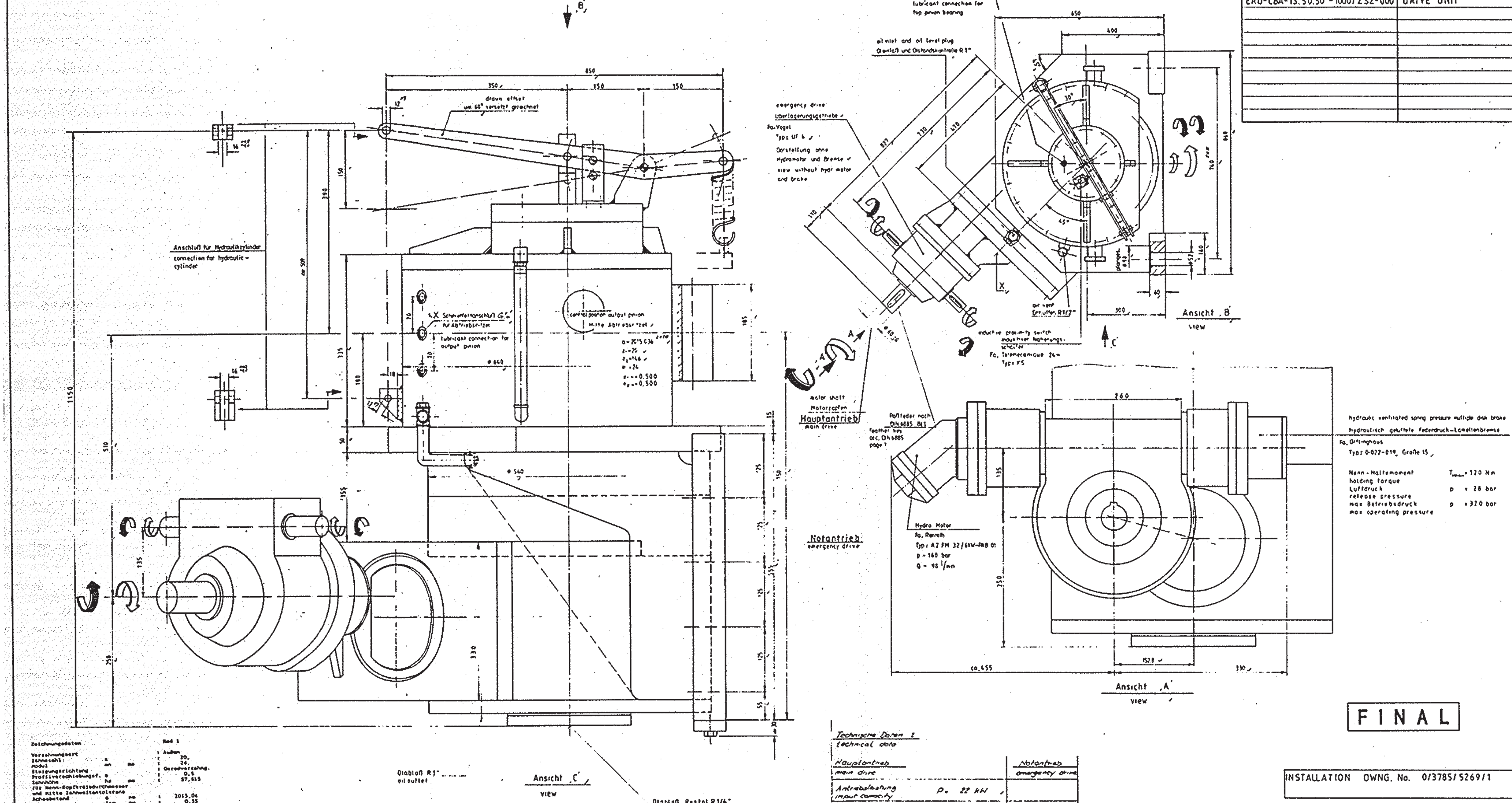
TABLE OF CONTENTS

Attention!
Control oil level once more after short operation time.

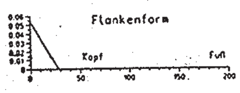
REFERENCE DRAWING	
DWG-No.	TITLE
ERD-CBA-13.50.50-1000/ZSZ-000	DRIVE UNIT



FINAL

Zeichnungsdaten			Rad 1
Verzahnungsart			Außen
Zähnezahl	z		20.
Modul	mn	mm	24.
Steigungsrichtung			Geradverzahng.
Profilverschiebungsf.	x		0,5
Zahnhöhe	h2	mm	57,615
für Nenn-Kopfkreisdurchmesser und Mitte Zahnweitentoleranz			
Achsabstand	a	mm	2013,04
	Aao	mm	0,55
	Aau	mm	-0,55
Grundkreisdurchmesser	dG	mm	451,052
Teilkreisdurchmesser	dO	mm	480,
Kopfkreisdurchmesser	dk	mm	550,
Toleranz von dk	TdK	mm	-0,5
min. Evolventenlänge	levmin	mm	93,231
zuläss. Flankenspiel	Sanzul	mm	2,161
erforderl. Flankensp.	Snerf	mm	0,542
DIN-Qualität			8.
Werkzeug-Bezugsprofil			Lud 17
Meßzähnezahl	z'		3.
Zahnweite	W max	mm	191,419
	W min	mm	191,31
Werkstoff			16 Mn Cr 5
Bestellvorschrift			909 0012
Wärmebehandlung			einsatzgehärtet
Eht nenn nach LDN 944 0464			2,15
Oberflächenhärte	HRC min		58.
	HRC max		62.
Bearbeitung der Zahnfußrundungen			gefräst
max. Rauhtiefe der Fußrundung Rz		mm	0,025
Bearbeitung der Zahnflanken			geschliffen
max. Rauhtiefe der Flanke Rz		mm	0,006
Zahnformkorrektur			Kopfrücknahme
Kopfrücknahme	aR	mm	0,056
Rückanahmehöhe	hR	mm	15,195
Ev. Abwälzlänge Rm.	eR	mm	28,379
Schablonenannerwinkel	aaKoR	Grad	3.

Zahnformkorrektur Rad 1



Technische Daten :
technical data

Hauptantrieb main drive			Notantrieb emergency drive
Antriebsleistung input capacity	P =	22 kW	
Nenn-Antriebsmoment input torque nom.	T_{1nom} =	140 Nm	77 Nm
Max - Antriebsmoment input torque max	T_{1max} =	355 Nm	
Antriebsdrehzahl input speed	n_1 =	1600 min⁻¹	2900 min⁻¹
Übersetzung ratio	i =	203,97	812,23
Abtriebsdrehzahl output speed	n_2 =	7,83 min⁻¹	3,57 min⁻¹
Nenn - Abtriebsmoment output torque nom.	T_{2nom} =	28442 Nm	45 000 Nm
Max - Abtriebsmoment output torque max.	T_{2max} =	72000 Nm	
Lagerlebensdauer bearing life time	L_h ≥	25000 h	
Schmiergruppe lubrication group	=	CLP 460	
Differenzdruck diff.-pressure	p =		160 bar
Schluckstrom flow	Q =		98 l/min

Umlaufende Teile müssen vom Käufer gegen unbeabsichtigtes Berühren geschützt werden!
The purchaser has to protect all rotating parts against touching.

INSTALLATION DWNG. No. 0/3785/5269/1

EIM PROJECT		ERDEMIR / EREĞLI DEMIR ve ÇELIK FABRIKALARI T.A.Ş.	
PROJECT NAME	ERDSLAB		
PO NO.	Y1-511/1703-5800(08)	DWG.CODE	
		MICROFILM No.	
		EMC 4	VAI
Kegelrad-Planetengetriebe bevel gear-planetary gearbox	IPX 145-So		ca.1850
ERD-CBA-13.50.50-8100/ZSZ-000		1:2	8

0/3785/5269/1

General information

These operating instructions do not contain any information which would be taken for granted as fundamental knowledge for trained and skilled machine operators.

The gear unit is supplied without an oil fill.
The gear unit is protected against corrosion internally. This provides protection against corrosion for storage in dry indoor areas at suitable temperatures for a period of twelve months. For longer storage periods the gear unit shall be completely filled with oil.
The gear unit has an outer coating. External flanges, shaft ends and flange-mount facings have an antirust coating.

Information relating to installation

The gear unit shall be installed without distortion in accordance with the mounting drawing.

If the couplings are mounted onto the gear journals, the bore diameters of the coupling hub must be adapted to the shaft end diameters of the gear units in accordance with our mounting drawing. When mounting the couplings the coupling hubs are to be heated up. The temperature of hubs with tapered seats must be 40 °C higher, and with cylindrical seats 100 °C higher, than the temperature of the shaft. This means that the couplings do not have to be driven into place through knocking and heavy hammering, thus sparing the bearings and gearwheels.

Caution!

When mounting the couplings, external splines must be lubricated with grease which sticks well.
Where grease nipples are available, coupling sleeves must be regreased at regular intervals of approx. 1000 operating hours.

Commissioning

Oil bath lubrication:

Before commissioning, the gear unit shall be filled with clean oil in accordance with the enclosed lubricant recommendations. A fine-meshed strainer is to be used when filling so that impurities cannot enter the gear unit. The oil level can be read from the relevant oil level checking devices. The oil level is indicated by the dip stick and inspection glass markings and in the case of screw-type inspection holes by the bottom of the hole. The oil level shall only be checked when the facility at a standstill.

Check whether the gear vent system is open because in certain cases the vent system is closed before transportation.

Pressure-type oil circulating system:

If the facility has a separate oil pump, the oil must be pumped round for approx. two hours before commissioning. A fine-meshed strainer shall be fitted at the inlet to the gear unit in order to collect any dirt from the pipework laid on-site. For pipe diameters above NW 25, the strainer shall be supported by a

2 mm thick perforated plate with holes approx. 8 mm in diameter to prevent the strainer being crushed by larger dirt particles and being carried into the internal piping system. During this pipe test, the external piping system must be checked for leaks. If there are oil circulating indicators on the bearings, the opportunity should also be taken to check oil circulation. Only when the pump test has been carried out, can the whole system be filled with oil.
Therefore, the oil level must be rechecked and adjusted, if necessary.
The lube oil pressure should be 1 to 3 bar at operating temperature.
Please ensure that the gear unit has been supplied with sufficient lubricating oil before starting up the drive motor.

During commissioning please pay particular attention to the following:

Abnormal noises
Temperature of individual bearing covers
Oil leaks
Constant monitoring of oil supply
ny other irregularities

The maximum operating temperature in general is 90 °C.

The gear unit may then be run at a maximum nominal capacity of 50 % for 24 operating hours.

After approx. 10 hours of operation at full load, all bolts on the gear unit, including the gear fastening bolts, shall be checked and tightened as required.

Maintenance

Check oil level (oil level indicated by relevant oil level checking devices).
Check gear unit for leaks.

All external screw connections to be checked on an annual basis.

Oil change: Under normal operating conditions, first oil change after approx. 250 operating hours. Further oil changes after each additional period of approx. 2,000 operating hours, but at least once every 12 months.
In special cases consultation with a petroleum products company is recommended. Before filling up with fresh oil as per enclosed lubricant recommendations, the gear must be cleaned with flush oil.

We shall not accept liability for damage caused by the following through no fault of our own:

1. Non-compliance with the general and special information given in these operating instructions.

2. Operating conditions deviating from the design data.

3. Overloading of any kind arising, for example, from vibrations (operation in the critical speed range) or torque surges.

We shall also not accept liability in cases where the gear unit is opened without our approval.

Ausstelltag | Stückzahl je Auftrag | Auftrags Nr.

