

SERVICE DATA

Motor Engine

	Einheit Unit	EC 215 Nr. / No. 72 1502 -
Hersteller und Typ Manufacturer and model		6BTA 5.9-C - 160
Arbeitsweise Type		Viertakt-Dieselmotor mit Aufladung, Ladeluftkühlung und Direkt- einspritzung Four-stroke Diesel engine with turbochar- ging, intercooler and direct injection
Standardleistung Standard rated output	ISO 3046/1-IFN ISO 3046/1-IFN	kW 119
Nennndrehzahl (bei Vollast) Rated speed (at full load)	min ⁻¹ rpm	1900
Leerlaufdrehzahl Idling speed	min ⁻¹ rpm	950
Hohe Leerlaufdrehzahl High idling speed	min ⁻¹ rpm	2052
Zündfolge Firing sequence		1-5-3-6-2-4
Drehrichtung Direction of rotation		Auf Schwungrad gesehen links Anti-clockwise when looking at flywheel
Ventilspiel Einlaß/Auslaß (bei kaltem Motor) Valve clearance: inlet and exhaust (engine cold)	mm / mm inch / inch	0,25 / 0,51 0.01 / 0.02
Verdichtungsverhältnis Compression ratio		17,5 : 1
Öldruck Oil pressure		
bei 950 min ⁻¹ (Mindestdruck) at 950 rpm (Minimum allowable)	bar / psi	0,7 / 10
bei 1900 min ⁻¹ (Mindestdruck) at 1900 rpm (Minimum allowable)	bar / psi	2,76 / 40
Öffnungsbereich - Thermostat Thermostat at opening range	°C °F	82 - 93 180 - 200

Track chain

2904584

Releasing crawler chain tension

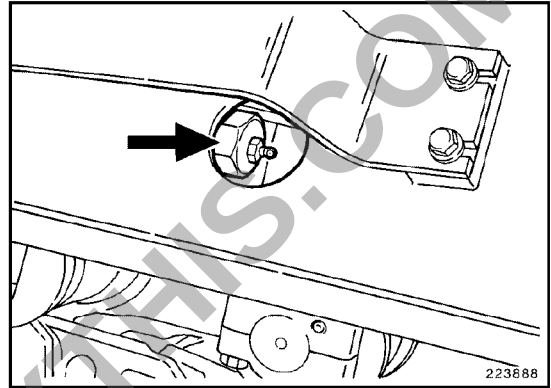
⚠
WARNING

Read and observe "Inspection and servicing - Safety instructions" before starting work on the crawler chain and the chain tensioning device.

Wear protective glasses.

The chain tension grease is under high pressure. Therefore, release the filler valve carefully.

The grease flows out into the crawler member. This prevents grease being ejected uncontrolledly.



- Clean the crawler unit as described in section "Cleaning the crawler unit".
- Park the machine on a dry level surface.
- Place a ring spanner on the filler valve (Fig. 1).
- Screw out filler valve, maximum two rotations. Grease from the chain tensioning device flows out at the thread of the filler valve.

The crawler chain tension has been released when grease no longer flows out of the filler valve and maximum crawler chain sag is present between the track carrier rollers, and between track carrier roller and driven wheel/front idler.

- Remove grease from crawler member and dispose of it in an environmentally responsible manner.
- Close filler valve securely.
- Tension crawler chain as described in section "Tensioning the crawler chain".
- Tension crawler chain of other crawler unit using the same procedure.
The sag of both crawler chains should be identical.

