



भारतीय अन्तर्देशीय जलमार्ग प्राधिकरण
(पत्तन, पोत परिवहन और जलमार्ग मंत्रालय, भारत सरकार)
INLAND WATERWAYS AUTHORITY OF INDIA
(Ministry of Ports, Shipping and Waterways, Govt. of India)



क्षेत्रीय कार्यालय :
गायघाट, पोस्ट-गुलजारबाग
पटना (बिहार)-800 007
ई-मेल : dirpat.iwai@nic.in

Regional Office :
Gaighat, P.O.-Gulzarbagh
Patna (Bihar) - 800 007
E-mail : dirpat.iwai@nic.in

File no.-12/IWAI/ENGG/P(02)/2024-25/ 592

Dated: 03-07.2025

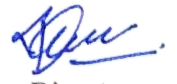
NOTICE INVITING QUOTATION

Sub: Budgetary rate/quotation for retrofitting, replacement, or repairing of the dredge pump coupling unit of CSD Yamuna at Gaighat, Patna.

Inland Waterways Authority of India (IWAI) invites sealed budgetary rate quotations from reputed agencies, suppliers, manufacturers, repairers, or shipbuilders for retrofitting, replacement, or repairing of the dredge pump coupling unit of CSD Yamuna, including fitting of the existing "PNEUMAFLEX" highly elastic friction clutch, manufactured by Lohmann & Stolterfoht, installed between the Caterpillar engine (1061 BHP / 791 kW) and the dredge pump on CSD Yamuna, as per specifications, sample, and drawing (drawing enclosed). The details for the BOQ are enclosed as Annexure I & II.

Terms & Condition: -

1. No advance payment will be made.
2. The firm shall be submitting the copy of PAN Card, GST Registration, cancel cheque/Bank and firm registration certificate.
3. The price may be quoted both in figures & words including all the cost such as; taxes etc. No other extra charges will be entertained.
4. The repair shall be completed within 15 days from receipt of the work order.
5. In case of delay in completion of the above repairing work and delivery, liquidated damages will be applicable @1.0% per week subject to a maximum 10% on the total value of the contract.
6. 90% payment will be made by cheque within 15 days from the date of completion of the work and certification of the bill by the officer concerned after deduction of the statutory dues. 10% amount will only be released after successful completing the 6 months guarantee period for repair work from the date of completion of work.
7. The repairer shall have the past experience related to similar nature of work/familiar with electrical/civil/mechanical work in River side/ riverine work etc.
8. Inland Waterways Authority of India (IWAI) reserves the rights to accept or cancel any quotation without assigning any reason or any prior notices.
9. The sealed quotation should reach to Director IWAI, Gaighat, Patna-800007 office. latest by 18.07.2025 at 1500 hrs. The sealed bids will be opened on same day i.e. 18.07.2025 at 1530 hrs.
10. You are requested to inspect the aforesaid unit in the dredger **CSD Yamuna** at **Gaighat, Patna** before submitting the budgetary rate/quotation. For any clarification you may contact IWAI, Director during the office working hours i.e. 10:00 to 17:00 hrs.


Director

BOQ for Retrofitting / Replacement of Dredge Pump Coupling Unit of CSD Yamuna at Gaighat, Patna					
SL.No.	Description of Works	Unit	Qty	Rate (in Rs.)	Amount (in Rs.)
	Option 2: Retrofitting/Replacement with Similar Power Dredge Pump Coupling Unit:- Scope of Work: This option involves the retrofitting or replacement of the existing dredge pump coupling unit on CSD Yamuna. The current unit is a "PNEUMAFLEX" highly elastic friction clutch (Manufacturer: Lohmann & Stolterfoht), installed between the Caterpillar engine (1061 BHP / 791 kW) and the dredger pump. <u>The proposed work includes the following:</u> • Removal of the existing clutch unit • Supply and installation of a new clutch unit with equivalent power rating and performance characteristics • Alignment and fitting of the new unit to ensure precise coupling between the engine and dredge pump • Reconnection of pneumatic, hydraulic, mechanical, or combined actuation systems, depending on suitability and compatibility • Commissioning and performance testing of the newly installed unit to ensure complete operational readiness Objective: To restore or enhance the operational reliability of the coupling system with minimal modification, ensuring compatibility with existing engine and pump setups while maintaining optimal performance.				
1.00					
1.10	Labour charge	comp job			
1.20	Tentative spares cost	LS			

Note:- Exclusive GST as applicable

Name of Firm and Seal & signature

BOQ for Repairing of Dredge Pump Coupling Unit of CSD Yamuna at Gajghat, Patna

Sl.No.	Description of Works	Unit	Qty	Rate (in Rs.)	Amount (in Rs.)
	Option 1:Repairing of Dredge Pump Coupling Unit Scope of Work: This option involves the repair of the existing "PNEUMAFLEX" highly elastic friction clutch, manufactured by Lohmann & Stolterfoht, installed between the Caterpillar engine (1061 BHP / 791 kW) and the dredge pump on CSD Yamuna. The clutch, which is pneumatically actuated, serves as a critical coupling component transmitting power from the main engine to the dredge pump. The repair process included the following steps: •Dismantling of the clutch unit from its installed position •Detailed inspection of all mechanical and pneumatic components •Replacement or refurbishment of worn or damaged parts as required •Reassembly and reinstallation of the clutch unit •Final alignment and functional testing to ensure smooth and reliable operation Objective: To restore the functionality of the existing coupling system by addressing wear and damage, thereby extending its service life and maintaining dredger performance with cost-effective maintenance.nality.				
1.10	Labour charge	comp job			
1.20	Tentative spares cost	LS			
Note:- Exclusive GST as applicable					
Amount in word					

Name of Firm and Seal & singnature

C.3.2. YAMUNA



Highly elastic friction clutch
PNEUMAFLEX
Installation - Operation - Maintenance

Customer: Bruinhof B.V.

Order No.: 1 0005

Contents

- List of technical data
- Description - Function - General Information
- Central feed line
- Installation
- Initial operation
- Maintenance
- Emergency clutching
- Details for spare part orders
- Spare part lists
- Spare part drawing
- Installation drawing

Attention

These operating instructions do not include informations which can be presumed as basic knowledge for trained engineers.


BRUINHOF B.V.
EEN VAN MANNESMANN-ONDERNEMING
ROTTERDAM 07 ROTTERDAM

5/53/51/10



Highly elastic friction clutch
PNEUMAFLEX
Installation instructions

Installation instructions

General Instructions

In marine propulsion units alignment must be done only while the ship is afloat.

It is recommended to install a fixed crane rail in the engine room above the coupling.

The basic condition for troublefree running of the clutch is an accurate alignment.

The permitted alignment to tolerances are listed on page 3 (refer to foot note). These values must not be exceeded to keep all additional forces caused by displacements as low as possible.

Fitting of the clutch hubs

If a clutch is delivered with flange hubs or spacer flanges these parts must be mounted first.

Flange hubs must be heated prior to fitting. For tapered fits the temperature of the hubs must be 40°C higher and for cylindrical fits 100°C higher than the temperature of the shaft. Thus driving-on-shocks or impacts are avoided and bearings and gear wheels are protected.

Alignment

Alignment of engine and driven unit is done without clutch (see page 3). For alignment check, the primary and secondary shafts must be turned simultaneously and the readings must be taken always at the same point. Values measured in such a manner are not influenced by any inaccuracies of the peripheries of the faces of the flanges.

Original verfilmt



Highly elastic friction clutch.
PNEUMAFLEX
Installation instructions

On principle the shafts should be turned only in one direction during aligning since the shafts can move slightly axially due to bearing clearances if the direction of rotation is changed. Errors of face readings are avoided.

