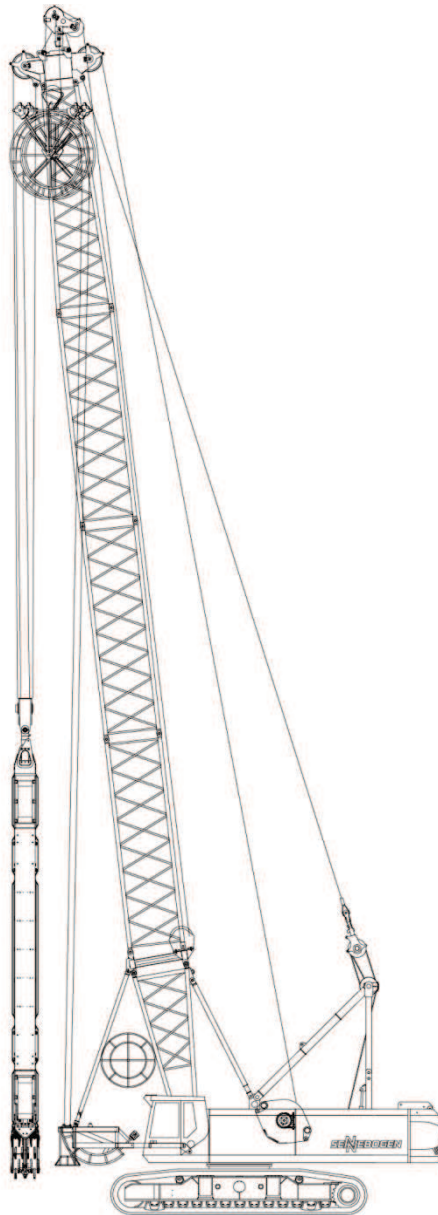


Instruction manual BC system



Translation of the original instruction manual
Keep for future use!

BAUER Maschinen GmbH
Postfach 12 60 • 86522 SCHROBENHAUSEN, GERMANY
Telephone +49 8252 97-0 • Fax +49 8252 97-1359

EQUIPMENT INFORMATION

This document applies to the following equipment:

Equipment model	Construction number	Year of manufacture
BC system	# 0105	2000
BS 6100	# 6.150	2000
BC 40	# 0266	2011
HTS 60	# 0124	2011

Date of publication of the original instruction manual: **08.2016**

BAUER Maschinen GmbH
BAUER-Straße 1
86529 SCHROBENHAUSEN
GERMANY

Head office

Telephone +49 8252 97-0
Fax +49 8252 97-1359
E-mail info@bauer.de

Postal address

BAUER Maschinen GmbH
Postfach 12 60
86522 SCHROBENHAUSEN
GERMANY

Technical Service

Hotline +800 1000 1200 (toll-free)
Telephone +49 8252 97-2888
e-mail BMA-Service@bauer.de

SYMBOLS USED IN THIS INSTRUCTION MANUAL

DANGER!



"**Danger!**" is used to identify an **immediate hazard**. **Serious injury or loss of life will result** if the instructions given in the manual are ignored or not correctly followed.

WARNING!



"**Warning!**" is used to identify a **potential hazard**. **Serious injury or loss of life can result** if the instructions given in the manual are ignored or not correctly followed.



CAUTION

"**Caution**" is used to identify a **dangerous situation**. **Injuries and/or damage to the equipment can result** if the instructions given in the manual are ignored or not correctly followed.



NOTE

"**Note**" is used to identify **tips for use** and other particularly useful information. In general, observance of the information here will facilitate the work.

PREFACE



en

You may not commission the device/system if you do not understand the language used in this instruction manual. In this case, contact the customer service department at BAUER Maschinen GmbH and order an instruction manual in a language you understand.

bg

Не пускайте в експлоатация уреда / съоръжението, ако не разбирате езика, на който е изготвено настоящото упътване за експлоатация. В този случай се свържете със Службата за клиенти на BAUER Maschinen GmbH и поръчайте упътване за експлоатация на разбираем за Вас език.

cn

如果您不理解本使用说明书中所使用的语言，则请您不要使用仪器/设备。在这种情况下，请联系 BAUER 机械有限公司的客户服务部并订购以您理解的语言所书写的使用说明书。

cs

Pokud neovládáte jazyk, kterým je napsán tento provozní návod, nesmíte přístroj / zařízení uvádět do provozu. V tom případě se obraťte na oddělení služeb zákazníkům společnosti BAUER Maschinen GmbH a objednejte si provozní návod v jazyce, který ovládáte.

ja

本取扱説明書で使用されている言語を理解できない場合は、本機を運転しないでください。そのような場合には、バウアーマシーネン GmbH のカスタマーサービスにお問い合わせのうえ、理解できる言語のマニュアルをご注文ください。

de

Sollten Sie die in dieser Betriebsanleitung verwendete Sprache nicht verstehen, darf das Gerät / die Anlage von Ihnen nicht in Betrieb genommen werden. Kontaktieren Sie bitte in so einem Fall den Kundendienst der BAUER Maschinen GmbH und bestellen Sie eine Betriebsanleitung in einer für Sie verständlichen Sprache.

da

Hvis De ikke forstår det anvendte sprog i denne driftsvejledning, må udstyret/ anlægget ikke tages i drift. Kontakt i et sådant tilfælde BAUER Maschinen GmbH's kundeservice, og bestil en driftsvejledning på et sprog, De forstår.

es

Si no entiende ninguno de los idiomas en los que está escrito este manual de instrucciones, no debe poner en funcionamiento el equipo/la instalación. En este caso, póngase en contacto con el servicio de atención al cliente de BAUER Maschinen GmbH y pida un manual de instrucciones en un idioma que entienda.

et

Kui te ei oska keelt, milles käesolev kasutusjuhend on koostatud, ei tohi te seadet/süsteemi kasutusele võtta. Palun võtke sellisel juhul ühendust BAUER Maschinen GmbH klienditeenistusega ja tellige kasutusjuhendi eksemplar teile arusaadavas keeles.

fi

Jos ette ymmärrä näiden käyttöohjeiden kieltä, ette saa ottaa laitetta/laitteistoa käyttöön. Ottakaa siinä tapauksessa yhteyttä BAUER Maschinen GmbH:n asiakaspalveluun ja tilatkaa käyttöohjeet sellaisella kielellä laadittuna, jota ymmärrätte.

fr

Si vous ne comprenez pas la langue employée dans ces instructions de service, vous ne devez pas mettre cet appareil ou cette installation en service. Dans un tel cas, contactez le service clientèle de BAUER Maschinen GmbH et commandez des instructions de service dans une langue que vous maîtrisez.

el

Αν δεν καταλαβαίνετε τη γλώσσα αυτών των οδηγιών λειτουργίας, δεν επιτρέπεται να θέσετε τη συσκευή ή την εγκατάσταση σε λειτουργία. Σε μια τέτοια περίπτωση ελάτε σε επαφή με το τμήμα εξυπηρέτησης πελατών της BAUER Maschinen GmbH και παραγγείλετε τις οδηγίες λειτουργίας σε μια γλώσσα που καταλαβαίνετε.

hr

Ako ne razumijete jezike korištene u ovim uputama za uporabu, onda uređaj / sustav ne smijete stavljati u pogon. U takvom slučaju stupite u kontakt sa servisnom službom tvrtke BAUER Maschinen GmbH i naručite upute za uporabu na nekom jeziku koji razumijete.

hu

Amennyiben Ön nem érti ennek az üzemeltetési utasításnak a nyelvét, nem szabad üzembe helyezni a készüléket/berendezést. Ebben az esetben értesítse a BAUER Maschinen GmbH ügyfélszolgálatát és rendeljen egy üzemeltetési utasítást az Ön számára érthető nyelven.

it

Se non comprendete la lingua utilizzata nelle presenti istruzioni per l'uso, non potete mettere in funzione l'apparecchio/l'impianto. In questo caso rivolgetevi al servizio di assistenza clienti della ditta BAUER Maschinen GmbH e ordinate le istruzioni per l'uso redatte in una lingua per voi comprensibile.

-
- lt** Jei nesuprantate šioje vartotojo instrukcijoje vartojamos kalbos, Jūs negalite eksploatuoti prietaiso / įrenginio. Susisiekite su klientų „BAUER Maschinen GmbH“ aptarnavimo tarnyba ir užsisakykite instrukciją Jums suprantama kalba.
-
- lb** Wann Dir d'Sprooch déi an dëser Betribsuleedung benotzt gëtt net verstitt, dierft Dir den Apparat/d'Anlag net a Betrib huelen. Kontaktéiert an esou engem Fall w.e.g. de Konnendéngscht vun der BAUER Maschinen GmbH a bestell eng Betribsuleedung an enger Sprooch déi Dir verstitt.
-
- lv** Ja jūs nesaprotat šajā lietošanas instrukcijā lietoto valodu, jūs nedrīkstat sākt šīs ierīces / iekārtas ekspluatāciju. Šādā gadījumā sazinieties ar uzņēmuma BAUER Maschinen GmbH klientu dienestu un pasūtiet lietošanas instrukciju jums saprotamā valodā.
-
- mt** Jekk mintix familjari mal-lingwa użata f'dan il-manwal ta' tħaddim, ma għandekx tħaddem dan l-apparat / sistema. Jekk ma tistax taqra dan il-manwal ta' tħaddim jew inkella jekk ma tistax tifhem il-kontenut tiegħu, għandek tikkuntattja lid-dipartiment tas-servizz tal-klijenti ta' BAUER Maschinen GmbH u għandek tordna manwal f'lingwa li tifhem.
-
- nl** Indien u de taal in deze gebruiksaanwijzing niet begrijpt, mag het apparaat / de installatie niet door u worden gebruikt. Neem in dat geval contact op met de klantendienst van BAUER Maschinen GmbH en bestel een gebruiksaanwijzing in een taal die u begrijpt.
-
- no** Hvis du ikke forstår språket som brukes i denne driftsveiledningen, må ikke enheten/anlegget settes i drift. Ta i så fall kontakt med kundeservice hos BAUER Maschinen GmbH og bestill en driftsveiledning på et språk du forstår.
-
- pl** Jeżeli instrukcja obsługi jest w nieznanym języku obcym, nie wolno włączać urządzenia/instalacji do eksploatacji. W takim przypadku należy się skontaktować z działem obsługi klienta firmy BAUER Maschinen GmbH i zamówić instrukcję obsługi w znanym sobie języku.
-
- pt** Se não compreender a língua utilizada neste manual de instruções, não pode colocar o aparelho/a instalação em funcionamento. Neste caso, queira contactar a assistência ao cliente da BAUER Maschinen GmbH e encomende um manual de instruções na língua pretendida.
-

ro

În cazul în care nu înțelegeți limba în care sunt scrise aceste instrucțiuni de exploatare, nu aveți voie să puneți dumneavoastră în funcțiune aparatul / instalația. În acest caz, luați legătura cu departamentul pentru clienți al firmei BAUER Maschinen GmbH și comanda instrucțiunile de exploatare într-o limbă pe care o înțelegeți.

ru

Если вы не понимаете язык, на котором написана данная инструкция по эксплуатации, ввод устройства / установки в эксплуатацию запрещается. В этом случае свяжитесь с отделом обслуживания компании BAUER Maschinen GmbH и закажите инструкцию по эксплуатации на языке, который вам понятен.

sv

Om du inte förstår språket i den här bruksanvisningen får du inte ta utrustningen/anläggningen i drift. Kontakta i sådant fall BAUER Maschinen GmbH:s kundtjänst för att beställa en bruksanvisning på ditt språk.

sk

Ak by ste nerozumeli jazyku, v ktorom je tento návod na prevádzku napísaný, nesmiete uviesť prístroj/zariadenie do prevádzky. V tomto prípade kontaktujte zákaznícky servis firmy BAUER Maschinen GmbH a objednajte si návod na prevádzku v jazyku, ktorému rozumiete.

sl

Če ne razumete jezika, v katerem je napisano to navodilo za obratovanje, naprave / sistema ne smete uporabljati. V takem primeru se obrnite na službo za podporo strankam podjetja BAUER Maschinen GmbH in naročite navodilo za obratovanje v jeziku, ki ga razumete.

tr

Bu işletim kılavuzunda kullanılan dili anlamadığınız takdirde cihazı / sistemi çalıştırmanız yasaktır. Bu durumda lütfen BAUER Maschinen GmbH firmasının müşteri hizmetleri ile iletişime geçiniz ve anlayabileceğiniz dilde bir işletim kılavuzu sipariş ediniz.

uk

Якщо ви не розумієте мову, яка використовується в цьому керівництві з експлуатації, вам не дозволяється вводити цей пристрій/цю установку в експлуатацію. В такому випадку зверніться до сервісної служби BAUER Maschinen GmbH і замовте керівництво з експлуатації на зрозумілій вам мові.

המערכת אם אינך מבין את השפה שבה כתובות הוראות הפעלה אלה/אין להפעיל את המכונה
והזמן BAUER Maschinen GmbH במקרה זה נא צור קשר עם שירות הלקוחות של חברת
הוראות הפעלה בשפה שלך.

he

ל

هذه المنشأة عن طريقك / في حال لم تفهم اللغة المستخدمة في تعليمات التشغيل هذه، لا يُسمح بأن يتم تشغيل هذا الجهاز
للمكينات محدودة الضمان واطلب تعليمات التشغيل BAUER يرجى الاتصال في مثل هذه الحالة بخدمة العملاء شركة
باللغة التي تفهمها
بريد إلكتروني

ar

This instruction manual is written for use by operating and maintenance personnel.

Before starting up the equipment PLEASE:

First, take your time and read the **"Instruction Manual"** and the enclosed booklet entitled **"Operating and safety instructions"**.

These two documents must always be kept with the equipment, so that they are available for reference at any time.

The **"Instruction Manual"** gives you a detailed description of the equipment, guidelines for transport and initial start-up as well as comprehensive instructions for the operation of the equipment, troubleshooting tips and information related to maintenance.

Technical data, weights and measurements apply to the date on which this instruction manual was published. We are constantly improving our products. As a result, there may be minor deviations between the technical data, weights and measurements contained in the instruction manual and those of the equipment as actually built and delivered. However, these minor deviations are inconsequential and do not affect or invalidate the contents of this instruction manual.

The equipment as delivered to you may have options that might not be pictured in the photographs or described in the text contained in this instruction manual exactly as they appear on your equipment. This is due to the individualization of the equipment based on the wishes and orders of the individual customers. These differences may not be used as a basis for claims of any kind.

The equipment shall only be used for the authorized purposes listed in the instruction manual. The manufacturer assumes no liability whatsoever for improper or unauthorized use of the equipment, operator errors, improper or insufficient maintenance.

The enclosed booklet entitled **Operating and safety instructions** contains the directions and related information for safe use of the equipment / rig. The **Operating and safety instructions** must be followed at all times.

Also, pay attention to and follow all the instructions contained in the attached documents (Appendix ____) of the component manufacturers.

This **instruction manual** was written and published by
BAUER Maschinen GmbH • Postfach 12 60 • 86522 SCHROBENHAUSEN, GERMANY

Copyright 2016, BAUER Maschinen GmbH

The information contained in this instruction manual and/or any of its parts, sections or sub-sections, is the intellectual property of BAUER Maschinen GmbH and is protected by domestic and international copyright and other intellectual property laws.

The information contained herein is provided for the operation, service, maintenance and troubleshooting of the equipment described herein.

