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Installation and maintenance

of ORTLINGHAUS air operated
CLUTCHES and BRAKES

Instruction
No. 192

Models
0-901
0-401
0-150

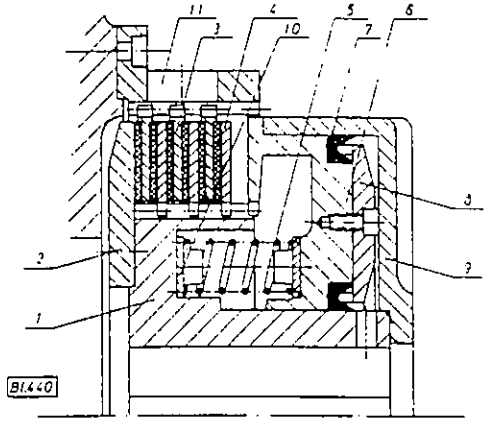

Fig. 1

I. Clutch 0-901

A. Description

The outer clutch housing (11) has internal splines engaging with correspondingly splined outer plates (3) and is centered with the driving flywheel or gear wheel and firmly secured by screws and dowels. The inner plates (4) alternate between the outer plates, connected to the hub (1) by splines, thus effecting the driving engagement when the plate stack is compressed by the air piston (6).

When the compressed air is discharged by means of a valve, the annular piston with the seals (7) is forced back by return springs (5) and so provides the necessary idling play between the plates. The return pressure (spring force/piston surface) normally ranges from 0,5 to 0,8 atm. If the clutch is working in connection with an air operated brake (e.g. on eccentric presses etc.) or, if for other reasons a very rapid disengagement is required, the clutch is supplied with the spring return pressure increased to 1,8 atm.

B. Installation

The bearings should be placed as close to the clutch as possible. If the clutch is connecting two shafts it is necessary to provide a centering bearing to ensure that the clutch halves are running true. The shafts must be accurately aligned.
The clutch hub is keyed to the shaft and secured against axial movement. The outer housing must be equally secured against axial displacement.
The compressed air supply line must be accurate and airtight, especially the joint between shaft and clutch hub. A sealing arrangement as shown on data sheet ON 2. 1. 08 (page 5 and 6 in leaflet) might be necessary.
Correctly mounted clutch halves will rotate freely in relation to each other when disengaged.

C. Compensation of wear

No readjustment is required as the plate wear is automatically compensated by the increasing piston stroke. When the piston reaches its maximum travelling distance the clutch will slip and the linings must be replaced.

D. Replacement of friction linings

The friction linings can be replaced when fully worn out. The plates can be easily removed after unbolting and removing the support plate (2).
Larger type clutches are supplied with split outer plates. After removal of the clutch housing the plate halves can be taken out and the linings replaced.
After re-assembly, utmost care should be taken to tighten and secure the screws properly to prevent loosening.

E. Clutch engagement

In connection with an air operated brake, see under II. paragraph E.

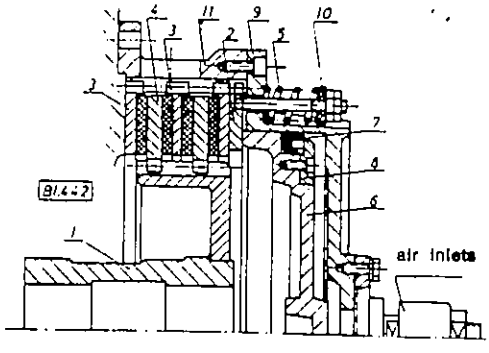

Fig. 2

II. Clutch 0-401

A. Description

The outer clutch housing (11) has internal splines engaging with the correspondingly splined outer plates (3) and is centered with the driving flywheel or gear wheel and firmly connected by screws and dowels. The inner plates (4), travelling on the external splines of the clutch hub (1)alternate with the lined outer plates, thus effecting the driving engagement when they are pressed together by the air piston (6). The piston (6) with seals (7) is moving in the cylinder (9), which in turn is connected to the clutch housing (11). When the compressed air is discharged the piston is pushed back by adjustable return springs (5). The return spring pressure (spring force/piston surface) is normally 0,5-0,8 atm.
If the clutch is used in connection with an air operated brake, or if for other reasons a more rapid disengagement is required, the clutch is supplied with the return spring pressure increased to approx. 1,8 atm.