	Teil-Nr.	Stck.-zahl	Benennung	Sach-Nr.	Bemerkungen
1	1	1	planet carrier	1/0383/7919/0	
2	2	3	planetary wheel	2/0305/4982/3	
3	3				
4	4	1	ring	4/0408/7341/0	
5	5				
6	6				
7	7				
8	8	1	retaining ring	120 x 4 DIN 471	
9	9	3	retaining ring	AS 80 x 4 DIN 471	
10	10	6	retaining ring	125 x 4 DIN 472	
11	11				
12	12	9	cyl. roller bearing	RN 216 E M6 DRR	
13	13	6	buffer disk	4/0401/4153/0	
14	14				
15	15				
16	16				
17	17	1	ring gear z=81	1/0333/8098/1	
18	18				
19	19				
20	20	1	gear wheel	1/0299/7040/0	
21	21	1	bevel gear z=42	2/0355/7077/0	
22	22	1	bevel pinion shaft	z=11 2/0261/7530/0	
23	23	1	gear wheel	2/0299/7041/0	
24	24	1	pinion shaft	2/0249/7158/0	
25	25	1	cam	3/0345/7088/0	
26	26	1	hollow shaft	2/0235/7218/0	

1991	Tag	Name
Bearb.		
Gepr.		
Norm.		

Stückliste

3-stage planetary gearbox
IPX 145 - So

Liste besteht aus 7 Blatt

Blatt Nr. 1

LOHMANN + STOLTERFOHT GmbH
Witten

Zugeh. Zusammenstellungszeichn.
1/3785/1550/0

4/3785/3658/1

Ers. f. | Ers. d.

Ausstelltag | Stückzahl je Auftrag | Auftrags Nr.

	Teil-Nr.	Stck.-zahl	Benennung	Sach-Nr.	Bemerkungen
1	27	1	output shaft	1/0244/8179/0	
2	28	1	rod	3/0925/7091/1	
3	29				
4	30	1	shp. roller bearing	23036	
5	31	1	sph. roller bearing	24032	
6	32	1	cyl. roller bearing	NU 1028	
7	33	2	tapered-roller bear.	32928	
8	34	1	cyl. roller bearing	NU 2317 E	
9	35	2	tapered-roller bear.	31314	
10	36	2	cyl. roller bearing	NJ 2210	
11	37	1	sph. roller bearing	21304	
12	38	1	shaft seal ring	175 x 215 x 16 B2	
13	39	1	shaft seal ring	195 x 230 x 15 B2	
14	40	1	shaft seal ring	70 x 100 x 13 B2	
15	41	2	shaft seal ring	45 x 65 x 10 B2	
16	42	1	buffer disk	4/0408/7706/0	
17	43	1	locking ring	V 190 A	
18	44	1	inner ring	160 x 175 x 40 EGS	
19	45	1	inner ring	4/0400/8077/0	
20	46	1	spacer ring	4/0401/4700/0	
21	47	2	quadring	4220 366 Y Nr. Q 25	
22	48	1	spacer ring	4/0401/4701/0	
23	49	2	du-sleeve	MB 3530 DU	
24	50	1	bearing flange	1/0023/4847/0	
25	51	1	pre-housing	0/0160/7032/0	
26	52	1	flange	1/0406/8534/0	

1991	Tag	Name
Bearb.		
Gepr.		
Norm.		

Stückliste

3-stage planetary gearbox
IPX 145 - So

Liste besteht aus 7 Blatt

Blatt Nr. 2

LOHMANN + STOLTERFOHT GmbH
Witten

Zugeh. Zusammenstellungszeichn.
1/3785/1550/0

4/3785/3658/1

Ers. f. | Ers. d.

Ausstelltag | Stückzahl je Auftrag | Auftrags Nr.

	Teil-Nr.	Stck.-zahl	Benennung	Sach-Nr.	Bemerkungen
1	53	1	switch arm	2/0925/7090/0	
2	54	1	bearing housing	0/0406/8523/3	
3	55	1	flange bell	2/0406/8531/0	
4	56	1	flange bell	2/0406/8532/0	
5	57	1	coupling sleeve	3/0345/7089/0	
6	58	1	coupling sleeve	3/0345/7090/0	
7	59				
8	60	1	locking cover	2/0439/8240/0	
9	61	1	ring	4/0405/7445/0	
10	62	1	disk	4/0408/7704/2	
11	63	1	sealing cover	1/0421/4806/0	
12	64	1	bearing bush	1/0459/7458/0	
13	65	1	locking cover	2/0439/8246/0	
14	66	1	spacer ring	4/0401/4698/0	
15	67	1	spacer ring	3/0401/4699/0	
16	68	1	end plate	4/0408/7703/1	
17	69				
18	70				
19	71				
20	72	1	constant motor	A2FM 32/61 W-PAB 01	
21	73	1	gear	type UEF 4, 1 = 4,5	
22	74				
23	75	1	multiple-plate brake	type: 0-022-019 size 15	
24	76				
25					
26					

1991	Tag	Name
Bearb.		Kn.
Gepr.		
Norm.		

Stückliste

3-stage planetary gearbox
IPX 145 - So

Liste besteht aus 7 Blatt

Blatt Nr. 3

LOHMANN + STOLTERFOHT GmbH

Zugeh. Zusammenstellungszeichn. 1/3785/1550/0

4/3785/3658/1

Ausstelltag | Stückzahl je Auftrag | Auftrags Nr.

	Teil-Nr.	Stck.-zahl	Benennung	Sach-Nr.	Bemerkungen
1	77	1	end plate	4/0409/7207/0	
2	78	1	flange	3/0583/7631/0	
3	79	1	flange	3/0583/7630/0	
4	80	1	locking cover	2/0439/8241/1	
5	81	1	end plate	3/0409/7206/0	
6	82	1	sheet	3/0021/7317/0	
7	83	1	sealing cover	2/0421/4810/0	
8	84		/		
9	85	8	cylindrical bolt	M 12 x 30 DIN 912	
10	86	8	hex. head screw	M 10 x 30 DIN 933	
11	87	1	hex. head screw	M 10 x 25 DIN 933	
12	88	6	hex. head screw	M 8 x 20 DIN 933	
13	89	24	hex. head screw	M 16 x 40 DIN 933	
14	90	14	hex. head screw	M 16 x 65 DIN 931	
15	91	2	cylindrical bolt	M 16 x 50 DIN 912	
16	92	2	cylindrical pin	10 M 6 x 65 DIN 7	
17	93	7	hex. head screw	M 16 x 55 DIN 931	
18	94	4	hex. head screw	M 12 x 30 DIN 933	
19	95	4	hex head screw	M 12 x 40 DIN 933	
20	96	10	hex. head screw	M 16 x 45 DIN 933	
21	97	24	hex. head screw	M 16 x 270 DIN 931	
22	98	8	cylindrical pin	16 M 6 x 50 DIN 7	
23	99	30	hex. head screw	M 12 x 50 DIN 931	
24	100	12	hex. head screw	M 12 x 55 DIN 931	
25	101	1	retaining ring	90 x 3 DIN 472	
26	102	1	retaining ring	180 x 4 DIN 472	

1991	Tag	Name
Bearb.		
Gepr.		
Norm.		

Stückliste

3-stage planetary gearbox
IPX 145 - So

Liste besteht aus 7 Blatt

Blatt Nr. 4

LOHMANN + STOLTERFOHT GmbH
Witten

Zugeh. Zusammenstellungszeichn.
1/3785/1550/0

4/3785/3658/1

Ers. f. | Ers. d.

Ausstelltag | Stückzahl je Auftrag | Auftrags Nr.

	Teil-Nr.	Stck.-zahl	Benennung	Sach-Nr.	Bemerkungen
1	103	3	O-ring	ID No. 086380 52 x 5	
2	104	1	O-ring	192 x 4	
3	105	6	splint	4 x 25 DIN 94	
4	106	3	bolt	B 14 h11x55x45 DIN 1443	
5	107	6	U-disk	B 15 DIN 125	
6	108	2	cylindrical pin	8 M 6 x 36 DIN 7	
7	109	5	hex. head screw	M 8 x 35 DIN 931	
8	110		~~/~~		
9	111	2	bolt	B 12 h11x55x45 DIN 1443	
10	112	4	U-disk	B 13 DIN 125	
11	113	8	shim	12 x 18 x 1 DIN 988	
12	114	1	barrel spring	4/0991/7014/0	
13	115	1	retaining ring	140 x 4 DIN 471	
14	116	1	retaining ring	210 x 5 DIN 472	
15	117	2	locking screw	G 1" DIN 910 KUR	
16	118	1	locking screw	R 1/4" DIN 906	
17	119	4	locking screw	M 14 x 1,5 DIN 910	
18	120	1	sun shaft	2/0249/7156/0	
19	121	1	spacer ring	4/0398/4899/0	
20	122	1	spacer ring	4/0398/4898/0	
21	123	1	spacer ring	4/0398/4896/0	
22	124	2	spacer ring	4/0403/7385/0	
23	125	1	spacer ring	4/0398/4897/0	
24	126	8	locking screw	R 1/2" DIN 906	
25	127		round iron	0,80 m measure: 18 x 100 DIN 669	
26	128	1	angle	1/2" DIN 2987	

1991	Tag	Name
Bearb.		Hr.
Gepr.		
Norm.		

Stückliste

3-stage planetary gearbox
IPX 145 - So

Liste besteht aus 7 Blatt

Blatt Nr. 5

LOHMANN + STOLTERFOHT GmbH
Witten

Zugeh. Zusammenstellungszeichn.
1/3785/1550/0

4/3785/3658/1

Ers. f. | Ers. d.

Ausstelltag | Stückzahl je Auftrag | Auftrags Nr.

	Teil-Nr.	Stck.-zahl	Benennung	Sach-Nr.	Bemerkungen
1	129	1	socket	R 1/2" FORM A DIN 2986	
2	130	2	nipple joint	R 1/2" x 180 DIN 2982	
3	131	1	air vent	EV 1019-14-00 R 1/2"	
4	132	1	sheet	4/0021/7318/0	
5	133	1	name plate	size 100	
6	134				
7	135	1	rating plate	LSN 6138001 sh. 1	
8	136				
9	137	1	feather key	B 22 x 14 x 80 LSN 6123011	
10	138	1	hex. head screw	M 12 x 110 DIN 931	
11	139	1	end plate	4/0409/7216/0	
12	140	2	ind. proximity switch	XSP HO8311	
13	141	1	washer	4/0021/7319/0	
14	142	2	hex. head screw	M 6 x 20 DIN 933	
15	143	4	splint	3,2 x 20 DIN 94	
16	144	4	sealing ring	A 14 x 18 x 1,5 DIN 7603	
17	145	1	sealing ring	A 22 x 27 x 1,5 DIN 7603	
18	146	1	nipple joint	R 1" x 150 DIN 2982	
19	147	1	angle	1" DIN 2987	
20	148	1	nipple joint	R 1" x 80 DIN 2982	
21	149	1	T-piece	R 1" DIN 2987	
22	150	2	locking screw	R 1" DIN 910	
23	151	2	sealing ring	A 33 x 39 x 2 DIN 7603	
24	152	4	hex. head screw	M 16 x 40 DIN 933	
25	153				
26	154				

1991	Tag	Name
Bearb.		
Gepr.		
Norm.		

Stückliste

3-stage planetary gearbox
IPX 145 - So

Liste besteht aus 7 Blatt

Blatt Nr. 6

LOHMANN + STOLTERFOHT GmbH
Witten

Zugeh. Zusammenstellungszeichn.
1/3785/1550/0

4/3785/3658/1

Ers. f. | Ers. d.

Ausstelltag | Stückzahl je Auftrag | Auftrags Nr.