Connection of the clutch to shafts with considerable overhang is not permitted. Slight overhang must be compensated during alignment by means of roller stands.

When the engine is located the installation length for the clutch must be checked.

The permitted tolerances of the installation length "B" (see page 3).

Original verfilmt



Highly elastic friction clutch
PNEUMAFLEX
Description-Function-General Information

The friction linings 13 are attached to the inner friction cones 11 and 12 and thus insulate the inward flow of heat, while the frictional heat is readily dissipated into the surrounding air via clutch casing 3 and 4. Liberally sized vent openings arranged in the casing will effectively aid heat dissipation when the clutch rotates.

When the clutch is disconnected, the clutch cylinder 17/18 is vented thus causing the friction cones 11 and 12 to return to their initial position by action of the resetting force of the axially prestressed rubber elements 7, to 10 without any springs being necessary.

If the clutch is in disengaged condition, the friction cones 11 and 12 rest on the supporting ring 14 via clutch cylinder 17 and via supporting disk 19 attached to clutch piston 18. This has the advantage that the clutch internals are in their proper axial and radial position in relation to hub 5 when the clutch is disconnected thus ensuring contactless running.

In clutches provided with a torsional limiting device the torsional angle is confined by means of two oppositely arranged stop elements each. On the outer side they are situated on friction cones 11 and 12 and on the inner side on stop rings 15.

In the event of a compressed air failure, the PNEUMAFLEX clutch can be engaged/disengaged when stationary via the emergency actuating system 26.

Original verfilmt



Highly elastic friction clutch
PNEUMAFLEX
Description-Function-General Information

General Information

The clutch is painted externally, Flanges, hub bores and flange surfaces are provided with a coat of anti-corrosion paint.

Terminals for air pipes to be connected at the site are closed by plug screws.

Tightening torques for screws

Dry screws (not lubricated) must be tightened with a torque spanner according to the following table:

Thread size	M 8	M10	M12	M14	M16	M20	M24	M30	M36	M42
Tightening torque for 8.8 (Nm)	21	42	74	118	176	358	618	1216	2129	3394

Liability

We are not liable for damages due to

- 1) Non observance of the general and particular operating instructions
- 2) Operating conditions which are not in accordance with the lay-out data
- 3) Overloads of special nature for example caused by torsional vibrations (operating in critical speed ranges and exceeding of the permitted alternating torques) torque shocks above the permitted peak torque or oily friction surfaces.

Further, we are not liable if the inner part of the clutch is dismantled during the guarantee period without our consent. Only dismantling of the tapered jackets is allowed for reaming purposes.

Original document

Auftrags-Nr.: 1 0005.01

Kunde.....: 165900 Bruinhof DM , NL-3077 AW Rotterdam

Liste der technischen Daten

AUSLEGUNGSDATEN:

Motorhersteller.....: Caterpillar
Motortyp.....:
Motorleistung.....: 791 kW
Motordrehzahl.....: 1200 min⁻¹
Abtriebsdrehmoment.....: kNm
Abnahme-gesellschaft.....: ohne
Abnahme.....: ohne
Schiffswerft.....: Scheepswerf Stapel B.V., Spaarndam
Neubau-Nummer.....: 177
Schiffsname.....:
Schiffstyp.....: Schneidkopfbagger

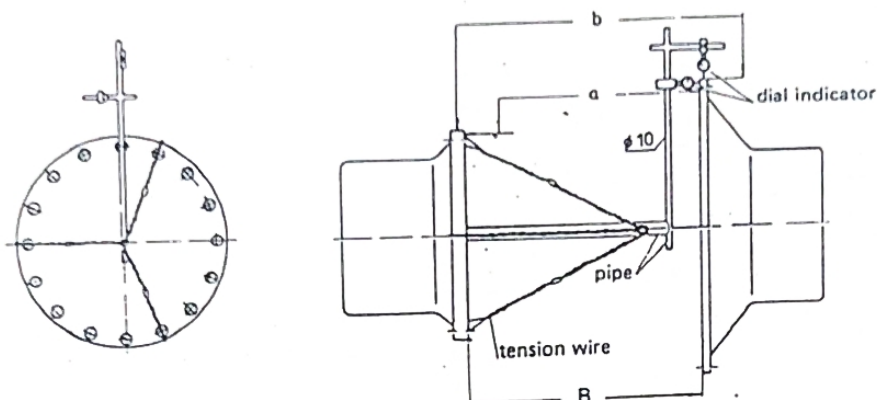
GETRIEBE-/KUPPLUNGSDATEN:

Kupplungsbauart/-größe.....: KAP 140/1220
Elementen-Härtegrad.....: MD
Drehschwingungsschema.....:
Innenkonservierung.....:
Farbanstrich (innen).....:
Farbanstrich (außen).....: grau, RAL 7038
Aufbau und Wirkungsweise...:





Highly elastic friction clutch PNEUMAFLEX Installation instructions



Sketch of alignment procedure

Admissible alignment errors ¹⁾

clutch size	KA 70 to KA 110	KA 120 to KA 180	KA 200 to KA 260	KA 280 to KA 340	KA 360 to KA 490
a and b (mm) ²⁾	0,12	0,15	0,2	0,25	0,3
B (mm) ³⁾	-0,25	-0,3	-0,4	-0,5	-0,6
admissible difference of travel (mm) ⁴⁾	1,0	1,2	1,6	2,0	2,4

- 1) Alterations by heat expansion in service must be taken into consideration for initial alignment.
A re-alignment of the installation is recommended if the double value of the permissible alignment error has been reached.
- 2) Checked with dial indicator from input to output side.
- 3) Installation distances B are shown in the installation drawing (appendage).
- 4) See page 5.

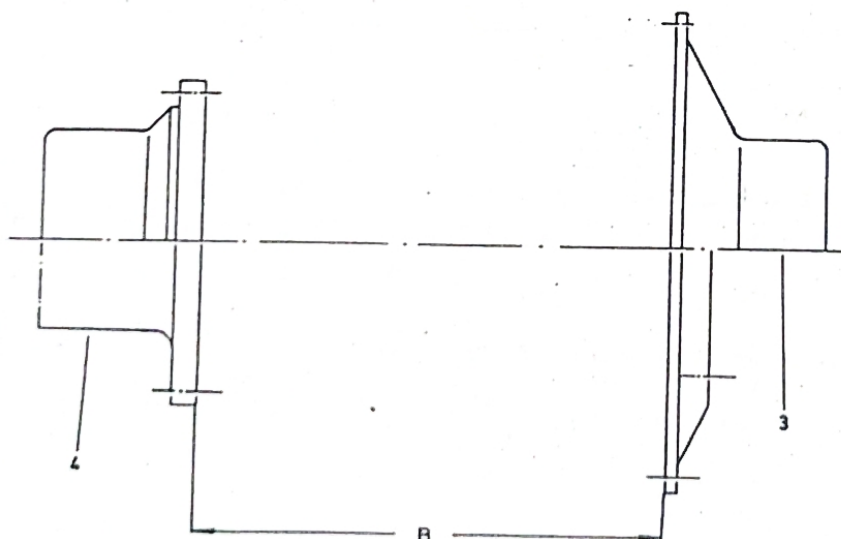
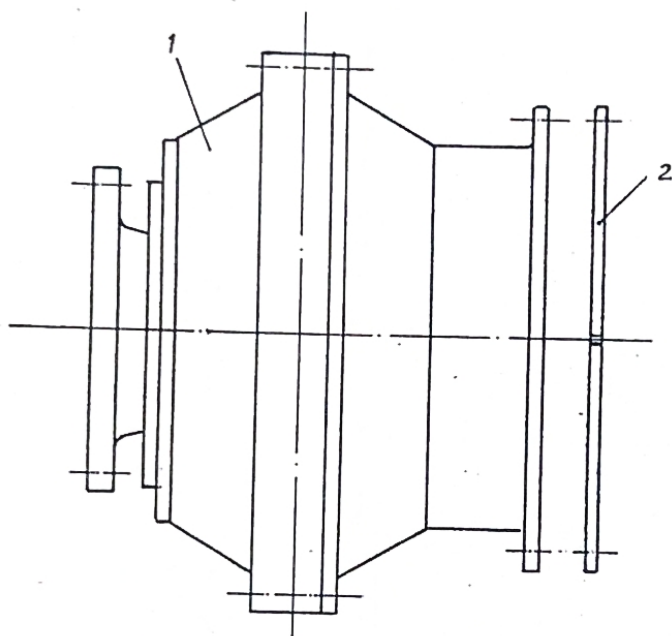
Original verfilmt



