



## Service Letter

No.:

SL88-228/OES

January 1988


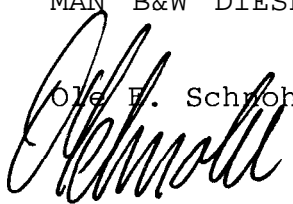
Dear Sirs,

MAN B&W Turbochargers NR20 and NR26

We are pleased to inform you that dismantling and reassembling the cartridge can be carried out by specialized service personnel as an alternative to exchange of the complete cartridge.

As supplement to the operating manual for turbocharger NR20 and NR26 please find enclosed the instruction for dismantling and reassembling cartridge dated 9.86 for NR20 and 4.87 for NR26.

Best regards,  
MAN B&W DIESEL A/S, HOLEBY

Ole E. Schryhr / Bent Hansen  




SUPPLEMENT TO  
TURBOCHARGER TYPE NR 20  
Dismantling and Reassembling  
Cartridge

Contents

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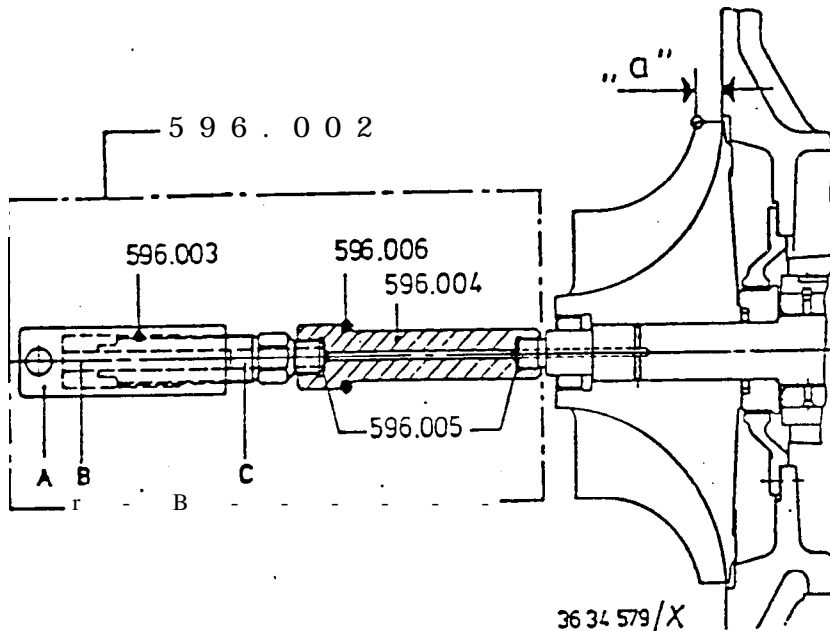
M. A. N. - B & W DIESEL GMBH  
STADTBACHSTRASSE 1  
D- 8900 AUGSBURG

D36 5655-1E

associated work cards....500.06

500.10 through

500.16



## TOOLS REQUIRED . . . . . Tool No.

- 1 Jacking device . . . . . 596.002  
consisting of:
- 1 Oil injector.....(596.003)
  - 1 Intermediate piece...(596.004)
  - 2 Sealing rings.....(596.005)
  - 1 O-ring.....(596.006)
- 1 Open end wrench SW 41  
1 Open end wrench SW 24  
1 Open end wrench SW 19  
1 Socket wrench SW 22  
1 Socket wrench SW10

Fig. 2

STARTING POSITION

Cartridge (599.001) is detached from turbocharger

SEQUENCE OF OPERATIONS 1, Disassembly1. Removal of compressor wheel (520.005) - Ill. 1 and 2

1.1 Measure distance "a" and record. - Ill. 2

1.2 Unscrew Closing nut (520.011) or, for version with revolution counting, magnetic nut (520.124) - right-hand thread -

1.3 Withdraw carrier (520.009).

1.4 Fill up jacking device (596.002) and screw onto shaft end of rotor (520.001). while doing so, watch position of sealing rings (596.005). - Ill. 2 -

Note Filling up of-jacking device:

- Screw off oil injector (596.003) from intermediate piece (595.004)
- Screw sleeve (A) of oil injector back as far as possible
- Press piston (B) back to end position with suitable object
- Fill up cylinder (B) with clean lube oil (Viscosity SAE 30 - SAE 50)
- Screw on oil injector (596.003) - with sealing ring (596.005) - to intermediate piece (596.004).

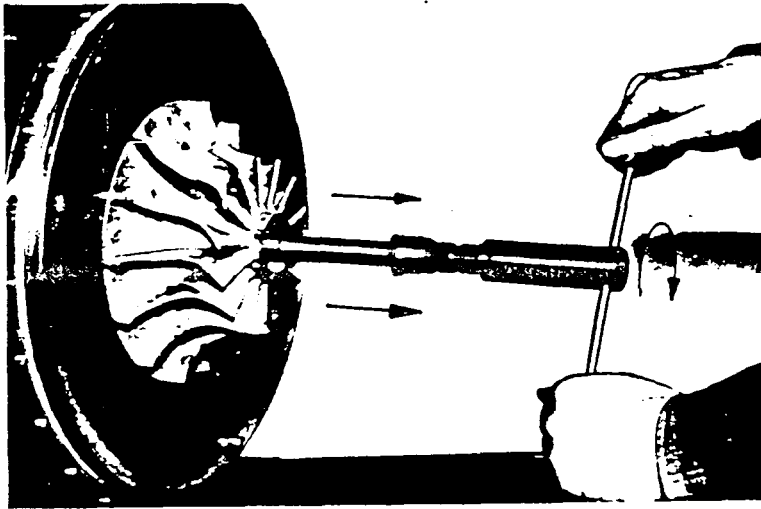


Fig. 3

#### 1.5 Extraction of compressor wheel (520.005) - Ill. 2 and 3 -

By turning sleeve (A) at oil injector (596.003), oil is pumped into the shaft pin until it has reached the groove between turbine shaft (520.001) and compressor wheel (520.005) and the compressor wheel can be moved freely on the shaft.

Now, the compressor wheel (520.005) must be extracted by hand immediately and steadily, employing constant axial force.

Note Uneven force in extracting the compressor wheel may result in disruption of the oil pressure in the groove between turbine shaft and compressor wheel. The compressor wheel then seizes.

If that happens, the remedy is described hereunder:

- Remove jacking device (595.002)
- Heat compressor wheel hub (not the blades) uniformly and carefully, but quick by means of a soft flame up to but not exceeding 80° C (over entire circumference, not only locally) then pull off compressor wheel with steady force immediately.

Attention: Overheating of the compressor wheel will lead to structural changes of the aluminium alloy, rendering the compressor wheel unserviceable.