We strictly prohibit any duplication, reproduction, translation, microfilming, electronic or magnetic storage or processing, copying or dissemination of these materials and/or the information contained herein, or any part thereof, with the exception of internal use by BAUER Maschinen GmbH or its authorized external suppliers, consultants or agents, without the prior written consent of BAUER Maschinen GmbH.

All legal rights and remedies are hereby expressly reserved.

Violators will be prosecuted.

BAUER Maschinen GmbH assumes no liability for use of the information contained herein in a prohibited fashion by any person or entity in any location.

BAUER Maschinen GmbH reserves the right to change, delete or otherwise alter or modify any information contained herein, or the equipment itself, at any time and for any reason, with or without notice.

CONTENTS

EQUIPMENT INFORMATION.....	I
PREFACE	III
CONTENTS.....	X
NAMEPLATES.....	XV
AFTER SALES SERVICE DEPARTMENT	XVI
INFORMATION ON DEFECTS LIABILITY	XVII
ADDITIONAL INFORMATION REGARDING DEFECTS LIABILITY FOR CUTTING SYSTEMS	XIX
REQUEST UNDER DEFECTS LIABILITY / WARRANTY CLAUSE.....	XX
STAFF REQUEST	XXI
REGISTRIERUNG BETREIBER UND GERÄT / OWNER AND EQUIPMENT REGISTRATION	XXII
1 DESCRIPTION	1 - 1
1.1 INTENDED USE	1 - 1
1.1.1 Änderungsantrag /	1 - 3
1.1.2 Intended Use of the Cutter	1 - 4
1.1.3 Intended Use of the Hose Guide System	1 - 5
1.1.4 Intended Use of the Base Machine	1 - 5
1.2 EQUIPMENT OVERVIEW	1 - 6
1.2.1 Base Machine with Process Equipment	1 - 6
1.2.2 Cutter	1 - 8
2 SAFETY	2 - 1
2.1 GENERAL SAFETY REQUIREMENTS	2 - 1
2.2 SAFETY OF THE EQUIPMENT/RIG	2 - 1
2.3 SOURCES OF DANGER	2 - 1
2.4 PROTECTIVE EQUIPMENT	2 - 2
2.4.1 EMERGENCY STOP	2 - 2
2.4.2 Emergency STOP on the Remote Control for the Cutter Wheels	2 - 2
2.4.3 "Pilot Control" Safety Stick	2 - 3
2.4.4 Emergency Exit	2 - 4
2.4.5 Fire Extinguisher	2 - 4
2.4.6 First Aid Box	2 - 5
2.4.7 Fall Protection Equipment	2 - 6
2.4.8 Hoist Limitation	2 - 7
2.4.9 Monitoring Oil Pressure of the Hose Tension Winches	2 - 8
2.4.10 Measuring the Pulling Force of Hose Tension Winches	2 - 10
2.4.10.1 Protection Against Excessive Load on One Side of the Boom Head	2 - 11
2.4.10.2 Overload Protection	2 - 11
2.4.11 Feed Pressure Monitoring of the Cutter Winch	2 - 12
2.4.12 Automatic Rope Tensioning Facility	2 - 12
2.5 STABILITY	2 - 13
2.5.1 Additional Specific Stability Guidelines	2 - 14
2.5.2 Validity	2 - 14

2.5.3	Prescribed Limit Values for Loads, Angles and Operating Radius	2 - 15
2.5.4	Operation with 916 mm Working Width and 52 m Cutting Depth	2 - 16
2.5.4.1	Load Case for Cutting	2 - 16
2.5.4.2	Load Case for Recovery	2 - 16
2.5.4.3	Ground Pressure	2 - 16
2.5.4.4	Load Capacity Table	2 - 17
2.5.5	Traveling with Process Equipment	2 - 18
2.5.5.1	Traveling between the Trenches	2 - 19
2.6	PERMISSIBLE WIND SPEED	2 - 20
2.6.1	Maximum Permissible Wind Speeds	2 - 22
3	TECHNICAL DATA	3 - 1
3.1	DIMENSIONS	3 - 1
3.2	EQUIPMENT SPECIFICATIONS	3 - 1
3.3	MUD PUMP CHARACTERISTICS	3 - 2
3.3.1	Pump with Two-Stage Impeller	3 - 2
3.3.2	Pump with Three-Stage Impeller (optional)	3 - 3
3.4	ROPE SPECIFICATIONS	3 - 4
3.4.1	Cutter Rope	3 - 4
3.4.2	Hose Tension Ropes	3 - 4
3.4.3	Recovery Ropes	3 - 4
3.5	NOISE EMISSIONS	3 - 5
3.6	VIBRATION ACCELERATION	3 - 5
3.7	PERMISSIBLE AMBIENT TEMPERATURE	3 - 6
4	CONTROLS AND INDICATORS	4 - 1
4.1	CAB	4 - 1
4.2	CONTROL PANEL - BASE MACHINE	4 - 2
4.3	CONTROL PANEL - CUTTER	4 - 3
4.4	REMOTE CONTROL - CUTTING	4 - 4
5	OPERATION	5 - 1
5.1	TRAVELING	5 - 1
5.1.1	Selecting the Travel Mode	5 - 1
5.1.2	Traveling with Process Equipment	5 - 2
5.2	OPERATING THE CUTTER	5 - 4
5.2.1	Switching the Cutting Mode On/Off	5 - 4
5.2.2	Lowering and Lifting the Cutter Manually	5 - 4
5.2.2.1	Winch Mode	5 - 5
5.2.3	Lowering the Cutter Automatically	5 - 7
5.2.3.1	Setting and Function of Knobs	5 - 7
5.2.3.2	Activating Crowd Automatic Mode	5 - 8
5.2.3.3	Deactivating Crowd Automatic Mode	5 - 8
5.2.3.4	Setting Options for Crowd Automatic Mode	5 - 9
5.2.4	Adjusting the Imposed Load	5 - 10
5.2.5	Controlling the Cutter	5 - 11
5.2.5.1	Steering Flaps	5 - 12
5.2.6	Operating the Cutter Wheels	5 - 14
5.2.6.1	Adjusting the Direction of Rotation of the Cutter Wheels	5 - 15
5.2.6.2	Maximum Cutter Wheel Torque	5 - 17
5.2.7	Lifting the Cutter	5 - 17
5.2.8	Operating the Mud Pump	5 - 18
5.3	HTS OPERATION	5 - 19

5.3.1	Operating the HTS Manually	5 - 19
5.3.2	Automatic HTS Control	5 - 20
5.4	STARTING A NEW TRENCH	5 - 21
5.4.1	Preparatory Measures	5 - 21
5.5	PRODUCING A TRENCH	5 - 22
6	START-UP/SHUT-DOWN	6 - 1
6.1	START-UP	6 - 1
6.1.1	Initial Start-up	6 - 1
6.1.2	Visual Check Before Start-Up	6 - 1
6.1.3	Start-Up after a Long Standstill	6 - 1
6.1.4	Daily Start-Up	6 - 2
6.1.4.1	Adjusting the Measuring Systems	6 - 3
6.1.4.2	Process Equipment	6 - 5
6.1.5	Safety Checks Before Starting Work	6 - 6
6.1.5.1	Checking the Emergency STOP	6 - 6
6.1.5.2	Checking the Pilot Control Safety Stick	6 - 6
6.1.5.3	Checking the Emergency STOP Function on the Remote Control for the Cutter Wheels	6 - 6
6.1.5.4	Checking the Limit Switches	6 - 7
6.1.6	Switching On the Control System	6 - 7
6.2	SHUT-DOWN	6 - 9
6.2.1	Daily Shut-Down	6 - 9
6.2.2	Shutting Down for a Longer Period	6 - 10
6.2.2.1	Diesel Tank	6 - 10
6.2.2.2	Process Equipment	6 - 10
6.2.3	Shutting Down Due to High Wind Speeds	6 - 11
7	RIGGING / DERIGGING	7 - 1
7.1	GUIDELINES FOR RIGGING/DERIGGING	7 - 1
7.1.1	Hydraulic Connection	7 - 2
7.2	WAX REMOVAL	7 - 4
7.3	ASSEMBLING THE SYSTEM	7 - 5
7.3.1	Assembling the Base Machine	7 - 5
7.3.2	Adjusting the Boom to the HTS	7 - 6
7.3.3	Pulling in the Cutter Rope	7 - 7
7.3.4	Pulling in the Hose Tension Ropes	7 - 9
7.3.5	Mounting the Supports on the Crossbeam	7 - 10
7.3.6	Raising the Boom	7 - 10
7.3.7	Mounting the Lower Fix Point	7 - 11
7.3.8	Mounting the Cutter	7 - 13
7.3.9	Installing Hoses on the Hose Wheels and the Lower Hose Guide	7 - 15
7.3.10	Attaching the Cutter to the Pulley Block	7 - 16
7.3.11	Erecting the Cutter	7 - 17
7.4	DISASSEMBLING THE SYSTEM	7 - 19
7.4.1	Removing the Cutter	7 - 20
7.4.2	Removing the Hose Wheels	7 - 21
7.4.3	Removing the Lower Fix Point	7 - 21
7.4.4	Lowering the Boom	7 - 24
7.4.5	Removing the Upper Fix Point	7 - 24
7.4.6	Disassembling the Base Machine	7 - 24
8	TRANSPORT	8 - 1
8.1	SAFETY GUIDELINES FOR TRANSPORT	8 - 1

8.2	TRANSPORT MEASURES	8 - 2
8.2.1	Base Machine	8 - 2
8.2.2	Process Equipment	8 - 2
8.3	TYING DOWN	8 - 4
8.3.1	Base Machine	8 - 4
8.3.2	Process Equipment	8 - 5
8.4	LOADING AND UNLOADING	8 - 6
8.4.1	General	8 - 6
8.5	LOADING AND UNLOADING THE CUTTER	8 - 7
8.5.1	Attaching the Cutter without Cutter Gear	8 - 7
8.5.2	Attaching the Cutter with Cutter Gear	8 - 8
8.6	TRANSPORT DATA	8 - 9
8.6.1	Process Equipment	8 - 9
8.6.2	Cutter BC 40 # 0330 Working Width 916	8 - 12
9	MAINTENANCE	9 - 1
9.1	SAFETY GUIDELINES FOR MAINTENANCE	9 - 1
9.1.1	Connection Elements	9 - 1
9.1.2	Welding Work	9 - 1
9.1.3	Pressure Containers	9 - 1
9.2	MAINTENANCE INTERVALS	9 - 2
9.3	MAINTENANCE PLAN	9 - 3
9.3.1	Entire Equipment	9 - 3
9.3.2	Hydraulic System	9 - 4
9.3.3	Attachments	9 - 5
9.3.4	Process Equipment	9 - 7
9.3.4.1	HTS	9 - 7
9.3.4.2	Cutter	9 - 9
9.4	MAINTENANCE DURING LONGER PERIODS OF STANDSTILL	9 - 12
9.4.1	Cutter	9 - 12
9.4.1.1	Shutting Down for a Longer Period	9 - 12
9.4.1.2	Start-up after a Prolonged Standstill	9 - 12
9.5	ROPE ACCESSORIES	9 - 13
9.5.1	Rope Swivel	9 - 13
9.5.2	Rope Hold-down Rollers	9 - 14
9.5.3	Rope Fasteners, Thimbles and Sleeves	9 - 14
9.5.4	Rope Sheaves	9 - 15
9.6	CUTTER	9 - 17
9.6.1	Cutter Gear	9 - 17
9.6.1.1	General Service and Maintenance Information	9 - 18
9.6.1.2	Checking the Gear Oil	9 - 21
9.6.1.3	Operation Chart for Contaminated Gear Oil	9 - 24
9.6.1.4	Filling in Gear Oil	9 - 27
9.6.1.5	Topping Up Gear Oil	9 - 31
9.6.1.6	Changing the Gear Oil	9 - 33
9.6.1.7	Checking the Gear Oil Pressure/Ambient Pressure	9 - 34
9.6.1.8	Checking the Leak Oil	9 - 35
9.6.1.9	Cutter Gear Service	9 - 36
9.6.1.10	Checking the Gear Shield	9 - 37
9.6.1.11	Changing the Gear Shield	9 - 40
9.6.1.12	Replacing the Cutter Gear Sensors	9 - 42
9.6.2	Cutter Wheels	9 - 44
9.6.2.1	General Information	9 - 44

9.6.2.2	Removing the Cutter Wheels	9 - 45
9.6.2.3	Installing the Cutter Wheels	9 - 46
9.6.2.4	Replacing the Flipper Tooth	9 - 47
9.6.2.5	Checking the Flipper Tooth	9 - 48
9.6.2.6	Welding the Stop to the Cutter Wheel	9 - 54
9.6.2.7	Welding the Stop to the Flipper Tooth	9 - 54
9.6.2.8	Checking Functionality of the Flipper Tooth	9 - 55
9.6.2.9	Changing the Cutter Teeth	9 - 56
9.6.2.10	Welding the Tooth Holder Insert	9 - 57
9.6.2.11	Other Maintenance Work on the Cutter Wheel	9 - 58
9.6.3	Suction Device	9 - 59
9.6.3.1	Suction Device Maintenance	9 - 59
9.6.3.2	Changing the Suction Device	9 - 60
9.6.4	Mud Pump	9 - 61
9.6.4.1	Checking the Oil Level	9 - 61
9.6.4.2	Filling in Oil and Venting the Pressure Compensator	9 - 63
9.6.4.3	Refilling the Pressure Compensator with Oil	9 - 65
9.6.4.4	Checking the Quality of the Oil	9 - 66
9.6.4.5	Flushing the Bearing Ring Seal	9 - 67
9.6.4.6	Changing the Oil	9 - 68
9.6.4.7	Checking the Bearing Ring Seals	9 - 69
9.6.4.8	Removing the Mud Pump	9 - 71
9.6.4.9	Installing the Mud Pump	9 - 72
9.6.4.10	Changing/Replacing the Speed Sensor	9 - 73
9.6.4.11	Checking and Adjusting the Impeller	9 - 74
9.6.5	Adjusting the Cutting Width	9 - 76
9.6.6	Turning Device	9 - 77
9.6.7	Turning Device	9 - 78
9.6.7.1	Changing the Oil	9 - 78
9.6.8	Inclinometer	9 - 79
9.7	MUD HOSE MAINTENANCE	9 - 81
10	LUBRICANTS/TABLES	10 - 1
10.1	LUBRICANTS	10 - 1
10.1.1	General Information	10 - 1
10.1.2	Lubricant Table	10 - 2
10.1.3	Lubricant Selection Lists	10 - 4
10.1.3.1	Gear Oils, Petroleum – CLP	10 - 4
10.1.3.2	Gear Oils, Synthetic – CLP PG	10 - 5
10.1.3.3	Gear Oils, Petroleum – API	10 - 6
10.1.3.4	Greases, Semi-synthetic – KP2N	10 - 7
10.1.3.5	Greases, Petroleum – KP2K	10 - 8
10.2	CONVERSION TABLE	10 - 9

NAMEPLATES

Nameplates on the equipment

Designation	Position
Base machine	In the vicinity of the cab
Process equipment	The construction number is welded to the process equipment.

AFTER SALES SERVICE DEPARTMENT

How do I contact the After Sales Service?

BAUER Maschinen GmbH
Abteilung Kundendienst / After Sales Service Department
Postfach 12 60
86522 SCHROBENHAUSEN
GERMANY

Telephone +800 1000 1200 (toll-free) / +49 8252 97-2888

Fax +49 8252 97-2587

e-mail BMA-Service@bauer.de



NOTE

Whenever you contact the after sales service, please provide the following information so that your inquiry can be dealt with accurately and more quickly

Equipment description

- Equipment model
- Construction number
- Engine hours

Description of problem

- Date (DD.MM.YYYY)
- Cause of damage (if known)
- Course of events leading to damage
- Scope of damage (which components could be defective/damaged?)

