Engine

2905272

	Unit	W50 No. 190 062 -
Manufacturer and model		Perkins 704.30
Rated output DIN 70 020 (at rated speed)	kW	41.5
Rated speed (at full load)	rpm	2300
Idling speed	rpm	800 $^{\pm 25}$
High idling speed	rpm	2590 $^{\pm 25}$
Firing sequence		1,3,4,2
Direction of rotation		Anti-clockwise when looking at flywheel
Valve clearance: inlet and exhaust (engine cold)	mm / mm	0.35 / 0.35
Compression pressure	bar	17.5 : 1
Oil pressure	bar	2.86

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Hydraulic circuit diagram - travel drive

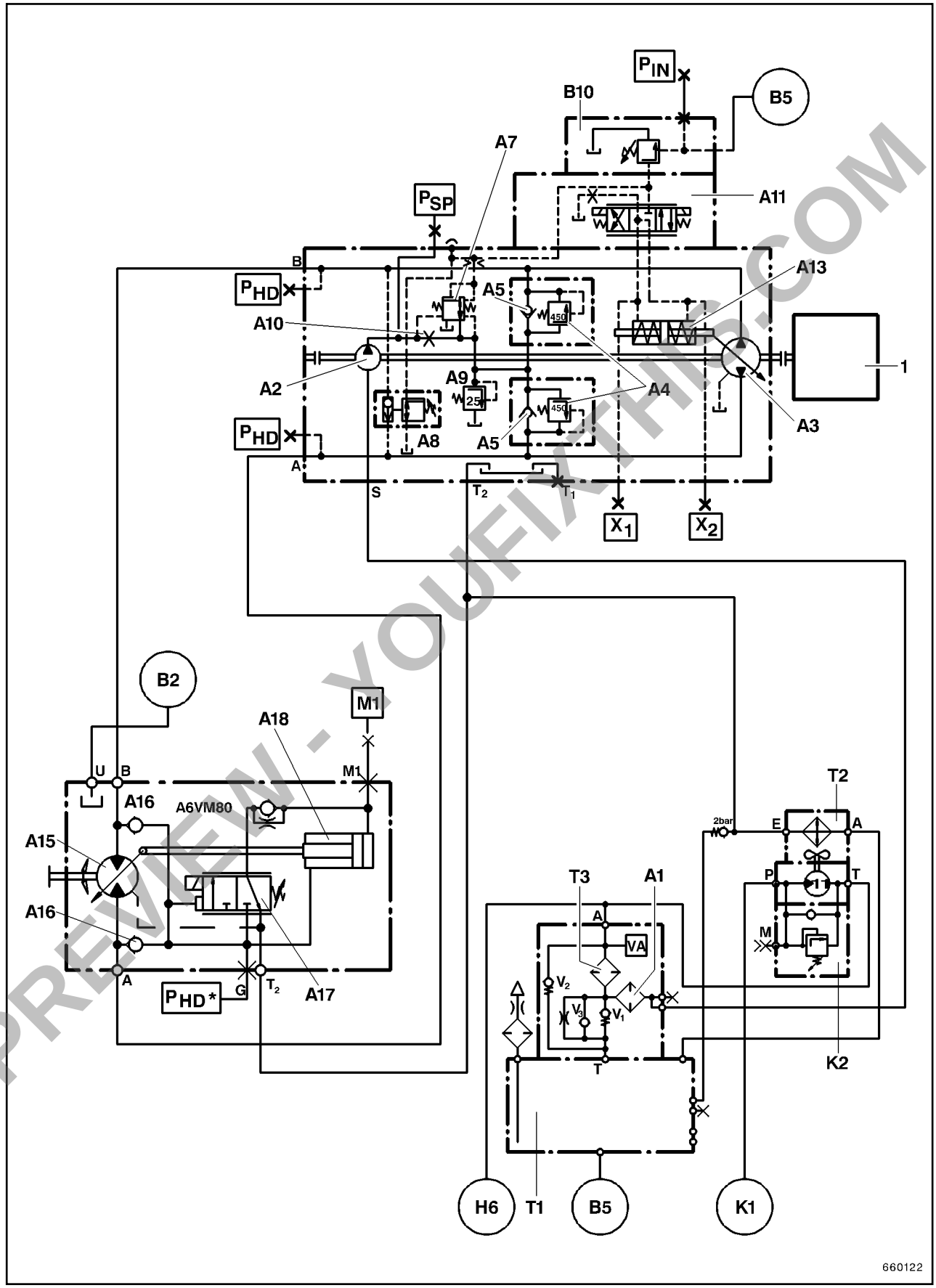
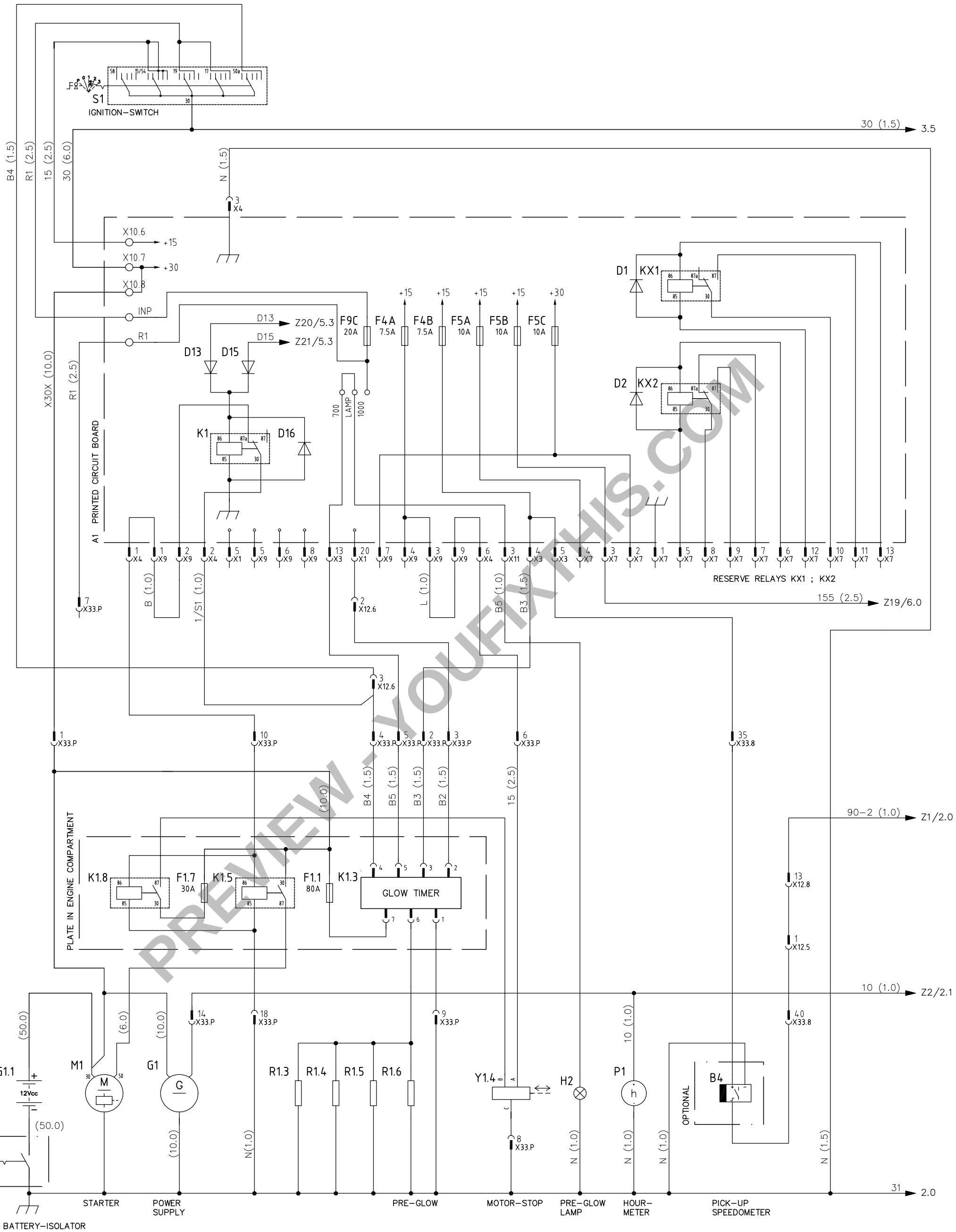


Fig. 2

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Ind.	Änd.-Nr./Change-No	Datum/Date	Name	Bearb.Abt./Written department G3350	Datum/Date	Name
04						
04				Bearb./Written	27.07.00	SIK
02				Gepr./Checked		
01	---	02.04.01	SIK	Norm/St.Check		

Typ	BG	UBG	CH
955	32	050	50

80WKZ W50H

Orenstein & Koppel
Aktiengesellschaft

Ursprung/Origin.