Highly elastic friction clutch
PNEUMAFLEX
Installation instructions

Installation of clutch

When the clutch is installed the central feedline must not protrude from the connecting flange. The clutch can be mounted vertically. Finally the two-part spacer ring is installed. If clutches are delivered without primary flange hubs or spacer flanges the spacer ring must be devided at the site after the holes are reamed.



Clutch with spacer ring

1 Clutch

2 Two-part spacer ring

3 Flange

4 Flange

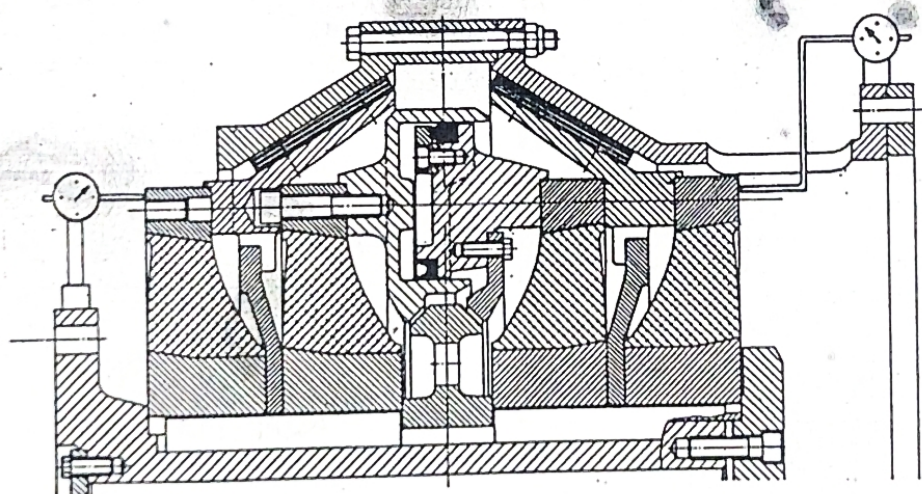
Original



Highly elastic friction clutch
PNEUMAFLEX
Maintenance

Maintenance

The thickness of the friction linings must be checked at periodic intervals which depend on the clutching sequence. The intervals must be determined separately for every propulsion unit (see page 2).



Checking of friction lining thickness (check points)

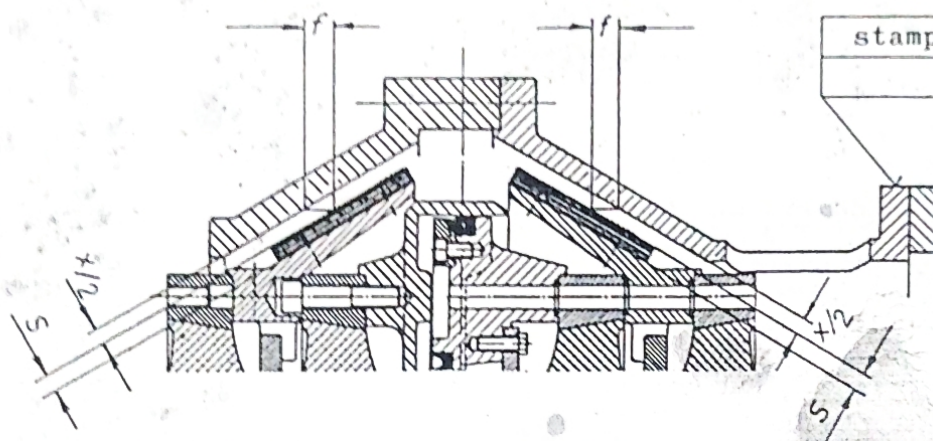
BRUNNEN B.V.

BRUNNEN B.V. - ROTTERDAM



Highly elastic friction clutch PNEUMAFLEX Maintenance

Total clearance X =
stamped here

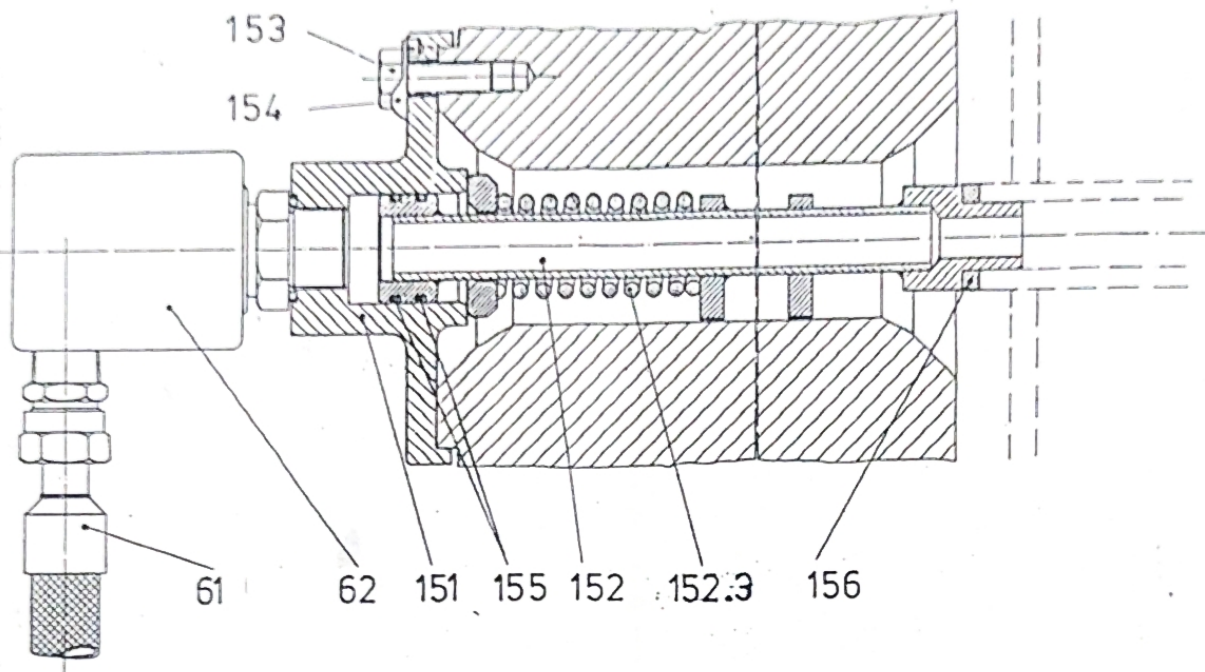


Clutch size	Thickness of friction linings S	Standard clearance X/2		Travel f		Max. adm. enlargement of f 1)
KA 70	8	1,0	0,1	2,0	0,2	6
KA 80		1,0		2,0		
KA 90		1,1		2,2		
KA 100		1,1		2,2		
KA 110		1,2		2,4		
KA 120		1,3		2,6		
KA 140		1,4		2,8		
KA 160	10	1,5	-0,15	3,0	-0,3	10
KA 180		1,6		3,2		
KA 200		1,8		3,6		
KA 220		2,0		4,0		
KA 240		2,2		4,4		
KA 260		2,4		4,8		
KA 280		2,6		5,2		
KA 300	12	2,8	-0,2	5,6	-0,4	14
KA 320		3,0		6,0		
KA 340		3,3		6,6		
KA 360		3,6		7,2		
KA 380		3,9		7,8		
KA 390		4,2		8,4		
KA 410		4,5		9,0		
KA 430	15	4,8	-0,3	9,6	-0,6	20
KA 450		5,1		10,2		
KA 470		5,4		10,8		
KA 490		5,8		11,6		
KA 510		6,2		12,4		
KA 530		6,6		13,2		

1) Corresponds with a wear up to the minimum friction lining thickness = 5 mm.