#### 1.6 Dismount jacking device (595.002), clean and place into tool kit again.

### 2. Removal of rotor (520.001)

#### 2.1 Lift rotor (520.001) slightly and move out centrically as far as possible in direction of turbine

Note Run-in labyrinths or deposits of coke residue may impair the process of removal, if so, use wooden pounding block.

In the process of removing the rotor, the labyrinth rings (520.006) and the O-ring (520.017) are being stripped off.

### 3. Removal of bearing bushes (517.002)

- 3.1 Take off O-ring (520.017) or, if stripped off, collect, resp.  
 3.2 Take off labyrinth ring (520.006).

Note If the labyrinth ring with its tips sticks to the sealing cover (517.017), loosen first lockwashers (517.033) on compressor side, unscrew hexagon nuts (517.032) and dismount sealing cover together with labyrinth ring.

- 3.3 Take out both bearing bushes (517.002).

Only in case of damage of sealing cover (517.017), bearing sleeve (517.008) or spacer sleeve (517.003), the following operations are required:

### 4. Removal of sealing covers (517.017)

- 4.1 on compressor side - loosen lockwashers (517.033), unscrew hexagon nuts (517.008), take off sealing cover (517.017) and gasket (517.031).  
 4.2 on turbine side - loosen lockwashers (517.033), unscrew hexagon nuts (517.032), take off end cover (517.009), sealing cover (517.017) and gasket (517.031).

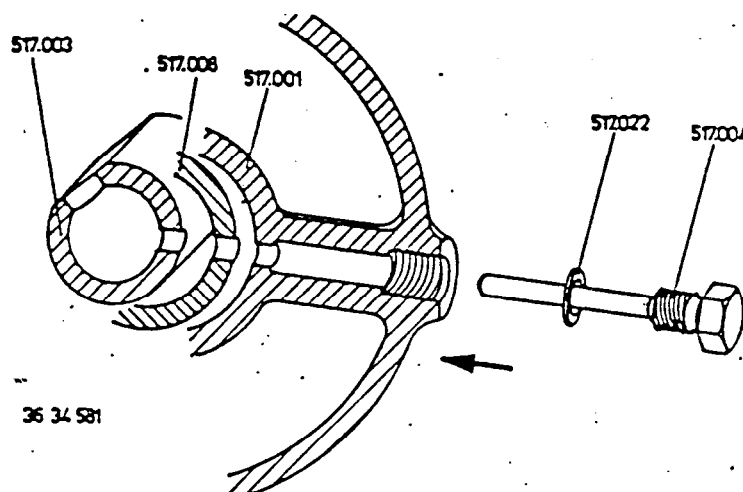


Fig. 4

### 5. Removal of bearing sleeve (517.008) and spacer sleeve (517.003) - Ill. 4 -

- 5.1 Screw out holding screw (517.004) and take off sealing ring (517.022).  
 5.2 Press out bearing sleeve (517.008) and spacer sleeve (517.003).

Note If, in case of remedying damage, the sleeves should be shrunk on or seize, they can easily be loosened or pressed through by slight pounding with a hammer or by means of a press, using a wooden or a copper bolt.

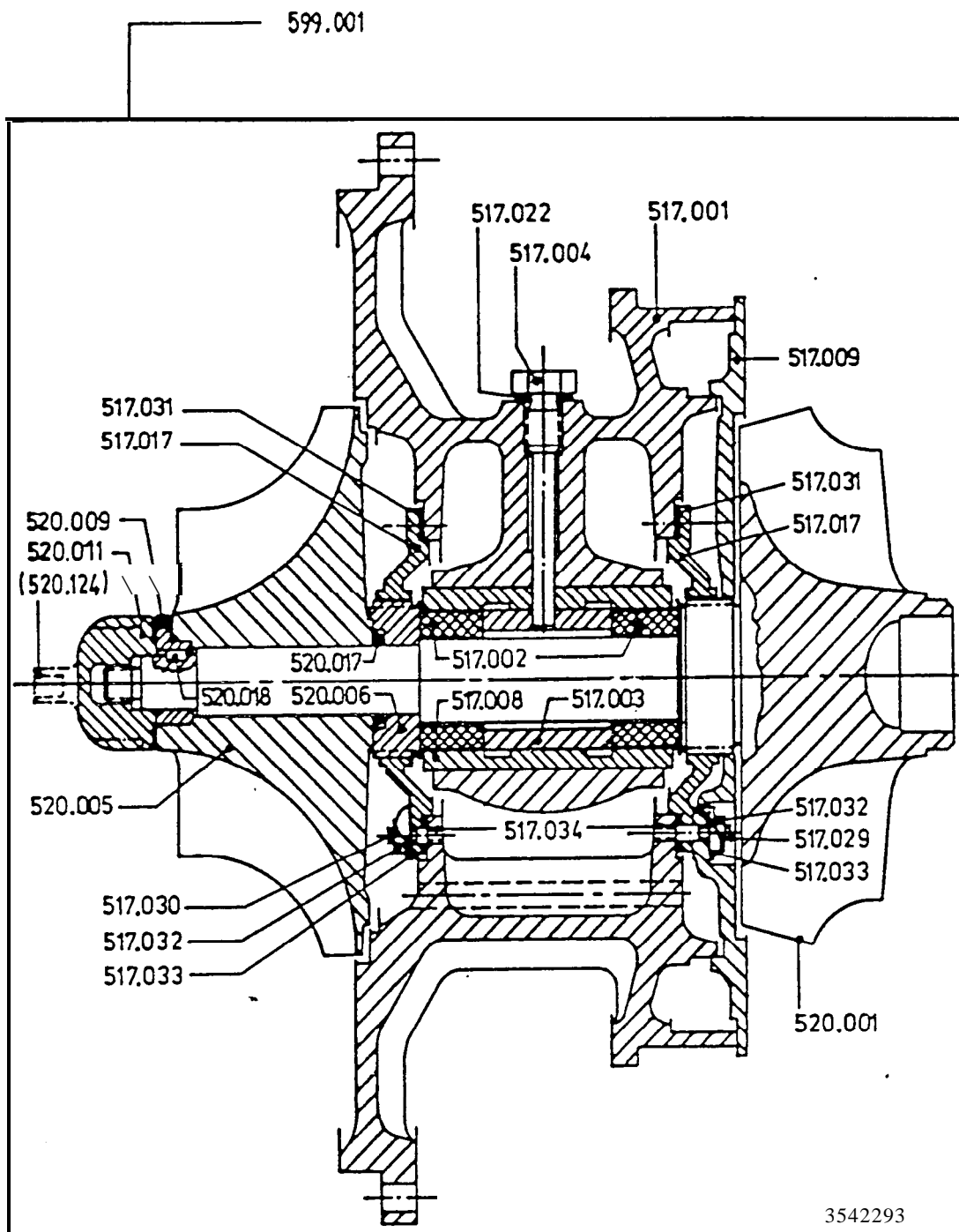


Fig. 1

# **LEGEND**

599.001 Cartridge complete, consisting of:

517.001	Bearing casing	520.001	Rotor
517.002	Bearing bush	520.005	Compressor wheel
517.003	Spacer sleeve	520.006	Labyrinth ring
517.004	Holding screw	520.009	Carrier
517.006	Bearing sleeve	520.011	End nut
517.009	End cover, turbine side	520.017	O-ring
517.017	Sealing cover	520.016	Feather key
517.022	Sealing ring		
517.029	Stud bolt	520.124	Magnetic nut
517.030	Stud bolt		( only for version with
517.031	Gasket		revolution counting, instead
517.032	Hexagon nut		of 520.011 )
517.033	Lockwasher		
517.034	Adhesive		

For inspection, clean individual parts as described hereunder.