Benennung/Description

WIRING DIAGRAM
ENGINE

Sach-Nr. / Part-No 3004800

A4 | Blatt / Sheet 1 | 15 Blätter / Sheets

F.K. / D.S.No

Ers. für / Substitut for

Ers. durch / Substituted

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Adjusting work at the hydrostatic travel drive

2800479

For all testing and adjusting work on the travel drive, the hydraulic oil temperatur must be ca. 60 - 70˚C.

Mechanical zero position

The mechanical zero position is not normally self-adjusting. Control or adjustment is therefore necessary only when:

- the pump has been dismantled and reassembled,
- the operator complains that the loader, despite the travel direction switch being set to neutral position, is moving in one direction. In this case, however, the functioning of the travel direction switch and the electromagnetically activated switching valve (A11) should **first** be checked.

To check the mechanical zero position, a pressure gauge (measuring range 600 bars) must be connected to both measuring points for the high pressure at travelling (P_{HD}).

N.B.:

The machine must now be secured with appropriate measures against forward or reverse movement. The safety instructions must be observed.

The engine is started up, the travel direction switch is set to neutral.

After slackening the lock nut (A13, Part 9) the centering rod (A13, Part 5) is turned with a socket wrench 5 mm until the same pressure (in this case feed pressure) is read off at both measuring points (P_{HD}).

After adjustment, the centering rod (A13, Part 5) must be secured with the lock nut (A13, Part 9).

The mechanical zero position is set.

Checking and adjusting high pressure at travelling

The high pressure at travelling (P_{HD}) is limited both by the high-pressure relief valves (A4) and by the pressure cutout (A8).

N.B.:

The maximum high pressure is attained only if the displacement switchover at the hydraulic motor (A15) is prevented. For this purpose the regulation threshold adjusting screw (A15, Part 2) must be **unturned** by ca. 3 turns. On completion of work, the regulation threshold of the hydraulic motor must be reset. For all high-pressure measurements, transmission range 2 (driving) must be selected at the travel direction lever.

If resetting of the regulation threshold of the engine is to be avoided, a pressure drop due to spinning wheels can generally also be avoided by applying the parking brake as far as the limit stop and preventing the travel drive from being switched off with the handbrake switch.

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Schrauben mit Regelgewinde nach DIN 13 - 13
Bolts with standard thread DIN 13 - 13

Gewinde-Nenn Ø Thread nominal Ø	Festigkeits-klasse Material quality	Anziehdrehmomente M_A in Nm Tightening torques M_A in Nm		
		gesamt total 0,10[1)]	gesamt total 0,12[2)]	gesamt total 0,16 (L)[3)]
M 5	8.8 10.9 12.9	4,9 7,3 8,5	5,5 8,1 9,5	6,5 9,5 11,2
M 6	8.8 10.9 12.9	8,5 12,5 14,5	9,5 14 16,5	11,2 16,5 19,5
M 8	8.8 10.9 12.9	20,5 30 35	23 34 40	27 40 47
M 10	8.8 10.9 12.9	41 60 71	46 68 79	55 80 94
M 12	8.8 10.9 12.9	71 104 195	79 117 215	94 140 260
M 16	8.8 10.9 12.9	170 250 300	195 280 330	230 340 400
M 20	8.8 10.9 12.9	350 490 580	390 560 650	470 670 780
M 24	8.8 10.9 12.9	600 850 1000	670 960 1120	800 1140 1350
M 30	8.8 10.9 12.9	1190 1700 2000	1350 1900 2250	1600 2300 2700
M 36	8.8 10.9 12.9	2100 3000 3500	2350 3300 3900	2800 4000 4700

[1)] Schraube und/oder Mutter galvanisch verzinkt (A3B).
Screw and/or nut electro-galvanized.

[2)] Schraube schwarz vergütet oder phosphatiert, Gewinde geölt.
Screw black-plated or phosphatized, thread oiled.

[3)] Schrauben mit flüssiger Schraubensicherung z.B. Loctite 242, 243.
Screws with liquid screw fixer, e.g. Loctite 242, 243.

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01 General

02 Service data

03 Engine

04 Travel drive

05 Axles

06 Steering

07 Brakes

08 Working hydraulic

09 Electrical system

10 Frame

11 Fittings, pipes and hoses

12 Sealing, protective, testing and cleaning agents

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FUNDAMENTAL SAFETY INSTRUCTIONS

2800455

Warnings and symbols

The following signs are used in the manual to designate instructions of particular importance:



Precautionary rules and measures designed to protect the machine operator and other persons from life-threatening danger or injuries and to prevent extensive damage.



Information and precautionary measures designed to prevent damage to the machine or other property.

□

Danger in the event of non-observance of the safety instructions



This wheel loader has been built in accordance with state-of-the-art standards and the recognized safety rules.

However, operating the machine if a fault is suspected or has occurred, or carrying out repair work inexpertly may

- **endanger the lives of persons in contact with it**
- **damage the machine and other property.**

The wheel loader must be stopped immediately on any damage being suspected or occurring to ensure that the safety of the operator, of other persons at the place of use or of other material property is not compromised.

All components are carefully co-ordinated. Trouble-free operation and a long service life can only be achieved with original spare parts.