Contact for queries

- Contact person; telephone / fax / e-mail

Description of site

- Name of site:
- Full address (post code, town, street)
- Directions for customer service personnel (if necessary)

INFORMATION ON DEFECTS LIABILITY

If any defects liability claims are raised by the customer in accordance with the contractual provisions, the following information is to be observed as a supplement to the contractual provisions.

- ⇒ **Start and duration of the defects liability period:**
 - The defects liability period is set out in principle in the contractual agreement.

- ⇒ **Prerequisites of defects liability:**
 - The product must be inspected upon delivery and any defects reported to BAUER immediately using the "Defects liability claim" form.
 - Correct operation, assembly and start-up of the product by trained and qualified personnel in accordance with the instruction manual and the safety manual.
 - Original BAUER spare parts must be used exclusively throughout the defects liability period.
 - During the defects liability period, the customer or owner of the product is required to have all maintenance and service work performed by BAUER or an agent authorized by BAUER, or he/she is to conduct the maintenance and service work him/herself in a regular and competent manner in accordance with the servicing schedule in the instruction manual, while under the supervision of BAUER or an agent authorized by BAUER.
 - Any work (service, maintenance, repairs, etc.) performed on the product must be recorded in the maintenance and repair log provided with each product.
 - Defective or damaged components must not be dismantled and/or repaired during the defects liability period without the prior consent of BAUER.
 - If a defect is detected, it is to be reported to BAUER immediately in writing by using the "Defects Liability Claim" form to ensure proper processing and to prevent subsequent damage.

- ⇒ **Exclusions from defects liability:**
 - Damage due to operator errors or to improper use, assembly or operation of the product, or due to improper start-up and misuse of the product.
 - Damage resulting from defective service and maintenance procedures.
 - Improperly performed repairs.
 - Modifications and/or alterations to the product which were not approved by BAUER.
 - Forceful physical damage.
 - Wear parts. This does not apply, if a wear part is shown to be defective (e.g. due to a material or manufacturing fault).
Note: Drilling tools, Kelly bars, ropes, etc. are deemed to be wear parts.

A) Liabilities and/or responsibilities of BAUER:

- BAUER will supply (spare) parts to rectify faults (supplementary performance) under defects liability in accordance with CIF and/or CIP Incoterms® 2010.
- BAUER will also supply staff if necessary for supplementary performance.



The components removed in connection with supplementary performance shall become the property of BAUER. BAUER will then decide whether to return the removed components at its own expense and risk or to proceed otherwise. Returns must always be conducted according to the specifications stipulated by BAUER.

- Returns/deadlines:
For returns, the following deadlines apply from the date of arrival of the new components at the job site in the destination country to the date of arrival of the disassembled components at BAUER headquarters, or any other destination designated by BAUER.
 - For returns by air freight: 4 weeks.
 - For returns by sea freight: 4 months.

If removed components requiring shipment by sea freight cannot be returned on time (e.g. because of the situation at the job site), BAUER's after sales service department must be informed of the delay in writing no later than six weeks before the above mentioned deadline. BAUER can then extend the deadline for return.

For returns by air freight, the deadline may not be extended.

If parts are not returned within the agreed period, any costs associated with subsequent performance that are incurred by BAUER in connection with the respective defects liability claim are to be borne by the customer.

B) Liabilities and/or responsibilities of the customer:



If the customer has informed BAUER of a defect, but it transpires that no defect is apparent during the examinations conducted by BAUER, or that the prerequisites for BAUER's defects liability are not met, then BAUER shall reserve the right to claim for any costs incurred.

ADDITIONAL INFORMATION REGARDING DEFECTS LIABILITY FOR CUTTING SYSTEMS

The following information applies in addition to the section entitled "Information on defects liability".

⇒ **Prerequisites for defects liability with regard to cutter gears:**

BAUER must be supplied with the following documents/data/information together with the "Defects liability claim":

- Completed failure data sheet (available from BAUER in the event of a claim).
- Data from the B-Tronic backup.
- The last 5 oil samples (see section "Cutter gear - checking the gear oil").
- The results of the last two cutter gear oil sample analyses (see section "Cutter gear - checking the gear oil").
- The maintenance and repair log with completed "Cutter gear maintenance work" data sheets.

⇒ **Exclusions from defects liability for cutter gears:**

Any moving components that come into contact with the cutting material are excluded from defects liability.

- This does not apply if components are shown to be defective (e.g. due to a material or manufacturing fault).

To: BAUER Maschinen GmbH Tel. +49 8252 97-2586
Abteilung Kundendienst Fax +49 8252 97-2587
Postfach 12 60 e-mail kvt@bauer.de
86522 Schrobenhausen

From: Owner/
Customer: Company name/Address: _____
Tel./Fax: _____ e-mail: _____
Agent: Company name/Address: _____

Request under defects liability / warranty clause

1. Product specifications

Total number of pages of notice: _____

Equipment: _____ Serial. no.: _____ Year of constr.: _____ Engine hours: _____

Rig operator: Name: _____ Operator license #: _____

Current location of equipment (postal address): _____

Date of commissioning: _____ Discovery of defect: _____

2. B-Tronic existing ☐ Yes ☐ No

3. Details of malfunctioning items

Please describe malfunctioning items and state their material number:

Name of malfunctioning item	Material number	Serial number

Remarks (symptoms, causes, position of malfunctioning items):

4. Delivery of new items and repair work

Malfunctioning items already replaced by items from customer's own stock ☐

Replacement of malfunctioning items by ordering from after sales service ☐

Shipment (by courier, air or sea freight): _____

Delivery address: _____

Information for pro forma invoice: _____

Replacement work by customer/agent ☐ Yes ☐ No

Estimated labour (hrs): _____ Estimated additional costs: _____

Date	Name of Applicant (please print)	Signature	Company
------	-------------------------------------	-----------	---------

5. For internal use only – Request under defects liability will be checked (to be completed by Bauer)

Request under defects liability approved: ☐ Yes ☐ No

In case of later rejection, the customer will be invoiced the costs.

If yes, give order number: _____ If no, give reasons: _____

Further reports: _____

Further actions: _____

Return of malfunctioning items by: _____

☐ Send B-Tronic Backup

(Signed by authorised Bauer employee)

Staff Request



Please send this form completely filled out to one of the below mentioned contacts

Address:

BAUER Maschinen GmbH
Abteilung Kundendienst
Postfach 12 60
86522 Schrobenhausen
Germany

Contact:

Secretary
Phone: +49 8252 / 97 – 2586
Fax: +49 8252 / 97 – 2587
E-Mail: kvt@bauer.de

Client

Company Name:

Contact Person:

Order No:

Phone:

E-Mail:

Requested Staff

Detail / Spare Parts

Skills

- ☐ Mechanic
☐ Electrician
☐ Operator
☐ Welder
☐

Spoken language on the job site

- ☐ German
☐ English
☐ National Language
☐

Requested Site Visit

Contact Person on Jobsite

Start:

Contact Person:

Duration:

Phone:

E-Mail:

Jobsite Information

Equipment Details / Attachment

Address:
(jobsite)

Equipment:

Attachment:

Serial No.:

Country:

Operating Hours:

Airport of Destination:

Reading Date:

Work Permit needed: ☐ Yes ☐ No

Information about the work to be carried out?

HSE: Any information about risks on the jobsite regarding the staff available?

Place, Date

Signature

An/ BAUER Maschinen GmbH
To: Abteilung Kundendienst/
After Sales Service Dept.
Postfach/P. O. Box 12 60
86522 Schrobenhausen, Germany
Tel.: +8000 1000 1200 / +49 8252 97-2888
Fax: +49 8252-97-2587
E-Mail: bma-service@bauer.de

Registrierung Betreiber und Gerät/ Owner and Equipment Registration

Wir möchten dem Betreiber jederzeit eine optimale Dienstleistung bezüglich Kundeninformationen bieten können.

Wir bitten deshalb jeden neuen Betreiber, sich und sein Gerät über dieses Formular bei der BAUER Maschinen GmbH registrieren zu lassen./

We would like to offer the equipment owner an optimum service as regards customer information at all times.

For this reason, we would ask each owner to register himself and his equipment with BAUER Maschinen GmbH by filling out this form.

1. Gerätedaten/Equipment Data

Gerät/
Equipment: _____ Baunummer/
Serial number: _____ Betriebsstunden/
No. of operating hours: _____

2. Betreiberdaten/Owner information

Aktueller Betreiber des Gerätes mit Anschrift/Current owner of the equipment, including address:

Firma/Company:	
Abteilung/Department:	
Ansprechpartner/Person to contact:	
Postfach/P. O. Box:	
Straße/Street:	
Land/Country:	
Tel./Tel.:	
Fax/Fax:	
E-Mail/E-mail:	

Datum/
Date

Name des Ausstellers
(in Blockbuchstaben)/
Name of issuer
(in capital letters)

Unterschrift/
Signature

Firma/
Company

1 DESCRIPTION

1.1 INTENDED USE

This equipment is only approved for the following activities:

Task	Abbreviation	Authorized use?
Production of deep trenches and construction of diaphragm walls	BC	Yes

Intended and authorized use means use under strict compliance with all instructions in this manual along with any additional instructions, directions, precautionary measures and prohibitions contained in manuals and documents.

The overall contents of this instruction manual pertain and refer exclusively to the equipment, including all original equipment and manufacturer-installed options, in the condition they were in on the day of delivery to the initial purchaser.

Any modifications made to the equipment, its components or manufacturer-installed options after delivery can compromise the safety of the equipment, whereupon this instruction manual is no longer valid. **Use of this equipment after such modification is unauthorized unless under prior written consent from BAUER Maschinen GmbH as indicated below.**

The manufacturer cannot be held liable in any way for any incidents arising from, or associated with, prohibited and unauthorized use of the equipment, **unless such use after modification has been consented to in writing by BAUER Maschinen GmbH.**

Following modification of the equipment, original components or manufacturer-installed options, the equipment may not be used in any way or at any location without written consent from BAUER Maschinen GmbH or until such consent is issued. Please submit a **change request** to BAUER Maschinen GmbH in order to receive such authorization.

Authorization to use the equipment after modification to the equipment itself, its original components or manufacturer-installed options may only be issued after a correct and complete change request has been received and reviewed by BAUER Maschinen GmbH.

No other person, entity or organization, including any public authorities, regardless of location, has the right to issue such authorization. Likewise no representative, distributor, importer, retailer or subsidiary of BAUER Maschinen GmbH has the right or is authorized to issue such authorization in valid form. Valid authorization can only be issued by the corporate headquarters of BAUER Maschinen GmbH upon submission of a correct and complete change request.


The equipment described in this manual is intended for the country for which the initial purchaser placed the order and must therefore only be used in this country. All contractual agreements between the manufacturer and the initial purchaser regarding the requirements and restrictions involved in using and operating this equipment in a country other than the one for which the equipment was ordered are binding for all individual and subsequent purchasers.

Any use of the equipment in a country other than the one for which it was ordered shall be considered unauthorized and strictly prohibited, unless prior written consent was requested from and granted by BAUER Maschinen GmbH.

The use of this equipment in the United States is authorized only if the equipment was initially ordered for use in and delivered to the United States, or if the use of this equipment in the United States has been expressly permitted and authorized in writing by BAUER Maschinen GmbH.

Any use of this equipment other than as authorized and described in this manual shall be considered unauthorized and is hereby expressly prohibited. The same applies to use of the equipment as a crane, for leveling purposes or for transporting people. These uses are expressly unauthorized and hereby strictly prohibited.

The manufacturer shall not be held liable for any injuries or damages of any kind that occur directly or indirectly in any way, shape or form in conjunction with, or as a result of, any unauthorized use described herein or any use that is not expressly authorized in this manual.

An/To: BAUER Maschinen GmbH Abteilung Kundendienst Postfach 1260 D-86522 Schrobenhausen	Tel. +49 8252 97-2586 Fax +49 8252 97-2587 E-Mail kvt@bauer.de	
--	---	---

Von (Eigentümer, Betreiber)/From (owner, user): _____

Tel.: _____ Fax: _____ E-Mail: _____

Gesamtseitenzahl dieses Antrages/Total number of pages of this request: _____

ÄNDERUNGSANTRAG / CHANGE REQUEST

für/for

Gerät/Equipment ☐ Ausrüstung/Attachment ☐ Anbauteil/Factory installed option ☐

1. Grunddaten/Equipment specifications

Gerät/Anlage Equipment/Plant: _____	Baunummer/ Serial number: _____	Baujahr/Year of manufacture: _____	Betriebsstunden/ Operating hours: _____
--	------------------------------------	---------------------------------------	--

Aktueller Standort des Gerätes/der Anlage mit Anschrift/
Current location of the equipment/plant with complete address: _____

Datum der Kommissionierung/Date of commissioning (first use): _____

Anbauteile (original)/Factory installed options (OEM):

Bezeichnung/Description	Materialnummer/Material number	Baunummer/Serial number

Ausrüstung (original)/Attachment (OEM):

Bezeichnung/Designation	Materialnummer/Material number	Baunummer/Serial number

2. Änderungsdaten/Change data für/for

Gerät/Equipment ☐ Ausrüstung/Attachment ☐ Anbauteil/Factory installed option ☐

Änderungsbeschreibung/Description of changes: Ggf. Angebotsnr. BAUER/BAUER offer no. (if applicable)

☐ Es wird hiermit ausdrücklich erklärt und bestätigt, dass sich das Gerät zum aktuellen Zeitpunkt im Originalzustand (Auslieferungszustand) befindet und ausschließlich mit BAUER-Originalkomponenten bestückt ist. Das Gerät befindet sich in einem technisch einwandfreien Zustand.
It is herewith explicitly declared and confirmed that the equipment is presently in its original condition (as delivered) and contains only genuine original BAUER OEM components.
The equipment is in a technically flawless condition.

☐ Eigentümer bittet um technische Überprüfung des Gerätes./
The owner requests a technical inspection of the equipment.