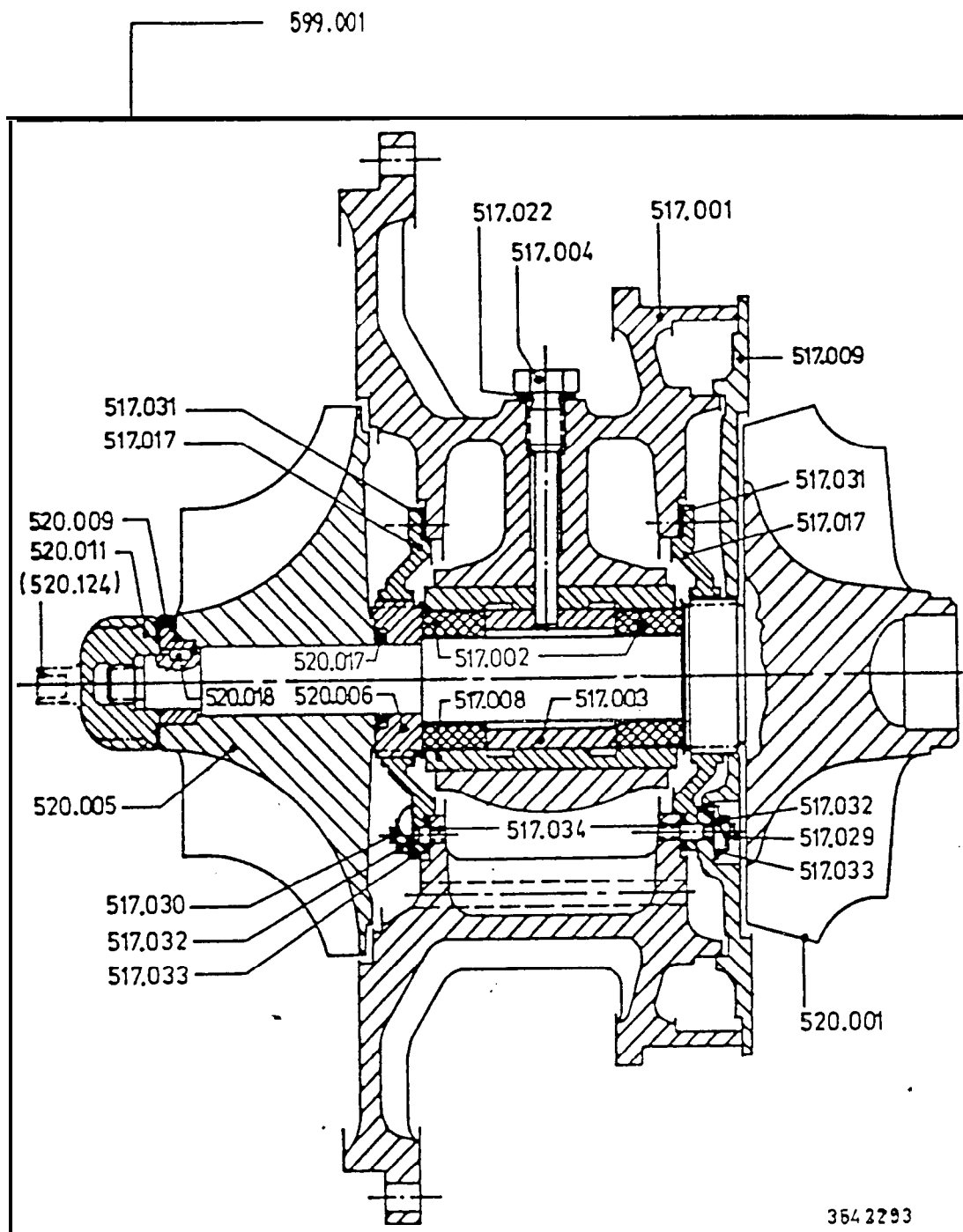
Burnt-in dirt layers, particularly on turbine side (such as residues of heavy fuel, oil coke) to be soaked in P3-water solvent and brushed off. If required, repeat process several times. Subsequently, neutralize with soda water.

Layers of oily dirt to be removed with fuel oil or any other liquid cleansing agent.

Bores for sealing air and lube oil to be flushed with fuel oil and then to be blown through with compressed air jet.

The following CHECKLIST comprises details on evaluation and required measures for repairing the cartridge (basic assembly). If more than one column is marked "X", the alternative more favourable with respect to the situation under consideration may be chosen.

Part No.	Individual Part	Part to be sent in for repair	
		Part to be replaced	
Order	Condition		
No.	Dimension of (D = External Ø, d = Internal Ø, b = Width) rejection		
517.001	<u>Bearing casing</u> Damage or incipient cracks, if stability or oil-leak-proof condition imperiled.....	X	
517.002	<u>Bearing bush</u> (2 units: identical for turbine and compressor side) Traces of seizure in touching pattern of axial surfaces.....*	X	
	Wear : $D \leq \emptyset 49.82$ , $d \geq \emptyset 30.04$ , $b \leq 23.94$ .....a	x	
	Note Uniform layer of lacquering is no cause of concern, internal and external diameters cannot be evaluated by visual inspection.		
517.003	<u>Spacer sleeve</u> Traces of seizure on axial surfaces.....	X	
517.008	<u>Bearing sleeve</u> Traces of seizure in the bore, or wear: $d \geq \emptyset 50.03$ .....	X	
517.009	<u>Closing cover - turbine side</u> In case of damage, if function or stability imperiled.....	X	
517.017	<u>Sealing cover</u> (2 units: identical for turbine and compressor side) Running-in pattern abnormal.....	X	
	Note The labyrinth clearance is smaller than the bearing play. Thus, the tips of the labyrinths are touching the sealing covers, causing wear. The scores, depending on the positioning of the rotor are, at the circumference, somewhat one-sided. If sealing covers are replaced, the gaskets (517.031) are also to be renewed.		
520.001	<u>Rotor</u> Damage to blades, for instance by foreign matter.....	X	
	Incipient cracks, (Crack test: e.g. sound test, fluorescent dye check).....	X	
	Traces of touching at blade outline, unilateral at circumference, are indication of imbalance.....*	x	x
	Traces of touching at blade outline, over entire circumference: If permissible gap exceeded. (Refer Operating Manual: Gaps and clearances, points 3 and 4).....	X	
	Labyrinth tips damaged or worn: $D \leq \emptyset 55.85$ .....*	X	
	Searing points damaged or worn: $D \leq \emptyset 29.94$ .....	X	
	Concentric running test: Clean centering points, mount for centering, measure for concentric running at both bearing points and at seat of compressor wheel (3 locations), if deviation exceeding 0.01 mm.....	x	x
	Note If eccentricity at those 3 locations is in same circumferential position and runs linear, the centering points are damaged and the real deviation from concentric running is smaller (max. permissible 0.01 mm).		
520.005	<u>Compressor wheel</u> Damage to blades, for instance by foreign matter.....	X	
	Incipient cracks, (Crack test: e.g. sound test, fluorescent dye check).....	X	
	Traces of touching at blade outline, unilateral at circumference, are indication of imbalance.....	x	x
	Traces of touching at blade outline, over entire circumference: If permissible gap exceeded (Refer Operating Manual: Gaps and clearances, points 3 and 4).....	X	
520.006	<u>Labyrinth ring</u> Labyrinth tips damaged or worn: $D \leq \emptyset 55.85$ .....	X	



