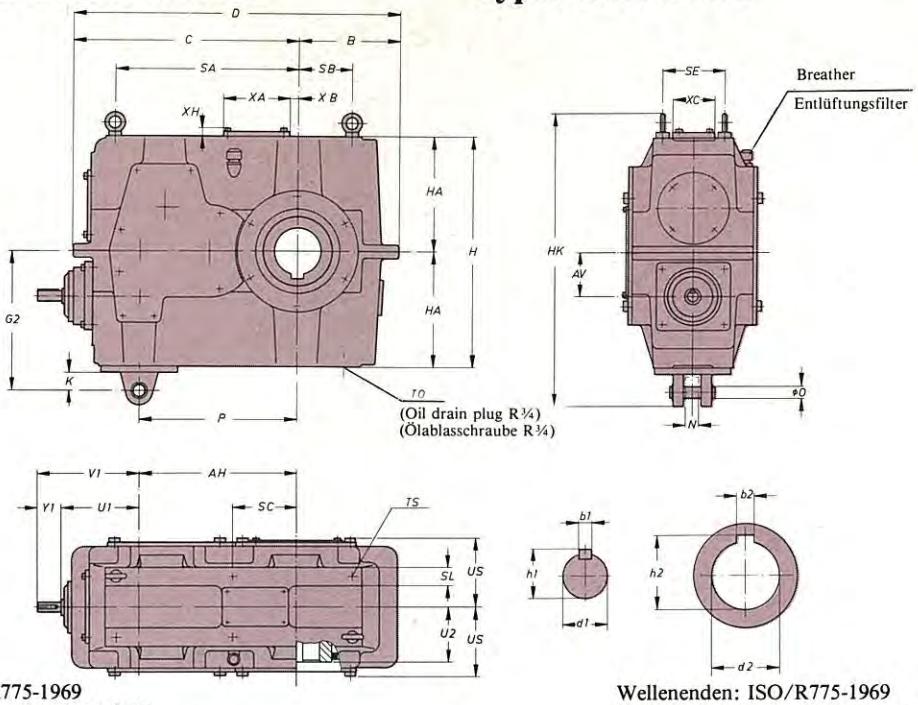
C SANTASALO
5TKC
C 3.351U-1
10.85

SANTA
5TKC
C 3.351U-4
10.85

uple reduction bevel-helical hollow gear units series 5TKC

Fünfstufige Kegel-Stirnrad-Aufsteckgetriebe Typenreihe 5TKC



nds: ISO/R775-1969
id keyways: ISO/R773-1969
eight deviations: ISO/R496-1966
ensions of the hollow shaft hole
horing rod: sheet C3.911U.

Wellenenden: ISO/R775-1969
Passfedern und Passfedernuten: ISO/R773-1969
Wellenhöhendifferenzen: ISO/R496-1966
Die Abmessungen der Bohrung der Hohlwelle und der Drehmomentstütze: Blatt C3.911U.

Gear case dimensions in mm — **Abmessungen des Gehäuses in mm**

AH	AV	B	C	D	G2	H	HA	HK	K	N	O	P	SA	SB	SC	SE	SL	TS_{max}	US
285	80	175	404	579	243	400	200	521	28	20	22h9	285	334	96	165	116	30	M12x18	129
320	80	205	450	655	273	450	225	585	28	20	22h9	320	360	111	170	120	35	M16x24	137
360	80	225	500	725	298	500	250	635	28	20	22h9	360	408	132	210	130	35	M16x24	147
405	80	255	555	810	343	560	280	729	38	32	32h9	405	450	145	185	148	40	M20x30	165
450	90	281	606	887	346	560	280	729	38	32	32h9	450	497	164	230	164	40	M20x30	185
505	100	308	671	979	383	630	315	804	38	32	32h9	505	558	188	185	174	40	M20x30	204
565	110	353	758	1111	437	710	355	932	52	45	45h9	565	619	217	201	188	50	M24x36	231
635	125	400	863	1263	487	800	400	1027	52	45	45h9	635	705	245	230	216	50	M24x36	254
715	140	448	946	1394	542	900	450	1132	52	45	45h9	715	782	280	251	250	50	M24x36	284

Shaft dimensions in mm — **Wellenabmessungen in mm**

Input shaft / Antriebswelle																Hollow shaft / Hohlwelle			
	160... 180: 106 < i ≤ 530 200... 400: 106 < i ≤ 475					160... 180: 530 < i ≤ 1185 200... 400: 475 < i ≤ 1185					1185 < i ≤ 2975								
U1	Y1	V1	d1	b1	h1	Y1	V1	d1	b1	h1	Y1	V1	d1	b1	h1	U2	d2	b2	h2
170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	118	80H8	22JS9	85,4
170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	125	90H8	25JS9	95,4
170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	135	100H8	28JS9	106,4
170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	154	110H8	28JS9	116,4
170	42	212	28k6	8h9	31	36	206	20k6	6h9	22,5	25	195	14k6	5h9	16	172	120H8	32JS9	127,4
190	58	248	30k6	8h9	33	36	226	22k6	6h9	24,5	28	218	16k6	5h9	18	192	140H8	36JS9	148,4
212	58	270	35k6	10h9	38	42	254	25k6	8h9	28	28	240	18k6	6h9	20,5	218	160H8	40JS9	169,4
236	82	318	40k6	12h9	43	58	294	30k6	8h9	33	36	272	20k6	6h9	22,5	240	180H8	45JS9	190,4
265	82	347	45k6	14h9	48,5	58	323	35k6	10h9	38	36	301	22k6	6h9	24,5	270	200H8	45JS9	210,4

Gear unit Getriebe	Inspection cover / Inspektionsdeckel XA	XB	XC	XH	Mass of gear unit / Masse des Getriebes kg	Quantity of oil / Ölmenge l
5TKC160					160	9
5TKC180					220	12
5TKC200					300	17
5TKC225	170	55	100	14	410	23
5TKC250	170	90	120	14	550	26
5TKC280	170	95	120	14	780	36
5TKC315	200	120	135	16	1070	49
5TKC355	200	135	135	16	1450	66
5TKC400	250	150	180	17	2000	90

facturer reserves the right to alteration.

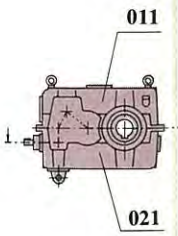
Recht auf Änderungen vorbehalten.

Exact ratios

Moments of to input sha

Gear unit Getriebe	112	
5TKC160	110,9978	14
	0,00114	0
5TKC180	112,6889	13
	0,00128	0
5TKC200	112,1133	13
	0,00135	0
5TKC225	113,0883	14
	0,00157	0
5TKC250	110,8960	14
	0,00218	0
5TKC280	113,8757	13
	0,00357	0
5TKC315	117,5899	14
	0,00596	0
5TKC355	112,4882	14
	0,0114	0
5TKC400	117,5028	14
	0,0188	0

Gear unit Getriebe	450	
5TKC500	417,2294	472,
	0,00973	0,0
5TKC560	444,8470	513,
	0,0169	0,0
5TKC630	440,7377	489,
	0,03	0,0
5TKC710	451,7419	504,
	0,0485	0,0



List of spare p

Part. No Pos.	Number off Anzahl
011	1
021	1
111	1
131	1
211	1
231	1
311	1
331	1
411	1
431	1
461	1
481	1

We recommend the use of when ordering spare parts.

Kymmene-Strömberg Corporation
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Mounting with shrink disc
Montage mit Schrumpfscheibe

Sizes
Grössen **90-400**

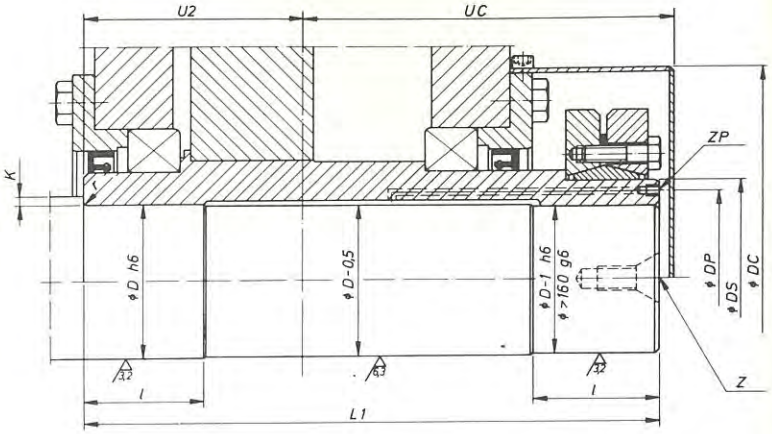


Fig. 6
Abb. 6

Dimensions in mm — **Abmessungen in mm**

Gear unit size Getriebe Grösse	Shrink disc Schrumpfscheibe			Shaft end of driven machine Wellenende der Arbeitsmaschine										Hollow shaft Hohlwelle		Cover Deckel		
				D	L1		l	k		r	U2		Z	DP	ZP	UC		DC
	Size Grösse (1	DS	Ma (2 Nm	stand (min)	2TC 3TC 4TC 3TKC(V) 5TKC(V)	2TKC		min	max	max	2TC 3TC 4TC 3TKC(V) 5TKC(V)	2TKC	SFS 50 37 DIN 332			2TC 3TC 4 TC 3TKC(V) 5TKC(V)	2TKC	
90	55-72	55	12	45	-	244	28	4	18	3	-	100	M16	-	-	-	152	134
110	75-72	75	29	60	-	290	30	4	23	3	-	122	M20	-	-	-	177	174
140	90-72	90	29	70	263	327	35	4	23	3	100	132	M20	80	6 x M6	172	204	194
160	100-72	100	29	80	301	-	40	4	23	3	118	-	M20	90	6 x M6	194	-	204
180	110-72	110	58	90	324	394	45	4	33	3	125	160	M24	100	6 x M6	214	250	244
200	125-72	125	58	100	349	-	50	6	33	4	135	-	M24	112	6 x M8	227	-	254
225	140-71	140	100	110	393	493	55	6	33	4	154	204	M24	125	6 x M8	250	300	264
250	165-71	165	240	120...(115)	441	547	65	6	38	4	172	225	M24	142	6 x M8	280	333	306
280	175-71	175	240	140...(135)	478	614	70	6	38	4	192	258	M30	157	6 x M8	298	364	324
315	200-71	200	240	160...(150)	551	697	85	7	43	5	218	291	M30	180	6 x M10	345	418	364
355	220-71	220	240	180...(160)	616	770	100	7	43	5	240	317	M30	200	6 x M10	390	467	384
400	240-71	240	470	200...(180)	680	862	110	7	48	5	270	361	M36	220	6 x M10	427	518	436

Mounting with shrink disc
Montage mit Schrumpfscheibe

Sizes
Grössen **500-710**

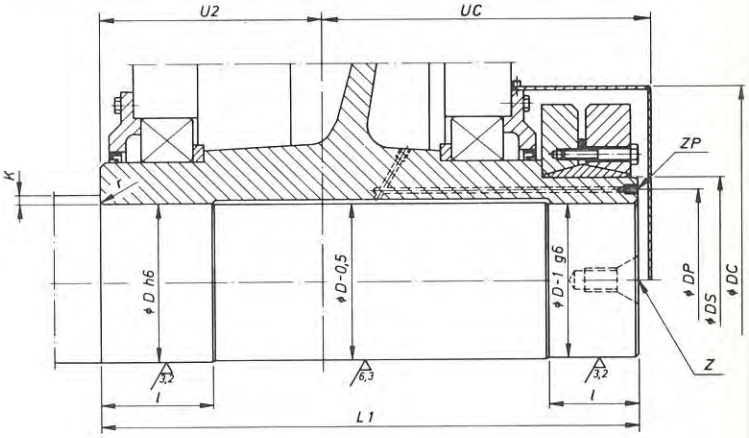


Fig. 7
Abb. 7

Dimensions in mm — **Abmessungen in mm**

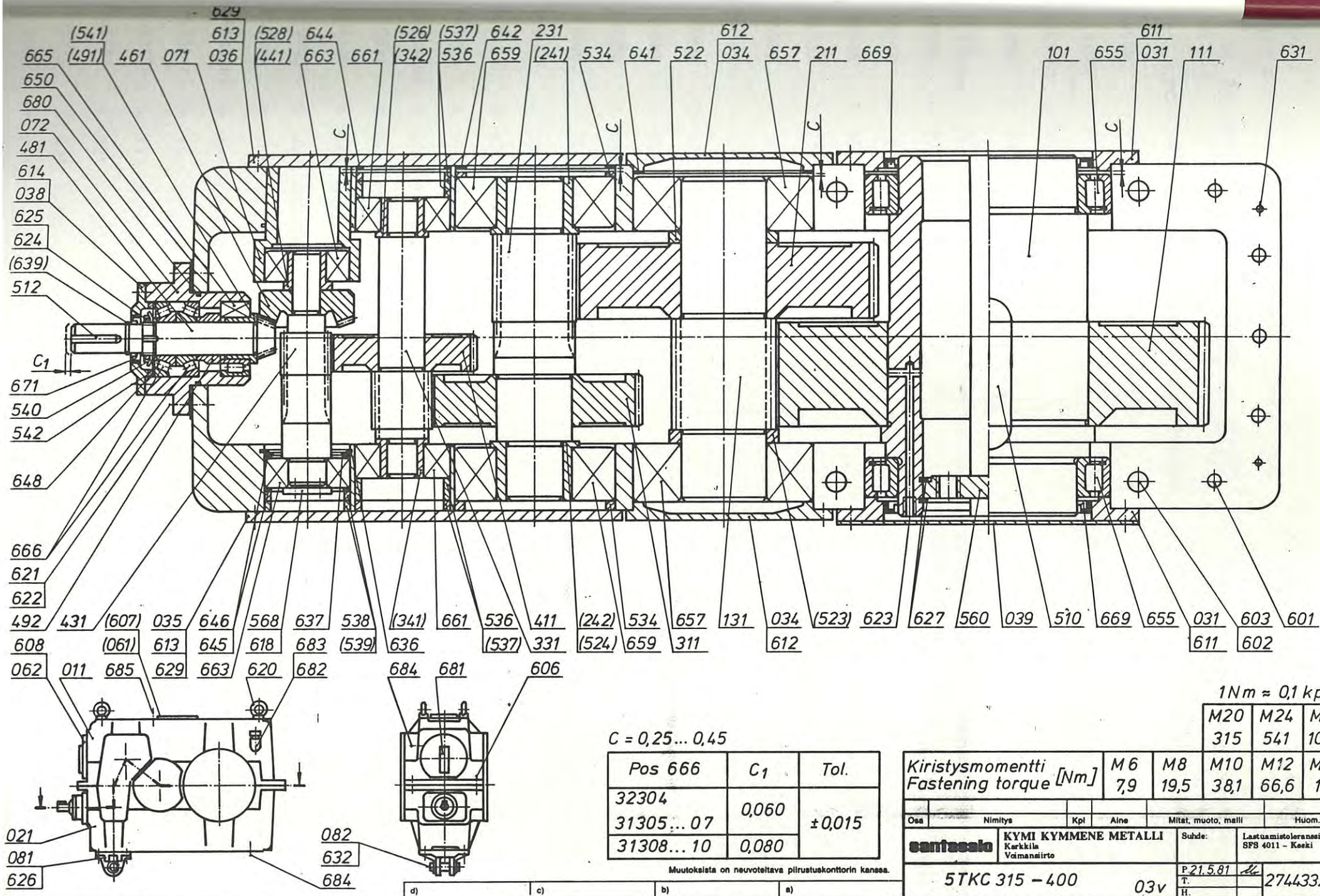
Gear unit size Getriebe Grösse	Shrink disc Schrumpfscheibe			Shaft end of driven machine Wellenende der Arbeitsmaschine										Hollow shaft Hohlwelle		Cover Deckel		
				D	L1			l	k		r	U2			Z	DP	ZP	UC		DC
	Size Grösse (1	DS	Ma (2 Nm	stand (min)	3TC 4TC 4TKC(V) 5TKC(V)	2TC 3TKC(V)	2TKC		min	max		3TC 4TC 4TKC(V) 5TKC(V)	2TC 3TKC(V)	2TKC	SFS 50 37 DIN 332			3TC 4TC 4TKC(V) 5TKC(V)	2TC 3TKC(V)	2TKC	
500	300-71	300	470	240...(220)	770	830	1090	140	8	6		310	340	470	M42	270	6 x M16	495	525	652	528
560	350-71	350	470	280...(260)	859	919	1199	160	11	8		345	375	515	M48	315	6 x M16	540	572	712	600
630	390-71	390	820	320...(300)	975	1035	-	165	11	8		400	430	-	M48	355	6 x M20	600	632	-	708
710	440-71	440	820	360...(340)	1084	1174	-	195	11	8		440	485	-	M48	400	6 x M20	670	714	-	758

1) Schaefer (TAS), Ringerfeder, Stüwe SD or Stüwe HSD shrink discs can be used.
2) Tightening torque of shrink disc screws.

Dimensions are not binding.

1) Schrumpfscheiben der Marken Schaefer (TAS), Ringerfeder, Stüwe SD oder Stüwe HSD können verwendet werden.
2) Erforderliches Anzugsmoment der Spannschrauben an der Schrumpfscheibe.

Massangaben unverbindlich.


629
(541) 613 (528) 644 (526) (537) 642 231 612 611
665 (491) 461 071 036 (441) 663 661 (342) 536 659 (241) 534 641 522 034 657 211 669 101 655 031 111 631
650
680
072
481
614
038
625
624
(639)
512
C1
671
540
542
648
666
621
622
492 431 (607) 035 646 568 637 538 (341) 661 536 411 (242) 534 657 131 034 (523) 623 627 560 039 510 669 655 031 603 601
608 (061) 613 645 618 683 (539) 636 (537) 331 (524) 659 311 612 611 602
062 011 685 629 663 620 682 684 681 606
021
081
626
082
632
684
C
C
C
C
C = 0,25... 0,45
Pos 666 | C1 | Tol.
32304 | 0,060 | ±0,015
31305... 07
31308... 10 | 0,080
Muutoksista on neuvoteltava piirustuskonttorin kanssa.
1Nm ≈ 0,1 kpm
Kiristysmomentti Fastening torque [Nm]
M6 7,9 | M8 19,5 | M10 38,1 | M12 66,6 | M16 161 | M20 315 | M24 541 | M30 1092
Osa | Nimitys | Kpl | Aine | Mitat, muoto, malli | Huom.
santasalo
KYMI KYMMENE METALLI
Karkkila
Voimansiirto
Suhde:
Lastuamistoleranssit: SFS 4011 – Keski
5TKC 315 – 400
03v
P. 21.5.81
T.
H.
2744332
d) c) b) a)
8 7 6 5 4 3 2 1
E D C B A

NO	PCS	DESP	TYP	MANUF.NO	ASSEMBLY DRG.NO
010	1	822	5TKC355	52531	2744332

:	PCS	POS	NAME	MODELL	DIMENSIONS			
009	1	011	GEAR CASE		H=-69			
341802	1	011	CASTING					
341801	1	021	CASTING					
5479	2	031	COVER					
5532	2	031	CASTING					
5492	2	034	COVER					
5542	2	034	CASTING					
5445	1	035	COVER					
4133	1	035	CASTING					
5425	1	036	COVER					
4133	1	036	CASTING					
7669	1	038	COVER					
5941	1	038	CASTING					
6489	1	039	COVER					
1890	1	061	INSP.COVER					
6469	1	062	INSP.COVER					
7293	1	071	BEAR.SLEEVE					
4483	1	072	BEARING COVER					
419202	1	072	CASTING					
5831	1	081	ANCHOR.PLATE					
4106	1	081	CASTING					
595300	1	082	ANCHOR.PIN					
4414	1	101	HOLLOW SHAFT		0.00	0	286	480
408701	1	101	CASTING					
5638107	1	111	WHEEL		7.00	77	563	142
432103	1	111	CASTING					
56141	1	131	PINION		7.00	-22	176	444
56270	1	211	WHEEL		4.50	-84	396	100
56678	1	231	PINION		4.50	24	123	418

NO	PCS	DESP	TYP	MANUF.NO	ASSEMBLY DRG.NO
010	1	822	5TKC355	52531	2744332

	PCS	POS	NAME	MODELL	DIMENSIONS
5245	1	311	WHEEL	2.75	104 299 72
5828	1	331	PINION	2.75	-23 73 378
7058	1	341	BEARING BUSH		
7058	1	342	BEARING BUSH		
7225	1	411	WHEEL	2.00	-97 204 50
5957	1	431	PINION	2.00	24 55 301
5406	1	441	BEARING BUSH		
9029	1	461	BEVEL WHEEL	2.75	28 0 0
9028	1	481	BEVEL PINION	2.75	-9 0 0
6981	1	492	INTERM.PIPE		
100142	1	510	KEY	SFS2636 B	63 32 142
100050	1	512	KEY	SFS2636 B	8 7 50
704114	1	522	DIST.RING		145 110 17
702821	1	524	DIST.RING		110 95 21
703723	2	534	DIST.RING		200 180 23
703142	2	536	DIST.RING		140 120 42
702635	1	538	DIST.RING		100 90 35
755409	1	539	DIST.RING		100 90 3
755307	1	540	DIST.RING		44 35 5
766628	1	541	DIST.RING		50 40 10
5935	1	560	END PLATE		
6879	1	568	END PLATE		
860	7	601	HEXAGON SCREW	SFS2064	M16 50 8.8
900	8	602	HEXAGON NUT	SFS2067	M30 8
5450	8	603	STUD BOLT	DIN939	M30FOX170 6.8
7300	5	606	6.S.C.SCREW	SFS2219	M16 35 8.8
690	6	607	HEXAGON SCREW	SFS2064	M8 20 8.8
780	6	608	HEXAGON SCREW	SFS2064	M12 30 8.8
790	12	611	HEXAGON SCREW	SFS2064	M12 35 8.8

NO	PCS	DESP	TYP	MANUF.NO	ASSEMBLY DRG.NO
1010	1	822	5TKC355	52531	2744332

	PCS	POS	NAME	MODELL	DIMENSIONS	
790	10	612	HEXAGON SCREW	SFS2064	M12 35	8.8
790	18	613	HEXAGON SCREW	SFS2064	M12 35	8.8
590	4	614	HEXAGON SCREW	SFS2064	M8 20	8.8
590	2	618	HEXAGON SCREW	SFS2064	M8 20	8.8
700	4	620	LIFTING EYE BOLT	DIN580	M24	
500	4	621	HEXAGON NUT	SFS2067	M16	8
510	4	622	STUD BOLT	DIN976	BM16X60	5.6
790	2	623	LOCKING SCREW	DIN913	M10 10	
700	1	624	NUT	SKF KM	7	
700	1	625	TAB WASHER	SKF MB	7	
890	4	626	HEXAGON SCREW	SFS2064	M20 60	8.8
000	2	627	LOCKING RING	DIN472	180 4	
000	4	631	TAPER DOWEL	DIN1	10X50	
150	2	632	LOCKING RING	DIN471	45 1.75	
910	1	636	LOCKING RING	DIN472	100 3	
940	1	637	SUPPORT RING	DIN988	SS 80X100X3.5	
40194	2	641	SHIM			
00180	2	642	SHIM			
40123	2	644	SHIM			
550	1	645	SHIM			
00082	2	646	SHIM			
000	1	648	SHIM			
330	4	650	SHIM			
948	2	655	BEARING		NCF2948V.C3	
223223	2	657	BEARING		22322EC3	
223193	2	659	BEARING		22319EC3	
223133	2	661	BEARING		22313EC3	
223093	2	663	BEARING		22309EC3	
223083	1	665	BEARING		22308EC3	

NO	PCS	DESP	TYP	MANUF.NO	ASSEMBLY DRG.NO
1010	1	822	5TKC355	52531	2744332

	PCS	POS	NAME	MODELL	DIMENSIONS
400	2	666	BEARING		31307
390	2	669	OIL SEAL		A 240 270 15
981	1	671	OIL SEAL		AS 32 50 10
302	1	680	O-RING		119.5X3
302	1	681	OIL GLASS		ML-170
820	1	682	BREATHER		R3/4
900	1	683	L-PIECE	LVI 5140	R3/4
120	2	684	PLUG	DIN906	R3/4
544	2	685	PLUG	DBI	38

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SANTASALO

Lubrication of gear units 9.111U-1

10.87

1. General

Lubrication, inspection and planned maintenance are of prime importance to ensure trouble free running of gear units. These instructions are designed to help achieve this end. For special gear units and gear units operating in exceptional conditions individual lubrication instructions are supplied by us.

2. Lubrication principles

The purpose of lubrication is to provide a film of oil which prevents direct metal to metal contact between the working flanks. At the same time the oil lubricates the bearings and seals. The purpose of lubrication is also to:

— reduce friction
— dissipate heat
— minimize wear
— remove wear particles
— inhibit corrosion.

The thickness of the film of oil depends on the following factors: the surface stress of the tooth, the viscosity and quality of the oil, pitch line velocity etc. The working flanks of the teeth will be damaged if the film repeatedly breaks during operation.

3. Lubrication methods

3.1 Choice of lubrication method

The lubrication method depends in the first place on the pitch line velocity. Design, type and size of the gear unit must also be considered.

The lubrication method depends on the pitch line velocity (v) of the gears as follows:

— bath lubrication can be used when $v < 4\ ms^{-1}$ (The size and type of gear unit determine the limit)
— splash lubrication is used at pitch line velocities $v < 14\ ms^{-1}$
— pressure lubrication is used if bath or splash lubrication are not possible.

3.2 Bath lubrication

When using bath lubrication the oil level is raised so that the gears are deep immersed in oil. In order to secure the lubrication of bearings it is often necessary to raise the oil level to the level of bearings.

3.3 Splash lubrication

The most commonly used method is splash lubrication. Parts of the gears immersed in the oil contained in the oil sump, lift the oil as they rotate and splash it around, lubricating the gears in mesh and the bearings. Generally a pitch line velocity of $v = 14\ ms^{-1}$ sets the limit for splash lubrication. However, with special arrangements splash lubrication can be applied with higher pitch line velocities.

3.4 Pressure lubrication

Selection of the correct type of pressure lubrication equipment is governed by several factors e.g. type/size of gear units, complexity of the required surveillance devices and the method of cooling. We manufacture two standard pressure lubrication unit types, if required both types of unit can be supplied with a water cooled oil cooler, see instruction 9.112.

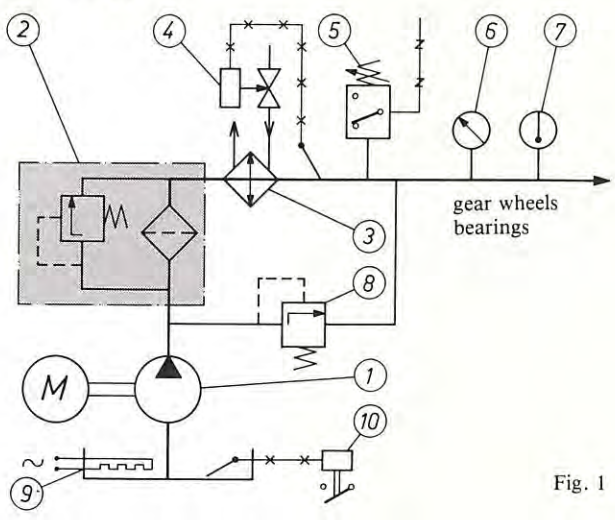

Fig. 1

The pressure lubrication system is built up from the following standard equipment (fig. 1):

— pump, driven by an electric motor (1). The pump may also be driven by a shaft (usually input shaft) of the gear unit. We recommend the electric motor of the pump to be so connected that it has to be started before the drive motor of the gear unit can be started and to have the pump motor protected with an overload relay
— pressure gauge (6)
— built-in pipe system leading the oil to tooth contacts and bearings.

Lubrication units for complex drives also include:

— filter (2)
— pressure switch (5) connected to the control circuit of the main motor to prevent start up before the oil pressure reaches a minimum set value. In the same way the pressure switch stops the main motor should the oil pressure drop below the set value. This value has already been preset at our factory and is recommended to be 60 % of the oil pressure under the normal operating temperature.

If the gear unit requires external artificial cooling, lubrication unit should also included:

— water-cooled oil cooler (3) or air-cooled oil cooler
— thermostatic water valve (4)
— thermometer (7)
— relief valve (8)

At low ambient temperatures:

— oil heater (9), regulated by thermostat (10) may be necessary.

The lubrication units can also be equipped with other surveillance devices according to customer's requirements.

Usually the pressure lubrication devices are fitted at the slow speed shaft end of the gear unit. Should this method prove to be unsatisfactory because of the size of gear unit or other space limitations, the pressure lubriction system is supplied as a separate unit.

The pressure lubrication unit can be either foot mounted or wall mounted, see instruction 9.112.

Standard delivery includes an oil suction hose of 800 mm max. length and an oil pressure hose of 1500 mm max. length.

The pressure lubrication unit should preferably be placed below the oil level of the gear unit and as close to it as possible.

3.5 Grease lubrication

Grease lubrication is employed for lubrication of bearings and seals almost exclusively in such cases where pressure lubrication is not necessary and bearings and seals do not get lubrication by any other means.

4. Oil heating

We should be informed of details about ambient temperature and its changes at the quotation stage. This information will help us to assess whether the oil should be heated. See also items 6.3 and 6.4.

The oil heater is a resistor element, which is placed in the oil sump of the gear unit and fastened to the wall of the gear case. If required, the resistor element can be removed for cleaning, in which case the oil has to be drained from the gear unit.

The oil heater is controlled by thermostat (10). The thermostat must be so set that the oil heater is switched on when

— the oil temperature of bath or splash lubricated gear units drops below the pour point of the oil
— the oil temperature of pressure lubricated gear units drops below the following temperatures:

ISO VG Class	680	460	320	220	150
Minimum temperature °C	25	20	15	10	5

The upper limit of the thermostat is so set that the oil heater is switched off at temperatures 8...10°C higher than the above mentioned switching-on temperature.

5. Oil cooling

The gear unit's maximum permitted operating temperature measured in the oil sump is generally +80°C; in some special cases (for example at high ambient temperatures) the permitted operating temperature may rise up to max. +100°C. If the running load of the gear unit is higher than the thermal rating, the gear unit needs increased cooling to prevent the temperature exceeding the above mentioned normal temperatures.

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8.2 Maintenance

8.2.1 Cleaning of the filter

The filter must be thoroughly cleaned at each oil change. The filter is opened and the filter chamber cleaned. The filtering element can be washed with a suitable solution. If clogged, the filtering element must be renewed.

Filter maintenance

- drain the filter reservoir through the drain plug
- open the filter by unscrewing the cover top of the filter
- remove the filter with the holder from the reservoir
- take the cartridge out of the holder by removing the wing nut
- wash the filter cartridge and clean the magnetic rod
- check condition of the cartridge and seals and replace with new original spare parts when needed
- assemble the filter in reverse order
- check the filter for any possible leaks

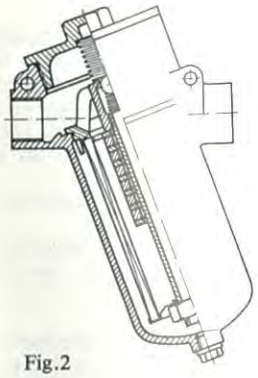

Fig.2

8.2.2 Oil changes

The first oil change must be made after 400...500 operating hours. The oil must be still warm when removed. If necessary, both the gear unit oil chamber and pressure lubrication system should be thoroughly rinsed with flushing oil during the oil change. Subsequent oil changes are performed after 4000 operating hours or once a year in case annual operating hours are less than 4000. If running temperature is 80°C or higher, the oil should be changed after every 2500 h.

With correctly selected synthetic oil, the intervals between oil changes can be doubled.

If necessary the gear unit should be rinsed during oil changes. For large gear units demanding substantial volumes of oil, it is possible to depart from the above general rule and to make the oil change only when regular inspection (at intervals of abt 4000 operating hours) of the oil quality shows it to be required. This procedure is adopted only if the inspection is carried out by a reliable specialist.

If the back stop (where fitted) has a separate oil chamber, the oil should be changed at the same time as the gear unit oil change (item 6.3.). The oil heater must also be removed and cleaned (item 4).

8.2.3 Subsequent greasing of grease lubricated bearings

The necessity for repeated greasing of grease lubricated bearings is limited, because the grease cannot escape into the oil sump. The initial greasing of these bearings is performed at our works. The recommended qualities of grease are indicated on the plate fixed to the gear unit. Table 2 shows roller bearing greases.

For grease application there is a grease nipple on the bearing housing or cover denoted by a red painted triangle. In most cases adding grease in connection with the oil change is sufficient. Precautions must be taken, as excessive greasing raises the operating temperature of the bearing.

Lime soap based greases do not withstand temperatures exceeding 60°C, which are normal in bevel bearings.

8.2.4 Cleaning of the outer surfaces

The outer surface of the gear unit must be kept clean, as accumulated dirt on this surface raises the operating temperature. The same reason for cleaning the outside surfaces also applies to the auxiliary equipment e.g. the pump motor, the air-cooled oil cooler, the cooling fans etc.

8.2.5 Cleaning of the oil cooler

The water-cooled oil cooler must also be cleaned. The quality of the cooling water determines how often this is carried out. In any case it should be cleaned at least when the oil change takes place.

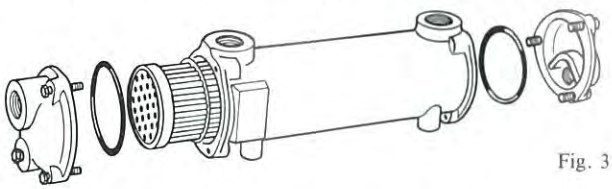

Fig. 3

Removal of the screws around the periphery at each end will allow the end covers and the seals to be removed. Following this operation the tube stack can be withdrawn from either end of the body.

If the tube stack requires cleaning it should first be degreased which will clean the oil side of the tubes. The inside of the tubes which have water passing through them may require mechanical cleaning. If this is the case they can be cleaned by pushing a length of 3 mm diameter steel rod down the tubes in the opposite direction to that in which the water flows. The other components of the oil cooler should be cleaned before assembly and as these contain no hidden surfaces, special instructions are not required.

When assembling the oil cooler, new '0' seals should be fitted and the end screws must be tightened to the torque settings: — EC types 8Nm and FG types 22Nm.

8.2.6 Cleaning of the Breather

During oil change the breather in the filling plug should be removed and checked to ensure that the air flows freely through it. If the breather is blocked, it must either be replaced or cleaned with a suitable solvent.

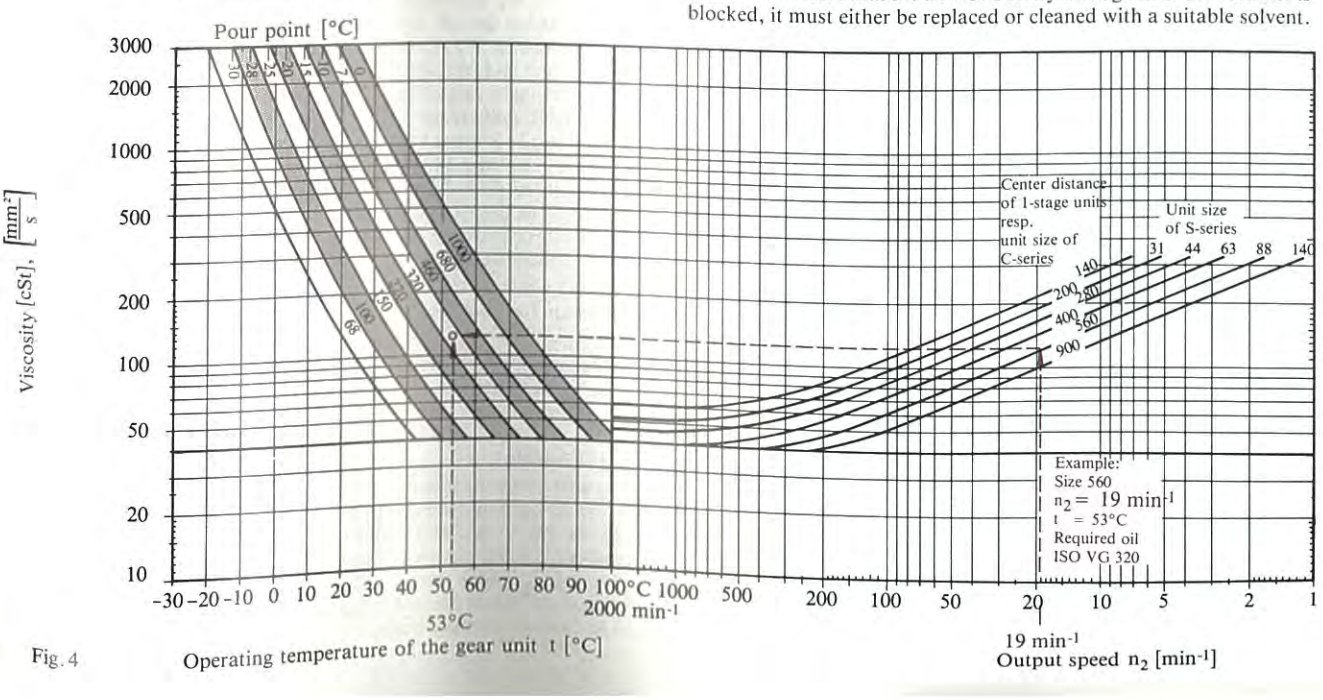

Fig. 4

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Increased cooling of the gear unit is achieved by:
— inserting a cooling coil in the oil sump of the gear unit
— mounting one or two fans at the input shaft of the gear unit
— external water-cooled oil cooler
— external air-cooled oil cooler

The employment of fans or an air-cooled oil cooler is not recommended for dusty conditions.

The use of water cooling coil or fans makes it possible to keep the driving temperature of the gear unit within the allowed limits , to enable the running load to exceed the thermal rating by 1,7...2 times. This limit being exceeded, an external water- or air-cooled oil cooler must be used in connection with a pressure lubrication system.
On the inlet side of the cooling coil and the water-cooled oil cooler a regulating valve has to be fitted which is opened when the oil temperature is +45...+50°C. To avoid manual control we recommend the use of a thermostat controlled water valve for the oil cooler. The maximum pressure of water is 1 MPa (10 kpcm^{-2}). The flow direction of water in the cooling water coil is not important, whereas the flow direction indicated on an external oil cooler must be strictly observed.
The water flow in the cooling water coil must be so regulated that the temperature in the oil sump of the gear unit does not exceed +70°C. Therefore, the oil sump is equipped with a thermometer. In an external water-cooled oil cooler the water flow is so regulated, that the temperature of the oil inlet to the gear unit is +45...+55°C.
The coolers are intended for clean fresh water. For salt water or unclean fresh water, cooler elements made from special materials are necessary. Therefore, information concerning the water quality should be supplied with the order.
Max. allowed water quantities must not be exceeded, see instruction 9.112.
In cases where the gear unit is equipped with an air-cooled oil cooler this is also provided with a thermostat to control the function of the motor driving the cooling fan.

6. Lubrication oils

6.1 Selection of lubrication oil

The viscosity of oil is important but not the only decisive factor in the selection of lubrication oil
In addition to the required viscosity, the oil must have a high viscosity index and include antioxidant, anti-rust, anti-foam and anti-wear additives.
Because of the high tooth pressures which occur in gear units, the oil should contain pressure resistant additives (mild EP-additives). If, due the operation temperatures or change intervals, synthetic oils are selected, it is recommended that hydrocarbon based oils are used.
A separate recommendation concerning synthetic lubricating oils will be delivered if required.

6.2 Lubrication oil classes

With consideration to the above mentioned requirements the oils are grouped in viscosity classes according to the standard ISO 3448-1975, on which our lubrication oil recommendation in the enclosed table 1 is based. Also lubricant No according to the standard AGMA 250.04-1981 is listed.

6.3 Selection of viscosity

All of our units have a plate indicating the recommended lubrication oil corresponding to a certain ISO VG class in table 1 and which is valid at normal temperatures (+5...+35°C). In case the gear unit is working in the open, it has two plates, one of which indicates the recommendation for normal temperatures (+5..+35°C) and the other for winter temperatures (—30°C...+5°C). If the gear unit is equipped with an oil heater it is generally possible to manage with the same oil both summer and winter.
In connection with incoming orders on gear units we sometimes receive information not fully conforming with the real facts; therefore, our lubrication instructions include a nomograph (fig. 4) which makes it possible to determine the viscosity of the oil required **at operating temperature.** The situation at cold-starting has to be checked (item 6.4) before the final oil class selection is made.
If the back stops (where fitted) are equipped with a separate oil chamber, the lubrication oil group ISO VG10/15 — operation temperature range —40°C...+50°C is used. It is not permissible to use oils with EP-additive in back stops.

6.4 Cold-starting

At cold-starting the temperature and viscosity limits are the following:
— bath and splash lubricated gear units: starting temperature higher than the oil's pour point (table 1)
— pressure lubricated gear units: viscosity of lubrication oil below 2000 cSt at starting temperature (see also table item 4).

If the viscosity of the oil selected exceeds the allowed viscosity at starting temperature, the nearest thinner oil group (Table 1) must be selected. When doing so, it must be checked that the viscosity limit is not lower than 40 cSt at operating temperature. If this is impossible there remain two alternatives
— to use different oil for winter and summer conditions, or
— to employ an oil heater.
When the starting temperature drops temporarily (for example at standstill) the difficulties in starting pressure lubricated gear units can be facilitated by having the electric motor pump running during the standstill period.
Should table 1 not include a lubrication oil meeting the above mentioned requirements (e.g. exceptionally cold ambient), the gear unit manufacturer or the oil company should be consulted.

7. Operation

7.1 Preparation for use

If the gear unit has been stored for a long period before use, 1/2—2 years, depending on the storage conditions, all roller bearings should be lubricated with a suitable hand lubricating device e.g. through inspection opening. The shafts are then manually rotated,to spread the lubricant throughout the bearings.

7.2 The first oil filling

For the first filling, it is very important that the oil quality is one recommended by us (note starting temperatures, items 6.3 and 6.4) or fully equivalent and that the quantity is correct. Gear units have a plate indicating the recommended qualities and quantity of oil in litres. Gear unit is also provided with an oil level indicator, e.g.a graduated glass on which an arrow indicates the correct oil level when the gear unit is at rest and the oil pump running if pressure lubricated. It is absolutely necessary that the oil filling is made according to the oil level indicator; the quantity of oil stamped on the plate is a guiding value only. In general, it is impossible to judge the correct quantity of oil when the gear unit is running.

7.3 The importance of correct oil quantity

The correct quantity of oil is especially important in splash lubricated gear units whose running load is close to the thermal rating. For instance, the operating temperature of a single reduction helical gear unit may rise 15—20°C above normal simply because 15 % too much oil has been added. The result is a reduction in the lubrication capability of the oil, at worst, damage to the gear unit.

7.4 Start and overhaul

Before starting pressure lubricated gear units the pressure lubrication system has to be checked by a test run. It is important that the rotational direction of the pump motor is correct and the current overload relay is suitable. Also check that the interlock between the main drive motor and the pump motor (via the pressure switch) operates satisfactory.
Starting is the most critical moment for lubrication. Therefore, it is extremely important to check the function of the pressure lubrication system. We refer to item 8.1 and instruction 9.211 and 9.112.

8. Control and service

8.1 Measures during operation

The pressure lubrication system:
— if the system includes a maximum pressure valve it opens on start with cold oil, when the oil pressure exceeds the set value 600 kPa (6 kpcm^{-2}) and closes when the running temperature of the gear unit becomes steady. The functioning of the pressure relief valve can be checked by lifting the lever, this opens the valve.
— the oil pressure at operating temperature is 80...250 kPa (0.8...2.5 kpcm^{-2}) depending on the design of the pipe system
— if the gear unit is fitted with a water cooling coil or external water cooled oil cooler, the water flow has to be so regulated that the temperature does not exceed the normal temperature (see item 5).

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1. General

Lubrication, inspection and planned maintenance are of prime importance to ensure trouble free running of gear units. These instructions are designed to help achieve this end. For special gear units and gear units operating in exceptional conditions individual lubrication instructions are supplied by us.

2. Lubrication principles

The purpose of lubrication is to provide a film of oil which prevents direct metal to metal contact between the working flanks. At the same time the oil lubricates the bearings and seals. The purpose of lubrication is also to:
— reduce friction
— dissipate heat
— minimize wear
— remove wear particles
— inhibit corrosion.
The thickness of the film of oil depends on the following factors: the surface stress of the tooth, the viscosity and quality of the oil, pitch line velocity etc. The working flanks of the teeth will be damaged if the film repeatedly breaks during operation.

3. Lubrication methods

3.1 Choice of lubrication method

The lubrication method depends in the first place on the pitch line velocity. Design, type and size of the gear unit must also be considered.
The lubrication method depends on the pitch line velocity (v) of the gears as follows:
— bath lubrication can be used when $v < 4$ ms^{-1} (The size and type of gear unit determine the limit)
— splash lubrication is used at pitch line velocities $v < 14$ ms^{-1}
— pressure lubrication is used if bath or splash lubrication are not possible.

3.2 Bath lubrication

When using bath lubrication the oil level is raised so that the gears are deep immersed in oil. In order to secure the lubrication of bearings it is often necessary to raise the oil level to the level of bearings.

3.3 Splash lubrication

The most commonly used method is splash lubrication. Parts of the gears immersed in the oil contained in the oil sump, lift the oil as they rotate and splash it around, lubricating the gears in mesh and the bearings. Generally a pitch line velocity of $v = 14$ ms^{-1} sets the limit for splash lubrication. However, with special arrangements splash lubrication can be applied with higher pitch line velocities.

3.4 Pressure lubrication

Selection of the correct type of pressure lubrication equipment is governed by several factors e.g. type/size of gear units, complexity of the required surveillance devices and the method of cooling. We manufacture two standard pressure lubrication unit types, if required both types of unit can be supplied with a water cooled oil cooler, see instruction 9.112.

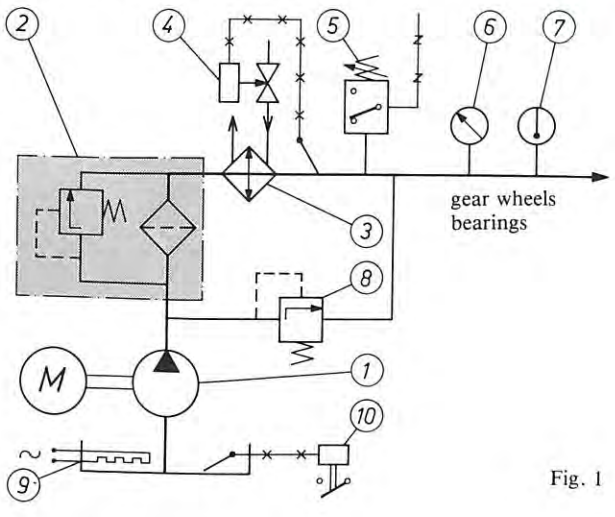

Fig. 1

The pressure lubrication system is built up from the following standard equipment (fig. 1):
— pump, driven by an electric motor (1). The pump may also be driven by a shaft (usually input shaft) of the gear unit. We recommend the electric motor of the pump to be so connected that it has to be started before the drive motor of the gear unit can be started and to have the pump motor protected with an overload relay
— pressure gauge (6)
— built-in pipe system leading the oil to tooth contacts and bearings.
Lubrication units for complex drives also include:
— filter (2)
— pressure switch (5) connected to the control circuit of the main motor to prevent start up before the oil pressure reaches a minimum set value. In the same way the pressure switch stops the main motor should the oil pressure drop below the set value. This value has already been preset at our factory and is recommended to be 60 % of the oil pressure under the normal operating temperature.
If the gear unit requires external artificial cooling, lubrication unit should also included:
— water-cooled oil cooler (3) or air-cooled oil cooler
— thermostatic water valve (4)
— thermometer (7)
— relief valve (8)
At low ambient temperatures:
— oil heater (9), regulated by thermostat (10) may be necessary.
The lubrication units can also be equipped with other surveillance devices according to customer's requirements.
Usually the pressure lubrication devices are fitted at the slow speed shaft end of the gear unit. Should this method prove to be unsatisfactory because of the size of gear unit or other space limitations, the pressure lubriction system is supplied as a separate unit.
The pressure lubrication unit can be either foot mounted or wall mounted, see instruction 9.112.
Standard delivery includes an oil suction hose of 800 mm max. length and an oil pressure hose of 1500 mm max. length.
The pressure lubrication unit should preferably be placed below the oil level of the gear unit and as close to it as possible.