Highly elastic friction clutch
PNEUMAFLEX
Central feedline



The central feedline is supported in the bore of the shaft, which is connected at the innerparts of the clutch.

The flange 151 is connected to shaft with screws 153. The helical spring 152.3 presses the pipe 152 with the sealring 156 air-tight against the seal surface of the air pipe in the Pneumaflex clutch.

The compressed air is supplied via the flexible hoseline 61 and the rotor seal 62.

Attention

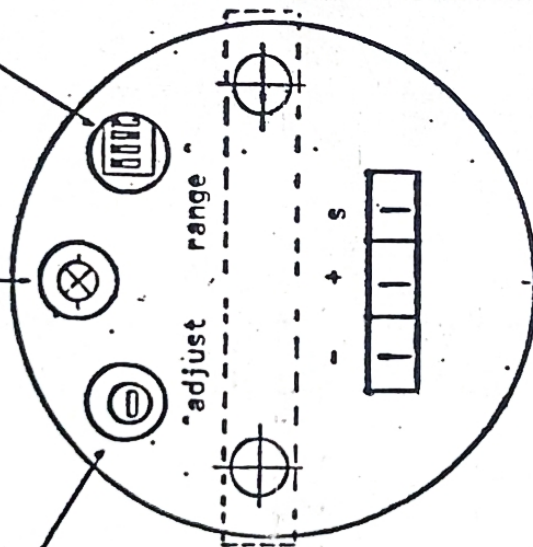
During mounting and dismounting of the clutch the central feedline must not protrude from the connecting flange.

Original verfilm

Frequentie bereik schakelaar.
Instrumentverlichting.

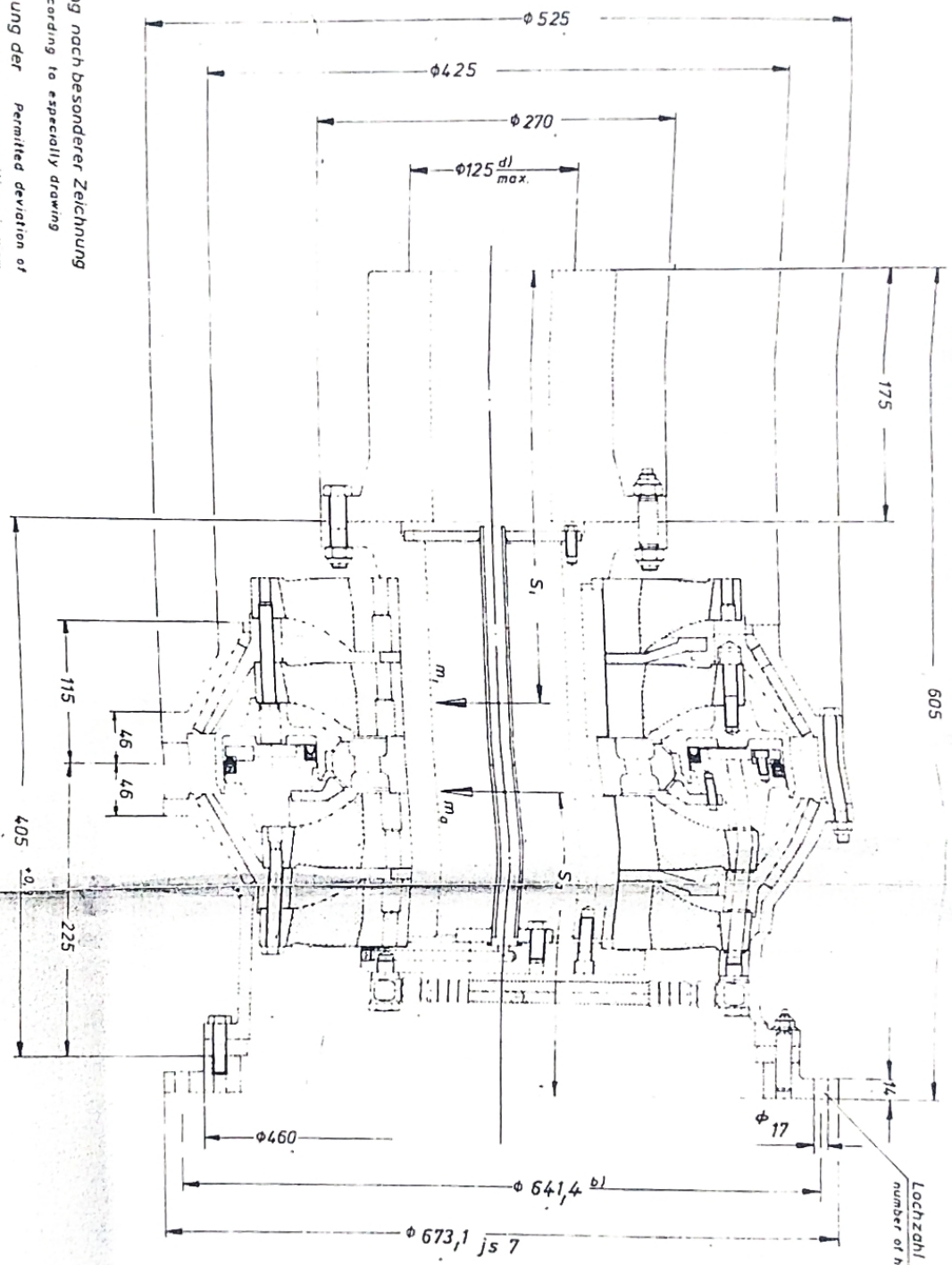
S1

Instelpotentiometer.



Instel mogelijkheden van S1.
Volle schaal uitslag bij de volgende standen van S1.

On	1	2	3	4	min.	30 Hz.
					max.	100 Hz.
On	1	2	3	4	min.	100 Hz.
					max.	450 Hz.
On	1	2	3	4	min.	450 Hz.
					max.	2100 Hz.
On	1	2	3	4	min.	2100 Hz.
					max.	8500 Hz.



d) Fertigbohrung nach besonderer Zeichnung
 finish bore according to especially drawing

b) Zul. Abweichung der Lage der Bohrungen
 Permitted deviation of hole positions in view of drawing positions
 für $\varnothing 64,4 = 0,2 \text{ mm}$

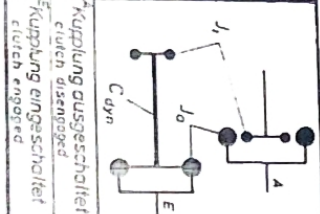
Umgebungstemperaturen für
 ambient temperatures for
 Betrieb/operation $+5^\circ\text{C} \dots +70^\circ\text{C}$
 Lagerung/storage $-55^\circ\text{C} \dots +80^\circ\text{C}$

Umkleidende Teile müssen vom
 Käufer gegen unbeabsichtigtes
 Berühren geschützt werden.
 (Gesetz über technische Arbeitsmittel)
 The purchaser has to protect all
 rotating parts against touching