#### LEGEND

599.001 Cartridge complete, consisting of:

517.001	@earing casing	520.001	Rotor
517.002	Bearing bush	520.005	Compresor wheel
517.003	Spacer sleeve	520.006	Labyrinth ring
517.004	Holding screw	520.009	Carrier
517.008	Bearing sleeve	520.011	End nut
517.009	End cover, turbine side	520.017	O-ring
517.017	Sealing cover	520.018	Feather key
517.022	Sealing ring		
517.029	Stud bolt	520.124	Magnetic nut
517.030	Stud bolt		( only for version with
517.031	Gasket		revolution counting, instead
517.032	Hexagon nut		of 520.011 )
517.033	Lockwasher		
517.034	Adhesive		



The reassembly of the cartridge is a reversal of the process of dismantling.

Watch out particularly for cleanliness of the individual parts. Slightly moisten sliding surfaces with clean lube oil.

If a new rotor and/or a new compressor wheel is installed, check for identity of blade outline with component originally installed.

#### 1. Inserting Bearing sleeve (517.008) and spacer sleeve (517.003)

1.1 Insert bearing sleeve and spacer sleeve in a manner ensuring that the bores for holding screw (517.004) and for oil supply coincide. - Ill. 4 -

1.2 Screw in completely holding screw (517.004) with sealing ring (517.022).

#### 2. Mounting sealing cover (517.017)

2.1 on turbine side - Put on gasket (517.031), sealing cover (517.017) and end cover (517.009) and tighten with hexagon nuts (517.032), secure with lockwashers (517.033).

2.2 on compressor side - Put on gasket (517.031) and sealing cover (517.017), tighten with hexagon nuts (517.032) and secure with lockwashers (517.033).

#### 3. Fitting of bearing bushes (517.002)

3.1 Insert bearing bushes into bearing sleeve (517.008) on turbine as well as on compressor side.

Note The bearing bushes are completely symmetrical installation, therefore, at discretion.

#### 4. Fitting rotor (520.001), labyrinth ring (520.006) and O-ring (520.017)

4.1 Carefully insert rotor in axial direction, do not damage labyrinth tips.

4.2 Place labyrinth ring (520.006) on turbine shaft, balancing marks on labyrinth ring and on rotor must coincide.

4.3 Shove on O-ring (520.017).

#### 5. Fitting of compressor wheel (520.005) -

Note Tight fit of the compressor wheel on the turbine shaft is secured by employing the heat shrink process. Therefore, the following operations must be performed in quick succession. Fix rotor in end position towards compressor side and secure against turning either by hand or with other suitable means.

Ensure that balancing marks of rotor (520.001), labyrinth ring (520.006), compressor wheel (520.005) and carrier (520.009) correspond radially regarding angle position.

Clads of labyrinth ring (520.006) and compressor wheel (520.005) must mesh.

For putting on the heated compressor wheel, wear protective gloves.

5.1 Clean seats from oil, grease or lubricants containing M S2 carefully. Apply thin guiding film of Molykote G Rapid, Holokote G-n or Molykote D on cylindrical seat of turbine shaft.

5.2 Heat compressor wheel (520.005) to approx. 80° C in water.

5.3 Insert feather keys (520.018) in turbine shaft, if they had been removed.

5.4 Shove compressor wheel (520.005) and carrier (520.009) on turbine shaft and tighten at once with closing nut (520.011) or magnetic nut (520.124) resp., in case of version with revolution counter.

#### 6. Inspection

6.1 Measure distance "a" - refer Ill. 2 - and compare with readings taken prior to disassembly. If excessive, clads of compressor wheel and labyrinth ring do not mesh. In that case, remove compressor wheel once more and refit correctly.

- 6.2 **Measure** aberration of compressor wheel from plane of rotation of impeller with dial gauge at largest radial distance, for admissible **rating refer** to Operation Manual Section 1, Sheet 52, Gaps and Clearances.
- 6.3 Measure axial play of rotor **with** gauge,  
admissible rating: refer Operation Manual, Section 1, Sheet 52, Gaps and Clearances, Point 5.



Ersatzteil-Nr. Bestell-Nr	Benennung	Stck	Spare part-No Order No	Designation	Qty.
	<u>Fuer Turbinenzustromaease</u>			<u>For Gas-admission casing</u>	
501.006	Stiftschraube	6	501.006	Stud screw	6
501.007	Sicherungsblech	12	501.007	Lockwasher	12
501.008	Sechskantmutter.	6	501.008	Hexagon nut	6
	<u>Fuer Lagerung</u>			<u>For Bearing</u>	
517.002	Lagerbuchse	2	517.002	Bearing bush	2
517.017	Dichtdeckel	2	517.017	Sealing cover	2
517.022	Dichtring	1	517.022	Seal ring	1
517.029	Stiftschraube	6	517.029	Stud screw	6
517.031	Dichtung	2	517.031	Gasket	2
517.032	Sechskantmutter	6	517.032	Hexagon nut	6
517.033	Sicherungsblech	12	517.033	Lockwasher	12
520.017	Runddichtring	1	520.017	O-ring	1



INHALTSVERZEICHNIS: WERKZEUG-SATZ

NR20

6

INDEX: SET OF TOOLS

S11.59600-0031

Werkzeug-Nr. Bestell-Nr	Benennung	Stck.	Tool-No Order No	Designption	Qty.
596.001	<u>Abbau Verdichtergehäuse</u> Sechskantschraube (Abdrueckschraube)	3	596.001	<u>Removing Compressor casing</u> Hexagon screw (puller screw)	3
596.003	<u>Abbau Verdichterrad</u> Öl-injektor	1	596.003	<u>Removing Compressor wheel</u> Oil-injektor	1
596.004	Zwischenstueck	1	596.004	Intermediate piece	1
596.005	Dichtung	2	596.005	Seal ring	2
596.006	Runddichtring	1	596.006	O-ring	1



SUPPLEMENTARY DESCRIPTION  
TO TURBOCHARGER TYPE NR 26

Dismantling and Reassembling  
Cartridge

Contents

Sheet No.