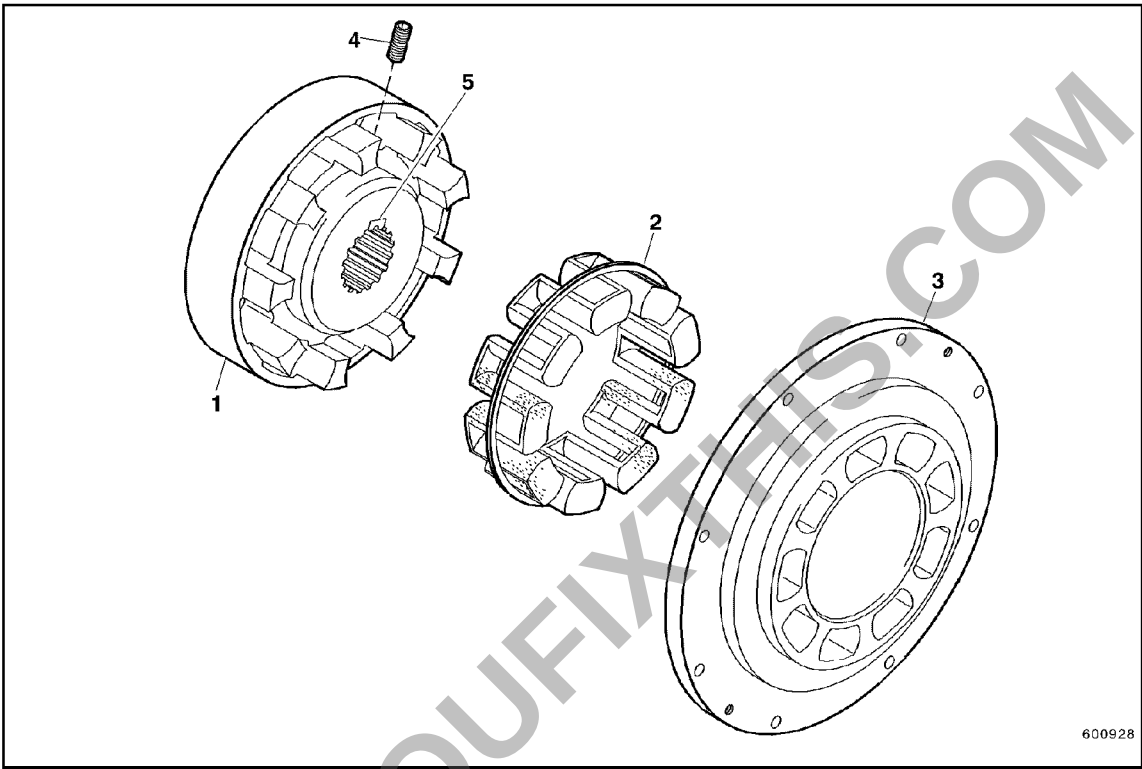
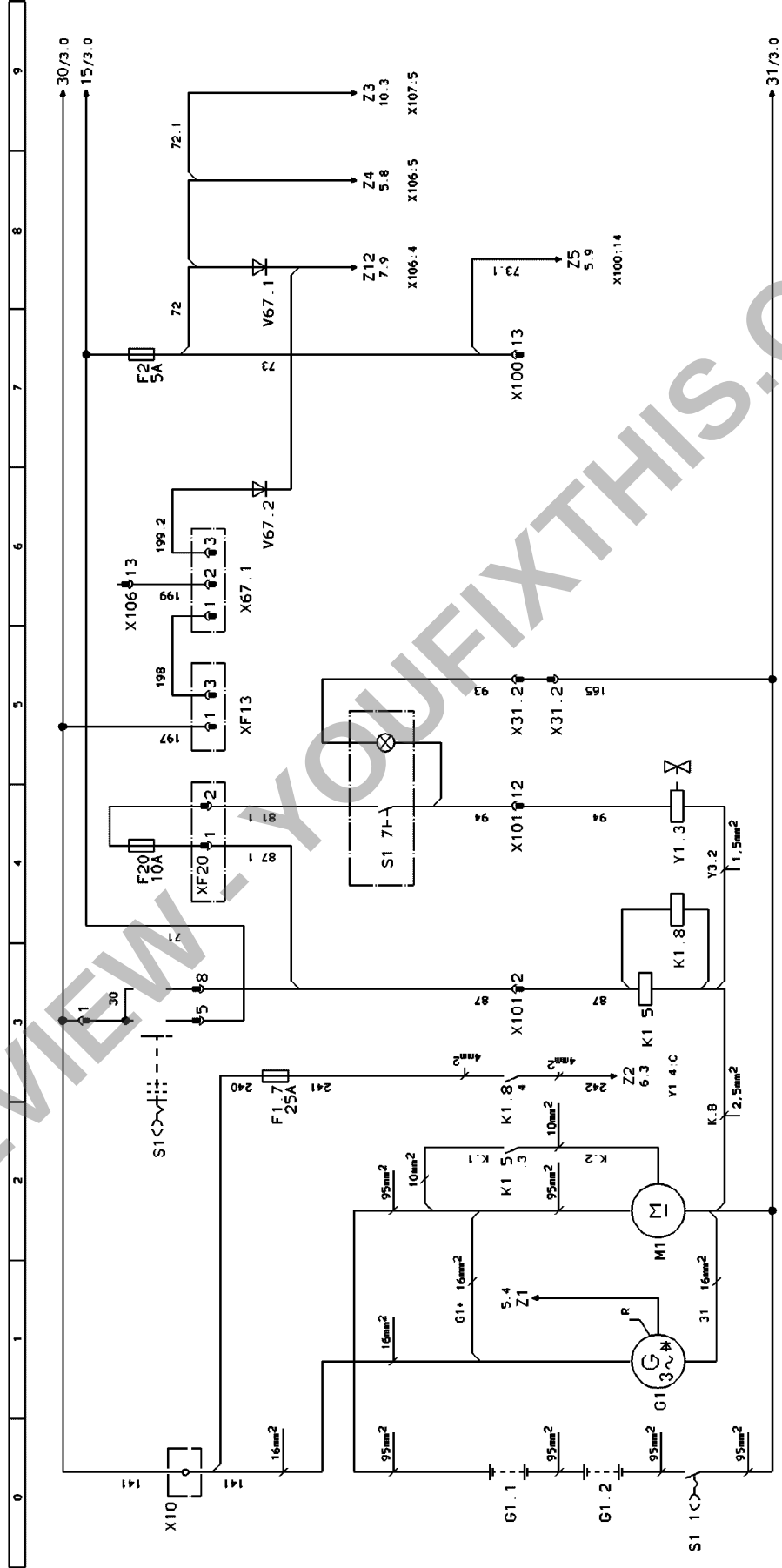


Fig. 2

Item	Quan.	Description	Weight kg / lb	Torque				
				Thread size	Material grade	Wrench size mm	M _A Nm	Torque lbft.
1	1	Coupling hub						
2	1	Intermediate ring						
3	1	Coupling flange						
4	1	Setscrew		M12 x 25	45 H	6	46	34
5	1	Clamping wedge						

31.050

3 005 143 000
Sheet 2 - 28



POWER SUPPLY STARTER MOTOR START RELAY STOP ENGINE
S1.1 - BATTERY MAIN SWITCH
COLD-STARTING SYSTEM
(OPTIONAL)
(OPTIONAL)

SERVICE DATEN / SERVICE DATA

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	4,9	5,5	6,5
	10.9	7,3	8,1	9,5
	12.9	8,5	9,5	11,2
M 6	8.8	8,5	9,5	11,2
	10.9	12,5	14	16,5
	12.9	14,5	16,5	19,5
M 8	8.8	20,5	23	27
	10.9	30	34	40
	12.9	35	40	47
M 10	8.8	41	46	55
	10.9	60	68	80
	12.9	71	79	94
M 12	8.8	71	79	94
	10.9	104	117	140
	12.9	195	215	260
M 16	8.8	170	195	230
	10.9	250	280	340
	12.9	300	330	400
M 20	8.8	350	390	470
	10.9	490	560	670
	12.9	580	650	780
M 24	8.8	600	670	800
	10.9	850	960	1140
	12.9	1000	1120	1350
M 30	8.8	1190	1350	1600
	10.9	1700	1900	2300
	12.9	2000	2250	2700
M 36	8.8	2100	2350	2800
	10.9	3000	3300	4000
	12.9	3500	3900	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.

Fault signalling in the ODC (ON-BOARD DIAGNOSTIC SYSTEM)

2801315

Fault code - Table

The ODC constantly monitors all essential machine functions for faults in the system.

When a fault is detected, the indication ERROR appears on the control panel display and a fault code indication alternates with the operating hours indicated

(z.B. 2345 WORKING HOUR
02 ERROR
2345 WORKING HOUR
100 ERROR
2345 WORKING HOUR).

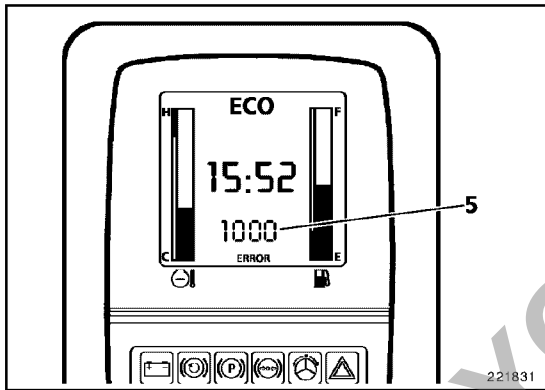


Fig. 1

Example:

Engine coolant temperature too high.

Code indication displayed: ERROR 1000

Since this is a severe fault, a buzzer in the control panel sounds additionally and the red warning lamp signals: coolant temperature too high.