3.5 Grease lubrication

Grease lubrication is employed for lubrication of bearings and seals almost exclusively in such cases where pressure lubrication is not necessary and bearings and seals do not get lubrication by any other means.

4. Oil heating

We should be informed of details about ambient temperature and its changes at the quotation stage. This information will help us to assess whether the oil should be heated. See also items 6.3 and 6.4.
The oil heater is a resistor element, which is placed in the oil sump of the gear unit and fastened to the wall of the gear case. If required, the resistor element can be removed for cleaning, in which case the oil has to be drained from the gear unit.
The oil heater is controlled by thermostat (10). The thermostat must be so set that the oil heater is switched on when
— the oil temperature of bath or splash lubricated gear units drops below the pour point of the oil
— the oil temperature of pressure lubricated gear units drops below the following temperatures:

ISO VG Class	680	460	320	220	150
Minimum temperature °C	25	20	15	10	5

The upper limit of the thermostat is so set that the oil heater is switched off at temperatures 8...10°C higher than the above mentioned switching-on temperature.

5. Oil cooling

The gear unit's maximum permitted operating temperature measured in the oil sump is generally +80°C; in some special cases (for example at high ambient temperatures) the permitted operating temperature may rise up to max. +100°C. If the running load of the gear unit is higher than the thermal rating, the gear unit needs increased cooling to prevent the temperature exceeding the above mentioned normal temperatures.

Table 1: Lubricating oils grouped according to ISO VG classes

ISO VG	AGMA	Company Oil	Viscosity	Pour point

Table 1: Lubricating oils grouped according to ISO VG classes

ISO VG class	AGMA Lubricant No	Company	Oil	Viscosity cSt/40°C	Pour point °C
10/15 *)		BP	Energol HLP 10	8.6	—51
		Esso	NUTO H 15	14.5	—45
		Mobil	Arctic Oil Light	13	—45
		Nynäs	Nynäs TD 10 EX	9.8	—54
		Shell	Tellus Oil R 10	10	—54
		Texaco	Rando Oil HDZ 15	16	—60
46 41.4— 50.6cSt (40°C)	**1 EP** 193— 235SUS (100°F)	Mobil	Mobil DTE 25	44	—31
		Nynäs	Nynäs TD 46 EX	47	—30
		Shell	Tellus Oil S 46	46	—33
		Texaco	Rando Oil HD 46	43	—30
		BP	Energol HLP 46	46	—30
		Esso	NUTO H 46	45	—33
68 61.2— 74.8cSt (40°C)	**2 EP** 284— 347SUS (100°F)	Nynäs	Nynäs GL 68	68	—27
		Shell	Omala Oil 68	68	—32
		Texaco	Meropa Lubricant 68	65	—34
		Chevron	EP Industrial Oil 68	68	—24
		BP	Energol GR—XP 68	65	—30
		Esso	Spartan EP 68	65	—33
		Mobil	Mobilgear 626	64	—33
100 90— 110cSt (40°C)	**3 EP** 417— 510SUS (100°F)	Shell	Omala Oil 100	100	—32
		Texaco	Meropa Lubricant 100	91	—31
		Chevron	EP Industrial Oil 100	100	—15
		BP	Energol GR—XP 100	96	—30
		Esso	Spartan EP 100	95	—30
		Mobil	Mobilgear 627	100	—29
		Nynäs	Nynäs GL 100	100	—24
150 135— 165cSt (40°C)	**4 EP** 626— 765SUS (100°F)	Texaco	Meropa Lubricant 150	140	—27
		Chevron	EP Industrial Oil 150	150	—15
		BP	Energol GR—XP 150	140	—27
		Esso	Spartan EP 150	140	—27
		Mobil	Mobilgear 629	142	—24
		Nynäs	Nynäs GL 150	150	—24
		Shell	Omala Oil 150	150	—25
220 198— 242cSt (40°C)	**5 EP** 918— 1122SUS (100°F)	Chevron	EP Industrial Oil 220	220	—12
		BP	Energol GR—XP 220	210	—27
		Esso	Spartan EP 220	225	—21
		Mobil	Mobilgear 630	209	—23
		Nynäs	Nynäs GL 220	220	—18
		Shell	Omala Oil 220	220	—18
		Texaco	Meropa Lubricant 220	198	—21
320 288— 352cSt (40°C)	**6 EP** 1335— 1632SUS (100°F)	BP	Energol GR—XP 320	305	—24
		Esso	Spartan EP 320	337	—18
		Mobil	Mobilgear 632	304	—18
		Nynäs	Nynäs GL 320	320	—12
		Shell	Omala Oil 320	320	—15
		Texaco	Meropa Lubricant 320	290	—18
		Chevron	EP Industrial Oil 320	320	— 9
460 414— 506cSt (40°C)	**7 EP** 1919— 2346SUS (100°F)	Esso	Spartan EP 460	440	—12
		Mobil	Mobilgear 634	437	—18
		Nynäs	Nynäs GL 460	460	— 9
		Shell	Omala Oil 460	460	— 9
		Texaco	Meropa Lubricant 460	420	—17
		Chevron	EP Indutrial Oil 460	460	— 9
		BP	Energol GR—XP 460	450	—15
680 612— 748cSt (40°C)	**8 EP** 2837— 3467SUS (100°F)	Mobil	Mobilgear 636	646	— 9
		Shell	Omala Oil 680	680	— 9
		Texaco	Meropa Lubricant 680	620	—15
		BP	Energol GR—XP 680	630	— 9
		Esso	Spartan EP 680	645	— 9

*) Oils employed for lubrication of back-stops

A separate recommendation concerning synthetic lubricating oils will be delivered if required.

Table 2: Roller bearing greases

General recommendation			
Company	Grease	Penetration	Dropping point °C
Chevron	Dura-Lith EP2	265/295	185
BP	Energrease LS-EP2	265/295	180
Esso	Beacon EP2	270/280	185
Mobil	Mobilux EP2	265/295	177
Nynäs	Nynäs Alexol L42	265/295	190
Shell	Alvania EP2	265/295	180
Texaco	Multifak EP2	265/295	186
Lubrication of warm (>80°C) running tapered roller bearings			
Beverol	Licol		
Optimol	Longtime PD2		
Shell	Lub 2370E		
Klueber	Isoflex LDS18 SA		
Lubrication of slow running thrust bearings			
Klueber	Unimoly GL 402		
Molub-			

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Lubrication of gear units 9.111U-4

10.87

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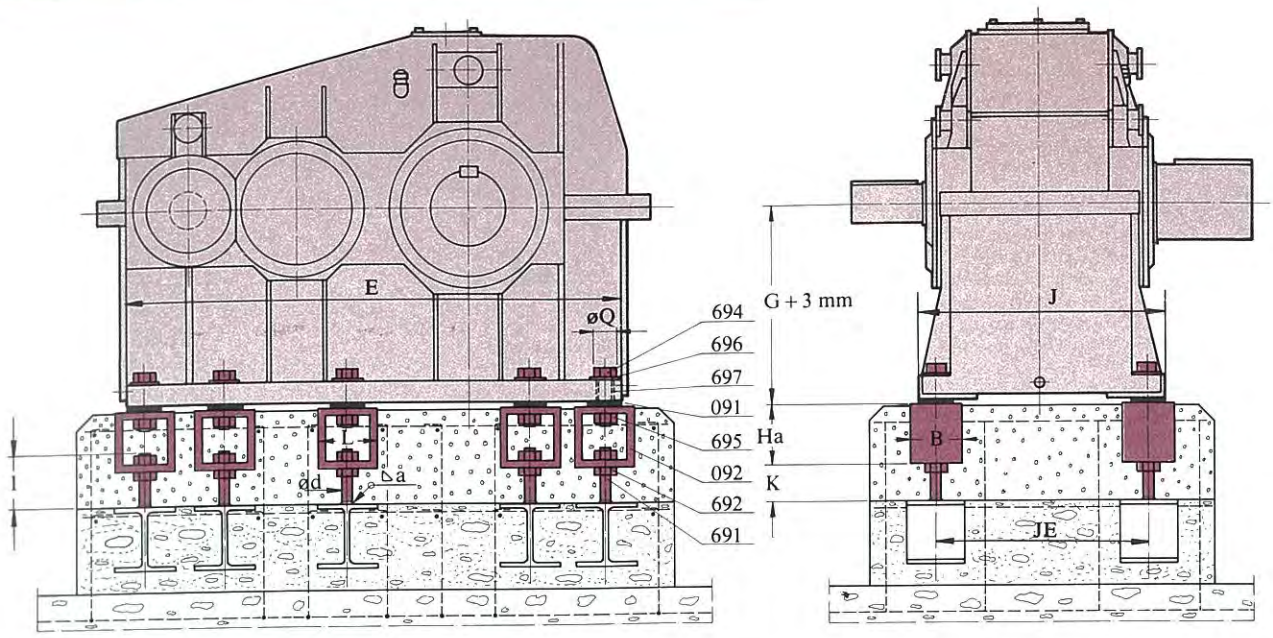

Fig. 2. Dimensions in mm

øM	Foundation screw ød	l	a	K	f*)	n*)	Foundation bracket B	L	Ha	Supporting girders DIN 1025 Fe37B
12	M24	100	8	50			80	120	120	HE100×100
15	M24	100	8	50			80	120	120	HE100×100
19	M24	100	8	50			80	120	120	HE100×100
24	M24	100	8	50	31		80	120	120	HE100×100
28	M30	140	10	70	46		120	150	140	HE140×140
35	M36	150	10	70	41		120	150	140	HE140×140
42	M42	180	10	90		22	150	185	180	HE180×180
48	M48	200	10	110		34	150	185	180	HE180×180

*) See figure 4.
Dimensions ø Q, E, G, J and JE are given in the leaflet of the gear unit.

Part. No Description

091	Fitting plate
092	Foundation bracket
691	Foundation screw
692	Nut
694	Hexagon screw
695	Nut
696	Washer
697	Centralizing bush

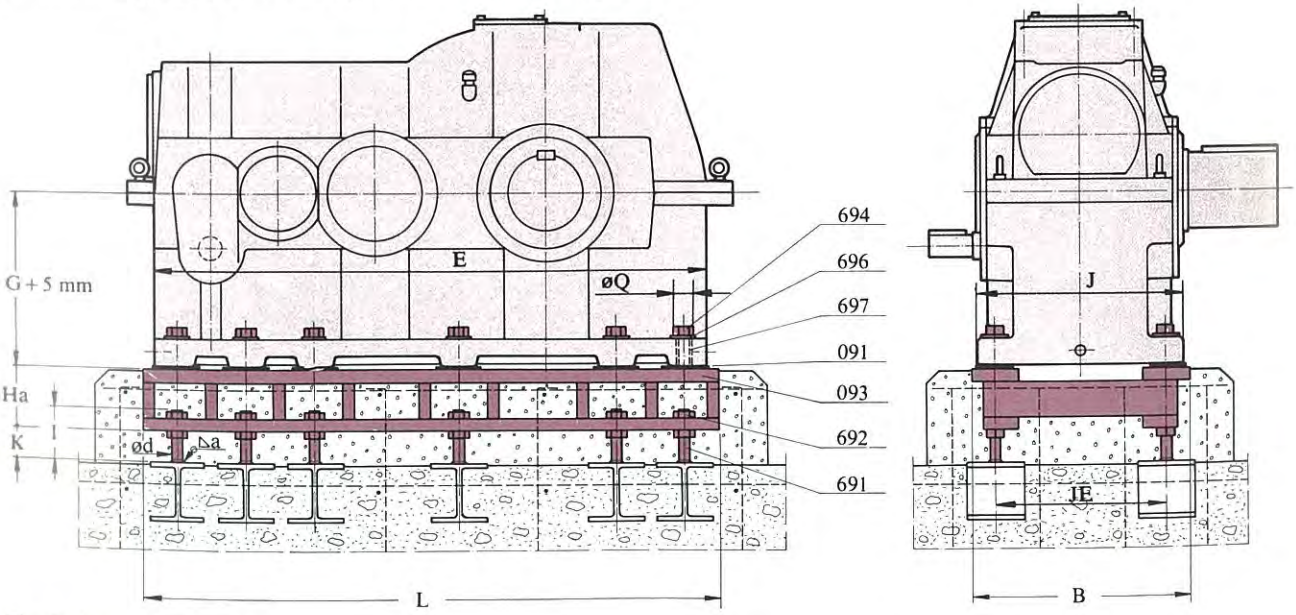

Fig. 3. Dimensions in mm

øM	Part.No. 694	Foundation screw ød	l	a	K	f*)	n*)	Bedplate B	L	Ha	Supporting girders DIN 1025 Fe37B
35	M30	M36	160	10	80	41		J+40	E+40	160	HE180×180
42	M36	M42	180	12	90		22	J+40	E+40	180	HE180×180
48	M42	M48	200	10	110		34	J+40	E+40	180	HE180×180
56	M48	M48	200	10	110		34	J+40	E+40	180	HE180×180

*) See figure 4.
Dimensions øQ, E, G, J and JE are given in the leaflet of the gear unit.

Part. No. Description

091	Fitting plate
093	Bedplate
691	Foundation screw
692	Nut
694	Hexagon screw
696	Washer
697	Centralizing bush

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SANTASALO

Mounting of gear units 9.211 W-3

01.88

4. MOUNTING OF GEAR UNITS

Foundation details of small gear units (below 250 kg) are shown in figure 1, and of larger gear units in figures 2 and 3. For dimensions we refer to the tables in connection with the figures. The checking procedure mentioned in paragraph 3 having been completed, mounting is carried out in the following order:

1) The parts shown in figures 1, 2 or 3 are fastened to the gear unit. The fitting plates 091 and centralizing bushes 697 are used to make it possible for later adjustments and for instance, make mounting of a replacement gear unit easier.
2) The gear unit is supported at the selected position on the supporting girders by means of three maximum spaced foundation screws (two on one side of unit, one on other side)
   — vertically by lifting, lowering and tilting, using the nuts of the foundation screws
   — horizontally by tapping the foundation screws lightly in the required direction.
   A spirit level and a straightedge or optic measuring devices are used for setting up purposes.
3) When the correct vertical and horizontal position and shaft line of the gear unit has been reached, the nuts on the three foundation screws are locked, and the other foundation screws are carefully lowered on to the girders and locked. The position of the gear unit must then be rechecked in case any disturbance in the setting has occurred. If so this must be rectified.
4) The ends of the foundation screws are first tack welded to the supporting girders, each screw at three points at least. The screws should be tack welded in pairs on each side of the centre line of the gear unit, starting from the middle. This makes it possible to avoid any movement due to welding.
   When all screws have been tack welded, they must be welded all the way round in the above mentioned order.
5) Mounting to be checked and grouting to be carried out according to instructions in paragraph. 2.4. Before grouting the lower ends of the screws should be protected, for example, by tape.
6) When the grouting concrete has set, the mounting must be checked and (if necessary) finely adjusted after removing the centralizing bushes from the fastening holes of the gear unit.
7) The mounting is finalized by securing with two tapered dowel pins. By this means, the gear unit can be moved (e.g. for coupling fitting) and refitted accurately by locating with the dowel pins. The top end of the pins to be fitted with nut for easy withdrawal.

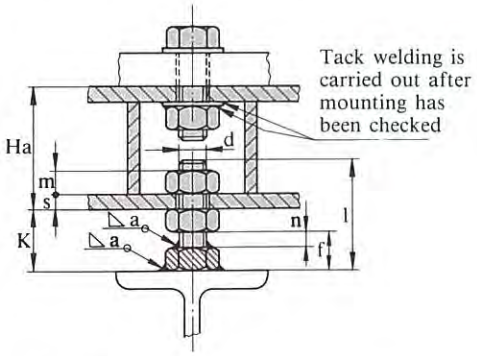

Fig. 4, Dimensions in mm

d	Ha	K	s	m	l	n	f	Note!
M24	120	50	16	19	100		31	see. fig. 2
M30	140	70	20	24	140		46	see. fig. 2
M36	140	70	20	29	140		41	see. fig. 2
M36	160	80	20	29	160		41	see. fig. 3
M42	180	90	20	34	180	22		see. fig. 2 and 3
M48	180	110	20	38	200	34		see. fig. 2 and 3

5. MOUNTING PRECISION

5.1. General

The mounting precision of to the driven and driving machines depends on the coupling method, type of coupling or of some other power transmission device (pulleys, chain wheels, open gears) and rotation speed.

Although the manufacturers usually give guiding values for the maximum misalignment tolerances, this does not mean that these are always allowable in practice. Inaccurate lining up has the following consequences: excessive vibrations (especially in the high speed shafts) or overloading of the bearing on the coupling or wheel side, and overheating.

5.2. Couplings

With reference to the mounting of flexible pin-couplings we refer t the table below (mounting precision for pin-couplings) and figure 5—8.

Mounting precision of flexible pin couplings
Dimensions in mm.

Outer diameter D	n < 500 min^{-1}		500—1500 min^{-1}		> 1500 min^{-1}	
	a_1—a_2	b	a_1—a_2	b	a_1—a_2	b
⩽100	0,05	0,05	0,04	0,04	0,03	0,03
>100⩽200	0,06	0,06	0,05	0,05	0,04	0,04
<200⩽400	0,12	0,10	0,10	0,08	0,08	0,06
<400⩽800	0,20	0,16	0,16	0,12	(0,12)	(0,10

a_1—a_2 = maximum angular misalignment
b = maximum offset misalignment

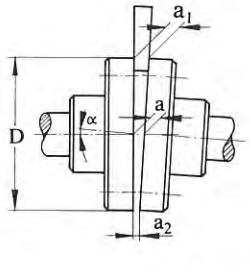

Fig. 5

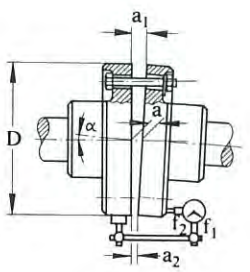

Fig. 6

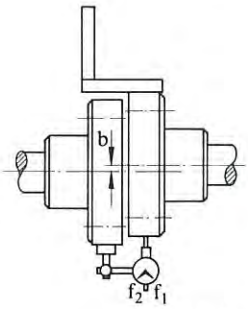

Fig. 7

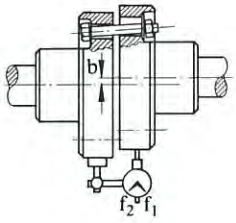

Fig. 8

In fig. 5 is shown how the angular misalignment ($\sphericalangle \alpha$) is measure using a key or a feeler gauge. When using this method, an accurat result is achieved only if the error of the faces is eliminated by turnin both coupling halves 180° and then calculating the average of the tw differences ($a_1 - a_2$).

In fig. 6 the same result as above is obtained using a dial micrometer The coupling halves are forced to rotate together (e.g. with one coup ling pin) so that the point of the micrometer does not move noticeabl on the measuring surface. This method assumes shaft bearings whic do not allow the shafts to move axially when rotating. If this canno be achieved, the axial movement must be eliminated by placing wooden key of the dimension a_1 between the faces opposite the mic rometer. The key must be kept in position while the coupling is rota ted during the measuring procedure.

In fig. 7 the offset misalignment is checked using a rule. The off centre values permitted are usually so small that sufficient accurac is best achieved with a micrometer. When the coupling half is rotate together with the micrometer, the misalingment b, in which is also in cluded the error in the outside diameter of the other coupling half is obtained from the variation shown on the micrometer.

Fig. 8 shows a more accurate method. The coupling halves rotate to gether and the point of the micrometer does not move noticeably o the measuring surface. When the variation shown on the micromete is divided by two, the misalignment b is obtained.

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SANTASALO

Mounting of hollow shaft gear units 9.231W-1

03.87

1. PLANNING

1.1 General

This instruction covers the mounting and anchoring of 2-, 3-, 4- and 5-stage gear units types of TC-, TKC- and TKCV. Together with these instructions the general instructions given in leaflet 9.211, Mounting of gear units, must be followed.

1.2 Mounting position and direction of rotation

A prequisite for a normal position of the hollow shaft gear unit (fig. 1) is that the shaft of the driven machine is horizontal, the joint face of the gear unit is mounted horizontally and that a vertical anchoring rod is used. For other mounting positions the gear unit manufacturer must be consulted.
The shaft position of the hollow shaft gear unit and the direction of rotation may be freely chosen, but usually it is most advisable to make a choice where pressure is exerted on the anchoring rod. Thus the loading on the shaft and bearings of the driven machine, caused by the anchoring force and the weight of the gear unit, is in most cases minimized.

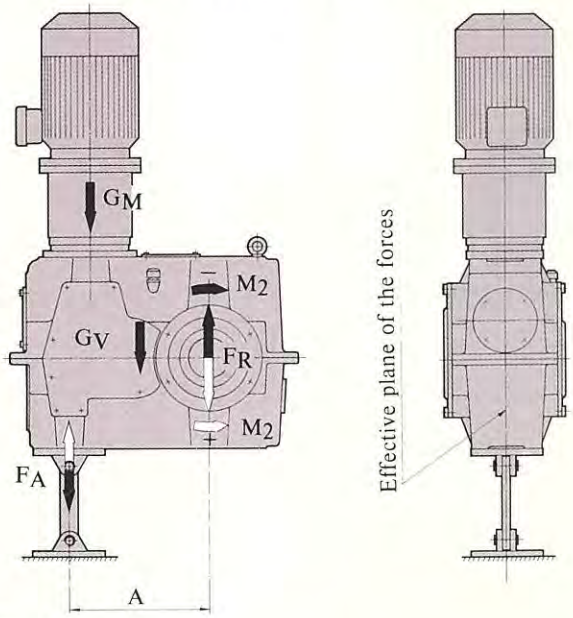

Fig. 1.

1.3 Forces caused by the hollow shaft gear unit

Regarding the calculation of the forces F_R and F_A which affect the shaft end of the driven machine and the anchoring rod, we refer to the formulae below and to figure 1 with its explanations.

Dir. of rot. of the hollow shaft	F_R	F_A
+	$F_R = \frac{M_2}{A} + \frac{2}{3} G_V$	$F_A = -\frac{M_2}{A} + \frac{1}{3} G_V + G_M$
−	$F_R = -\frac{M_2}{A} + \frac{2}{3} G_V$	$F_A = \frac{M_2}{A} + \frac{1}{3} G_V + G_M$

Explanations

When the direction of rotation of the hollow shaft is determined, the gear unit must always be looked at in the position as shown in figure 1.

F_R	[N]	the force exerted by the gear unit on the shaft end of the driven machine.
F_A	[N]	the force exerted by the gear unit on the anchoring rod..
M_2	[Nm]	the torque exerted on the shaft by driven machine. When calculating the forces F_R and F_A the nominal output torque M_{N2} is used. Anchoring rod must de dimensioned to absorb the maximum torgue.
M_2/A	[N]	force on anchoring rod relative to output torque.
G_V	[N]	weight of hollow shaft gear unit, of which about 2/3 affect the shaft end of the driven machine and 1/3 the anchoring rod.
G_M	[N]	the total weight of the motor fixed to the gear unit, its fastening and connecting devices.
A	[m]	the distance of anchoring rod from the centre line of the shaft of the driven machine.

Braking

If the hollow shaft gear unit is fitted with a brake or is used to give a braking effect, the braking torque has to be considered in the calculations, where the direction of forces M_2/A. will be changed.

2. MOUNTING TOOLS

The mounting of C-hollow shaft gear unit is carried out by using the end plate and suitable screws (see fig. 2...5). The size of screws required for mounting can be found from the table 1.

Table 1

Gear unit-size	Mounting-/stud bolt			Removal-/hex. screw		
	Thread	Length	pcs	Thread	Length	pcs
90	M16	240	1	M20	240	1
110	M20	240	1	M24	240	1
140	M20	200	1	M24	220	1
160	M20	300	1	M24	260	1
180	M24	300	1	M30	260	1
200	M24	360	1	M30	300	1
225	M24	380	1	M30	320	1
250	M24	410	1	M30	360	1
280	M20	180	2	M24	140	2
315	M20	180	2	M24	140	2
355	M24	210	2	M30	160	2
400	M24	210	2	M30	180	2
500	M24	300	2	M30	220	2
560	M30	300	2	M36	260	2
630	M30	360	2	M36	260	2
710	M36	360	2	M42	300	2

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6. REMOVAL OF THE HOLLOW SHAFT GEAR UNIT

6.1 Drain the oil from the gear unit.

6.2 Remove the cover top of the hollow shaft.

6.3 Fix the lifting devices to the gear unit and disconnect the gear unit from the anchoring rod.

6.4 Removal is carried out using tapped holes in the end plate by pushing with screws. Gear unit sizes 90–250. When removing, the thread on the shaft must be protected e.g. with screwed plug. Gear unit sizes 280–400. Before removing the end plate must be turned 90 °.

6.5 If in spite of all precautions, rust has formed on the contact surface, removal can be made easy by pumping rust (see fig. 2 . . . 5) dissolving fluid (e.g. Caramba) through a special inlet hole so that it can spread to the contact surfaces.

6.6 When removing, a hydraulic cylinder and suitable removing tools can also be used.

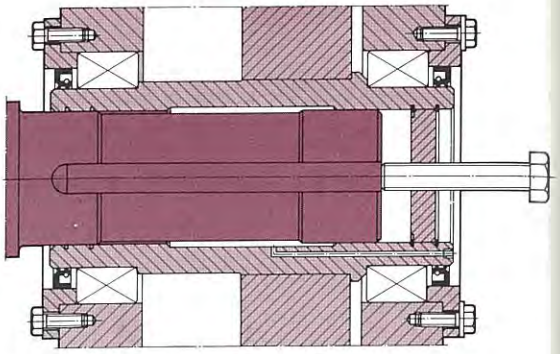
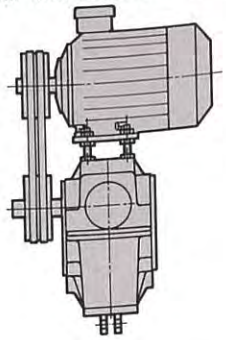


Fig. 7.

7. MOTOR SIZES ALLOWABLE FOR DIRECT MOUNTING TO C-TYPE GEAR UNITS

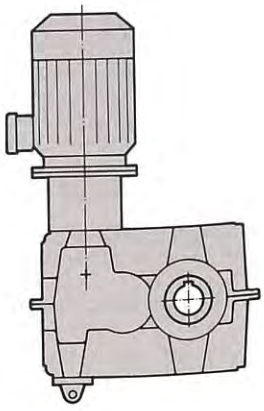
Without separate investigation a motor can be flanged to the gear unit as follows $n_1 \leqq 1500\ min^{-1}$.



$G_M \leqq 1{,}5 \cdot G_{gear\ unit}$

Fig. 8

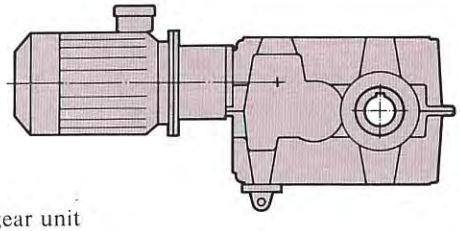
7.1 Motor on the gear unit standing on motor bracket for V-belt use



$G_M \leqq 1{,}5 \cdot G_{gear\ unit}$

Fig. 9

7.2 Flanged motor in vertical position on the gear unit



$G_M \leqq 1{,}5 \cdot G_{gear\ unit}$

Fig. 10.

7.3 Flanged motor to the input shaft end with bevel gearing

Foot mounted gear units
$G_M \leqq 1 \cdot G_{gear\ unit}$

Hollow shaft gear units
$G_M \leqq 0{,}4 \cdot G_{gear\ unit}$

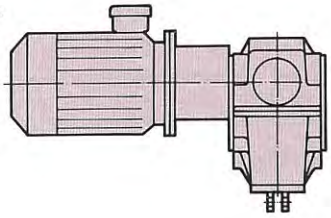


Fig. 11.

7.4 Flanged motor gear unit with normal coupling

If more powerful (and heavier) motors than in this instruction are required, each case must be investigated separately. In cases where motors weigh over 1000 kg an investigation is necessary. The required details for investigation:

1. Dimensions, weight of the motor and position of centre of gravity from motor flange.
2. The type and size of coupling
3. The shaft dimension, material, bearings and service factor of the driven machine on which the hollow shaft gear unit is to be fitted
4. The shaft position

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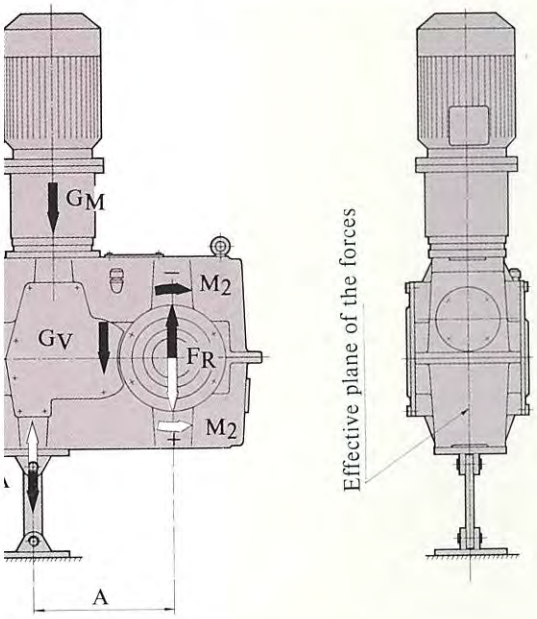
LANNING

General

instruction covers the mounting and anchoring of 2-, 3-, d 5-stage gear units types of TC-, TKC- and TKCV. Together these instructions the general instructions given in leaflet , Mounting of gear units, must be followed.

Mounting position and direction of rotation

equisite for a normal position of the hollow shaft gear unit 1) is that the shaft of the driven machine is horizontal, oint face of the gear unit is mounted horizontally and that tical anchoring rod is used. For other mounting positions ;ear unit manufacturer must be consulted.
shaft position of the hollow shaft gear unit and the direc- of rotation may be freely chosen, but usually it is most sable to make a choice where pressure is exerted on the an- ing rod. Thus the loading on the shaft and bearings of the n machine, caused by the anchoring force and the weight e gear unit, is in most cases minimized.



1.

Forces caused by the hollow shaft gear unit

arding the calculation of the forces F_R and F_A which affect shaft end of the driven machine and the anchoring rod, we to the formulae below and to figure 1 with its explanations.

. of rot. of hollow shaft	F_R	F_A
+	$F_R = \frac{M_2}{A} + \frac{2}{3} G_V$	$F_A = -\frac{M_2}{A} + \frac{1}{3} G_V + G_M$
−	$F_R = -\frac{M_2}{A} + \frac{2}{3} G_V$	$F_A = \frac{M_2}{A} + \frac{1}{3} G_V + G_M$

Explanations

When the direction of rotation of the hollow shaft is determined, the gear unit must always be looked at in the position as shown in figure 1.

F_R	[N]	the force exerted by the gear unit on the shaft end of the driven machine.
F_A	[N]	the force exerted by the gear unit on the anchoring rod..
M_2	[Nm]	the torque exerted on the shaft by driven machine. When calculating the forces F_R and F_A the nominal output torque M_{N2} is used. Anchoring rod must de dimensioned to absorb the maximum torgue.
M_2/A	[N]	force on anchoring rod relative to output torque.
G_V	[N]	weight of hollow shaft gear unit, of which about 2/3 affect the shaft end of the driven machine and 1/3 the anchoring rod.
G_M	[N]	the total weight of the motor fixed to the gear unit, its fastening and connecting devices.
A	[m]	the distance of anchoring rod from the centre line of the shaft of the driven machine.

Braking

If the hollow shaft gear unit is fitted with a brake or is used to give a braking effect, the braking torque has to be considered in the calculations, where the direction of forces M_2/A. will be changed.

2. MOUNTING TOOLS

The mounting of C-hollow shaft gear unit is carried out by using the end plate and suitable screws (see fig. 2...5). The size of screws required for mounting can be found from the table 1.

Table 1

Gear unit-size	Mounting-/stud bolt			Removal-/hex. screw		
	Thread	Length	pcs	Thread	Length	pcs
90	M16	240	1	M20	240	1
110	M20	240	1	M24	240	1
140	M20	200	1	M24	220	1
160	M20	300	1	M24	260	1
180	M24	300	1	M30	260	1
200	M24	360	1	M30	300	1
225	M24	380	1	M30	320	1
250	M24	410	1	M30	360	1
280	M20	180	2	M24	140	2
315	M20	180	2	M24	140	2
355	M24	210	2	M30	160	2
400	M24	210	2	M30	180	2
500	M24	300	2	M30	220	2
560	M30	300	2	M36	260	2
630	M30	360	2	M36	260	2
710	M36	360	2	M42	300	2

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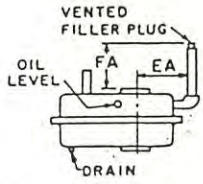
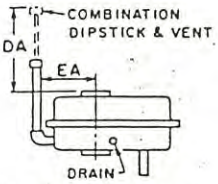
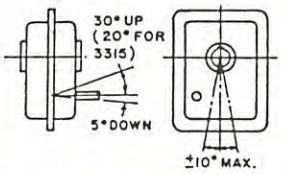


INPUT SHAFT UP

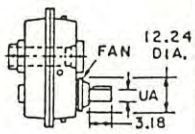


INPUT SHAFT DOWN

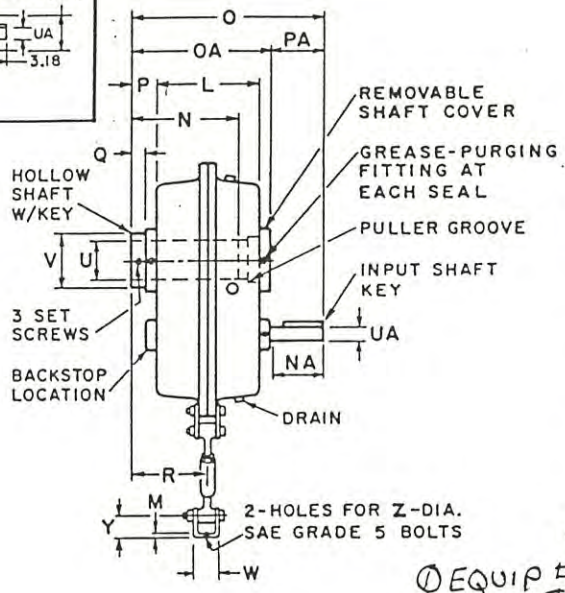
INCLINED DRIVES
(All Clock Positions)

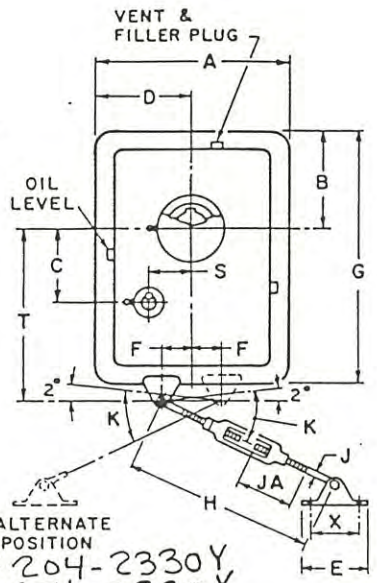


COOLING FAN
(Size 3315 only)



HORIZONTAL DRIVE — 6 O'CLOCK MOUNTING
(Can also be mounted in 3, 9 and 12 o'clock positions.)





DIMENSIONS — INCHES

UNIT SIZE ★	A	B	C	D	E	F	G	H★ Long Rod Min	H★ Long Rod Max	J Dia	K Max	L	M	N‡ Min	N‡ Max	O	P	Q	R	S	T	UNIT SIZE ★
2107	9.16	4.10	2.90	4.58	3.56	0♦	10.36	21	27	5/8	32°	5.82	.18	4.00	6.30	9.64	1.08	.46	4.00	1.16	7.24	2107
2115	10.36	4.60	3.49	5.18	3.56	0♦	11.86	21	27	5/8	32°	6.50	.18	4.40	7.02	10.84	1.14	.52	4.40	1.38	8.24	2115
2203	11.48	5.74	4.07	5.74	4.26	1.6	14.74	24	30	3/4	42°	6.44	.18	4.40	6.78	11.36	1.22	.60	4.44	2.15	10.50	2203
~~2207~~	~~12.76~~	~~6.88~~	~~4.90~~	~~6.68~~	~~4.26~~	~~1.6~~	~~17.68~~	~~24~~	~~30~~	~~7/8~~	~~42°~~	~~7.40~~	~~.18~~	~~5.00~~	~~7.84~~	~~12.90~~	~~1.30~~	~~.68~~	~~5.00~~	~~2.71~~	~~12.56~~	~~2207~~
2215	14.88	7.44	5.59	7.44	5.00	2.1	19.50	27	33	7/8	42°	8.72	.25	5.70	9.22	14.78	1.34	.72	5.70	2.90	13.64	2215
~~2307~~	~~16.92~~	~~8.46~~	~~6.58~~	~~8.46~~	~~8.62~~	~~3.2~~	~~22.28~~	~~30~~	~~35~~	~~1~~	~~42°~~	~~9.12~~	~~1.00~~	~~6.00~~	~~9.66~~	~~15.60~~	~~1.46~~	~~.84~~	~~6.02~~	~~3.40~~	~~16.02~~	~~2307~~
3315	16.92	8.46	6.58	8.46	9.62	3.2	22.28	30	35	1 1/4	42°	10.00	1.12	6.40	10.00	17.54	1.46	.86	6.46	3.40	16.02	3315

UNIT SIZE ★	Hollow Shaft U +.0025 −.0000	Hollow Shaft Keyway	V	W	X	Y	Z Dia	DA	EA	FA	JA★ Std	JA★ Min	NA	OA	PA	Input Shaft UA +.0000 −.0005	Input Shaft Key	Ave Wt-lb Dble Red.	Ave Wt-lb Sgle Red.	UNIT SIZE ★
2107	1.4370	3/8x1/8	1.87	1.12	2.50	.94	3/8	19.02	3.90	9.31	8.5	4.1	2.00	7.52	2.12	.8750	3/16x3/16x1 3/4	30	25	2107
2115	1.9370	1/2x1/8	2.40	1.12	2.50	.94	3/8	18.60	4.28	9.31	8.5	4.1	2.50	8.26	2.58	1.1250	1/4x 1/4x2 1/4	45	40	2115
2203	2.1870	1/2x1/8	2.78	1.24	3.00	1.06	1/2	18.18	5.30	9.13	9.0	4.4	3.00	8.28	3.08	1.3750	5/16x5/16x2 3/4	115	110	2203
~~2207~~	~~2.4370~~	~~5/8x3/16~~	~~3.15~~	~~1.24~~	~~3.00~~	~~1.00~~	~~1/2~~	~~20.24~~	~~6.20~~	~~10.01~~	~~9.0~~	~~4.4~~	~~3.50~~	~~9.92~~	~~3.58~~	~~1.5000~~	~~3/8x 3/16x3 1/4~~	~~190~~	~~180~~	~~2207~~
2215	2.9370	3/4x3/16	4.15	1.50	3.62	1.32	5/8	22.11	6.48	10.96	10.5	4.6	4.00	10.68	4.10	1.8750	1/2x 1/2x3 5/8	260	245	2215
~~2307~~	~~3.4370~~	~~7/8x1/4~~	~~4.15~~	~~3.24~~	~~6.50~~	~~2.62~~	~~3/4~~	~~23.49~~	~~7.16~~	~~10.86~~	~~12.0~~	~~5.8~~	~~4.50~~	~~11.10~~	~~4.64~~	~~2.1250~~	~~1/2x 1/2x4~~	~~375~~	~~355~~	~~2307~~
3315	3.9370●	1 x1/4	4.80	3.88	7.00	3.12	1	18.64	6.53	9.60	12.8	4.8	4.90	12.06	5.48	▲	1/2x 1/2x4 1/2	400	375	3315

★ Dimensions are for reference only and are subject to change without notice unless certified. Backstops are NOT available for vertical drives and Size 3315J05. Consult Factory for mountings other than illustrated above. Unless otherwise specified, Standard Long Tie Rods dimensioned above will be furnished. Above units (except Sizes 2307 and 3315) are also available with Standard Short Tie Rods with H Min = 13", H Max = 19" and JA Std = 5.5". Both the Long and Short Tie Rods can be cut off in the field to JA Min.

‡ N Max is maximum projection of driven shaft into hollow shaft only if a wheel puller is to be used to dismount the unit. When the hollow shaft cover is removed, the unit may be used for through-shaft applications.

♦ For Sizes 2107 and 2115, Dimension F equals zero; the tie rod bracket is located on the unit vertical center line.

● For Size 3315, Dimension U tolerance is +.005", −.000".

▲ For Size 3315J05, Dimension UA = 2.1250".
For Sizes 3315J14 and 3315J25, Dimension UA = 2.2500".

~~PRELIMINARY~~-CERTIFIED PRINT FOR:

Purchaser HED EMORA, INC. Purch. Order No. 1053 Dated 4-15-88

Horizontal-~~Vertical~~ Unit Size 2215JR14A No. Req'd THREE Motor hp 20, rpm 1800

~~With~~-Without Bushing. Bushing Bore +.002 −.000 Driven Shaft Keyway

~~With~~-Without Backstop. Hollow Shaft Rotation: Clockwise-Counterclockwise (When Facing Input Shaft).

~~With~~-Without Overload Release; Refer to Dimension 375-852 for Overload Release Dimensions.

Unit Pulley P.D. Motor Pulley P.D. V-belt No. and Length

Remarks Date 4-29-88 Signed R R POE M.O. 8-831083

Input Shaft RPM
Hollow Shaft RPM
Unit Ratio 13.60
Service Rating HP
Service Class (AGMA)

EQUIP # 204-2330Y
EQUIP # 204-2320Y
EQUIP # 204-2820Y

FALK
a good name in industry
THE FALK CORPORATION
MILWAUKEE

Motor Mounts for Std. NEMA Frames with Standard Drive Positions

DRIVE SIZES 2107 thru 2307 and 3315

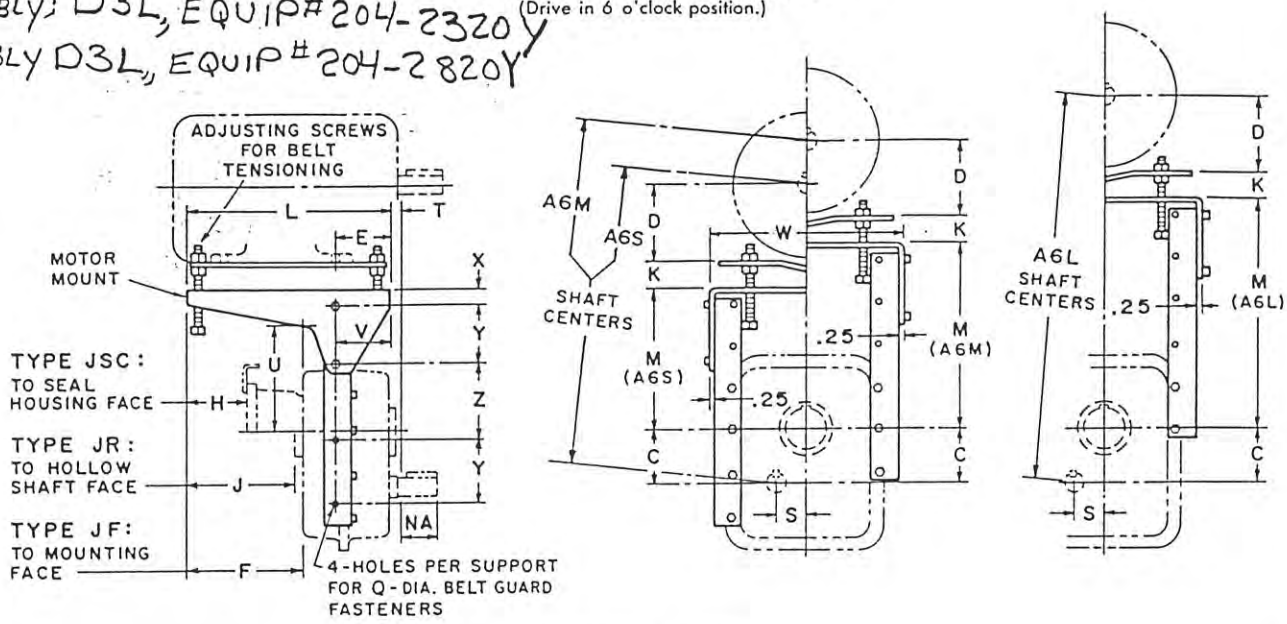
SHAFT MOUNTED DRIVES
FLANGE MOUNTED DRIVES
SCREW CONVEYOR DRIVES
All Horizontal Types
Subject to change without notice

375-820B
DIMENSIONS
October 1981
Supersedes 375-820A

ASSBLY: B9L, EQUIP #204-2330Y
ASSBLY: D3L, EQUIP #204-2320Y
ASSBLY D3L, EQUIP #204-2820Y

HORIZONTAL DRIVE — A6 ASSEMBLY

(Drive in 6 o'clock position.)



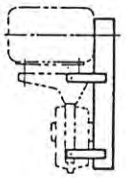
DIMENSIONS — INCHES

D & E DIMENSIONS

Frame	56	140	180	210
D	3.5	3.5	4.5	5.25
E	2.5	2.0	2.5	3.25

Frame	250	280	320	360
D	6.25	7.0	8.0	9.0
E	4.00	4.5	5.0	4.9

GUARDS

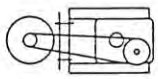


OSHA type guard when specified below. Dimensions to suit components.

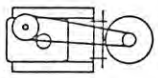
STANDARD HORIZONTAL ASSEMBLIES*

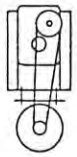
A6 (6 o'clock) assembly is shown above.