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B. Installation

The housing is centered to a separately supported gearwheel or flywheel, connected by screws and dowels and secured against axial movement.
The clutch hub is keyed to the shaft and secured against axial displacement. The air supply line is connected directly to the cylinder via a rotating air inlet.
After correct assembly the disengaged clutch should turn easily.

C. Compensation of wear

No adjustment is required, as the plate wear is automatically compensated by the increasing piston stroke. When the maximum travelling distance of the piston has been reached the linings must be replaced.

D. Replacement of friction linings

In order to replace worn linings by riveting on new friction segments, the housing with cylinder is removed and the plates taken out. When the clutch is reassembled all screws must be carefully secured.

E. Clutch engagement in connection with an air operated brake

When using the clutch in connection with a brake it is important to avoid overlapping as this might cause overheating. If the brake must work when the air pressure drops (fail safe action) it is necessary to engage the brake by springs and to disengage by compressed air.

This can be arranged as follows:

a) Brake cylinder and clutch cylinder are connected to the air supply by the same valve. The clutch return springs are set at 1,8 atm and the brake release springs at 1,6 atm. The brake is then released before the clutch engages and overlapping is prevented.

b) If the release pressure of the brake is higher than the clutch return pressure (i.e. clutch 0,5 atm, brake 3 atm) it is necessary to provide separate valves, controlled by adjustable limit switches to engage and disengage in set order and positively avoid overlapping.
If required, please ask for further details.

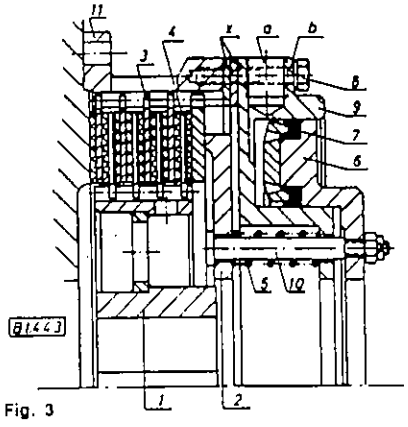


Fig. 3

III. Brake 0-150

A. Description

The outer housing (11) with inner splines for the lined outer plates (3) is centered on the machine frame and locked with screws and dowels. The inner discs (4) are alternating with the outer discs, travelling axially on the splines of the brake hub. The engagement pressure is provided by pressure springs (5).
The annular piston (6) with the seals (7) is connected to the pressure plate (2) by bolts (10). The brake releases when the piston and the pressure plate are moved by compressed air applied at the air inlet (a). When the air is discharged the pressure springs return the piston and engage the brake. The min. pressure required to release the brake is 1,6 to 1,8 atm.

B. Installation

The hub is keyed to the shaft and secured against axial displacement. The outer housing with the cylinder is centered and fixed to the machine frame as described in paragraph A.

C. Compensation of wear

The stroke of the piston should be kept as short as possible to reduce air consumption. When the stroke increases by wear of linings it should be adjusted. This is done by loosening the bolts (8) enough to remove one layer of distance segments (x) which are then re-inserted behind the screw head in position (b). When the bolts are tightened the wear is then compensated, by the reduced piston travelling distance.

D. Replacement of friction linings

See under II. paragraph D.

IV. Installation and maintenance faults and their rectification.

a) The clutch or brake is slipping.
The friction linings are worn out and the piston has reached its maximum travelling distance. The wear must be compensated as described in paragraph III. C.
In automatically compensating clutches (0-901 and 0-401) or if the max. compesation has been reached, the linings must be renewed as described in paragraph I. D.

b) The air pressure might be too low.
In normal applications the clutch requires an air pressure of 4,5—5 atm. The min. pressure required to disengage the brake is normally 1,6 — 1,8 atm.

c) The clutch or brake is overheating.
The heat may be due to faults or lack of lubrication of bearings adjoining the clutch or brake. If the clutch and brake are working in sequence, overlapping may cause overheating. See II. paragraph E. As friction generates heat an above ambient temperature of the unit is normal. To avoid damage to seals the temperature of the cylinder should not exceed 80° C, corresponding to approx. 100° C of the housing. If the seals are exposed to higher temperatures for any length of time they must be replaced as they become hard and brittle and may cause leakage.

d) Heat dissipation by forced cooling.
The heat dissipation can be improved by attaching a ventilator fan to the continuously running part.