Name/Name	Unterschrift/Signature	Datum/Date
-----------	------------------------	------------

3. BAUER-intern (wird von BAUER ausgefüllt)/For internal use of BAUER (to be filled in by BAUER)

Antrag erhalten am/Request received on: _____

Antrag weitergeleitet an/ Request forwarded to:	VT <input type="checkbox"/> Name: _____ EK <input type="checkbox"/> Name: _____ PM <input type="checkbox"/> Name: _____ andere/other <input type="checkbox"/> Name: _____	Datum/Date: _____ Datum/Date: _____ Datum/Date: _____ Datum/Date: _____
---	--	--

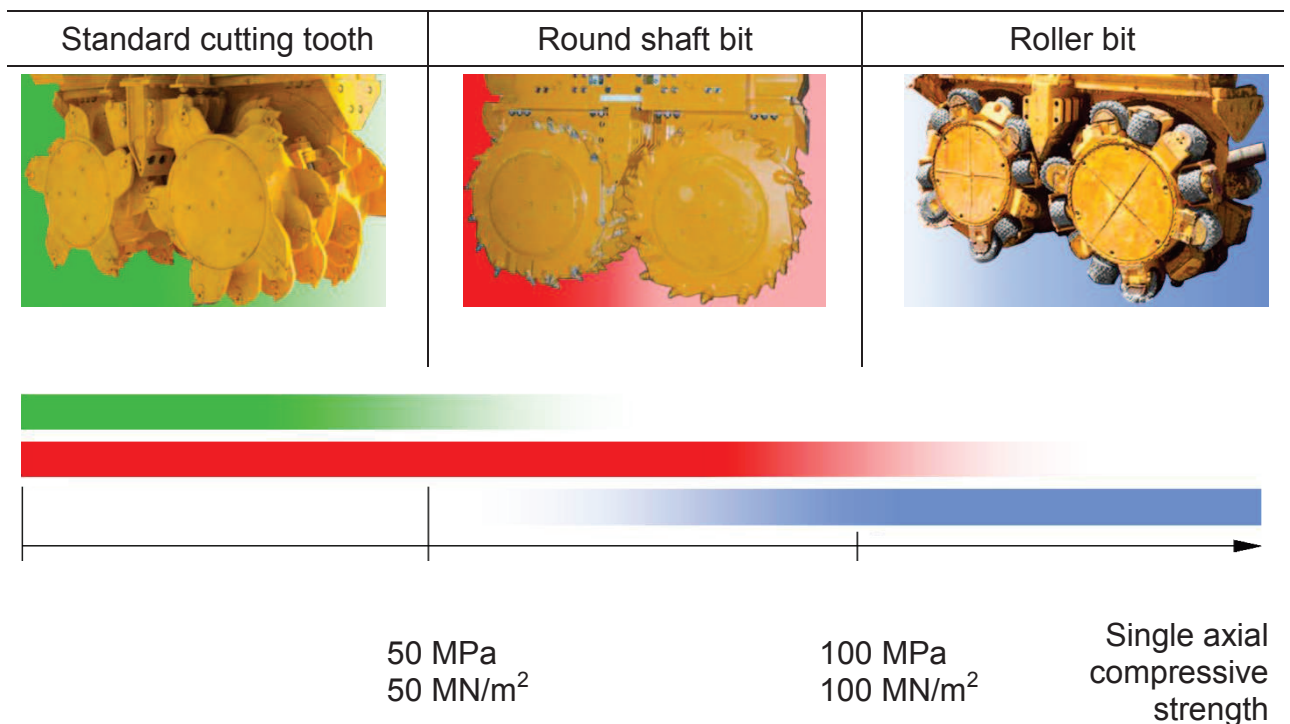
Name KVT-Mitarbeiter/Name of KVT employee: _____

1.1.2 Intended Use of the Cutter

The BAUER cutter has been specifically designed for the production of deep trenches and diaphragm walls in stable ground.

The system can be fitted with different cutter wheels and cutter teeth, which are suitable for various ground conditions and diaphragm walls of various widths.

The correct type of cutter wheel is essential for achieving optimum cutting progress. The selection of a suitable type depends heavily on the soil characteristics.



The different cutter teeth and round shank chisels on offer cover the various applications. As it is rare for ground to exhibit an homogeneous structure over the entire depth of the slot wall, an optimum configuration is usually achieved by varying the cutter teeth. It is therefore also possible to mix different cutter teeth and round shank chisels.

The cutter must be removed from the trench if progress is unusually and unexpectedly slow, despite a suitable cutter configuration. The cutter wheels should then be checked for wear, functionality and blockages through rock, steel components, silt or other similar material.

In principle, cutting of steel parts (including reinforcing steel) should always be avoided, as it results in increased wear and can lead to exclusion from warranty in case of repeated occurrence and resulting damage to the cutter.

The stability of the trench must be guaranteed by an adequate level of suspension in the trench at all times.

The trench statics must be maintained on site.

The cutter is fitted with steering flaps. These enable the cutter to be steered in the trench extremely precisely.

The cutter is (in principle) equipped with a deviation measuring system. This is intended as a working aid to indicate the direction and allow the operator to maintain the correct direction. The measuring system allows the equipment operator to steer the cutter in a particular direction when a deviation is detected. The measuring system measures the inclination of the cutter frame and, as progress increases, the inclination is calculated with the distance traveled in order to calculate the deviation. This is then displayed on the screen and in the cutting record as a vertical or inclined cutting course in an X and Y direction. Regular checks need to be carried out to ensure that the cutter frame and the measuring system are in a vertical position. If the cutter hangs in the trench diagonally and is then lowered, the system will indicate a sloping cutting course. If there is substantial overbreak in an inclined trench, the cutter may have enough room to hang vertically. In this case, a lower inclination value will be displayed on the screen and recorded in the cutting record.

The deviation measuring system cannot provide information about the condition of the trench (such as overbreak, diaphragm wall thickness after cutting, etc.). Incorrect operation and/or incorrect handling of the equipment can cause incorrect results to be displayed/provided.

Difficult ground conditions such as overbreak, oversize particles, boulders and other obstacles can cause deviations. For deeper trenches with limited deviation, it is important to use an independent trench measuring technique, for example ultrasound measurement. This provides monitoring and confirmation that the trench actually corresponds to the information shown on the screen and in the cutting record.

1.1.3 Intended Use of the Hose Guide System

The attainable cutting depth is defined by the hose guide system used. If different configurations and rigging options are permissible for a system, please consult the information in the chapters "Stability" and "Rigging/derigging".

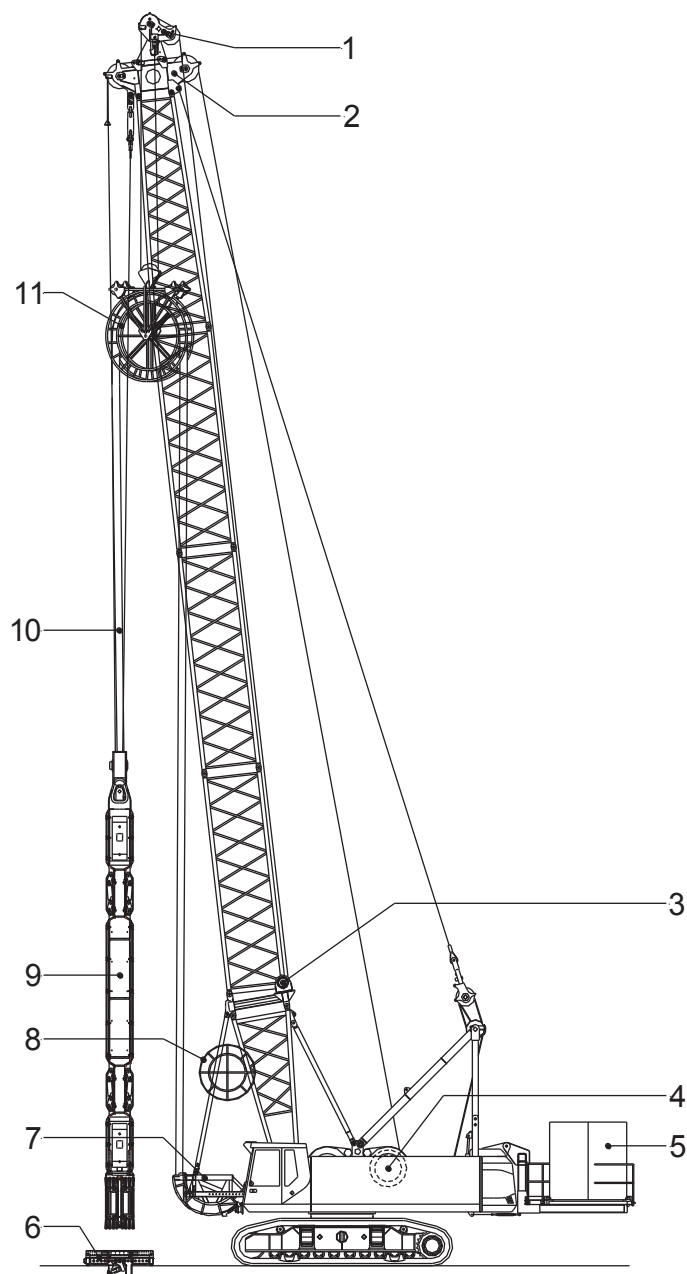
1.1.4 Intended Use of the Base Machine

The base machine is specially equipped for use as a cutter carrier. For further possible uses, please refer to the instruction manual of the base machine.

1.2 EQUIPMENT OVERVIEW

1.2.1 Base Machine with Process Equipment

- 1 Upper fix point
- 2 Boom head
- 3 Hose tension device
- 4 Cutter winch
- 5 Hydraulic power unit (optional)*
- 6 Guide frame
- 7 Lower fix point
- 8 Hose attachment
- 9 Cutter
- 10 Wire ropes
- 11 Hose wheels



FG017503.wmf

*) not supplied with this version

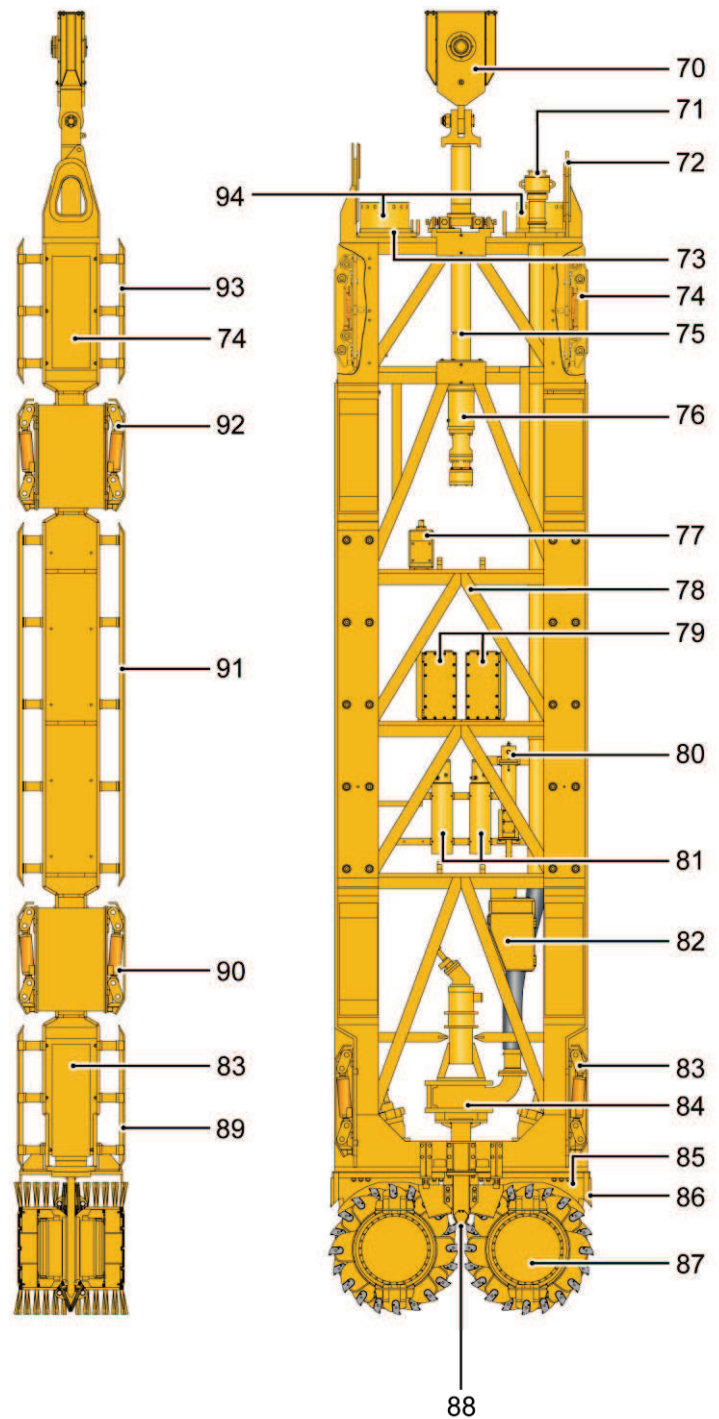
DESCRIPTION



Components	Function
Boom head	Fastening point for the "upper fix point". Guides the cutter rope.
Upper fix point	Guides the hose tension ropes.
Hose tension device with hose tension ropes	Enables lifting and lowering of the hose wheels.
Cutter winch	Enables lifting and lowering of the cutter.
Guide frame	Used to support the weight of the cutter and to ensure exact positioning of the diaphragm wall cutter in the diaphragm wall.
Lower fix point	Fastening point for the mud hose and the hydraulic hose belt. Hydraulic hose belt guide.
Hose attachment	Guides the hydraulic hose belt from the base machine to the "lower fix point".
Cutter	Loosens and crushes the surface via rotating cutter wheels.
Wire ropes	Lifting equipment for working with the process equipment
Hose wheels	Guide the hydraulic hose belt and the mud hose to the cutter.

1.2.2 Cutter

- 70 Pulley block
- 71 Mud pipe connection
- 72 Attachment point for recovery ropes
- 73 Connection plate
- 74 Upper steering flap
- 75 Support
- 76 Turning motor
- 77 Upper electrical box
- 78 Cutter frame
- 79 Hydraulic boxes
- 80 Pressure compensation for the mud pump
- 81 Pressure compensation for the cutter gear
- 82 Lower electrical box
- 83 Lower steering flaps
- 84 Mud pump
- 85 Gear shield
- 86 Stop end panel (optional)
- 87 Cutter wheels
- 88 Suction device with reamer plate
- 89 Lower cutter frame extension
- 90 Lower steering flaps
- 91 Central cutter frame extension
- 92 Upper steering flaps
- 93 Upper cutter frame extension
- 94 Lifting points for recovery ropes (optional)



Component	Function
Stop end panel	End stop for insertion of the scaling board in the trench.
Suction device	Sucks in the resulting cut material.
Reamer plates	Clean the areas between the cutter teeth.
Pressure compensator	Controls the pressure of the gear oil.
Electrical boxes	Contain the cutter electronics.
Mud pump	Conveys the resulting cut material through the mud hose to the surface.
Cutter wheels	Loosen and crush the surface material and convey this to the suction device.
Gear shields	Transfer the driving power to the respective cutter wheel.
Hydraulic boxes	Contain the cutter hydraulic control system.
Post-cutting plates	Cut the diaphragm walls at the sides, which the cutter teeth cannot reach.
Connection plate	Connects the hydraulic hose bundle to the cutter.
Pulley block	Connects the cutter rope to the cutter.
Steering flaps	Guide and control the cutter in the trench.
Turning motor	Enables the cutter to be rotated.

2 SAFETY

2.1 GENERAL SAFETY REQUIREMENTS

- It is of fundamental importance that the national accident prevention codes be observed in the country where this equipment is used.
- Furthermore, the "Operating and safety instructions" booklet supplied with this equipment must be observed. It contains general and company-specific instructions.
- The safety instructions specified in the various sections of this instruction manual must also be observed without fail.

2.2 SAFETY OF THE EQUIPMENT/RIG

The safety built into this equipment is state-of-the-art and complies with all valid EC requirements.

Equipped safety devices guarantee the highest possible safety standard.

2.3 SOURCES OF DANGER

- When the drilling/cutting mode is selected, the equipment operates with rotating tools. Being pulled in by such a tool could lead to severe or even fatal injuries.
- In vibrator applications, the equipment operates with high-frequency oscillating tools. Contact with such a tool could lead to severe or even fatal injuries.
- The stability of the equipment must not be endangered. Exceeding the rig's capacity or operating with faulty limit switches can make the equipment fall violently causing severe personal injury or even loss of life.
- Never remove equipped safety devices or render them out of order by making changes to the equipment.
- Check for oil spills from the hydraulic system. If certain components are damaged, hydraulic oil can spray out under high pressure, causing severe burns and poisoning.
- The cooling system gets very hot during operation. Coming into contact with components containing coolant can result in burns.
- Engine, gear and hydraulic oils get very hot during operation. Touching a component containing such oil can cause burns.
- The power supply must be disconnected before carrying out maintenance or cleaning work (switch off the equipment, stop the engine and disconnect the power supply with the battery main switch!).
- Before leaving the equipment, shut it down and prevent it from being started by unauthorized personnel.