D3: 3 o'clock (D3S, D3M, D3L)



B9: 9 o'clock (B9S, B9M, B9L)





C12: 12 o'clock (C12S, C12M, C12L)

MOTOR MOUNT SIZE*	Type T Frame Min	Type T Frame Max*	C	F	H	J	K Min	K Max	L	M A6S	M A6M	M A6L	Q	S	T	U A6S	U A6M	U A6L	V	W	X	Y	Z	NA	Motor Mount Wt-lb
M2107-1	56	184	2.90	8.94	4.94	7.86	.64	3.92	15.00	....	13.80	17.00	.375	1.16	.50	....	10.56	13.76	3.80	11.30	1.26	4.40	8.84	2.00	40
M2115-1	56	215	3.49	8.30	4.30	7.16	.64	3.92	15.00	....	13.56	16.76	.375	1.38	.50	....	10.92	14.12	4.10	12.50	1.26	4.40	8.84	2.50	42
M2203-1	56	254	4.07	8.36	4.36	7.14	.64	3.92	15.00	11.08	14.28	17.48	.500	2.15	.50	7.94	11.14	14.34	4.04	13.88	1.44	4.40	7.28	3.00	47
M2203-2	256	256	4.07	10.56	6.56	9.34	1.26	4.98	17.20																82
M2207-1	56	254	4.90	7.40	3.28	6.10	.64	3.92	15.00	9.84	13.64	17.44	.500	2.71	.50	6.92	10.72	14.52	4.44	16.10	1.44	4.40	7.98	3.50	50
M2207-2	256	284	4.90	9.60	5.48	8.30	1.26	4.98	17.20																85
~~M2215-1~~	~~56~~	~~254~~	~~5.59~~	~~6.06~~	~~1.80~~	~~4.72~~	~~.64~~	~~3.92~~	~~15.00~~	11.11	15.31	19.51	.625	2.90	.50	8.40	12.60	16.80	5.58	17.58	1.58	5.50	8.06	4.00	~~62~~
M2215-2	256	324	5.59	11.56	7.30	10.22	1.26	4.98	20.50																115
~~M2307-1~~	~~56~~	~~254~~	~~6.58~~	~~5.64~~	~~.88~~	~~4.18~~	~~.64~~	~~3.92~~	~~15.00~~	13.10	16.30	19.50	.750	3.40	.50	10.30	13.50	16.70	5.72	19.70	1.76	5.50	10.58	4.50	~~67~~
M2307-2	256	326	6.58	11.14	6.38	9.68	1.26	4.98	20.50																120
M3315-1	56	254	6.58	5.20	.44	3.74	.64	3.92	15.00																67
M3315-2	256	326	6.58	10.70	5.94	9.24	1.26	4.98	20.50	13.10	16.30	19.50	.750	3.40	1.38	10.92	14.12	17.32	5.72	19.70	1.76	5.50	10.58	4.90•	120
M3315-4	364	365	6.58	10.58	5.82	9.12	5.20	8.78	20.40																160

*Dimensions are for reference only and are subject to change without notice unless certified. When determining belt length for minimum shaft centers, follow the belt manufacturer's installation allowance recommendations.

*Refer to Engineering 377-820 for standard vertical assemblies and all Type U frame motor limits.

• Dimension shown is for unit without fan. For unit with fan, Dimension NA = 3.18.

~~PRELIMINARY~~-CERTIFIED PRINT FOR:

Purchaser HEDEMORA INC. Purch. Order No. 1053 Dated 4-15-88

Motor Mount Size M2215-2 No. Req'd 3 Fitted by [redacted] - Purch Assy B9L, D3L Min-Max Shaft Centers 32.7-36.4

Motor { Make NEMA HP 20 RPM 1800 Frame 256T Volts — Hertz —

Phase ..... AC-[redacted], Open Drip Proof, Enclosed Fan-Cooled, Enclosed Non Ventilated, Explosion Proof. Furnished by [redacted] - Purch. Fitted by [redacted] - Purch.

Pulleys and V-Belts Furnished by [redacted] - Purch. Guard: Solid - Expanded Metal Furnished by [redacted] - Purch. — Fitted by [redacted] - Purch.

Date 4-29-88 Signed [redacted] M.O. 8-83108 3

SIZES 2107 THRU 2307 & 3315

INTRODUCTION

For minimum bearing loads on the driven machine, minimum shaft deflection and the most economical belt selections use the 6 o'clock mounting position illustrated below. The total assembly may also be mounted in the 3, 9 and 12 o'clock position. Always locate the air vent at the top of horizontal units.

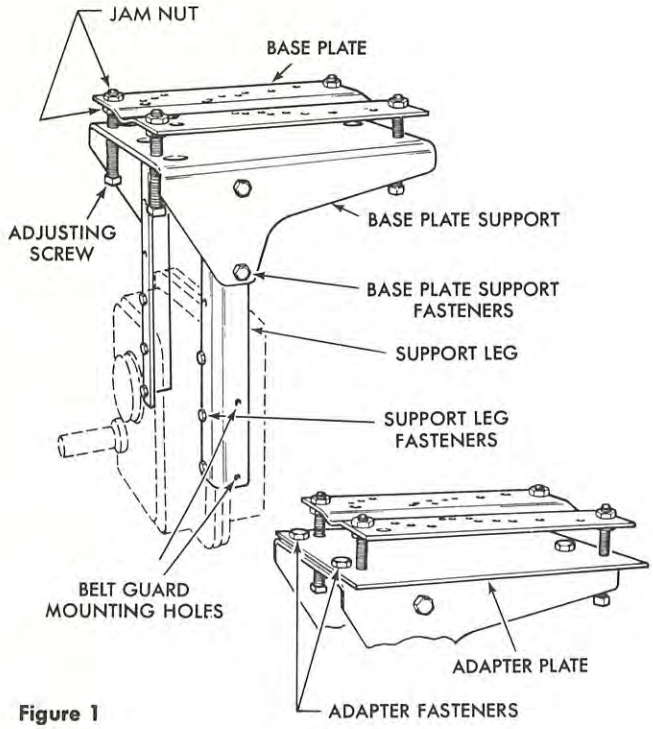
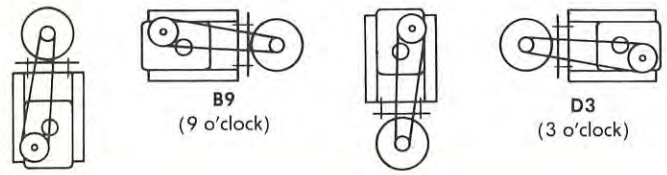


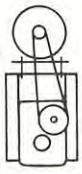
Figure 1

STANDARD ASSEMBLIES



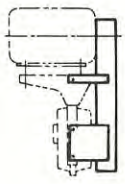
OPTIONAL ASSEMBLY

The motor mount may be mounted on the high speed shaft end of FLANGE MOUNTED DRIVES (SCREW CONVEYOR DRIVES also if clearance over the trough ends permit) when increased motor mount clearance is required at the driven machine. Due to tie rod interference, this assembly CANNOT be used with SHAFT MOUNTED DRIVES.



GUARDS

CAUTION: Consult applicable local and national safety codes for proper guarding of rotating members. Mounting holes located on the motor mount supports are provided for installing a belt guard.



OSHA type guard when specified. Dimensions to suit components.

ASSEMBLY INSTRUCTIONS

CAUTION: Remove all external loads from unit before servicing unit or accessories.

1. **ASSEMBLE MOTOR MOUNT**—Loosely assemble support legs to the base plate support as shown in Figure 1.
   NOTE: Nuts on inside for Sizes 2107 thru 2203
   Nuts on outside for Sizes 2207 thru 2307 & 3315
   For motor frames 256 and larger, fasten adapter plate to base plate support and tighten adapter fasteners to the torque specified in Table 1. Assemble adjusting screws to base plate support (or adapter plate when used). Assemble base plate to adjusting screws with a jam nut above and below the base plate.

Table 1 FASTENER SIZE AND TORQUE * lb-in.

Unit Size	FASTENERS					
	Motor Mount		Support Leg		Adapter Plate	
	Size	Torque	Size	Torque	Size	Torque
2107	.375-16	330	.312-18	225	...	...
2115	.375-16	330	.312-18	225	...	...
2203	.500-13	825	.375-16	330	.625-11	720
2207	.500-13	825	.500-13	825	.625-11	720
2215	.625-11	1640	.500-13	825	.625-11	720
2307	.750-10	2940	.500-13	825	.625-11	720
3315	.750-10	2940	.500-13	825	.625-11	720

* All fasteners are Grade 5.

2. **MOUNT MOTOR MOUNT TO UNIT**—Remove and discard housing flange fasteners and substitute the corresponding longer support leg fasteners used to fasten the motor mount assembly to the input side of the unit. To determine the number of housing flange fasteners to be removed for a given shaft center and unit size, see Table 2. Nuts should be on the output side of the unit. Torque support leg and base plate support fasteners to values specified in Table 1.

SHAFT CENTERS FOR HORIZONTAL & VERTICAL DRIVES

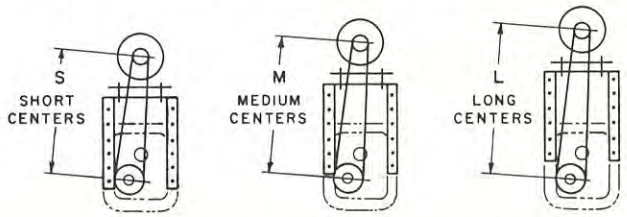


Table 2 SUPPORT LEG FASTENER QUANTITY (Each Side)

Shaft Centers	Unit Size					
	2107	2115	2203	2207	2215	2307 3315
Short	NA	NA	4	4	4	6
Medium	3	3	3	3	3	5
Long	2	2	2	2	2	4

3. **MOUNT MOTOR**—Position motor on base plate so that all mount holes are in alignment. Install and tighten motor fasteners.
4. **MOUNT SHEAVES AND V-BELT**—Mount sheaves as close to the unit and motor housing as possible. Hold a straight edge across the faces of the two sheaves to obtain correct alignment. Adjust V-belt to the tension recommended by the belt manufacturer by turning the adjusting screws evenly. When the required tension is reached, tighten lock nuts. DO NOT over tighten belts. Over tightening belts reduces belt and bearing life.

SIZES 3407-3507 & 608 ON PAGE 2

INSTALLATION OF MOTOR MOUNTS—SIZES 3407-3507 & 608

INTRODUCTION

The Falk Equi-Poised Motor Mount is an all-steel weldment that bolts directly to the steel frame of Falk Shaft Mounted (Type J), Flange Mounted (Type JF) and Screw Conveyor (Type JSC) Drives, as shown in Figure 1.

This modern design provides a simple means of tensioning V-belts with adjusting screws. The motor base plate is pre-drilled for rerated NEMA standard foot-mounted motors within the rated capacity of the reducer.

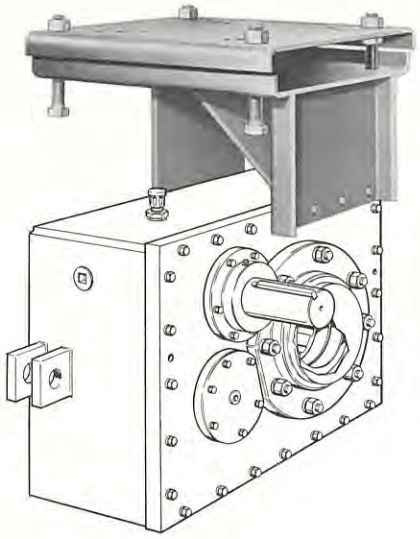


Figure 1

ASSEMBLY INSTRUCTIONS

From Figure 2, determine which assembly is required. Units are shown assembled in the 3 o'clock position, high speed shaft relative to low speed shaft. They can also be mounted in the 6, 9 and 12 o'clock positions after the motor mounts are assembled.

CAUTION

Remove all external loads from unit before servicing unit or accessories.

Consult applicable local and national safety codes for proper guarding of rotating members.

STANDARD ASSEMBLIES

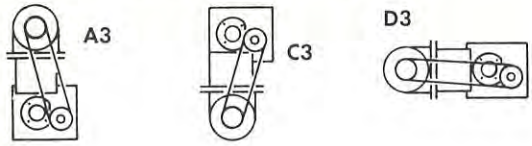


Figure 2

Table 1 FASTENER SIZE AND TIGHTENING TORQUE (lb-in.)*

Unit Size	Motor Mount to Housing		Support to Seal Cage		Support to Motor Mount		Support to Flange	
	Size	Torque	Size	Torque	Size	Torque	Size	Torque
3407	.500-13	825	.750-10	3960	.500-13	825	.750-10	3960
3415	.500-13	825	.750-10	3960	.500-13	825	1.25-7	12600
3507	.500-13	825	.875-10	6400	.500-13	825	1.25-7	12600
608	.750-10	2940	.750-10	2940	.750-10	2940	.750-10	2940

* All fasteners are Grade 5.

ASSEMBLY INSTRUCTIONS (CONTINUED)

1. **ASSEMBLE MOTOR MOUNT BRACKET TO REDUCER**

A. **Sizes 3407 thru 3507**—Remove housing cover fasteners and bolt motor mount bracket to housing using longer fasteners provided.

B. **Size 608**—Attach bracket to pads provided on seal cage.

2. **ASSEMBLE REAR SUPPORT BRACKET TO REDUCER**

A. **Sizes 3407 thru 3507JR and 3407JF, JSC**—(Figure 4) Remove nuts and lockwashers from seal cage studs and attach rear support bracket.

B. **Sizes 3415, 3507 and 608JF**—(Figure 3) Attach rear support to flange using mounting bolts furnished by user (Furnished by Falk for Size 608JF).

C. **Size 608J** (Figure 4) Attach rear support bracket to seal cage pads using fasteners provided.

3. **ASSEMBLE SUPPORT BRACKET TO MOTOR MOUNT BRACKET**—Use the fasteners provided. Torque all fasteners to values listed in Table 1.

4. **ASSEMBLE BASE PLATE TO MOTOR MOUNT BRACKET**—Assemble adjusting screws to motor mount bracket and base plate with jam nuts above and below the base plate.

5. **MOUNT MOTOR**—Position motor on base plate so that all mount holes are in alignment. Install and tighten motor fasteners.

6. **MOUNT SHEAVES AND V-BELT**—Mount sheaves as close to the unit and motor housing as possible. Hold a straight edge across the faces of the two sheaves to obtain correct alignment. Adjust V-belt to the tension recommended by the belt manufacturer by turning the adjusting screws evenly. When the required tension is reached, tighten lock nuts. DO NOT over tighten belts. Over tightening belts reduces belt and bearing life.

Figure 3
Sizes 3415 thru 3507 & 608JF

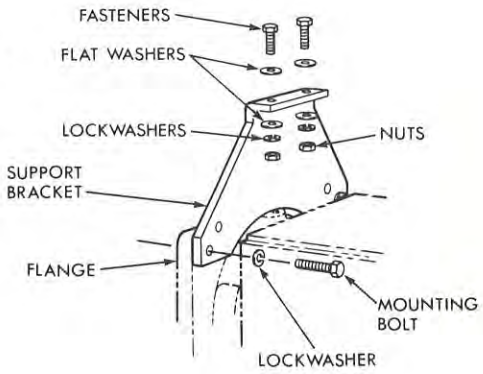
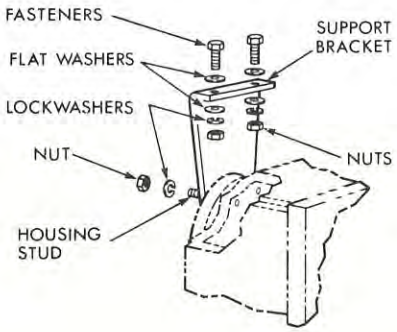


Figure 4 Sizes:
3407-3507JR
3407JF & JSC
608J



INTRODUCTION

STANDARD DRIVES — This literature applies to all standard Series J gear drives (J, JR, JRV, JF, JFV & JSC) with ratings, speeds, ratios and dimensions as catalogued in current Falk bulletins. Refer to the Factory for all specials and modifications.

HOW TO ORDER-Give complete data shown on reducer nameplate and state whether unit is a Horizontal or Vertical Shaft Mounted, Flange Mounted or Screw Conveyor Drive. Also, give Reference Numbers and name of parts required. — Drawings and Reference Numbers are representative of all sizes and the actual parts may not agree in exact detail for each unit. Complete nameplate data and parts Reference Numbers will assure receipt of correct parts.

The numerical designation stamped on the nameplate completely identifies all parts used in the reducer. All units with exactly the same nameplate markings have interchangeable rotating elements.

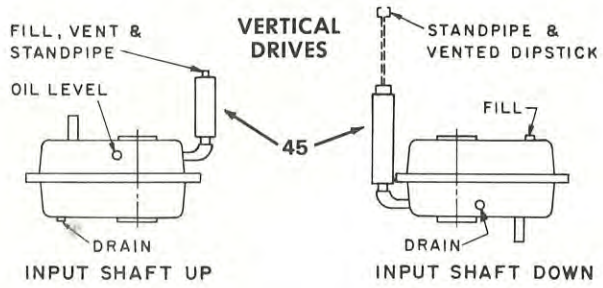
UNIT IDENTIFICATION

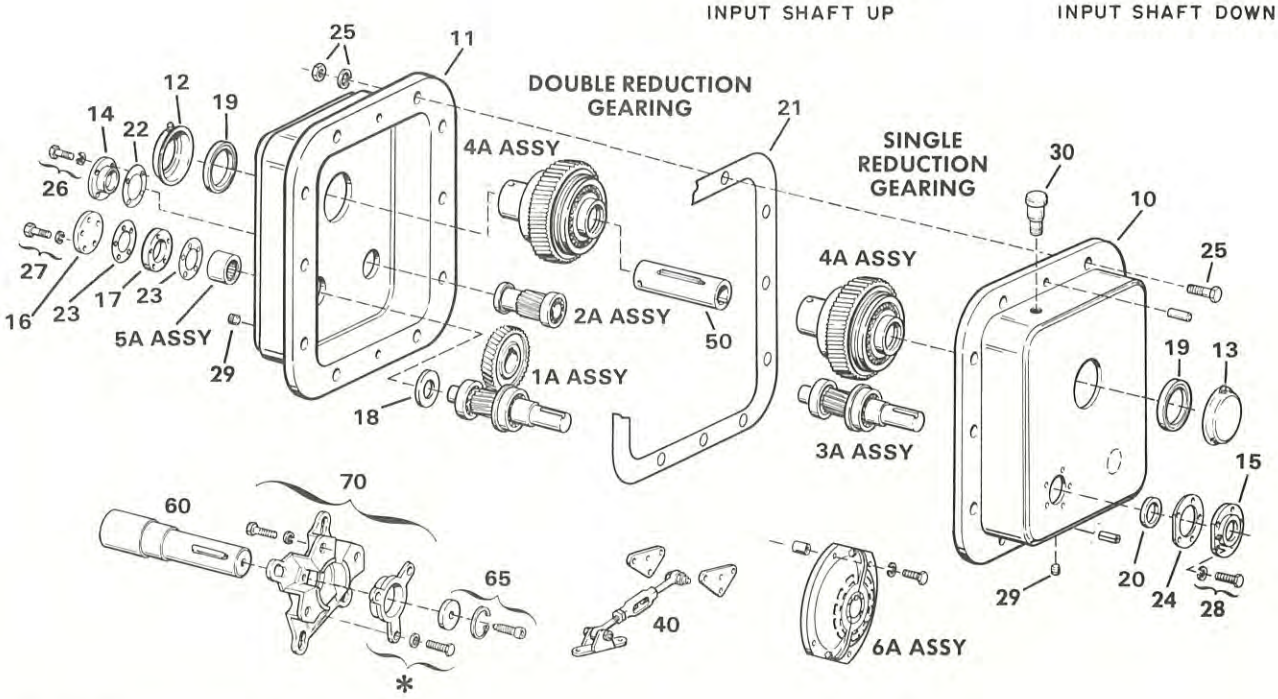
PINION-SHAFT-BEARING ASSEMBLIES — With today's productio procedures Falk can normally furnish a total rotating assembly mor economically than if a customer purchases individual parts, disassemble the old parts, and reassembles using some new and some old parts Falk replacement assemblies also reduce down time and always consis of all new parts.

SHIMS, GASKETS AND SEALS — When unit is disassembled or enc covers are removed, order new shim-gaskets and oil seals to prevent oi leakage. When replacing internal rotating elements, order seals anc Shim-Gasket Kit 100.

BACKSTOPS — When internal backstops are replaced, also replace the high speed pinion shaft. New shim-gaskets are furnished with the internal backstop package.

FASTENERS — Fasteners are sold in sets for a specific item, i.e. four for an end cover, eight for a L.S. seal cage, etc. Fasteners describes cap screws, bolts, studs, nuts, and lockwashers as required.





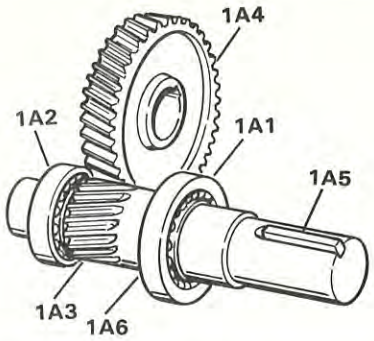
*Clamp ring and fasteners for packing gland only.

Ref. No.	Part Description	Ref. No.	Part Description	Ref. No.	Part Description
1A Thru 6A Assemblies on Page 2		19	Seals, L.S.	28	Fasteners for Ref. #15 (Size 3315 only)
10	Housing – Input side & dowels	20	Seal, H.S.	29	Pipe Plugs – Housing
11	Housing – Output side & dowels	21	Shim – gaskets for Ref. #10 & 11	30	Vent, Air
12	Cover – Seal, L.S.	22	Shim – gaskets for Ref. #14 (Sizes 2307 & 3315 only)	40	Tie Rod – Anchor Assy.
13	Cover – Shaft, L.S.	23	Gasket for Ref. #16 (2★)	45	Filler – Pipe Assy. (Vert.)
14	Cover – End, L.S. Pinion (Sizes 2307 & 3315 only)	24	Shim – gaskets for Ref. #15 (Size 3315 only)	50	Bushing
15	Cover/Cage – Seal, H.S.	25	Fasteners for Ref. #10 & 11	60	Shaft – Drive Assy. Includes #65
16	Cover – End (or backstop) H.S.	26	Fasteners for Ref. #14 (Sizes 2307 & 3315 only)	65	Kit – Thrust Plate
17★	Spacer – Cover, H.S.	27	Fasteners for Ref. #16	70	Housing – Seal Assy.
18†	Spacer – Bearing, H.S.			100	Kit – Shim & Gasket. Includes Ref. Nos. 21, 22, 23 & 24 (Available only as a Kit)

★Size 2207 Ratios 5:1 & 9:1 Only.
†Sizes 2203 & 2207 Ratios 5:1 & 9:1 Only. Size 2215 Ratios 5:1, 9:1 & 14:1 Only. Size 2307 All Ratios.

GEAR, BACKSTOP AND FAN ASSEMBLIES

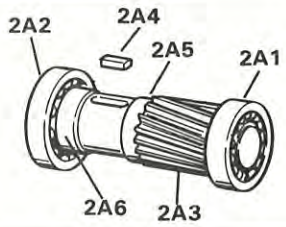
1A — HIGH SPEED SHAFT ASSEMBLY (Double Reduction)



Ref. No.	Part Description
1A1	Bearing – Outer
1A2	Bearing – Inner
1A3	Pinion – High Speed
1A4	Gear – High Speed
1A5	Key – High Speed Extension
1A6	Retaining Ring (Ratio 25:1 only)

Also order shim and gasket Kit Ref. No. 100 listed on Page 1.

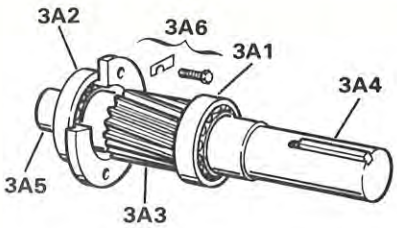
2A — LOW SPEED PINION ASSEMBLY (Double Reduction)



Ref. No.	Part Description
2A1	Bearing – Outer } Tapered roller 2307 & 3315 only
2A2	Bearing – Inner }
2A3	Pinion – Low Speed
2A4	Key – High Speed Gear
2A5	Spacer – Gear (As required)
2A6	Spacer – Bearing (As required)

Also order shim and gasket Kit Ref. No. 100 listed on Page 1.

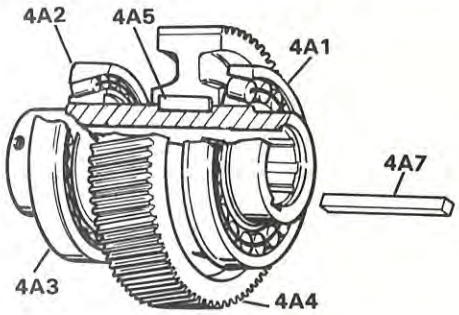
3A — HIGH SPEED SHAFT ASSEMBLY (Single Reduction)



Ref. No.	Part Description
3A1	Bearing – Outer
3A2	Bearing – Inner
3A3	Pinion – High Speed
3A4	Key – High Speed Extension
3A5	Retaining Ring (As required)
3A6	Plate – High Speed Thrust and Hardware (2115 Only)

Also order shim and gasket Kit Ref. No. 100 listed on Page 1.

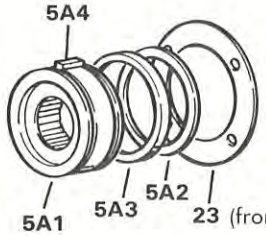
4A — LOW SPEED SHAFT ASSEMBLY (Single and Double Reductions)



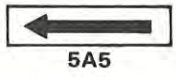
Ref. No.	Part Description
4A1	Bearing – Outer
4A2	Bearing – Inner
4A3	Shaft – Low Speed, with set screws
4A4	Gear – Low Speed
4A5	Key – Low Speed Gear
4A7	Key – Low Speed Shaft

Also order shim and gasket Kit Ref. No. 100 listed on Page 1.

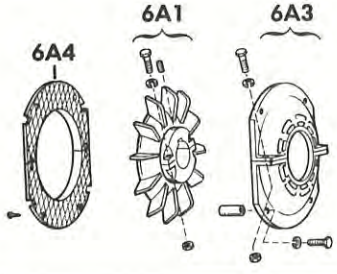
5A — BACKSTOP ASSEMBLY



Ref. No.	Part Description
5A1	Backstop
5A2	Retaining Ring (As required)
5A3	Spacer (2115J25 Only)
5A4	Key
5A5	Rotation Arrow Plate



6A — FAN ASSEMBLY



Ref. No.	Part Description
6A1	Fan – Sub-Assy.
6A3	Guard – Fan, Sub-Assy.
6A4	Grill – Guard, Sub-Assy.

FALK
a good name in industry
THE FALK CORPORATION
MILWAUKEE

Instructions for Installation and Maintenance

SIZES 2107 thru 2307 & 3315

SHAFT MOUNTED DRIVE
FLANGE MOUNTED DRIVE
SCREW CONVEYOR DRIVE
All Types
Subject to change without notice

378-120
SERVICE MANUAL
March 1988
Supersedes 10-81

PAG
1

INTRODUCTION

The following instructions apply to all standard Falk Size 2107 thru 2307 & 3315 drives. If a drive is furnished with special features, refer to the supplementary instructions shipped with the drive.

Credit for long service and dependable operation of a gear drive is often given to the engineers who designed it, or the craftsmen who constructed it, or the sales engineer who recommended the type and size. Ultimate credit belongs to the mechanic on the job who worked to make the foundation rigid and level, who accurately aligned the shafts and carefully installed the accessories, and who makes sure that the drive receives regular lubrication. The details of this important job are the subject of this manual.

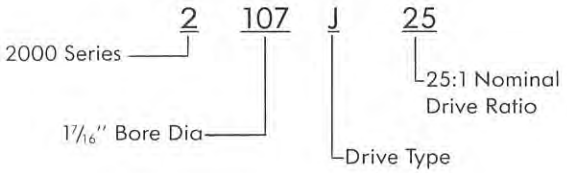
WARRANTY—The Falk Corporation (the "Company") warrants that, for a period of one year from the date of shipment, the product described herein will deliver successfully its rated output as indicated on the nameplate, provided, it is properly installed and maintained, correctly lubricated, and operated in the environment and within the limits of speed, torque or other load conditions for which is was sold. Such product is expressly not warranted against failure or unsatisfactory operation resulting from dynamic vibrations imposed upon it by the drive system in which it is installed unless the nature of such vibrations has been fully defined and expressly accepted in writing by the Company as a condition of operation.

CAUTION

Consult applicable local and national safety codes for proper guarding of rotating members.

Lock out power source and remove all external loads from unit before servicing unit or accessories.

GEAR DRIVE IDENTIFICATION



INSTALLATION INSTRUCTIONS

FOR SATISFACTORY PERFORMANCE, CAREFULLY FOLLOW THESE INSTRUCTIONS

Welding—Do not weld the gear unit housing or accessories without prior approval from The Falk Corporation. Welding on the unit may cause distortion of the housing or damage to the bearings and gear teeth. Welding without prior approval will void the warranty.

DRIVE RATING—Operate the drive only within the horsepower and output speed for which it was selected and specified in Bulletin 371-110 for the application. Refer to the nameplate for drive size, ratio and other data.

SCREW CONVEYOR DRIVE KIT—The kit consists of a seal housing and drive shaft with the associated hardware. A trough end is optional. The seal housing is designed to accommodate any of three types of seals; waste packing, mechanical dual lip or packing gland. The waste packing is furnished as standard.

VERTICAL DRIVES—A standpipe kit is furnished for vertical shaft mounted and flange mounted drives. Consult Factory for installation instructions for all vertical screw conveyor drive applications.

DRIVEN SHAFT—The driven shaft extension on which the drive is to be mounted must be straight and free of burrs.

HOLLOW SHAFT—The bore of the drive hollow output shaft has axial grooves and a bonded solid lubricant coating to minimize atmospheric and fretting corrosion which causes shafts to seize.

DO NOT REMOVE THE BONDED SOLID LUBRICANT COATING FROM HOLLOW SHAFT BORE

BUSHINGS FOR SHAFT & FLANGE MOUNTED DRIVES—Remove the three set screws in the hollow bore. Liberally coat the bushing outside diameter and the hollow shaft bore with a NLGI #2 grease. Insert the key in the bushing and insert the assembly into the hollow shaft until all set screw holes are in line. Install the three longer set screws supplied with the bushing so that they protrude through the hollow shaft into the bushing and hold it in place while the drive is being installed.

LIFTING—SHAFT & FLANGE MOUNTED DRIVES

Horizontal Shaft Mounted Drives: Determine tie rod location on drive from Figure 8. Remove the two housing flange fasteners (three on Sizes 2307 and 3315) and discard them. Assemble the tie rod anchor brackets to drive with the longer fasteners supplied with the tie rod. Torque fasteners to value specified in Table 1. Install the tie rod fastener in the tie rod anchor brackets, sling the drive from the fastener as shown in Figure 1A and lift the drive.

Horizontal Flange Mounted Drives: Remove a housing flange fastener and install a long fastener with nut. Sling the drive from both ends of the fastener as shown in Figure 1B. When drive is in its final position, replace the housing flange fastener and torque to value specified in Table 1.

Vertical Shaft Mounted and Flange Mounted Drives: Remove three housing fasteners and install eyebolts as shown in Figure 1D. Eyebolt sizes are 5/16" for Size 2107 and 2115 drives, 3/8" on Size 2203 drives and 1/2" on Size 2207 thru 2307 & 3315 drives. Sling drive from eyebolts and lift into final position. Remove eyebolts, reinstall housing flange fasteners and torque to value specified in Table 1.

LIFTING—SCREW CONVEYOR DRIVES

Horizontal Drives: To lift the basic drive, remove a housing flange fastener and install a long fastener with nut. Sling the drive from both ends of the fastener as shown in Figure 1B. When the drive is in its final position, replace the housing flange fastener and torque to value specified in Table 1. After assembly of the seal housing, the drive may be lifted by means of a sling around the seal housing and the high speed shaft as shown in Figure 1C.

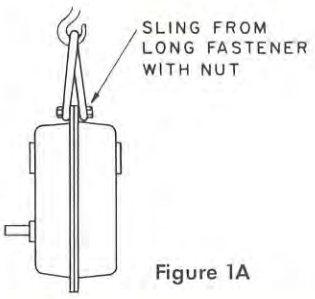


Figure 1A

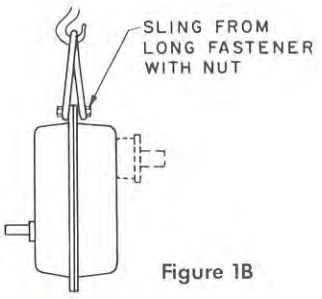


Figure 1B

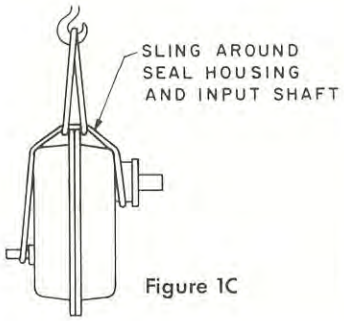


Figure 1C


Figure 1D

PREVENTIVE MAINTENANCE

AFTER FIRST WEEK—Check all external bolts and plugs for tightness. It is not necessary to adjust gears or bearings. These were permanently set at the Factory.

AFTER FIRST MONTH'S SERVICE—Proceed as follows:

1. Operate drive until sump oil reaches normal operating temperature. Shut the drive down and drain immediately.
2. Immediately flush drive with an oil of the same type and viscosity grade as the original charge (warmed to approximately 100°F in cold weather). Rapidly pour or pump a charge equal to 25-100% of the initial fill thru the drive, or until clean oil flows thru the drain.
3. Close the drain and refill the drive to the correct level with new or reclaimed oil of the correct type and viscosity. If determined to be in good condition by the supplier, drain oil may be reused if it is filtered thru a 100 micron or finer filter.

PERIODICALLY—Carefully check the oil level of the drive when it is stopped and at ambient temperature, add oil if needed. If the oil level is above the specified level, have the oil analyzed for water content. Moisture in the oil may indicate seal leakage or condensation. If so, correct the defect immediately and change the oil. DO NOT overfill or oil leakage may result. On vertical shaft drives with input shaft down, remove fill plug before checking oil level. If drive is equipped with a fan, periodically clean accumulated foreign matter from the fan and fan guard to allow adequate air flow.

OIL CHANGES—For normal operating conditions, change gear oils and extreme pressure oils every 6 months or 2500 operating hours, whichever occurs first. Compounded oils may require more frequent changes. In dusty areas or where temperatures are high, more frequent changes may be required. Lubricant suppliers can test oil samples from the unit periodically and recommend economical change periods based on the rate of lubricant contamination and degradation.

If the drive is operated in an area where temperatures vary with the seasons, change the oil viscosity grade to suit the temperature.

Refer to Manual 128-010 for typical lubricants meeting Falk specifications. Viscosity recommendations are listed on the reducer nameplate.

GREASE PURGED SEALS—Periodically (at least every six months), depending upon the frequency and degree of contamination, purge contaminated grease by pumping fresh bearing grease through the seal cage until it flows out along the shaft. Wipe off the purged grease.

HOLLOW SHAFT BORE—Periodically (at least every six months) slowly pump a NLGI #2 grease into the hollow shaft bore (if shaft cover has not been removed for through-shaft applications) until grease appears at the output end. The grease will minimize the effects of fretting corrosion in the hollow shaft bore and aid in removal of the drive from the driven shaft.

PACKING GLAND SEAL—Refer to Page 6.

DISMANTLING—CAUTION: Lock out power source and remove all external loads from unit before removing unit or servicing unit or accessories.

Service manuals and parts guides are available from the Factory and Falk Representatives. When writing, please give complete data from the nameplate on the drive; Model, Size and Ratio.

SPARE AND REPAIR PARTS—When ordering parts, always give complete data from the nameplate on the Falk drive AND identify drive as a shaft mounted, flange mounted or screw conveyor drive. This complete nameplate data will assure you of receiving the correct parts. If a new nameplate is received with the new parts (for example, when the gear drive ratio is changed), replace the old nameplate on the drive with the new nameplate for future reference.

STORED AND INACTIVE DRIVES

New Drives Which Have Not Been Operated—Each drive is spin-tested with a rust preventive oil that will protect internal parts against rust for a period of 4 months in an outdoor shelter or 12 months in a dry building after shipment from the Factory.

If a drive is to be stored or inactive beyond the above periods, spray all internal parts with a rust preventive oil that is soluble in lubricating oil or add 1 ounce of "Motorstor" vapor phase rust inhibitor oil. Seal air vent immediately with pressure sensitive tape.

Before operating drives which have been stored or inactive, remove tape and fill to the proper level with oil meeting specifications given in Service Manual 128-010.

Shutdown of New or Existing Drives Which Have Been Operated—If a drive is to be stored or inactive for more than 2 months after a period of operation, add 1 ounce of "Motorstor"* to the oil sump and immediately seal the air vent with pressure sensitive tape. It is not necessary to drain the oil prior to storage if oil is still serviceable and not contaminated.

Before operating drive, remove tape and check oil level.

Periodically inspect stored or inactive drives and spray or add rust inhibitor every six months, or more often if necessary. Indoor dry storage is recommended.

Drives Ordered for Extended Storage can be treated at the Factory with a special preservative and sealed to rust-proof parts for periods longer than those stated above, if specified on the order.

* Product of the Daubert Chemical Company, Chicago, Illinois. (Formerly known as "Nucel Oil.")

INTRODUCTION

The following instructions apply to the standard units listed above. Drawings are representative of this series of drives and may not agree in exact detail with all unit sizes. When ordering parts or requesting information, specify the unit size, type, model number and ratio. Consult Falk before changing speed or ratio.

CAUTION: Consult applicable local and national safety codes for proper guarding of rotating members.

GEAR DRIVE IDENTIFICATION

2 — 2000 Series
107 — Bore Dia 107 = 1 7/16"
J — Drive Type
25 — 25:1 Nominal Ratio

RECOMMENDATIONS

Replace all shaft seals and shim-gaskets when reassembling. Gear elements should be replaced as pairs.

CAUTION: Remove all external loads from unit before servicing unit or accessories.

REQUIRED EQUIPMENT

In addition to standard mechanics' tools, the following equipment is required: hoist, sling, arbor press, wheel puller, torque wrench, feeler gauges and dial indicator with stand.

LIFT INSTRUCTIONS

Drain oil from unit before removal.

Record mounting dimensions of unit, sheaves and other accessories for reference when reassembling.

Horizontal Shaft Mounted Drives, Type JR (Figure 1A). Remove tie rod from tie rod anchor and then replace the anchor fastener and nut. Sling unit from the anchor fastener and lift unit.

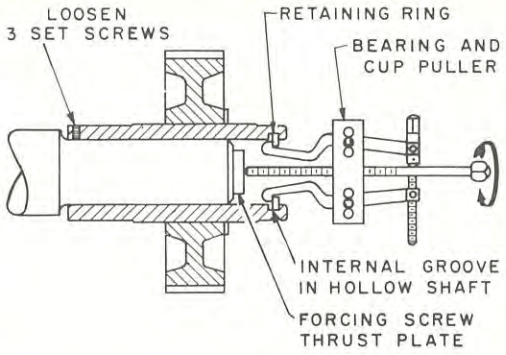
Horizontal Flange Mounted and Screw Conveyor Drives, Types JF and JSC (Figure 1B). Remove a fastener from the housing flange and replace with a long fastener and nut. Sling unit from both ends of the fastener. Remove mounting fasteners and lift off unit. Screw conveyor drives may also be lifted by slinging the unit from the seal housing and input shaft as shown in Figure 1C.

Vertical Drives — Types JRV and JFV (Figure 1D). Remove three housing flange fasteners and install eyebolts. Eyebolt sizes are 5/16" for Size 2107 and 2115 drives, 3/8" on Size 2203 drives and 1/2" on Size 2207, 2215, 2307 & 3315 drives. Sling and lift unit.

UNIT REMOVAL — The unit may be removed from the driven shaft with the aid of an internal puller where the driven shaft does not extend through the unit. The following cup pullers are generally available.

Owatonna Tool Co. Bearing and Cup Puller
#943 with Forcing Screw #515-S (Sizes 2115 thru 2307 & 3315)
Armstrong Bray & Co. Bearing and Cup Puller
#943 with Forcing Screw #10-1 (Sizes 2115 thru 2307 & 3315)
Snap-On-Tools Corp. Bearing and Cup Puller
#CG 240 (Sizes 2107 thru 2207)
#CG 270 (less standard Forcing Screw)
#CG 270-11 Forcing Screw (Sizes 2215, 2307 & 3315)

Remove hollow shaft cover and trapped grease. Install a retaining ring in the internal groove of the hollow shaft. If the drive shaft end has a threaded hole, use a .250" thick plate or disc under the puller forcing screw to avoid damage to the threaded hole. For flange mounted drives, remove the foundation bolts. Loosen the three set screws in the hollow shaft. Install the internal puller in the hollow shaft so that the hooks engage the retaining ring. Turn the forcing screw against the driven shaft as illustrated at top of next column.



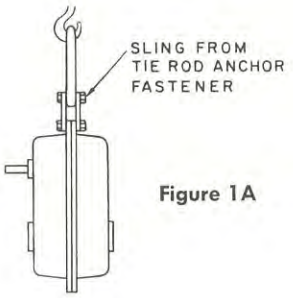


Figure 1A

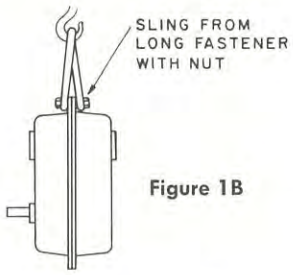


Figure 1B

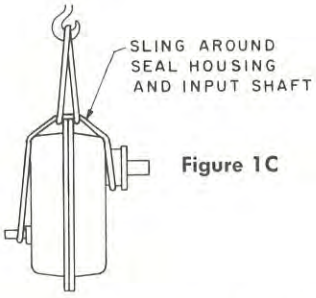


Figure 1C

Figure 1D

GENERAL INSTRUCTIONS

NOTE: For typical unit assembly, see Figure 2, Page 2.

1. **PRE-DISASSEMBLY** — To prevent dirt from falling into the unit, clean all external surfaces of the unit before disassembly.
2. **SEALS.**

A. Replacement is recommended. To replace seals on a disassembled drive, refer to Steps 6, Page 2 and 17H, Page 5. To replace seals without disassembling drive, refer to Step 20, Page 5.

B. If seals are not to be replaced, observe the following before starting disassembly:
— Pry off severe duty seal covers and low speed shaft cover. Clean shaft extension, but DO NOT ALLOW abrasive material to mar the shaft surface polished by the seal.
— PROTECT seal lips from sharp edges of the keyway by wrapping thin strong paper around the shaft and coating the paper and seal lips with grease before sliding the seal on or off the shaft. Do not expand the seal lips more than .030" diameter.

3. **SHIM-GASKETS** — During disassembly, wire or tie shim-gaskets to the housing half, end cover or seal cage, etc., for reference when reassembling. DO NOT reuse any shim-gaskets. Shim-gaskets of minimum compressability are available from the Factory in thicknesses of .007, .009, .015 and .031 inches. Refer to Table 1 for thicknesses of compressed shim-gaskets.

Table 1 FALK SHIM-GASKET COMPRESSIBILITY — Inches

Thickness	New	.007	.009	.015	.031
	Compressed	.006	.008	.013	.028

E. Wrap several turns of tape around the drill approximately .250" from the drill point to prevent the drill from entering too deeply into the housing and damaging the bearing. Grease or magnetize the drill to help retain the chips. Drill two .125" diameter holes in the seal case 180° apart. Control the angle of the drill as illustrated in Figure 14 to prevent damage to the shaft.

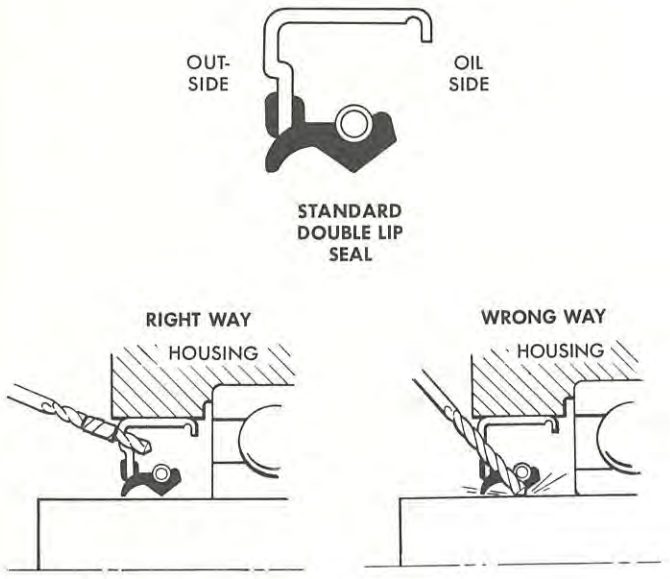


Figure 14

F. Insert two #10-.750" sheet metal screws into the seal leaving .500" of the screw protruding above the seal face. DO NOT drive the screw more than .250" beyond seal face or bearing damage may occur. Use a claw type pry bar under the screw head as shown in Figure 15 and lift the seal out. Remove all chips. Use a magnet to remove the chips that fall into the bore. Flush the unit to remove chips from the bearing. Remove Permatex from housing bore.

G. Refer to Step 17H, Page 5 for new seal installation.

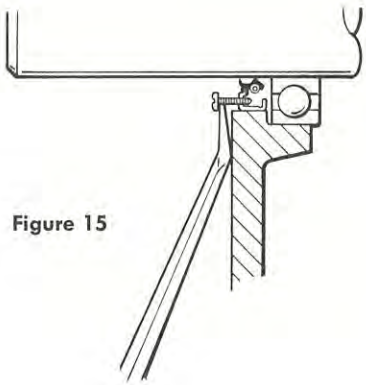


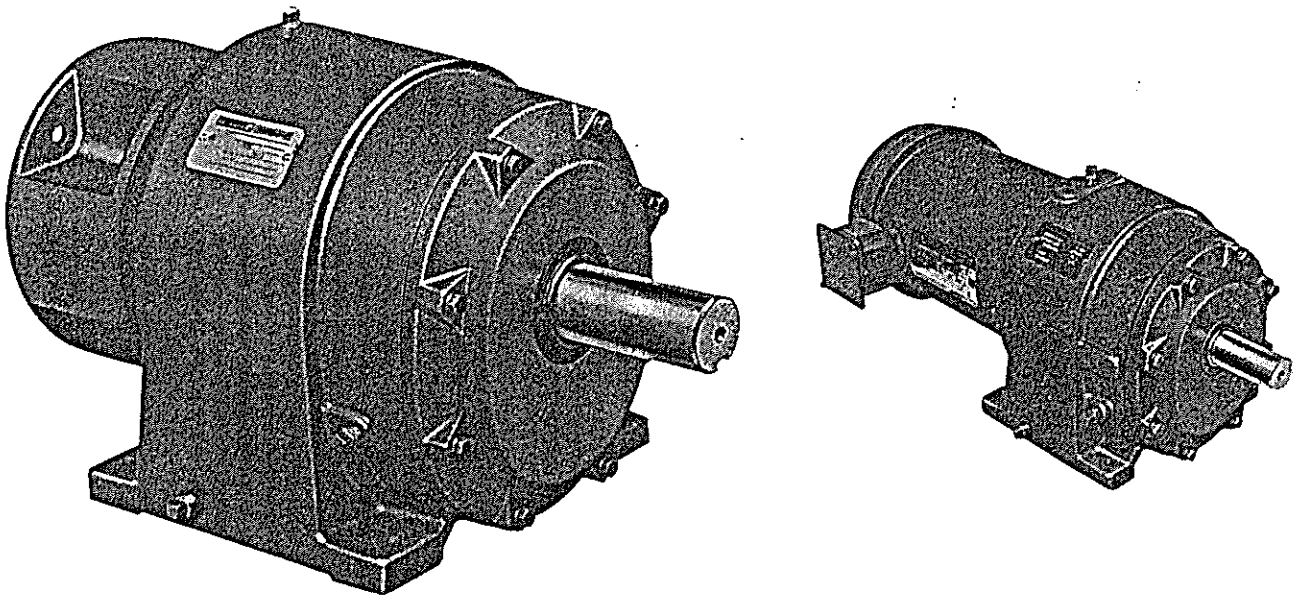
Figure 15

MASTER® XL PARALLEL GEARMOTORS AND C-FACE REDUCERS

SERVICE AND REPAIR

FOR SIZES 16, 21, 28

TM21A Model # MG1119 (129.7:1)



WARNING

BECAUSE OF THE POSSIBLE DANGER TO PERSON(S) OR PROPERTY FROM ACCIDENTS WHICH MAY RESULT FROM THE IMPROPER USE OF PRODUCTS, IT IS IMPORTANT THAT CORRECT PROCEDURES BE FOLLOWED: PRODUCTS MUST BE USED IN ACCORDANCE WITH THE ENGINEERING INFORMATION SPECIFIED IN THE CATALOG. PROPER INSTALLATION, MAINTENANCE AND OPERATIONAL PROCEDURES MUST BE OBSERVED. THE INSTRUCTIONS IN THE INSTRUCTION MANUALS MUST BE FOLLOWED. INSPECTIONS SHOULD BE MADE AS NECESSARY TO ASSURE SAFE OPERATION UNDER PREVAILING CONDITIONS. PROPER GUARDS AND OTHER SUITABLE SAFETY DEVICES OR PROCEDURES AS MAY BE DESIRABLE OR AS MAY BE SPECIFIED IN SAFETY CODES SHOULD BE PROVIDED, AND ARE NEITHER PROVIDED BY RELIANCE ELECTRIC NOR ARE THE RESPONSIBILITY OF RELIANCE ELECTRIC.