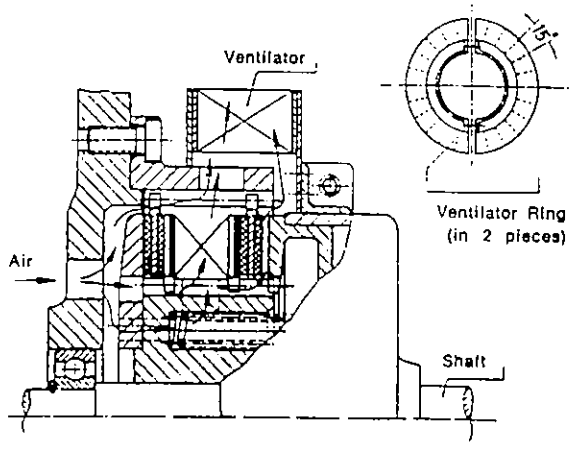
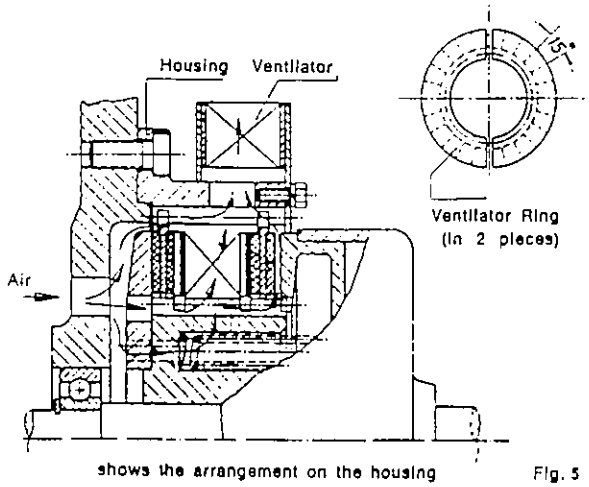


Fig. 4 shows the arrangement on the inner part and



shows the arrangement on the housing Fig. 5

V. Spare parts (See Fig. 1-3)

When ordering spare parts it is necessary to quote the factory number which is stamped on the hub or housing in addition to the part's number. In order to avoid faulty deliveries it would be appreciated if orders were placed in writing.

VI. Accessories for air operated clutches.

a) Seals
For the sealing on the shaft of clutch 0-901 it is recommended to use methods shown on data sheet ON 2.1.08 (page 5 and 6 of this leaflet), which also indicates the seals required.

b) Compressors
If no central air supply is available or in mobile applications, the size of compressor is decided by the air consumption of the clutch or brake.
The tables below give the cylinder volume of the different sizes.

Model	Cylinder capacity in litres	
	Minimum (with new linings)	Maximum (with worn-off linings)
0—901—.00—47	0,1	0,2
0—901—.00—55	0,3	0,6
0—001—.00—63	0,4	0,8
0—901—.00—69	0,6	1,2
0—901—.00—75	0,8	1,6
0—901—.00—78	1,3	2,6
0—901—.00—81	2,2	4,4
0—901—.00—84	2,7	5,4
0—901—.00—86	3,8	7,6
0—901—.00—90	4,1	9,3
0—401—.00—75	0,5	1,5
0—401—.00—78	0,6	1,8
0—401—.00—81	0,9	2,7
0—401—.00—84	1,2	3,6
0—401—.00—86	1,6	4,8
0—401—.00—90	2,5	7,5

Model	Average cylinder volume in litres (wear is adjustable)
0—150—.00—47	0,1
0—150—.00—63	0,35
0—150—.00—75	0,8
0—150—.00—78	0,9
0—150—.00—84	2,3
0—150—.00—86	3,9

The volume of the supply line between the clutch and control valve must be added.

Required amount of free air can be calculated as follows:

$Q = 1{,}5 \cdot V \cdot p \cdot z$ = compressor capacity at atmospheric pressure in l/min.

V = cylinder and connection pipe volume.

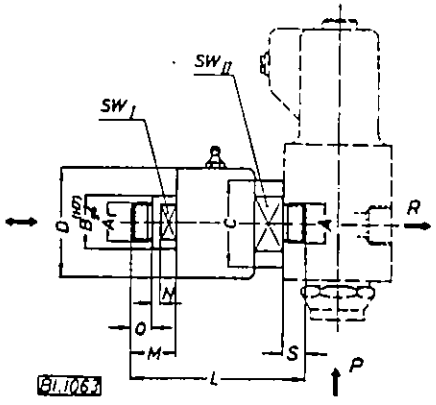
p = normal working pressure in atm.

z = max. number of engagements per minute.