□

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Nm	0	1	2	3	4	5	6	7	8	9
2110	1556.251	1556.989	1557.727	1558.464	1559.202	1559.939	1560.677	1561.414	1562.152	1562.889
2120	1563.627	1564.365	1565.102	1565.840	1566.577	1567.315	1568.052	1568.790	1569.528	1570.265
2130	1571.003	1571.740	1572.478	1573.215	1573.953	1574.690	1575.428	1576.166	1576.903	1577.641
2140	1578.378	1579.116	1579.853	1580.591	1581.328	1582.066	1582.803	1583.541	1584.279	1585.016
2150	1585.754	1586.491	1587.229	1587.967	1588.704	1589.442	1590.179	1590.917	1591.654	1592.392
2160	1593.129	1593.867	1594.604	1595.342	1596.080	1596.817	1597.555	1598.292	1599.030	1599.768
2170	1600.505	1601.243	1601.980	1602.718	1603.455	1604.193	1604.930	1605.668	1606.406	1607.143
2180	1607.881	1608.618	1609.356	1610.093	1610.831	1611.568	1612.306	1613.043	1613.781	1614.519
2190	1615.256	1615.994	1616.731	1617.469	1618.207	1618.944	1619.682	1620.419	1621.157	1621.894
2200	1622.632	1623.369	1624.107	1624.844	1625.582	1626.320	1627.057	1627.795	1628.532	1629.270
2210	1630.007	1630.745	1631.482	1632.220	1632.958	1633.695	1634.433	1635.170	1635.908	1636.646
2220	1637.383	1638.121	1638.858	1639.596	1640.333	1641.071	1641.808	1642.546	1643.283	1644.021
2230	1644.759	1645.496	1646.234	1646.971	1647.709	1648.447	1649.184	1649.922	1650.659	1651.397
2240	1652.134	1652.872	1653.609	1654.347	1655.084	1655.822	1656.560	1657.297	1658.035	1658.772
2250	1659.510	1660.247	1660.985	1661.722	1662.460	1663.198	1663.935	1664.673	1665.410	1666.148
2260	1666.885	1667.623	1668.361	1669.098	1669.836	1670.573	1671.311	1672.048	1672.786	1673.523
2270	1674.261	1674.999	1675.736	1676.474	1677.211	1677.949	1678.686	1679.424	1680.162	1680.899
2280	1681.637	1682.374	1683.112	1683.849	1684.587	1685.324	1686.062	1686.800	1687.537	1688.275
2290	1689.012	1689.750	1690.487	1691.225	1691.962	1692.700	1693.437	1694.175	1694.913	1695.650
2300	1696.388	1697.125	1697.863	1698.601	1699.338	1700.076	1700.813	1701.551	1702.288	1703.026
2310	1703.763	1704.501	1705.239	1705.976	1706.714	1707.451	1708.189	1708.926	1709.664	1710.401
2320	1711.139	1711.876	1712.614	1713.352	1714.089	1714.827	1715.564	1716.302	1717.040	1717.777
2330	1718.515	1719.252	1719.990	1720.727	1721.465	1722.202	1722.940	1723.677	1724.415	1725.153
2340	1725.890	1726.628	1727.365	1728.103	1728.841	1729.578	1730.316	1731.053	1731.791	1732.528
2350	1733.266	1734.003	1734.741	1735.479	1736.216	1736.954	1737.691	1738.429	1739.166	1739.904
2360	1740.641	1741.379	1742.116	1742.854	1743.592	1744.329	1745.067	1745.804	1746.542	1747.280
2370	1748.017	1748.755	1749.492	1750.230	1750.967	1751.705	1752.442	1753.180	1753.917	1754.655
2380	1755.393	1756.130	1756.868	1757.605	1758.343	1759.080	1759.818	1760.555	1761.293	1762.031
2390	1762.768	1763.506	1764.243	1764.981	1765.719	1766.456	1767.194	1767.931	1768.669	1769.406
2400	1770.144	1770.881	1771.619	1772.356	1773.094	1773.832	1774.569	1775.307	1776.044	1776.782
2410	1777.520	1778.257	1778.995	1779.732	1780.470	1781.207	1781.945	1782.682	1783.420	1784.157
2420	1784.895	1785.633	1786.370	1787.108	1787.845	1788.583	1789.320	1790.058	1790.795	1791.533
2430	1792.271	1793.008	1793.746	1794.483	1795.221	1795.958	1796.696	1797.434	1798.171	1798.909
2440	1799.646	1800.384	1801.121	1801.859	1802.596	1803.334	1804.072	1804.809	1805.547	1806.284
2450	1807.022	1807.759	1808.497	1809.234	1809.972	1810.710	1811.447	1812.185	1812.922	1813.660
2460	1814.397	1815.135	1815.873	1816.610	1817.348	1818.085	1818.823	1819.560	1820.298	1821.035
2470	1821.773	1822.510	1823.248	1823.986	1824.723	1825.461	1826.198	1826.936	1827.674	1828.411
2480	1829.149	1829.886	1830.624	1831.361	1832.099	1832.836	1833.574	1834.312	1835.049	1835.787
2490	1836.524	1837.262	1837.999	1838.737	1839.474	1840.212	1840.949	1841.687	1842.425	1843.162
2500	1843.900	1844.637	1845.375	1846.113	1846.850	1847.588	1848.325	1849.063	1849.800	1850.538
2510	1851.275	1852.013	1852.750	1853.488	1854.226	1854.963	1855.701	1856.438	1857.176	1857.914
2520	1858.651	1859.389	1860.126	1860.864	1861.601	1862.339	1863.076	1863.814	1864.552	1865.289
2530	1866.027	1866.764	1867.502	1868.239	1868.977	1869.714	1870.452	1871.189	1871.927	1872.665
2540	1873.402	1874.140	1874.877	1875.615	1876.353	1877.090	1877.828	1878.565	1879.303	1880.040
2550	1880.778	1881.515	1882.253	1882.990	1883.728	1884.466	1885.203	1885.941	1886.678	1887.416
2560	1888.153	1888.891	1889.628	1890.366	1891.104	1891.841	1892.579	1893.316	1894.054	1894.792
2570	1895.529	1896.267	1897.004	1897.742	1898.479	1899.217	1899.954	1900.692	1901.429	1902.167
2580	1902.905	1903.642	1904.380	1905.117	1905.855	1906.593	1907.330	1908.068	1908.805	1909.543
2590	1910.280	1911.018	1911.755	1912.493	1913.230	1913.968	1914.706	1915.443	1916.181	1916.918
2600	1917.656	1918.393	1919.131	1919.868	1920.606	1921.344	1922.081	1922.819	1923.556	1924.294
2610	1925.031	1925.769	1926.507	1927.244	1927.982	1928.719	1929.457	1930.194	1930.932	1931.669
2620	1932.407	1933.145	1933.882	1934.620	1935.357	1936.095	1936.832	1937.570	1938.307	1939.045
2630	1939.783	1940.520	1941.258	1941.995	1942.733	1943.470	1944.208	1944.946	1945.683	1946.421
2640	1947.158	1947.896	1948.633	1949.371	1950.108	1950.846	1951.583	1952.321	1953.059	1953.796
2650	1954.534	1955.271	1956.009	1956.747	1957.484	1958.222	1958.959	1959.697	1960.434	1961.172
2660	1961.909	1962.647	1963.385	1964.122	1964.860	1965.597	1966.335	1967.072	1967.810	1968.547
2670	1969.285	1970.022	1970.760	1971.498	1972.235	1972.973	1973.710	1974.448	1975.186	1975.923
2680	1976.661	1977.398	1978.136	1978.873	1979.611	1980.348	1981.086	1981.823	1982.561	1983.299
2690	1984.036	1984.774	1985.511	1986.249	1986.986	1987.724	1988.462	1989.199	1989.937	1990.674
2700	1991.412	1992.149	1992.887	1993.625	1994.362	1995.100	1995.837	1996.575	1997.312	1998.050
2710	1998.787	1999.525	2000.262	2001.000	2001.738	2002.475	2003.213	2003.950	2004.688	2005.426
2720	2006.163	2006.901	2007.638	2008.376	2009.113	2009.851	2010.588	2011.326	2012.063	2012.801
2730	2013.539	2014.276	2015.014	2015.751	2016.489	2017.226	2017.964	2018.701	2019.439	2020.177
2740	2020.914	2021.652	2022.389	2023.127	2023.865	2024.602	2025.340	2026.077	2026.815	2027.552
2750	2028.290	2029.027	2029.765	2030.502	2031.240	2031.978	2032.715	2033.453	2034.190	2034.928
2760	2035.666	2036.403	2037.141	2037.878	2038.616	2039.353	2040.091	2040.828	2041.566	2042.303
2770	2043.041	2043.779	2044.516	2045.254	2045.991	2046.729	2047.466	2048.204	2048.941	2049.679
2780	2050.417	2051.154	2051.892	2052.629	2053.367	2054.104	2054.842	2055.580	2056.317	2057.055
2790	2057.792	2058.530	2059.267	2060.005	2060.742	2061.480	2062.218	2062.955	2063.693	2064.430
2800	2065.168	2065.905	2066.643	2067.380	2068.118	2068.856	2069.593	2070.331	2071.068	2071.806