Technische Daten für die
 Drehschwingungsberechnung
 siehe LUS-Liste RDE 75420
 "PNEUMAFLEX® KA"

Technical data for torsional-
 vibration calculation see
 LUS-list RDE 75420
 "PNEUMAFLEX® KA"

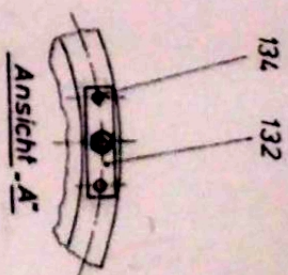
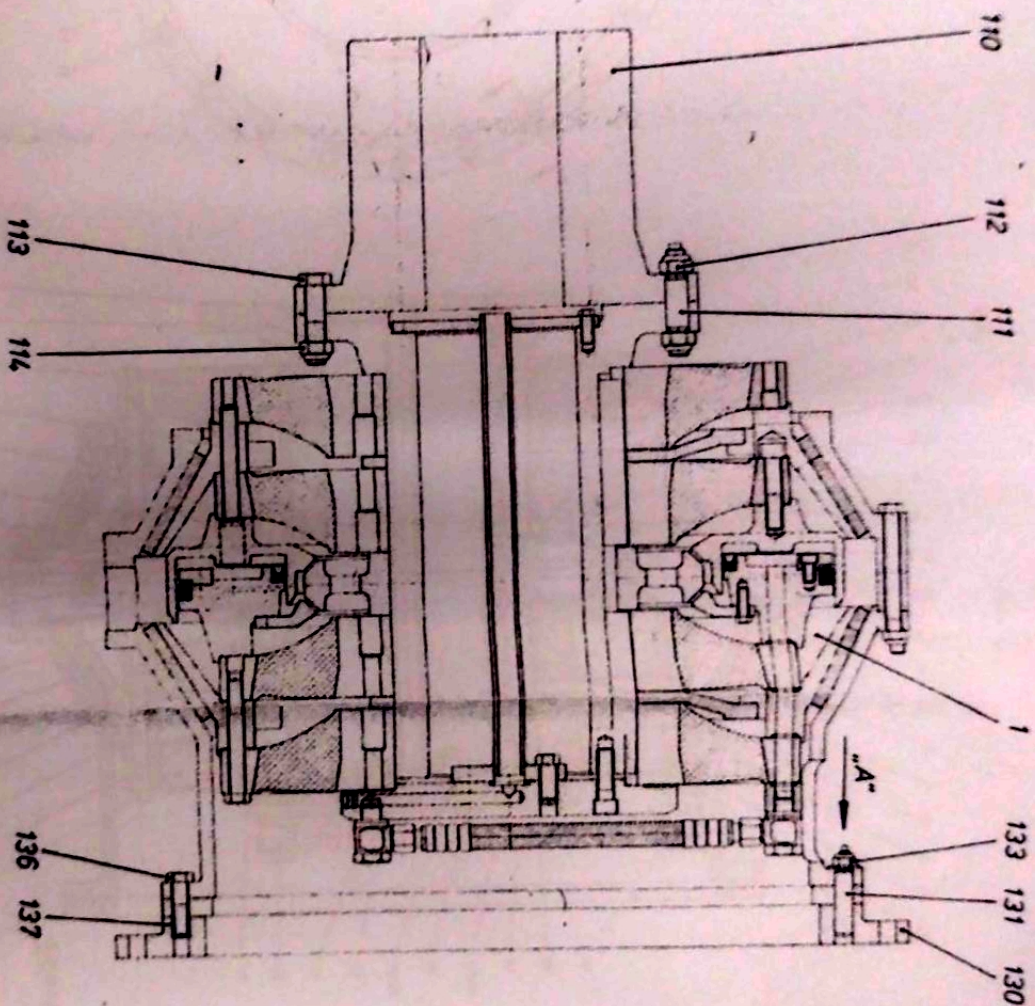
Lochzahl 12
 number of holes



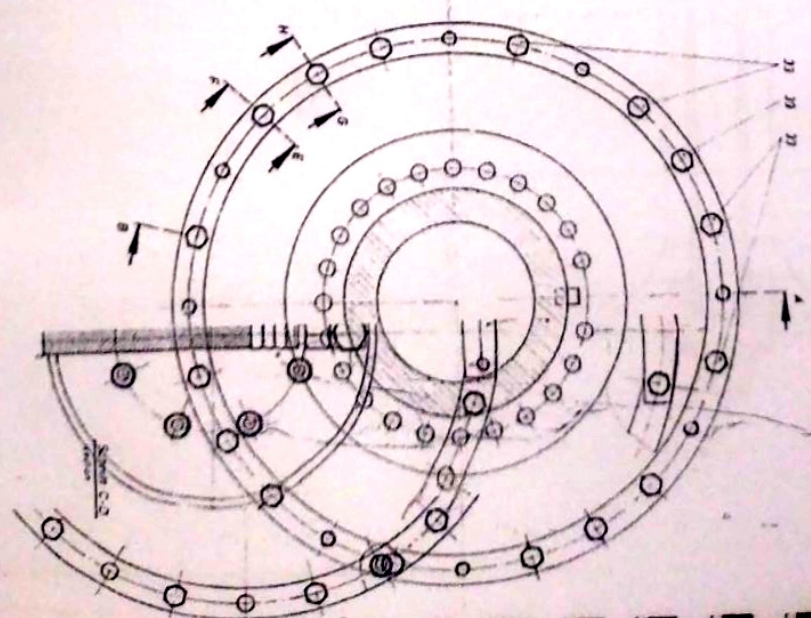
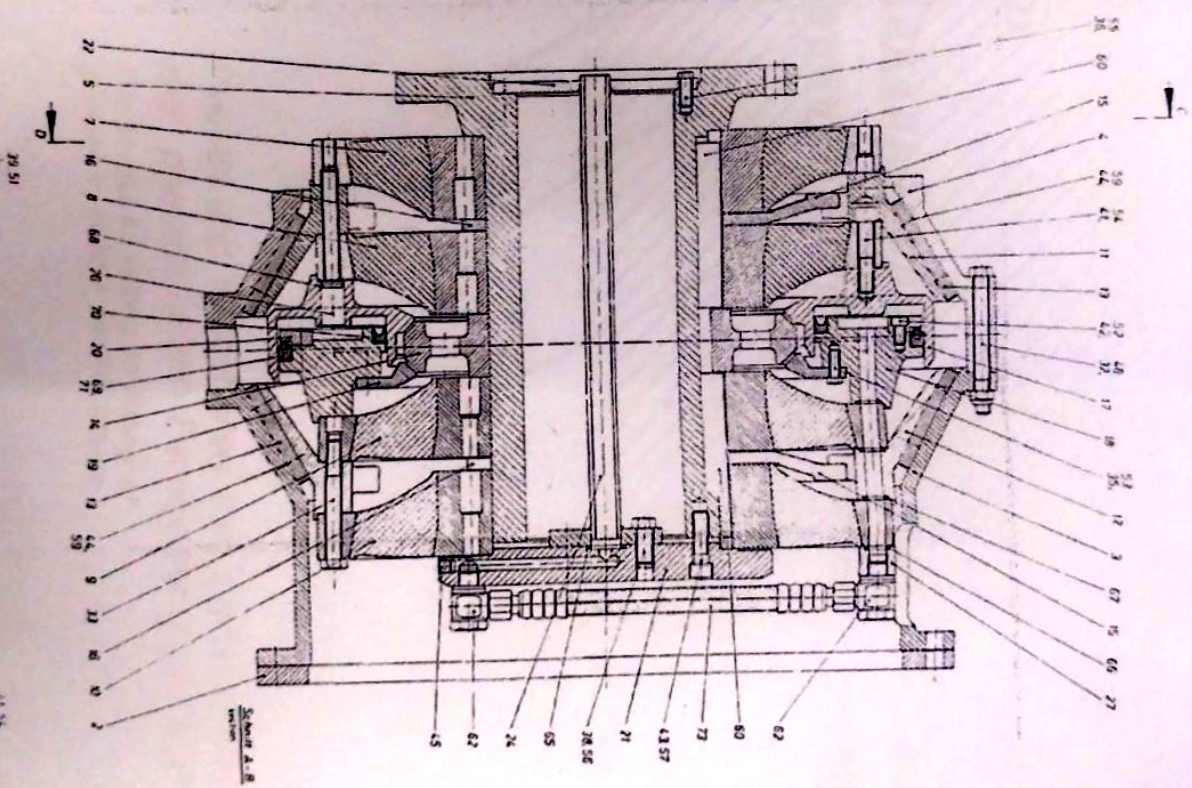
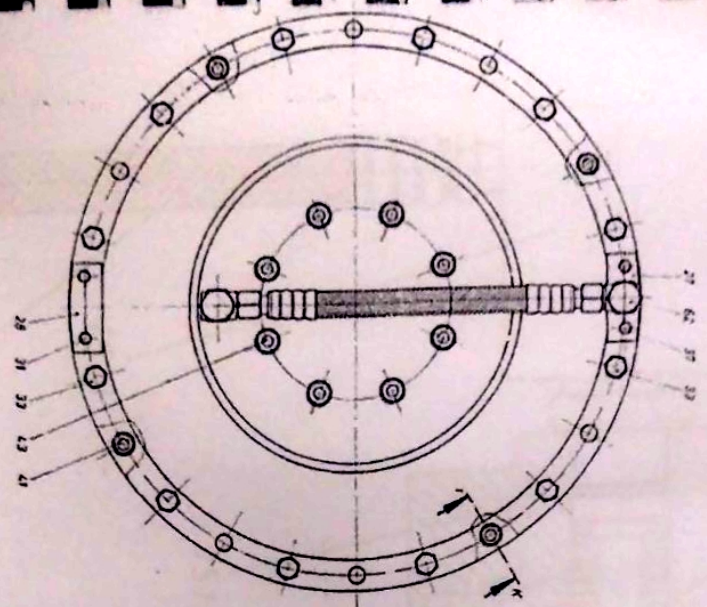
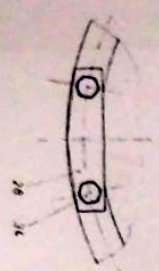
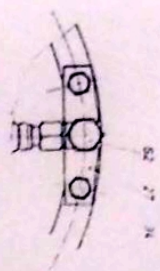
J = Massenträgheitsmoment moment of inertia			
m = Gewicht weight			
S = Schwerpunkt point of gravity			
Innenanteile inner parts			
J ₁	m ₁	S ₁	J ₂
kgm ²	kg	mm	kgm ²
359	198	327	463
Außenanteile outer parts			
J ₀	m ₀	S ₀	J ₁
kgm ²	kg	mm	kgm ²
094	115	307	7,28
150	208		