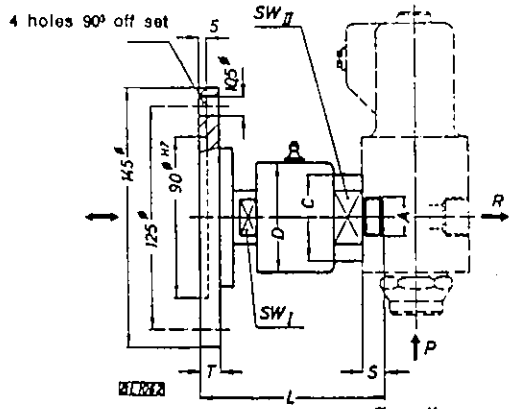
1,5 = leakage factor, depending on operation conditions.

If more than one unit is incorporated this must be correspondingly considered.

c) Rotating air inlets 0-086-006-01-000/001, 0-086-006-02-000/001, 0-086-006-03-000/001 and 0-086-006-05-000/001 can be supplied with the clutch.
The connection of the air inlet to the shaft should be adequately sealed and well aligned. Accurate performance and long life can only be warranted if the inner part is running true with shaft.



Type I



Type II

Type I

Model	A	A_1	B	C	D	SW I	SW II	L	M	N	O	S	$n_{max.}$
0-086-006-01-000	R 1/2"	M 22x1,5	30	48	62	24	41	97	25	3	12	12	1500
0-086-006-02-000	R 3/4"	M 27x1,5	35	52	70	28	46	114	30	3	15	15	1250
0-086-006-03-000	R 1"	M 35x1,5	45	65	80	32	55	127	33	5	15	17	1000
0-086-006-05-000	R1 1/2"	M 50x1,5	60	85	100	50	75	165	45	5	22	22	800

Type II

Model	A	C	D	SW I	SW II	L	S	T	n_{max} [min.$^{-1}$]
0-086-006-01-001	R 1/2"	48	62	24	41	102	12	12	1500
0-086-006-02-001	R 3/4"	52	70	28	46	119	15	12	1250
0-086-006-03-001	R 1"	65	80	32	55	132	17	12	1000
0-086-006-05-001	R1 1/2"	85	100	50	75	170	22	15	800

1. Model 0-086-006-01-000 with spigot Ø 30 g6, centering depth required 3 mm.
   Model 0-086-006-02-000 with spigot Ø 35 g6, centering depth required 3 mm.
   Model 0-086-006-03-000 with spigot Ø 45 g6, centering depth required 5 mm.
   Model 0-086-006-05-000 with spigot Ø 60 g6, centering depth required 5 mm.
2. Model 0-086-006-01-001, 0-086-006-02-001, 0-086-006-03-001 and 0-086-006-05-001 for centering spigot Ø 90 H7. Centering face must run true.
3. Air supply pipes must be connected to the air inlet by a flexible metal hose of at least 300 mm length to prevent excessive load on the bearings. Operating pressure max. 6,0 atm.
   Maintenance: Lubricate with 6-8 grams of grease at intervals of approx. 7000 hours.

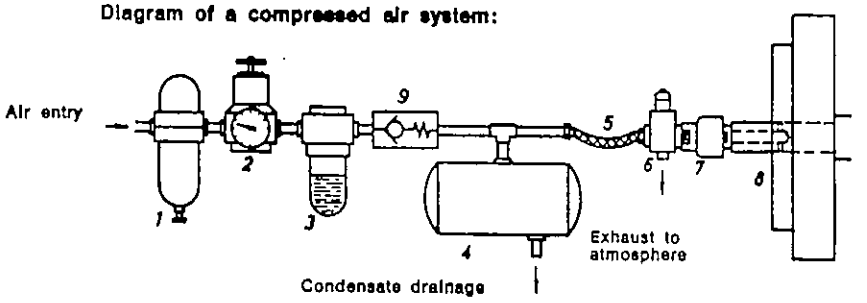
d) Air accumulator

Especially with high engagement figures, i.e. eccentric presses or similar, it is recommended to use a pressure compensating tank (accumulator) of suitable size in order to avoid a drop in pressure during the engagement.
A pressure switch can be incorporated to prevent engagement at too low a pressure which might cause the clutch to slip.

e) In general engineering (cranes, earthmoving equipment etc.) a supply line of 8-12 mm inner diameter (standard connection M 22x1,5) is normally adequate.
For very rapid engagement (i.e presses etc.) it is necessary to use larger pipes as indicated below, in order to achieve accurate performance.