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Hydraulic system

Checking and setting data

	Unit	W50 No. 190 062 -
Hydr. oil temp. (oil reservoir) for checking and adjustments	˚C	60 - 70
Working hydraulic		
- primary pressure relief	bar	230 $^{\pm 10}$
- secondary pressure relief tip cylinder piston side	bar	235 $^{\pm 5}$
- secondary pressure relief tip cylinder rod side	bar	285 $^{\pm 5}$
- secondary pressure relief hoist cylinder piston side	bar	285 $^{\pm 5}$
Steering		
- primary pressure relief	bar	175 $^{+20}_{-5}$
- secondary pressure relief	bar	240 $^{\pm 10}$
Drive unit		
- charge pressure (at speed 2300 min^{-1})	bar	25 $^{+5}_{-2}$
- beginning of control action (at speed 1100 min^{-1} $^{\pm 100}$)	bar	50 $^{+20}$
- end of control action (at speed 1900 min^{-1} $^{\pm 100}$)	bar	400
- pressure cut-off	bar	430 $^{\pm 10}$
- opening pressure high-pressure valve	bar	465 $^{+20}_{-10}$
- inch valve		
- brake pressure at inch begin	bar	5 $^{\pm 1}$
- brake pressure at inch end	bar	13 $^{\pm 1}$
- control begin variable motor	bar	260 $^{\pm 10}$
Hydraulic cylinder hoist times (shovel empty)		
- lifting		6 $^{\pm 0.5}$
- lowering	Sec.	3 $^{\pm 0.5}$
- tipping		1 $^{\pm 0.5}$

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Foreword

2800799

Anyone involved with commissioning, operating, inspecting and servicing the FH construction machine must read through and acquaint himself with the "OPERATING MANUAL" - and especially the Section "FUNDAMENTAL SAFETY INSTRUCTIONS" - before starting work.

The "Service Data" contains details which are important to the service staff. Data included in other parts of the general documentation have been left aside.

Data regarding auxiliary units for operating ancillary or special systems, as well as data on machines produced only in small numbers, have not been included.

Filling quantities are only approximate figures intended to help in stockholding the various fluids and agents. Each unit has appropriate checking systems, e.g. dipstick or checking screws, with which the exact filling level can be checked.

The Part Nos. given in the sections are not to be used when ordering spare parts. They are only intended to identify the component being referred to. When ordering spare parts, use only the Part Nos. given in the spare parts lists.

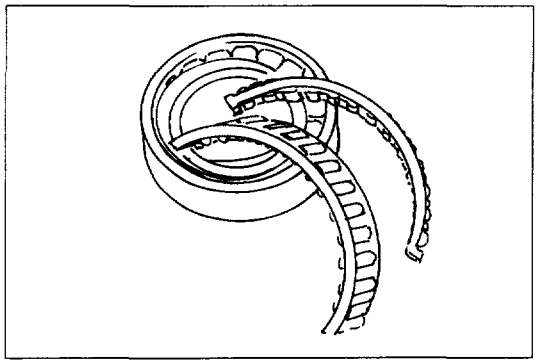
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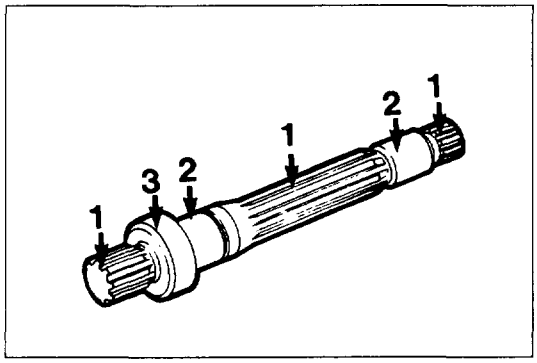
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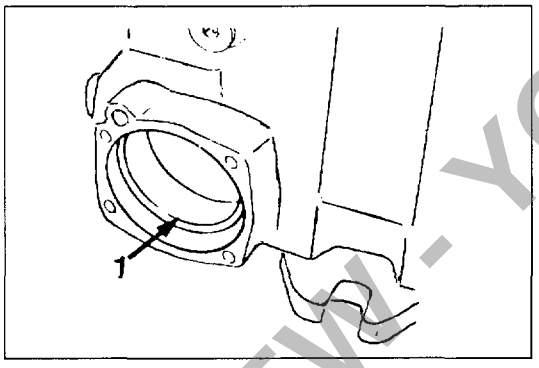
62 Alle Lager erneuern.

Replace all bearings.



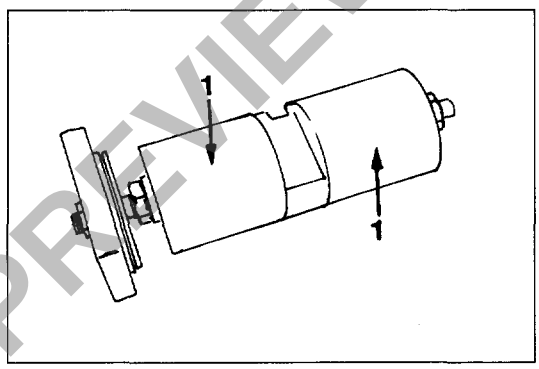
63 Kontrolle!
1. Verzahnung, ausgeschlagen, Passungsrost.
2. Lauffläche.
3. Einlaufrillen vom Wellendichtring.

Check!
1. Splines for damage or fretting.
2. Running surfaces.
3. Groove cut by shaft seal.



64 Stellkolbenlaufbüchse (1) riefenfrei, nicht ausgelaufen.

Check that the control piston guide bush (1) is free of grooves and has not worn out.



65 Kontrolle!
Stellkolben (1) riefenfrei.

Check!
Control piston (1) is not scored.

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General Working Instructions

Thorougly clean the removed axle. As long as all openings are closed it can be cleaned with water or with a steam jet.

After dismantling, clean the parts in a suitable cleaning agent. Do not use water or a steam jet as this will result in rusting.

Remove old sealing compound.

Mark bolted parts such as axle housing and axle tube or differential housing, cap, before separating them.

Thoroughly check parts which are subject to wear, e. g. bearings, thrust washers, disks, if they are to be re-used. Checking antifriction bearings requires particular special knowledge.

Check gears for wear and surface cracks.

Replace bearings damaged or destroyed during dismantling. For tapered roller bearings, also replace the outer roller bearing ring in any case.

If specified, warm up bearings on hot plates or in heating ovens. Never warm up with a direct flame.

Parts shrunk on must be re-driven after cooling down to obtain perfect bearing.

Replace ring gears and pinion drive shafts only in couples.

Replace differential bevel pinions only in sets, even though only one of them may need to be changed. The may have been manufactured by different methods in the course of time.

Replace disks for brakes and self-locking differentials only in sets.

Apply oil to shafts, bearings, bushes etc. before pressing them in.

Always replace sealing elements such as O-rings, circlips, shaft rings or collars. Apply grease to the sealing lips of the shaft rings when installing them.

Strictly observe all specified setting dimensions, check data and tightening torques for reassembling.

Alter factory settings only when replacing bearings and/or gears.

Keep the bevel gear couple backlash and surface appearance unchanged when re-installing them.

In the illustrations, special tools are marked "S" and bear continuous numbers. In "List of Special Tools", all tools are listed under their continuous numbers including their IDs, descriptions and illustrations. They can be ordered under their IDs.

Ersatzteile nur nach der jeweiligen Ersdatzteilliste bestellen.

Spare-parts order must be based on the relevant spare-parts list.