Bauart type	Größe size	Ausführungs-Nr. design-No.
KAP 140	2 220	1 220

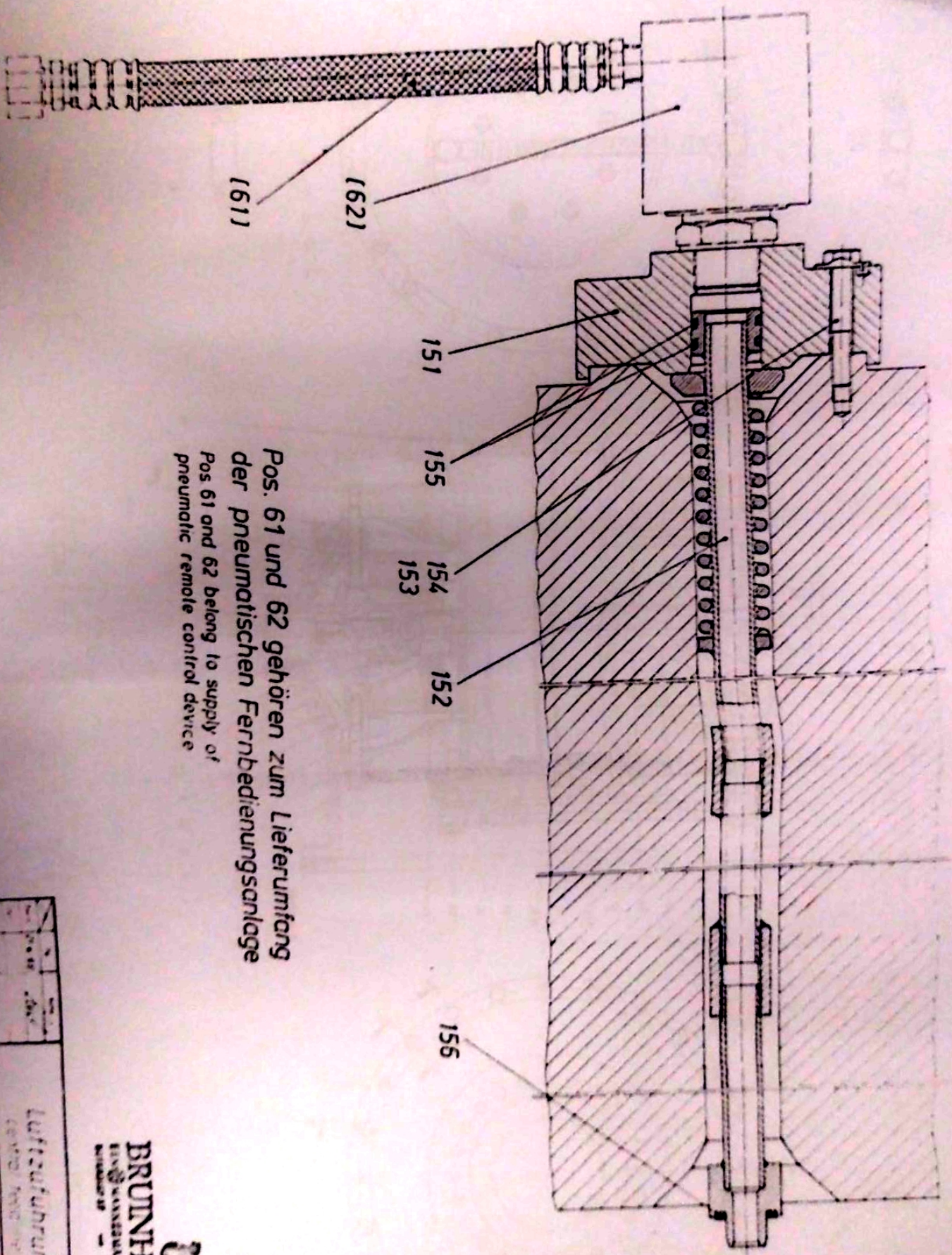
Verdrehschwingungsberechnung torsional limit	
mit with	ohne without
obere Kupplungscharakteristik upper clutch half	untere Kupplungscharakteristik lower clutch half
Hochelastische Schaltkupplung Highly Elastic Friction Clutch PNEUMAFLEX KA	
311821522410	



Bauteil		Ausführungs-Nr.		Verstärkungsgründung	
Typ		2220		mit	
KAP		1220		ohne	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	
				untere Kupplungshälfte	
				obere Kupplungshälfte	