	Teil-Nr.	Stck.-zahl	Benennung	Sach-Nr.	Bemerkungen
1	155	16	hex. head screw	M 10 x 30 DIN 933	
2	156	2	grease nipple	AM 10 x 1 DIN 3402	
3	157	1	adjusting spring	B 8 x 7 x 45 DIN 6885	
4	158	1	sheet	3/0023/4860/0	
5	159	4	hex. head screw	M 16 x 40 DIN 933	
6	160	2	cylindrical pin	16m6 x 40 DIN 7	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

1991	Tag	Name
Bearb.		
Gepr.		
Norm.		

Stückliste

3-stage planetary gearbox
IPX 145 - So

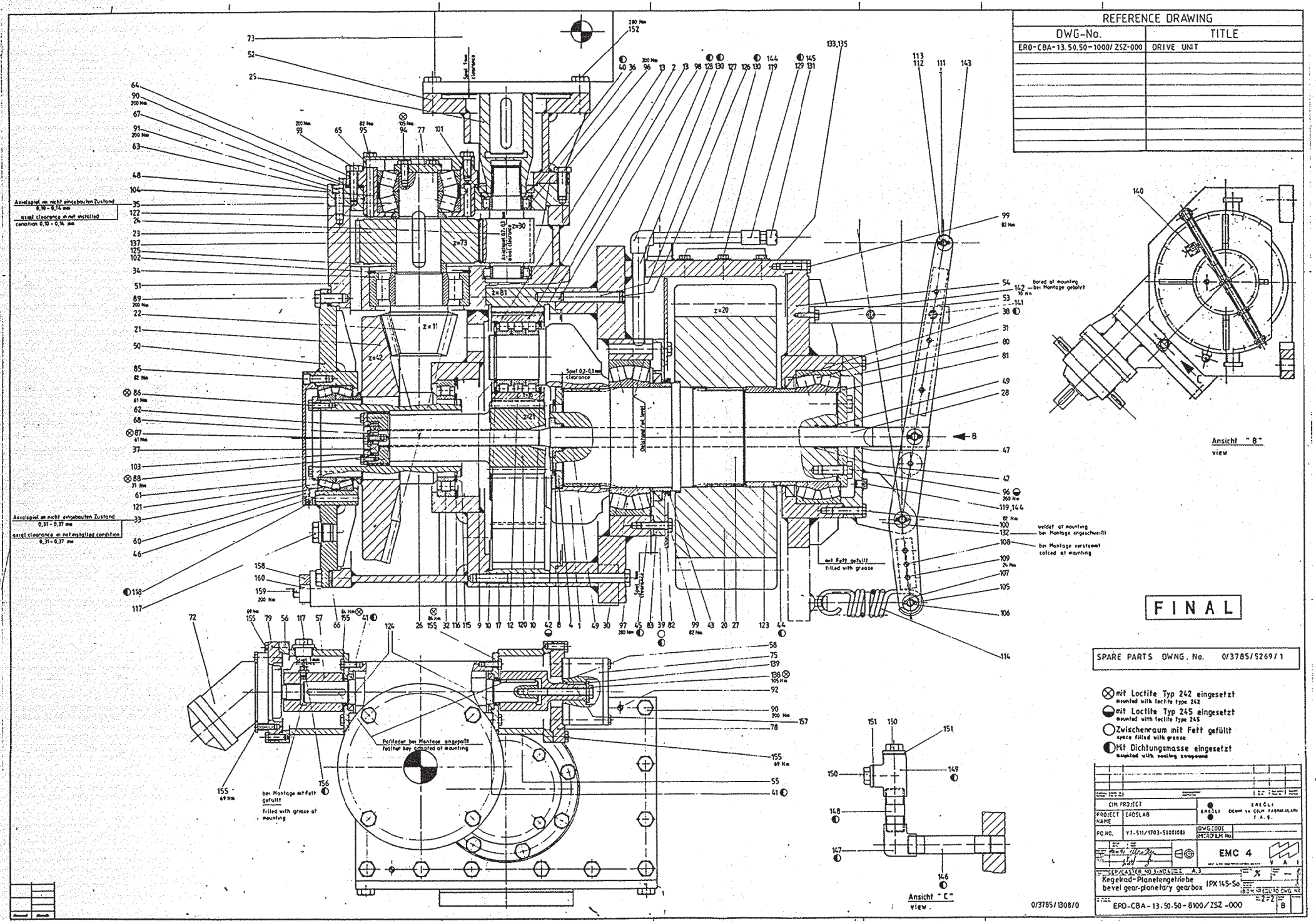
Liste besteht aus 7 Blatt

Blatt Nr. 7

LOHMANN + STOLTERFOHT GmbH
Witten

Zugeh. Zusammenstellungszeichn.
1/3785/1550/0

4/3785/3658/1


REFERENCE DRAWING
DWG-No.
TITLE
ERO-CBA-13.50.50-1000/ ZSZ-000
DRIVE UNIT
Axialspiel im nicht eingebauten Zustand 0,10 - 0,14 mm
axial clearance in not installed condition 0,10 - 0,14 mm
Axialspiel im nicht eingebauten Zustand 0,31 - 0,37 mm
axial clearance in not installed condition 0,31 - 0,37 mm
Ansicht "B"
view
Ansicht "C"
view
FINAL
SPARE PARTS DWNG. No. 0/3785/5269/1
mit Loctite Typ 242 eingesetzt
mounted with loctite type 242
mit Loctite Typ 245 eingesetzt
mounted with loctite type 245
Zwischenraum mit Fett gefüllt
space filled with grease
Mit Dichtungsmasse eingesetzt
mounted with sealing compound
Paßfeder bei Montage angepaßt
feather key situated at mounting
bei Montage mit Fett gefüllt
filled with grease at mounting
bored at mounting
bei Montage gebohrt
welded at mounting
bei Montage eingeschweißt
bei Montage verstemmt
calced at mounting
mit Fett gefüllt
filled with grease
CIM PROJECT
PROJECT NAME
EROSLAB
PO.NO.
Y1-S11/1703-S1000103
DWG.CODE
MICROFILM No
EMC 4
Kegelrad-Planetengetriebe
bevel gear-planetary gearbox
IPX 145-So
ERO-CBA-13.50.50-8100/ZSZ-000
B
0/3785/1308/0

Superposing gearbox

Typ: LÜ/ÜF
a= 135

BETRIEBSANLEITUNG IN ENGLISCH

OPERATING INSTRUCTIONS

Installation

Please check:
a. The specific quantity of grease or oil at the plug or oil sight glass or dip stick.
b. That the breather screw - for oil filled units - is fitted.
c. That the assembly is correct and that the gearbox is stable with stress-free shafts and no alignment errors.

It is generally not practical for the gearbox to be "run-in" under partial load. Therefore the gearbox should be stopped several times after attaining its operating temperature, to allow it to cool down.

Maintenance

Grease filled gearboxes

Grease filled gearboxes are virtually maintenance free. Under normal operating conditions we recommend a grease check after two years.

Recommended grease types (room temperature, normal application)
Shell Flow grease H
Mobil Gargoyle grease 1200 W
BP Energrease HT EP 00
Calypsol D 6024
Aral Grease FD 0
Fuchs Renosod GFB

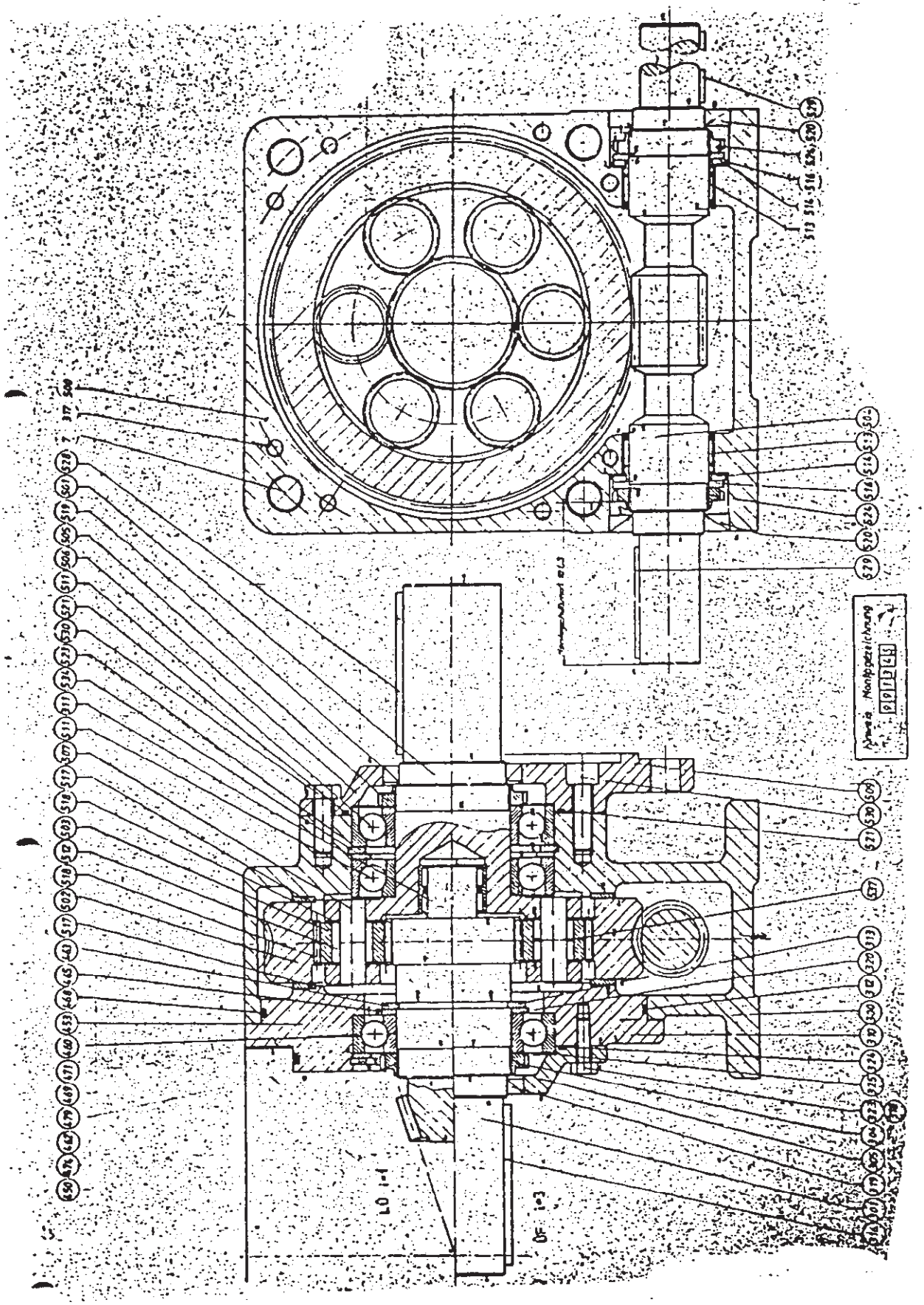
Oil filled gearboxes

The first oil change should be carried out after approx. 500 operating hours. We recommend that the housing is rinsed with flushing oil, thereby removing running in residue. Then fill with the specified oil, up to the oil level mark or gauge. Subsequent oil changes after every 3000 operating hours.

Recommended oil types (room temperature, normal application)
Shell Omala 150
Mobil Mobilgear 629
BP Energol GR XP 150
Texaco Meropa 150
Aral Degol BG 150

Superposing gearbox

Typ: LÜ/ÜF
a = 135



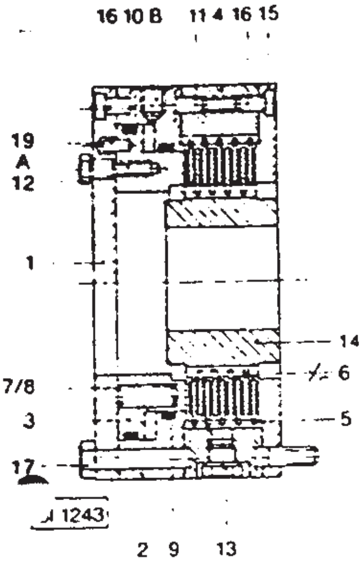
Ortlinghaus-Werke GmbH
D-5632 Wermelskirchen

Installation and maintenance
for hydraulically released spring-applied multi-plate brake

Instruction No. 521

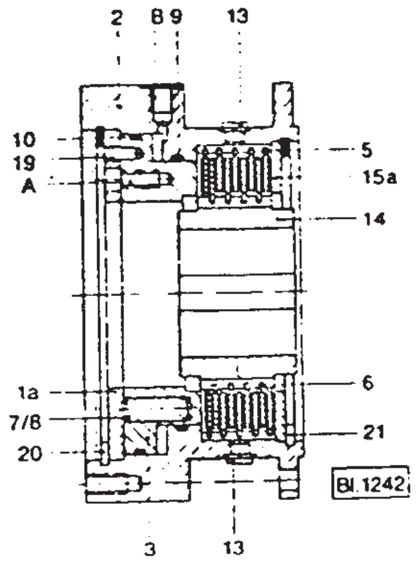
Series 0-022

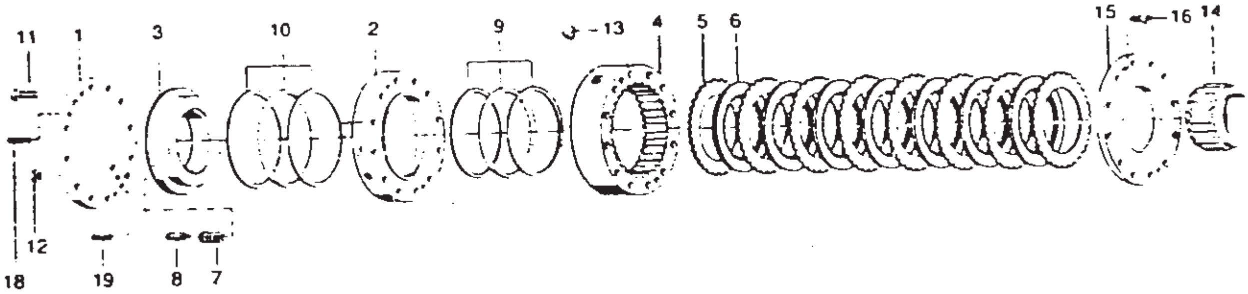
Fig. 1: series 0-022-.. $^0_8$-



1 Flange
1a Spring support plate
2 Cylinder
3 Piston
4 Ring housing
5 Outer plate
6 Inner plate
7 Spring
8 Spring
9 Inner seal
10 Outer seal
11 Screw
12 Plug screw
13 Drain plug
14 Hub
15 Pressure plate
15a Pressure plate
16 Screw
17 Fitted bolt
18 Dowel
19 Dowel
20 Circlip
21 Circlip

Fig. 2: series 0-022-..1-





1. Operation

The Ortlinghaus spring-applied hydraulically released multi-plate brake is a safety brake, which is disengaged hydraulically and is engaged by spring force when the cylinder is exhausted.