2.4 PROTECTIVE EQUIPMENT

2.4.1 EMERGENCY STOP

In case of emergency!

Press the Emergency STOP button (1)!
All equipment functions will promptly come to a stop.

To re-start, pull the depressed Emergency STOP button.



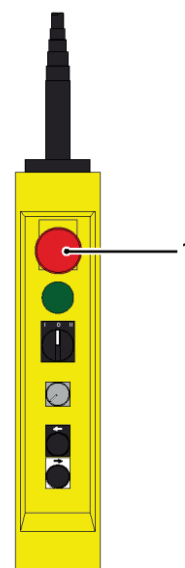
2.4.2 Emergency STOP on the Remote Control for the Cutter Wheels

Pressing the Emergency STOP button (1) on the remote control will promptly stop the rotation of the cutter wheels.

The green indicator light will also illuminate to indicate that the cutter cannot be restarted from the remote control or from the base machine.

- To restart the cutter wheels from the remote control, the depressed Emergency STOP button must be released and one of the cutter wheels (I or II) must be selected.

To restart the cutter wheels from the operator's cab, the depressed Emergency STOP button must be released, the selector switch set to "0" and the "Cutting Mode" selected on the control panel.



2.4.3 "Pilot Control" Safety Stick



CAUTION




Danger of accident!

Danger of accident due to uncontrolled movements of the equipment.

- Move the safety stick to the "OFF" position before leaving the cab.

Initial situation:

- Before leaving the cab
- Move the safety stick to the "OFF" position.
- ✓ All hydraulic functions of the equipment are shut down.

"Pilot control" safety stick	Position	Process
		<ul style="list-style-type: none"> • Move the safety stick forwards. ✓ Pilot control is "ON" ✓ All hydraulic functions are operational.
		<ul style="list-style-type: none"> • Move the safety stick backwards. ✓ Pilot control is "OFF" ✓ All hydraulic functions are deactivated.

Move the "pilot control" safety stick to the "ON" position prior to restarting work.

2.4.4 Emergency Exit

WARNING!



Risk of injury!

Risk of injuries due to flying glass shards.

- Protect eyes and limbs against shards of broken glass before using the emergency hammer.

The position of the emergency hammer is shown in the illustration.

Prerequisite:

- Equipment operator trapped in cab.
- Strike the edge of the window using the emergency hammer.
- Leave the cab.



2.4.5 Fire Extinguisher

The machine is provided with **one** fire extinguisher (engine power < 200 kW) or **two** fire extinguishers (engine power > 200 kW).

Their location in or on the machine is identified with a decal (see fig.).

Operating personnel must read the operating instructions on the fire extinguisher(s) at regular intervals so that they are familiar with its/their proper use.



2.4.6 First Aid Box

The first aid box is located in the operator's cab. Its location is identified with a decal (see fig.).



2.4.7 Fall Protection Equipment

WARNING!

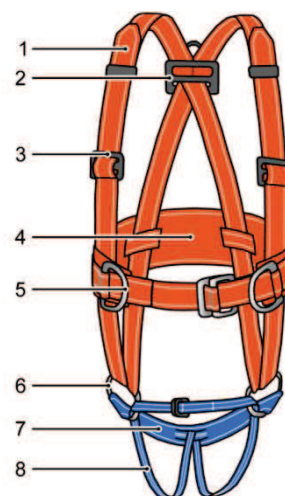


Risk of falling!

If persons working on elevated components are not properly secured, they may fall and suffer severe or fatal injuries.

- Personnel working on elevated components must use the fall protection equipment specified in the instruction manual and/or be appropriately secured.

- 1 Shoulder straps, orange-red
- 2 Ring for attaching a lifeline
- 3 Buckles for adjusting the shoulder straps
- 4 Waist belt with wide support for the back
- 5 D-rings for attaching to fall protection rails
- 6 Rings for attaching a seat support
- 7 Seat support, blue
- 8 Leg straps, blue



How to don

Slip on the orange-red shoulder straps like a jacket, with the lifeline ring to the back. Pull the free end of the waist belt through the twin-buckle at the other end and return through the inner buckle.

Step into the loose hanging leg straps, pull them through the crotch and through the corresponding rings and secure using the twin-buckle, like with the waist belt. The seat support must be in position under the buttocks.

How to use

The safety harness (DIN 7478 sec. A) may only be used in conjunction with a lifeline (DIN 7471) together with a fall-damping device. The harness including all accessories must be checked for proper working order before being put to use. Never use damaged equipment. Connection points must be secure and located above the standing position. The possible fall height must be kept at a minimum using rope shorteners. Never work with a slack rope. Ensure that the lifeline is positioned properly in the ring (2) and in the connection point at all times.

2.4.8 Hoist Limitation

The system is equipped with hoist limiters (hoist limit switches). These are installed on the boom head. One is linked to the cutter rope and the other two are each linked to a hose tension winch rope.

- The hoist limiter is actuated when a rope has been lifted to the maximum permissible height, i.e. when the limit switch is contacted by the rope thimble.
- When a hoist limiter is activated, one of the following messages will appear on the display:

- **"Hoist limit switch on boom head is active"**

The following functions are blocked:

- "Lifting" of the cutter winch.
- "Lowering" of the boom.

- **"Hoist limit switch on mud hose is active"**

The following functions are blocked:

In manual mode:

- "Lifting" of the left hose tension winch.

In automatic mode:

- "Lifting" of the cutter winch.
- "Lowering" of the boom.

- **"Hoist limit switch on hydraulic hose is active"**

The following functions are blocked:

In manual mode:

- "Lifting" of the left hose tension winch.

In automatic mode:

- "Lifting" of the cutter winch.
- "Lowering" of the boom.

2.4.9 Monitoring Oil Pressure of the Hose Tension Winches

The spooling gears for the two hose tension winches are equipped with safety brakes.

These brakes will release (disengage) when a specific hydraulic oil pressure is reached. If the oil pressure is not sufficient to release the brakes, a warning buzzer will sound and the following message will appear on the display:

Brake pressure of is too low

At the same time, the "Auto HTS" function – and all of the functions linked with it – are switched off automatically.

The cause of the lack in hydraulic pressure must now be traced and corrected. Work cannot be resumed until after the fault has been corrected.

Feed pressure control

A pressure switch is installed for controlling the feed pressure:

In case the feed oil pressure drops below a specific value, a warning buzzer will sound and the monitor will display the following message:

Feed pressure of is too low

At the same time, the "Auto HTS" function – and all of the functions linked with it – are switched off automatically.

The cause of the lack in hydraulic pressure must now be traced and corrected. Work cannot be resumed until after the fault has been corrected.

The two hose tension winches must be provided with a certain amount of hydraulic pressure to be able to lift the hose wheels.

The precise amount of hydraulic pressure depends on the cutting depth; it is factory set by BAUER in conformance with the user's requirements.

The equipped safety switch continually checks the operating pressure on the two hose tension winches while they are used in automatic mode:

As soon as the operating pressure drops below the preset value, the safety switch will promptly turn off the automatic mode. The functions of the cutter winch and the cutter cylinder will be blocked as well.

At the same time, a warning buzzer will sound and the monitor will display the following warning message:

Load holding pressure of ... is too low



CAUTION!

Immediately stop operation and correct the fault!

2.4.10 Measuring the Pulling Force of Hose Tension Winches

The pulling force measuring unit is built into the winch. The measuring unit has the following functions:

- To prevent excessive load on the boom head (overload protection).
- To prevent excessive load on one side of the boom head (torsion protection).
- To prevent actuation of the automatic winch mechanism while hoses are not sufficiently tensioned (mode release protection).

How the measuring unit works:

The pulling force on the ropes is measured continuously at both winches. The measuring units are built into the two hose tension winches.

The current pulling force measured for the two hose tension winches can be read under the "HTS Information" menu item on the B-Tronic screen.

2.4.10.1 Protection Against Excessive Load on One Side of the Boom Head

To protect the boom head against an excessive load on one side, the pulling force of the two hose tension winches must be almost equal.

The permitted deviation is preset by BAUER and cannot be adjusted by the user.

As soon as the preset value is exceeded, the winch currently being operated will be stopped from lifting or lowering.

This can happen in both the manual and automatic operating modes.

If this has occurred, operation can be resumed by performing the following steps:

- "Lift" the winch on which the pulling force is the lowest, or
- "Lower" the winch on which the pulling force is the highest.

2.4.10.2 Overload Protection

Also installed is an overload protection device, which governs the maximum permissible pulling force of the hose tension winches.

As soon as the maximum value is reached, the overload protection stops the automatic crowd, and one of the following two messages appears on the screen:

Hydraulic hose overload

or

Mud hose overload

The stop can be overcome:

- automatically, if the automatic control mode of the winches is activated; after a short pause operation can be resumed.
- by "lifting" the cutter winch.
- by "lowering" the overloaded hose tension winch.

2.4.11 Feed Pressure Monitoring of the Cutter Winch

The feed pressure on the cutter winch is monitored by a control element.

In case the feed oil pressure drops below a specific value, a warning buzzer will sound and the monitor will display the following message:

Control drive pressure is too low

At the same time, the "Auto HTS" function – and all of the functions linked with it – are switched off automatically.

The cause of the lack in hydraulic pressure must now be traced and corrected. Work cannot be resumed until after the fault has been corrected.

2.4.12 Automatic Rope Tensioning Facility

This shut down mechanism prevents the cutter winch from unwinding too much rope, thereby ensuring the rope remains taut while the cutter is being lowered.

This shut down mechanism is preset by BAUER and cannot be adjusted by the user.

If the automatic rope tensioning facility is activated, the following message will appear on the screen:

**Automatic rope tensioning facility
is active**

Lift the cutter unit and the message will disappear.

2.5 STABILITY

WARNING!

Danger of equipment tipping over!

If there is insufficient stability the equipment can tilt and fall over. Persons in the vicinity of the equipment can be seriously or fatally injured as a result.

The following operating conditions must be observed to guarantee the stability of the equipment:



- Firm and even working platform;
Observe national standards and guidelines regarding ground and working platform conditions!
- Fully mounted counterweight!
- Surface with sufficient load-bearing capacity!
- Observe upper carriage speed
- No abrupt movements!
- Lower movable loads as close to the ground as possible!
- Ensure the route is free of obstacles!
- Apply the swing brake before moving!
- Avoid slants. Adapt the travel practice!
- Traversing across upward / downward slopes is prohibited!
- Driving and pivoting the machine at the same time is prohibited!
- The inertia of the cutter must be taken into account when starting, braking and pivoting!
- Bending of the boom when the cutter is lifted extends the operating radius. Take this into account when traveling and during operation. If necessary, the actual operating radius will need to be measured!

2.5.1 Additional Specific Stability Guidelines

WARNING!



Danger of equipment tipping over!

If the specific guidelines are not observed in operation mode, the equipment can tilt or topple over.

- Swing brake is activated during operation and when traveling.
- The inertia of the cutter must be taken into account when starting, braking and pivoting.

0266



NOTE

Stability information is calculated in compliance with DIN EN 996.

2.5.2 Validity

Stability has been calculated for the BC system # **0105**.

The BC system consists of the following components:

Base machine

BS 6100	Serial number:	# 6.150
	Counterweight [t]:	10.2 + 6.6 + 7.2 + 8
	Floor plates [mm]:	1000

Process equipment

BC 40	Serial number:	# 0266
	Working width [mm]:	1200
	Working length [mm]:	2800
	Weight [t]:	36.6
HTS 60	Serial number:	# 0124
	Maximum working depth [m]:	60

2.5.3 Prescribed Limit Values for Loads, Angles and Operating Radius

WARNING!



Danger of equipment tipping over!

If there is insufficient stability, the equipment can tilt and fall over. Persons in the vicinity of the equipment can be seriously or fatally injured as a result.

Mount the "Lateral inclination retrofit kit".

Do not exceed prescribed limit values for loads, angles, and operating radii.

WARNING!



Danger of equipment tipping over!

The boom may bend when the cutter is lifted, so that the maximum permissible operating radius is exceeded. The equipment can tip and fall over. Persons in the vicinity of the equipment can be seriously or fatally injured as a result.

Check the operating radius before each operation.

Working radius "r" [mm] 5980 to 7200

Boom angle [°] 80 to 77

Permissible working
platform inclination
during

operation/recovery [°]:

Upper carriage speed v_1
[rpm]:



NOTE

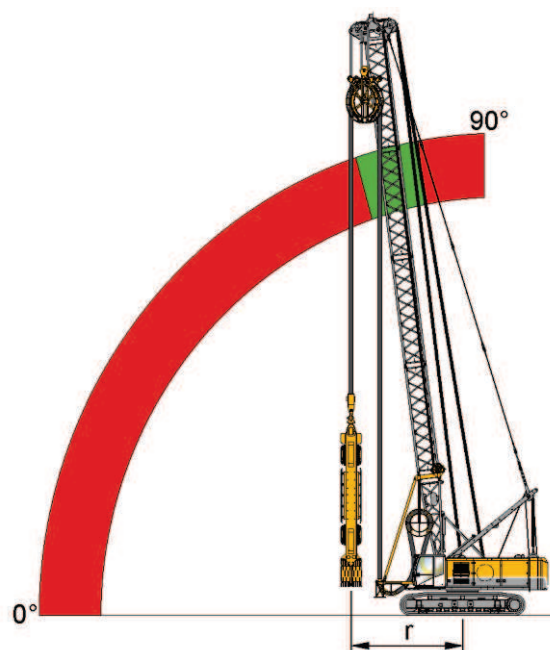
The boom angle is always calculated on the basis of the difference between the boom and the horizontal.