The following fault codes can be displayed:

02		8000
04	200	10000
08	400	
10	800	40000
	1000	80000
	2000	05
		09

01 Foreword / Safety instructions

02 Service Data

03 Tools

04 Undercarriage

05 Superstructure

06 Diesel engine

07 Gear boxes

08 Hydraulic system

09 Electrical system

10 Equipment

Fittings, pipes and hoses

11 Welding for maintenance and repair

Sealing, protective, checking and cleaning agents

12



SAFETY PRECAUTION INFORMATION

UNSAFE OPERATING PRACTICES AND IMPROPER USE OF THE MACHINE AND ITS ATTACHMENTS ON THE PART OF THE OPERATOR OR SERVICE TECHNICIAN CAN RESULT IN INJURIES. OBSERVE THE FOLLOWING SAFETY PRECAUTIONS AT ALL TIMES:

1. FOR SERVICING, THE LOADER SHOULD BE ON LEVEL TERRAIN, ENGINE STOPPED WITH THE WHEELS BLOCKED OR THE ENTIRE MACHINE SOLIDLY SUPPORTED WITH THE WHEELS OFF THE GROUND BEFORE SERVICING ANY COMPONENT OF THE DRIVETRAIN.
2. FOR SERVICING UNDER THE OPERATOR'S SEAT, RAISE THE SEAT AND PAN ASSEMBLY TO THE RAISED LATCHED POSITION AND SECURELY LATCH.
3. DO NOT OPERATE THE MACHINE UNLESS THE SEAT IS LATCHED IN THE OPERATE POSITION.
4. DO NOT SERVICE THE MACHINE WITH A RAISED BOOM UNLESS THE BOOM IS RESTING ON BOOM LOCK PINS OR CYLINDER LOCKING TOOLS OR FIXTURES.
5. DO NOT SERVICE THE LOADER WITH THE ENGINE RUNNING UNLESS THE LOADER IS PROPERLY AND SECURELY SUPPORTED WITH ALL FOUR WHEELS OFF THE GROUND.
6. USE CAUTION WHEN SERVICING THE UNIT AROUND MOVING PARTS.
7. DO NOT TILT THE BOOM AND CAB WITHOUT PROPER INSTRUCTION.
8. DO NOT TILT THE BOOM AND CAB WITHOUT USING THE PROPER CAB TILTING TOOL.
9. REINSTALL ALL SHIELDS REMOVED FOR SERVICE.
10. NEVER LOOSEN ANY HYDRAULIC CONNECTIONS BEFORE RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM.
11. WEAR EYE PROTECTION SUCH AS GOGGLES, ETC.
12. WEAR EAR PROTECTION SUCH AS EARPLUGS, ETC. WHEN YOU FEEL THE NOISE LEVEL IS UNCOMFORTABLE.
13. IF ANY SERVICING OR ADJUSTMENTS REQUIRE THE BATTERY TO BE DISCONNECTED, DISCONNECT THE (-) NEGATIVE GROUND CABLE.
14. WHEN SERVICING ELECTRICAL COMPONENTS, DISCONNECT THE (-) NEGATIVE GROUND CABLE.
15. IF AN ELECTRONIC INSTRUMENT CLUSTER (EIC) REQUIRES REMOVAL FROM THE DASH AREA OR THE MACHINE, DISCONNECT THE (-) NEGATIVE GROUND BATTERY CABLE. THIS WILL SHUT OFF POWER TO THE EIC AND PREVENT DAMAGE TO THE EIC BOARD OR BLOWING FUSES IF THE BOARD IS ACCIDENTALLY GROUNDED.
16. IF WELDING IS REQUIRED ON THE MACHINE, DISCONNECT THE (-) NEGATIVE GROUND CABLE. FAILURE TO DISCONNECT THE BATTERY MAY RESULT IN DAMAGE TO THE EIC (ELECTRONIC INSTRUMENT CLUSTER) MONITORING SYSTEM AND OTHER ELECTRICAL COMPONENTS.
17. IF WELDING IS REQUIRED ON AN ATTACHMENT, REMOVE THE ATTACHMENT FROM THE MACHINE.

INTRODUCTION

This service manual provides the technical information needed to properly service and maintain your machine. Use it in conjunction with the operator's manual which is supplied with the loader. Keep both manuals available for ready reference.

Whenever working on New Holland Construction equipment, left and right sides of the machine are determined by standing behind the unit, looking in the direction of travel.

The easiest and least time-consuming removal, disassembly, and reassembly procedures are detailed in the manual. Modifying these procedures is not recommended.

New Holland Construction machines are designed with emphasis on safety for operator protection. However, careless and negligent operation can still result in serious injury to persons or damage to property. Be sure to read and follow all safety instructions in this manual.

This service manual provides the technical information needed to properly service and maintain your machine. Use it in conjunction with the operator's manual which is supplied with the loader. Keep both manuals available for ready reference.

When in need of parts, always order genuine New Holland service parts from your New Holland Construction dealer. Be prepared to give your dealer the model and serial number of the engine. Record the serial numbers here.

Model _____

Serial Number _____

Engine Model _____

Engine Serial Number _____



CAUTION: THIS SYMBOL IS USED THROUGHOUT THIS BOOK WHENEVER YOUR OWN PERSONAL SAFETY IS INVOLVED. TAKE TIME TO BE CAREFUL!

ABOUT IMPROVEMENTS

New Holland Construction is continually striving to improve its products. We must, therefore, reserve the right to make Improvements or changes when it becomes practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.

ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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SERVICE DATEN / SERVICE DATA

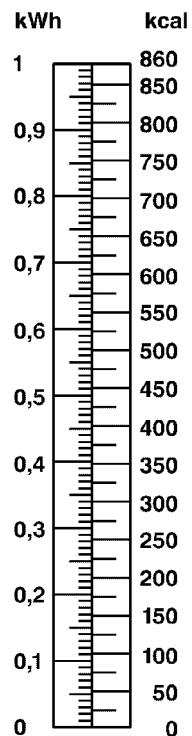
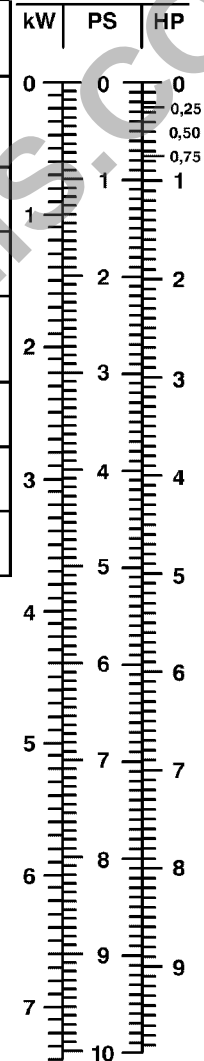
Leistung, Energiestrom, Wärmestrom Power, energy and heat flow