The springs (7/8) force together the outer plates (5) which engage in the housing (4) and the inner plates (6) which are positioned on the (14). Thus torque can be transmitted from hub to housing. The housing (4) piston (3) cylinder (2) flange (1) and pressure plate (15) are ...led as a single unit, held together by screws (11 and 16) or for the 0-022-. .1 (fig. 2) by circlips (20 and 21). The brake is fixed to the shaft either by keys or with a spline. The oil connection is M12 x 1,5 (or R ¼" if required).

1.1 Emergency operation

If the hydraulic system breaks down, the brake can be disengaged mechanically. Remove the plugs (12), and screw in jacking screws (see table below) into the tapped holes A. The screws are then tightened evenly to disengage the brakes. The jacking screws are only supplied if requested. Emergency operation can also be effected by means of a hydraulic hand pump.

Size of brake		11	15	23	25	31	39	47	55	63	69
Outside diameter	fig. 1	105	120	135	155	180	205	245	290	345	400
	fig. 2	—	135	—	170	190	215	250	315	—	—
Jacking screws DIN 931-8 8		M6x16	M6x20	M8x25	M8x25	M8x25	M8x25	M10x30	M12x35	M12x35	M12x35

2. Dismantling the unit

2.1 Changing the plate pack (5 and 6)

Disengage the brake mechanically (as per 1.1 above). Remove the screws (16) or circlips (21). Remove the pressure plate (15) or (15a) and then the inner and outer plates. Starting with an outer plate (5), replace the plate pack.

Re-align the brake on the machine casing, and secure it. Then remove the jacking screws. If the jacking screws are removed first, the inner plates (16) will be extremely difficult to align on the hub (14).

2. ...anging the seals (9 and 10)

Note: Springs (7 and 8) are under load.

In order to release the tension in the springs slowly, a force must be exerted on the flange (1) or (1a) (eg. by a flypress). Remove the screws (11) or circlip (20) release the spring pressure and dismantle the unit completely.

3. Maintenance

The brake is self adjusting. When the unit is operated at high-frequency and high pressure, a small quantity of oil may leak past the seals (9 and 10). On the dry running brake there is a drain plug (13), which may be fitted at the same level as the oil inlet, offset at 180° to it. The series 0-022-. . 1 are fitted with two drain holes at the same level as the inlet, and offset 180° to each other. An oil leakage return flow pipe may be connected to the drain holes, although for the dry running brakes, it is sufficient to drain the unit after every 5000 engagements, simply by removing the drain plug. A return pipe, if fitted must be vertical, such that the oil will return (at atmospheric pressure) under gravity.

4. Installation and maintenance faults

Fault	Cause	Cure
brake torque is reduced	plates are too worn	change plate pack (2.1)
	excessive oil leakage	drain oil and change contaminated plates (3 and 2.1)
	viscosity of oil is too high	use an oil of lower viscosity
brake becomes overheated	working pressure is too low	see 6
	viscosity of oil is too high	use an oil of lower viscosity
	stroke is restricted	take care to provide room for the full stroke when using an unit without pressur plate (15)

5. Working fluid

A hydraulic oil with a viscosity range of 45-70 mm^2/s 40 °C (mm^2/s = cSt) is required to actuate the brake. In the case of a wet running brake, the viscosity of the oil may not exceed 70 mm^2/s 40 °C, and should contain no additives likely to reduce the coefficient of friction between the plates (eg Hypoid oils). We recommend ATF oils. If a working fluid other than hydraulic oil is to be used, special seals are required. Please check with our engineers.

6. Control

The brakes are rated at a maximum working pressure of 320 bar. To disengage the brake requires:

Size 11 to 15 min. 19 bar standard version; 28 bar strengthened version.
Size 23 to 63 min. 12 bar standard version; 18 bar strengthened version. } (more pressure springs)
Size 69 min. 24 bar standard version; 38 bar strengthened version.

Thus the brakes can be put in the hydraulic motor circuit. In closed circuits, it is advantageous to position the brake in the line to the feed pump. The brake is normally placed in its own control circuit.

7. Examples of control circuits

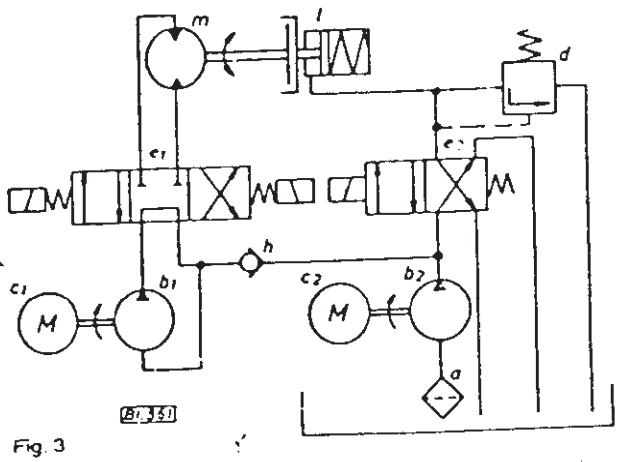


Fig. 3

a = filter
b, b_1 = pump
b_2 = filling pump
c, c_1, c_2 = electric motor
d = press. regulating valve
e, e_1, e_2 = multi-way valve
g = throttle (to reduce shock pressure)
h = non-return valve
l = brake
m = hydraullic motor

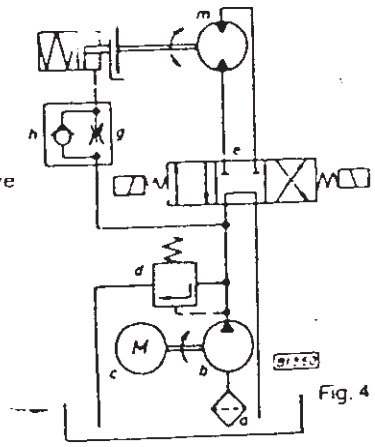


Fig. 4

7.1 Closed loop circuit: oil returned to intake (fig. 3). When the main valve for the hydraulic motor is actuated, the brake is simultaneously disengaged by a slave-valve.

7.2 Open loop circuit: oil returned to the sump. (fig. 4)

8. Spare parts

Replacement parts are designated as per figs. 1 and 2 overleaf. When ordering spare parts please give the factory number, which is to be found on the outer surface of the housing. In order to avoid delivery of incorrect parts, please place all orders in writing or by telex.

ORTLINGHAUS-WERKE GMBH – D-5632 WERMELSKIRCHEN – W.-GERMANY

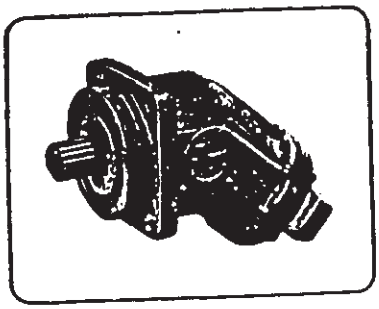
Postbox 1440 - Telephone (0 21 96) 8 51 - Telex 8 513 311 - Telegr.: Ortlinghauswerk Wermelskirchen

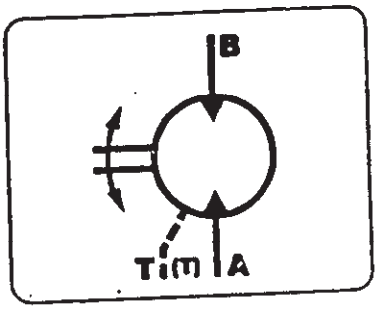
25.5.83 fisch page 2 (2) 4138381454210

MANNESMANN REXROTH
hmann+Stotterfoht

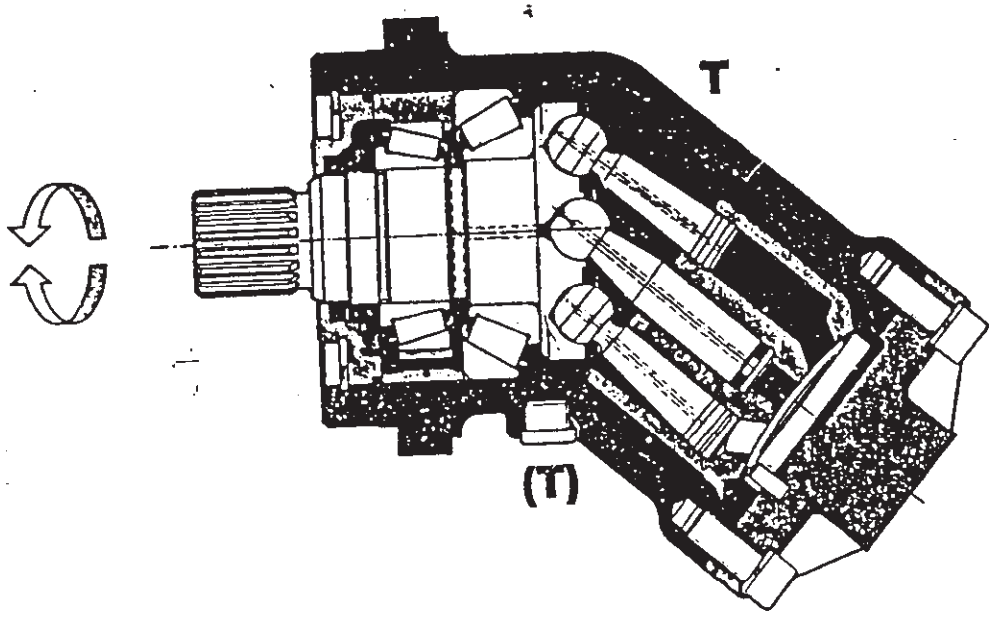
Konstantmotor
Fixed Displacement Motor

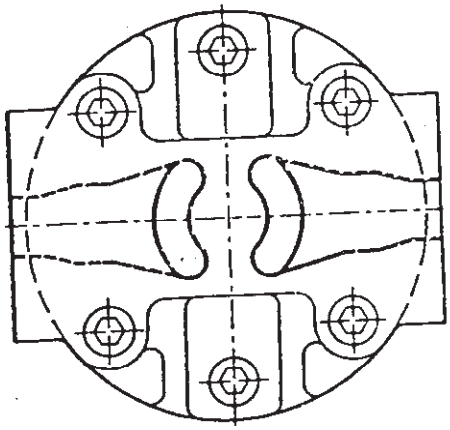
RDE 91001-L/05.86

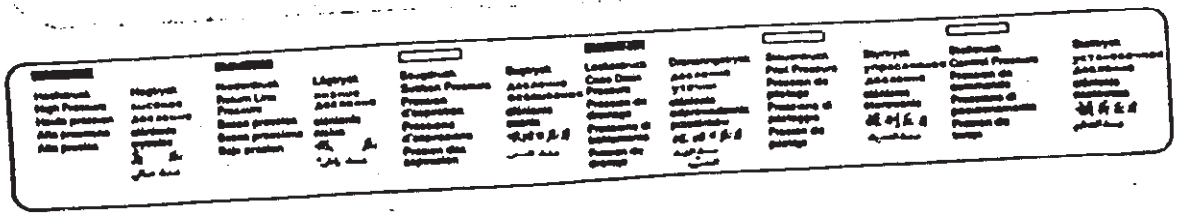




MANNESMANN REXROTH
Hydromatik
Brueninghaus Hydraulik
A2FM.../6
Index 1
Konstantmotor
Fixed Displacement Motor







MANNESMANN REXROTH
Lohmann+Stolterfoht

Konstantmotor
Fixed Displacement Motor

RDE 91001-L/05.86

Beschreibung
Konstantmotor mit Axial-Kegelkolben-Triebwerk in Schrägachsenbauart für hydrostatische Antriebe im offenen und geschlossenen Kreislauf.
Die Abtriebsdrehzahl ist proportional dem Schluckstrom und umgekehrt proportional dem Schluckvolumen. Das Abtriebsdrehmoment wächst mit dem Druckgefälle zwischen Hoch- und Niederdruckseite.
Der Motor ist geeignet für den Einsatz in mobilen und stationären Anwendungsbereichen.
Fein abgestufte Nenngrößen bieten weitgehende Anpassung an den jeweiligen Antriebsfall.
Die Axialkolbenmaschine A2FM ist ebenfalls für Pumpenbetrieb im geschlossenen Kreislauf einsetzbar.