Impermissible boom angle



Permissible boom angle



2.5.4 Operation with 916 mm Working Width and 60 m Cutting Depth

2.5.4.1 Load Case for Cutting

Calculated lifting load* [t]	Permissible operating radius [mm]		Permissible boom inclination [°]	
43.0	Maximum:	7200	Maximum:	77.7
	Minimum:	5980	Minimum:	80.0

2.5.4.2 Load Case for Recovery

Calculated recovery load* [t]	Permissible operating radius [mm]		Permissible boom inclination [°]	
70.2	Maximum:	6200	Maximum:	79.6
	Minimum:	5980	Minimum:	80.0

2.5.4.3 Ground Pressure

Definition:



Upper carriage crosswise to the undercarriage



Upper carriage in line with the undercarriage

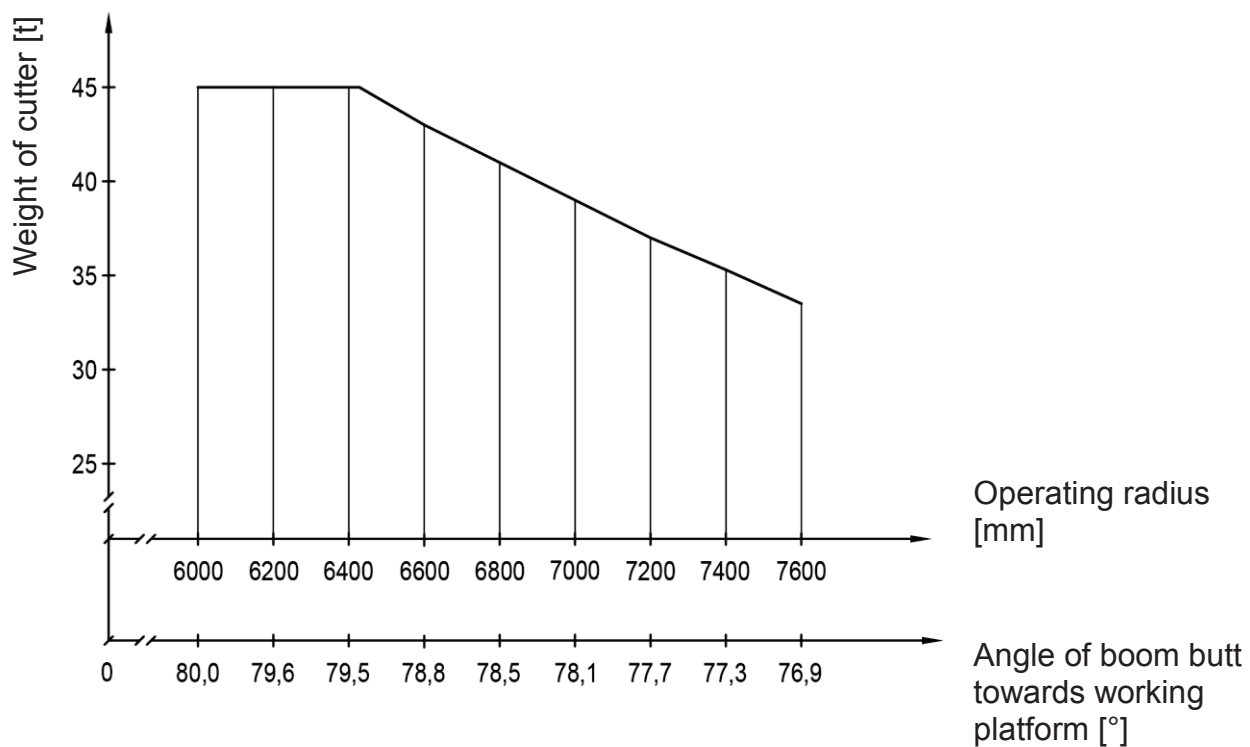
Load case: Cutter suspended above trench

	Ground pressure [kPa]
Upper carriage crosswise to the undercarriage	216
Upper carriage in line with the undercarriage	328
Maximum ground pressure	386

Load case: Recovery

	Ground pressure [kPa]
Upper carriage crosswise to the undercarriage	286
Upper carriage in line with the undercarriage	529
Maximum ground pressure	616

2.5.4.4 Load Capacity Table



2.5.5 Traveling with Process Equipment



CAUTION

Risk of causing damage to components!

When moving the equipment, particularly when traveling on slopes/inclines, components of the equipment can collide with the ground and be damaged as a result.

- Always observe and comply with the prescribed conditions and the associated figures for moving the equipment.

Permitted configuration for correct movement

- Cutter # 0330
- Working width 916 mm
- Working width 2800 mm
- HTS # 0062
- BS 6100 # 6.150
- 32 t counterweights

The following conditions apply to the correct movement of this equipment with process equipment:

- The upper carriage is positioned parallel to the undercarriage.
- The swing brake is activated.
- Maximum operating radius/maximum boom angle is set.
- Process equipment and movable loads are lowered as far as possible.

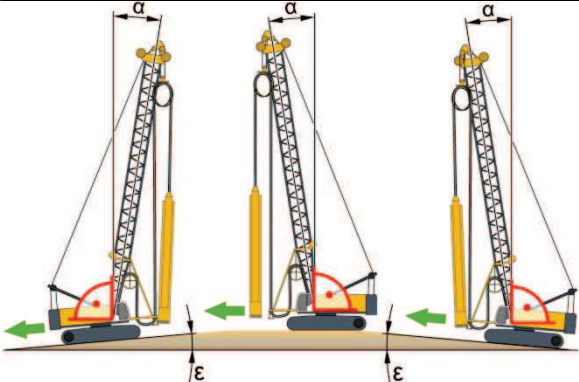
WARNING!



Danger of accident!

If the equipment is used to travel on slopes/inclines and the operating radius is not adjusted in accordance with the particular inclination, the boom can tip backwards. The process equipment can then collide with the cab. Personnel could be hit as a result and suffer severe or fatal injuries.

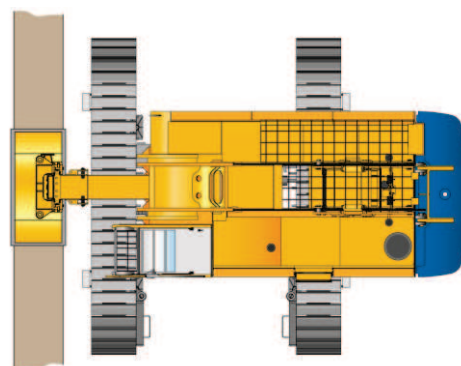
- Check the operating radius when traveling on slopes/inclines and readjust it if the angle indicator on the boom no longer displays the value of the maximum operating radius.

Permissible working platform inclination (ϵ)	Figure
<p>Maximum 5° (α = maximum boom inclination)</p>	

2.5.5.1 Traveling between the Trenches

The following conditions apply to the correct movement of this equipment with process equipment:

- The equipment must always be accompanied by a person giving directions when traveling.
- Activate the swing brake. Driving and pivoting the machine at the same time is prohibited.
- Check the ground has sufficient load-bearing capacity.
- Lower process equipment as far as possible.
- Travel slowly and avoid swinging the process equipment.
- Drive parallel to the trench, as illustrated.
- No abrupt movements.
- Avoid slants.



2.6 PERMISSIBLE WIND SPEED

WARNING!

Danger of equipment tipping over!

The equipment can tilt and fall over during storms with high wind speeds. Persons in the vicinity of the equipment can be seriously or fatally injured as a result.



- Observe the local weather conditions, especially the wind speed (dynamic pressure) with a suitable device (e.g. wind anemometer, wind direction indicator, meteorological office).
- Please observe the instructions in the section "Maximum permissible wind speeds".
- Persons in the vicinity of the equipment must leave the danger zone immediately.

WARNING!

Danger of accident!

Lightning strikes can result in serious injury or death.



- Do not leave the cab if there is an imminent risk of a lightning strike.
- Persons in the vicinity of the equipment must leave the danger zone immediately.
- Following an electric shock to the equipment, check that the equipment's electrical and electronic system is intact and in proper working order.

Table of wind forces

Beaufort	Designation	Wind speed			Effect of the wind
		km/h	m/s	mph	
0	Calm	< 1	< 0.2	< 0.6	Smoke rises vertically; sea is glassy smooth
1	Light air	1 - 5	0.3 - 1.5	0.6 - 3.1	Smoke moves, but flag is motionless; small ripples on the water
2	Light breeze	6 - 11	1.6 - 3.3	3.7 - 6.8	Wind felt on face, leaves move; small waves on the water
3	Gentle breeze	12 - 19	3.4 - 5.4	7.5 - 11.8	Leaves and thin branches move; flag extends
4	Moderate breeze	20 - 28	5.5 - 7.9	12.4 - 17.4	Dust and loose paper are blown around; branches move; small, but fairly long waves
5	Fresh breeze	29 - 38	8.0 - 10.7	18.0 - 23.6	Small trees start to sway; white crests on the water
6	Strong breeze	39 - 49	10.8 - 13.8	24.2 - 30.5	Strong branches sway; cables whistle; umbrellas are difficult to hold; rough sea with some spray
7	Near gale	50 - 61	13.9 - 17.1	31.1 - 37.9	Entire trees moving; difficult to walk against the wind; sea heaving and water foams
8	Gale	62 - 74	17.2 - 20.7	38.5 - 46.0	Branches break; significant difficulty with walking outdoors; moderately high waves; spray blows off
9	Strong gale	75 - 88	20.8 - 24.4	46.6 - 54.7	Some structural damage (roof tiles are thrown down); high waves
10	Storm	89 - 102	24.5 - 28.4	55.3 - 63.4	Trees are uprooted; significant structural damage; very high waves
11	Violent storm	103 - 117	28.5 - 32.6	64 - 72.7	Strong gusts; severe storm damage; roofs are taken off; extremely high waves
12	Hurricane	118 - 133	32.7 - 36.9	73.3 - 82.6	Very severe storm damage and devastation; sea completely white; air filled with foam and spray

2.6.1 Maximum Permissible Wind Speeds

Unpredictable wind speeds

Unpredictable wind speeds are wind speeds that occur abruptly and without warning.

WARNING!




Danger of equipment tipping over!

Unpredictable wind speeds that exceed the "permissible wind speed for operation" can cause the equipment to tilt and fall over. Persons in the vicinity of the equipment can be seriously or fatally injured as a result.

- All persons must leave the danger zone without delay.

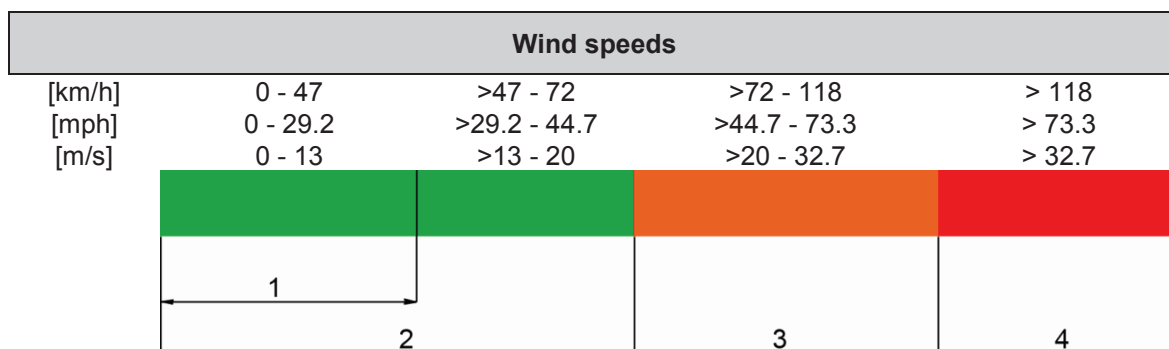
Wind speeds

[km/h]	0 - 47	>47 - 72	> 72
[mph]	0 - 29.2	>29.2 - 44.7	> 44.7
[m/s]	0 - 13	>13 - 20	> 20



1	Permissible wind speeds for rigging mode: The equipment may be rigged or derigged in the event of wind speeds within range (1).
2	Permissible wind speeds for operation: The equipment may be operated in wind speeds within range (2).
3	Wind speed above which the equipment may no longer be operated: The equipment may no longer be operated in wind speeds within range (3). All persons must leave the danger zone without delay.

Predictable wind speeds

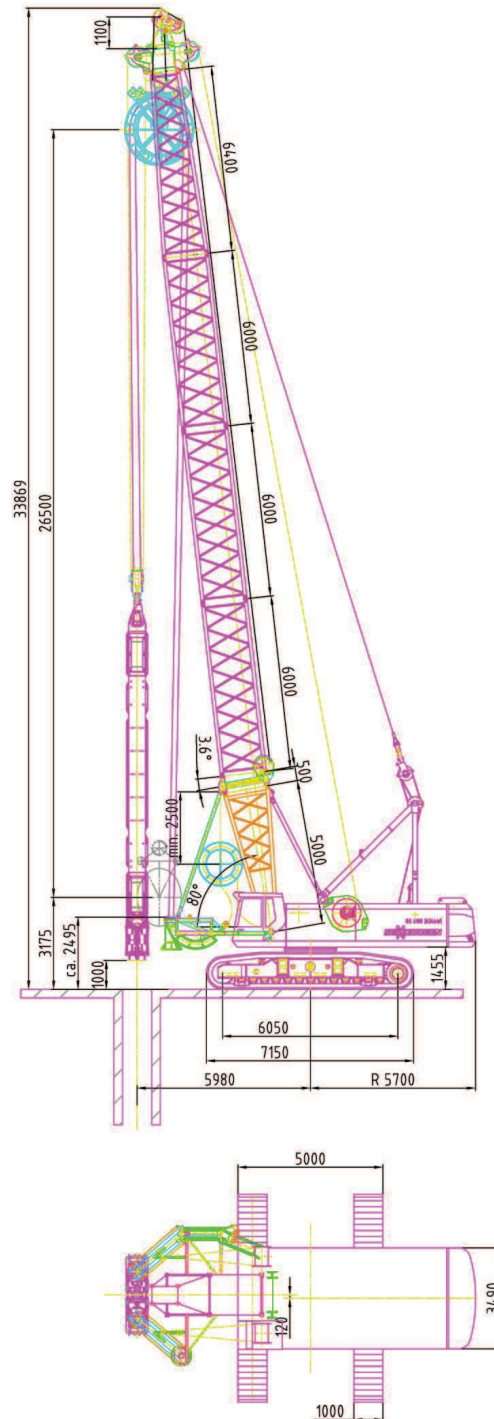


1	Permissible wind speeds for rigging mode: The equipment may be rigged or derigged in the event of wind speeds within range (1).
2	Permissible wind speeds for operation: The equipment may be operated in wind speeds within range (2).
3	Wind speed above which the equipment may no longer be operated: The equipment may no longer be operated at wind speeds within range (3) and it should have already been shut down at wind speeds within range (2). Further information can be found in the section "Daily shut-down".
4	Wind speed above which the equipment must be derigged: At wind speeds within range (4), the equipment must have already been derigged. Rigging work may only be carried out at wind speeds within range (1). Further information can be found in the section "Shutting down due to high wind speeds".