$$1 \text{ Nm/s} = \frac{1}{9,81} \text{ kp m/s} = 0,102 \text{ kp m/s}$$

	W	kW	kcal/s	kcal/h	kp m/s	PS	HP
1 W = (= 1 N m/s = 1 J/s)	1	0,001	$2,39 \times 10^{-4}$	0,860	0,102	0,00136	0,00134
1 kW =	1 000	1	0,239	860	102	1,36	1,341
1 kcal/s =	4 190	4,19	1	3600	427	5,69	5,61
1 kcal/h =	1,16	0,00116	$\frac{1}{3600}$	1	0,119	0,00158	0,00156
1 kp m/s =	9,81	0,00981	0,00234	8,43	1	0,0133	0,0131
1 PS =	736	0,736	0,176	632	75	1	0,9863
1 HP =	746	0,746	0,178	641,8	76,09	1,0145	1

$$1 \text{ kp m/s} = 3600 \text{ kp m/h}$$

$$1 \text{ kp m/h} = \frac{1}{3600} \text{ kp m/s}$$



600034

600033



WARNING

Conversions or modifications to the machine

Unauthorized conversions or modifications of the hydraulic excavator are forbidden for reasons of safety.

The nominal pressure of pressure relief valves must not be modified.

Do not remove the lead seals from pressure-relief valves and pressure accumulators.



CAUTION

Recommissioning

Prior to recommissioning:

- Grease all lubricating points.
- Check all oil levels and make the necessary corrections.
- Carry out function checks of all repaired components.
- Check all functions of the excavator including the brakes during a test run. Release the hydraulic excavator for recommissioning only after all functions have been found to work perfectly.

□

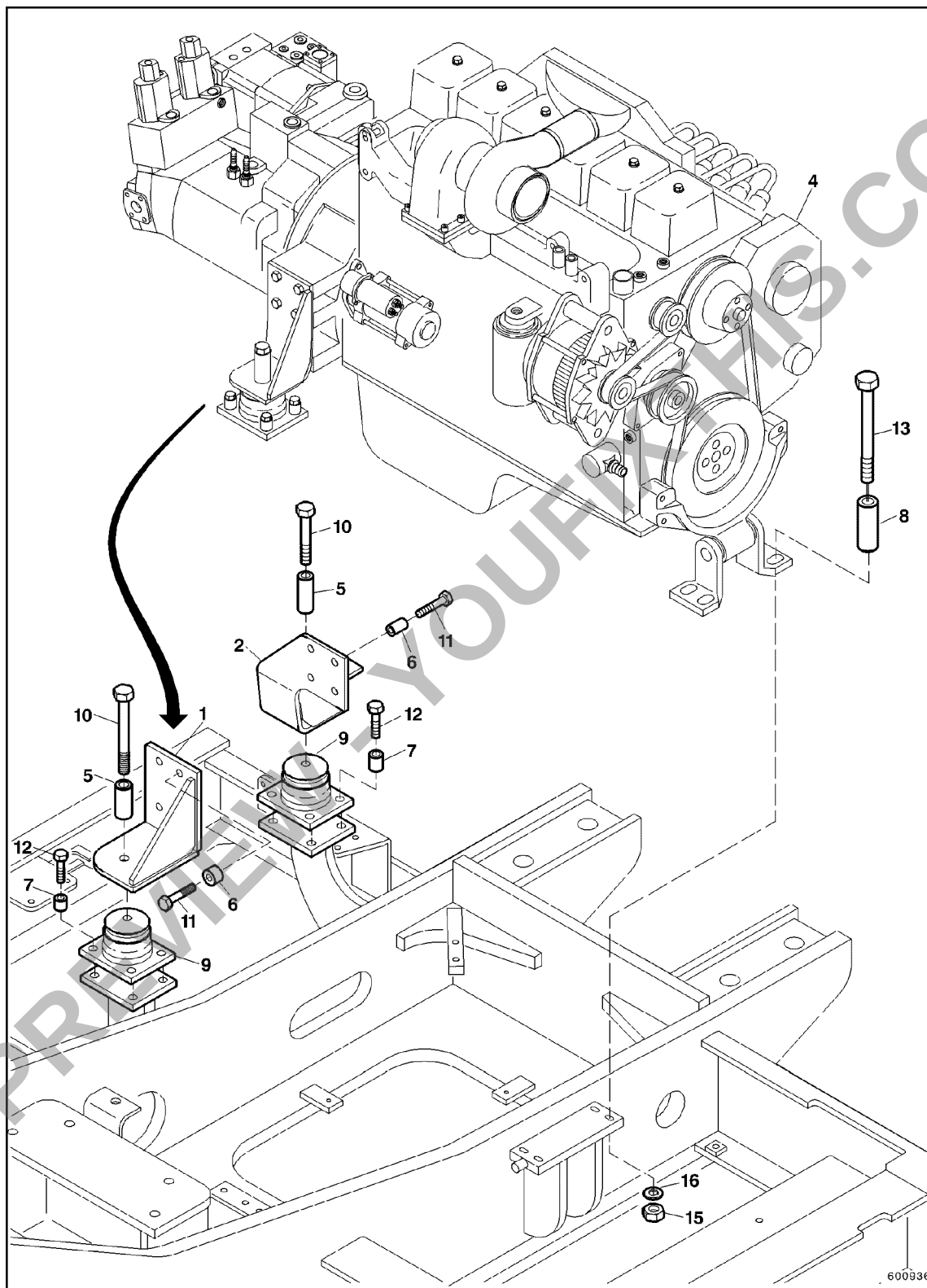


Fig. 1

TRAVEL GEARBOX

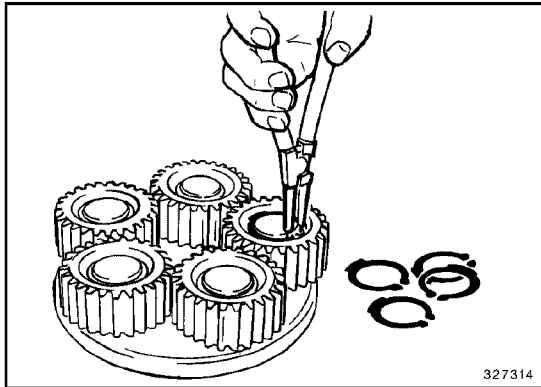


Fig. 40
Insert the circlips.