TABLE OF CONTENTS

GENERAL

The Master Parallel Gear line is composed of one basic reducer. This reducer is used to make up two types of motor and gear reduction packages.

1. THE GEARMOTOR – is a compact integral power package. Partial motor is directly connected to the reducer input shaft by means of a semi-rigid coupling.
2. THE C-FACE REDUCER – is also a compact power package utilizing a standard "C" Face motor, adapter, and flexible coupling connecting to the reducer.

The Master Parallel gearing is Helical design with ball bearings on input shaft and Taper roller bearings on intermediate and output shafts.

MOUNTING

Before servicing the gearmotor, check diagrams on tags supplied to see that oil level plug location and oil level are correct for position in which gearmotor is to operate.

ROTATION

To reverse the direction of rotation of a 3-phase A-C Gearmotor, interchange any two of the lines going to the motor. If it is a 2-phase gearmotor, interchange the wires of one phase. Four wire 2-phase gearmotors have lead marking conforming to NEMA standards.

D-C Gearmotors may be reversed by interchanging the armature leads. In all cases, connection diagrams are furnished with the motors.

LUBRICATION AND MAINTENANCE INFORMATION

Lubrication is extremely important for satisfactory operation. Proper oil level must be maintained in the gearcase at all time. Red plugs indicate oil level check points. Frequent inspections with the unit not running (preferably when warm) should be made by removing this plug to check for proper lubricant level. If the level is low, add lubricant through one of the upper openings until it begins coming out of the oil level hole. Replace the oil level plug securely.

RECOMMENDED LUBRICANTS

Use only the best grade of automotive engine lubricants, unless otherwise specified. Where gear units are used out-of-doors, seasonal changes may be necessary. The proper grade of oil is listed as follows:

Ambient Temp. (Room)	Oil Grade for Countershaft Speeds			
	13.5 to 500	501 to 1000	1001 to 3000	Over 3000
110°F to 165°F	SAE 50 (A)	SAE 40	SAE 30	SAE 20W
60°F to 110°F	SAE 40	SAE 30	SAE 20W	SAE 10W
35°F to 70°F	SAE 30	SAE 20W	SAE 10W	SAE 10W
10°F to 40°F	SAE 20W	SAE 10W	SAE 10W	
-10°F to +20°F	SAE 10W	NOTE (B)		
-30°F to +10°F	NOTE (B)	NOTE (C)		
-65°F to -20°F	NOTE (C)			

Note (A) — Use automotive heavy duty oil, SAE 50 grade with oxidation inhibitor.

Note (B) — Use Gulf Paramount No. 22 which is a naphenic base oil with a low pour point and viscosities of 109.8 SUS at 100°F or 39.1 SUS at 210°F. Any other oil meeting these specifications would be a suitable substitute.

Note (C) — Use Mobil Oil Co. Avrex No. 903.

Note (D) — For temperatures below 10°F special oil seals are required.

WARRANTY

This equipment is warranted under Reliance's published "Standard Conditions for Sale of Electrical Apparatus."

Warranty claims on any such apparatus must be submitted to the company within the initial service year and prior to the expiration of any applicable terminal claim period.

Parts, service, and repairs, in or out of warranty may be arranged through any Reliance Authorized Service Shop, Distributor, or District Sales Office.

Damage in shipment, abuse, misuse, applicable maintenance and repair and periodic adjustments, as required, are not part of this warranty.

SIZES D-16-21-28

1. Input Shaft (driver gear)
2. Seal Sleeve
3. Lock Ring or Clamp
4. Seal (input)

5a. Ball Bearing (input shaft)
5b. Ball bearing (input shaft)

6. Gearcase
7. Cover Plate
8. Bearing Housing

9a. Roller Bearing
9b. Roller Bearing

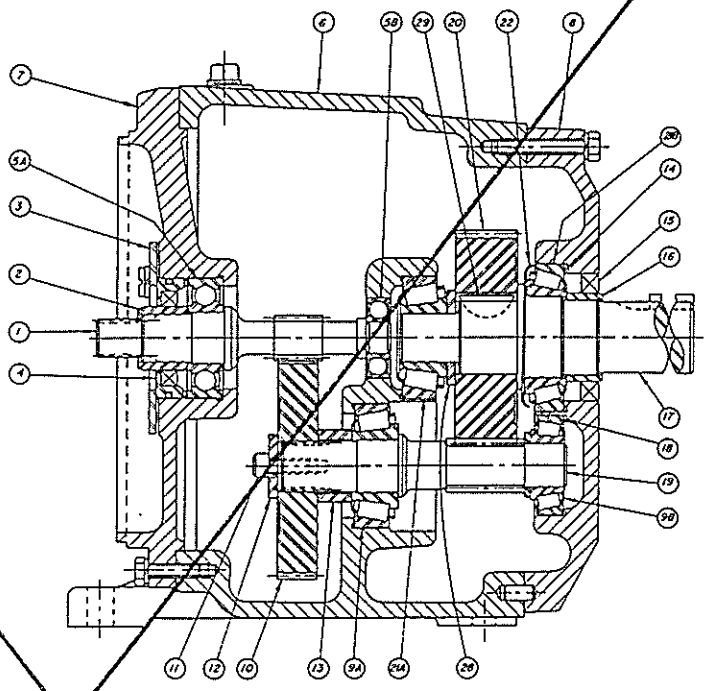
10. 1st Stage Driven (gear)
11. Screw
12. Washer
13. Spacer (gear)
14. Shims
15. Seal (output)
16. Seal Sleeve (output)
17. Output Shaft
18. Shims
19. 2nd Stage Driver (gear)
20. 2nd Stage Driven (gear)

21a. Roller Bearing
21b. Roller Bearing

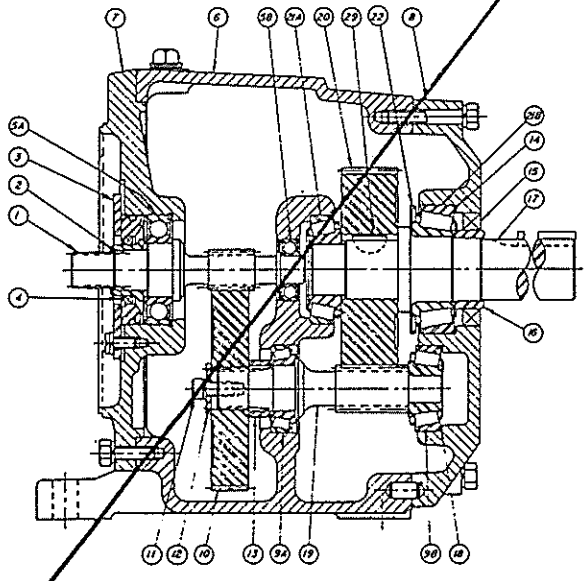
22. Grease Retainer (shaft up mounting only)*

23. Shell Pinion } Shell pinion
24. Spacer } in some D-28
25. Spacer } ratios

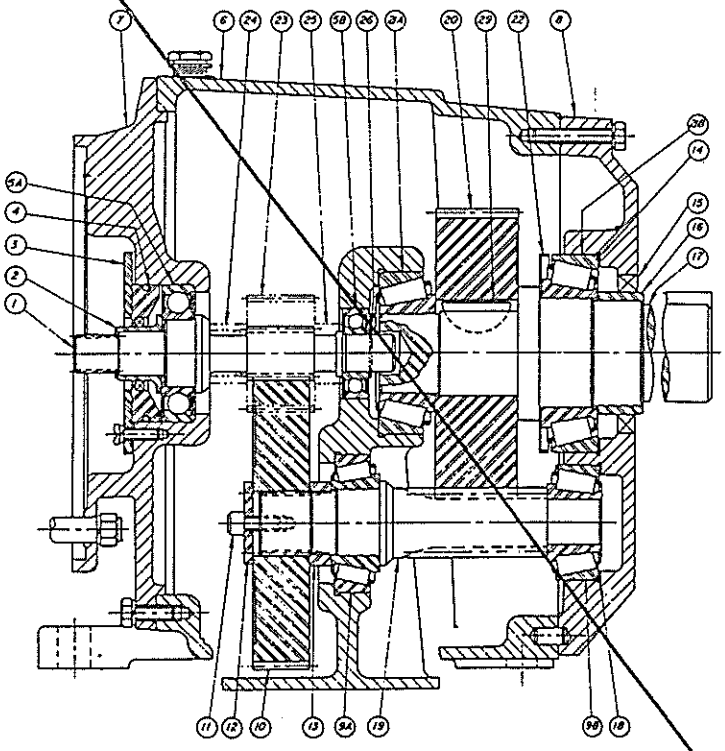
26. Lock Ring
27. Key
28. Spacer (gear)
29. Key



D21



D16



D28

INSTRUCTIONS FOR DISASSEMBLY AND REASSEMBLY FOR TRIPLE PARALLEL GEARMOTORS AND REDUCERS

1. Remove the drain plug and drain the lubricant from the gearcase. It is suggested that disassembly begin at the input shaft end of the reducer. Present manufacturing of gearmotors utilize a seal clamp and screws.
2. The input shaft seal (4) and bearing (5A) were locked into the coverplate (7) by means of a lockring in earlier designs. Remove the bolts holding the coverplate and tap cover so as to loosen it at the gasket joint. The coverplate and the input shaft assembly can be removed as a unit. Be careful not to hit or damage the gear teeth. Remove the lockring or clamp and tap or pull the pinion shaft (1) bearing, and seal from the coverplate (7).
3. Remove the screw (11) and washer (12) holding the first stage driven gear (10) on the second stage pinion shaft (19). This gear should slip off freely.
4. Remove the screw (24) and washer (25) holding the second stage driven gear (20). This gear will not normally come off of the shaft until output shaft and bearing housing (8) are removed.
5. Remove the three bolts (21) holding the bearing clamp (22) on the second stage pinion shaft. By moving gear (20) on the third stage pinion shaft, the second stage pinion shaft (19) can now be removed. This shaft assembly should now be pulled out, at the same time one bearing cup and shims will also come out.
6. Loosen all screws on bearing housing (8) and remove all except one on each side to keep output shaft in place. With bearing housing loose you can now reach into the gearcase from opposite end and slip off second stage driven gear (20) from third stage pinion shaft (29).
7. Stand gearcase on end with output shaft vertical. Remove remaining screws and lift off bearing housing. Lift out output shaft assembly (17) also the third stage pinion shaft (29).
8. All parts and castings should be washed and inspected for possible replacement. It is our suggestion that the shimming of bearings be done to one shaft at a time, this allows for better freedom and less possibility of too much preloading or looseness of bearings.
9. If new seals and bearings are being installed it is a good idea to press on the new seal sleeve. Apply some sealer to the shaft at sleeve location.
10. Install the third stage pinion shaft (29) in the gearcase. Place the shims (28) under the bearing cup (27B) in the bearing housing (8). Install the bearing housing with several bearing housing screws. Check the shaft from the inside of the gearcase for proper shimming of the roller bearings (27A-B). The shaft (29) should be free to turn with no side motion in the bearings.
11. Remove the bearing housing screws, bearing housing and lift out the third stage pinion shaft.

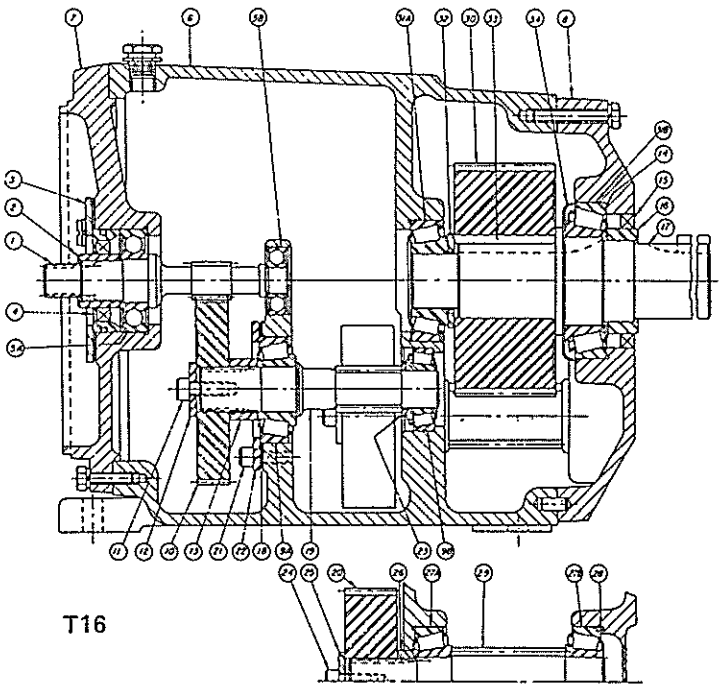
    NOTE: Grease retainer (34) used only in vertical output shaft up mounting only.
12. Place the final output shaft (17) into the gearcase. The bearing shims should be placed under the bearing cup (31B) in the bearing housing (8). Install the bearing housing and secure with several screws. Check the output shaft to be sure that the shaft turns freely and there is no side motion in the bearings.
13. Remove the bearing housing (8) again and re-install the third stage pinion shaft (29).

    NOTE: It is now necessary to place the second stage driven gear (20) and spacer (26) onto the third stage pinion shaft (29) from the input end of the gearcase. Use screw (24) and washer (25) finger tight in order to keep the gear on splined shaft while completing assembly of output shaft end. Apply silicone rubber adhesive to gasket surface and re-install bearing housing with all screws. You should now be able to turn the third stage pinion shaft freely from inside the gearcase.
14. From the input end you can now place the second stage pinion shaft (19) into the bearing bores. You will need to loosen the screw (24) which was finger tight and slide gear (20) on spline in order for bearing on pinion shaft (19) to clear gear and go into bearing bore. To secure these shaft bearings (9A-B) the shims (18) are placed under the bearing clamp (22). Again shim so there is no side motion in the bearings and shaft turns freely.
15. Secure the second stage driven gear (20) onto the third stage pinion shaft (29) with screw (24) and washer (25).
16. The first stage driven gear (10) and spacer (13) can now be placed on the second stage pinion shaft (19). Lock this gear on the shaft with screw (11) and washer (12).
17. If new bearings (5A-B) have been installed on the input shaft (1), a new seal sleeve (2) should also be installed. Apply some sealer to the shaft at the seal sleeve location and press the sleeve in place. The input shaft assembly should be placed in the coverplate (7).

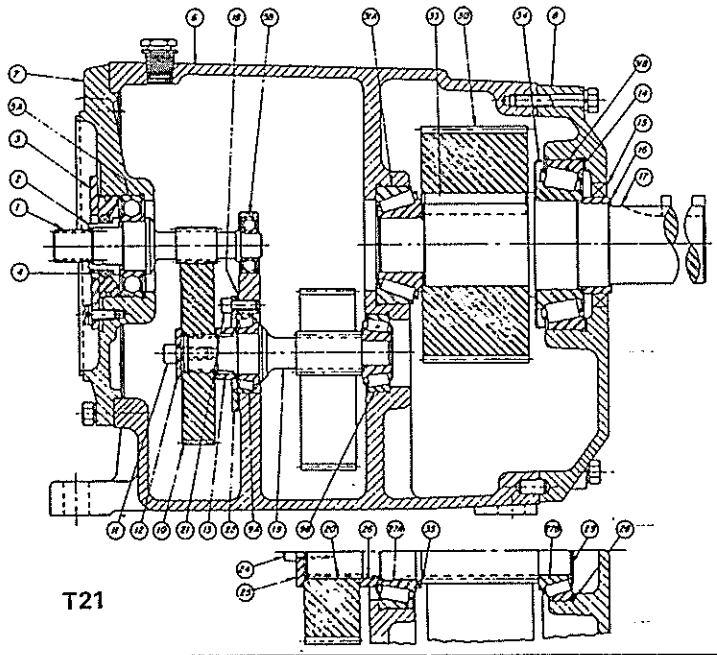
    NOTE: In T-28 reducers, some ratios have a shell pinion (37) on the input shaft. There are additional spacers (36-38) and lockring (39) on this input shaft.
18. Apply silicone rubber adhesive to the gasket area. Take input shaft (1) and coverplate assembly and install on gearcase making sure that pinion meshes with driven gear and outboard bearing (5B) slides into the bearing bore properly. Install coverplate screws and secure them.
19. The oil seal assembly (4) can now be placed in the coverplate (7). A bit of lubricant should be applied to the seal sleeves and to the O-Ring. This will allow the seal to slide into place much easier. Install the seal clamp (3) and secure with clamp screws. If the unit is a gearmotor with a lockring, add ball bearing shims as required, between the lockring and the seal housing, to limit the end play of the input shaft to the internal clearance of the ball bearing.
20. If the output shaft oil seal has not as yet been installed, it should now be placed in the bearing housing and a tube of proper dimensions used, to tap the seal flush with the casting surface.
21. Fill the reducer with the proper lubricant to the correct oil levels for test. Reassemble motor in reverse order.

SIZES T16-21-28

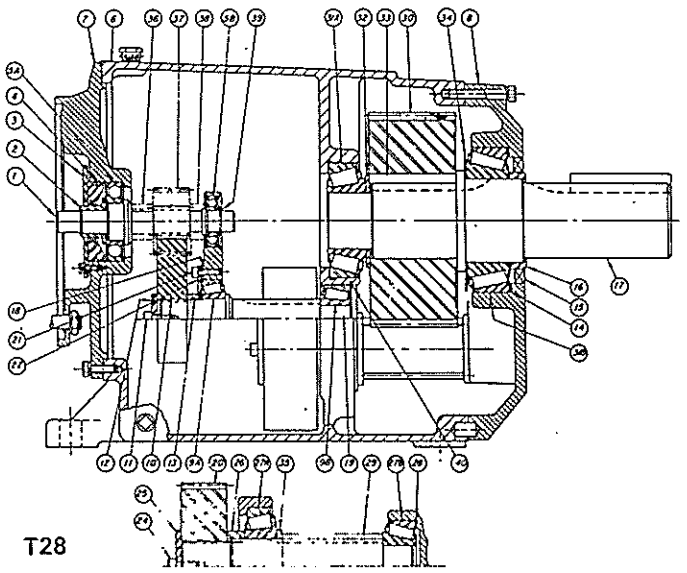
1. Input Shaft (1st stage driver)
2. Seal Sleeve
3. Lock Ring or Clam
4. Seal
5a. Ball Bearing (input shaft)
5b. Ball Bearing (input shaft)
6. Gearcase
7. Cover Plate
8. Bearing Housing
9a. Roller Bearing
9b. Roller Bearing
10. Gear (1st stage driven)
11. Screw
12. Washer
13. Spacer (gear)
14. Shims
15. Seal
16. Seal Sleeve (output)
17. Output Shaft
18. Shims
19. Gear (2nd stage driver)
20. Gear (2nd stage driven)
21. Screws (bearing clamp)
22. Clamp
23. Spacer (T-16)
24. Screw
25. Washer
26. Spacer
27a. Roller Bearing
27b. Roller Bearing
28. Shims
29. Gear (3rd stage driver)
30. Gear (3rd stage driven)
31a. Roller Bearings
31b. Roller Bearings
32. Spacer (T-16 & T-28)
33. Key
34. Grease Retainer (shaft up mounting only)*
35. Spacer (T-21 & T-28)
36. Spacer } Shell Pinion
37. Shell Pinion } in some T-28
38. Spacer } ratios
39. Lock Ring
40. Lock Ring



T16



T21



T28

Master / 2 Ponders Court / P.O. Box 499 / Greenville, SC 29607 / 803-297-4800

MASTER
RELIANCE ELECTRIC

FILTRATE VALVE

Drawing No. 1-86726-A

The sealing between the shaft and the filtrate valve is a plastic wearing plate. The thickness of a new plate is 40 mm. The wearing depth is 5 mm. The valve with the plastic plate is pressed against the shaft with 3 springs. The 3 bolts holding the valve have one stop ring each behind the valve. The distance between the valve and the stop rings should be adjusted to 5 mm for a new wearing plate after some hours run so the valve is warm. Before this distance is zero it is time to change the wearing plate.

To change the wearing plate the filtrate valve has to be removed. The plate is fixed to the valve with a number of screws at the peripheri and 3 screws in the centre. These 3 screws are counter-sunk and covered with plastic washers. Use new washers to cover the holes when the new plate is installed. Check the above mentioned distance between the valve and the 3 stop rings when the valve is back in the right position.

A possible small leakage between the shaft and the wearing plate is collected by a ring around the valve and recircled to the drop leg by means of a rubber hose. The collecting ring is sealed with a V-ring on the shaft. Check the condition of the V-ring and change if necessary.

WIRE CLEANING SHOWER

Drawing No. 1-86742-B

The cleaning shower shall cover the whole disc area. The movement range of the shower can be adjusted. The connection between the shower drive and the pipe is a friction coupling.

Adjustment:

- Stop the shower in the lower position.
- Lossen the coupling. Unscrew all screws. If necessary change the 3 white screws to one dimension bigger screws and tighten them. That will loosen the coupling.
- Lift the shower pipes to the position where the lowest shower nozzle is about 50 mm above the flat bar at the bot'om of the disc sector.
- Tighten the coupling screws in 2 or 3 steps to a torque of 70 Nm.
- Run the shower with water and check that the whole disc area is cleaned.

STUFFING BOXES

Shaft sealings - Drawings No. 1-86650-A, 1-86652-A

Use a sealing material with 3/4" square section in a good quality. Cut the sealings in a way that there is no gap when they are bent around the shaft. The length should be:

Drive end, mm	820
Filtrate enc, mm	3820

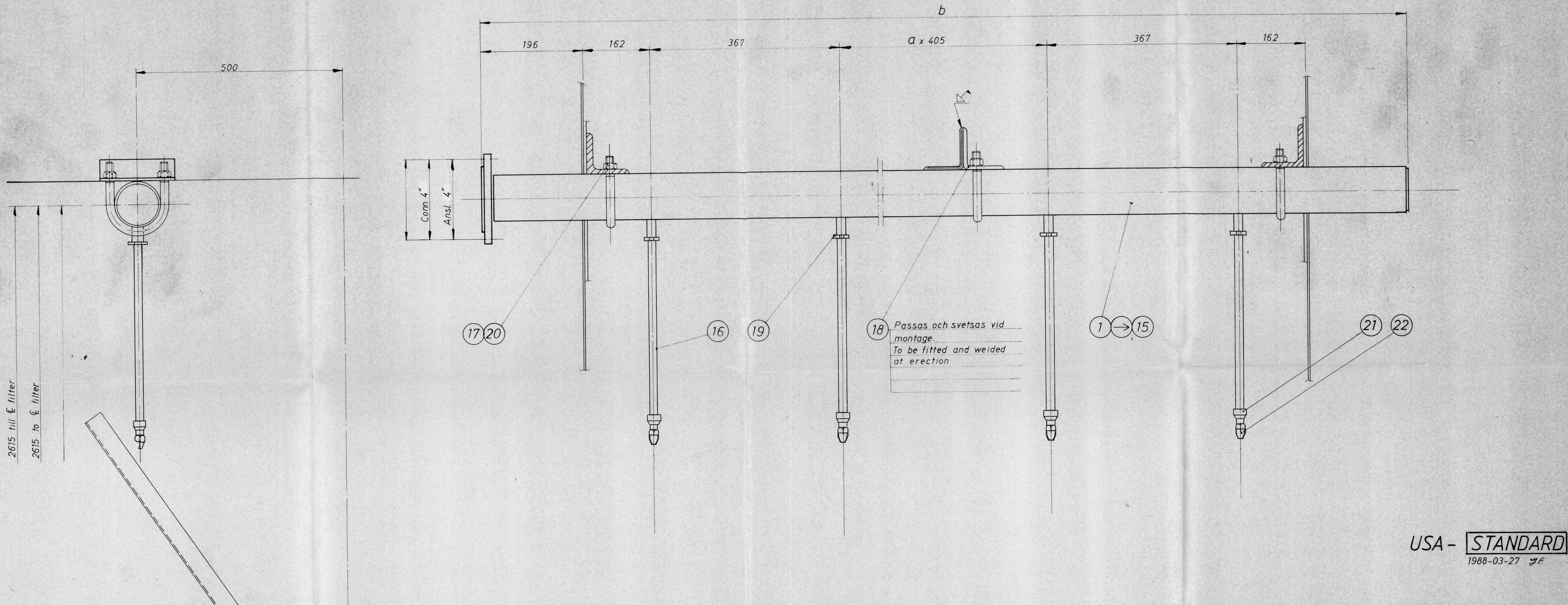
Install the sealings with the joint on top of the shaft. Press the sealing to the bottom of the box with the gland. Unscrew the gland nuts and tighten them **by hand force only**. Start the filter. If there is too much leakage in the sealings tighten the nuts alternately with maximum 1/4 rotation each. A leakage of 15-20 drops per minute is normal.

Conveyor Repulper - Drawing No. 1-86298

The shafts have exchangable wearing bushings in stainless steel in the sealing positions. The sealing material is the same as for the centre shaft (3/4"). The length of the sealings before installation should be 490 mm. Cut and install them in the same way as for the centre shaft.

	Too low inlet pulp consistency	Too low inlet pulp flow	Too high inlet pulp flow (= too high filter speed)	Discharge shower nozzles plugged or in wrong position	The cleaning shower does not clean the whole discs	Cleaning shower nozzles plugged. Unscrew and clean	Filter bags plugged. Clean or change	Holes in filter bags. Change	Incorrect level control	Incorrect vacuum indicator	Change the split between cloudy and clear filtrate	Hole in the rubber connection between filtrate valve and drop leg	Sealing between filtrate valve and centre shaft in bad condition
Poor pulp discharge	X		X	X	X								
Filter vat level variations		X						X	X				
Low filter vat level		X							X				
high filter vat level	X		X	X	X	X	X		X				
High filtrate consistency								X			X		
Insufficient vacuum		X						X	X	X		X	X
Low outlet pulp consistency	X	X	X					X	X			X	

Där ej annat angives gäller / Unless specified the following is valid	
Ytjämnhet Ra µm / Surface roughness	Tolerans för / Tolerance for
Skarpa kanter brytes mm / Sharp edges to be dressed	Bearb. yta / Machined surface: SMS 715 = ISO 2768 Serie medel / Medium series
	Obearb. yta / Unmachined surface: SMS 715 = ISO 2768 Serie grov / Coarse series.
Ändr. Rev. / Spec.	Datum Date / Sign.



USA - STANDARD
1988-03-27 JE

Utf. / Design	Antal sk. / No. of disc.	a	b
P	22	20	9550
O	21	19	9145
N	20	18	8740
M	19	17	8335
L	18	16	7930
K	17	15	7525
J	16	14	7120
H	15	13	6715
G	14	12	6310
F	13	11	5905
E	12	10	5480
D	11	9	5075
C	10	8	4670
B	9	7	4265
A	8	6	3860

Description	P	O	N	M	L	K	J	H	G	F	E	D	C	B	A	Det No	Benämning och nettodim / Description and net dim	Ritn / Drwg	Material	Vikt / Weight	Anm / Note
Nozzle	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	22	Dysa NPT 3/8"	P 5025	2346		15040269
Reduction	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	21	Förminskning R½"-R3/8"	RM 111	2343		15120211
Nut	8	8	8	8	8	6	6	6	6	6	6	6	6	6	4	20	Mutter ½" UNC		2343		
Nut	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	19	Mutter R½"	RM 160	2343		
Bracket	2	2	2	2	2	1	1	1	1	1	1	1	1	1	–	18	Konsol	3-76828-A			15126702
Clamp	4	4	4	4	4	3	3	3	3	3	3	3	3	3	2	17	Klamma	3-86764			
Spray pipe	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	16	Spolrör	3-86771			
Distributing pipe	1															15	Fördelningsrör	2-86773-P			
		1														14		-O			
			1													13		-N			
				1												12		-M			
					1											11		-L			
						1										10		-K			
							1									9		-J			
								1								8		-H			
									1							7		-G			
										1						6		-F			
											1					5		-E			
												1				4		-D			
													1			3		-C			
														1		2		-B			
Distributing pipe															1	1	Fördelningsrör	2-86773-A			

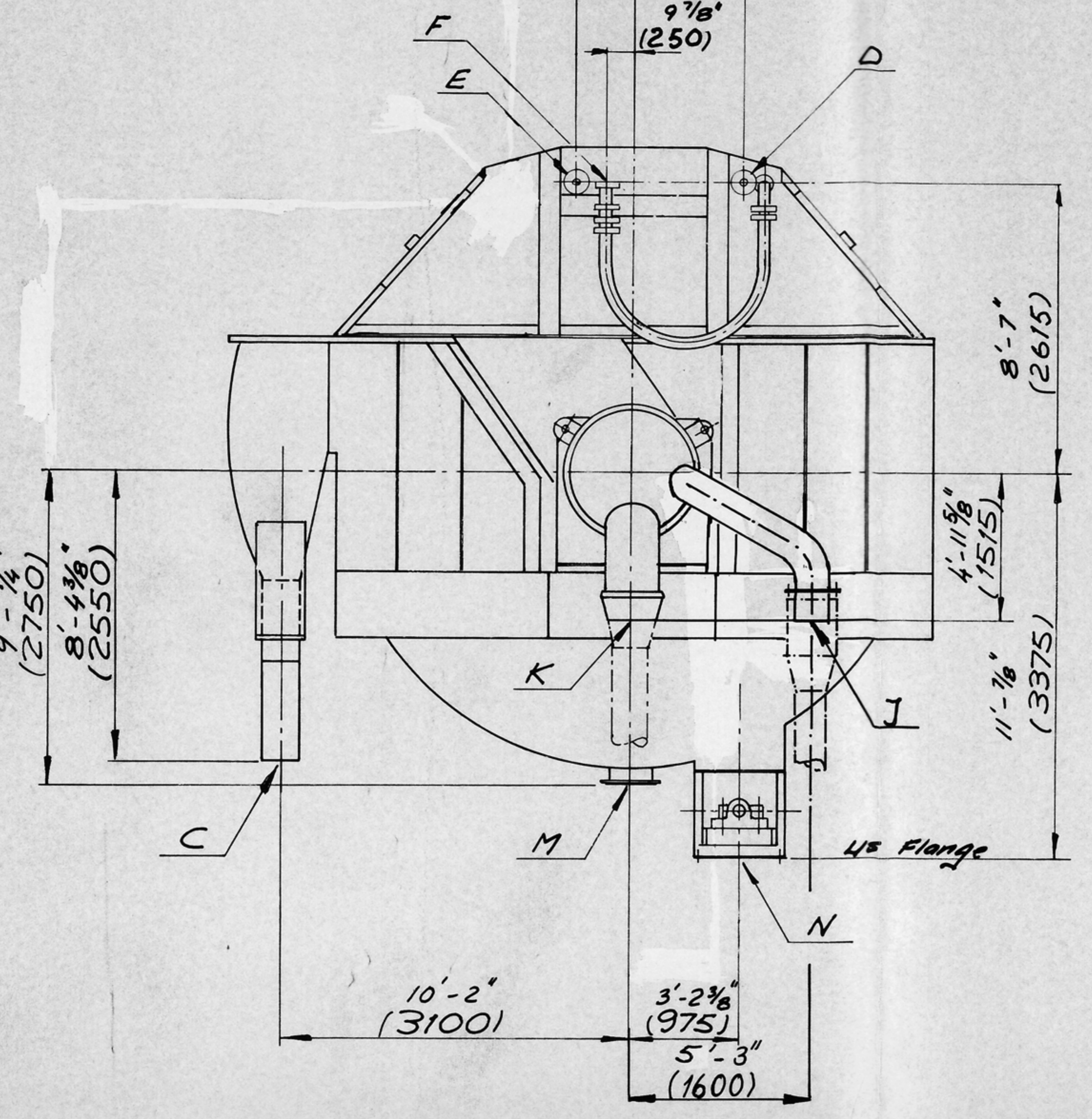
Utf./Ant. Design Number	Ritad / Drawn: 880327 JE	SKIVFILTER ø 5000 Rännspolning ·med dysa SMST	Total vikt / Total weight	Ersättes av / Replaced by
Skala / Scale: 1:5	Kontr. / Checked		Ersätter / Replaces drwg	Reg. av / Reg. by
HEDEMORA ☆ HEDEMORA AB SWEDEN			1-86772	Ändr. Rev.

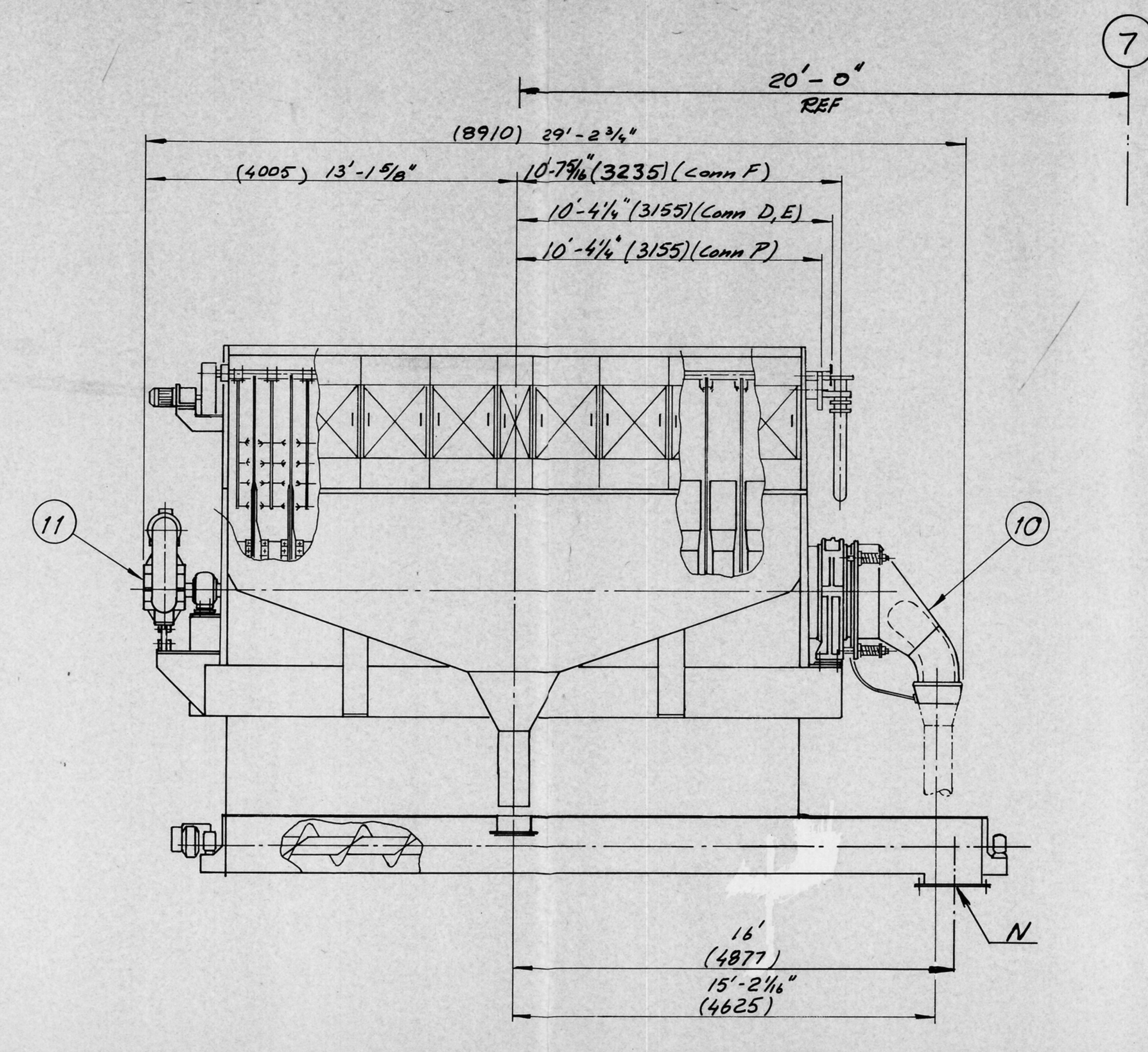
Ant | Utf | Anläggning | Best. nr | Lev | Utlämnad | Anm./Smst

1-86772

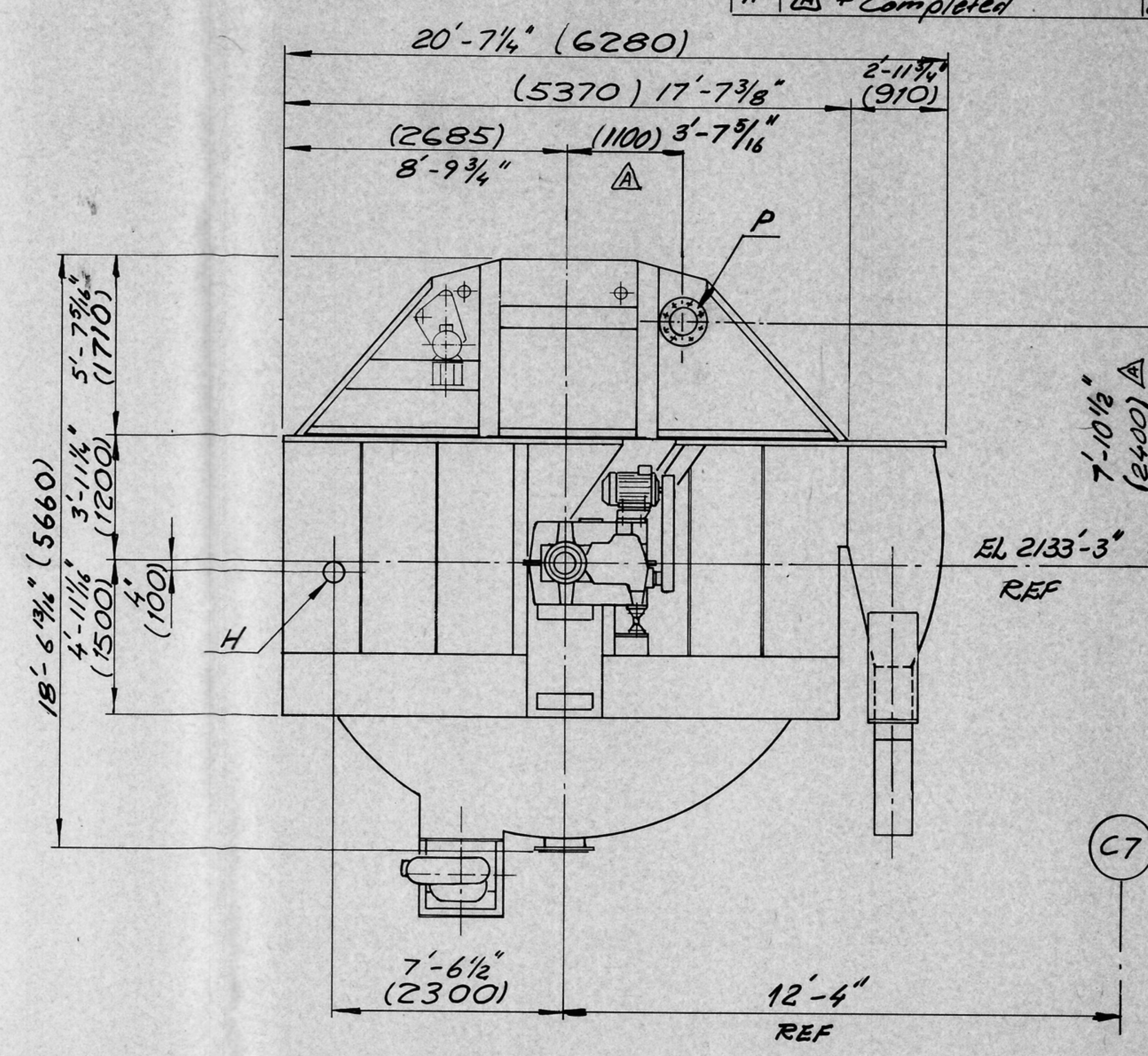
Där ej annat angives gäller / Unless specified the following is valid		
Ytjämnhet Ra µm / Surface roughness	Tolerans för / Tolerance for	
Skarpa kanter brytes mm / Sharp edges to be dressed	Bearb. yta / Machined surface	SMS 715=ISO 2768 / Serie medel / Medium series
	Obearb. yta / Unmachined surface	SMS 715=ISO 2768 / Serie grov / Coarse series

Ändr. Rev.	Spec.	Datum Date	Sign.
A	A + Completed	880322	AP





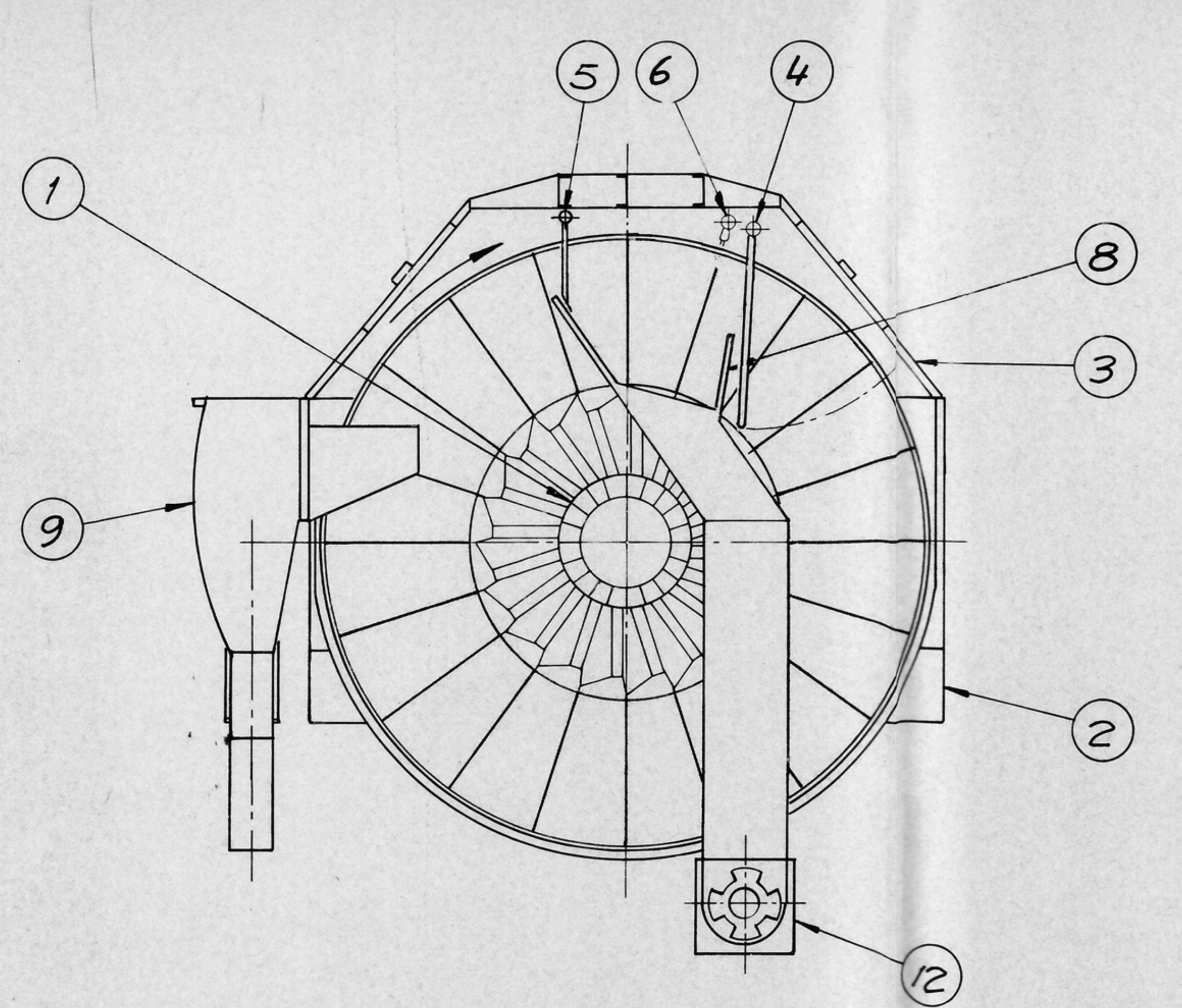
VIEW LOOKING WEST

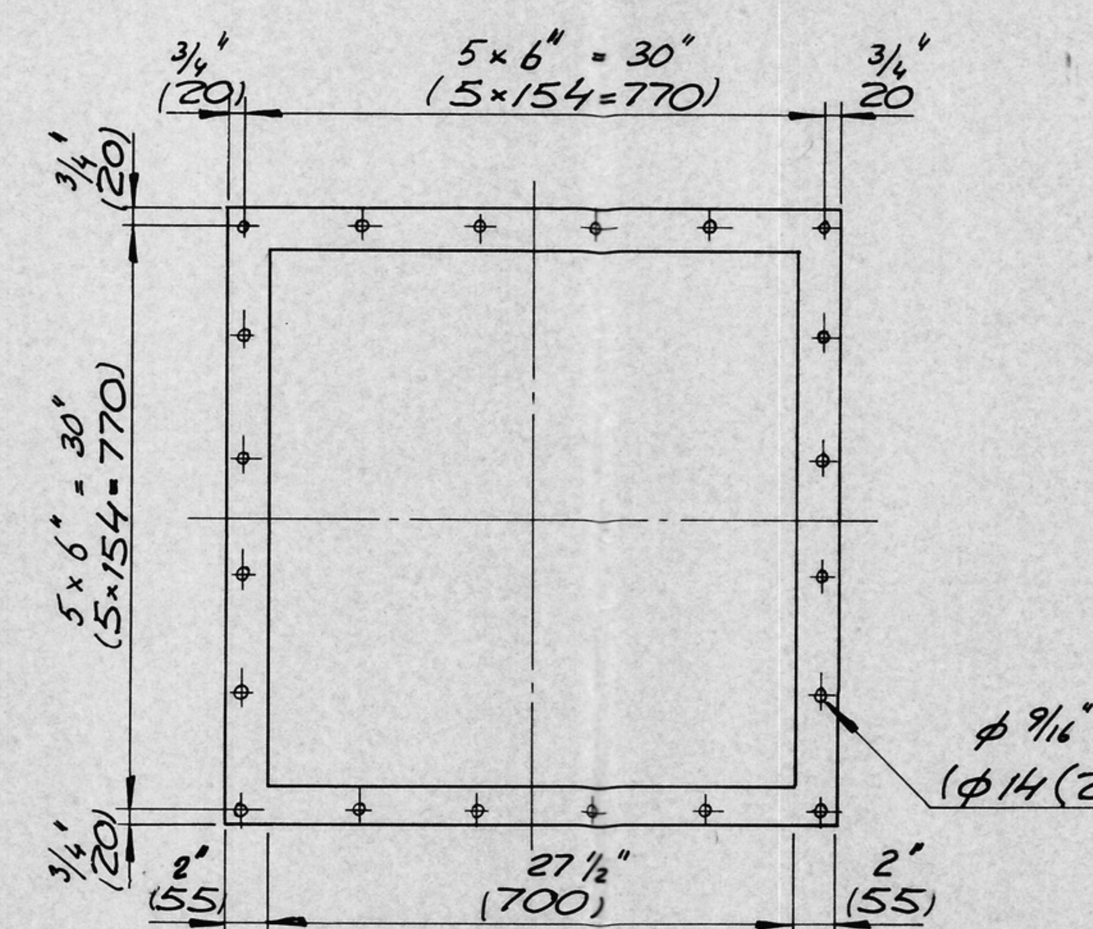


VIEW LOOKING NORTH

Flänsar enl. 150 Lbs A.N.S.I
Flange acc. 150 Lbs A.N.S.I

	Benämning	Description	Benennung	Ant. Nr. Anz.	Ansl. Conn. Anschl.	Anmärkning Remark Anmerkung
C	Inlopp	Inlet	Zulauf	1	20"	Weld conn.
D	Kakavspoln.	Discharge shower	Ablösespritze	1	3"	Flg
E	Rännspolning	Sluicing shower	Rinnen-Spritze	1	4"	Flg
F	Duksprits	Wire cleaning shower	Reinigungsspritze	1	4"	Flg
H	Flänsför nivågivare	Flange for level ind.	Flansche für Pegelz.	1	3"	Flg spec DS 441.05
J	Förfiltrat	Cloudy filtrate	Trub-Filtrat	1	14"	
K	Klarfiltrat	Clear filtrate	Klar-Filtrat	1	14"	Reduced to 12"
M	Bottenavtappn.	Drainage	Bodenentleerung	1	12"	Flg
N	Massautlopp	Pulp outlet	Fangstoff	1	☐	Special see below
P	Utsugning	Ventilation	Ventilierung	1	12"	Flg