Filterung
Entsprechend den Reinheitsklassen SAE 6, NAS 9 oder ISO 18/15. Gewöhnlich wird dies von Filterelementen mit dem Wert β 20–40 = 100 erreicht. Es ist darauf zu achten, daß sich der β-Wert mit steigendem Differenzdruck am Filterelement nicht verschlechtert.

Durchflußrichtung
Drehrichtung rechts = A nach B | Drehrichtung links = B nach A

Drehzahlbereich
Minimaldrehzahl n_{min} nicht begrenzt. Bei geforderter Gleichförmigkeit der Drehbewegung Drehzahl n_{min} nicht unter 50 min^{-1}. Maximaldrehzahl n_{max} siehe Wertetabelle.

Leckflüssigkeitsdruck
Je niederer die Drehzahl und der Leckflüssigkeitsdruck, desto höher die Standzeit des Wellendichtrings.
$p_{max} \leq 2$ bar (abs)
Höhere Werte sind mit anderen Wellendichtungen möglich.
Der Druck im Gehäuse muß gleich oder größer sein als der äußere Druck auf den Wellendichtring.

Optimale Wirkungsrichtung von F_q
Durch geeignete Wirkungsrichtung von F_q kann die durch die inneren Triebwerkskräfte entstehende Lagerbelastung vermindert werden.
Abweichungen von ± 35° von der optimalen Richtung sind zulässig. Bei größeren Abweichungen bitten wir um Rücksprache.

Einbaulage
Einbaulage beliebig. Das Motorgehäuse muß bei Inbetriebnahme und während des Betriebs mit Druckflüssigkeit gefüllt sein. Die Leckölleitung ist so zu verlegen, daß das Gehäuse bei Stillstand des Motors nicht leerläuft, d.h. das Leitungsende muß im Tank unter dem min. Ölspiegel einmünden.
Bei einem Höhenunterschied zwischen Tank und Konstantmotor A2FM größer 6 m bitte Rücksprache.
Zur Befüllung des Gehäuses und zum Anschluß der Leckölleitung ist in jeder Einbaulage der jeweils höchste Leckölanschluß T zu verwenden.

Description
Fixed displacement motor, bent axis design featuring conical pistons. For use in hydrostatic transmissions, open and closed circuits, with or without charge pressure on the outlet port.
Shaft speed is proportional to rate of flow with a given displacement and inversely proportional to displacement with a given rate of flow. Output torque is dependent on motor displacement and pressure differential between work ports.
The motor is suitable for both industrial and mobile applications.
A large selection of sizes is available for optimal application.
A model A2FM is also available as a pump for closed circuit applications.

Filtration
Corresponds to the Cleanliness Classification SAE 6, NAS 9 or ISO 18/15. This is normally achieved with filter elements having a value of β 20 - 40 = 100. Care must be taken to ensure that the β-value does not decrease when the differential pressure on the filter element increases.

Rotation
CW = A to B | CCW = B to A

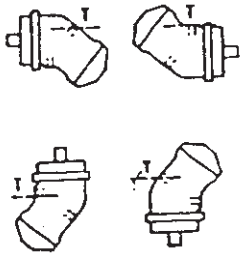
Speed range
Refer to specifications below. Minimum speed is not specified. Speeds of less than 50 rpm are not recommended when motor "ripple" is of concern.

Case pressure
The maximum case pressure p_{max} is 15 psi. The life of the shaft seal is increased when the shaft speed and case pressure are decreased.
Higher case pressure are possible through the use of optional shaft seal material and/or design.
The case pressure should be equal to or greater than the external pressure on the shaft seal.

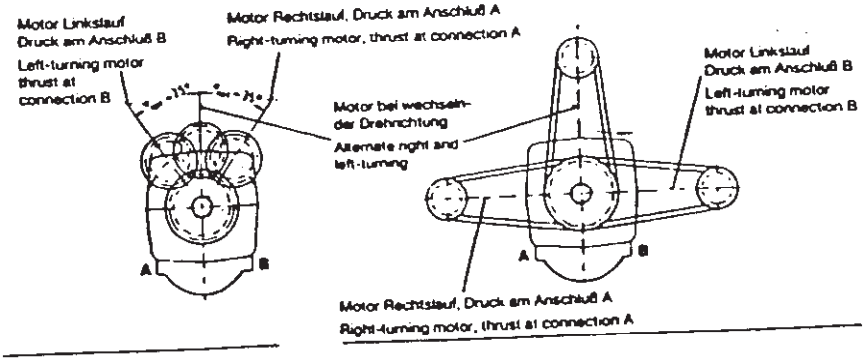
Radial shaft load (F_q)
Bearing life can be increased through selective positioning of the radial load on the drive shaft. Proper application of the radial load counteracts the internal forces from the rotating element which load the bearings.
A tolerance of + or – 35 degrees from the optimum is allowable. For deviations greater than this please consult the factory.

Mounting position
The A2FM motor may be mounted in any position. Take care to ensure that the bearings are immersed in hydraulic fluid at commissioning and remain immersed at all times thereafter, even when the unit is not in operation.
When mounting in a shaft-up position, special considerations regarding the case drain line are required to ensure that the motor bearings are always immersed in hydraulic fluid.
If the distance between the motor and the reservoir is greater than 20 ft. please consult the factory.

Einbaulage / Mounting attitude



Optimale Wirkungsrichtung von F_q / Optimal positive direction (for F_q)



Wertetabelle (theoretische Werte, ohne Berücksichtigung von η_{mh} und η_v; Werte gerundet)
Table of Values (theoretical data, not adjusted for η_{mh} and η_v; to nearest whole figures)

Nenngröße / Nominal size	NG		10	12	18	23	28	32	45	56	63	80	90	107	125	160	180
Schluckvolumen / Displacement vol.	V_g	cm^3	10.3	12.0	16.0	22.9	28.1	32.0	45.6	56.1	63.0	80.4	90.0	106.7	125.0	160.4	180.0
Max. Drehzahl / Max. speed	n_{max}	min^{-1}/rpm	6000	6000	6000	4750	4750	4750	4250	3750	3750	3350	3350	3000	3000	2650	2650
Max. Schluckstrom / Max. displac. flow	Q_{max}	l/min	62	72	96	109	133	152	194	210	236	269	301	320	375	425	477
Drehmomentkonstante / Fixed torque	M_t	Nm/bar	0.164	0.19	0.25	0.36	0.445	0.509	0.725	0.89	1.0	1.27	1.43	1.70	1.99	2.54	2.86
Masse (ca.) / Mass (approx.)	m	kg	5.4	5.4	5.4	8.5	8.5	8.5	13.5	18	18	23	23	32	32	45	45

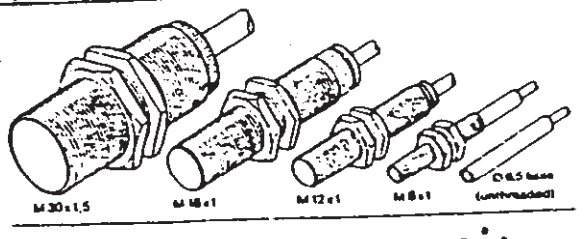
LOHMANN+STOLTERFOHT

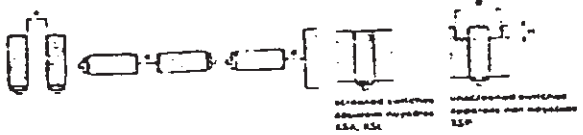
MANNESMANN REXROTH

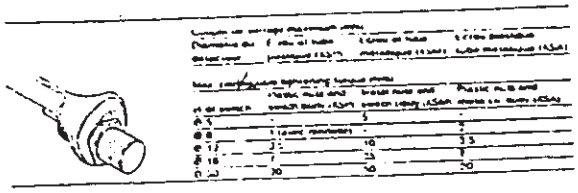
Lohmann+Stolterfoht

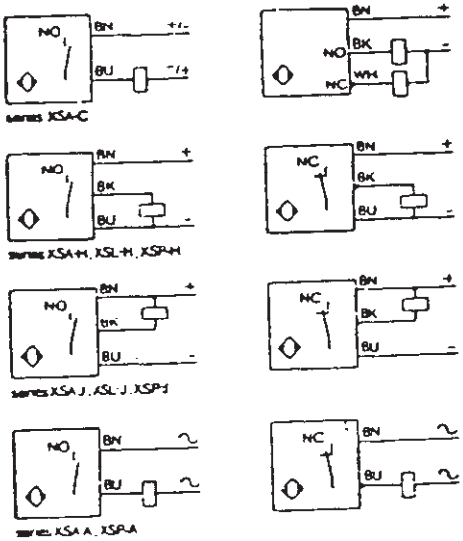
DEUTSCH
Induktive Näherungsschalter Baureihe XSA, XSL, XSP
Bauform A gemäß DIN EN 50008/50036/50040

ENGLISH
inductive proximity switches type XSA, XSL, XSP
standardised to CENELEC; form A









Fixing
Depending on model
M30 x 1.5, M18 x 1, M12 x 1, M8 x 1, Ø 6.5 unthreaded.
Care should be taken when mounting the Ø 6.5 mm unthreaded model, to ensure that no pointed screws are used to locate it, with the attendant risk of damage.
The use of a saddle clamp, ref. XSA-Z165 is recommended.
Setting-up procedure: L.E.C. indicator
Most models incorporate a "light-emitting diode" indicator lamp, which illuminates whenever the proximity switch output is "on".

N.B.: C 6.5 and 8 mm models
Whenever these models are mounted on a moving part of a machine, care should be taken to ensure that the cable leaving the switch is supported for at least 10 cm; such that any flexing of the cable is at the area of greatest radius of curvature. It is possible to support the cable where it leaves the switch, with a heat-shrink sleeve, in order to provide further protection if required.

Mounting precautions, minimum distances (mm)

Between switches	XSA, XSL-H01	H02 C02 A02	C05 H05 A05	C10 H10 A10
- side by side	e = 0	e = 0	e ≥ 10 mm	e ≥ 20 mm
- face to face	e ≥ 15 mm	e ≥ 15 mm	e ≥ 80 mm	e ≥ 120 mm
Bet. switches and surrounding metal				
- opposite	e ≥ 3 mm permissible	e ≥ 6 mm permissible	e ≥ 15 mm permissible	e ≥ 30 mm permissible
- flush mounting in metal				

Between switches	XSP-H01	H04 A04	H08 A08	H15 A15
- side by side	e ≥ 5 mm	e ≥ 15 mm	e ≥ 25 mm	e ≥ 40 mm
- face to face	e ≥ 22 mm	e ≥ 60 mm	e ≥ 100 mm	e ≥ 100 mm
Bet. switches and surrounding metal				
- opposite	e ≥ 4.5 mm D = 24 mm H = 3 mm	e ≥ 12 mm D = 36 mm H = 8 mm	e ≥ 24 mm D = 54 mm H = 16 mm	e ≥ 45 mm D = 90 mm H = 30 mm
- flush mounting in metal				

Wiring
Before switching on:
– Check that the supply voltage is compatible with the switch to be used.