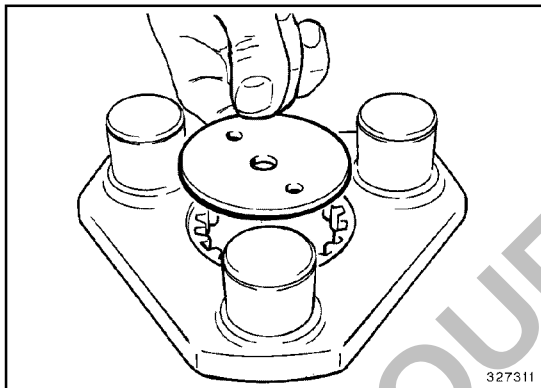


Fig. 41
Insert the disk into the planet carrier of planetary stages I and II.

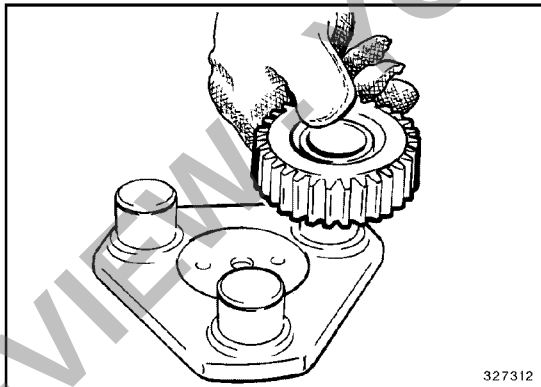


Fig. 42
Put the heated-up spur gears on the pins of the planet carrier **with their big bevels down**.

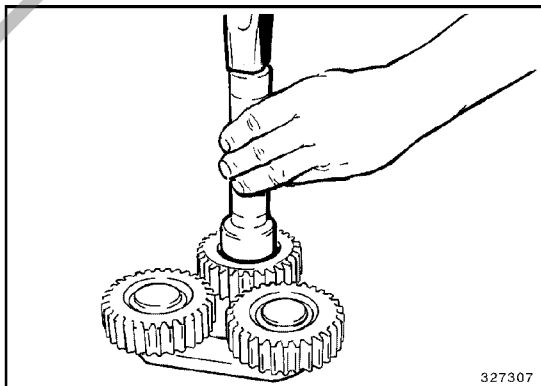


Fig. 43
Immediately drive the bearing fully down with a suitable sleeve.

SWING GEARBOX

Swing gearboxes, types S 5, S 10, S 13, S 16

2796835

Preliminary measures

- Park the machine on firm and level ground.
- Lock the superstructure.
- Set the working equipment on the ground.
- Depressurize the hydraulic system.
- Secure the machine as described in the Operating Instructions

For repairs and overhauls, the gearbox unit should be completely removed for dismantling in a workshop.
Only the swing brake can be repaired and/or replaced without being removed from the machine. □

SWING GEARBOX

Special tools and accessories

Table 2
Special tools

No. (item)	Fig.	Gearbox type	Part No.	Designation
S 1	2	S 5 S 10 S 13 S 16	73176971 73176972 73176973 73176973 73176974	Fitting punch
S 2	4 5 5 6	S 5 S 10 S 13 S 16	73176726 73176727 73176728 73176729	Fitting cover
S 3	20	S 5 S 10 S 13, S 16	73176975 73176976 73176976	Fitting sleeve
S 4	22	S 5, S 10 S 13, S 16	73176730	Device
S 6	21	S 5 S 10 S 13, S 16	73176731 73176732 73176733	Adjusting nut
S 7	24	S 5 S 10 S 13, S 16	73176734 73176735 73176736	Fitting insert
S 9 S 9.1 S 9.2 S 9.3 S 9.4		S 5, S 10	73176725	Fitting set brake S 5/ S 10 including: 2 fitting plates 2 hex screws M 6 x 12 2 cylinder-head screws M 6 x 25 1 hex bolt M 16 x 120 with hex nut M 16

Table 3
Sealing and securing compounds

Liquid screw fixer : P/N 73171473

- Packing 10 cm³ : P/N 73171475

Sealing compound / Adhesive : P/N 73171476

- Packing 50 g : P/N 73176140

- Packing 250 g : P/N 73176141

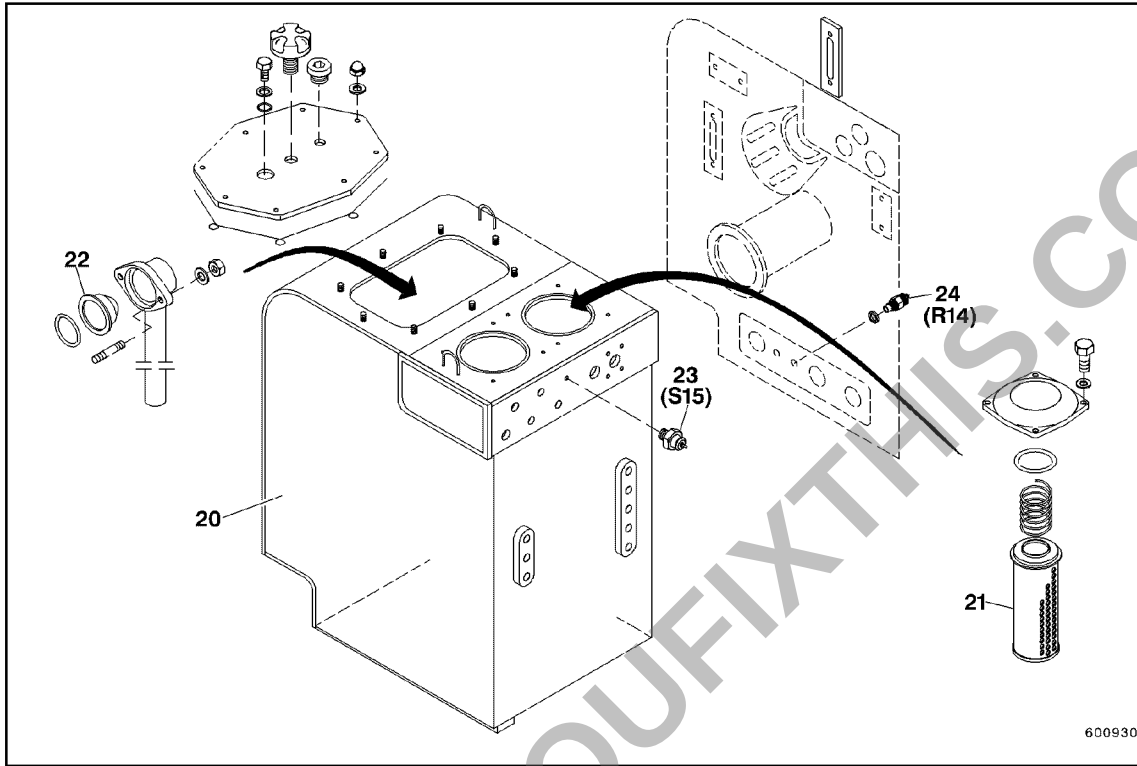


Fig. 12

Hydraulic reservoir, complete (20, Fig. 12)

Reservoir for the hydraulic oil with the following components:

- 2 return flow filters (21)
- 2 bypass valves (22)
- 1 filter contamination switch S 15 (23)
- 1 thermal sensor R 14 (24)

Return flow filters (21, Fig. 12)

The return flow filters filter the oil flowing back from the consumers. The oil flows through the filter elements from inside to outside.