Ansl.
Conn.
Anschluss N
1:10

FOUNDATION SEE DRAWING 1-86609

Equipment N^os - 204 2330 A

TMP DISCFILTER LINE B

1	12	Skruvrivare	Conveyor repulper	Auflöseschnecke	1-86298
1	11	Drift	Drive	Antrieb	1-87753
1	10	Filtratventil	Filtrate valve	Filtratventil	1-86726-B
1	9	Inloppslåda	Feed box	Einlaufskasten	1-86389
1	8	Rännor	Aprons	Rinnen	1-85730-G
	7				
1	6	Kakavspolning	Discharge shower	Satsabspülung	1-86646-G
1	5	Rännspolning	Sluicing shower	Rinnenspülung	1-86772-G
1	4	Duksprits	Wire cleaning shower	Tuchspritzanordn.	1-86742-A
1	3	Huv	Hood	Haube	1-85320-G
1	2	Tråg	Vat	Trog	1-86289
1	1	Centr. axel med sektorer	Centre shaft with sectors	Zentr. Welle mit Sektoren	1-85326-G
A	Det	Benämning	Description	Benennung	Nr

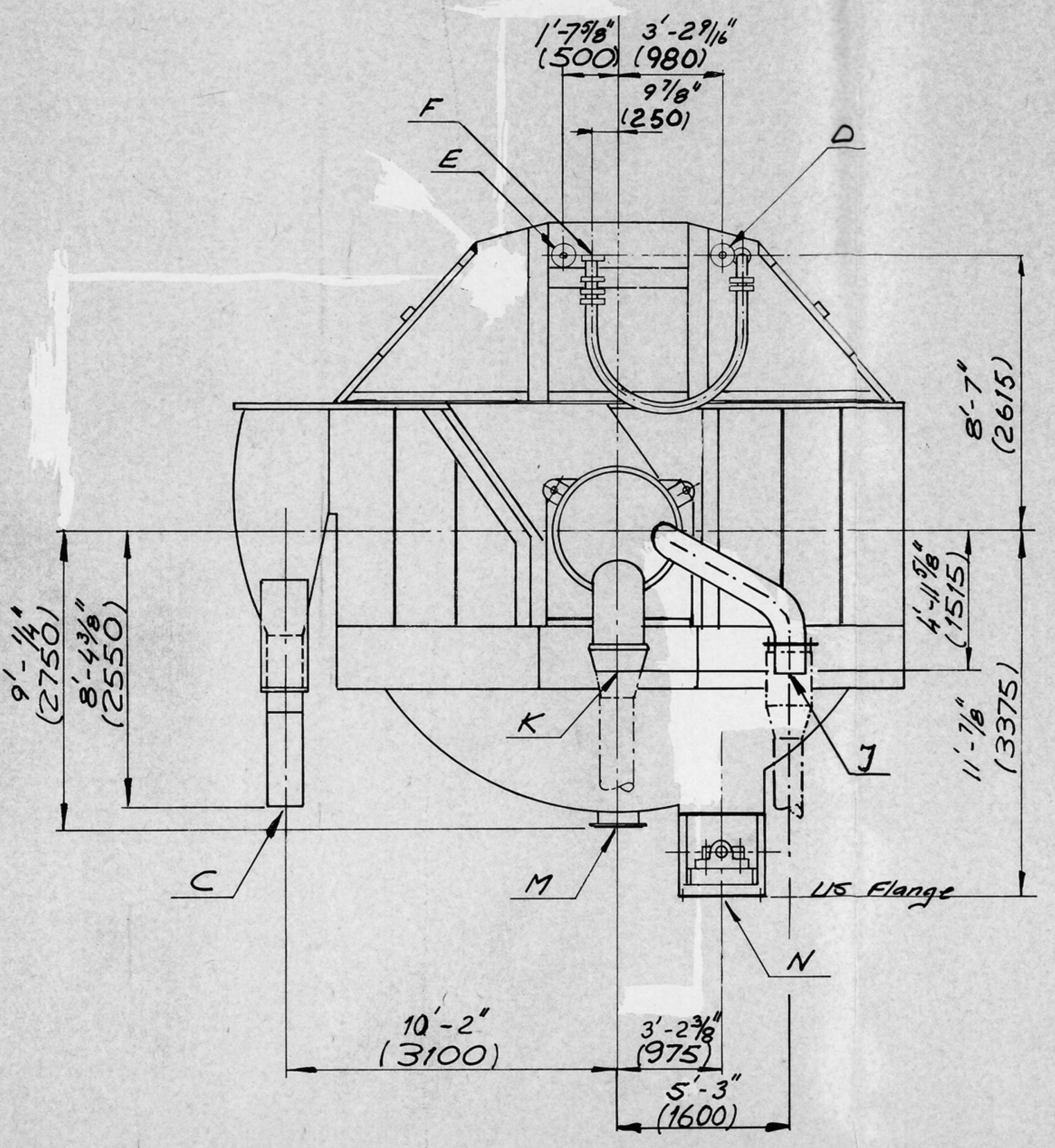
Utf. Ant. / Design Number	Ritad / Drawn: 880217 AP	SKIVFILTER ϕ5000	Total vikt / Total weight	Ersättes av / Replaced by
Skala / Scale: 1:50 1:10	Kontr. / Checked	DISCFILTER ϕ5000	Ersätter / Replaces drwg	Reg. av / Reg. by
HEDEMORA / HEDEMORA AB SWEDEN		SCHEIBENFILTER ϕ5000 / 9/14 DISCS ANS	1-86607	Ändr. Rev. A

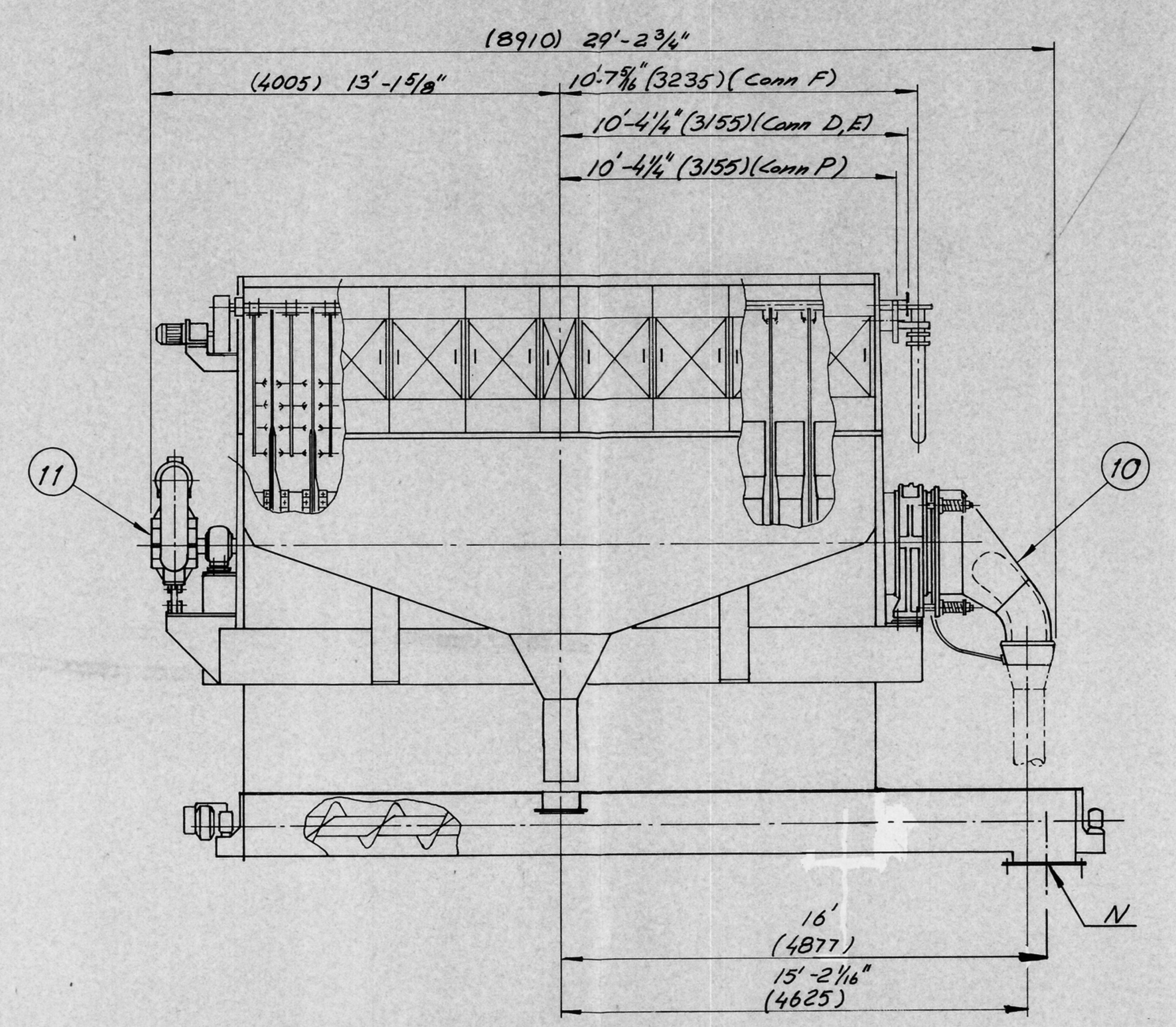
Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst
1	A	Ponderay Newsprint	70.88.2312	837	29/6-88 AW	

1-86607

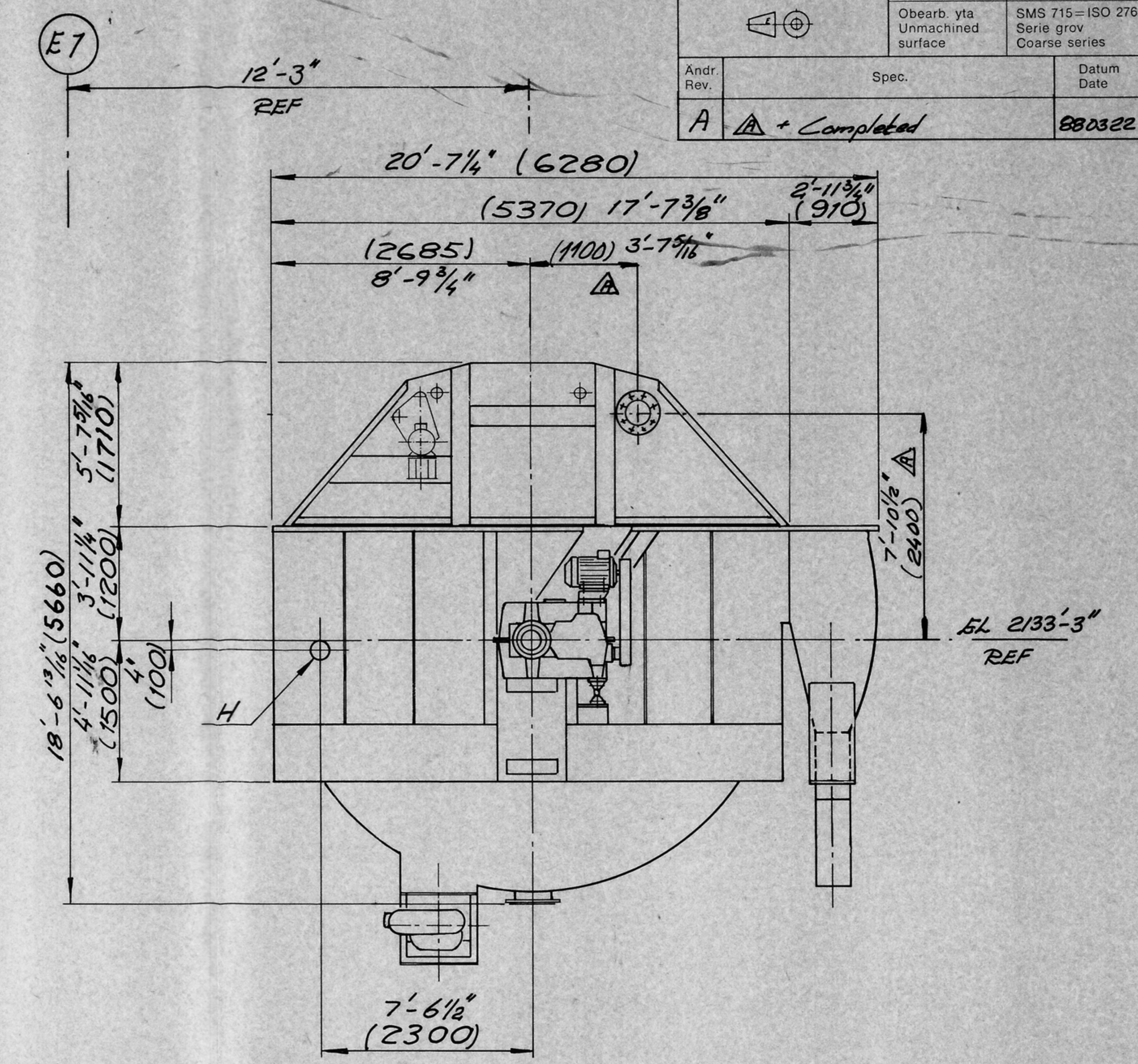
Där ej annat angives gäller / Unless specified the following is valid		
Ytjämnhet Ra µm / Surface roughness	Tolerans för / Tolerance for	
Skarpa kanter brytes ... mm / Sharp edges to be dressed	Bearb. yta / Machined surface	SMS 715=ISO 2768 Serie medel / Medium series
	Obearb. yta / Unmachined surface	SMS 715=ISO 2768 Serie grov / Coarse series

Ändr. Rev.	Spec.	Datum Date	Sign.
A	A + Completed	880322	AP



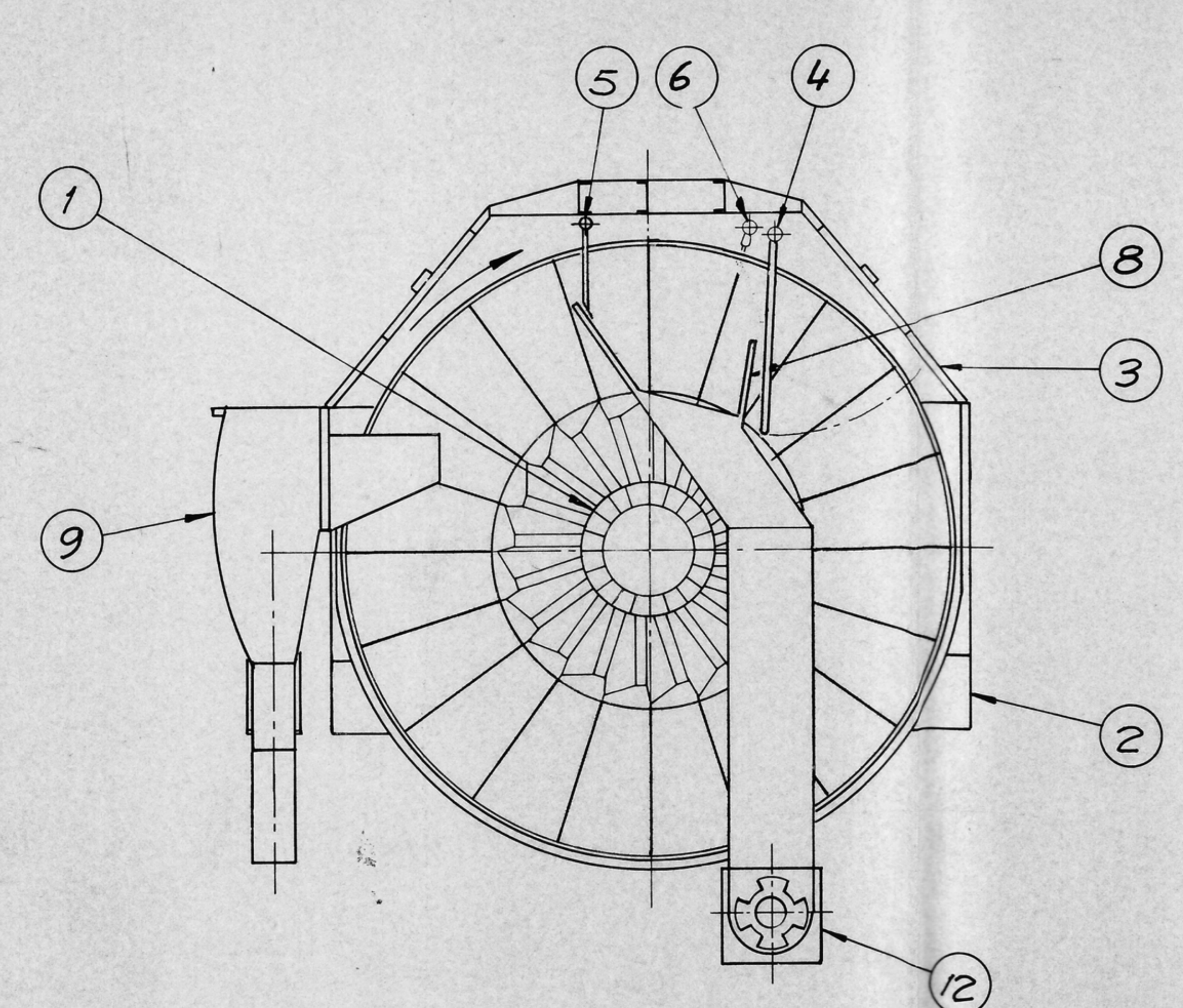


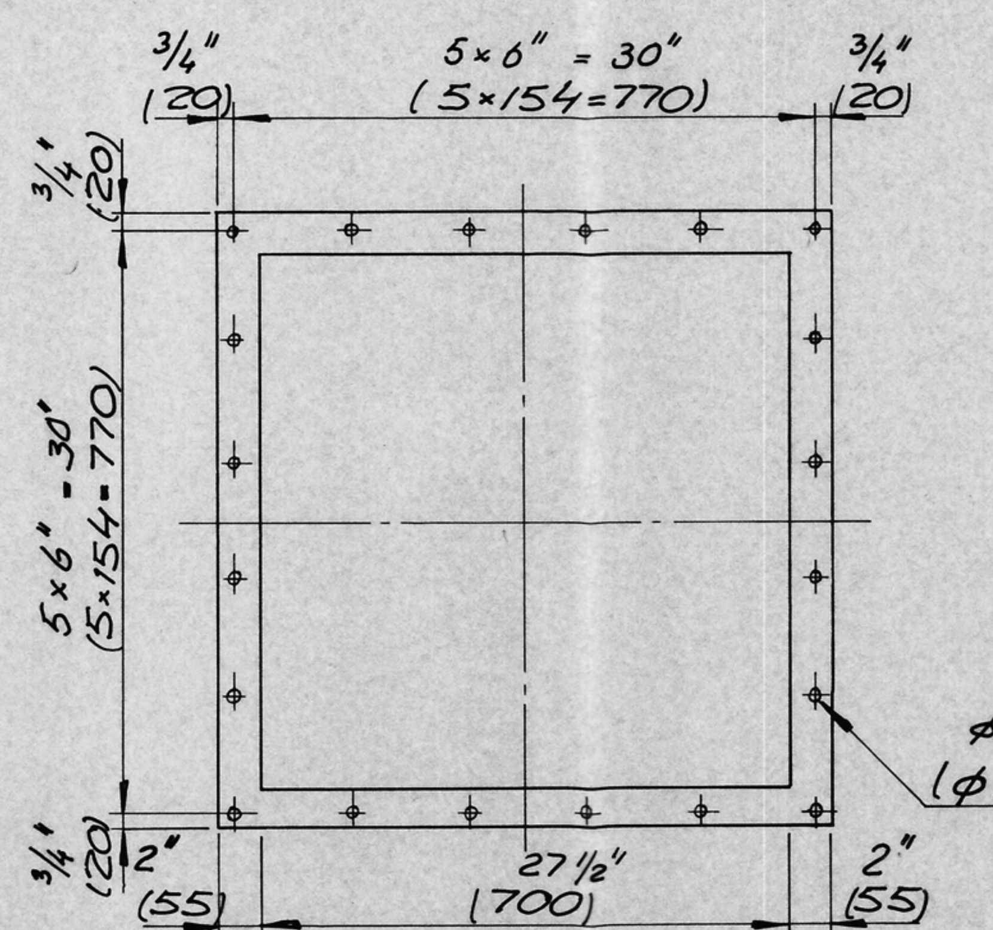
VIEW LOOKING WEST



VIEW LOOKING NORTH

Flänsar enl. 150 Lbs A.N.S.I
Flange acc. 150 Lbs A.N.S.I





Ansl.
Conn.
Anschluss N
1:10

	Benämning	Description	Benennung	Ant. Nr. Anz.	Ansl. Conn. Anschl.	Anmärkning Remark Anmerkung
C	Inlopp	Inlet	Zulauf	1	20"	Weld conn.
D	Kakavspoln.	Discharge shower	Ablösespritze	1	3"	Flg
E	Rännspolning	Sluicing shower	Rinnen-Spritze	1	4"	Flg
F	Duksprits	Wire cleaning shower	Reinigungsspritze	1	4"	Flg
H	Fläns för nivågivare	Flange for level ind.	Flansche für Pegelz.	1	3"	Flg spec DS 441.05
J	Förfiltrat	Cloudy filtrate	Trub-Filtrat	1	14"	
K	Klarfiltrat	Clear filtrate	Klar-Filtrat	1	14"	Reduced to 12"
M	Bottenavtappn.	Drainage	Bodenentleerung	1	12"	Flg
N	Massautlopp	Pulp outlet	Fangstoff	1	□	Special see below
P	Utsugning	Ventilation	Ventilierung	1	12"	Flg

FOUNDATION SEE DRAWING 1-86609

CERTIFIED DRAWING
HEDEMORA AB
HEDEMORA SWEDEN
88 02 22 AP

Equipment N^os -204 2820
SLF DISCFILTER

A	Det	Benämning	Description	Benennung	Nr
1	12	Skruvrivare	Conveyor repulper	Auflöseschnecke	1-86298
1	11	Drift	Drive	Antrieb	1-87753
1	10	Filtratventil	Filtrate valve	Filtratventil	1-86726-B
1	9	Inloppslåda	Feed box	Einlaufskasten	1-86389
1	8	Rännor	Aprons	Rinnen	1-85730-G
	7				
1	6	Kakavspolning	Discharge shower	Satsabspülung	1-86646-G
1	5	Rännspolning	Sluicing shower	Rinnenspülung	1-86772-G
1	4	Duksprits	Wire cleaning shower	Tuchspritzanordn.	1-86742-A
1	3	Huv	Hood	Haube	1-85320-G
1	2	Tråg	Vat	Trog	1-86289
1	1	Centr. axel med sektorer	Centre shaft with sectors	Zentr. Welle mit sektoren	1-85326-G

Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst
1	A	Ponderay Newsprint	70.88.2324	837	29/6-88 JW	

Utf./Ant. Design Number
Ritad Drawn: 880217 AP
Skala Scale: 1:50 1:10
Kontr. Checked

SKIVFILTER ø5000
DISCFILTER ø5000
SCHEIBENFILTER ø5000
9/14 DISCS ANS

Total vikt Total weight
Ersättes av Replaced by
Ersätter Replaces drwg
Reg. av Reg. by

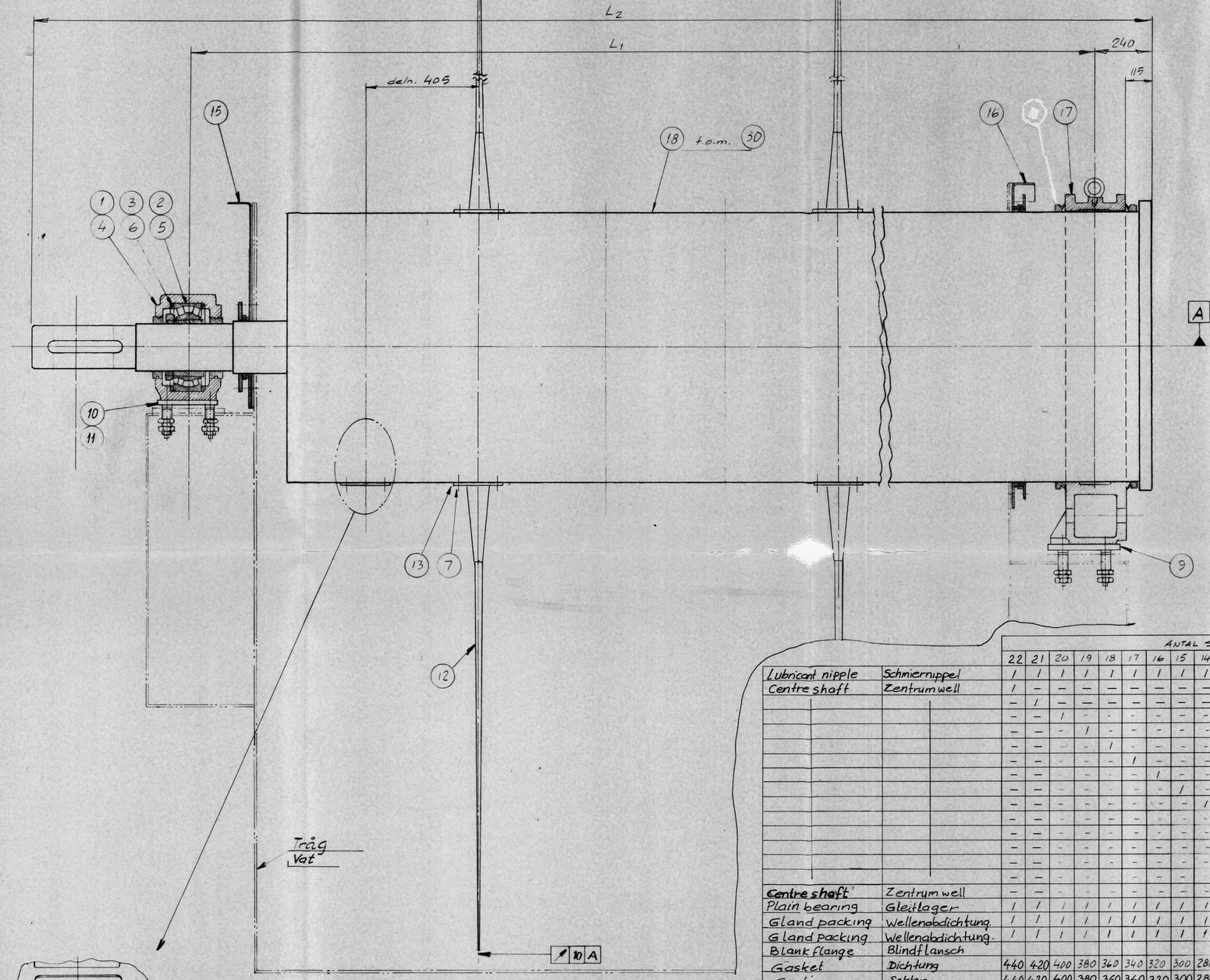
HEDEMORA
HEDEMORA AB SWEDEN

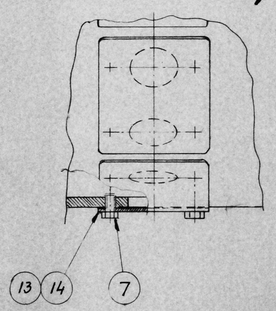
1-86608
Ändr. Rev. A

1-86608

Där ej annat angives gäller: Unless specified the following is valid:			
Ytjämnhet / Smoothness	Tolerans för Tolerance for		
Radie / Radius		Utv. mått Outside measures	Inv. mått Inside measures	Övr. mått Other measures
Skarpa kanter brytes ..... mm / Sharp edges to be dressed	Bearb. yta Machined surface	+ 0 − IT 14 : 2	+ IT 14 : 2 − 0	+ IT 14 : 2 − 3
	Obearb. yta Unmachined surface	+ 0 − IT 17 : 2	+ IT 17 : 2 − 0	+ IT 17 : 2 − 2

Nr No.	Ändring Revision	Datum Date	Sign. Sign.
A	Del.8 flyttad till ritn. 1-87439	880803	JE





Antal skivor No. of discs	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Grupp Group	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P
L1	4137	4542	4947	5352	5757	6162	6567	6972	7377	7782	8187	8592	8997	9402	9807
L2	5035	5440	5845	6250	6655	7060	7465	7870	8275	8680	9145	9550	9955	10360	10765

Note: Number of sectors, det. 12, when all discs are erected. For unerected disc reduce number of sectors withe 20 and advance number of blind flanges, pos.14, withe 10.

NOT. Antal sektorer det. 12 gäller vid fullt antal monterade skivor. För omonterad skiva reduceras antalet sektorer med 20 st och tillkommer 10 st. blindfläns det. 14

Jämför ritn. 1-85891.

USA: STANDARD

		ANTAL SKIVOR/Number of discs																			
		22	21	20	19	18	17	16	15	14	13	12	11	10	9	8					
Lubricant nipple	Schmiernippel	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33	Smörjnippel KR 1/8"			
Centre shaft	Zentrumwell	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	32	Centrumaxel	1-85338-P		
		–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	31		-O		
		–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	30		-N		
		–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	29		-M		
		–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	28		-L		
		–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	27		-K		
		–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	26		-J		
		–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	25		-H		
		–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	24		-G		
		–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	23		-F		
		–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	22		-E		
		–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	21		-D		
		–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	20		-C		
		–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	19		-B		
Centre shaft	Zentrum well	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	18	Centrumaxel	1-85338-A		
Plain bearing	Gleitlager	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17	Glidlager ϕ 1125	2-85328		
Gland packing	Wellenabdichtung	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16	Axeltätning ϕ 1125			
Gland packing	Wellenabdichtung	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	Axeltätning ϕ 226			
Blank flange	Blindflansch																14	Blindfläns	3-74118		
Gasket	Dichtung	440	420	400	380	360	340	320	300	280	260	240	220	200	180	160	13	Packning	4-74119		
Sector	Sektor	440	420	400	380	360	340	320	300	280	260	240	220	200	180	160	12	Kassettsektor			
Bearing plate	Lagerplatte	1	1	1	1	1	1	1	–	–	–	–	–	–	–	–	11	Lagerplatta	1-85339		
Bearing plate	Lagerplatte	–	–	–	–	–	–	–	1	1	1	1	1	1	1	1	10	Lagerplatta	1-85337-A		
Bearing plate	Lagerplatte	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9	Lagerplatta	1-85327-B		
																	8				
Screw	Schraube	880	840	800	760	720	680	640	600	560	520	480	440	400	360	320	7	Skruv	4-85334	2343	
Guide ring	Führungsring	2	2	2	2	2	2	2	–	–	–	–	–	–	–	–	6	Styrring	FRB 10/400		
Bearing	Lagermit klemmh.	1	1	1	1	1	1	1	–	–	–	–	–	–	–	–	5	Lager m. klämhylsa	23148 CCK/W33+H3148A		
Bearing house	Lagerhöuse	1	1	1	1	1	1	1	–	–	–	–	–	–	–	–	4	Lagerhus	SD 3148 TS		SKF
Guide ring	Führungsring	–	–	–	–	–	–	–	2	2	2	2	2	2	2	2	3	Styrring	FRB 10/370		
Bearing	Lagermit klemmh.	–	–	–	–	–	–	–	1	1	1	1	1	1	1	1	2	Lager m. klämhylsa	23144 CCK/W33+H3144A		
Bearing house	Lagerhöuse	–	–	–	–	–	–	–	1	1	1	1	1	1	1	1	1	Lagerhus	SD 3144 TS		
		P	O	N	M	L	K	J	H	G	F	E	D	C	B	A	Det. No.	Benämning och nettodim. Description and net dim.	Ritn. Drwg.	Material	Vikt Weight	Anm. Note

Ant.	Utf.	Anläggning	Best. nr	Utlåmnad	Grp.	Smst.	Anm.

Antal Number	
Skala Scale	1:10
Ritad Drawn	880224 KB
Kontr. Checked	

HEDEMORA
AB HEDEMORA VERKSTÄDER
SWEDEN

Skivfilter ϕ5000
Centrumaxel smst.
DELN 405 DI-700
DISCFILTER ϕ5000
CENTRESHAFT ASSEMBLY

Total vikt Total weight	Ersättes av Replaced by
Ersätter Replaces drwg.	Reg.

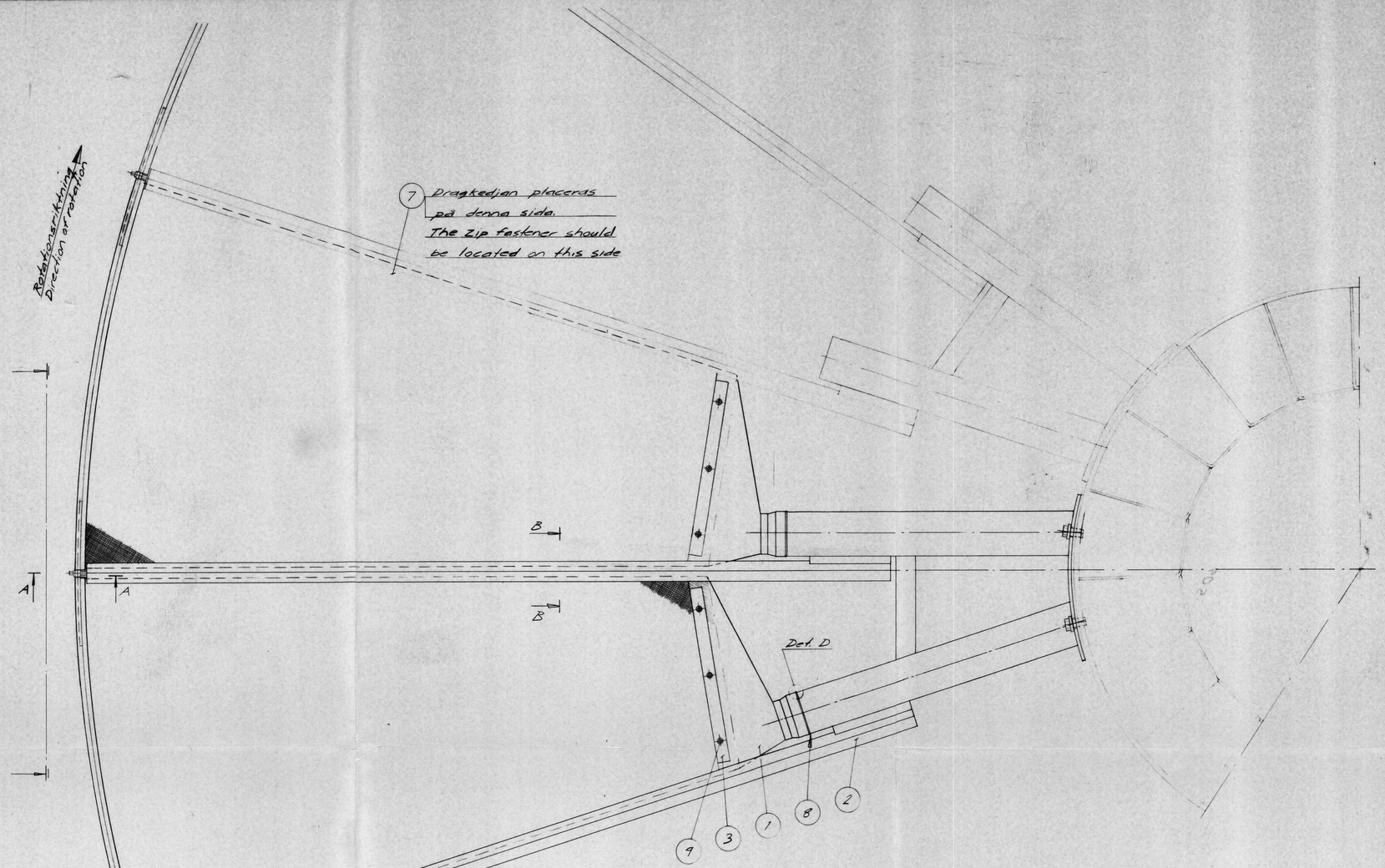
1-85 326

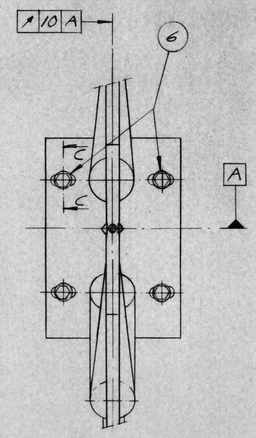
1-85 326

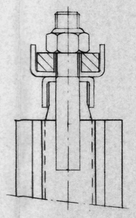
Där ej annat angives gäller
Unless specified the following is valid

Ytjämnhet Ra µm Surface roughness	Tolerans för Tolerance for	
Skarpa kanter brytes ___ mm Sharp edges to be dressed	Bearb. yta Machined surface	SMS 715=ISO 2768 Serie medel Medium series
	Obearb. yta Unmachined surface	SMS 715=ISO 2768 Serie grov Coarse series

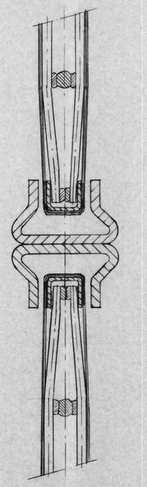
Andr. Rev.	Spec.	Datum Date	Sign.
A	ø65,09 var ø68,26.	880427	



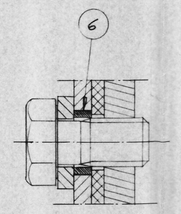




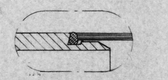
A—A



B—B



C—C



Det. D

Jämför ritn. 1-85 099.

USA: STANDARD 880316

Utf B reservkassetter (2st)
Design B is spare cassettes (two of).

Jfr. 1-84734

Description				Det. No.	Benämning och nettodim. Description and net dim.	Ritn. Drwg.	Material	Vikt Weight	Anm. Note
Loc nut		—	2	10	Låsmutter 5/16" UNC	2343			
Loc nut		12	12	9	Låsmutter 1/4" UNC	2343			
O-ring		2	2	8	O-ring ø65,09 × 3,53	EPDM Gummi 60 Shore			
Filter bag		2	2	7	Dukpåse	1-84017-B			
Guide bush		—	2	6	Centreringsbricka	3-84733		0,005	
Guide bar		—	2	5	Styrlist	3-85087		0,34	
Guide rail		—	2	4	Styrprofil	2-85086		0,6	
Clamping ledge		4	4	3	Klamlist	3-84751		0,2	
Cassette frame		—	1	2	Kassettkällare	1-86644		17,3	
Cassette		2	2	1	Kassett	1-86645		10,2	

Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst.

Utf./Ant. Design/Number
Ritad Drawn: 880301 KrB
Skala Scale: 1:5, 1:1
Kontr. Checked

HEDEMORA
HEDEMORA AB
SWEDEN

SKIVFILTER ø5000
Dubbelsektor 6/12
Sammanställning
DISC FILTER ø5000
Twin sector 6/12 Ass. drwg.

Total vikt Total weight: 38,7 kg
Ersätter Replaces drwg.
Ersättes av Replaced by
Reg. av Reg. by

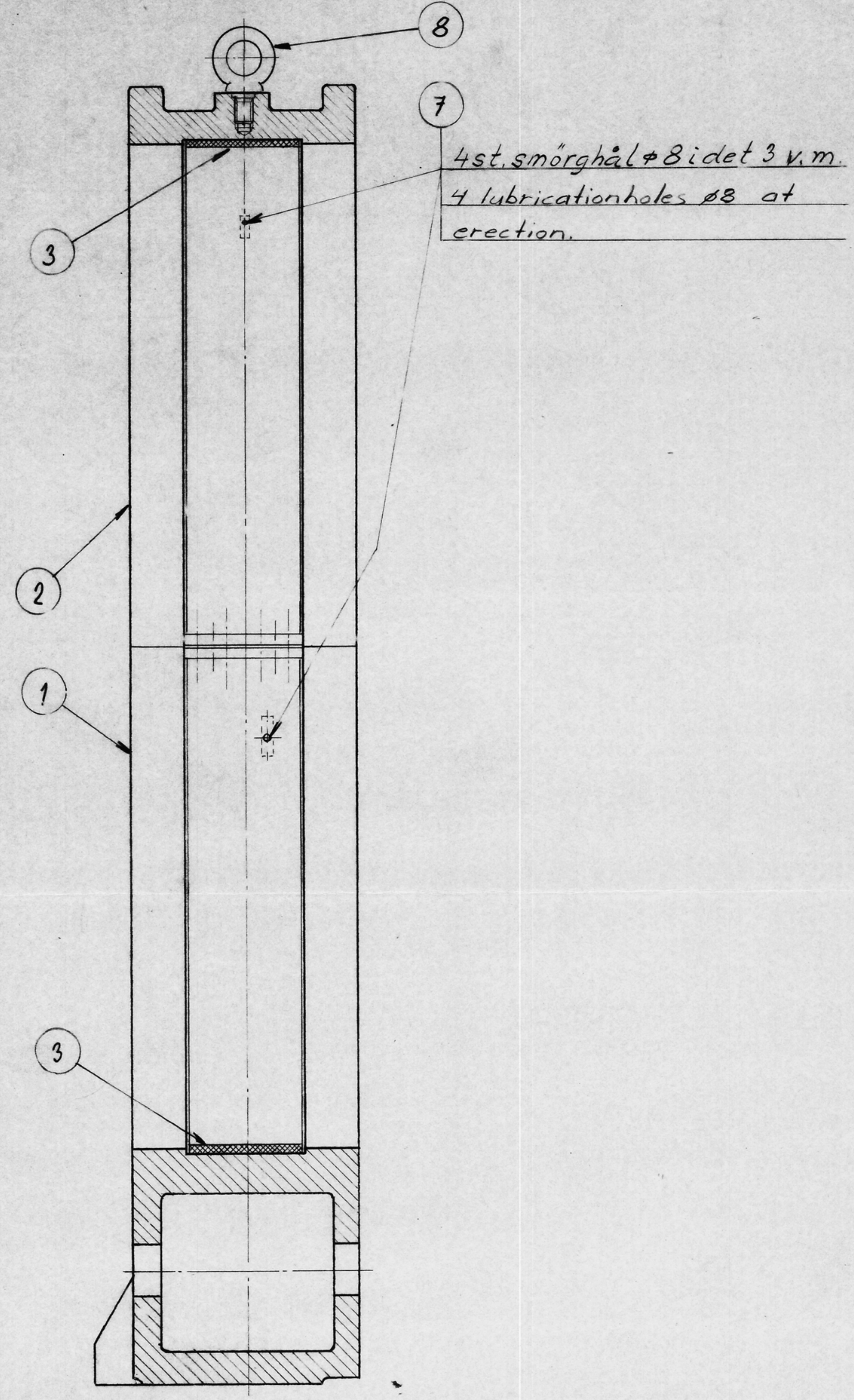
1-86 642 A

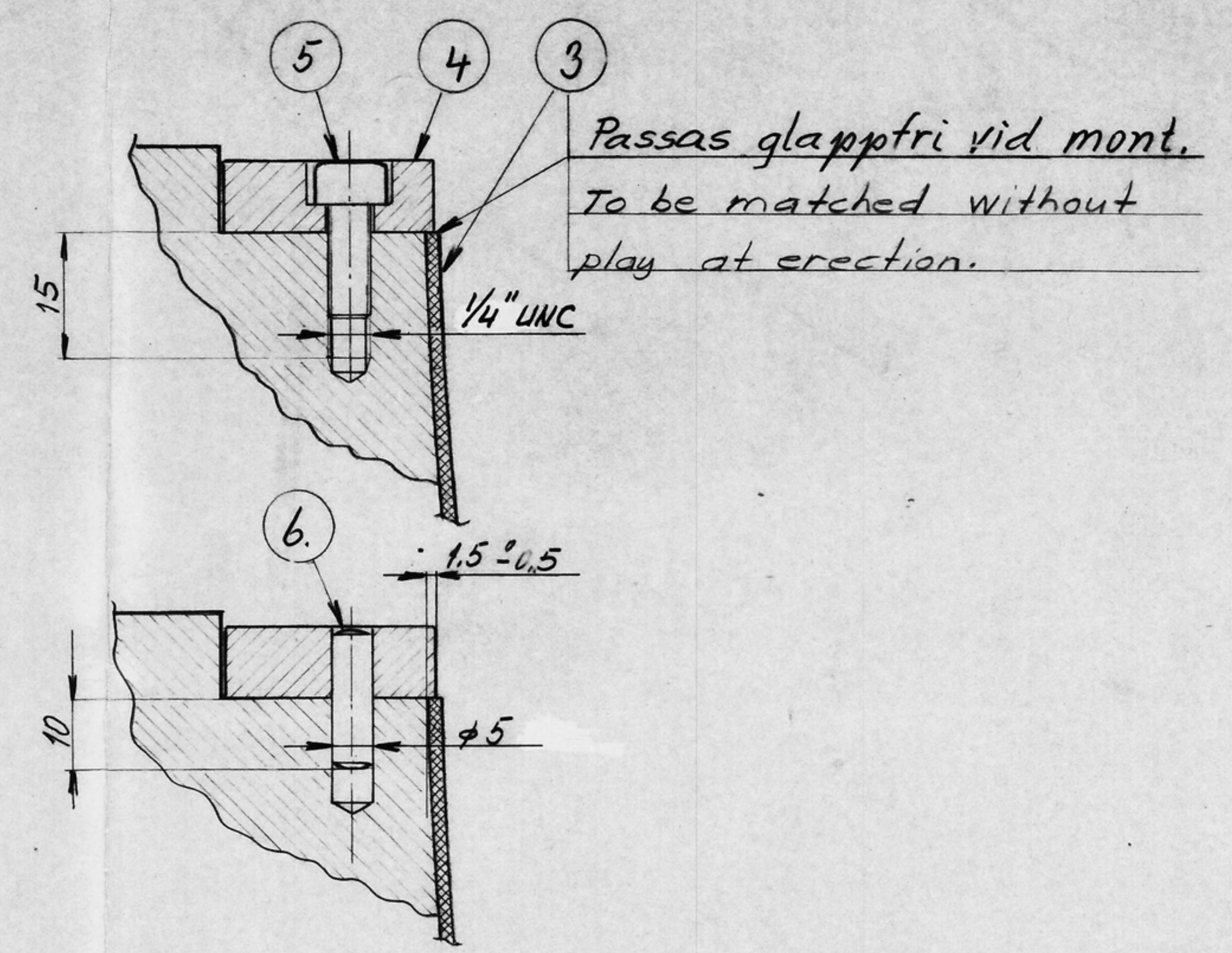
1-86 642

2-85 328

Där ej annat angives gäller Unless specified the following is valid		
Ytjämnhet Ra µm Smoothness	Tolerans för Tolerance for	
Skarpa kanter brytes .... mm Sharp edges to be dressed	Bearb. yta Machined surface	SMS 715=ISO 2768 Serie medel Medium series
	Obearb. yta Unmachined surface	SMS 715=ISO 2768 Serie grov Coarse series

Ändr. Rev.	Spec.	Datum Date	Sign.