Use ORIGINAL SPARE-PARTS only.

All tools and measuring instruments must be in perfect condition.

Special tools are identified in the illustrations with the letter "S" and the number. The "List of special tools" lists all tools by number with P/N, designation and picture reference. They may be ordered by the Parts Number P/N.

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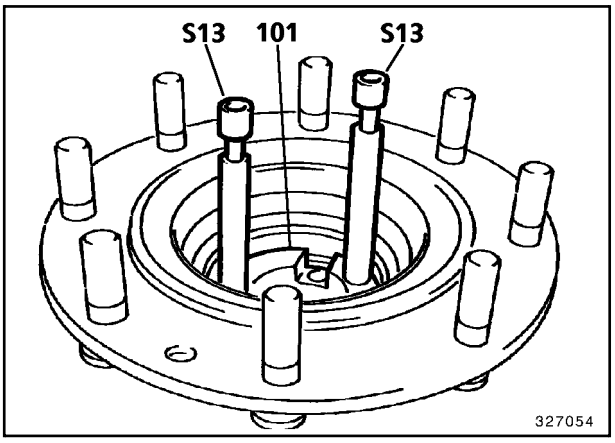


Fig. 12

Screw two pins of mounting fixture (S13) into axle tube (101).

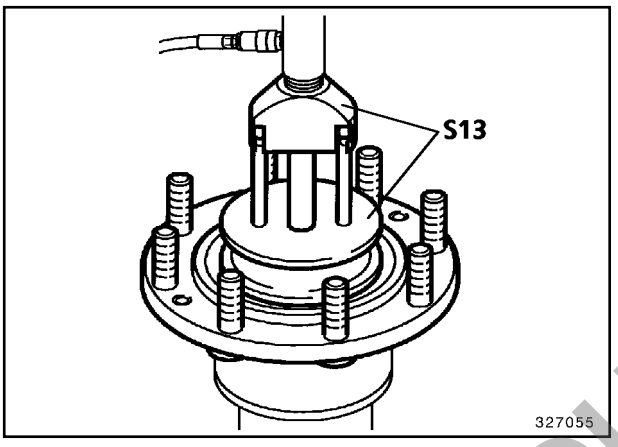


Fig. 13

Apply mounting fixture (S13) with screwed-in cylinder for conventional hydraulic presses (Lukas).

Fully press hub onto axle tube.

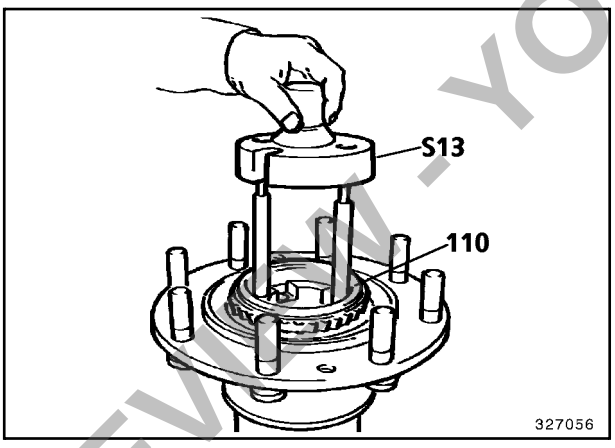


Fig. 14

Insert tapered roller bearing (110).

Apply new die of mounting fixture (S13) to bearing ring.

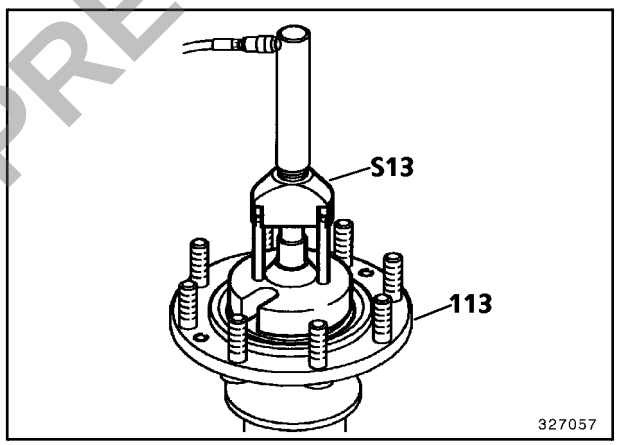


Fig. 15

Increase pressure of hydraulic press to approx. 200 bar (2903 psi). Give hub a few taps with plastic mallet for settling.

Reduce pressure to 50 bar (726 psi) and turn hub (113) by hand. This value yields the axial prestress of 0.05 - 0.15 mm required for new tapered roller bearings (110).

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Differential Assembly (Pre-Assembling)

Refer to Chapter "Differential Assembly".

Complete Axle Drive and Axle Assemblies

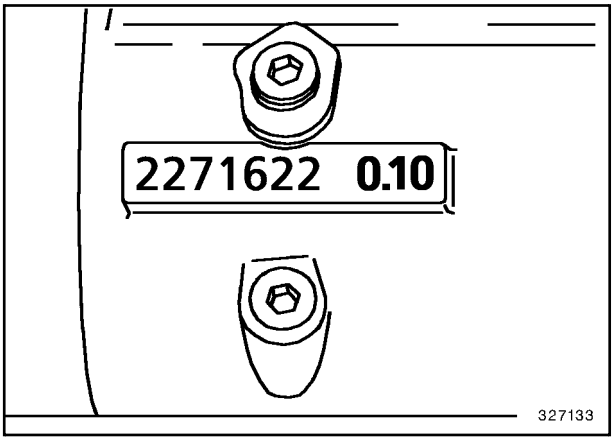


Fig. 20

An information field for stamping in the ID and dimensions is located between the filler cap and the drain plug or on the flange. Refer to arrow in Fig. 25.

The deviation from the nominal dimension (e. g. 0.10) or the complete dimension (e. g. 120.10) is stamped in.

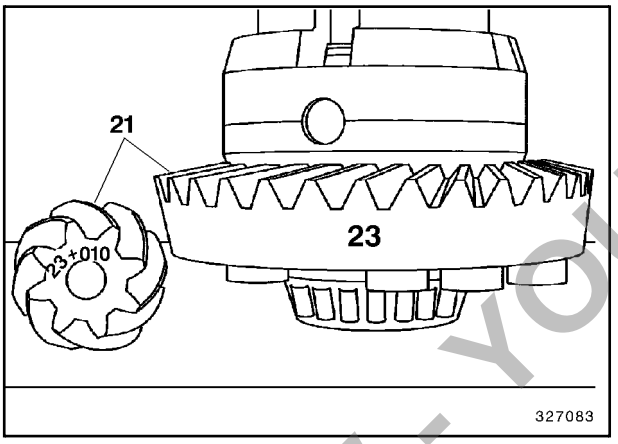


Fig. 21

Compare the figures engraved in the pinion shaft and in bevel gear (21). The mating number (e. g. 23) must, by all means, agree. The value (e. g. +0.10) given only on the pinion shaft is the deviation from the nominal dimension.

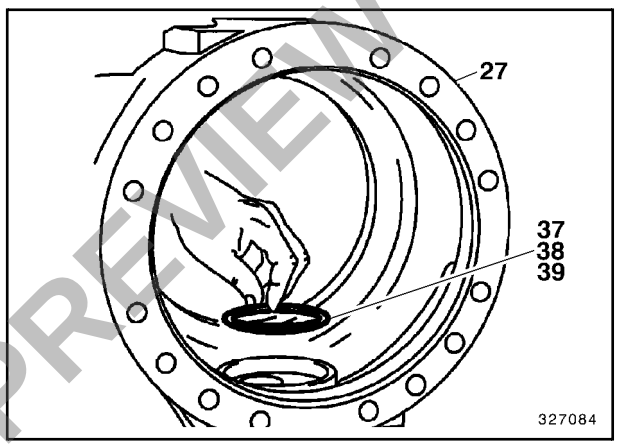


Fig. 22

Determine spacing washer(s) (37-39), refer to next page, and insert.