Bypass valve (22, Fig. 12)

The bypass valve prevents the return flow filters (11) from bursting. It opens at a pressure of more than 1.5 bars. The oil then flows unfiltered into the reservoir.

Filter contamination switch (23(S15), Fig. 12)

This switches on a warning light and an acoustic warning signal in the cab when the return flow filters are contaminated.

Thermal sensor (24(R14), Fig. 12)

The thermal sensor registers the temperature of the hydraulic oil and informs the load limit regulator.

□

Feed pressure and zero point

- Connect first 600 bar, then 60 bar pressure gauge to both high-pressure measuring ports (MA and MB, Fig. 3) and check 20 bar feed pressure with the engine running.
- Correction of non-uniform pressures:
Turn setscrew for mechanical zero point (6, Fig. 3) until both pressures are the same.
- Correction of incorrect feed pressure:
Override permanently set feed pressure valve with spacers.
- Replace the 60 bar pressure gauges again by the 600 bar pressure gauges

Swinging power (swinging mode)

- Connect 60 bar pressure gauge to control pressure measuring port (9).
- Turn in setscrew of pressure cutoff (2) by two turns.
- Set swinging mode key to normal swinging power - LED on.
- Raise boom sensitively and connect full swinging power.



CAUTION

Max. checking time: 5 seconds.

Risk of overheating.

- Check control pressure at measuring port (9); if necessary, set to 15 bars at swinging mode valve, pressure relief (10).
- Then adjust pressure cutoff (2).

High swinging pressure and safety valves

- Activate CW/CCW swinging and check pressure cutoff (2) for 390 bars; adjust if necessary.
- Check opening pressure of safety valves (7 and 8, Fig. 3) for 420 bars by turning up pressure cutoff (2). For setting, see safety valve.

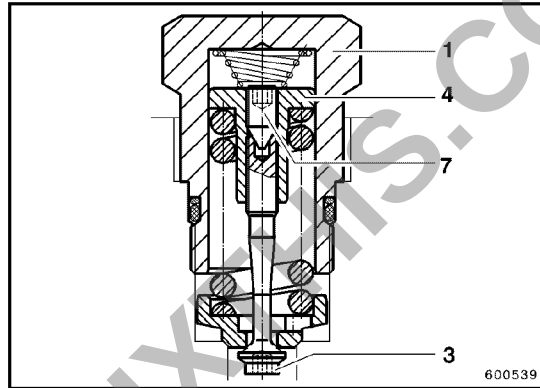


Fig. 4



CAUTION

Max. checking time: 5 seconds.

Risk of overheating.

- Set pressure cutoff (2) back to 390 bars.

Safety valve

For pressure changes, the safety valve must be removed.

Fig. 4

- 1 - Housing; tightening torque = 90 Nm
- 3 - Spindle for changing the pressure setting; 1 turn of spindle = 44 bars; change of set value possible only after loosening lock-screw (7).
- 4 - Valve disk; the set differential pressure is stamped into the valve disk, e.g. 400 bars.
- 7 - Lock-screw

Claw-pole alternator

- 1 - Slip-ring end shield
- 2 - Rectifier heat-sink
- 3 - Power diode
- 4 - Exciter diode
- 5 - Transistorized regulator in hybrid technique
- 6 - Stator with three-phase winding
- 7 - Stator with claw poles
- 8 - Fan
- 9 - Pulley
- 10 - Drive end shield with mounting flanges

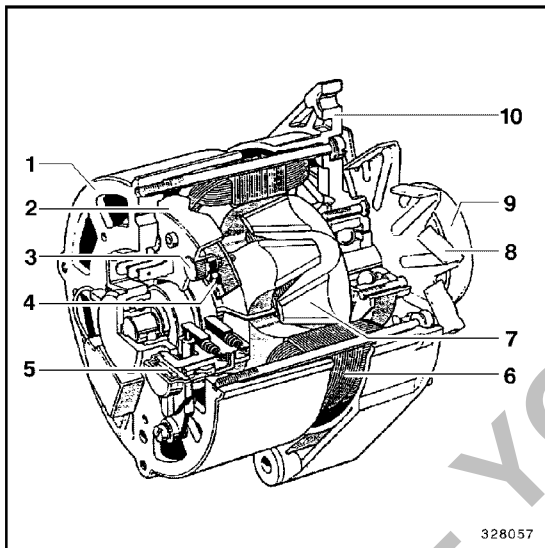


Fig. 5

Important:

The battery must not be disconnected from the alternator when the alternator is running.

Circuit with fault indication on interruption in the exciter circuit

- 1 = Alternator
- 2 = Charge monitoring lamp
- 3 = Resistor R
- 4 = Ignition switch
- 5 = Battery

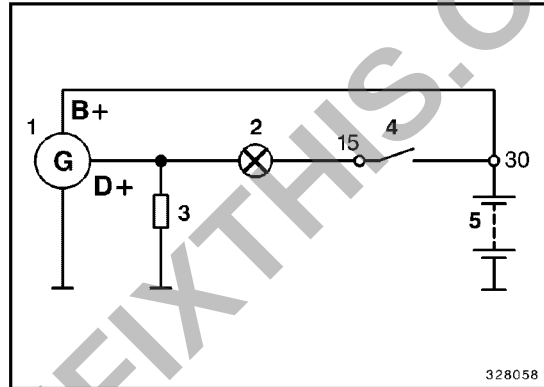


Fig. 6

The sole functions of the charging control lamp are to ensure that the alternator is pre-magnetized and to monitor the exciter circuit. If the charging control lamp lights up while the alternator is running, it means that no exciter current is present and thus that no battery charging is being executed.