Jämför ritn. 2-74102

USA: STANDARD

Före montaget infettas det. 3 med smörjfett Mobil Plex 48.

Detail 3. is to be lubricated with grease Mobil Plex 48 before erection.

A	Det. No.	Benämning och nettodim. Description and net dim.	Ritn. Drwg.	Material	Vikt Weight	Anm. Note Description
1	8	Lyftögla LT 3/4" UNC	SS 1915	-	1,0	Eye bolt nut
4	7	Smörjnippel "AH KR1/8"	SMS 1568	-	-	Lubricant nipple
8	6	Pinne CP-h6 5x20	SMS 2374	1650-06	-	Pin
16	5	Skruv UGS 1/4" UNC x 16		8.8 f.z.b.	-	Screw
4	4	Klämlist	3-74105		1,0	Clamping ledge
2	3	Lagerskålshalva	2-74104		10	Bearing cup
1	2	Överdel	1-85336-2		350	Upper part
1	1	Underdel	1-85336-1		400	Lower part

Antal Number	Ritad Drawn 880223 KrB	Skivfilter ⌀ 5000 Centrumaxel Glidlager ⌀1125 Smst. Disc filter ⌀5000 Plainbearing Ass. drwg.	Total vikt Total weight 762 kg	Ersättes av Replaced by
Skala Scale 15/12 82 Bela	Kontr. Checked		Ersätter Replaces drwg.	Reg. av Reg. by R

HEDEMORA
AB HEDEMORA VERKSTÄDER
SWEDEN

2-85 328

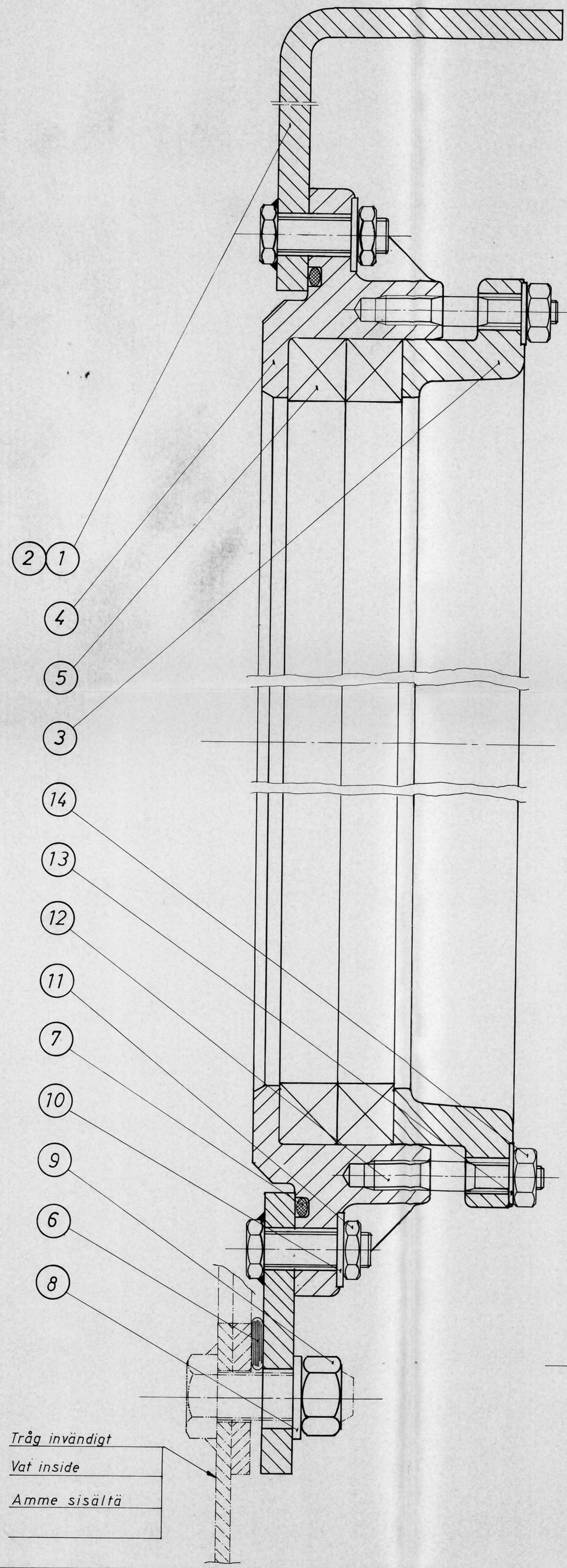
Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Grp.	Smst.	Anm.

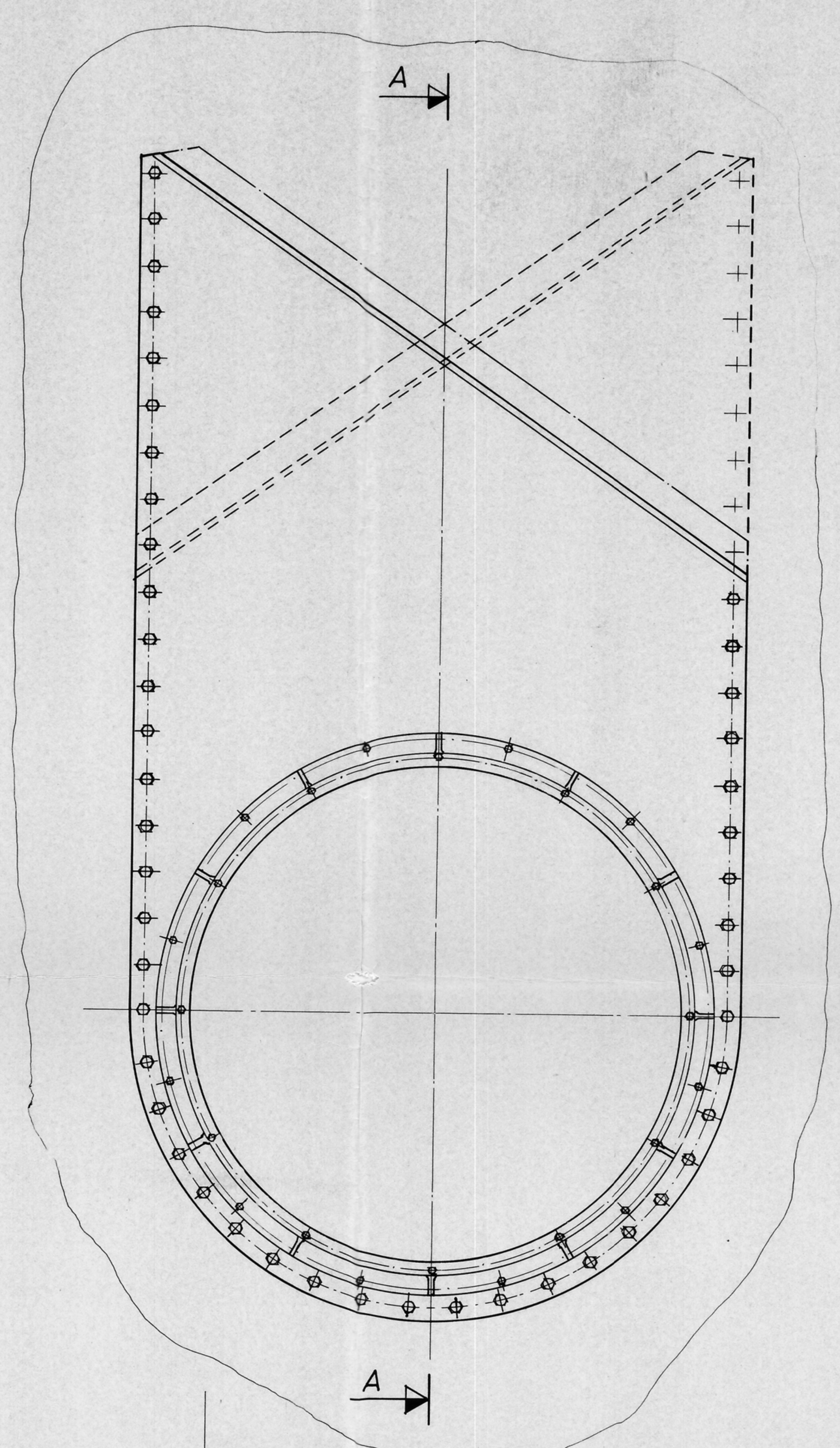
Barklunds, Sthlm. 82.01. 1000 ex. Velvetex VT 20 58046

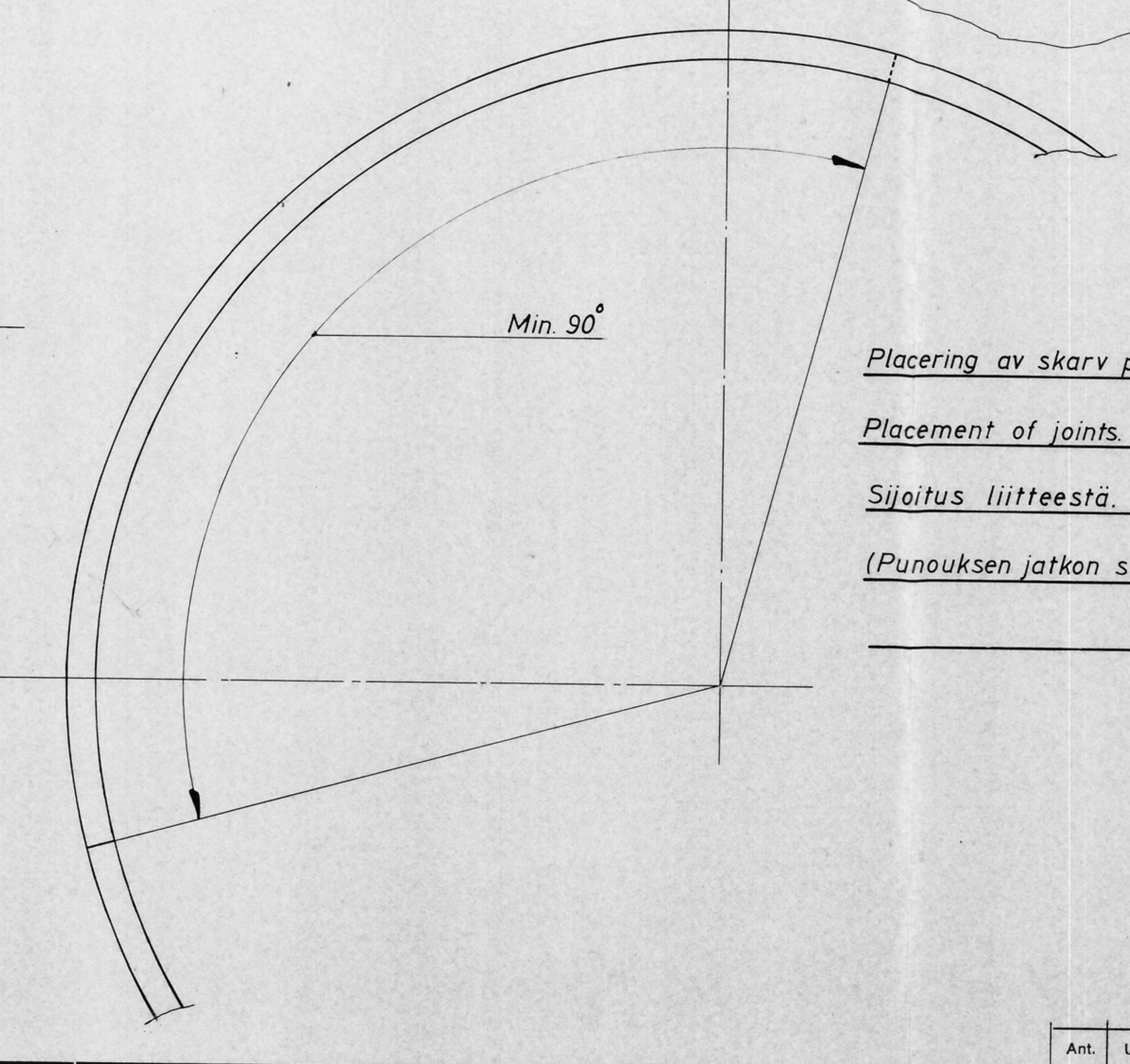
Där ej annat angives gäller / Unless specified the following is valid		
Ytjämnhet Ra µm / Surface roughness		Tolerans för / Tolerance for
Skarpa kanter brytes ___ mm / Sharp edges to be dressed	Bearb. yta / Machined surface	SMS 715=ISO 2768 Serie medel / Medium series
	Obearb. yta / Unmachined surface	SMS 715=ISO 2768 Serie grov / Coarse series

Ändr. / Rev.	Spec.	Datum / Date	Sign.

A - A







Not.1 Packningarna det 5 monteras med skarvarna förskjutna min. 90°. Glandret åtdrages så att packningarna kommer i rätt läge, därefter lossas glandret och åtdrages erforderligt för tätning. Flätan skall vara ca 225 mm för lång när den skall monteras i tätningsboxen.

Note.1 The stuffing boxes item 5 will be assembled with the joints displaced min.90°. Tighten the flange untill the packings reaches the final position. After that loosen the nuts and retighten to obtain sealed condition. The packings should be about 225 mm to long when mounting it.

Not.1 Tiiviste saumat 5 asennetaan vähintään min. 90° toisistaan. Laippa kiristetään, että tiivisteet asettuvat oikein paikalleen. Laippa iroitetaan ja sen jälkeen kiristetään tasaisesti. Täytyy olla noin 225 mm ylipitkä, kunse asennetaan tiivisteboxsiin.

USA:
STANDARD
1988-01-13 JE

Placering av skarv på flätorna.
Placement of joints.
Sijoitus liitteestä.
(Punouksen jatkon suoriitaminen)

Utf. A. Medurs rotation / Utf. B. Moturs rotation / Jmfr. ritn. 2-85662 (Utf. B enl. ritn.)
Design B Counter clock-wise rotation / Design A Clock-wise rotation.
Suoritus B. Takaisin / Suoritus A Ympäri

Jämför 1-86038

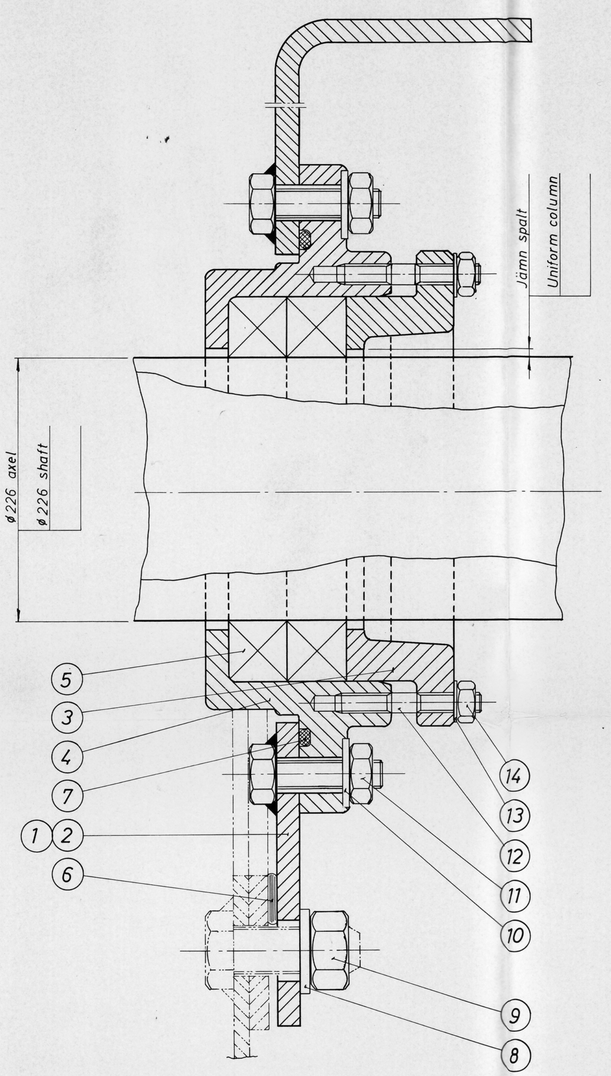
			C	B	A	Det. No.	Benämning och nettodim. / Description and net dim.	Ritn. / Drwg.	Material	Vikt / Weight	Anm. / Note
	Mutteri	Nut		12	12	14	UGM 3/8" UNC		2343		
	Levy	Wascher		12	12	13	BRB 10,5 x 22	SMS 70			154210648
	Ruuvi	Stud bolt		12	12	12	UHGS 3/8" UNC x 65				
	Mutteri	Nut		12	12	11	UGM 1/2" UNC				
	Levy	Wascher		12	12	10	BRB 13,5 x 24	SMS 70			154210649
	Mutteri	Nut		47	47	9	UGM 5/8" UNC				
	Levy	Wascher		47	47	8	BRB 17 x 30	SMS 70	2343		154210650
	O-rengas naru	O-ring string		1	1	7	O-ringssnöre ~1200 x 5,7		EPDM		15120360
	Tiiviste	Gasket		1	1	6	Kronlist 15 x 8 L=5116	Cellgummi EPDM Rygum L=5275			154250040
	Tiiviste	Stuffing box pack		2	2	5	Packboxfläta ⌑ 19 L=3820	Lattyflon 4789 L=4200			154250072
	Tiivisteboxsiin	Stuffing box		1	1	4	Packbox	1-86655			15120629
	Laippa	Flange		1	1	3	Gland	1-84262			15120632
	Kilpi	Shield		1	–	2	Sköld	1-86654			
	Kilpi	Shield		–	1	1	Sköld	1-86653			
	Kannake	Description									

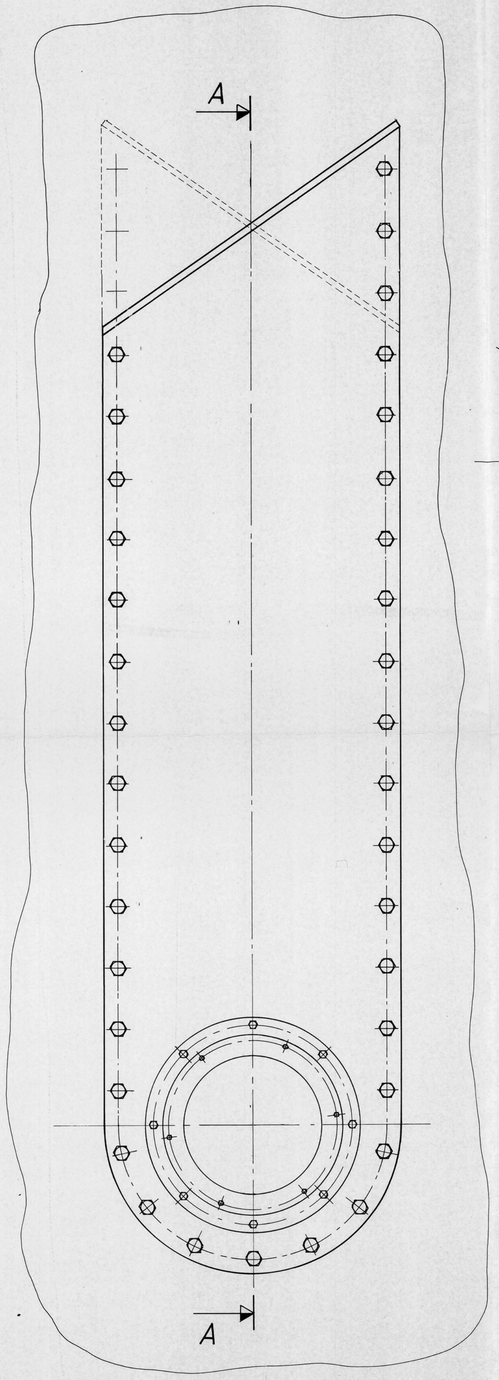
Utf./Ant. Design/Number	Ritad / Drawn: 880315 KrB	SKIVFILTER ø 5000	Total vikt / Total weight	Ersättes av / Replaced by
Skala / Scale: 1:20, 1:10, 1:1	Kontr. / Checked	Axeltätning ø 1125	Ersätter / Replaces drwg.	Reg. av / Reg. by
HEDEMORA — HEDEMORA AB SWEDEN		Högt tråg		Ändr. / Rev.
		Smst.	1- 86 652	

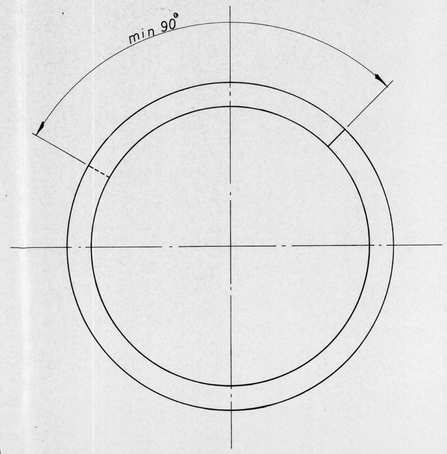
Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst

1- 86 652

A–A







Placering av skarv på flätorna.

Placement of joints.

Där ej annat angives gäller Unless specified the following is valid		
Ytjämnhet Ra µm Surface roughness	Tolerans för Tolerance for	
Skarpa kanter brytes ____ mm Sharp edges to be dressed	Bearb. yta Machined surface	SMS 715=ISO 2768 Serie medel Medium series
	Obearb. yta Unmachined surface	SMS 715=ISO 2768 Serie grov Coarse series

Ändr. Rev.	Spec.	Datum Date	Sign.

Not.1 Packningarna det. 5 monteras med skarvarna förskjutna min. 90°
Glandret åtdrages så att packningarna kommer i rätt läge,
därefter lossas glandret och åtdrages erforderligt för tätning.
Flätan skall vara ca: 50 mm för lång när den skall monteras
i tätningsboxen.

Note.1 The stuffing boxes item 5 will be assembled with the joints displaced min. 90°. Tighten the flange untill the packings reaches the final position. After that loosen the nuts and retighten to obtain sealed condition. The packings should be about: 50 mm to long when mounting it.

USA:
STANDARD
1987-11-12 JE

Ⓐ Utf. B. Moturs rotation / Design B. Counter clock-wise direction
Utf. A. Medurs rotation / Design A. Clock-wise direction.
Jfr. ritn. 1-85666 / Comp. drwg. 1-85666

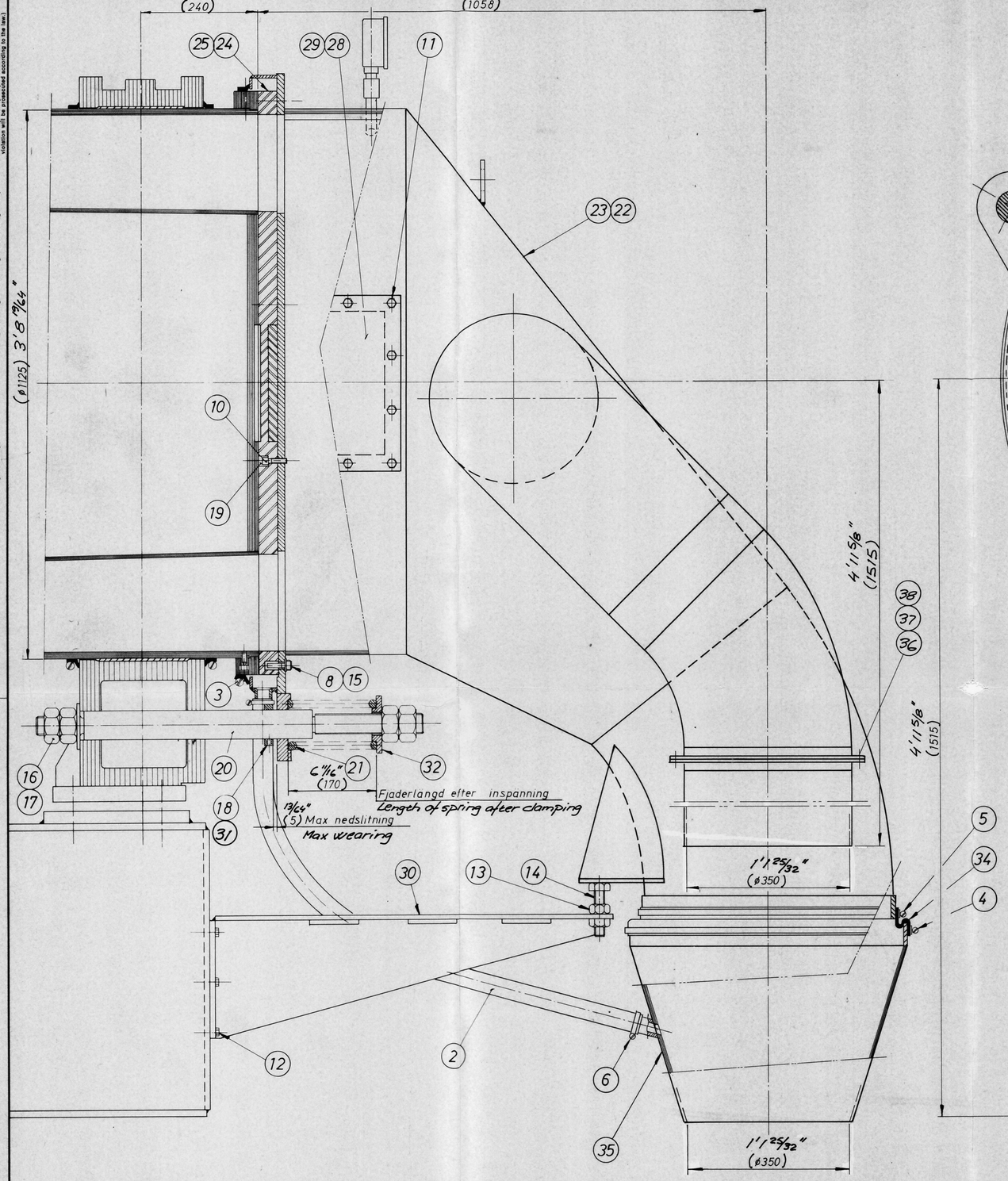
Jämför 1-85 663.

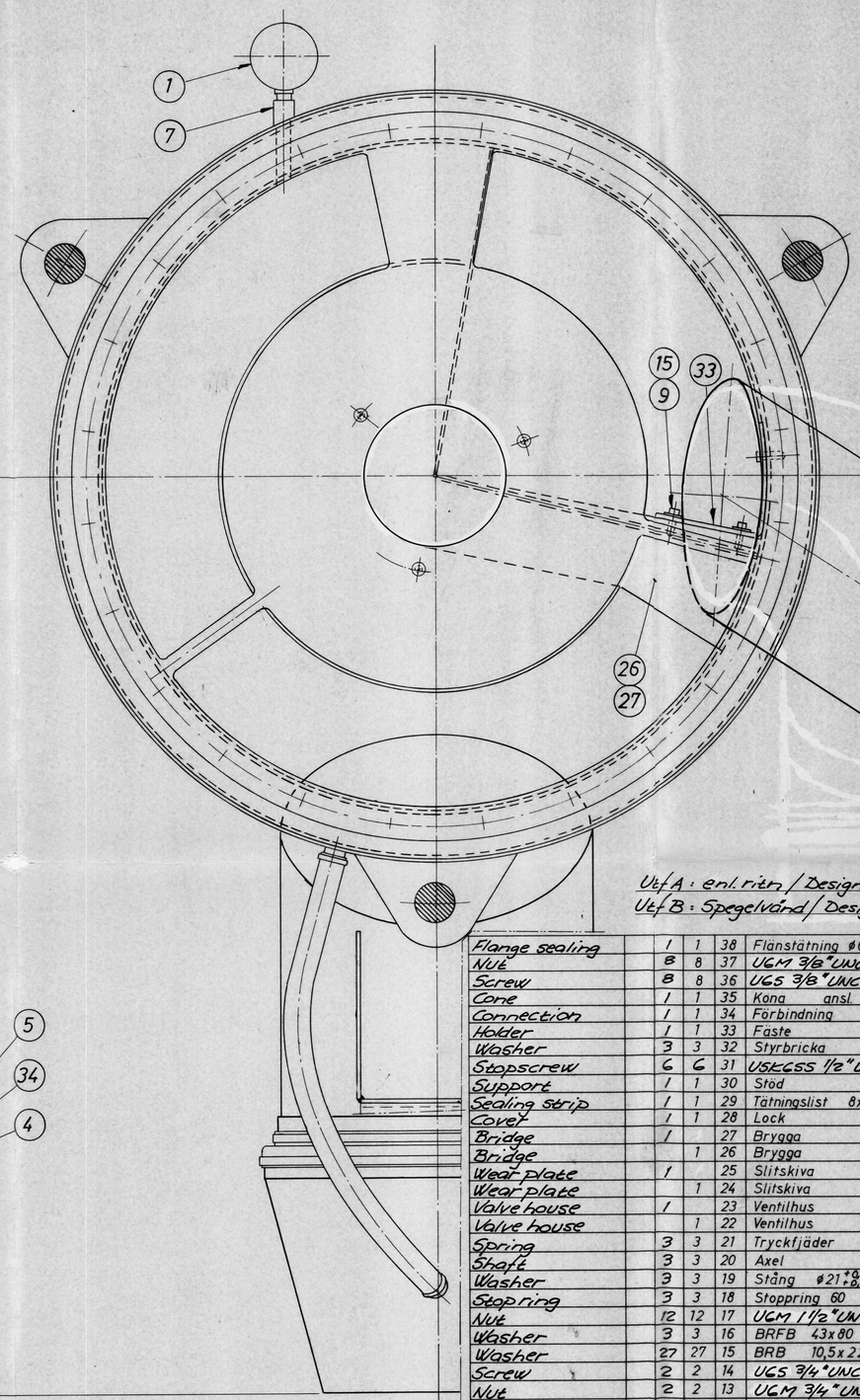
	Nut		6	6	14	UGM 5/16"UNC		2343		
	Washer		6	6	13	BRB 8,4x16	SMS 70			154210647
	Stud bolt		6	6	12	UHGS 5/16"UNC x 50				
	Nut		8	8	11	UGM 3/8"UNC				
	Washer		8	8	10	BRB 10,5 x 22	SMS 70			154210648
	Nut		36	36	9	UGM 5/8"UNC				
	Washer		36	36	8	BRB 17x30	SMS 70	2343		154210650
	O-ring		1	1	7	O-ring 299,3 x 5,7		EPDM		15120357
	Gasket		1	1	6	Kronlist 15x8 L=3496	Cellgummi	EPDM L=4000		154250040
	Stuffing box packing		2	2	5	Packboxfläta ϕ19 L=820	L=1000	Lattyflon 4789		154250072
	Stuffing box		1	1	4	Packbox	1-86651			
	Gland		1	1	3	Gland	1-84264			15120631
	Shield		1	—	2	Sköld	1-86649			
	Shield		—	1	1	Sköld	1-86648			
C	B	A	Det. No.			Benämning och nettodim. Description and net dim.	Ritn. Drwg.	Material	Vikt Weight	Anm. Note

Utf./Ant. Design/Number		Ritad Drawn. 880315 KFB	SKIVFILTER ϕ5000 Axeltätning ϕ226 Högt tråg Smst	Totai vikt Total weight	Ersättes av Replaced by
Skala Scale 1:1, 1:25, 1:5		Kontr. Checked		Ersätter Replaces drwg.	Reg. av Reg. by
HEDEMORA ☆ HEDEMORA AB SWEDEN				1-86 650	Ändr. Rev.

Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst

1-86 650





Jmfr. 1-85763

Utf A: enl. ritn / Design A: according to drug. (Clockwise rot.)
Utf B: Spegelvänd / Design B: mirror inverted (Anti-Clockwise rot.)

c/c outlet = 5'3"
c/c utlopp = 1600

Description	C	B	A	Det. No.	Benämning och nettodim. Description and net dim.	Ritn. Drwg.	Material	Vikt Weight	Anm. Note
Flange sealing		1	1	38	Flänstätning ø6,4 x 1160		Gore-tex		
Nut		8	8	37	UGM 3/8"UNC		2343		
Screw		8	8	36	UGS 3/8"UNC x 3/4"		2343		
Cone		1	1	35	Kona ansl. 350	2-76839			
Connection		1	1	34	Förbindning	D-11735			
Holder		1	1	33	Fäste	3-76424			
Washer		3	3	32	Styrbricka	3-67121			
Stopscrew		6	6	31	USKGSS 1/2"UNC x 3/4"		2343		
Support		1	1	30	Stöd	1-86724			
Sealing strip		1	1	29	Tätningslist 8x3x1020		EPDM		
Cover		1	1	28	Lock	3-74254			
Bridge		1		27	Brygga	2-86732			
Bridge			1	26	Brygga	2-86731			
Wear plate		1		25	Slitskiva	1-86730			
Wear plate			1	24	Slitskiva	1-86729			
Valve house		1		23	Ventilhus	1-86728			
Valve house			1	22	Ventilhus	1-86727			
Spring		3	3	21	Tryckfjäder	D-11617			
Shaft		3	3	20	Axel	3-86720			
Washer		3	3	19	Stång ø21 +0,5 +0,2 x 10		HD-1000 polyeten		
Stopring		3	3	18	Stoppring 60	3-84067			
Nut		12	12	17	UGM 1 1/2"UNC		fzv		
Washer		3	3	16	BRFB 43x80		fzv		
Washer		27	27	15	BRB 10,5x22		2343		
Screw		2	2	14	UGS 3/4"UNC x 4"		2343		
Nut		2	2	13	UGM 3/4"UNC		2343		
Screw		6	6	12	UGS 1/2"UNC x 1 1/4"		2343		
Screw		10	10	11	UGS 3/8" x 5/8"		2343		
Screw		3	3	10	UGGS 1/2"UNC x 1 1/2"		2343		
Screw		3	3	9	UGGS 3/8"UNC x 1"		2343		
Screw		24	24	8	UGGS 3/8"UNC x 1 1/2"		2343		
Socket		1	1	7	Muff R1/2" RM 110		2343		
Hose clamp		2	2	6	Slangklämma S ø45x20 Skz		2343		Norma
Hose clamp		1	1	5	Slangklämma ø520		2333		PA-RI
Hose clamp		1	1	4	Slangklämma ø580		2333		PA-RI
V-ring		1	1	3	V-ring 1200 A spec	D-30600 D-30601			Forsheda
Hose		1	1	2	Sug och returslang nr.1041-20	L=1400 Synt gummi			Wira
Pressure gauge		1	1	1	Dämpvätskefylld manometer	ansl. NPT 1/2" ø100			grad -1 till 10 bar

Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst
1	.	Ponderay Newsprint	7088 2318	V. 837	12/4-88 MW	1-85784
1	B	Ponderay Newsprint	7088 2324	V. 837	12/4-88 MW	1-86608
1	B	Ponderay Newsprint	7088 2312	V. 837	12/4-88 MW	1-86607

Utf./Ant. Design/Number: 880322 MK
Ritad Drawn:
Skala Scale: 1:5
Kontr. Checked:

HEDEMORA
HEDEMORA AB
SWEDEN

SKIVFILTER ø5000
Filtratventil ø1125/700
Smst. (Moturs Utf. A / Moturs Utf. B)
DISCFILTER ø5000
Filtratevalve ø1125/700 dwg.

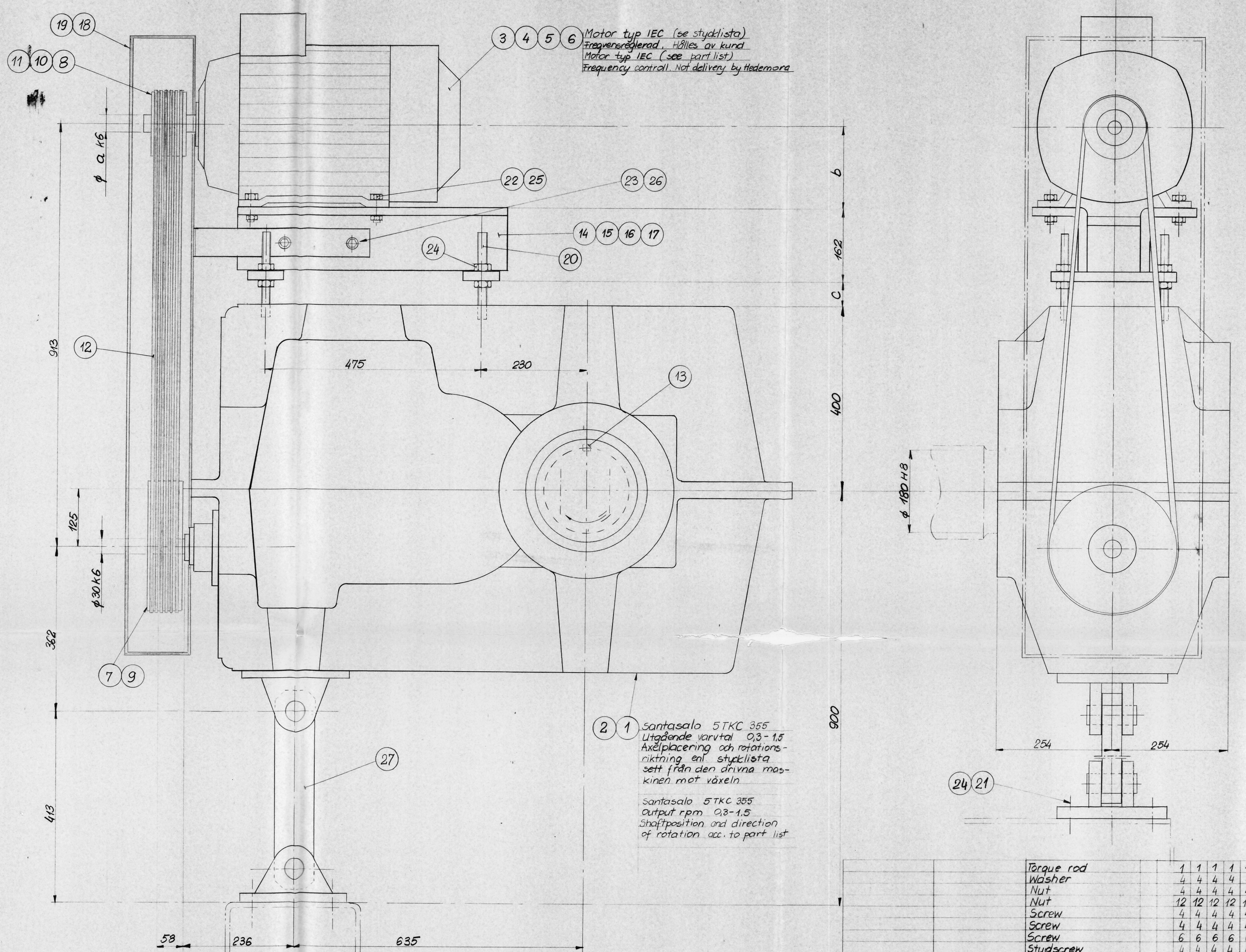
Total vikt Total weight:
Ersättes av Replaced by:
Ersätter Replaces drwg.:
Reg. av Reg. by:
Ass.
1-86726
Andr. Rev.

1-86726

Där ej annat angives gäller Unless specified the following is valid		
Ytjämnhet Ra µm Surface roughness	Tolerans för Tolerance for	
Skarpa kanter brytes ____ mm Sharp edges to be dressed	Bearb. yta Machined surface	SMS 715=ISO 2768 Serie medel Medium series
	Obearb. yta Unmachined surface	SMS 715=ISO 2768 Serie grov Coarse series

Ändr. Rev.	Spec.	Datum Date	Sign.

Där ej annat angives gäller / Unless specified the following is valid			
Ytjämnhet Ra µm / Surface roughness		Tolerans för / Tolerance for	
Skarpa kanter brytes ..... mm / Sharp edges to be dressed	Bearb. yta / Machined surface	SMS 715 = ISO 2768 / Serie medel / Medium series	
	Obearb. yta / Unmachined surface	SMS 715 = ISO 2768 / Serie grov / Coarse series	
Ändr. / Rev.	Spec.	Datum / Date	Sign.



Utf A-D enl. ritn. / Design A-D acc. to drwg. Medurs / clockwise
Utf E-H motsatt ritn. / Design E-H mirror inverted Moturs / anticlock wise

Mått \ Utf.	A	B	C	D	E	F	G	H
a	42	42	48	48	42	42	48	48
b	160	160	180	180	160	160	180	180
c	66	66	46	46	66	66	46	46

Description	H	G	F	E	D	C	B	A	Det. No.	Benämning och nettodim. / Description and net dim.	Ritn. / Drwg.	Material / Anm.	Vikt / Weight	Artik. Nr
Torque rod	1	1	1	1	1	1	1	1	27	Momentstöd HA=413		Santasalo	28	
Washer	4	4	4	4	4	4	4	4	26	BRB 10,5×22		fzb		
Nut	4	4	4	4	4	4	4	4	25	U6M ½" UNC		fzb		
Nut	12	12	12	12	12	12	12	12	24	U6M 1" UNC		fzb		
Screw	4	4	4	4	4	4	4	4	23	U6S ⅜" UNC x 20		fzb		
Screw	4	4	4	4	4	4	4	4	22	U6S ½" UNC x 60		fzb		
Screw	6	6	6	6	6	6	6	6	21	U6S 1" UNC x 60		fzb	1,9	
Studscrew	4	4	4	4	4	4	4	4	20	Pinnskruv 1"x 190		Helgängad	2,9	
V-belt quard	1	1	—	—	1	1	—	—	19	Kilrepsskydd	1-74168 E		5	
V-belt quard	—	—	1	1	—	—	1	1	18	Kilrepsskydd	1-74168 A		5	
Motorbracket	1	—	—	—	1	—	—	—	17	Motorhylla	2-86585 E		~65	
Motor bracket	—	1	—	—	—	1	—	—	16	Motorhylla	2-86585 D		~65	
Motorbracket	—	—	1	—	—	—	1	—	15	Motorhylla	2-86585 C		~65	
Motorbracket	—	—	—	1	—	—	—	1	14	Motorhylla	2-86585B		~65	
Flat key	1	1	1	1	1	1	1	1	13	Plattkil 45×25×270	SMS 2306		2,4	
V-belt	3	3	3	3	3	3	3	3	12	Kilrep 3Vx950				
Bush	1	1	—	—	1	1	—	—	11	Bussning nr 2517 för axel ϕ1⅝"				
Bush	—	—	1	1	—	—	1	1	10	Bussning nr 2517 för axel ϕ 42				
Bush	1	1	1	1	1	1	1	1	9	Bussning nr 2517 för axel ϕ30				
V-belt sheave	1	1	1	1	1	1	1	1	8	Remskiva ϕ6,5" OD			3,55	
V-belt sheave	1	1	1	1	1	1	1	1	7	Remskiva ϕ8,0" OD			15,5	
Motor	(1)	—	—	—	(1)	—	—	—	6	Motor Reliance 256 T		Hålles av kund		
Motor	—	(1)	—	—	—	(1)	—	—	5	Motor IEC 180 M				
Motor	—	—	(1)	—	—	—	(1)	—	4	Motor IEC 160 L				
Motor	—	—	—	(1)	—	—	—	(1)	3	Motor IEC 160 M		Hålles av kund		
Shaft gear	1	1	1	1	—	—	—	—	2	Tappväxel 5 TKC 355 Medursrotation (04)		Santasalo	1450	
Shaft gear	—	—	—	—	1	1	1	1	1	Tappväxel 5 TKC 355 Motursrotation (03)		Santasalo	1450	

Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst
1	D	Ponderay Newsprint	70.88.2312	w. 837		1-86607
1	H	Ponderay Newsprint	70.88.2318	w. 837		1-85784
1	D	Ponderay Newsprint	70.88.2324	w. 837		1-86608

Utf./Ant. Design/Number
Ritad / Drawn: 880915
Kontr. / Checked
Skala / Scale: 1:5

HEDEMORA
HEDEMORA AB SWEDEN

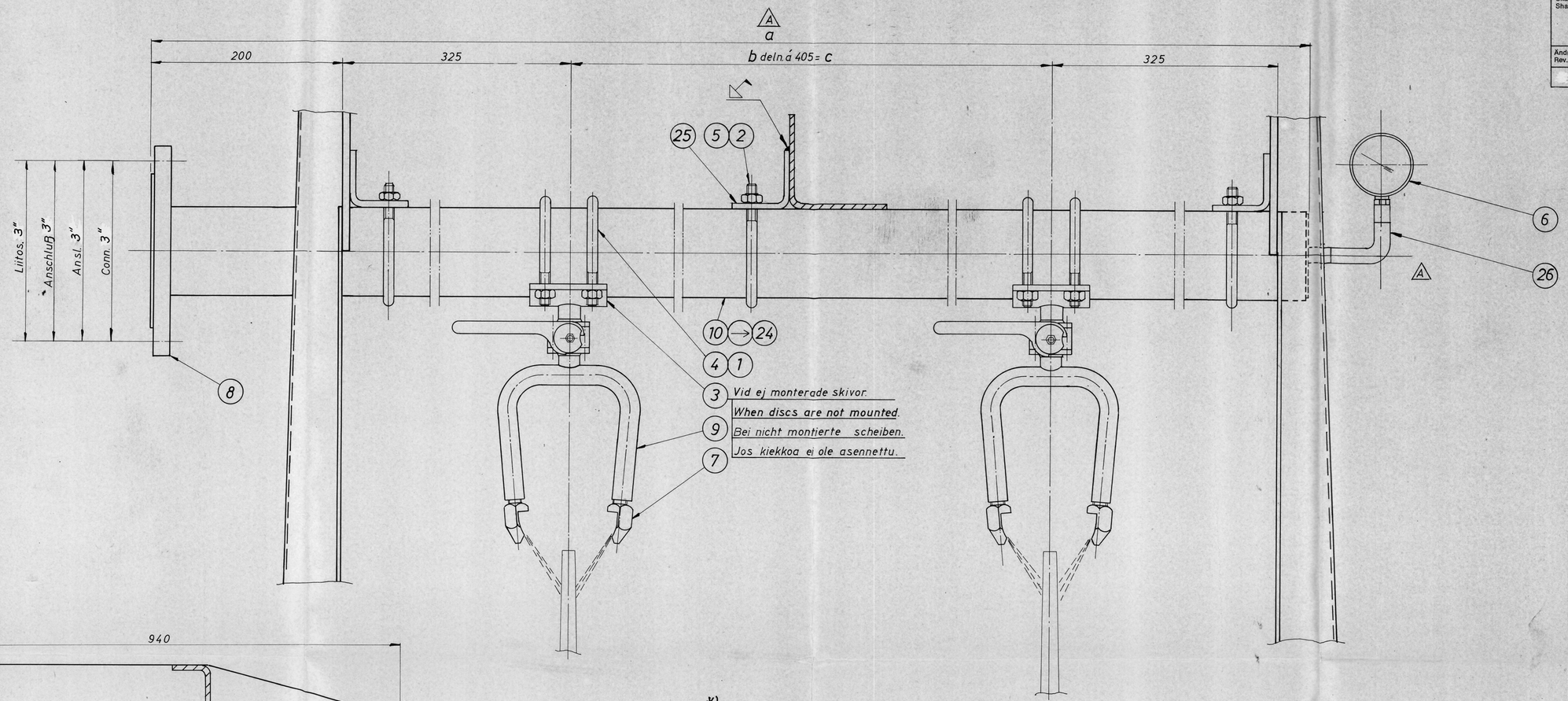
SKIVFILTER ϕ5000
Drift SMST
DISCFILTER ϕ5000
Drive Assy dwg.