3 TECHNICAL DATA

3.1 DIMENSIONS

Dimensions in [mm]



Total weight [t]	Process equipment/tool	Characteristics
148.1	HTS 52 with BC 40	Cutting depth 52 m

3.2 EQUIPMENT SPECIFICATIONS

Base machine

Upper carriage

Type	BS 6100
Serial number	# 6.150

Cutter winch

Type	4.27 10406
Serial number	102
Pulling force (1st layer)	160 kN
Rope diameter	26 mm
Rope length	400 m

Hose tension winch

Type	4.22 10067
Serial number	130/131
Pulling force (1st layer)	65 kN
Rope diameter	22 mm
Rope length	105 m

Cutter

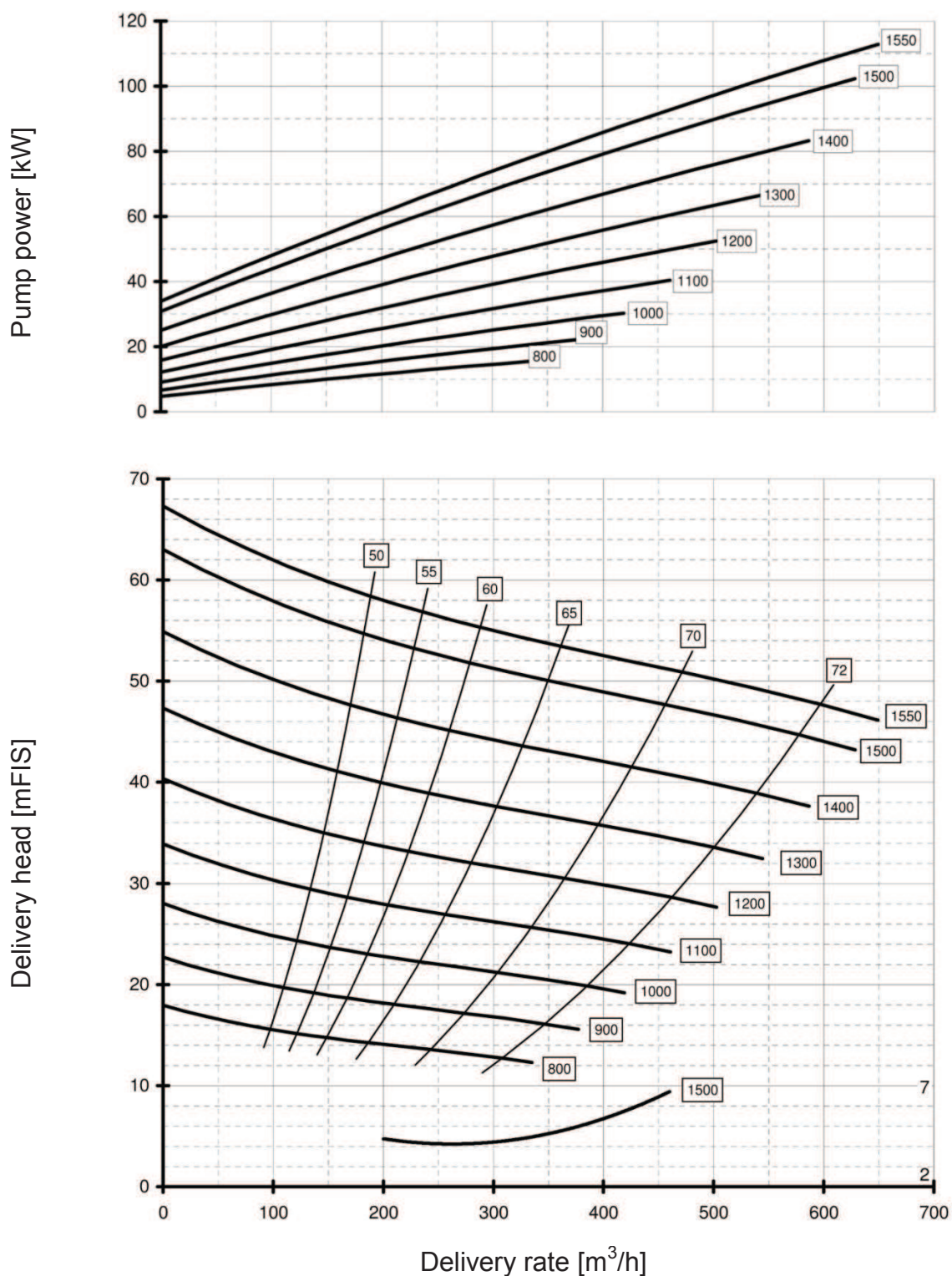
Trench width	1200 mm
Trench length	2800 mm
Cutter wheel speed	0 – 25 rpm
Cutter wheel torque	2 x 100 KNm

Mud pump

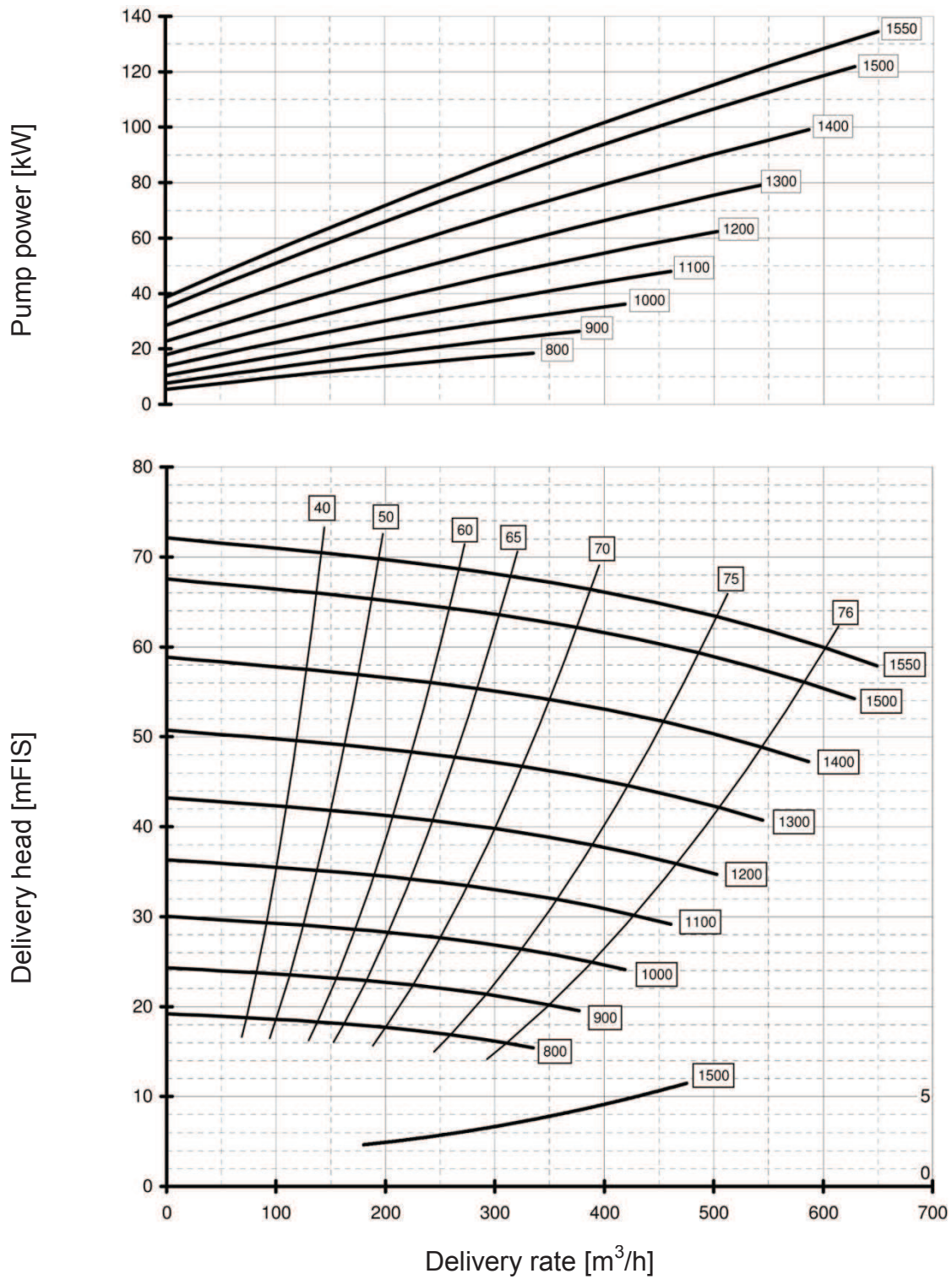
Type	6"
Power consumption	82 kW
Performance diagrams	(see following page)

3.3 MUD PUMP CHARACTERISTICS

3.3.1 Pump with Two-Stage Impeller



3.3.2 Pump with Three-Stage Impeller (optional)



3.4 ROPE SPECIFICATIONS

WARNING!



Danger of accident!

Rope breakages can cause serious accidents.

- Ropes installed in hoist winches must have a minimum breaking load which is at least 3 times the pulling force of the winch.
- The safety factors of the ropes must comply with the standards required for the equipment and must be observed.

3.4.1 Cutter Rope

Technical data:

Finished length	400 m
Diameter	26 mm

3.4.2 Hose Tension Ropes

Technical data:

Finished length	105 m
Diameter	22 mm

3.4.3 Recovery Ropes

Technical data:

Finished length	62 m
Diameter	22 mm

3.5 NOISE EMISSIONS

Acoustic emissions have been determined according to directive 2000/14/EC

Guaranteed sound pressure level L_{pA} (in the cab) 74.7 dB(A)

3.6 VIBRATION ACCELERATION

The operator's exposure to vibration acceleration during operation with this equipment is less than 0.5 m/s^2 .

3.7 PERMISSIBLE AMBIENT TEMPERATURE



CAUTION

Risk of causing damage to components!

If operated outside the specified temperature ranges, there is a risk of causing damage to the components.

- For use at temperatures outside the specified ranges, the manufacturer must be consulted.



CAUTION

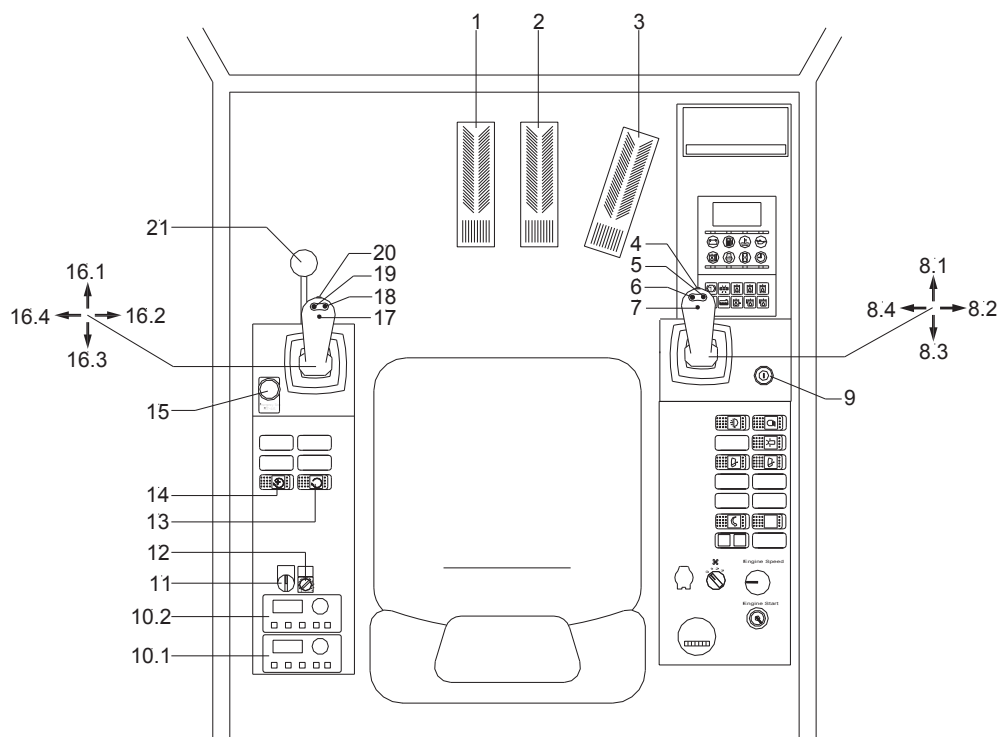
Risk of causing damage to components!

In the event of a brief interruption and/or prolonged periods where external temperatures reach -10 °C (14 °F) or below, liquid media that is used for producing a product (such as water and suspension) can freeze. The supply lines that are used to convey liquid media can become blocked and damaged as a result.

- Stop operation during prolonged external temperatures of -10 °C (14 °F) or below, or implement suitable measures to prevent liquid media (such as water and suspension) from freezing.
- At external temperatures below 0 °C (32 °F), the flow of liquid media in supply lines should be maintained (a stop of the flow should be avoided); if necessary, thoroughly clean and empty supply lines so they are free of foreign particles.

Operating conditions	Permissible temperature range
Normal operation with standard equipment	-20 °C (-4 °F) to +40 °C (+104 °F)
Normal operation with cooling package	to -25 °C (-13 °F)
During storage	-40 °C (-40 °F) to +40 °C (+104 °F)

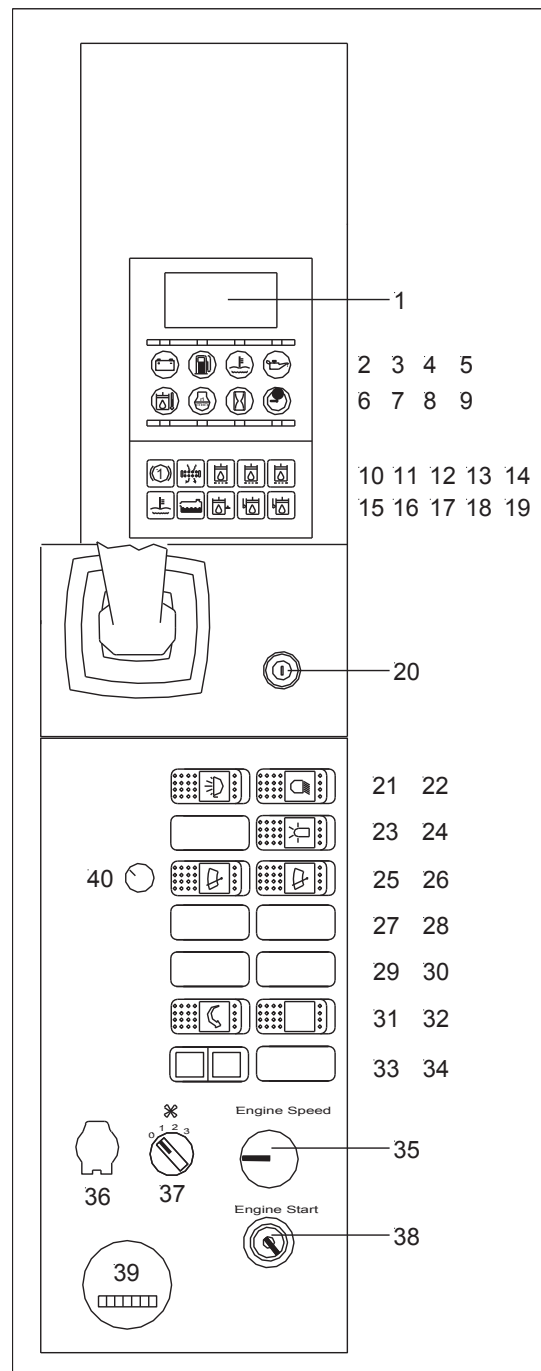
4.1 CAB



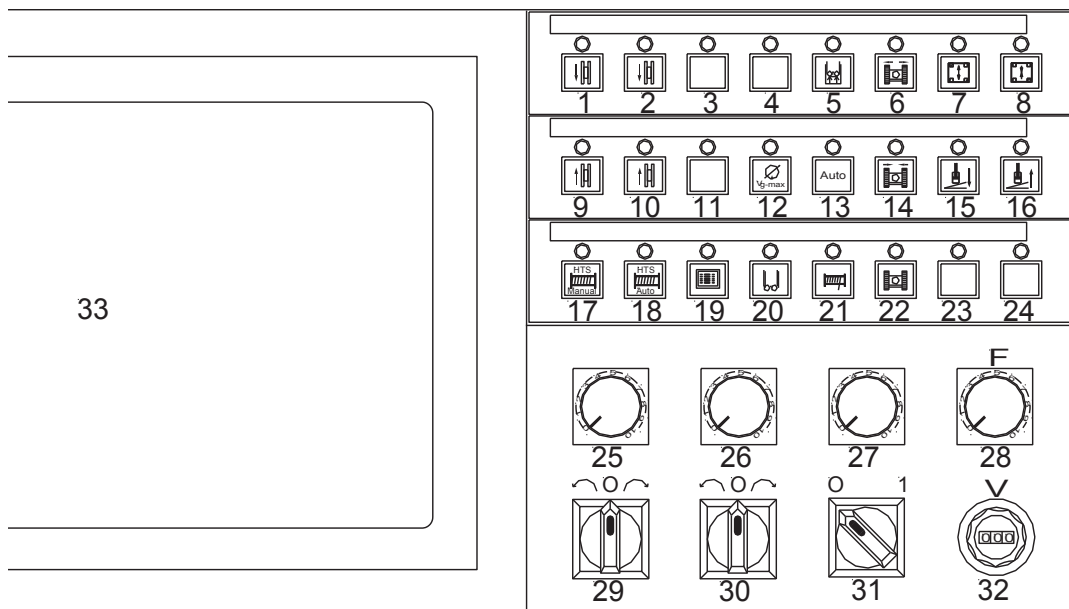
- | | | | |
|------|--|------|--------------------------------------|
| 1 | Operate left crawler | 11 | - |
| 2 | Operate right crawler | 12 | - |
| 3 | - | 13 | - |
| 4 | "Rig" bypass button | 14 | - |
| 5 | Activate horn | 15 | Emergency STOP |
| 6 | - | 16.1 | - |
| 7 | - | 16.2 | Turn the upper carriage clockwise |
| 8.1 | Manual mode: Unwind wire rope of cutter winch | 16.3 | - |
| 8.2 | Lower boom | 16.4 | Turn upper carriage counterclockwise |
| 8.3 | Manual mode: Wind in wire rope of cutter winch | 17 | - |
| 8.4 | Raise boom | 18 | Deactivate swing brake |
| 9 | Switch load torque limiter on/off | 19 | Activate swing brake |
| 10.1 | Auxiliary heating operating element - engine compartment | 20 | "Rig" bypass button |
| 10.2 | Auxiliary heating operating element - cab | 21 | "Pilot control" safety stick |