Important:

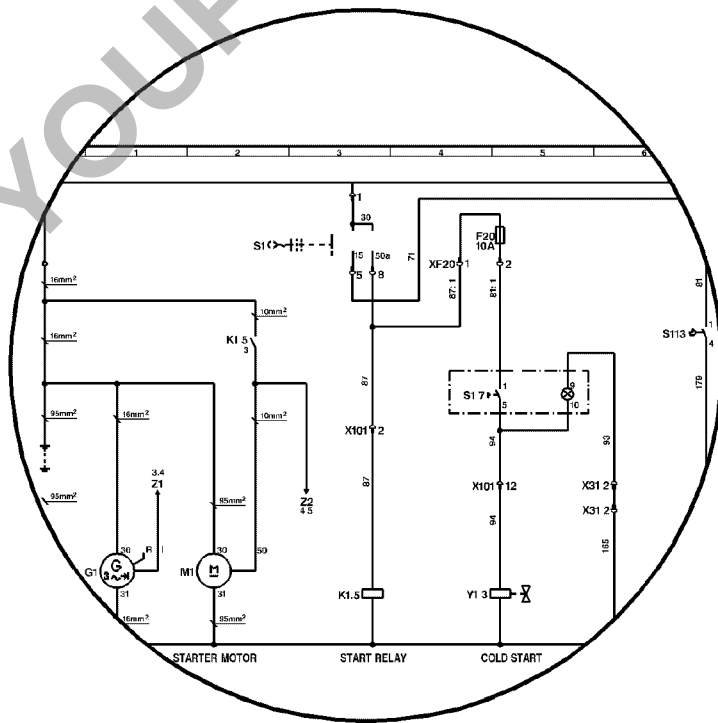
The charging control lamp must not be replaced except with an equivalent one, in general 1.2 W with 12 V systems and 2 W with 24 V systems.

The functions of the charging control are based on the system shown in Fig. 6. If the ignition switch (4) is closed, current flows from the battery (5) through the lamp (2) via a resistor to ground. The resistor (3) has such a resistance value that the lamp lights up. If the diesel engine is then started and the alternator thus driven, a positive voltage will result at terminal (D +) of the alternator. When there is a positive voltage on both sides of the lamp, the charging control lamp will be extinguished. The resistor must be mounted immediately adjacent to the lamp.

Technical Handbook

Automotive electrical systems in construction machinery

Interpretation of wiring diagrams Troubleshooting



2 732 669.00 us

TECHNICAL HANDBOOK

PCS functional diagram

Legend of PCS components (Fig. 3).

A10	On-Board Computer (ODC)
A10X4	Diagnosis socket for hand-held tester EDS
A100	Control Panel
B10.1	Inductive speed pickup (engine)
B13.1 R10.2	Coolant temperature sensor
M10 Y1.4	Engine speed actuator Shut-off solenoid Engine-STOP
R10	Engine speed potentiometer
R14	Hydraulic oil temperature sensor
S10.1 (DSL)	Servo-pressure switch
S10.2 (DSF)	Travelling pressure switch (mobile excavators only)
Y10	Proportional valve (output control of main pumps)
M	Servo-pressure measuring port (45 ⁺¹ bar)
X3	Measuring port - control pressure from proportional valve
1	Servo valve - stick and swinging
2	Servo valve - boom and bucket
3	Servo valve - travelling right track
4	Servo valve - travelling left track
5	Servo valve - travelling (mobile excavators only)
6	Shuttle valve logic
7	Diesel engine
8	Main pump P1
9	Main pump P2
10	Swing pump P3
11	Swing motor
12	Servo pump
13	Pressure relief from servo circuit

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FITTINGS, PIPES AND HOSES

Flanges-90°

90° flanges (Fig. 1) are used in cases in which there is little or no room for a pipe or hose bend (e.g. on hydraulic cylinders).

They are each provided with 4 through and 4 threaded holes, as well as with a seal ring groove (seal ring - see Section "Flange coupling - pipe / hose").

Parts Nos. for the various flange sizes, as well as for the appropriate fixing bolts, can be taken from Table 3 below.

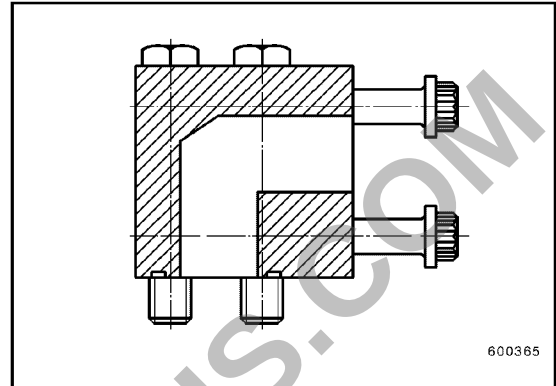


Fig. 1

Table 3: Parts Nos. for 90° flanges

Size	DN (mm)	Pressure range		Parts No. 90°-flange	Parts No. Double-hex bolt	Parts No. Hex. bolt
		(bar)	(psi)			
$\frac{3}{4}$ "	20	---	---	---	---	---
		420	6000	73175988	73171494	73175327
1"	25	210	3000	73175989	73171495	73175214
		420	6000	73170357	73171498	73170360
1 $\frac{1}{4}$ "	32	210	3000	73175990	73171495	73175987
		420	6000	73171366	73171502	73171367
1 $\frac{1}{2}$ "	40	210	3000	73175991	73171439	73171187
		420	6000	73175993	73171505	73175986
2"	50	210	3000	73175992	73171499	73171346
		---	---	---	---	---

REPAIR WELDING TECHNIQUES

3.5 Recommended groove shapes for manual welding with electrodes

For repairs or welding work carried out in the field, the following weld groove configurations should be preferred.

These groove configurations can be employed for plate thicknesses up to 30 mm. The dimensions shown in the drawings are applicable up to this thickness.

For gas metal-arc welding, the weld preparation angle can be reduced to 45°.

For greater plate thicknesses, the weld preparation angles must be reduced so as to leave a maximum opening width of abt. 30 mm. Except for the sharp-edge seam, all grooves should be gouged out, ground and counter-welded, if possible.