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Overview of the steering system

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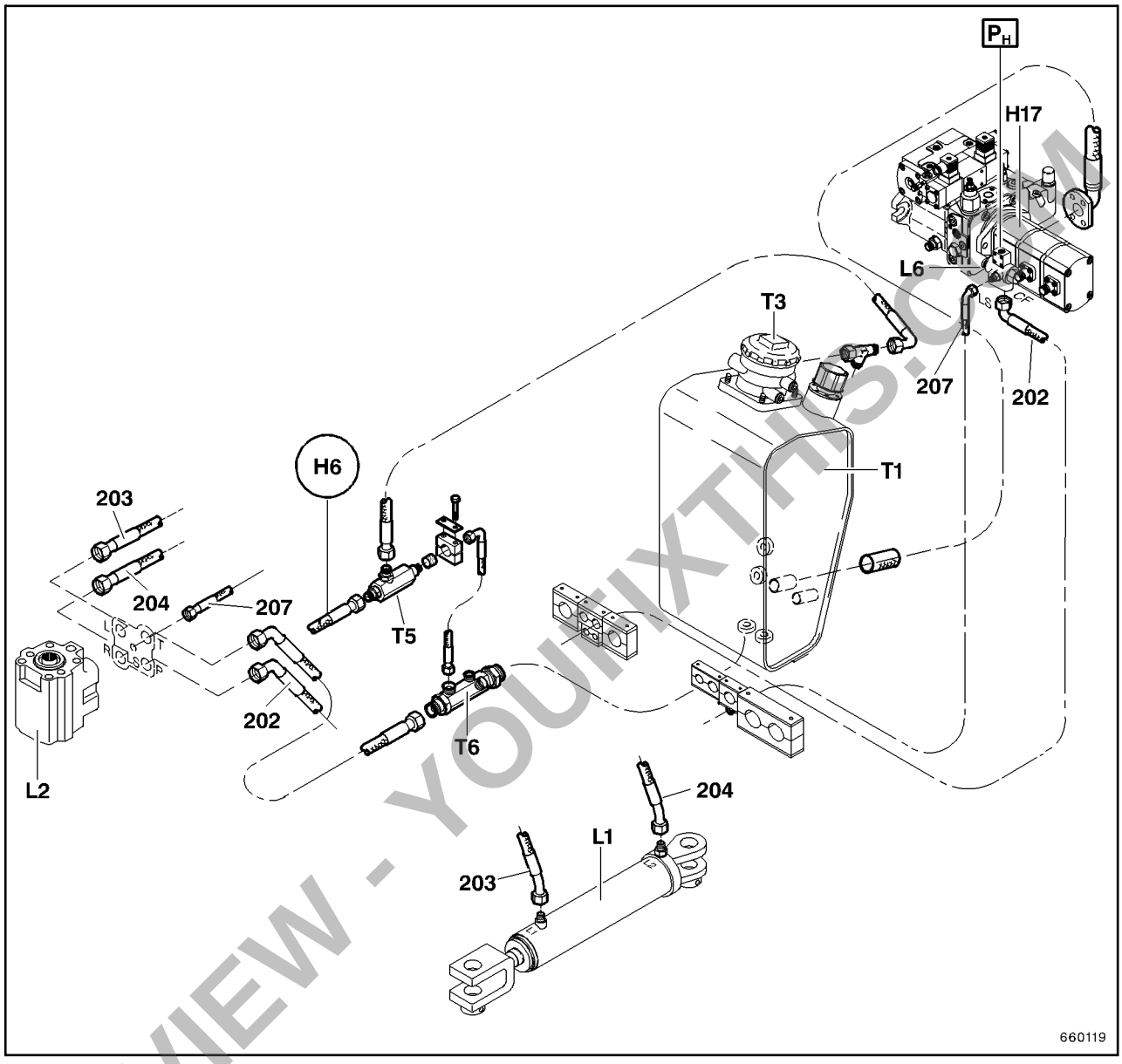


Fig. 2

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Testing and adjusting operations on the parking brake

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The parking brake must be set in such a way that it is fully applied after **four notches** of the handbrake lever (1, Fig. 11).

For this purpose it must first be ensured that both levers (2) are correctly mounted on the rear axle and are in reciprocally mirrored position both in released position and at the pressure points.

If this is not the case, the position of the levers (2) can be corrected after slackening the screws (3).

The length of the handbrake lever path is determined by shortening or extending the cable length between the levers (2). Corrections of up to one notch on the handbrake lever can also be made on the cable control to the handbrake lever at the setscrews (4) located there.

Major corrections must be made by adjusting the cable length between the levers (2). If adjustments on such a large scale are necessary, the thickness of the brake disc linings must also be checked in all events (see section on Multiple-disc Brakes).

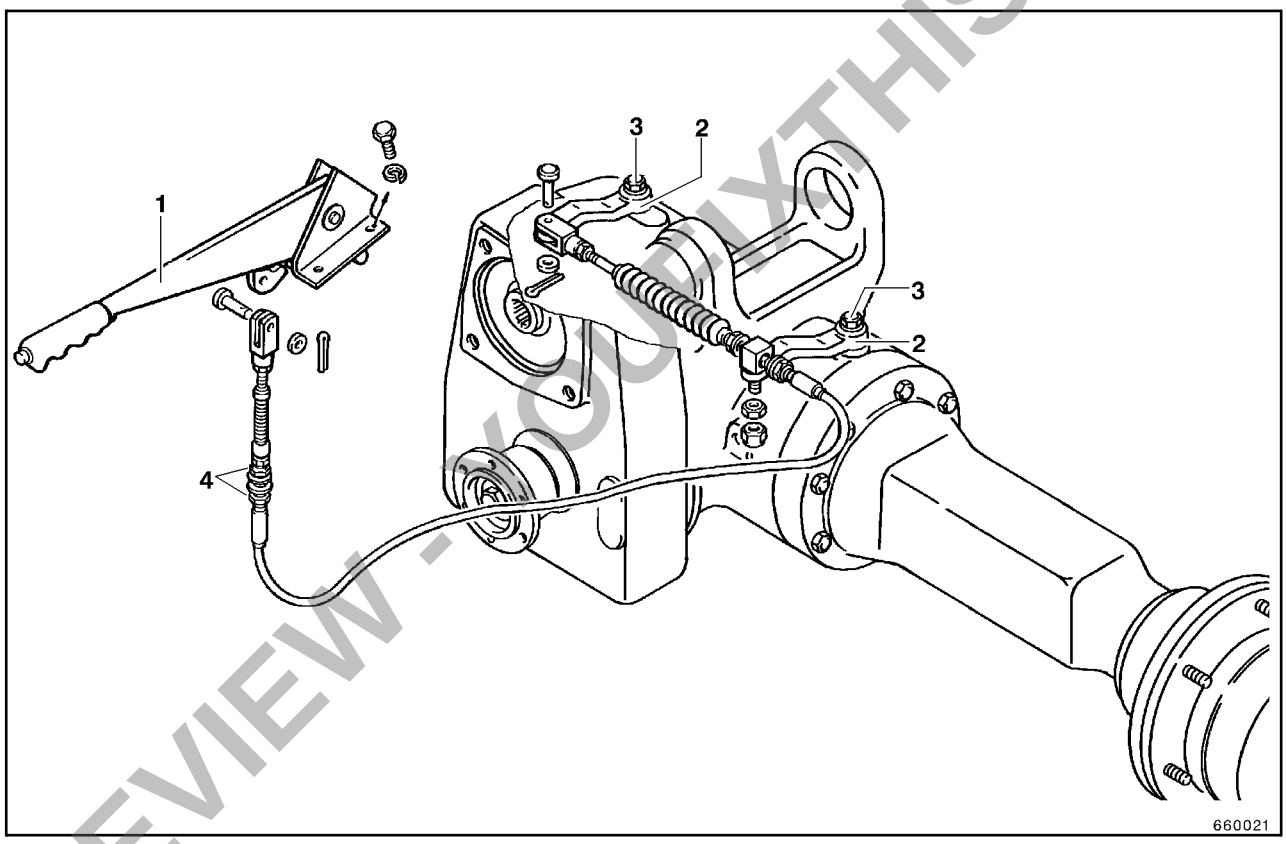


Fig. 11

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Lifting cylinder load-holding valve (optional)