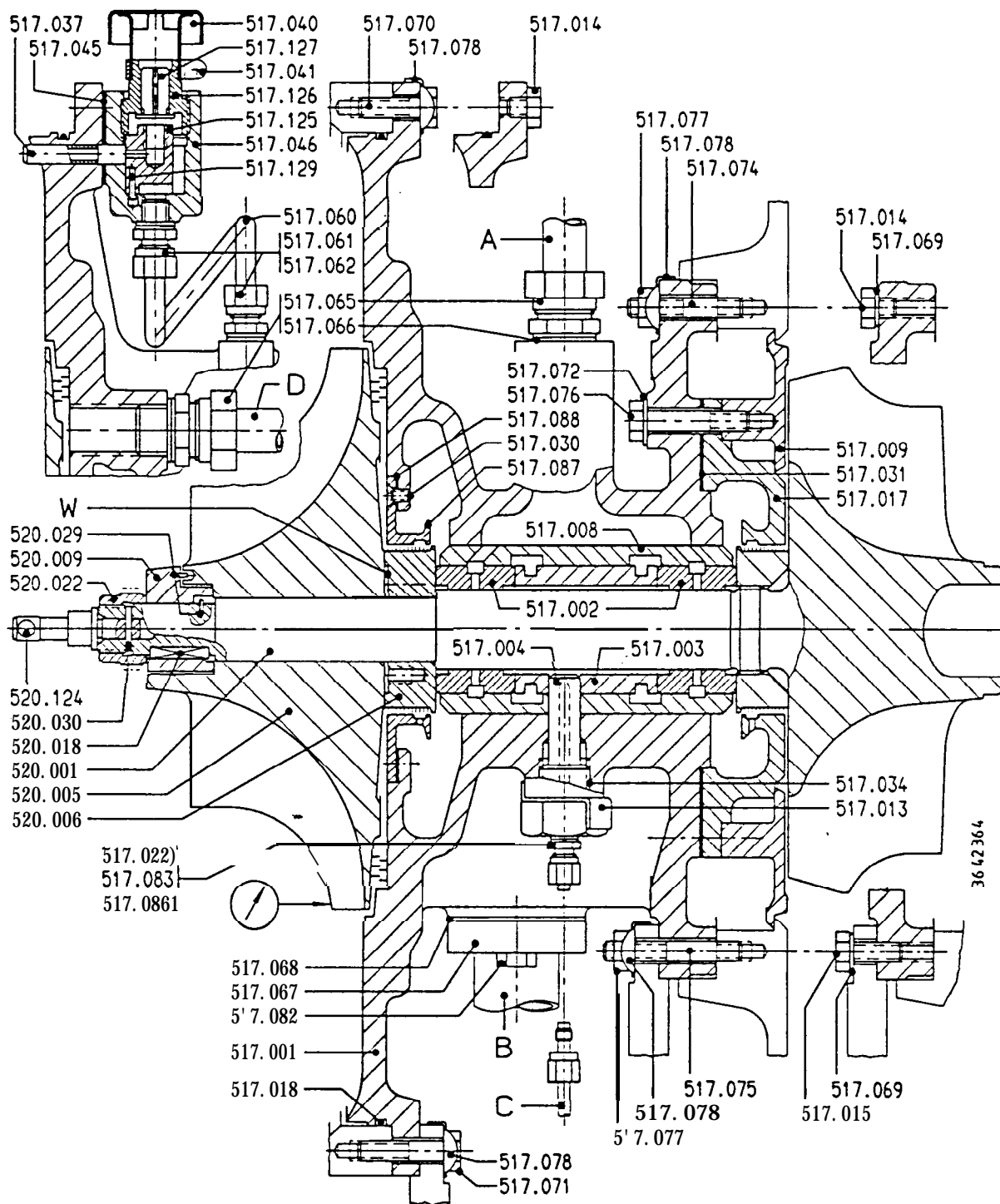
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Sequence of Operations 2	Reassembling Cartridge	2
Sequence of Operations 3	Inspection of Component Parts	2, 3
List of Component Parts of Cartridge		4

MAN B&W DIESEL GMBH  
STADTBACHSTRASSE 1

D- 8900 AUGSBURG

D36 5656-1 E

P. T. O.





DISMANTLING AND REASSEMBLING  
CARTRIDGE  
INSPECTION OF COMPONENT PARTS

NR 26

Sheet 1

associated work cards . . . 500.06. 500.10 through 500.21

LEGEND

517.001 Bearing casing  
517.002 Bearing bush  
517.003 Spacer sleeve  
517.004 Holding screw  
517.008 Bearing sleeve  
517.009 Covering disc  
517.013 Lockwasher  
517.017 Sealing cover  
517.030 Countersunk screw  
517.031 Gasket  
517.034 Metal adhesive  
517.072 Disc spring  
517.076 Hexagon screw  
517.087 Sealing cover  
517.088 Gasket

520.001 Turbine rotor  
520.005 Compressor wheel  
520.006 Labyrinth ring  
520.009 Carrier  
520.018 Feather key  
520.022 Nut  
520.029 Grooved pin  
520.030 Spring pin  
520.124 Magnetic shaft

W = Balance mark  
A = Lubricating oil supply  
B = Lubricating oil discharge  
C = Connection interval pre-lubrication (if installed)  
D = Venting pipe

TOOLS REQUIRED

1 Open end wrench A/F 17  
1 Open end wrench A/F 36  
1 Socket wrench A/F 41  
1 Offset screw driver A/F 4  
1 Pounding block or copper bolt  
1 Hammer  
1 Pin punch  
1 Flat chisel  
1 Gauge

STARTING POSITION

Cartridge (599.001) is removed from turbocharger.

Dismantling of cartridge is required and is effected by trained service personnel, refer work card 500.21.

SEQUENCE OF OPERATIONS 1: Dismantling

1. Unscrew nut (520.022) (right-hand thread), remove spring pin (520.030) with pin punch and draw out magnetic shaft (520.124).
2. Pull off carrier (520.009)
3. Pull off compressor wheel (520.005) axially by hand.