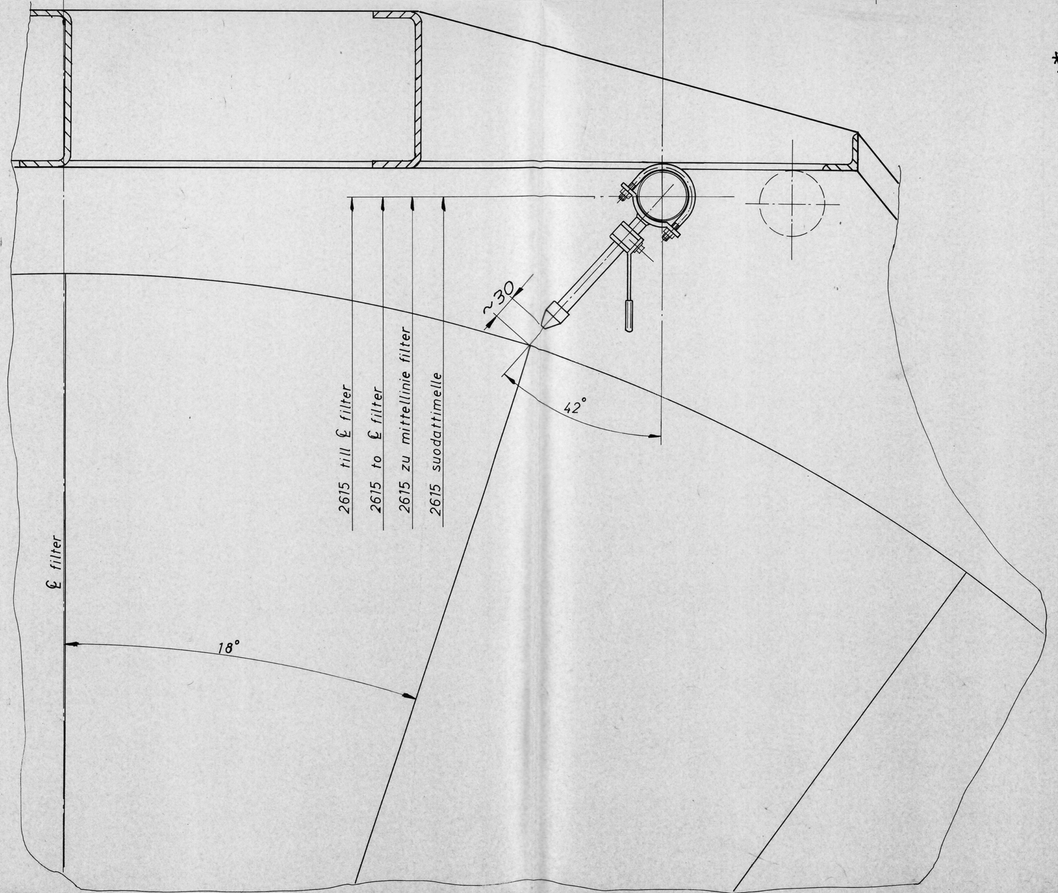
Total vikt / Total weight
Ersättes av / Replaced by
Ersätter / Replaces drwg.
Reg. av / Reg. by
Ändr. / Rev.

1-87753

Där ej annat angives gäller Unless specified the following is valid		
Ytjämnhet Ra µm Surface roughness	Tolerans för Tolerance for	
Skarpa kanter brytes ___ mm Sharp edges to be dressed	Bearb. yta Machined surface	SMS 715=ISO 2768 Serie medel Medium series
	Obearb. yta Unmachined surface	SMS 715=ISO 2768 Serie grov Coarse series

Ändr. Rev.	Spec.	Datum Date	Sign.





*) Gäller antal installerade skivor.
Valied installed discs.
Anzahl gültig für angebaute scheiben.
Koskee asennettujen kiekkojen määrää.

Jämför ritn. 1-86 017.
Jmfr. 1-76818.

		Suoritus	Kiekkojen lkm.
Jako. 405		Aus-führung	Anzahl scheiben
Teilung. 405			
Grad. 405		Design.	Number of discs.
Deln. 405			
a	b	c	Utf.	Antal skivor.
---	---	---	---	---
3715	7	2835	A	8
4120	8	3240	B	9
4525	9	3645	C	10
4930	10	4050	D	11
5335	11	4455	E	12
5740	12	4860	F	13
6145	13	5265	G	14
6550	14	5670	H	15
6955	15	6075	I	16
7360	16	6480	J	17
7765	17	6885	K	18
8170	18	7290	L	19
8575	19	7695	M	20
8980	20	8100	N	21
9385	21	8505	O	22

USA: STANDARD

			Antal skivor / Number of discs / Anzahl scheiben / Kiekkojen lkm.														Det. No.	Benämning och nettodim. Description and net dim.	Ritn. Drwg.	Material	Vikt Weight	Anm. Note
			22	21	20	19	18	17	16	15	14	13	12	11	10	9	8							
Röörinmutka	Rohr krümmer	Pipe bend	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	26	Gäng böj 90° 1¼" med muff	AJARV120	2343		ansl. 8
Kannake	Konsole	Console	5	5	5	5	5	4	4	4	4	3	3	3	3	3	3	25	Konsol	3-86018			
Jakoputki	Verteilerrohr	Distributing pipe	1															24	Fördelningsrör	2-86381-O			
				1														23		-N			
					1													22		-M			
						1												21		-L			
							1											20		-K			
								1										19		-J			
									1									18		-I			
										1								17		-H			
											1							16		-G			
												1						15		-F			
													1					14		-E			
														1				13		-D			
															1			12		-C			
																1		11		-B			
Jakoputki	Verteilerrohr	Distributing pipe															1	10	Fördelningsrör	2-86381-A			
Haarasuihku	Spritzanordnung	Spray device															*)	9	Spritsanordning	1-73663			
Irtolaippa	Loserflansch	Loose flange	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	Lösfläns Conn. 3"	ANSI	1312		Galv.
Suutin	Spritz düse	Nozzle															*)	7	Spritsdysa NPT 3/8"	P 3530	2346		
Painemittari	Manometer	Pressure gauge	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	Tryckmätare ansl. R1/4", ø 64	0-10 bar			
Kiristin	Schelle	Clamp	5	5	5	5	5	4	4	4	4	3	3	3	3	3	3	5	Klamma	3-83489			
Kiristin	Schelle	Clamp	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16	4	Klamma	3-86647			
Sokealaippa	Blindflansch	Blind flange															*)	3	Blindfläns	3-67530			
Mutteri	Mutter	Nut	10	10	10	10	10	8	8	8	8	6	6	6	6	6	6	2	Mutter U6M 7/16"UNC		2343		
Mutteri	Mutter	Nut	88	84	80	76	72	68	64	60	56	52	48	44	40	36	32	1	Mutter U6M 3/8"UNC		2343		
Nimike	Benennung	Description	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A						

Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst

Utf./Ant. Design/Number	
Skala Scale	1:5, 1:2,5
Ritad Drawn	880304 KrB
Kontr. Checked	

HEDEMORA
HEDEMORA AB
SWEDEN

SKIVFILTER ø 5000
Kakavspolning smst.
Discharge shower
Satzabspülung
Kakun irtiotto

Total vikt Total weight	Ersättes av Replaced by
Ersätter Replaces drwg	Reg. av Reg. by

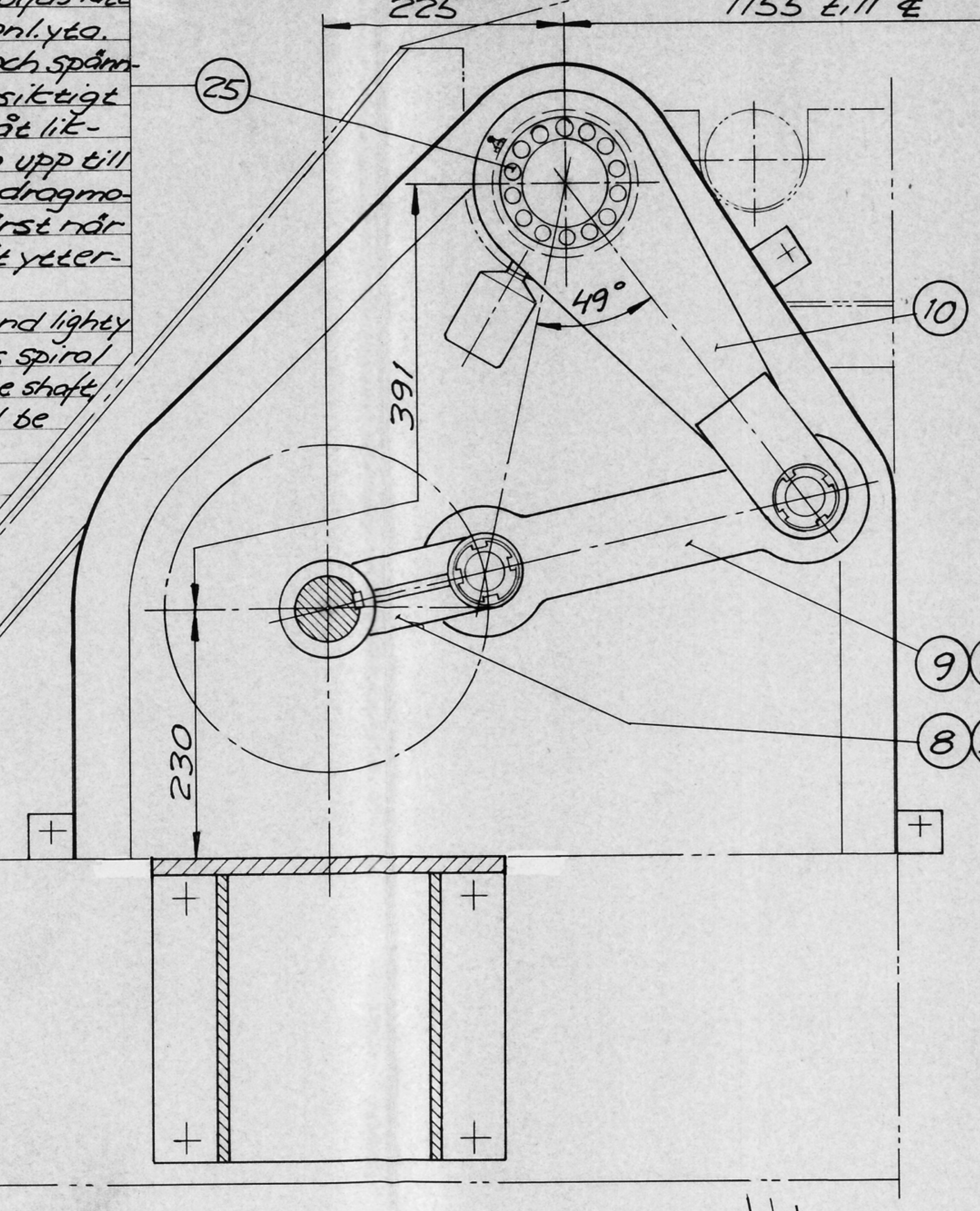
Ändr Rev.

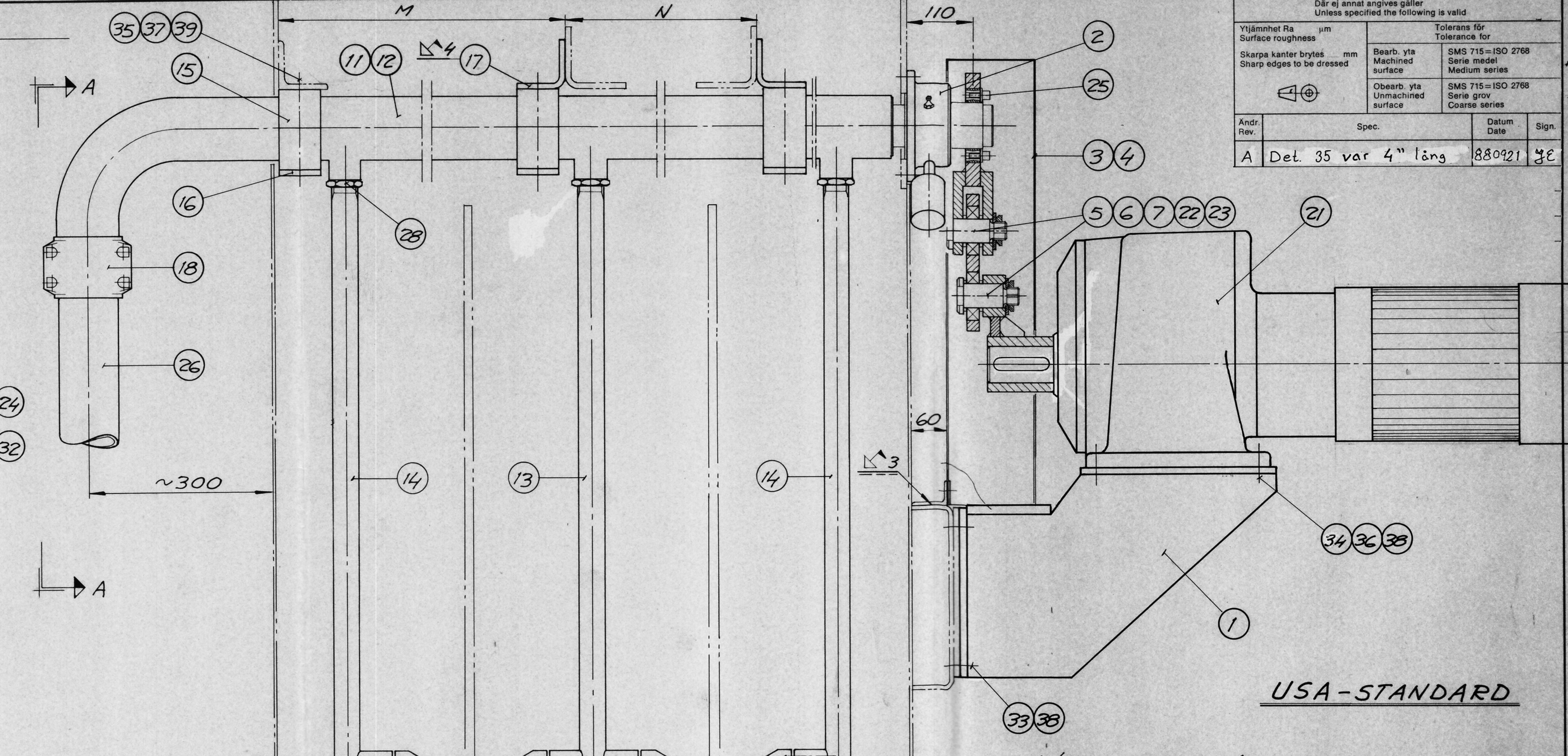
1-86 646

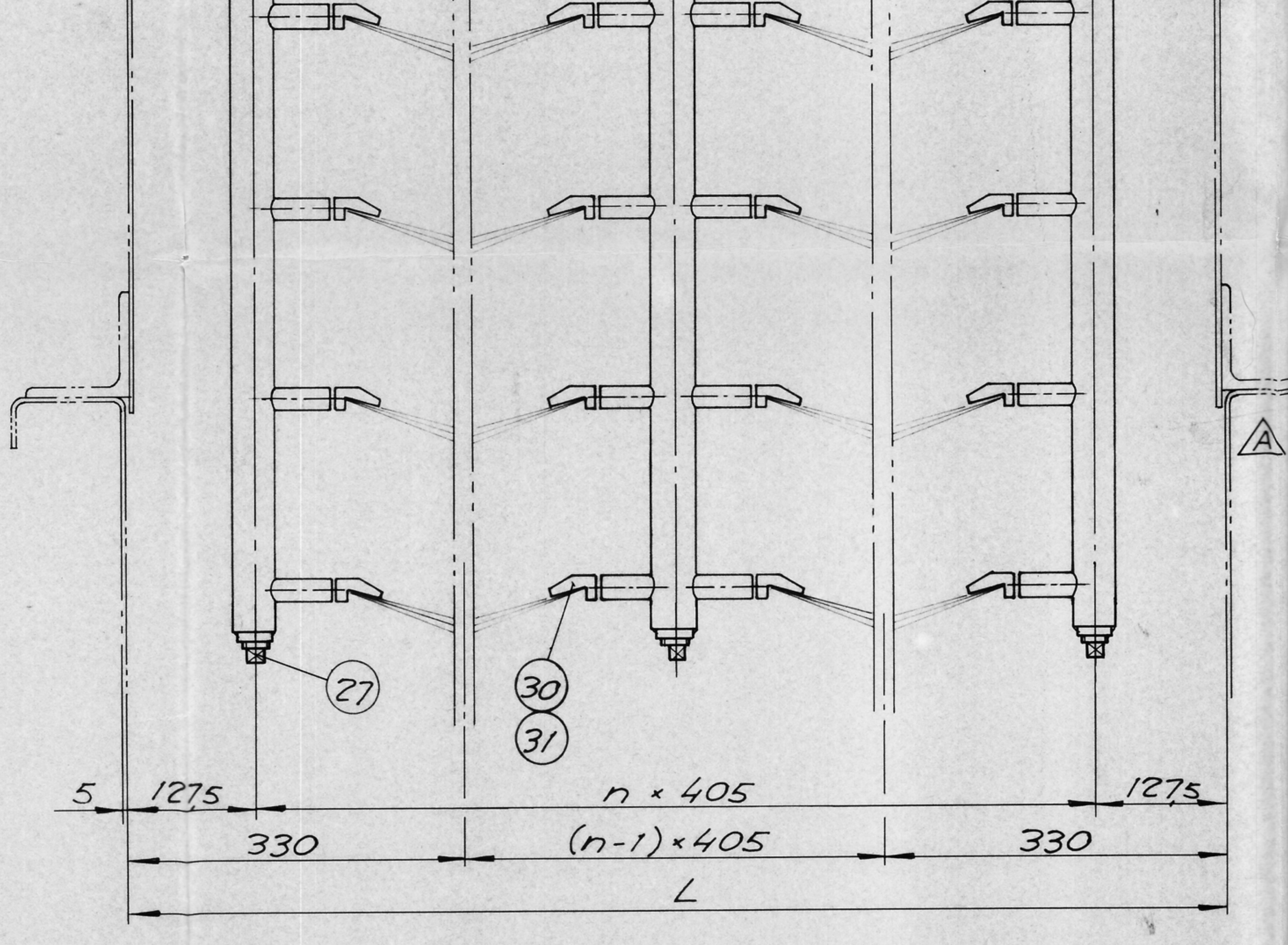
1-86 646

Axeln och navloppet rengöres och inoljas lätt liksom även skruvarnas gänga och anl.yta. Därefter ihopmonteras axel, nav och spännsats. Spännskruvarna dras åt försiktigt och navet riktas. Skruvarna dras åt likformigt och korsvis i 2 till 3 steg upp till dragmoment 70 Nm. Skruvarnas dragmoment kontrolleras i ordn.följd. Först när ingen av skruvarna går att dra åt ytterligare, är monteringen klar.

The shaft and the hub are cleaned and lighty rubbed with oil as well as the screws spiral and contact surface. Thereafter the shaft, the hub and the stretchset should be put together. The stretchset are gently tighted uniformed and crosswised for 2 to 3 steps up to an extension strain of 50 ft.lb The screws extension strain are checked in order. When none of the screws can be tighted anymore the assemblage is completed

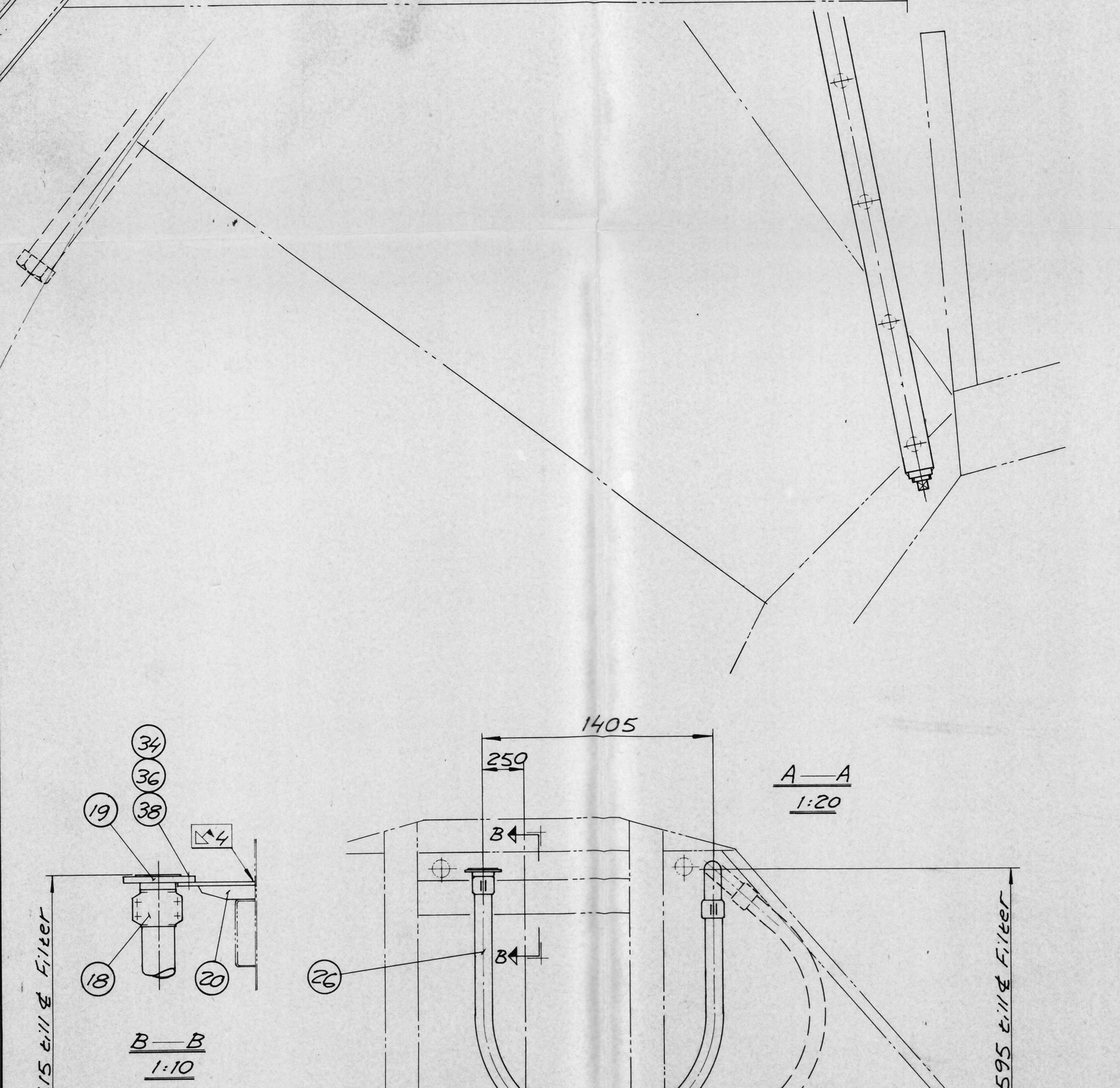






Utf. A: Enl. ritning (moturs rotation)
Utf. B: Spegelvänd (medurs rotation)
Design A: acc. to drawing (Anti-clockwise rot.)
Design B: mirror inverted (Clockwise rot.)
Jmfr. 1-85749

C	B	A	Det No	Benämning och hetdim / Description and het dim	Ritn / Drwg	Material	Vikt / Weight	Description
	×	×	39	Bricka RB13,5×24		2343		Washer
	18	18	38	Bricka BRB 17×30		fzv		Washer
	×	×	37	Mutter UGM ½"UNC		2343		Nut
	7	7	36	Mutter UGM 5/8"UNC		fzv		Nut
	×	×	35	Skruv UGS ½"UNC × 6½"		2343		Screw
	7	7	34	Skruv UGS 5/8"UNC × 2½"		fzv		Screw
	4	4	33	Skruv UGS 5/8"UNC × 1¾"		fzv		Screw
	1	1	32	Stoppskruv USKGSS 3/8"UNC × 5/8"				Stopscrew
	*	*	31	Plugg NPT 3/8"	Sandvik	2343		Plug
	*	*	30	Dysa NPT 3/8"	P3530	2346		Nozzle
			29					
	n+1	n+1	28	Mutter R 1¼"	RM160	2343		Nut
	n+1	n+1	27	Propp R ¾"	RP110	2343		Plug
	1	1	26	Slang TR 25125-80	Trelleborg	L=3700		Hose
	1	1	25	Spännsats BIKON 4000-75-115				Stretching set
	2	2	24	Sf.kullager 2208-2RS1	SKF			Sph. roller bearing
	2	2	23	Axelmutter KM7	SKF			Nut
	2	2	22	Låsbricka MB7	SKF			Washer
	1	1	21	Kuggväxelmotor	TM21A/213TC 2hp			Geared motor
	1	1	20	Slangstöd	2-82967			Hose support
	1	1	19	Slanganslutning	2-84270			Hose conn.
	2	2	18	Klämskal	1-82950			Hose conn.
	×	×	17	Fäste	3-74304			Bracket
	×	×	16	Lagerstöd	3-83105			Bearing support
	×	×	15	Lagerhalva	3-82972			Half bearing
	2	2	14	Spritsrör	2-86274-B			Spray pipe
	n-1	n-1	13	Spritsrör	2-86274-A			Spray pipe
	1		12	Fördeln. rör	2-86273-			Distributing pipe
		1	11	Fördeln. rör	2-86272-			Distributing pipe
	1	1	10	Arm	2-69309			Arm
	1	1	9	Arm	3-86271			Arm
	1	1	8	Verslång	2-86746			Crank elbow
	2	2	7	Tapp	3-69219			Tap
	2	2	6	Bricka	4-69221			Washer
	4	4	5	Bricka	4-78071			Washer
	1		4	Skydd	2-86745			Shield
		1	3	Skydd	2-86744			Shield
	1	1	2	Lager	2-84063			Bearing
	1	1	1	Motorhylla	2-86743			Motor bracket



x)

Antal skivor / Number of discs	n	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Antal/Number	Det. 15	4	4	4	4	4	4	4	4	6	6	6	6	6	6	6
	16	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3
	17	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2
	35	4	4	4	4	4	4	4	4	6	6	6	6	6	6	6
	37	4	4	4	4	4	4	4	4	6	6	6	6	6	6	6
Antal/Number	39	8	8	8	8	8	8	8	8	12	12	12	12	12	12	12
L		3495	3900	4305	4710	5115	5520	5925	6330	6735	7140	7545	7950	8355	8760	9165
M		1282	1282	1687	1687	2092	2092	2497	2497	2497	2497	2902	2902	3307	3307	3307
N										1711	2116	1711	2116	1711	2116	2521

Ant.	Utf.	Anläggning	Best nr	Lev.	Utlämnad	Anm. Smst

Ritad / Drawn: 880329 MK
Skala / Scale: 1:20, 1:5, 1:10
Kontr / Checked:

Skivfilter ⌀5000 ANS
Högt tråg 8-22 skivor
Duksprits smst
Discfilter ⌀5000 ANS
Wire cleaning shower, ass.drwg

HEDEMORA
HEDEMORA AB
SWEDEN

Total vikt / Total weight:
Ersättes av / Replaced by:
Ersätter / Replaces drwg:
Reg. av / Reg. by:

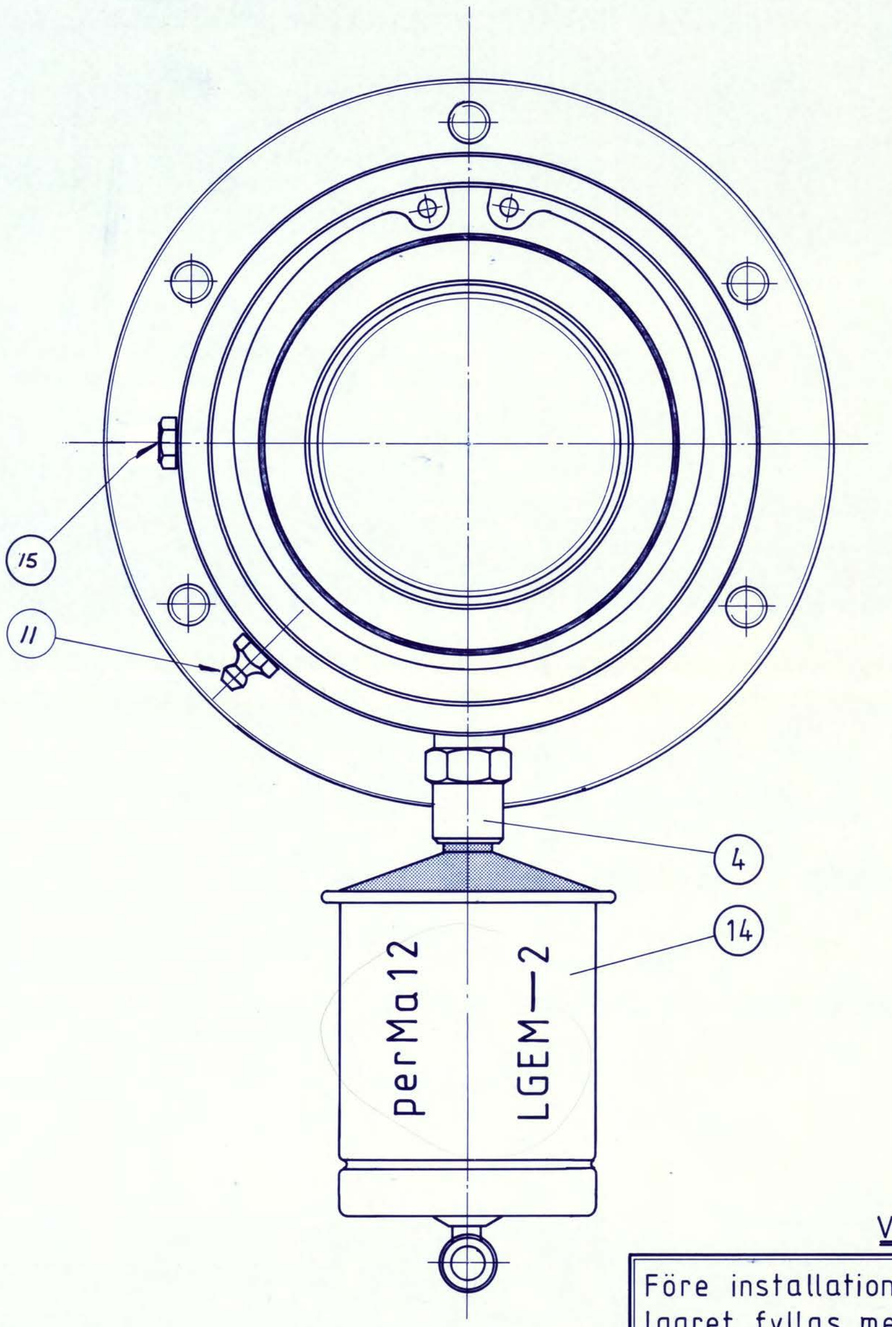
1-86742 Andr / Rev. A

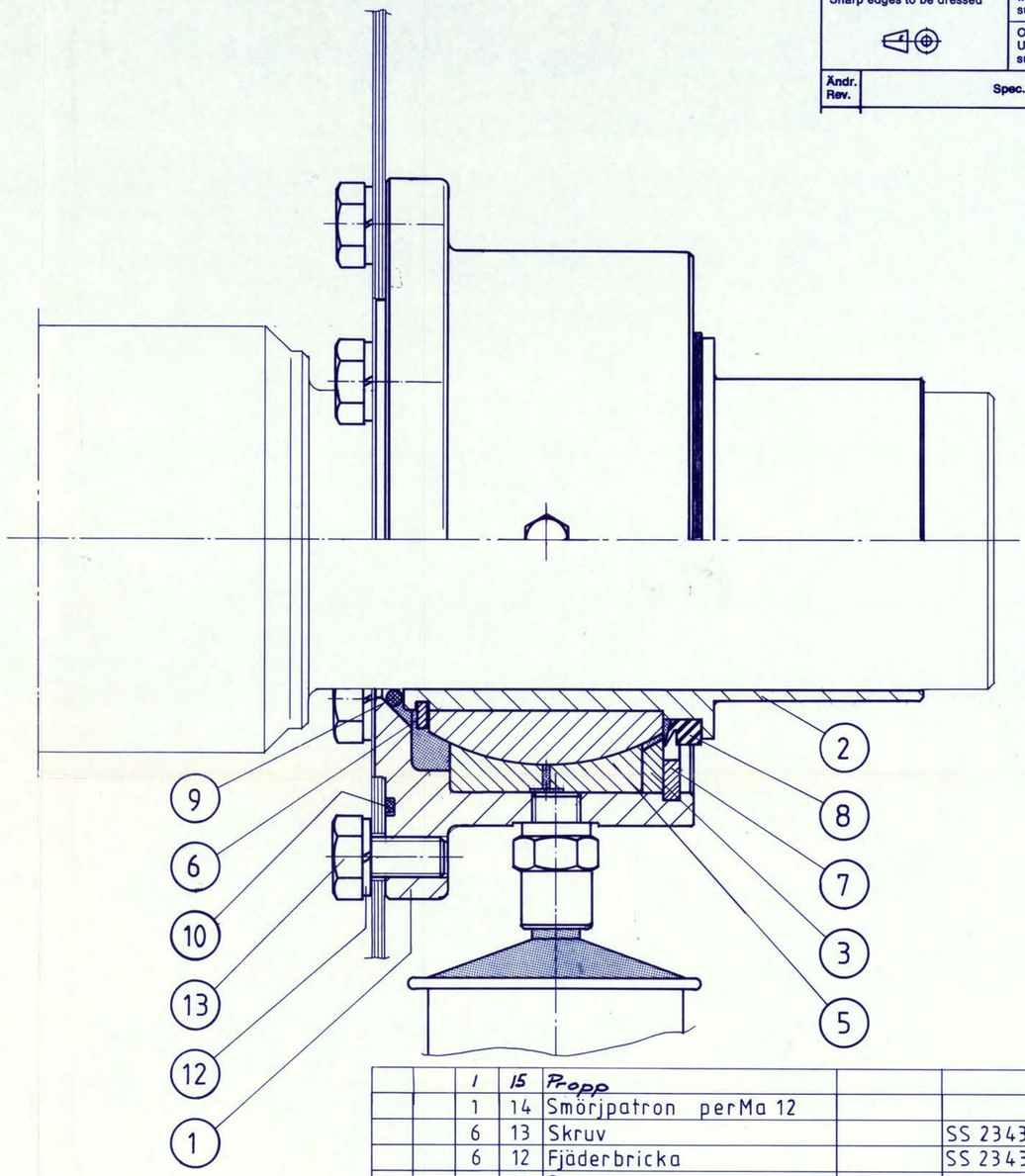
1-86742

Där ej annat angives gäller
Unless specified the following is valid

Ytjämnhet Ra µm Surface roughness	Tolerans för Tolerance for	
Skarpa kanter brytes ..... mm Sharp edges to be dressed	Bearb. yta Machined surface	SMS 715 = ISO 2768 Serie medel Medium series
	Obearb. yta Unmachined surface	SMS 715 = ISO 2768 Serie grov Coarse series

Ändr. Rev.	Spec.	Datum Date	Sign.





C	B	A	Det. No.	Benämning och nettodim. Description and net dim.	Ritn. Drwg.	Material	Vikt Weight	Anm. Note
			1	15	Propp					RP 140 R 1/8"
			1	14	Smörjpatron perMa 12					LGEM 2
			6	13	Skruv			SS 2343		M6S-H 1/2"UNC×22
			6	12	Fjäderbricka			SS 2343		FBB 13
			1	11	Smörjnippel					AH 1/8"-27 PTF
			1	10	O-ring					Φ 123,42 × 3,53
			1	9	O-ring					Φ 70 × 4
			1	8	V-ring					V-85 A
			1	7	Seegersäkring					SgH 120
			1	6	Seegersäkring					A 80 × 2,5V
			1	5	Lager					GE 80 ES-SKF
			1	4	Nippel	3-82334				
			1	3	Bricka	3-82785				
			1	2	Klämhylsa	3-82788				
			1	1	Lagerhus	2-84064				

VIKTIGT

Före installation av smörjpatronen skall lagret fyllas med LITIUM-fett med hjälp av en handspruta

Utf./Ant. Design/Number	Ritad Drawn	SKIVFILTER	Total vikt Total weight	Ersättes av Replaced by
	861218 MK	Dukspritslagring – drivända	Ersätter Replaces drwg.	Reg. av Reg. by
Skala Scale 1:1	Kontr. Checked	Smst.		Ändr. Rev.
HEDEMORA AB SWEDEN	OSC LLATTING Schouler		2-84063	

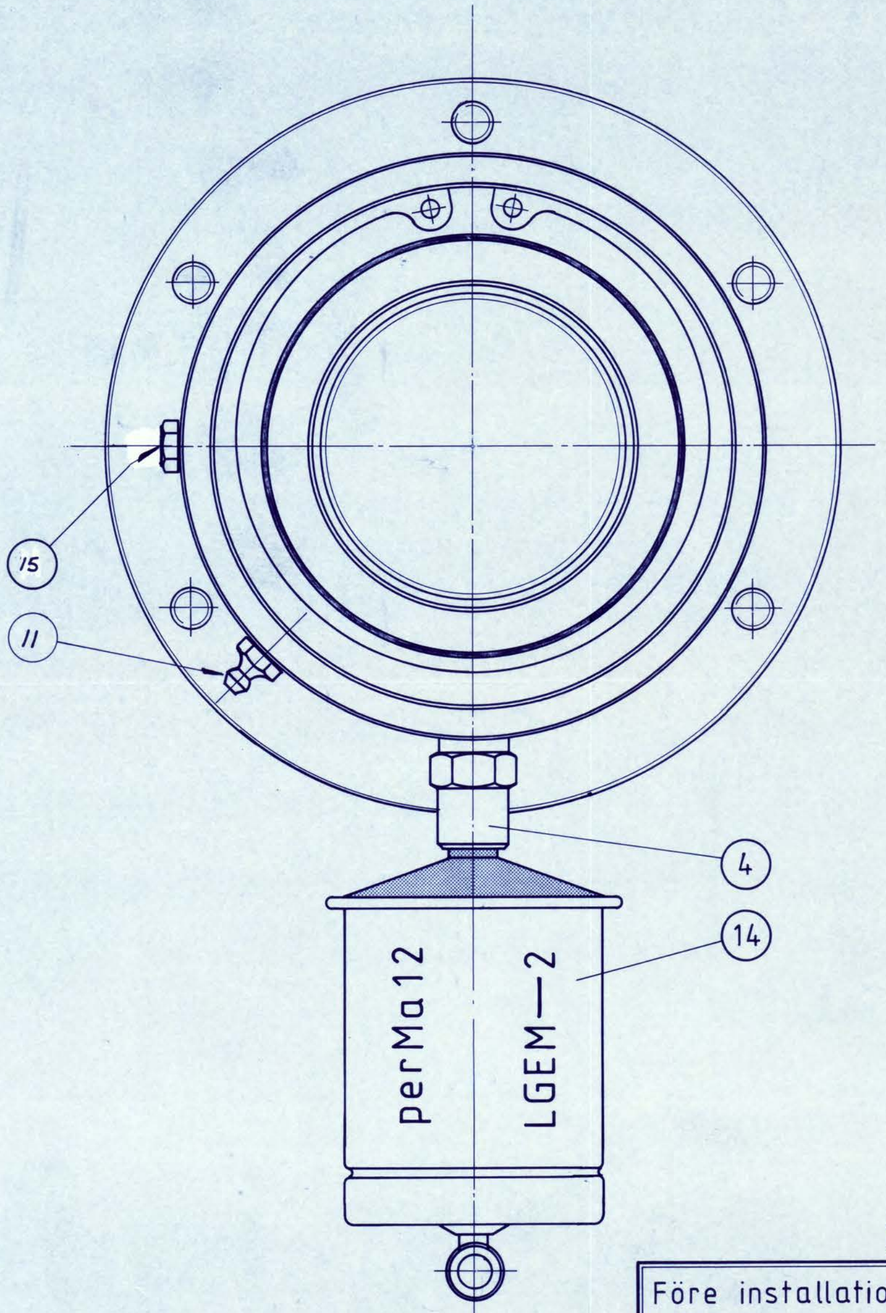
1	A	Sweetwater	70.86.2579	V717	870108 MK	1-83751
Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst

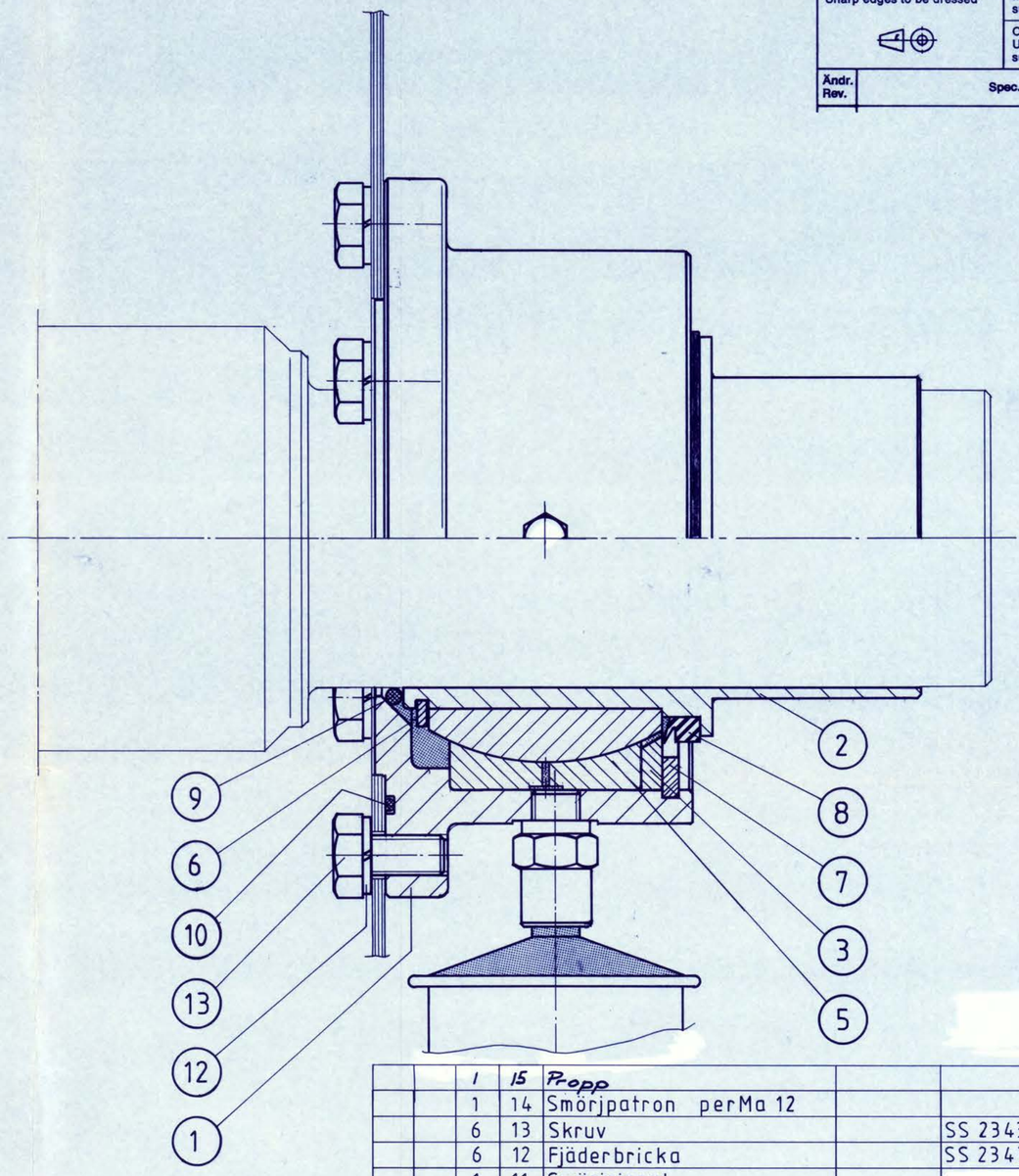
2-84063

Där ej annat angives gäller
Unless specified the following is valid

Ytjämnhet Ra µm Surface roughness	Tolerans för Tolerance for	
Skarpa kanter brytes ..... mm Sharp edges to be dressed	Bearb. yta Machined surface	SMS 715 = ISO 2768 Serie medel Medium series
	Obearb. yta Unmachined surface	SMS 715 = ISO 2768 Serie grov Coarse series

Ändr. Rev.	Spec.	Datum Date	Sign.





		1	15	Propp				RP 140 R 1/8"
		1	14	Smörjpatron perMa 12				LGEM 2
		6	13	Skruv		SS 2343		M6S-H 1/2"UNC×22
		6	12	Fjäderbricka		SS 2343		FBB 13
		1	11	Smörjnippel				AH 1/8"-27 PTF
		1	10	O-ring				Ø 123,42 × 3,53
		1	9	O-ring				Ø 70 × 4
		1	8	V-ring				V-85 A
		1	7	Seegersäkring				SgH 120
		1	6	Seegersäkring				A 80 × 2,5V
		1	5	Lager				GE 80 ES-SKF
		1	4	Nippel	3-82334			
		1	3	Bricka	3-82785			
		1	2	Klämhylsa	3-82788			
		1	1	Lagerhus	2-84064			
C	B	A	Det. No.	Benämning och nettodim. Description and net dim.	Ritn. Drwg.	Material	Vikt Weight	Anm. Note

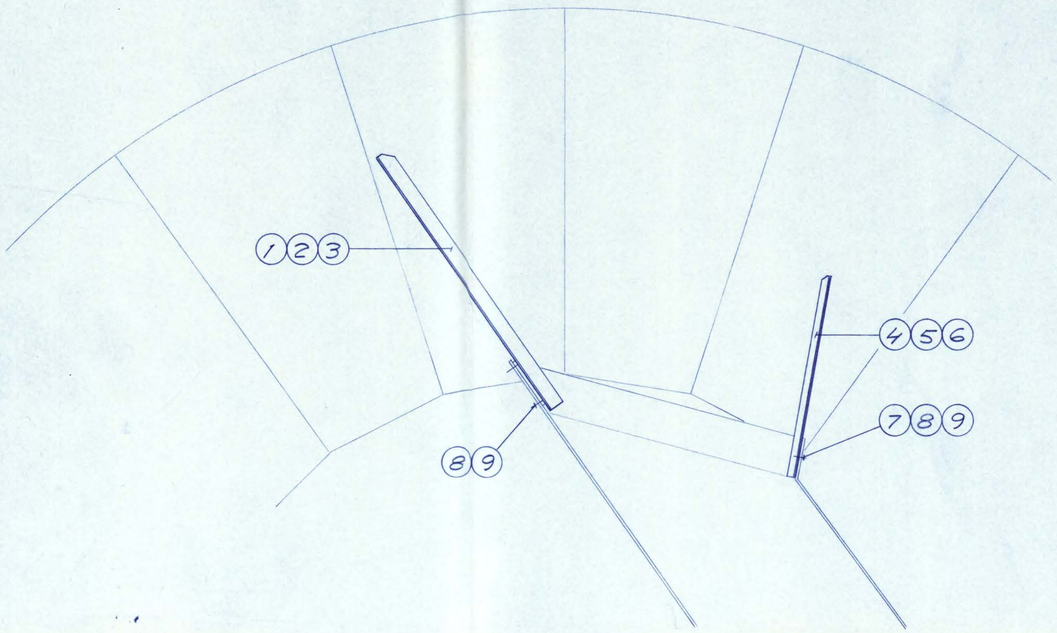
VIKTIGT

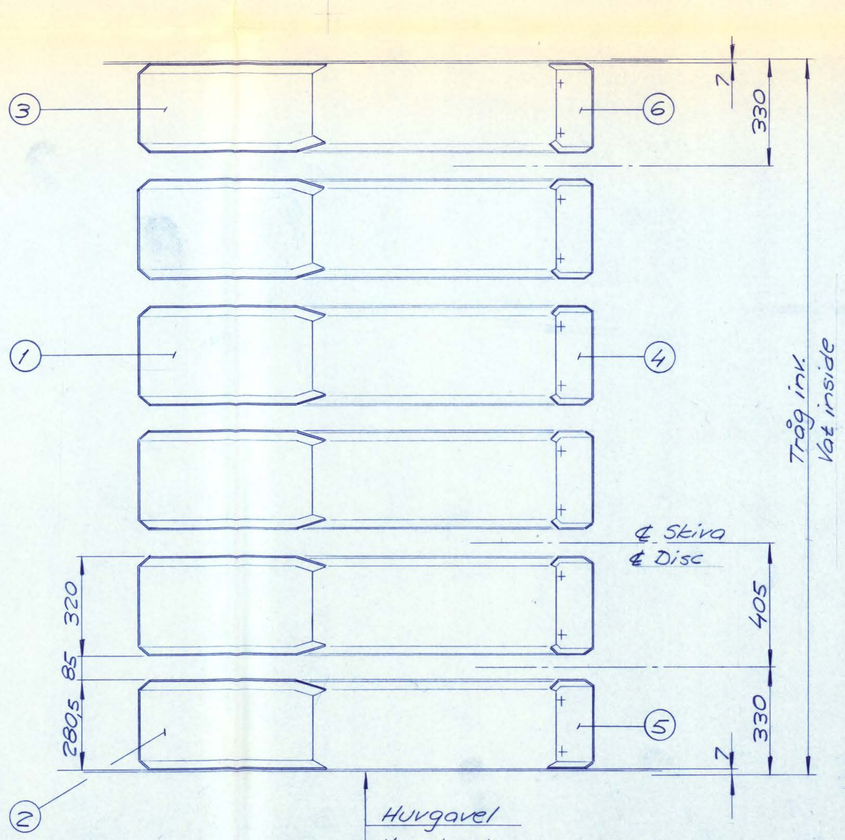
Före installation av smörjpatronen skall lagret fyllas med LITIUM-fett med hjälp av en handspruta

Utf./Ant. Design/Number	Ritad Drawn	SKIVFILTER	Total vikt Total weight	Ersättes av Replaced by
Skala Scale 1:1	Kontr. Checked 861218 MK	Dukspritslagring – drivända	Ersätter Replaces drwg.	Reg. av Reg. by
HEDEMORA AB SWEDEN		Smst.	2-84063	Andr. Rev.