– Switches for use on DC
• 2-wire types: XSA-C
The XSA-C10 and XSA-C05 models incorporate both N/O and N/C outputs, both of which may be used. For N/O the load should be connected between the black wire and the negative line, and for N/C, between the white wire and the negative line.
• 3-wire types:
XSA-H/XSL-H/XSP-H: the positive side of the load should be connected to the black wire and the negative line.
XSA-J/XSL-J/XSP-J: the negative side of the load should be connected to the black wire and the positive, to the positive line.

Please note that the XSA-H05/H10, XSA-J05/J10 models incorporate protection against output overload and short-circuit, as well as supply line reverse polarity.

– Switches for use on AC
• 2-wire models: XSA-A/XSP-A
The load should be wired in series with the proximity switch.

N.B.: to prevent damage due to short-circuit it is recommended that a "quick-blow" 800 mA (*) fuse be incorporated, in series with the switch (ref. XUZ-E08).

Montage
Einbau in Durchgangsbohrung Ø ø12/18/30
Befestigung mit Sechskantmuttern M6 x 1/M12 x 1/M18 x 1/M30 x 1.5
Bei der Bauform Ø 6,5 (glatte Hülse) darf die Befestigung nicht mit Spitzschrauben erfolgen. Befestigungsschelle XSA Z165 verwenden.

Anwendungshinweise: Funktionsanzeige. Bei Geräten, die mit einer Funktionsanzeige ausgestattet sind, leuchtet diese bei durchgesteuertem Ausgang.
Anmerkung: Bauform Ø 6,5 und M6 x 1
Besteht die Basis oder Geräte- und Leitungsbefestigung aus beweglichen Teilen, dann sind folgende Schutzmaßnahmen für den Leitungsausgang zu beachten.
Die Leitung ist im Abstand < 10 cm vom Gerät aus abzufangen; danach kann der bewegliche Leitungsübergang in Form einer großen Schleife beginnen. Durch Umhantelung der Leitung einschließlich des Geräteendes mit Schrumpfschlauch kann auch ein Schutz für den Leitungsausgang vorgenommen werden.

Montageabstände (mm)

XSA, XSL-	H/J01...	H/J/C/A02...	H/J/C/A05...	H/J/C/A...
Näherungsschalter untereinander				
- nebeneinander	e = 0	e = 0	e ≥ 10 mm	e ≥ 20 mm
- gegenüber	e ≥ 15 mm	e ≥ 15 mm	e ≥ 60 mm	e ≥ 120 mm
Näherungsschalter und Metallmassen				
- gegenüber	e ≥ 3 mm möglich	e ≥ 6 mm möglich	e ≥ 15 mm möglich	e ≥ 30 mm möglich
- bündig eingebaut				

XSP-	H/J01...	H/J/A04...	H/J/A08...	H/J/A15...
Näherungsschalter untereinander				
- nebeneinander	e ≥ 5 mm	e ≥ 15 mm	e ≥ 25 mm	e ≥ 40 mm
- gegenüber	e ≥ 22 mm	e ≥ 60 mm	e ≥ 100 mm	e ≥ 100 mm
Näherungsschalter und Metallmassen				
- gegenüber	e ≥ 4,5 mm D = 24 mm H = 3 mm	e ≥ 12 mm D = 36 mm H = 8 mm	e ≥ 24 mm D = 54 mm H = 16 mm	e ≥ 45 mm D = 90 mm H = 30 mm
- bündig eingebaut				

Anschluß
– Geräteneinsspannung und Betriebsspannungsquelle auf Übereinstimmung prüfen.
– Geräte für Gleichspannungssteuerkreise
• 2-Draht-Technik XSA-C...
Das Gerät ist in Reihe mit der Last an die Betriebsspannung anzuschließen. Die Geräte sind unpolarisiert und kurzschlußfest, ausgenommen die Ausführungen mit W-Funktion (O+S). Bei diesen Geräten muß die Last am S-Ausgang (schwarzer Leiter) bzw. O-Ausgang (weißer Leiter) angeschlossen werden; die Funktionsanzeige leuchtet nur, wenn der S-Ausgang belegt ist.
• 3-Draht-Technik
p-schaltend XSA-H... XSL-H... XSP-H...
Anschluß der Last: zwischen dem Ausgang (schwarzer Leiter) und –Betriebsspannung
n-schaltend XSA-J... XSL-J... XSP-J...
Anschluß der Last: zwischen dem Ausgang (schwarzer Leiter) und +Betriebsspannung.
Anmerkung: Die Ausführungen XSA-H05.../H10... /J05.../J10... sind intern gesichert gegen Verpolung, Kurzschluß und Überlast.
– Geräte für Wechselspannungssteuerkreise.
• 2-Draht-Technik XSA-A... XSP-A...
Das Gerät ist in Reihe mit der Last an die Betriebsspannung anzuschließen.
Anmerkung: Diese Geräte haben keinen Kurzschlußschutz und sollten möglichst in Reihe mit einer Spezialsicherung angeschlossen werden. 0,8 A Charakteristik flink, 5 x 20 mm (XUZ-E08).

Lube Oil Recommendations
Survey

Supersedes edition 11. 80

1. General

The gear unit lubricants recommended by L+S are CLP gear oils and HD motor oils.

The previously valid editions of lubricant group specifications SS, UU, PP, PP-U1, HH, HP, FF, FW are now replaced by LSN 935 1410 and LSN 935 1420.

2. LSN 935 1410 "L+S Lube Oil Recommendations; CLP 22 - 1000"

This specification includes CLP oils in accordance with DIN 51517, part 3. Other oils which meet or even surpass CLP requirements have also been included (e.g.hydraulic oils, motor oils or poly-alphaolefin oils).

It should be noted that not all of the oils included in these L+S specifications are suited for every conceivable application. For this reason L+S groups, LS1, LS2 and LS3 have been established (refer to Sheet 2).

Shop standard LSN 935 1410 is divided according to ISO viscosity classes.

LSN designation of a CLP oil:

CLP 100 / Group LS2 to LSN 935 1410

The required L+S groups have to be specified by the Design Divison!

When selecting a certain oil brand it must be ensured that all the requirements of the L+S groups specified by the Design are satisfied.

In case that requirements of further L+S lubrication groups are met by a given oil, this oil can still be used for the application.

3. LSN 935 1420 "L+S Lube Oil Recommendations; Motor Oil HD SAE 20,30 and 40"

This shop standard includes unigrade motor oils according to DIN E 51502 8.88 (plain or with additives) which do not significantly reduce the coefficient of friction in multiple disk clutches (sintered material or organic lining).

LSN designation of an HD oil:

HD SAE 200 to LSN 935 1420

4. Requirements to be Met by CLP and HD Oils

4.1. C L P Oils

Mineral oils with additives increasing corrosion protection and ageing resistance as well additives which reduce wear in the area of mixed friction and polyalphaolefin oils (oils an the basis of synthetic hydrocarbons) which satisfy the demands specified for gear oils according to DIN 51517, part 3.

4.1.1 L+S Groups for CLP Oils

LS1: These oils have attained breakdown-load stage 12 in stringent FZG testing A16,6/90.

LS2: CLP oils compatible with multiple disks; when using these oils tested in accordance with Regulation 5021-40/0.6.2. of M/s Ortlinghaus under the conditions listed below the

friction coefficients : $\mu_{stat} = 0.12$
$\mu_{dyn} = 0.08$
are not fallen short of.

Friction couple : Steel/sintered lining (wet running)
sintered material quality
(5021-40 to Ortlinghaus)
Friction surface pressure: p = 0.6 - 1.6 N/mm²
Sliding velocity : v = 6.7 - 16.7 m/s
Oil sump temperature : 60 to 80°C

LS3: Polyalphaolefin oils tend to foaming when mixing with preservation oil remnants (detergent, dispersive oils). Therefore, the unit is to be flushed out with a suitable purging oil or a mineral oil is to be used for running-in.

4.2 HD SAE Motor Oils

Unigrade motor oils (plain or with additives) which do not significantly reduce the coefficient of friction in multiple disk clutches (sintered material or organic lining); suitable for peak temperatures of up to 180°C arising in multiple disk clutches during actuation.

static friction coefficient $\mu_{stat} \geq 0.12$
dynamic friction coefficient $\mu_{dyn} \geq 0.08$

Designation to DIN E 51502 8.88: HD SA-SF SAE 20,30 or 40
HD CA-CD SAE 20,30 or 40

5. Comparsion between Old and New Lube Oil Recommendations

Comparison between Groups	
Old	New
PP...	CLP...
PP...-U1	CLP...LS2
HP	CLP...
HH...	CLP...LS1
SS...	CLP...
FF...	CLP...
FW...*	CLP...*
UU 40	HD SAE 20
UU 63	HD SAE 30
------	HD SAE 40 (new)

Comparison of the Viscosity of CLP Oils				
Old			New (ISO-VG) to DIN 51519	
Viscosity Range	Viscosity at 50°C mm²/s(cSt)	Viscosity at 40°C mm²/s (cSt)	ISO iscosity Class	Viscosity at 40°C mm²/s (cSt)
16	12,5- 20	17 - 28	ISO-VG 22	19,8 - 24,2
25	20 - 31,5	28 - 49	ISO-VG 32	28,8 - 35,2
			ISO-VG 46	41,4 - 50,6
40	31,5- 50	49 - 80	ISO-VG 68	61,2 - 74,8
63	50 - 80	80 - 135	ISO-VG 100	90 - 110
100	80 -125	135 - 220	ISO-VG 150	135 - 165
			ISO-VG 220	198 - 242
160	125 -200	220 - 360	ISO-VG 320	288 - 352
250	200 -315	360 - 600	ISO-VG 460	414 - 506
400	315 -500	600 - 1050	ISO-VG 680	612 - 748
			ISO-VG 1000	900 -1100

* The old lubrication group FW related to low temperature applications.

This oil brand is to be selected from the CLP... range to suit the individual application and this choice must be verified.

The pour point may serve as an indication.

It must, however, not be confused with the lowest temperature of the application range !!!

Lube Oil Recommendations

CLP 460

Old LSN Designation: PP 250

CLP Oils

Mineral oils with additives increasing corrosion protection and ageing resistance as well as additives which reduce wear in the area of mixed friction and polyalphaolefin oils (oils on the basis of synthetic hydrocarbons) which satisfy the demands specified for gear oils according to DIN 51517,part 3.

Designation to DIN 51517,part 3 : CLP 460

ISO viscosity acc.to DIN 51519 : ISO - VG 460

Kinematic viscosity at 40 °C : min. 414,0 mm^2/s (cSt)
: max. 506,0 mm^2/s (cSt)

FZG testing A8,3/90 to DIN 51354/2 : min. breakdown-load stage 12

Oil-Comp.	Oil Brand	Pourp.* in °C	L+S Group** LS1	LS2	LS3
Agip	BLASIA 460	-14	x		
Aral	Degol BG 460 Degol TU 460	-18 -12	+		
AVIA	AVILUB RSX 460	-15	x		
BP	Energol GR-XP 460	-12	x		
Castrol	Alphasyn T 460 Alpha SP 460 Alpha ZN 460	-39 -3 -9	x x		x
Chevron	NL Gear Compound 460	-18	x		
DEA	Falcon CLP 460	-15	x		
ESSO	SPARTAN EP 460	-15	x		
ELF	REDUCTELF SP 460 ELF EPONA Z 460 REDUCTELF SYNTHESE 460	-15 -15 -45	x x x		x
FINA	GIRAN L 460	-18	x		
Fuchs	RENEP COMPOUND 110	-15	x		
Klüber	LAMORA 460	-17			
Mobil	Mobilgear 634 Mobilgear SHC 460	-11 -46	x		x
Shell	Omala Öl 460	-15	x		
TOTAL	CARTER EP 460	-18	x		
Tribol	Tribol 1100/460 Tribol 1510/460	-21 -33	x		x

* The pour point must not be confused with the lowest temperature of the application range !