Note If the compressor wheel should seize (f.i. on account of fretting corrosion), a special fluid of low viscosity (such as Caramba) is to be fed into the groove of the shaft seat and should be allowed to react. Then pull off compressor wheel by moving back and forth.

4. Lift turbine rotor (520.001) slightly and move out centrally as far as possible in direction of turbine.

Note Run-in labyrinths or deposits of coke residue may impair the process of removal, if so, use wooden pounding block. In the process of removing the rotor, the labyrinth ring (520.006) is being stripped off. The two feather keys (520.018) normally are not removed, they must, however, not be lost.

5. Take out labyrinth ring (520.006) from sealing cover (517.087).

Note If the labyrinth ring sticks, first detach sealing cover (517.087) as described under 7.

6. Take out both bearing bushes (517.002).
7. Screw out countersunk screws (517.030), remove sealing cover (517.087) and gasket (517.088).
8. In case the spacer sleeve (517.003) and/or bearing sleeve (517.008) must be removed, loosen lockwasher (517.013), screw out holding screw (517.004) (right-hand thread), press out spacer sleeve and bearing sleeve in direction of compressor side.

Note If the sleeves should seize, they can be loosened by slight pounding with a hammer, or thrust out with a press, using a wooden or a copper bolt.

P. T. O.

D36 5656 E  
1

Arbeitszeit — Stunden  
Working time — hours  
Durée de travail — heures  
Tiempo de trabajo — horas

1.: 2.0  
2.: 2.0

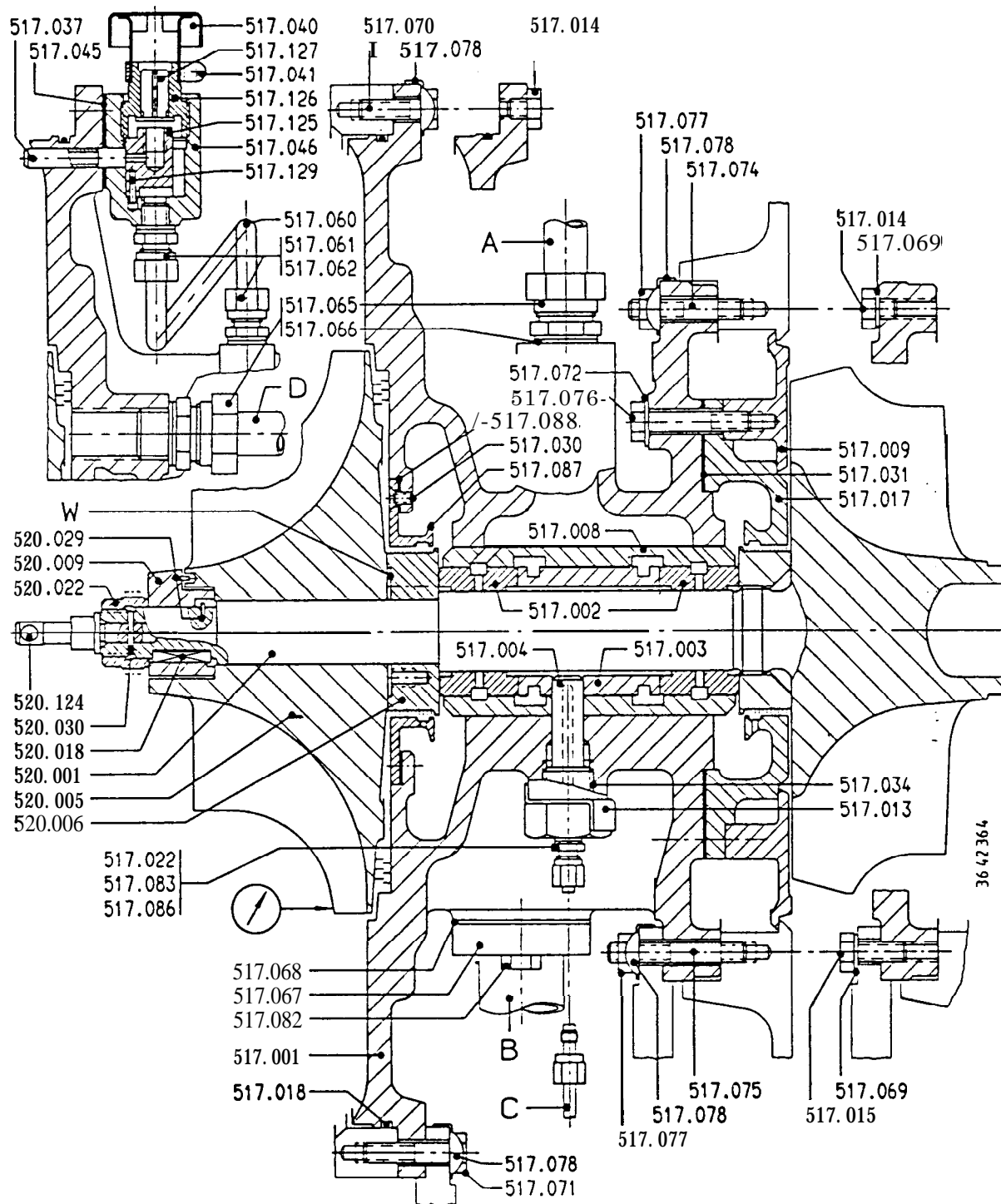


Allé Every 15,000 + 500  
Toutes les As required  
Cada

Reparationsstunden  
Operating hours  
heures de marche  
horas de servicio

9. In case the covering disc (517.009) and/or sealing cover (517.017) must be removed, unscrew hexagon screws (517.076) and disc springs (517.072), take off covering disc (517.009), sealing cover (517.017) and gasket (517.031).

INSPECTION OF COMPONENT PARTS refer sequence of operations. 3.





SEQUENCE OF OPERATIONS 2: Reassembling

When reassembling the cartridge, particular attention is to be attached to the cleanliness of the individual parts. Slightly moisten sliding surfaces of bearing points with clean lube oil. Only use perfect gaskets. If a new rotor and/or a new compressor wheel is installed, check for identity of blade outline with component originally installed.