Model	Internal width of the valves and air inlets supply A	Model	Internal width of the valves and air inlets supply A	Model	Internal width of the valves supply A
0—901—.00—47	1/2"	0—401—.00—75	1"	0—150—.00—47	1/2"
0—901—.00—55	3/4"	0—401—.00—78	1"	0—150—.00—63	3/4"
0—901—.00—63	3/4"	0—401—.00—81	1"	0—150—.00—75	1"
0—901—.00—69	3/4"	0—401—.00—84	1 1/2"	0—150—.00—78	1 1/2"
0—901—.00—75	1"	0—401—.00—86	1 1/2"	0—150—.00—84	1 1/2"
0—901—.00—78	1"	0—401—.00—90	1 1/2"	0—150—.00—86	1 1/2"
0—901—.00—81	1"				
0—901—.00—84	1"				
0—901—.00—86	1 1/2"				
0—901—.00—90	1 1/2"				

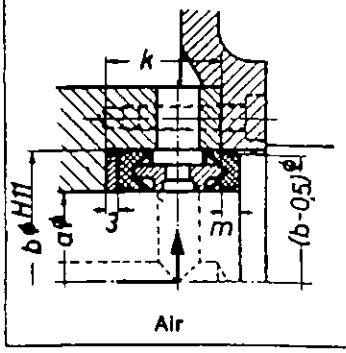
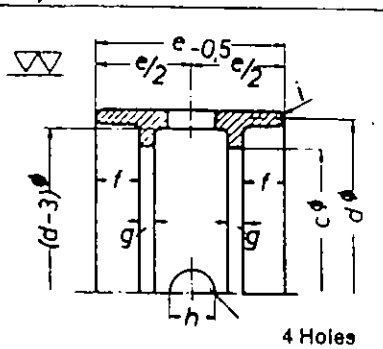
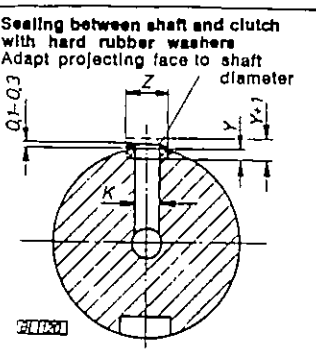
Diagram of a compressed air system:



1 = Compressed air filter, 2 = Pressure reducing valve, 3 = Lubricator, 4 = Pressure compensating air reservoir, 5 = Flexible metal hose, 6 = Solenoid three-way valve, 7 = Air inlet adaptor, 8 = Clutch, 9= Check valve.

Sealing between shaft and clutch model 0-901 | ON 2.1.08

The sealing ring sizes correspond to the catalogue of Simrit-Werk, Carl Freudenberg, Weinheim (Bergstraße). Hub keyway depth is assumed to be according to DIN 6885.
Measurements in mm. Machining quality for all parts in contact with seals: $\sqrt{\sqrt{\sqrt{}}}$

Sketch 1	Space-Ring	Sketch 2
		
Air	4 Holes	Sealing between shaft and clutch with hard rubber washers. Adapt projecting face to shaft diameter

ON 2.1.08 cont.

		Clutch size									
		41	55	63	69	75	78	81	84	86	90
Constant measurements for all shaft dias	e	22	29	32	32	33	34	40	40	45	
	f	5	5	6.5	6.5	7	8.5	9	9	9	
	g	2	2	2	2	2	3	3	3	3	
	h	8	12	14	14	14	10	15	15	18	
	i	0.75	0.75	1	1	1	1.5	1.5	1.5	1.5	
Mesurements sealing sketch 2	K	10	15	15	15	15	15	20	20	25	25
	Z	25	35	35	35	35	35	40	40	50	50
	Y	7	9	9	9	9	9	11	11	15	15