** If for the gearbox lubricant to be used there is no indication as to a specific L+S group, any of the oil brands specified above may be used.

L+S lubrication groups to be in accordance with LSN 935 1400

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Fax (00852) 6911641
Telex (0802) 35623 cdsas hx

INDIEN / *INDIA*

Industrial- and Mobile-Sector
G.L. Rexroth Industries Ltd.
Stanrose House
New Prabhadevi Road
BOMBAY 400025
Tel. (0091) 22/4301030
Fax (0091) 22/4300212
Telex (051) 1173879 glr in
Sales office in Ahmedabad

Marine-Sector
Equip Engineers India PVT. Ltd.
1512 Maker Chambers V
221 Nariman Point
BOMBAY 400021
Tel. (0091) 22/2043635
Fax (0091) 22/2045157
(0091) 22/2045916
Telex (091) 116404 cone in

IRAN

Iran Hydraulic Systems Co. Ltd.
P.O.B. 19-395-3636
TEHERAN
Tel. (0098) 21/4883518
(0098) 21/4889089
Telex (088) 213636-9 lpba ir
(attn. d 5067)

JAPAN

Nippon Ican Ltd.
8th floor, Shin-Chuo-Bldg.
(Kyobashi) 1-5, 1 Chome
Shintomi, Chuo-Ku
TOKYO 104
Tel. (0081) 3/5527781
Fax (0081) 3/5550681
Telex (0720) 2523688 icansp j

KAMBODSCHA
CAMBODIA

Address see HONG KONG

LAOS

Address see HONG KONG

MALAYSIA

Rexroth Sendirian Berhad
No. 5 Lorong ss 13/6B
Subang Jaya Industrial Estate
47500 PETALING JAYA,
SELANGOR
Tel. (0060) 3/7344870
Fax (0060) 3/7344864
Telex (084) 37788 rex mal

NORD-KOREA
NORTH KOREA

Address see HONG KONG

PAKISTAN

Jimson Associates Ltd.
P.O.Box 2117
51, McLeod Road
LAHORE 6
Tel. (0092) 42/63704
Telex (082) 44067 jimsn pk

PHILIPPINEN
PHILLIPINES

Industrial- and Mobile-Sector
Conell Bros. Company
Pilipinas, Inc.
The Cougar Building
114 Valero Street
Salcedo Village
Makati
METRO MANILA
Tel. (0063) 2/817-3694
(0063) 2/817-1178
Fax (0063) 2/817-1235
Telex (075) 66524, 22155, 14856

SINGAPUR
SINGAPORE

Industrial- and Mobile-Sector
G.L. Rexroth Pte. Ltd.
19, Kian Teck Way
SINGAPORE 2262
Tel. (0065) 2656033
Fax (0065) 2650813
Telex (087) 24551 rexsing rs

Marine-Sector
Schottel Far East (Pte.) Ltd.
23 Gul Drive
SINGAPORE 2262
Tel. (0065) 8610955
Fax (0065) 8612301
Telex (087) RS 24715

SÜD-KOREA
SOUTH KOREA

Mobile- and Industrial-Sector
Intersco Korea Branch
Room 313, Nonnyun Bldg.
37-12 Jamwondong Seocho-Ku
SEOUL
Tel. (0082) 2/544-9855
Fax (0082) 2/544-9857
Telex (0801) k 27989 mskor

MANNESMANN REXROTH Lohmann+Stolterfoht	Hinweise für Ersatzteilbestellungen Details for Spare Part Orders	liste list B 81

Zur besonderen Beachtung bei Ersatzteilbestellungen:

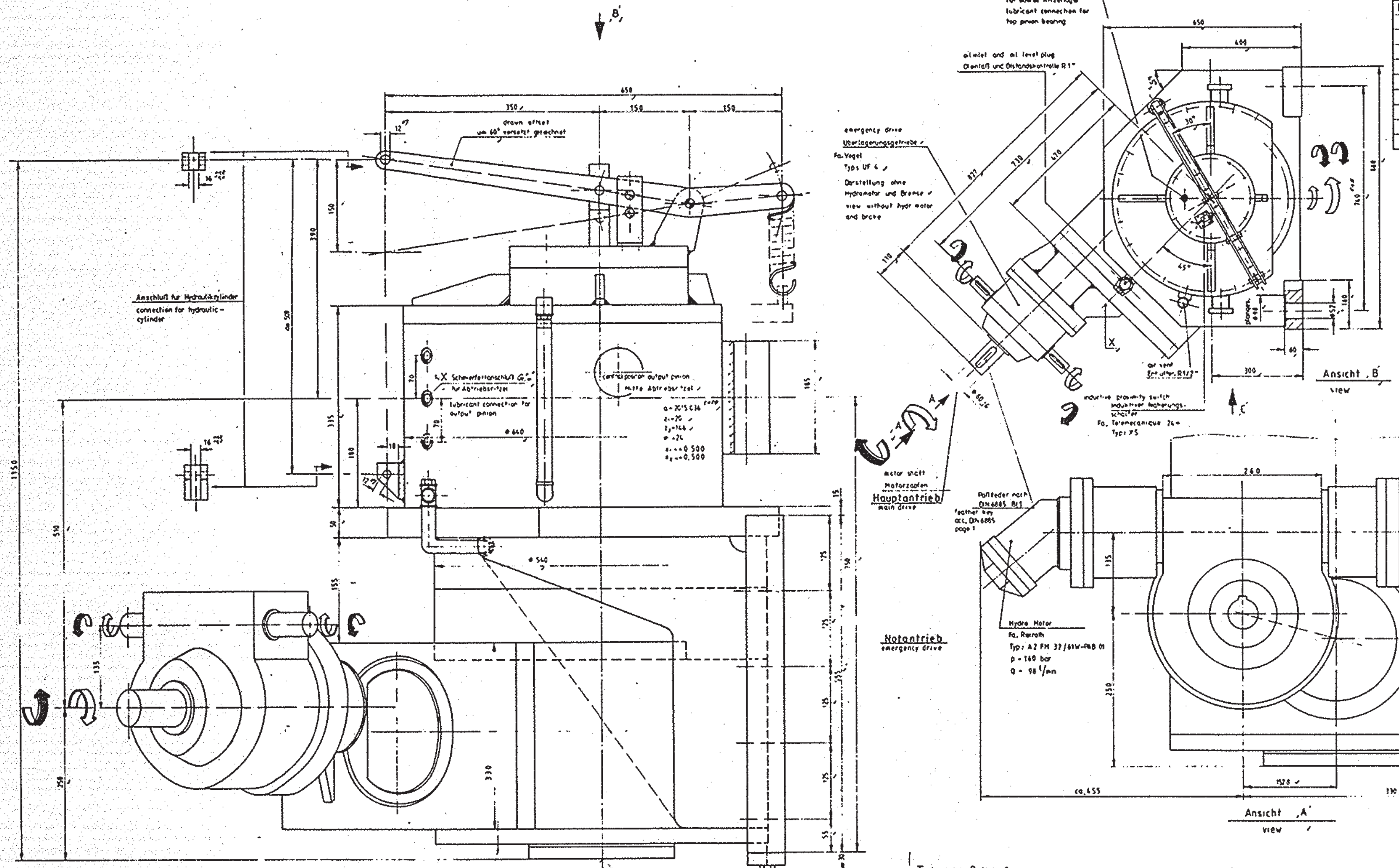
1. Ersatzteilbestellungen bitten wir möglichst schriftlich aufzugeben. In dringenden Fällen genügen zunächst telefonische oder telegrafische Bestellungen, wenn diese umgehend schriftlich bestätigt werden.
2. Die Bestellung muß folgende Angaben enthalten:
   a) die auf dem Leistungsschild unserer Erzeugnisse aufgeschlagene Fabrikat- und Auftragsnummer.
   b) Stückzahl der benötigten Ersatzteile.
   c) die in den Ersatzteillisten aufgeführte Teilnummer, Benennung und Sachnummer des Ersatzteiles.
   d) die gewünschte Versandart (z.B. Express, Frachtgut, usw.).
3. Bestellungen nehmen alle unsere in Liste RDE 80 103 aufgeführten Außenstellen entgegen.

When ordering spare parts please note the following:

1. Kindly let us have spare part orders in writing. In urgent cases, orders by telephone or telegraph will be sufficient, when these are confirmed in writing by return.
2. The order must contain the following data:
   a) the type- and order-No. shown on the rating plate of our products.
   b) quantity of spares.
   c) the part number, denomination, and drawing number of the spare part mentioned in the spare part lists.
   d) the required means of dispatch (e.g. by express, by ordinary freight, etc.).
3. Our agencies listed in "List RDE80are entitled to book orders.

REFERENCE DRAWING

DWG-No.	TITLE
ERO-CBA-13.50.50 -1000/ZSZ-000	DRIVE UNIT



Zeichnungsdaten			Rad 1
Verzahnungsart			Außen
Zähnezahl	z		20.
Modul	mn	mm	26.
Steigungsrichtung			Geradverzahnung
Profilverschiebungsf.	x		0,3
Zahnhöhe	h	mm	57,615
für Nenn-Kopfkreisdurchmesser und Mitte Zahnweitentoleranz			
Achsabstand	a	mm	2015,04
	Aao	mm	0,33
	Aau	mm	-0,33
Grundkreisdurchmesser	dg	mm	451,052
Teilkreisdurchmesser	d0	mm	480.
Kopfkreisdurchmesser	dk	mm	550.
Toleranz von dk	Tdk	mm	+0,3
min. Evolventenlänge	levmin	mm	93,251
zulässiges Flankenspiel	Snzul	mm	2,261
erforderl. Flankensp.	Snerf	mm	0,342
DIN-Qualität			8.
Werkzeug-Bezugsprofil			Luß 17
Meßzähnezahl	z'		3.
Zahnweite	W max	mm	191,419
	W min	mm	191,31
Werkstoff			16 Mn Cr 5
Bestellvorschrift			909 8012
Wärmebehandlung			einsatzgehärtet
Eht nenn nach LEW 944 0486			2,25
Oberflächenhärte	HRC min		58.
	HRC max		62.
Bearbeitung der Zahnfußrundungen			gefräst
max. Rauhtiefe der Fußrundung Rz		mm	0,025
Bearbeitung der Zahnflanken			geschliffen
max. Rauhtiefe der Flanke Rz		mm	0,006
Zahnformkorrektur			Kopfrücknahme
Kopfrücknahme	aR	mm	0,054
Rücknahmehöhe	hR	mm	13,195
Ev. Abwälzlänge Krn.	aR	mm	28,379
Schablonennennwinkel	αnsch	Grad	3.

Zahnformkorrektur Rad 1

Flankenform

Technische Daten :
technical data

Hauptantrieb main drive		Notantrieb emergency drive
Antriebsleistung input capacity	P = 22 kW	
Nenn-Antriebsmoment input torque nom.	T_{1nom} = 140 Nm	77 Nm
Max.-Antriebsmoment input torque max.	T_{1max} = 355 Nm	
Antriebsdrehzahl input speed	n_1 = 1600 min⁻¹	2900 min⁻¹
Übersetzung ratio	i = 203,47	812,23
Abtriebsdrehzahl output speed	n_2 = 7,89 min⁻¹	3,63 min⁻¹
Nenn-Abtriebsmoment output torque nom.	T_{2nom} = 26448 Nm	45000 Nm
Max.-Abtriebsmoment output torque max.	T_{2max} = 72000 Nm	
Lagerlebensdauer bearing life time	L_h ≥ 25000 h	
Schmiergruppe lubrication group	= CLP 460	
Differenzdruck diff.-pressure	p =	160 bar
Schluckstrom flow	Q =	98 l/min

FINAL

INSTALLATION DWNG. No. 0/3785/5269/1

Umlaufende Teile müssen vom Käufer gegen unbeabsichtigtes Berühren geschützt werden!

The purchaser has to protect all rotating parts against touching.