DATE	1/10/22	BY	W. H. HODGKINSON
TIME	10:00 AM	BY	W. H. HODGKINSON
REVISION	1	BY	W. H. HODGKINSON
REVISION	2	BY	W. H. HODGKINSON
REVISION	3	BY	W. H. HODGKINSON
REVISION	4	BY	W. H. HODGKINSON
REVISION	5	BY	W. H. HODGKINSON
REVISION	6	BY	W. H. HODGKINSON
REVISION	7	BY	W. H. HODGKINSON
REVISION	8	BY	W. H. HODGKINSON
REVISION	9	BY	W. H. HODGKINSON
REVISION	10	BY	W. H. HODGKINSON

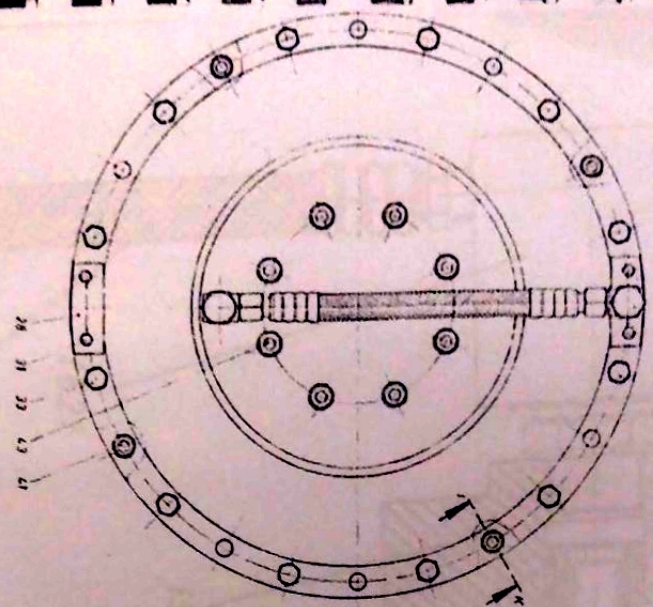
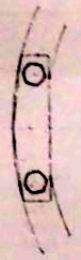


Pos. 61 und 62 gehören zum Lieferumfang
der pneumatischen Fernbedienungsanlage
Pos 61 and 62 belong to supply of
pneumatic remote control device

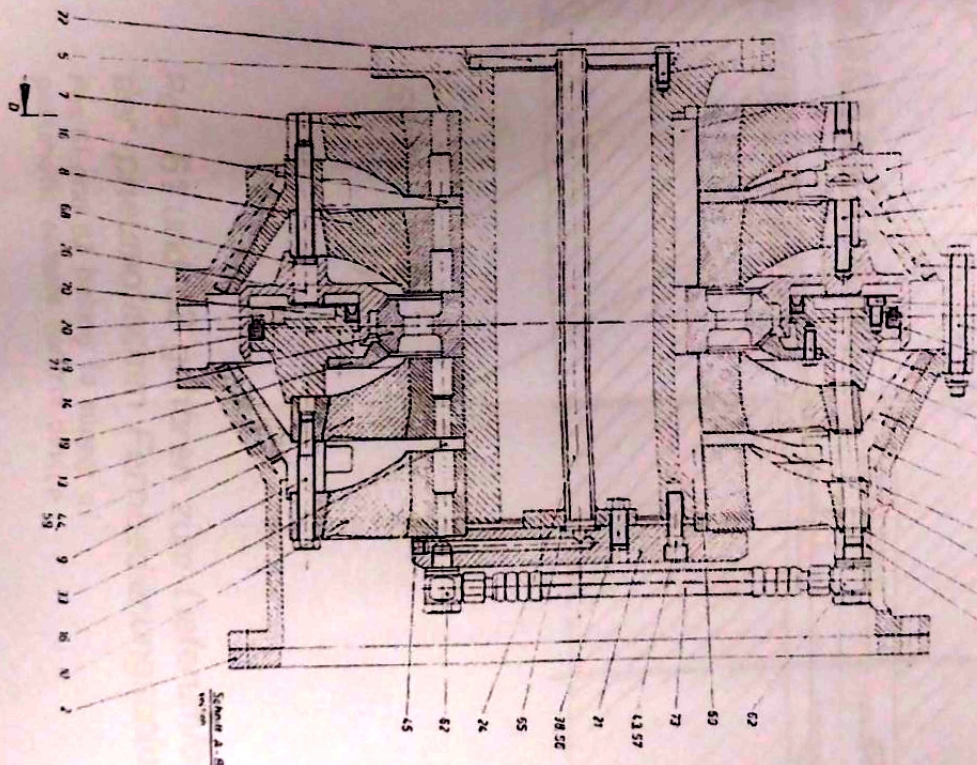
BRUNHOF B.V.

 LEUNIGSMANN-INGENIEURUNG
 KREUZWEGERSTR. 10
 42699 SOLINGEN

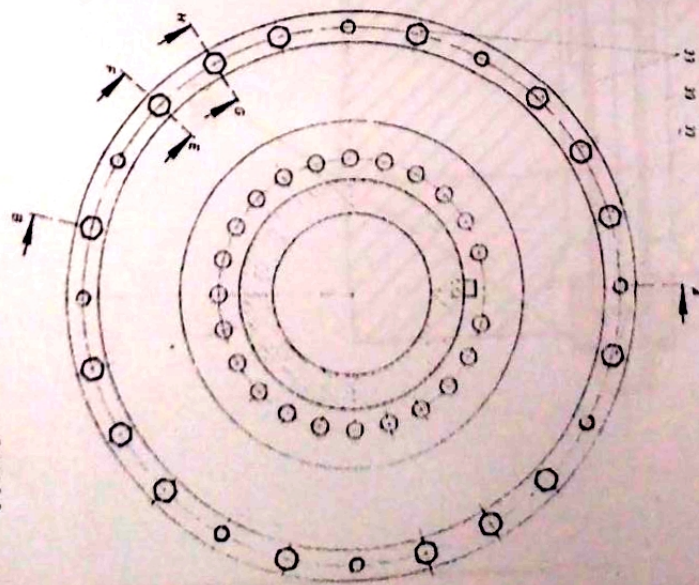
TECHN. ZEICHNUNG 3 1192 / 039 / 0	Luftzuführung (EVT) / (EVT) / 0
--------------------------------------	------------------------------------