Items Fig. 18

1 - Load-holding valve, set pressure 250 bars

2 - Throttle-screw size SW 10 for valve dampening
Do not turn throttle-screw beyond maximum. Before adjusting the screw, loosen the locknut by an appropriate amount to prevent the integrated sealing ring from being damaged by the thread.

H1 - Lifting cylinder

H6 - Working hydraulics control block

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Alternating current diagram

T Duration of one full cycle (period) in s, f frequency in Hz (¤ = 1/T)

î Peak value (amplitude) of the current,

û Peak value (amplitude) of the voltage,

ω Radian frequency in 1/s (ω= 2 · ·φ)

φ Phase shift angle (phase shift means: current and voltage attain their peak value or their zero crossing at different times) between current and voltage.

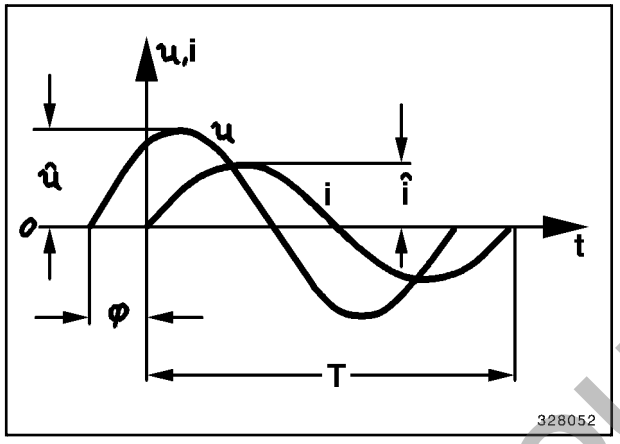


Fig. 7

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Terminal	Designation
	Start inhibit relay
50 e	Input
50 h	Output
	Alternator
51	D.c. voltage at rectifier
51 e	D.c. voltage at rectifier with choke
	Trailer signals
52	General signalling from trailer to tractor vehicle
53	**Wiper motor** Input (+)
53 a	Wiper (+), limit stop
53 b	Wiper (shunt winding)
53 c	Electrical washer pump
53 e	Wiper (Brake winding)
53 i	Wiper motor with permanent magnet and third brush (for higher speed)
	Stoplight
54	for lamp clusters and trailer connectors
	Trailer signal
54 g	Compressed-air valve for permanent brake, electro-magnetically operated
55	**Fog lamp**
56	**Headlamps**
56 a	Main beam and main beam warning
56 b	Dipped beam
56 d	Flasher contact
57	**Position lamp** for motor-cycles (in foreign countries also for cars, trucks, etc.)
57 a	**Parking lamp**
57 L	Parking lamp, left
57 R	Parking lamp, right
58	**Position, tail, licence plate and instrument-panel lamps**
58 b	Tail lamp change-over for single-axle trailers
58 c	Trailer connectors for tail lamp connected with single-conductor cable, fuse-protected in trailer
58 d	Adjustable instrument panel illumination, tail and position lamp
58 L	left
58 R	right, licence-plate lamp

Terminal	Designation
	Alternator (Magnetic ignition alternator)
59	Alternating voltage, output, rectifier, input
59 a	Charging armature, output
59 b	Tail-lamp armature, output
59 c	Stop-lamp armature, output
61	**Alternator monitor**
	Tone-sequence switch
71	Input
71 a	Output to horn 1 + 2 low-tones
71 b	Output to horn 1 + 2 high-tones
72	**Alarm switch** (Rotary beacon)
75	**Radio, cigarette lighter**
76	Loudspeaker
77	**Door-valve control**
	Switch normally closed and change-over contacts
81	Input
81 a	1st output, break contact
81 b	2nd output, break contact
	Make contact
82	Input
82 a	1st output
82 b	2nd output
82 z	1st input
82 y	2nd input
	Multi-point switch
83	Input
83 a	Output, position 1
83 b	Output, position 2
83 L	Output, position left
83 R	Output, position right
	Current relay input
84	Input, drive and relay contact
84 a	Output, drive
84 b	Output, relay contact
	Switching relay
85	Output, drive (end of winding minus and ground) Input, drive
86	Beginning of winding
86 a	Beginning of winding or 1st winding
86 b	Winding tap or 2nd winding

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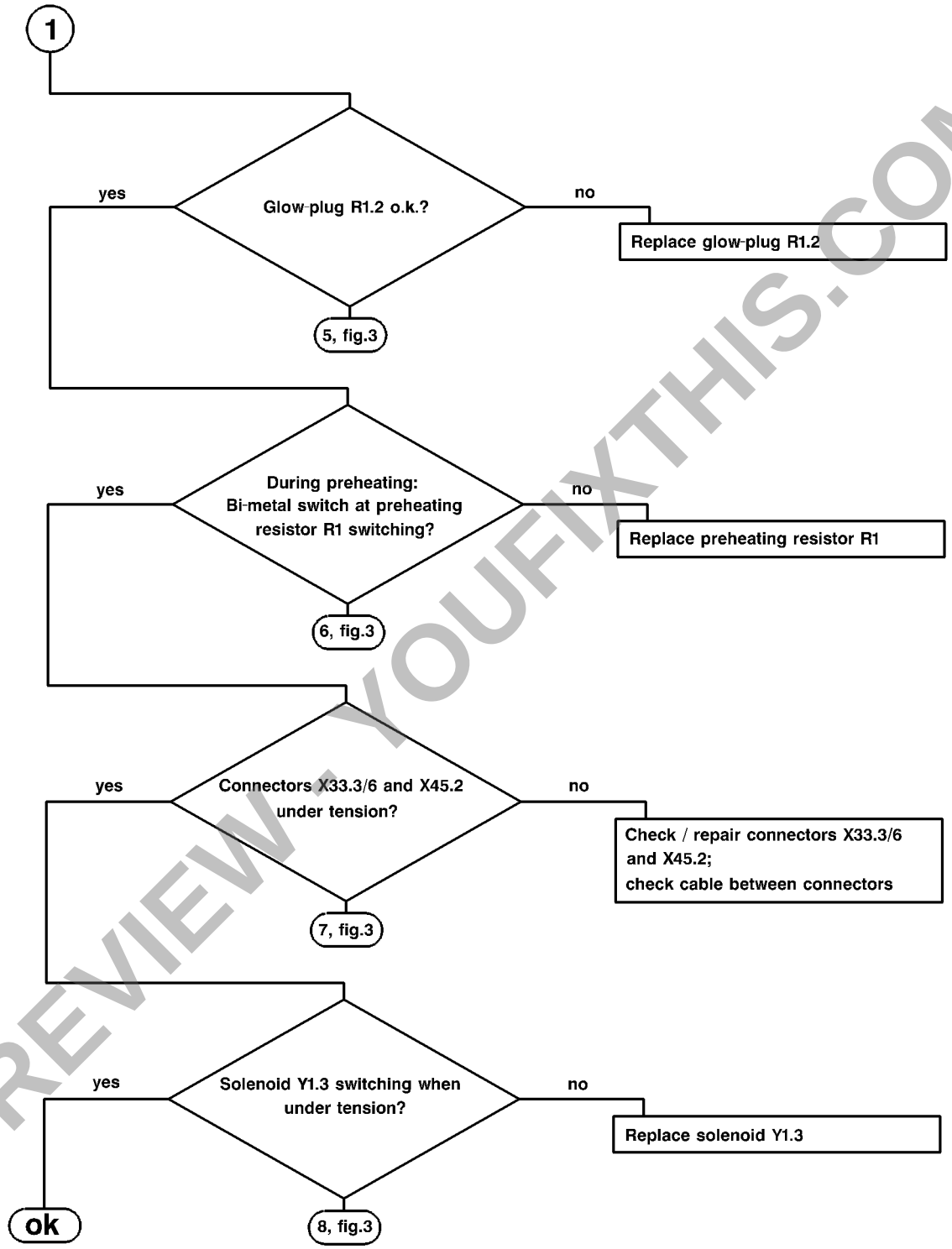