0/3785/5269/1

CIM PROJECT		ERDEMIR / EREĞLİ DEMİR ve ÇELİK FABRİKALARI T.A.Ş.	
PROJECT NAME	ERDSLAB		
PO NO.	YI-511/1703-5800(08)	DWG CODE / MICROFILM No	

EMC 4

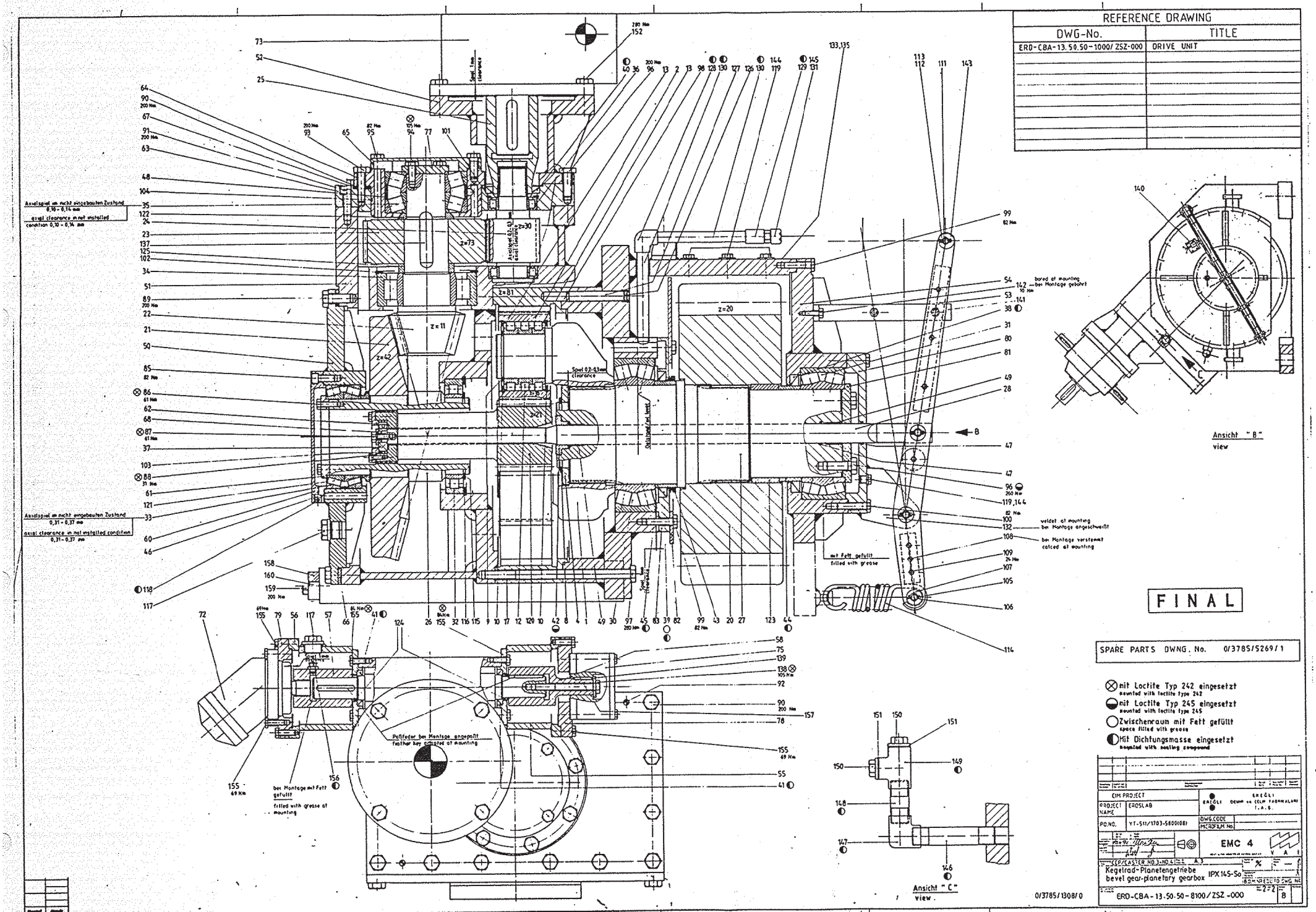
Kegelrad-Planetengetriebe
bevel gear-planetary gearbox
IPX 145-So

ca.1850

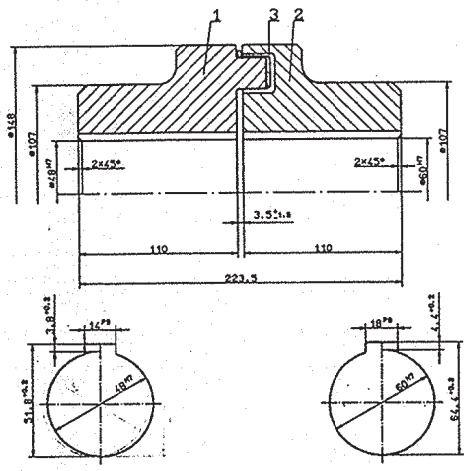
ERD-CBA-13.50.50-8100/ZSZ-000

1:2

B


REFERENCE DRAWING
DWG-No.
TITLE
ERD-CBA-13.50.50-1000/ZSZ-000
DRIVE UNIT
Axialspiel im nicht eingebauten Zustand 0,10 – 0,16 mm
axial clearance in not installed condition 0,10 – 0,16 mm
Axialspiel im nicht eingebauten Zustand 0,31 – 0,37 mm
axial clearance in not installed condition 0,31 – 0,37 mm
Ansicht "B"
view
Ansicht "C"
view
FINAL
SPARE PARTS DWNG. No. 0/3785/5269/1
mit Loctite Typ 242 eingesetzt
mounted with loctite type 242
mit Loctite Typ 245 eingesetzt
mounted with loctite type 245
Zwischenraum mit Fett gefüllt
space filled with grease
Mit Dichtungsmasse eingesetzt
mounted with sealing compound
EIM PROJECT
PROJECT NAME EROSLAB
PO.NO. YT-511/1703-5800108
DWG.CODE
MICROFILM No.
EMC 4
Kegelrad-Planetengetriebe
bevel gear-planetary gearbox
IPX 145-S0
ERD-CBA-13.50.50-8100/ZSZ-000
B
0/3785/1308/0

REFERENCE DRAWING	
DWG-No.	TITLE
ERD-CBA-13.50.50-1000/ZSZ-000	DRIVE UNIT



KUPPLUNGS DATEN:
COUPLING DATAS
Tkmax.=800 Nm
n max.=4500 min-1

FINAL

TSCHAN Teile Nr.:	CAD	ERD-CBA-13.50.50-8350/AFS-000	
P.I.V. TSCHAN		Maßstab 1	
		ELAST. NOR-MEX KUPPLUNG FLEX. NOR-MEX COUPLING E 148 GG SPECIAL LENGHT	
	P.I.V. TSCHAN GmbH 6680 Neunkirchen	91.3-1019	

CIM PROJECT		EREĞLİ DEMİR ve ÇELİK FABRİKALARI T.A.Ş.	
PROJECT NAME	EROSLAB	DWG.CODE	
PO.NO.	YT-S11/1703-5800(08)	MICROFILM No.	
91-12-15	OBER	EMC 4	
CCP/CASTER NO.3+NO.4	A.3		
LADLE TURRET DRIVE UNIT ELASTIC COUPLING		B.O.M NR.EQU.TO DWG. NR.	
ERD-CBA-13.50.50-8350/ZSZ-000		B	

STUECKLISTE
Bill of Material

Abt.: EMC 5

VOEST-ALPINE INDUSTRIEANLAGENBAU

ANLAGE/KUNDE Plant/Purchaser
C.C. PLANT ERDEMIR
CASTER NO.3 AND NO.4

Item No.: A. 3

VAI-Zng.Nr.: ERD-CBA-13.50.50-8350/STL-000
DWG.NO.:

SEITE-Nr.: 1 von 1 Rev.

AENDERUNGEN Revision					BEARBEITET Prepared by	
Zeile line	Rev.	DATUM Date	NAME	GEPRUEFT Checked	DATUM Date	NAME
					08.01.92	DOBER
					GEPRUEFT Checked by	
					DATUM Date	NAME
					. .	DOBER

BENENNUNG Designation
LADLE TURRET
DRIVE ELASTIC COUPLING
NOR-MEX E 148 GG

GES.MASSE [kg] Total Weight: 12.0

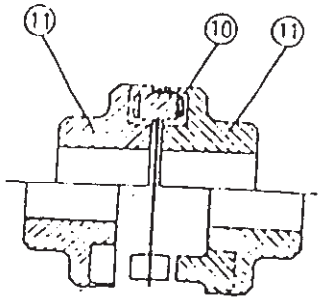
	SACH-Nr. POS.-NR. Item No. Pos.No.	Zchngs.F.	MENGE Quantity	BENENNUNG GEGENSTAND Designation subject	WEIGHT [kg] Item / Total	WERKSTOFF Material NORM standard	BEMERKUNG remarks
1	0001	-	1	KUPPLUNGSNABE coupling hub	5.5	GG 20	No.1013014 A58
2	0002	-	1	KUPPLUNGSNABE coupling hub	5.5	GG 20	No.1013014 A45
3	0003	-	1	ELAST.ZWISCHENRING flexible spider	1.0	Pb S	No.0100514075
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

FINAL

Flexible NOR-MEX Coupling
Type E
Assembly Instructions

GB 82 4 1157

01.03.1983



Item 10 Flexible Element

Item 11 Coupling Hub

The Nor-Mex coupling type "E" is one of the family of highly flexible elastomeric shaft couplings, accommodating axial, angular and radial mis-alignments.

Torque is transmitted via a one piece flexible element with high damping properties, which is also oil and temperature resistant.

To ensure easy assembly of the coupling, we would suggest that the element is dusted with a lubricant such as talcum powder or similar.

After assembly of the coupling halves, ensure that they are no closer than the recommended clearances "S1", or overall length "LE" as shown in the catalogue or drawing.

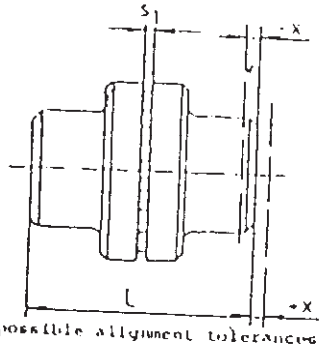
Maximum element life will be obtained when the coupling is accurately aligned. We would suggest that using a straight edge, the coupling is aligned as shown in the drawing below. The straight edge being placed on the outside diameter of the coupling.

The chart below gives the optimum mis-alignments commensurate with maximum element life and associated bearing life, together with ease of assembly.

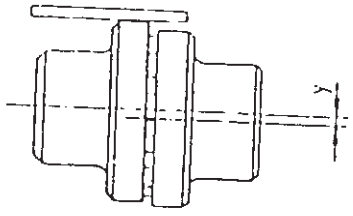
In special cases where noiseless operation and low vibration amplitudes are required, the three forms of mis-alignments must each be reduced to below 0,1 mm.

During use, the flexible Nor-Mex coupling is maintenance free. It is advisable to re-new the element during general plant overhauls.

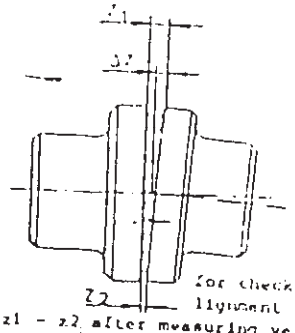
AXIAL OFF-SET



RADIAL-OFF-SET



ANGULAR-OFF-SET



Maximum possible alignment tolerances

for check-up mis-alignment read $\Delta z = z1 - z2$ after measuring vertically and horizontally over 1/2 turn.

NOR-MEX	50	67	82	97	112	128	148	168	194	214	240	265	295	330	370	415	480	575
x (mm)	± 0,5	± 1	± 1	± 1	± 1	± 1	± 1	± 1,5	± 1,5	± 2	± 2	± 2,5	± 2,5	± 2,5	± 2,5	± 2,5	± 2,5	± 2,5
y (mm)	0,2	0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5	0,5
Δz (mm)	0,1	0,1	0,1	0,1	0,1	0,1	0,12	0,12	0,12	0,15	0,15	0,15	0,15	0,15	0,2	0,2	0,2	0,2

Techan GmbH Postfach 2100 D-6680 Neunkirchen-Saar Telefon (06821) 866-0 Telex 4 44 810 Telefax (06821) 86353