3.5.1 Butt joints

Recommended weld groove shapes:

- V-butt weld (fig. 39)
- Double-V butt weld (fig. 40)
- Single-bevel butt weld (fig. 41)
- Double-bevel butt weld (fig. 42)
- Square-edge butt weld (fig. 43)

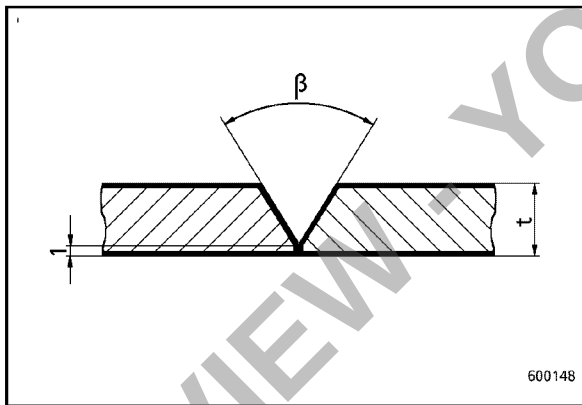


Fig. 39

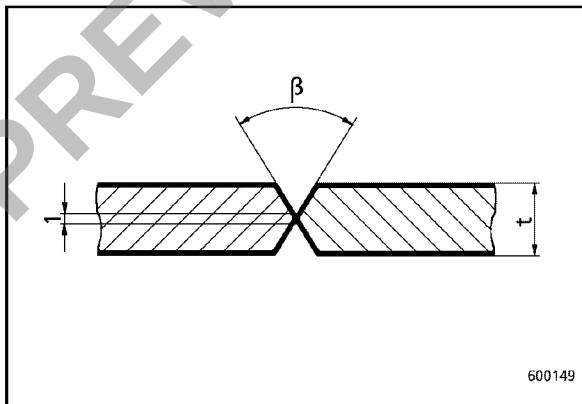


Fig. 40

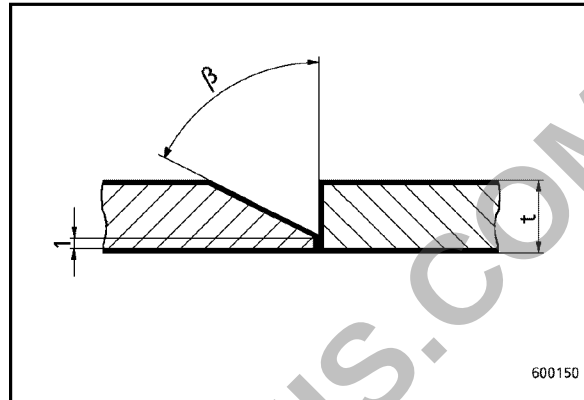


Fig. 41

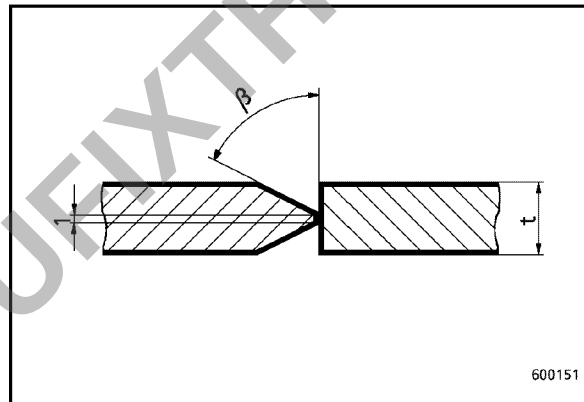


Fig. 42

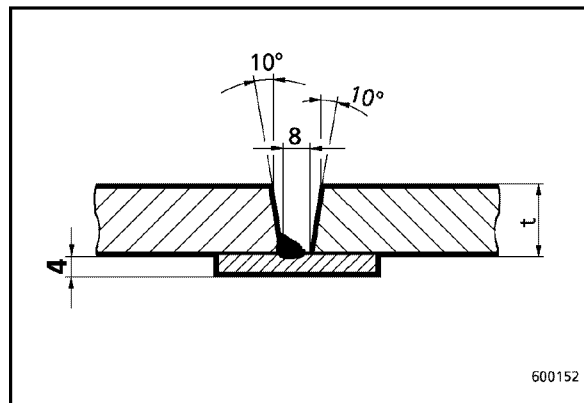


Fig. 43

Welding technique	Symbol EN 24 063	Opening angle β
E	111	60
MAGM	135	45
Solid wire	136	45

WEAR PROTECTION

9. Wear protection (hard-facing)

9.1 Fundamentals

Component surfaces subject to strong wear can be given a protection by welding wear-resistant material onto these surfaces.

The need to provide wear-protection should be known before the machine is put into operation.

If the component is to be hard-faced after putting into operation, the wear-protection must be applied in time, i.e. before the base material itself begins to show signs of wear. A component with worn load-bearing elements can no longer be protected properly against wear.

The wear protection is not durable, but is also subject to wear and tear. Due to the particular metallurgical properties of the hard-facing materials, the rate of wear is, however, considerably reduced.

The wear protection system must be regularly inspected and carefully maintained.

It is therefore advisable to provide for regular reworking during machine standstill periods or for a timely replacement of worn-out components.

Reworking of used components can then be performed in a workshop where more time is available.

An attentive and well-trained repair staff can contribute considerably towards achieving high machine availability.

In the following chapters several wear protection systems are discussed. The question of which system is to be applied can be answered only by taking the specific conditions of use into account. A good decision can be taken only by weighing up and evaluating the advantages and disadvantages of the systems.

9.2 Build-up welding of wear protection layers

Wear-prone areas are protected by the application of a wear-resistant weld overlay.

Depending on the conditions of use, the choice is between a weld metal of high toughness and good impact resistance on the one hand and greater surface hardness on the other.

Another important factor to be considered for reworking is the material's suitability for being welded out of position.

An excellent weld metal for this purpose is one containing chromium, tungsten and niobium carbides embedded in a tough matrix and offering at the same time good resistance to abrasive wear and sufficient resistance to impact.

Such weld metal has a cumulative hardness of abt. 59 to 61 HRC. For higher values of impact strength, it is advisable to choose another weld metal with a lower hardness of abt. 54 to 56 HRC.

The hard and not very tough weld metal tends to form hairline cracks on its surface which are produced by surface stresses (fig. 1).

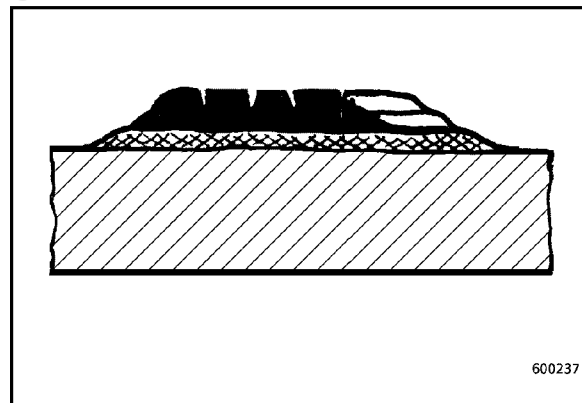


Fig 1

In order to prevent the cracks from running through into the base material, a so-called buffer layer must be provided for in case of components subject to alternating or pulsating loads.

Areas subject to particularly high stresses, such as the side cutting edges of excavating tools, should even be protected by 2 buffer layers (fig. 2).

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