1	A	Sweetwater	70.86.2579	V717	870108 MK	1-83751
Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst

2-84063





Där ej annat angives gäller
Unless specified the following is valid

Ytjämnhet Ra µm Surface roughness	Tolerans för Tolerance for	
Skarpa kanter brytes ___ mm Sharp edges to be dressed	Bearb. yta Machined surface	SMS 715=ISO 2768 Serie medel Medium series
	Obearb. yta Unmachined surface	SMS 715=ISO 2768 Serie grov Coarse series

Ändr. Rev.	Spec.	Datum Date	Sign.

	P	O	N	M	L	K	J	H	G	F	E	D	C	B	A						
Number of discs	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	Antal skivor					
Vat inside	9165	8760	8355	7950	7545	7140	6735	6330	5925	5520	5115	4710	4305	3900	3495	Trög inv.					

STANDARD

1987-12-08

(For USA)

	P	O	N	M	L	K	J	H	G	F	E	D	C	B	A	Det. No.	Benämning och nettodim. Description and net dim.	Rtn. Drwg.	Material	Vikt Weight	Anm. Note
Washer	184	176	168	160	152	144	136	128	120	112	104	96	88	80	72	9	Bricka RB 105×30		2343(316L)		
Nut	138	132	126	120	114	108	102	96	90	84	78	72	66	60	54	8	Mutter MGM 10		2343(316L)		(3/8"UNC)
Screw	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18	7	Skruv M6S 10×25		2343(316L)		(3/8"UNC×1")
Apron	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	Rönna	1-85734-6			
Apron	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	Rönna	1-85734-5			
Apron	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	4	Rönna	1-85734-4			
Apron	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	Rönna	1-85734-3			
Apron	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	Rönna	1-85734-2			
Apron	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	1	Rönna	1-85734-1			
Description	P	O	N	M	L	K	J	H	G	F	E	D	C	B	A						

Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst

Utf./Ant. Design/Number	Ritad Drawn	871117 MK	Skivfilter ø5000 ANS
Skala Scale	1:10	Kontr. Checked	Rönnor smst.
HEDEMORA	HEDEMORA AB SWEDEN		Disc filter ø5000 ANS
			Aprons, ass. drwg.

Total vikt Total weight	Ersättes av Replaced by
Ersätter Replaces drwg.	Reg. av Reg. by

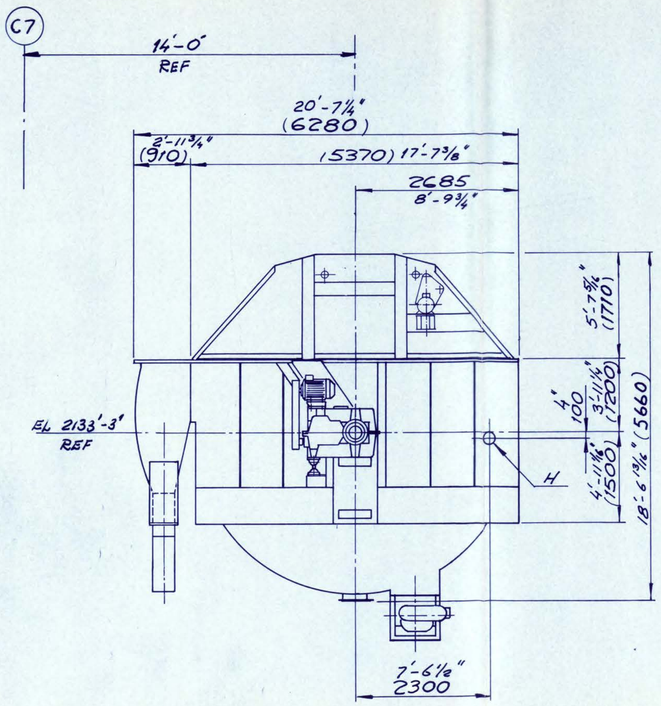
Ändr. Rev.

1-85730

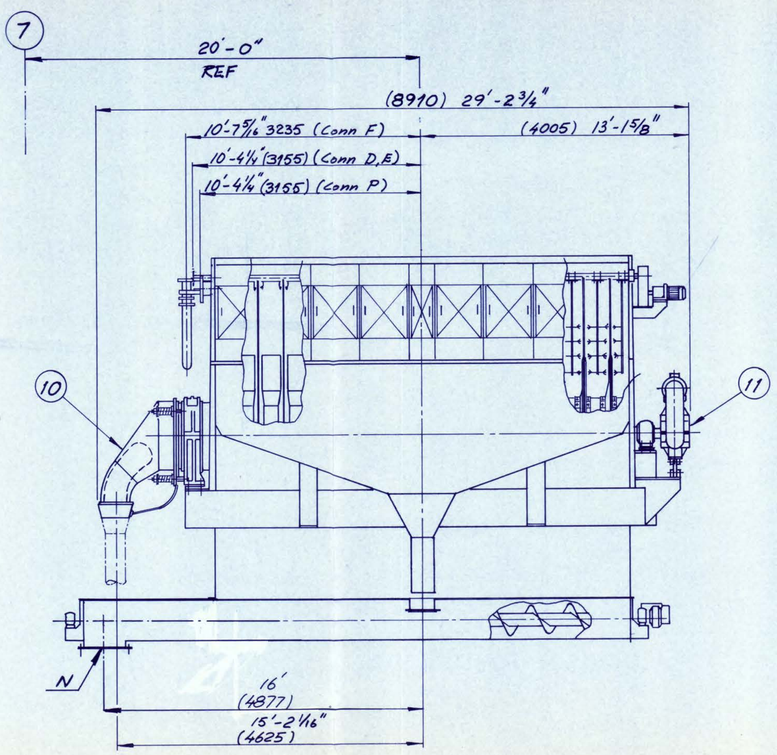
1-85730

Där ej annat angives gäller Unless specified the following is valid		
Ytjämnhet Ra µm Surface roughness	Tolerans för Tolerance for	
Skarpa kanter brytes ____ mm Sharp edges to be dressed	Bearb. yta Machined surface	SMS 715=ISO 2768 Serie medel Medium series
	Obearb. yta Unmachined surface	SMS 715=ISO 2768 Serie grov Coarse series

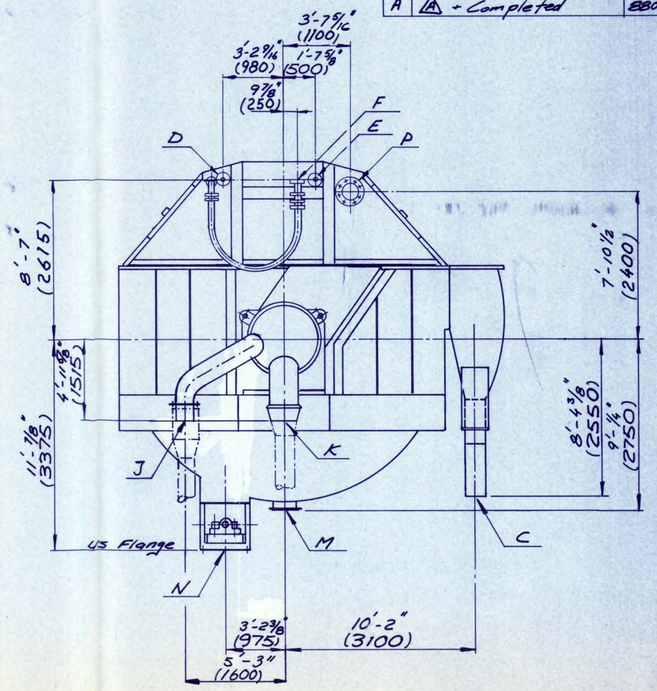
Ändr. Rev.	Spec.	Datum Date	Sign.
A	(A) + Completed	880322	AP



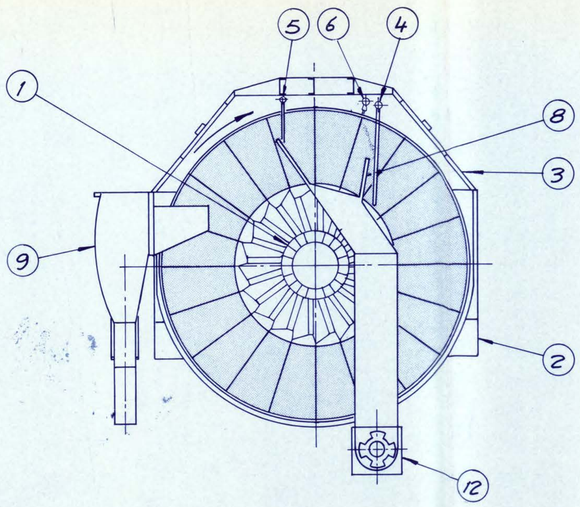
VIEW LOOKING NORTH

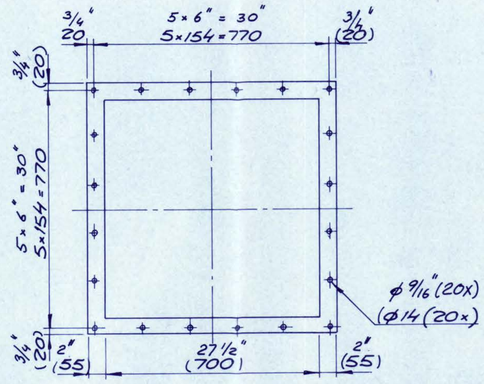


VIEW LOOKING EAST



Flänsar enl. 150 Lbs A.N.S.I.
Flange acc. 150 Lbs A.N.S.I.





Ansl.
Conn.
Anschluss N
1:10

	Benämning	Description	Benennung	Ant. Nr. Anz.	Ansl. Conn. Anschl.	Anmärkn. Remark Anmerkung
C	Inlopp	Inlet	Zulauf	1	20"	Weld conn.
D	Kakavspoln.	Discharge shower	Ablösespritze	1	3"	Flg
E	Rännspolning	Sluicing shower	Rinnen-Spritze	1	4"	Flg
F	Duksprits	Wire cleaning shower	Reinigungsspritze	1	4"	Flg
H	Flänsförminskare	Flange for level ind.	Flansche für Pegelz.	1	3"	Flg spec. DS 441.05
J	Förfiltrat	Cloudy filtrate	Trub-Filtrat	1	14"	
K	Klarfiltrat	Clear filtrate	Klar-Filtrat	1	14"	Reduced to 12"
M	Bottenavtappn.	Drainage	Bodenentleerung	1	12"	Flg
N	Massautlopp	Pulp outlet	Fangstoff	1	□	Spec. See below
P	Utsugning	Ventilation	Ventilierung	1	12"	Flg

FOUNDATION SEE DRAWING 1-85785

88 02 22 AP

Equipment N^os - 204 2320 (A)
TMP DISCFILTER LINE A

Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst
1		Ponderay Newsprint	70.88.2318	837	296-88 MW	

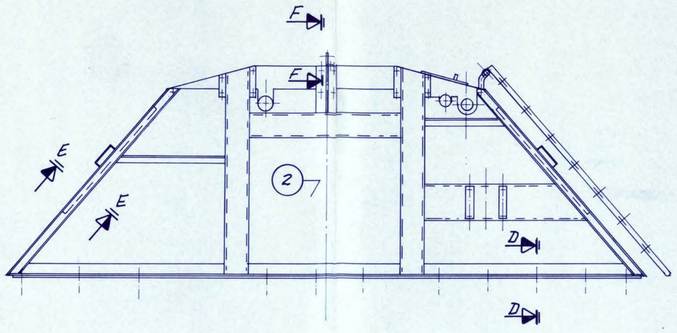
1	12	Skruvrivare	Conveyor repulper	Auflöseschnecke	1-86298
1	11	Drift	Drive	Antrieb	1-87753
1	10	Filtratventil	Filtrate valve	Filtratventil	1-86726-A
1	9	Inloppslåda	Feed box	Einlaufskasten	1-86389
1	8	Rännor	Aprons	Rinnen	1-85730-G
	7				
1	6	Kakavspolning	Discharge shower	Satzabspülung	1-86646-0
1	5	Rännspolning	Sluicing shower	Rinnenspülung	1-86772-G
1	4	Duksprits	Wire cleaning shower	Tuchspritzanordn.	1-86742-B
1	3	Huv	Hood	Haube	1-85319-G
1	2	Tråg	Vat	Trog	1-86026
1	1	Centr.axel med sektorer	Centre shaft with sectors	Zentr. Welle mit Sektoren	1-85326-G
A	Del	Benämning	Description	Benennung	Nr.

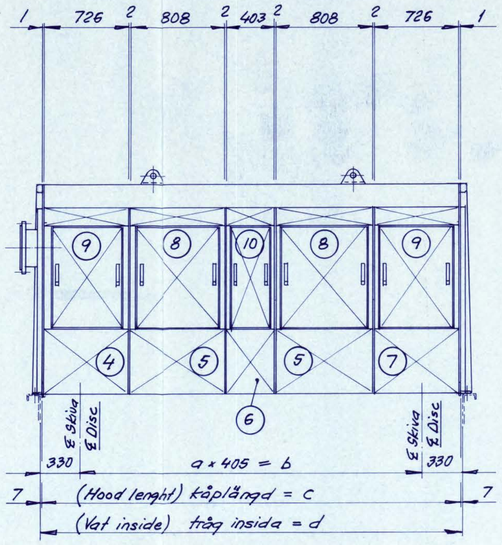
Utf./Ant. Design/Number	Ritad Drawn	SKIVFILTER ø5000 DISCFILTER ø5000 SCHEIBENFILTER ø5000 × 9/14 DISCS ANS	Total vikt Total weight
Skala Scale 1:50 1:10	87/230 AP Kontr. Checked		Ersättes av Replaced by
HEDEMORA ☆ HEDEMORA AB SWEDEN			Ersätter Replaces drwg.
			Reg. av Reg. by
		1-85784	Ändr. Rev. A

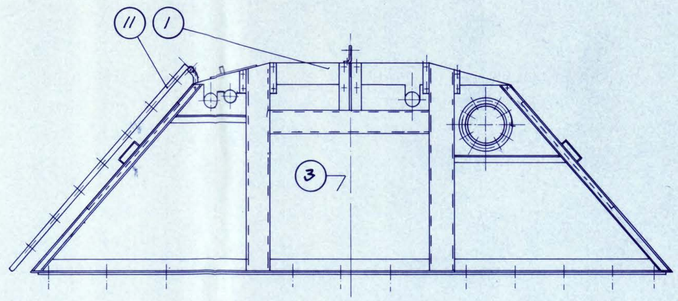
1-85784

Där ej annat angives gäller / Unless specified the following is valid		
Ytjämnhet Ra µm / Surface roughness		Tolerans för / Tolerance for
Skarpa kanter brytes ___ mm / Sharp edges to be dressed	Bearb. yta / Machined surface	SMS 715=ISO 2768 Serie medel / Medium series
	Obearb. yta / Unmachined surface	SMS 715=ISO 2768 Serie grov / Coarse series

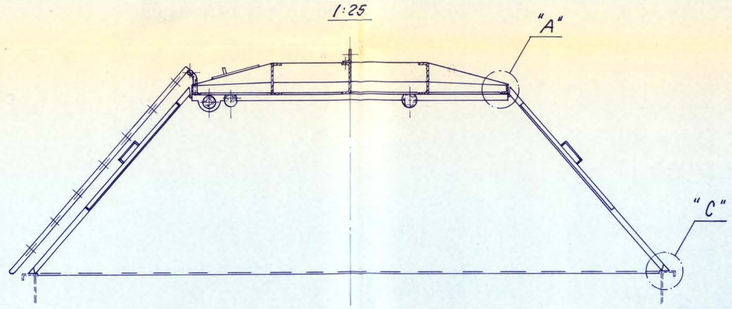
Ändr. Rev.	Spec.	Datum Date	Sign.

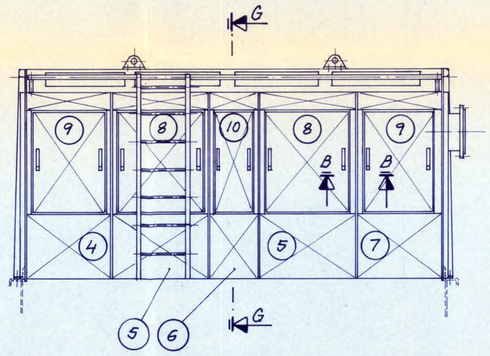






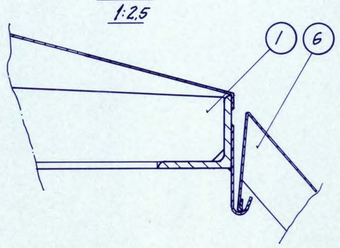
G - G
1:25



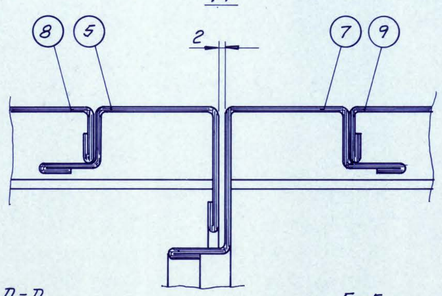


Utf. Design	Ant. skiv No. of disc	a	b	c	d
A	8	7	2835	3481	3495
B	9	8	3240	3886	3900
C	10	9	3645	4291	4305
D	11	10	4050	4696	4710
E	12	11	4455	5101	5115
F	13	12	4860	5506	5520
G	14	13	5265	5911	5925
H	15	14	5670	6316	6330
I	16	15	6075	6721	6735
J	17	16	6480	7126	7140
K	18	17	6885	7531	7545
L	19	18	7290	7936	7950
M	20	19	7695	8341	8355
N	21	20	8100	8746	8760
O	22	21	8505	9151	9165

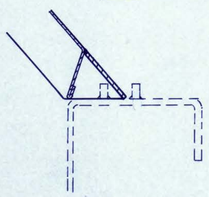
"A"
1:2,5



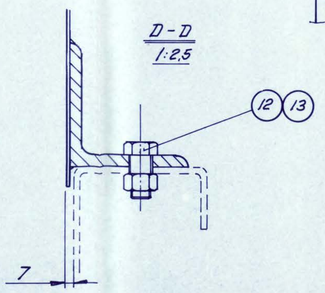
B - B
1:1



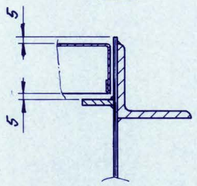
"C"
1:2,5



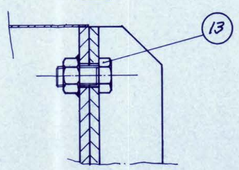
D - D
1:2,5



E - E
1:2,5



F - F
1:2,5



USA:
STANDARD

Antal skivor / Number of discs.																			
22	21	20	19	18	17	16	15	14	13	12	11	10	9	8					
50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	13	Skruv	U16S 5/8"UNC x 38	SS 2343	316L	Screw 5/8"UNC x 1 5/8"
22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	12	Mutter	U6M 5/8"UNC	SS 2343	316L	Nut 5/8"UNC
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	Stege		2-85314		Ladder
2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	10	Lucka		2-83215-C		Apperture
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	9	|		2-83215-B		|
18	18	16	16	14	14	12	12	10	10	8	8	6	6	4	8	Lucka		2-83215-A		Apperture
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7	Huvdel		1-86279		Hoodpart
2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	6	|		1-86278		|
18	18	16	16	14	14	12	12	10	10	8	8	6	6	4	5	|		1-86277		|
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	Huvdel		1-86276		Hoodpart
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	Gavel, ventilsida		1-85324-		Gable, valveside
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	Gavel, drivsida		1-85323-		Gable, driveside
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Bärbalk		1-85317		Crossbeam
O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Det. No.	Benämning och nettodim. / Description and net dim.		Ritn. Drwg.	Material	Anm. Note

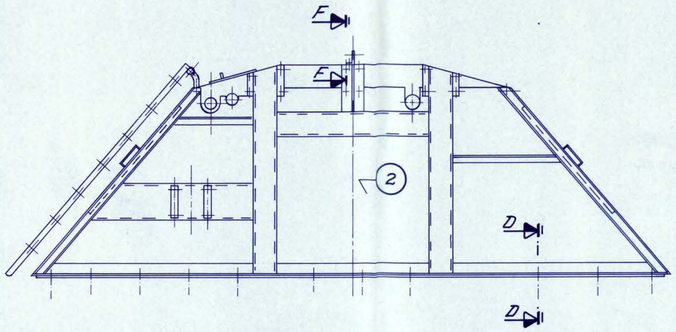
Utf. / Ant. Design / Number	Ritad Drawn 880203 KrB	Total vikt / Total weight	Ersättes av / Replaced by
Skala / Scale 1:25, 1:2,5, 1:1	Kontr. Checked	Ersätter / Replaces drwg.	Reg. av / Reg. by
HEDEMORA	HEDEMORA AB SWEDEN	Skivfilter ⌀5000 ANS Medurs rot. Högt tråg Filterkåpa. Smst. Discfilter ⌀5000 ANS Hood. Ass. drwg.	1-85319 Andr. Rev.

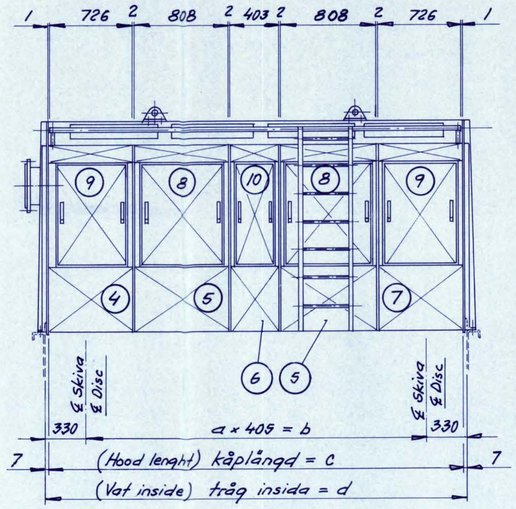
Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst

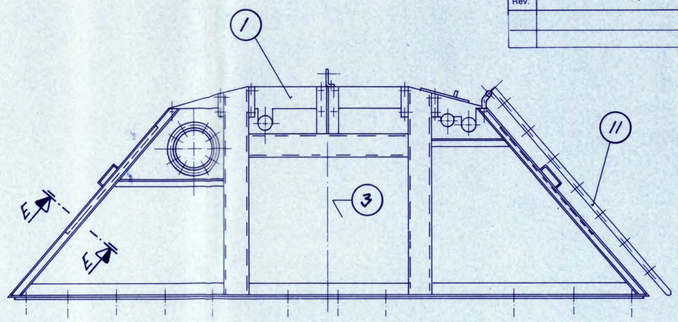
1-85 319

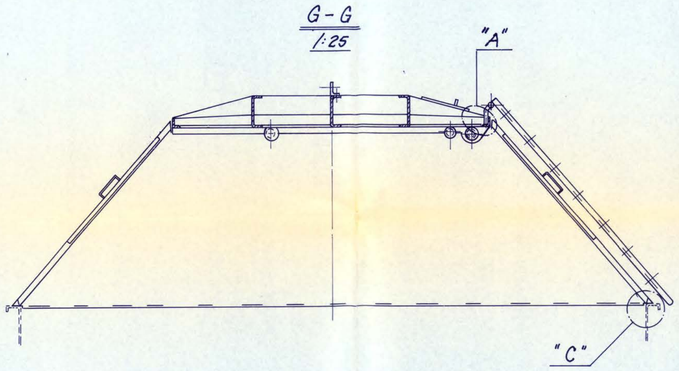
Där ej annat angives gäller Unless specified the following is valid			
Ytjämnhet Ra µm Surface roughness	Tolerans för Tolerance for		
Skarpa kanter brytes mm Sharp edges to be dressed	Bearb. yta Machined surface	SMS 715=ISO 2768 Serie medel Medium series	
	Obearb. yta Unmachined surface	SMS 715=ISO 2768 Serie grov Coarse series	

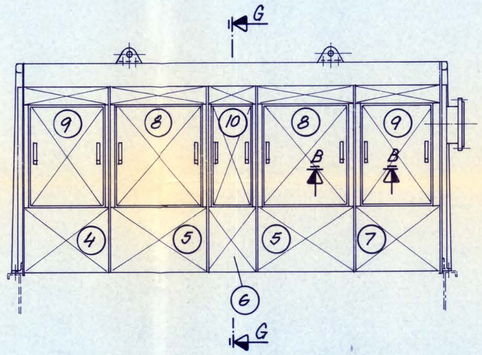
Ändr. Rev.	Spec.	Datum Date	Sign.



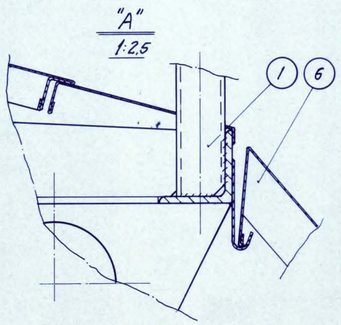


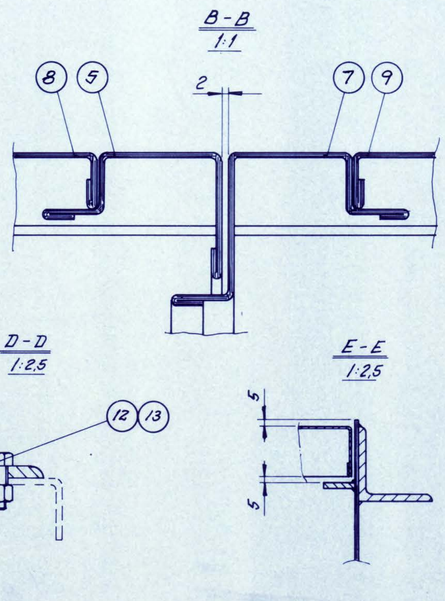






Utf. Design	Ant. skiv. No. of disc	a	b	c	d
A	8	7	2835	3481	3495
B	9	8	3240	3886	3900
C	10	9	3645	4291	4305
D	11	10	4050	4696	4710
E	12	11	4455	5101	5115
F	13	12	4860	5506	5520
G	14	13	5265	5911	5925
H	15	14	5670	6316	6330
I	16	15	6075	6721	6735
J	17	16	6480	7126	7140
K	18	17	6885	7531	7545
L	19	18	7290	7936	7950
M	20	19	7695	8341	8355
N	21	20	8100	8746	8760
O	22	21	8505	9151	9165





USA:
STANDARD

Antal skivor / Number of discs.																			
22	21	20	19	18	17	16	15	14	13	12	11	10	9	8					
50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	13	Skruv	U6S 5/8"UNC x 38	SS 2343	316L	Screw 5/8"UNC x 1½"
22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	12	Mutter	U6M 5/8"UNC	SS 2343	316L	Nut 5/8"UNC
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	Stege	2-85 314			Ladder
2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	10	Lucka	2-83 215-C			Apperture
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	9	"	2-83 215-B			"
18	18	16	16	14	14	12	12	10	10	8	8	6	6	4	8	Lucka	2-83 215-A			Apperture
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7	Huvdel	1-86 279			Hoodpart
2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	6	"	1-86 278			"
18	18	16	16	14	14	12	12	10	10	8	8	6	6	4	5	"	1-86 277			"
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	Huvdel	1-86 276			Hoodpart
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	Gavel, ventilsida	1-85 322- [ ] 324			Gable, valveside
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	Gavel, drivsida	1-85 321- [ ] 323			Gable, driveside
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Bärbalk	1-85 318			Crossbeam
O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Def No	Benämning och nettodim Description and net dim	Ritn Drwg	Material		Anm. Note

Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst

Utf. Ant
Design Number

Ritad
Drawn
880203 K-B

Skala
Scale
1:25, 1:2,5, 1:1

Kontr
Checked

HEDEMORA
HEDEMORA AB
SWEDEN

Skivfilter ø5000 ANS
Moturs rot. Högt tråg
Filterkåpa. Smst.
Discfilter ø5000 ANS
Hood. Ass. drwg.

Total vikt
Total weight

Ersättes av
Replaced by

Ersätter
Replaces drwg

Reg. av
Reg. by

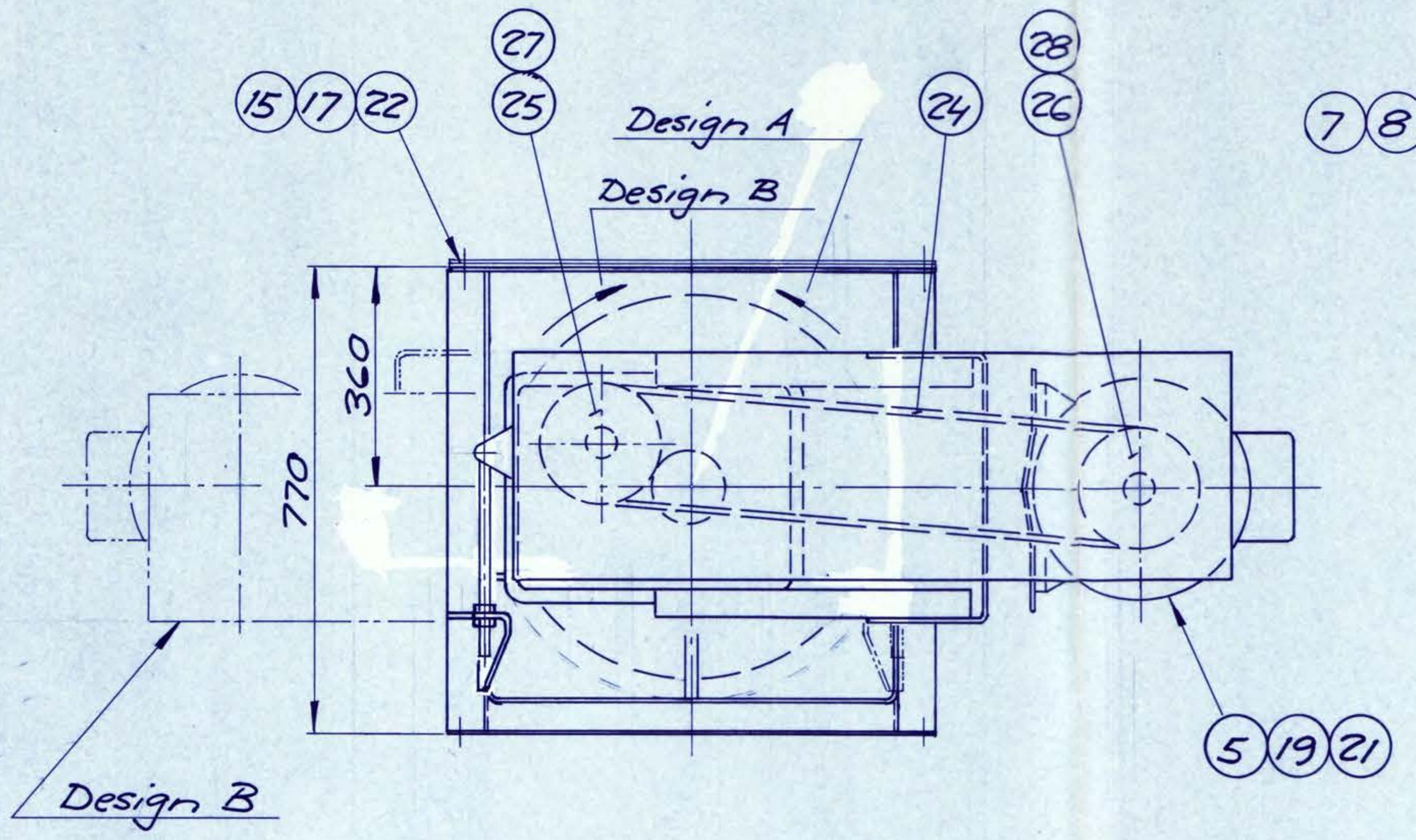
Ändr
Rev

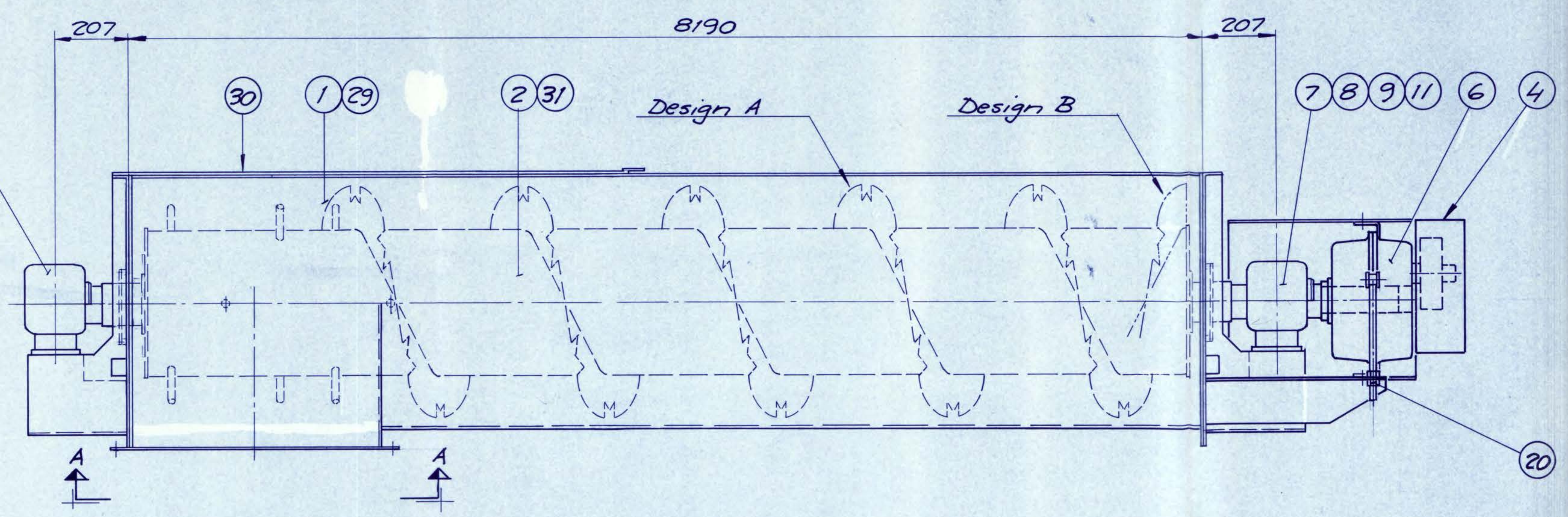
1-85 320

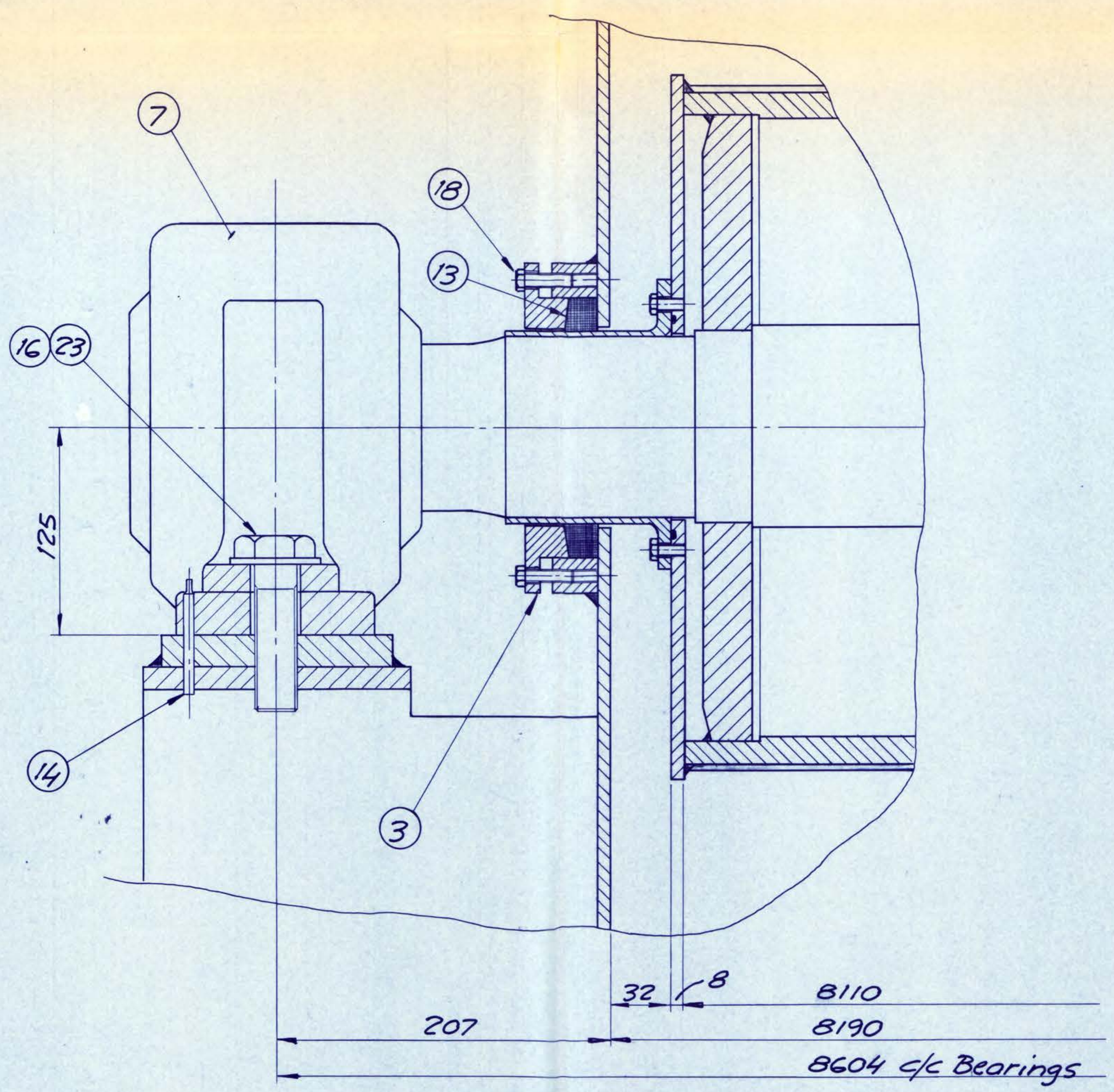
1-85 320

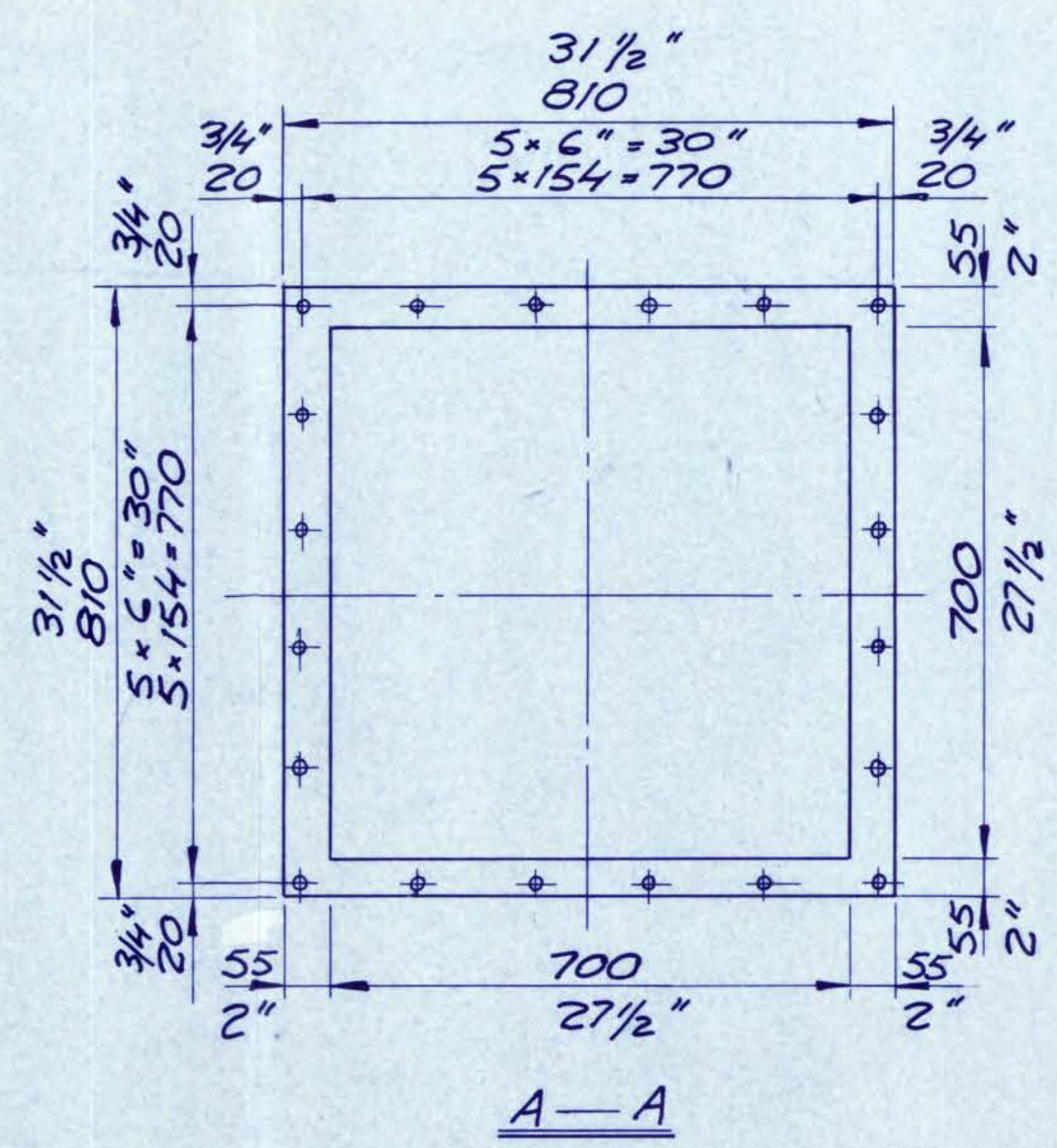
Där ej annat angives gäller / Unless specified the following is valid		
Ytjämnhet Ra µm / Surface roughness	Tolerans för / Tolerance for	
Skarpa kanter brytes mm / Sharp edges to be dressed	Bearb. yta / Machined surface	SMS 715=ISO 2768 Serie medel / Medium series
	Obearb. yta / Unmachined surface	SMS 715=ISO 2768 Serie grov / Coarse series

Ändr. Rev.	Spec.	Datum Date	Sign.
A	Design B added. Shaft mirror inverted	880301	MK
B	Div. rev.	880915	









Design A : Acc. to drawing
Design B : Mirror inverted

C	B	A	Det. No.	Benämning och nettodim. / Description and net dim.	Ritn. Drwg	Material	Vikt Weight	Anm. Note
			32					
	1		31	Shaft	2-86300-B			
	1	1	30	Cover	3-86302			
	1		29	Vat	1-86299-B			
	1	1	28	Bush ø 1 5/8"				
	1	1	27	Bush ø 1 7/8"				
	1	1	26	V-belt sheave 5,6" OD				
	1	1	25	V-belt sheave 8,0" OD				
	4	4	24	V-belt 3V×900				
	4	4	23	Washer ø45/26 t=4		galv.		
	68	68	22	Nut 1/2" UNC		316L		
	4	4	21	Nut		galv.		
	2	2	20	Nut 7/8" UNC		galv.		
	4	4	19	Screw		galv.		
	8	8	18	Screw 5/16" UNC×1"		316L		
	68	68	17	Screw 1/2" UNC×1 1/4"		316L		
	4	4	16	Screw 1" UNC×3 1/4"		galv.		
	1	1	15	Sealing strip 15×8 L=60 Cellgummi		EPDM		Rygum
	4	4	14	Taper pin GKP 8×8×65				
	2	2	13	Stuffing box sealing 3/4" L=490				
	1	1	12	Key				
	2	2	11	Spacer ring FEB 135/200P				
	1	1	10	End cover ASNA 522-619				
	2	2	9	Lubrication set ASNA 522V				
	2	2	8	Bearing 22222 CCK/W33+H322				
	2	2	7	Plummer block SNH 522TA-619N3				
	1	1	6	Shaft mounted drive [1] 2215+M2215-2 (B9L / B3L)				FALK
	1	1	5	Motor 20hp, 1800 rpm				
	1	1	4	V-belt guard	1-86297			
	2	2	3	Packing gland	2-81831			
		1	2	Shaft	2-86300-A			
		1	1	Vat	1-86299-A			

Design B: items 24–28

[1] Including keys for Hollow Shaft and Input Shaft.

Ant.	Utf.	Anläggning	Best. nr	Lev.	Utlämnad	Anm./Smst Ass. drwg.
1	B	Ponderay Newsprint	70882324			1-86608
1	B	Ponderay Newsprint	70882312			1-86607
1	A	Ponderay Newsprint	70882318			1-85784

Utf./Ant. Design/Number	Ritad Drawn: 880224 MK	Disc Filter ø5000×14 discs	Total vikt / Total weight
Skala Scale: 1:10 1:2,5	Kontr. Checked	Conveyor repulper ø640	Ersätter / Replaces drwg.
HEDEMORA — AB HEDEMORA VERKSTÄDER, SWEDEN		Assembly drawing	Ersättes av / Replaced by
		1-86298	Ändr. Rev. B

1-86298