Fig. 4

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Selection and qualification of personnel

Any work on and with the machine must be executed by reliable personnel only. Statutory minimum age limits must be observed.

Employ only trained or instructed staff and set out clearly the individual responsibilities of the personnel for operation, set-up, maintenance and repair.

Make sure that only authorized personnel works on or with the machine.

Define the machine operator's responsibilities - also with regard to observing traffic regulations - giving the operator the authority to refuse instructions by third parties that are contrary to safety.

Do not allow persons to be trained or instructed or persons taking part in a general training course to work on or with the machine without being permanently supervised by an experienced person.

Work on the electrical system and equipment of the machine must be carried out only by a skilled electrician or by instructed persons under the supervision and guidance of a skilled electrician and in accordance with electrical engineering rules and regulations.

Work on chassis, brake and steering systems must be performed by skilled personnel only, which has been specially trained for such work.

Work on the hydraulic system must be carried out only by personnel with special knowledge and experience of hydraulic equipment.

OPERATING SAFETY INSTRUCTIONS

Standard operation

Avoid any operational mode that might be prejudicial to safety.

Before beginning work, familiarize yourself with the surroundings and circumstances of the site, such as obstacles in the working and travelling area, the soil bearing capacity and any barriers separating the construction site from public roads.

Take the necessary precautions to ensure that the machine is used only when in a safe and reliable state.

Operate the machine only if all protective and safety-oriented devices, such as removable safety devices, emergency shut-off equipment, soundproofing elements and exhausters, are in place and fully functional.

Check the machine at least once per working shift for obvious damage and defects. Report any changes (incl. changes in the machine's working behaviour) to the competent organization/person immediately. If necessary, stop the machine immediately and lock it.

In the event of malfunctions, stop the machine immediately and lock it. Have any defects rectified immediately.

Start the machine from the driver's seat only.

During start-up and shut-down procedures always watch the indicators in accordance with the operating instructions.

Before setting the machine in motion, make sure that nobody is at risk.

Before starting work or travelling with the machine, check that the braking, steering, signalling and lighting systems are fully functional.

Before setting the machine in motion always check that the accessories have been safely stowed away.

When travelling on public roads, ways and places always observe the valid traffic regulations and, if necessary, make sure beforehand that the machine is in a condition compatible with these regulations.

In conditions of poor visibility and after dark always switch on the lighting system.

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Flange coupling hose / connection surface

Fig. 1 shows:

1 - Connection surface
2 - Seal ring
5 - Double-hex bolt
9 - Flange half
10 - Hyd. hose with SAE flange fitting

Assembly:

1. Fit seal ring (2) into seal ring groove (see "Seal rings")
2. Push hose (10) up against connection surface. Face of fitting must make contact over whole circumference.
3. Fit the two flange halves (9) one after the other. Screw in bolts (5) as far as possible by hand.
4. Tighten up bolts (5) diagonally to the torques specified. The required torques (final torques) can be found in Table 2.

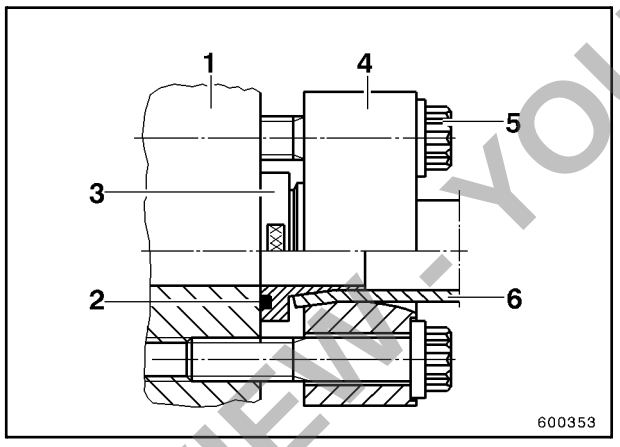


Fig. 1

Table 2: Tightening torques for double-hex bolts

Thread	Wrench size	Tightening torque Nm (lbft)
M 10	11	60 (44)
M 12	13	100 (74)
M 14	15	160 (118)
M 16	19	250 (185)

It is not necessary to check the gap dimension.

In case of leakage:

Tighten up bolts (5) to prescribed torque. Otherwise change seal ring (2).

Flange coupling - pipe / hose

F-system

Fig. 1 shows:

2 - Seal ring
4 - Flange (one-part)
5 - Double-hex bolt
6 - Pipe
7 - F-ring (wedge ring) without seal ring groove[1)]
9 - Flange half
10 - Hydraulic hose with SAE flange fitting
11 - Hex. nut

[1)] If F-ring has a seal ring groove (3, Fig. 3), a centre disk (8) and a second seal ring (2) must be used.

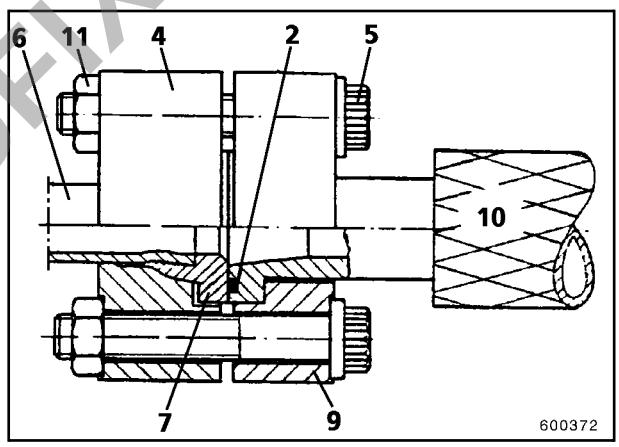


Fig. 2

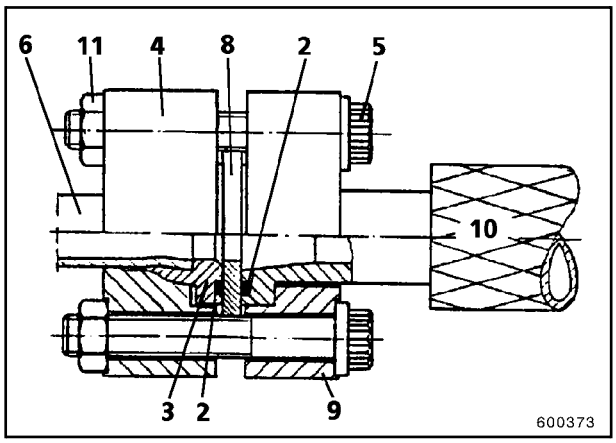


Fig. 3

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