1. Insert bearing sleeve (517.008) and spacer sleeve (517.003) into bearing casing, in doing so, watch for correct position. Axial distance of bores for holding screw (517.004) is smaller towards the direction of compressor side.
2. Screw in holding screw (517.004) with lockwasher (517.013) and metal adhesive (517.034, f.i. Loctite) and secure.
3. Tighten covering disc (517.009), sealing cover (517.017) and gasket (517.031) with disc springs (517.072) and hexagon screws (517.076). Watch for position relative to sealing air bore. Disc springs to be installed with their concave side pointing towards the bearing casing.
4. Tighten gasket (517.088) and sealing cover (517.087) with countersunk screws (517.030). In case of sealing cover with oil trap groove, install with oil drain aperture pointing downwards.
5. Place bearing bushes (517.002) into bearing sleeve (517.008) on turbine as well as on compressor side. Bearing bushes are symmetric, thus position of installation at discretion.
6. Carefully insert rotor (520.001) in axial direction, do not damage labyrinth tips.
7. Move in labyrinth ring (520.006), in doing so, balancing mark "W" on labyrinth ring and on grooved pin (520.029) on turbine rotor must radially be placed one of the other.
8. Insert feather keys (520.018) into turbine shaft, if they had been removed. Fit new feather keys into grooves of carrier (520.009) and chamfer edges to the extent necessary to ensure that installation and removal of compressor wheel are not impaired.
9. Fix rotor at end position towards compressor side and against turning, either by hand or with other suitable means. Then move compressor wheel (520.005) and carrier (520.009) onto turbine shaft up to end position. Ensure that balancing marks "W" of labyrinth ring (520.006), grooved pin (520.029) of turbine rotor and carrier, as well as bore in compressor wheel, (for grooved pin) are corresponding radially.
10. Fasten magnetic shaft (520.124) with spring pin (520.030) on turbine shaft. Ends of tensioning sleeve to protrude evenly.
11. Fasten rotor parts with nut (520.022).
12. Measure aberration from plane of rotation at largest radial distance, permissible rate: Refer Operation Manual Section 1, Sheet 53, Gaps and Clearances.
13. Measure axial clearance of rotor, using dial gauge, permissible rate: Refer Operation Manual Section 1, Sheet 53, Gaps and Clearances, Point 5.

SEQUENCE OF OPERATIONS 3: Inspection of Component Parts.

for inspection, clean component parts as described hereunder.

Burnt-in dirt layers, particularly on turbine side (such as residues of heavy fuel, oil coke) to be soaked with P3-water solvent and brushed off. If required, this process is to be repeated several times. Subsequently, neutralize with soda water.

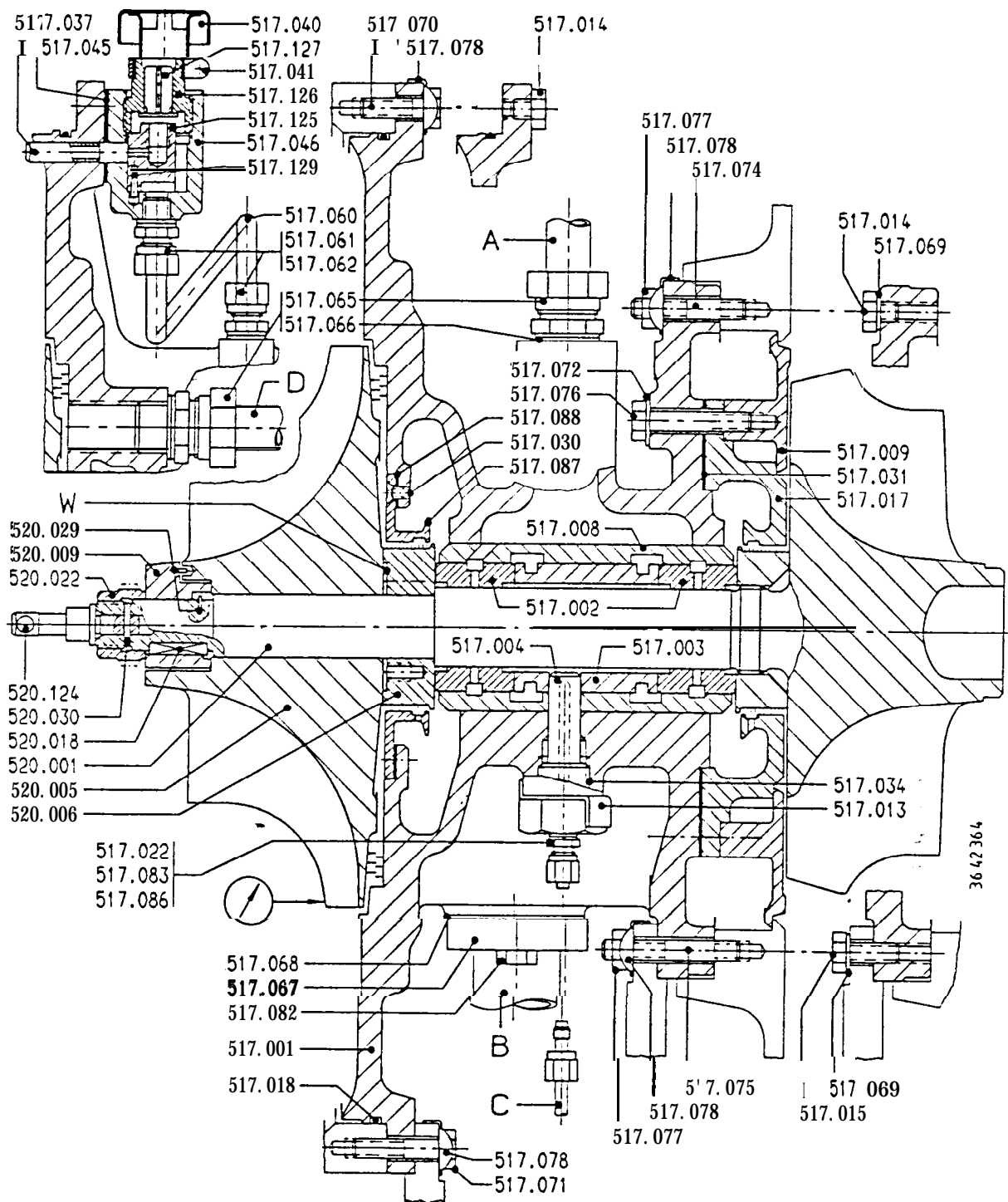
Layers of oily dirt to be removed with fuel oil or any other liquid cleansing agent.


Bores for sealing air and lube oil to be flushed with fuel oil and then to be blown through with compressed air jet.

The following CHECKLIST comprises details on evaluation and required measures for repairing the basic assembly. If more than one column is marked "X", the alternative more favourable with respect to the situation under consideration may be chosen.