18 60 15 4 66 24 11 12 62 10 17 16 14 13 3 67 5 68 27



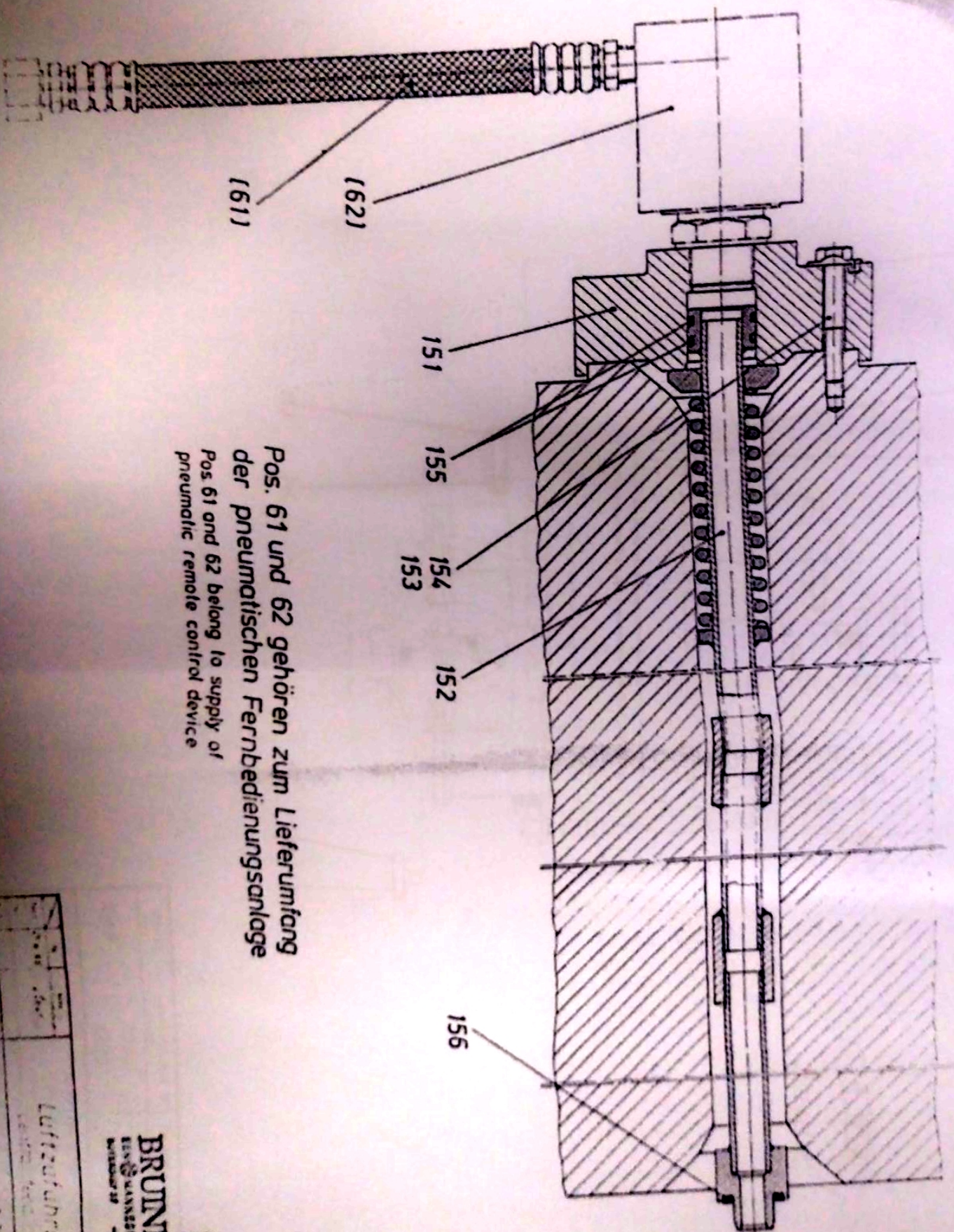
SECTION A-A



SECTION B-B



NO. 1	1/10/10	1/10/10
NO. 2	1/10/10	1/10/10
NO. 3	1/10/10	1/10/10
NO. 4	1/10/10	1/10/10
NO. 5	1/10/10	1/10/10
NO. 6	1/10/10	1/10/10
NO. 7	1/10/10	1/10/10
NO. 8	1/10/10	1/10/10
NO. 9	1/10/10	1/10/10
NO. 10	1/10/10	1/10/10

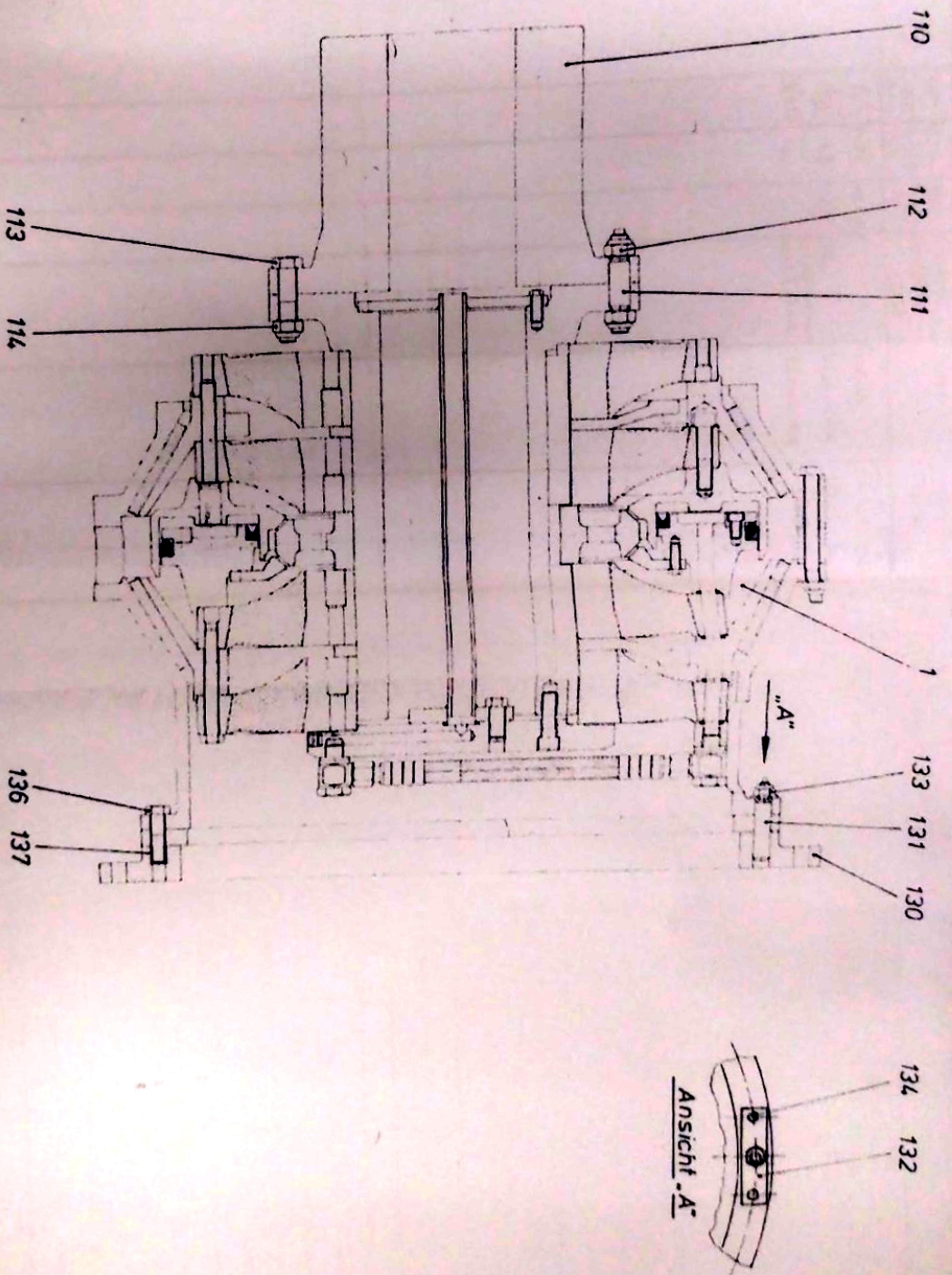


Pos. 61 und 62 gehören zum Lieferumfang
der pneumatischen Fernbedienungsanlage
Pos. 61 and 62 belong to supply of
pneumatic remote control device

BRUNNEN
BRUNNEN B.V.
KUNSTSTOFF-INDUSTRIE
KUNSTSTOFF-INDUSTRIE
KUNSTSTOFF-INDUSTRIE

Luftzuführung

3



Bauteil		Ausführungs-Nr.		Verordnungs-Nr.	
Typ		Ser.Nr.		Fert.Nr.	
KAP		2220		mit	
1220		ohne		obere Kupplungshälfte	
				untere Kupplungshälfte	
Hochelastische Schaltkupplung					
High Elastic Friction Clutch					
PNEUMAFLEX KA					
3 / 1182 / 1006 / 0					