Shaft dia	Seal	Constant measurements for all clutch size a	b	c	d	k	m	k	m	k	m	k	m	k	m	k	m	k	m	k	m	
42	N 42-5	42	55	43	48.5	26.5	5.5	33	6													
44	N 44-4	44	56	45	50	26	5	32.5	5.5													
45	N 45-9	45	58	46	51.5	26.5	5.5	33	6													
48	N 48-4	48	60	49	54	26	5	32.5	5.5													
50	N 50-31	50	60	51	55	29	8	35.5	8.5	40	7											
52	N 52-15	52	64	53	58			38	10	42	9											
55	N 55-15	55	75	56	65					38	5											
58	N 58-3	58	80	59	69					39	6											
60	N 60-3	60	80	61	70	max. bore				39	6	41	4									
62	N 62-11	62	78	63	70					38	5	40	3	40.5	3.5							
65	N 65-10	65	85	66	75			max. bore		39	6	41	4	41.5	4.5							
68	N 68-6	68	90	69	79					39.5	6.5	41.5	4.5	42	5							
70	N 70-1	70	90	71	80					39	6	41	4	41.5	4.5							
72	N 72-3	72	96	73	84							42	5	42.5	5.5							
75	N 75-12	75	90	76	82.5					38	5	40	3	40.5	3.5	42	3					
78	N 78-3	78	102	79	90							—	—	42.5	5.5	44	5					
80	N 80-2	80	100	81	90							41	4	41.5	4.5	43	4	46	7			
82	N 82-2	82	100	83	91							40	3	40.5	3.5	42	3	45	6			
85	N 85-7	85	100	86	92.5							40	3	40.5	3.5	42	3	45	6			
88	N 88-5	88	105	89	96.5									41.5	4.5	43	4	46	7			
90	N 90-6	90	110	91	100					max. bore				41.5	4.5	43	4	46	7	51	2	55.5 2.5
92	N 92-2	92	116	93	104									42.5	5.5	44	5	47	8	52	3	56.5 3.5
95	N 95-9	95	110	96	102.5									40.5	3.5	42	3	45	6	50	1	54.5 1.5
98	N 98-1	98	122	99	110									42.5	5.5	44	5	47	8	52	3	56.5 3.5
100	N 100-9	100	120	101	110							max. bore		41.5	4.5	43	4	46	7	51	2	55.5 2.5
102																						
105	N 105-8	105	125	106	115									41.5	4.5	43	4	46	7	51	2	55.5 2.5
108	N 108-1	108	138	109	123											45.5	6.5	48.5	9.5	53.5	4.5	58 5
110	N 110-3	110	130	111	120									41.5	4.5	43	4	46	7	51	2	55.5 2.5
112	N 112-1	112	142	113	127											45.5	6.5	48.5	9.5	53.5	4.5	58 5
115	N 115-3	115	140	116	127.5											44	5	47	8	52	3	56.5 3.5
118	N 118-2	118	150	119	134											45.5	6.5	48.5	9.5	53.5	4.5	58 5
120	N 120-3	120	140	121	130											43	4	46	7	51	2	55.5 2.5
125	N 125-2	125	145	126	135											43	4	46	7	51	2	55.5 2.5
128	N 128-1	128	160	129	144													48.5	9.5	53.5	4.5	58 5
130	N 130-5	130	150	131	140									max. bore		43	4	46	7	51	2	55.5 2.5
133.5	N 133.5-1	133.5	160	134	147													47	8	52	3	56.5 3.5
135	N 135-5	135	160	136	147.5													47	8	52	3	56.5 3.5
138	N 138-4	138	160	139	149													47	8	52	3	56.5 3.5
140	N 140-2	140	170	141	155															53.5	4.5	58 5
142																						
145	N 145-2	145	170	146	157.5															54	5	58.5 5.5
148																						
150	N 150-1	150	180	151	165											max. bore				53.5	4.5	58 5
152																						
155	N 155-1	155	185	156	170															53.5	4.5	58 5
158	N 158-1	158	190	159	174															53.5	4.5	58 5
160	N 160-4	160	190	161	175															53.5	4.5	58 5
162																						
165	N 165-3	165	187	166	176															50.5	1.5	55 2
168	N 168-1	168	192	169	180													max. bore				55.5 2.5
170																						
																				max. bore =190 mm		max. bore =195 mm	max. bore =300 mm

Where k and m values are indicated the sealing should be effected acc. to sketch 1 and the figures from the table. Larger shafts up to max. bore should be sealed acc. to sketch 2.

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