Part No. Order No.	Individual Part Condition Dimension of $D$ = outer dia., $d$ = inner dia., $b$ = width rejection:	Part to be sent in for repair	
		Part to be replaced	
517.001	<u>Bearing casing</u> Damage or incipient cracks, if stability or oil-leak-proof condition imperiled.....	X	
517.002	<u>Bearing bush</u> (2 units: identical for turbine and compressor side)		
	Traces of seizure in touching pattern of axial surfaces.....*	X	
	Wear : $D \leq 64.62$ mm dia., $d \geq 40.04$ mm dia., $b$ 139.94 mm .....	X	
	Note Uniform layer of lacquering is no cause of concern, internal and external diameters cannot be evaluated by visual inspection.		
517.003	<u>Spacer sleeve</u> Traces of seizure on axial surfaces.....	X	
517.008	<u>Bearing sleeve</u> Traces of seizure in the bore, or wear: $d \geq 65.03$ mm .....	X	
517.009	<u>Covering disc</u> In case of damage, if function or stability imperiled.....	X	
517.017	<u>Sealing cover</u> (turbine side) Running-in pattern through tips of labyrinth rings abnormal .....	X	
517.037	<u>Sealing cover</u> (compressor side) Running-in pattern through tips of labyrinth rings abnormal .....	X	
	Note The labyrinth clearance is smaller than the bearing play. Thus, the tips of the labyrinths are touching the bore of the sealing covers (517.017 and 517.037). The stores resulting from that contact are somewhat one-sided at the circumference, depending on the position of the rotor.		
525.001	<u>Turbine rotor</u> Damage to blades, for instance by foreign matter.....	X	
	Incipient cracks, (Crack test: e.g. sound test, fluorescent dye check).....	X	
	Traces of touching at blade outline, unilateral at circumference, are indication of imbalance .....	X	X
	Traces of touching at blade outline, over entire circumference: If permissible gap exceeded (refer Operating Manual: Gaps and Clearances, points 3 and 4).....	X	
	Labyrinth tips damaged or worn: $D \leq 84.81$ mm dia. ....	X	
	Bearing points damaged or worn: $D \leq 39.93$ mm dia. ....	X	X
	Concentric running test: Clean centering points, mount for centering, measure for concentric running at both bearing points and at seat of compressor wheel (3 locations), if deviation exceeding 0.01 mm.....	X	X
	Note If eccentricity at those 3 locations is in same circumferential position and runs linear, the centering points are damaged and the real deviation from concentric running is smaller (max. permissible 0.01 mm).		
520.003	<u>Compressor wheel</u> Damage to blades, for instance by foreign matter.....	X	
	Incipient cracks, (Crack test: e.g. sound test, fluorescent dye check).....	X	
	Traces of touching at blade outline, unilateral at circumference, are indication of imbalance.....	X	X
	Traces of touching at blade outline, over entire circumference: If permissible gap exceeded (refer Operating Manual: Gaps and Clearances, points 1 and 2).....	X	
520.006	<u>Labyrinth ring</u> Labyrinth tips damaged or worn: $D \leq 84.81$ mm dia. ....	X	



		VERZEICHNIS DER EINZELTEILE LIST OF SINGLE PARTS RUMPFGRUPPE / CARTRIDGE	NR26	
			Blatt 4	
Bestell-Nr. Order No.	Benennung	Designation	Norm Nr. Standard No.	
599.001	<u>Rumpfgruppe</u> (517.000 + 520.000)	<u>Cartridge</u> (517.000 + 520.0001)		
517.000	<u>Lagerung</u>	<u>Bearing</u>	-0337	
517.001	Lagergehaeuse	Bearing casing		
517.002	Lagerbuchse	Bearing bush		
517.003	Abstandshuelse	Spacer sleeve		
517.004	Halteschraube	Holding screw		
517.008	Lagerhuelse	Bearing sleeve		
517.009	Abdeckscheibe	Covering disc		
517.013	Sicherungsblech	Lockwasher	DIN 463-28-St	
517.014	Sechskantschraube	Hexagon screw	M 1591-M10x10-SM	
517.015	Sechskantschraube	Hexagon screw	M 1591-M10x25-SM	
517.017	Dichtdeckel	Sealing cover		
517.018	Runddichtring	O-ring		
517.022 +	Dichtring	Seal ring	DIN 7603-A10x14-Cu	
517.030	Senkschraube	Countersunk screw	DIN 7991-M6x16-4.8	
517.031	Dichtung	Gasket		
517.034	Metallkleber	Metal adhesive	z.B./e.g. LOCTITE	
517.037	Spannstift	Spring pin	DIN 1481-10x40	
517.040	Ventilschutz	Valve protection		
517.041	Schlauchschelle	Hose clamp	R 597-E25x12	
517.045	Dichtung	Gasket		
517.046	Ventilgehaeuse	Valve casing		
517.060	Rohr	Pipe		
517.061	Dichtring	Seal ring	DIN 7603-A14x20-Cu	
517.062	Verschraubung	Screw connection	DIN 2353-CL10-St	
517.065	Verschraubung	Screw connection	DIN 2353-CL22-St	
517.066	Dichtring	Seal ring	DIN 7603-A26x32-Cu	
517.067	Flansch	Flange		
517.068	Dichtung	Gasket	M 618-104x70x45-AF	
517.069	Dichtring	Seal ring	DIN 7603-A10x16-Cu	
517.070	Sechskantschraube	Hexagon screw	DIN 933-M10x30-8.8	
517.071	Sechskantschraube	Hexagon screw	DIN 931-M10x45-8.8	
517.072	Tellerfeder	Disc spring	DIN 2093-A20-X20CrMoV121	
517.074	Stiftschraube	Stud screw	AM 1701-M10x40	
517.075	Stiftschraube	Stud screw	AM 1701-M10x50	
517.076	Sechskantschraube	Hexagon screw	M 1591-M10x55-SM	
517.077	Sechskantmutter	Hexagon nut	AM 1702-M10	
517.078	Sicherungsblech	Lockwasher	DIN 93-10,5-X10CrNiTi189	
517.082	Sechskantschraube	Hexagon screw	DIN 933-M10x30-8.8	
517.083 +	Verschraubung	Screw connection	DIN 2353-CL6-St	
517.086 +	Verschlussbutzen	Closure plug	AR 592-BUZ 6-L	
517.087	Dichtdeckel	Sealing cover		
517.088	Dichtung	Gasket		

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Bestell-Nr. Order No.	Banennung	Designation	Norm Nr. Standard No.
517. 125	Ventileinsatz	Valve insert	DIN 1470-3x16-St
517. 126	Verschussschraube	Screw plug	
517. 127	Ventilteller	Valve plate	
517. 129	Zylinderkerbstift	Grooved pin	
† falls vorhanden (Anschluss fuer Intervall Vorschnierung)		if provided (connection for interval type priming)	
520. 000	<u>Laeufer</u>	<u>Rotor</u>	- 0445
520. 001	Turbinenlaeuer	Turbine rotor	
520. 005	Verdichterrad	Compressor wheel	
520. 006	Labyrinthring	Labyrinth ring	
520. 009	Mitnehmer	Carrier	
520. 018	Passfeder	Feather key	DIN 6885-A8x7x32-C45K
520. 022	Mutter	Nut	
520. 029	Zylinderkerbstift	Grooved pin	DIN 1473-2x8-St
520. 030	Spannstift	Spring pin	DIN 1481-3x22
520. 124	Magnetwelle	Magnetic shaft	