4.2 CONTROL PANEL - BASE MACHINE

- 1 Diagnostics screen
- 2 Display battery voltage
- 3 Display diesel tank fill level
- 4 Display coolant temperature
- 5 Display engine oil pressure
- 6 Display hydraulic oil temperature
- 7 Display engine speed
- 8 Display engine hours
- 9 Display time
- 10 Display: Swing brake activated
- 11 Warning: Air filter contaminated
- 12 Warning: Hydraulic oil filter contaminated
- 13 Warning: Hydraulic oil filter contaminated
- 14 Warning: Hydraulic oil filter contaminated
- 15 Warning: Cooling liquid temperature too high
- 16 Warning: Coolant level too low
- 17 Display: Valve on hydraulic tank closed
- 18 Warning: Hydraulic oil level too low
- 19 -
- 20 Switch load torque limiter on/off
- 21 Switch headlights on/off
- 22 Switch rear light on/off
- 23 -
- 24 Signaling device: Switch rotating beacon light on/off
- 25 Wipers
- 26 Wipers
- 27 -
- 28 -
- 29 -
- 30 -
- 31 Switch automatic speed reset on/off
- 32 Load limit control manual/automatic
- 33 Warning: Engine diagnostics
- 34 -
- 35 Diesel engine speed adjustment
- 36 Electric socket
- 37 Cab ventilation: Adjust power level
- 38 Switch ignition on/off
- 39 Hour counter
- 40 Adjust wiper interval



4.3 CONTROL PANEL - CUTTER



- | | | | |
|----|---|----|--|
| 1 | Manual mode: Unwind the wire rope of the hose tension winch "mud hose" | 18 | Preselection: HTS automatic mode |
| 2 | Manual mode: Unwind the wire rope of the hose tension winch "hydraulic hose" | 19 | Switch B-Tronic on/off |
| 3 | - | 20 | Preselection: Cutting mode |
| 4 | - | 21 | Preselection: Winch mode |
| 5 | Lift cutter | 22 | Preselection: Travel mode |
| 6 | Undercarriage: Extend telescoping cylinders | 23 | Not used |
| 7 | Clamp guide frame | 24 | Not used |
| 8 | Release guide frame | 25 | Left cutter wheel: Adjust speed |
| 9 | Manual mode: Wind in the wire rope of the hose tension winch "mud hose" | 26 | Right cutter wheel: Adjust speed |
| 10 | Manual mode: Wind in the wire rope of the hose tension winch "hydraulic hose" | 27 | Mud pump: Adjust speed |
| 11 | - | 28 | Adjust imposed load |
| 12 | Activate maximum torque of the cutter gear | 29 | Left cutter wheel: Adjust direction of rotation |
| 13 | Preselection: Automatic mode | 30 | Right cutter wheel: Adjust direction of rotation |
| 14 | Undercarriage: Retract telescoping cylinders | 31 | Switch mud pump on/off |
| 15 | Lift A-frame | 32 | Crowd automatic mode: Adjust crowd speed |
| 16 | Lower A-frame | 33 | B-Tronic screen |
| 17 | Preselection: HTS manual mode | | |

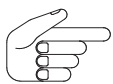
4.4 REMOTE CONTROL - CUTTING

- 1 Emergency STOP for cutter wheels
- 2 Indicator light: Emergency STOP activated
- 3 Preselection:
left cutter wheel (I) / (0) / right cutter wheel (II)
- 4 Adjust speed of selected cutter wheel
- 5 Turn selected cutter wheel counterclockwise
- 6 Turn selected cutter wheel clockwise



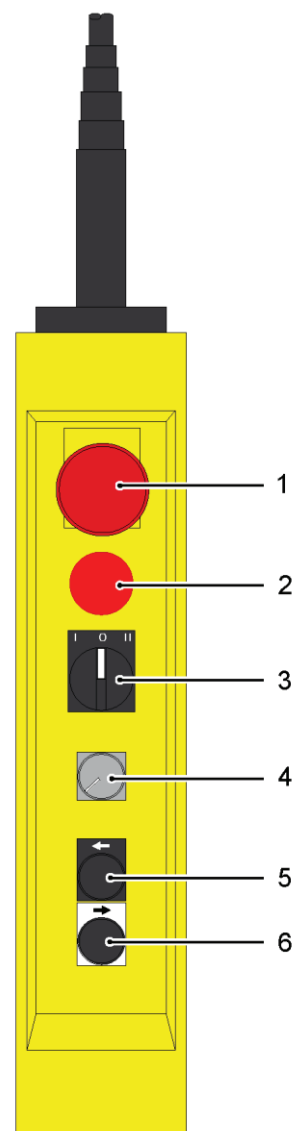
NOTE

Operation of the cutter is only possible if the remote control is plugged into the designated slot. The position of this slot is described in detail in the section "Rigging/derigging".



NOTE

The selection switch (3) on the remote control must be turned to position "0" if the cutter wheels are to be controlled from the cab with the remote control connected.



5 OPERATION

5.1 TRAVELING

5.1.1 Selecting the Travel Mode

The "Travel" function is automatically preselected when the equipment is started.

For units with cutter equipment, the "Travel" or "Cutting" mode must be selected before starting any operation.

To select **"Travel"** mode:

- Press the  button.
The indicator light illuminates.

To select **"Cutting"** mode:

- Press the  button.
The indicator light illuminates.

5.1.2 Traveling with Process Equipment

Prerequisite:

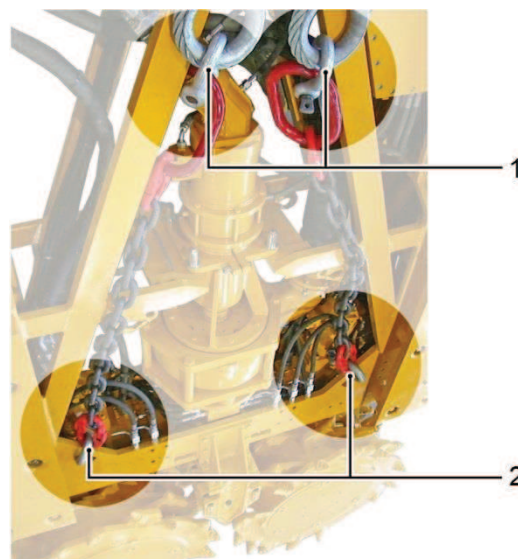
- The equipment is fully assembled.
- The equipment is ready for operation.
- The cutter is connected to the lower fix point.



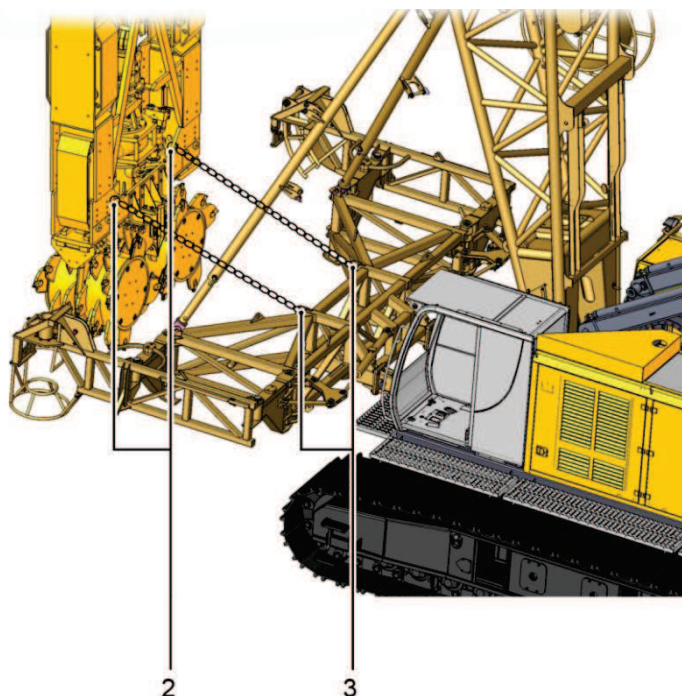
Two chains of the spreader can be used to connect the cutter.

NOTE

- Open the shackles (1) and remove the chain from the thimble of the spreader.
- Attach the two chains with shackles to the lower lifting points of the cutter (2).
- Move the cutter to the minimum permissible operating radius by lifting the boom.



- Use shackles to connect each free end of the chain to the corresponding lifting point (3) on the lower fix point.
- Lower the boom to its max. permissible operating radius.
- ✓ The two chains are tensioned.
- ✓ The cutter is suspended in the direction of the base machine.
- ✓ The equipment is ready to travel!



CAUTION!

Danger of equipment tipping over!

Incorrect operation can cause the equipment to topple over when traveling!

- All instructions in the "Stability" section must be observed.



NOTE

For information on traveling with the base machine, please refer to the base machine instruction manual.

5.2 OPERATING THE CUTTER



Risk of causing damage to the equipment!

Hoist limit switches are shut down in the rigging mode!
Take great care when operating winches.





Danger of falling stones!

Clean the cutter and hose belts every time they are withdrawn from the trench.

5.2.1 Switching the Cutting Mode On/Off

The cutting mode must be preselected before cutting can commence.

Button	Process
 20	<ul style="list-style-type: none"> Press button (20). ✓ LED of button (20) lights up green and the cutting mode is switched on.
 20	<ul style="list-style-type: none"> Press button (20). ✓ LED of button (20) does not light up green and the cutting mode is switched off.

5.2.2 Lowering and Lifting the Cutter Manually

The cutter can be lowered and lifted manually using the control lever.

Cutting operation is only permitted in the crowd automatic mode.

5.2.2.1 Winch Mode

In winch mode, cutter winch 1 is selected and the rope is wound onto/unwound from cutter winch 1 when the cutter is lowered/lifted.

Variant 1

Prerequisite:






- HTS automatic mode  is active:

Table: Joystick

Button	Control lever right		Process
 21		-	<ul style="list-style-type: none"> Press button (21) and move the right control lever forwards. <ul style="list-style-type: none"> ✓ LED of button (21) lights up green. ✓ The cutter and hose wheels of the mud hose and the hydraulic hose belt are lowered.
 21		-	<ul style="list-style-type: none"> Press button (21) and move the right control lever backwards. <ul style="list-style-type: none"> ✓ LED of button (21) lights up green. ✓ The cutter and hose wheels of the mud hose and the hydraulic hose belt are lifted.

Variant 2

Prerequisite:



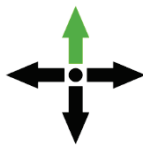


- HTS manual mode  (7.17) is activated.
- The hose wheels must be lifted/lowered parallel to the cutter rope.

Table: Joystick



Button	Control lever, right (10)		Process
 21		+ 4	<ul style="list-style-type: none"> • Press button (21). • Press and hold button (4) on the right control lever. • Move the right control lever (10) forward and manually lower the hose wheels of the mud hose and the hydraulic hose belt. ✓ LED of button (7.21) lights up green. ✓ The cutter and hose wheels of the mud hose and the hydraulic hose belt are lowered.
 21		+ 4	<ul style="list-style-type: none"> • Press button (21). • Press and hold button (4) on the right control lever. • Move the right control lever back and manually lift the hose wheels of the mud hose and the hydraulic hose belt. ✓ LED of button (21) lights up green. ✓ The cutter and hose wheels of the mud hose and the hydraulic hose belt are lifted.

5.2.3. Lowering the Cutter Automatically

The automatic lowering of the cutter ensures a consistent crowd speed.

5.2.3.1 Setting and Function of Knobs

"Imposed load" knob



Knob position	Process
 28	<ul style="list-style-type: none"> Set the knob (28) to "0". ✓ Maximum imposed load is set.
 28	<ul style="list-style-type: none"> Set the knob (28) to "10". ✓ Minimum imposed load is set.



NOTE

The imposed load is the actual weight pressing on the ground to be processed. This results from the force exerted by the weight of the cutter minus the tensile force of the winch.

"Crowd speed" knob

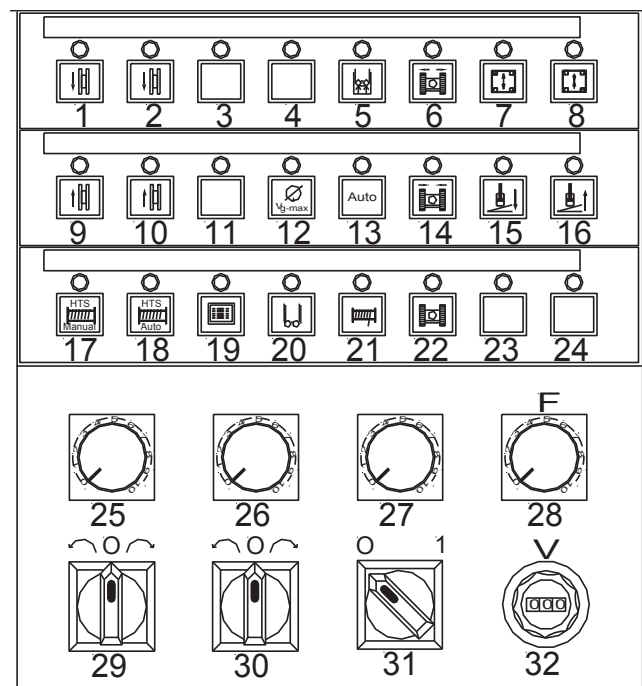
Knob position	Process
 32	<ul style="list-style-type: none"> Set knob (32) to "000". ✓ Crowd speed is switched off.
 32	<ul style="list-style-type: none"> Set the knob (32) to "500". ✓ Maximum crowd speed is set.

5.2.3.2 Activating Crowd Automatic Mode


If the crowd automatic mode is activated, the crowd is controlled via the imposed load and the crowd speed.

Prerequisite:

- Knob (32) is set to "000".
 - The cutter wheels are switched on and the cutter wheel speed is set.
- Press buttons (20) and (18).
 - ✓ LEDs of buttons (20) and (7.18) illuminate green.
 - Press button (13).
 - ✓ LED of button (13) illuminates green and the crowd automatic mode is activated.
 - Set the imposed load (28).
 - Set the crowd speed (32).
 - ✓ The cutter is lowered automatically.



5.2.3.3 Deactivating Crowd Automatic Mode

Button	Process
 13	<ul style="list-style-type: none"> • Press the button for the crowd automatic mode (13). ✓ LED of button (13) does not illuminate and the crowd automatic mode is deactivated.



NOTE

The crowd automatic mode can also be deactivated by pressing button (21) or button (5).

5.2.3.4 Setting Options for Crowd Automatic Mode

In order to reach optimum cutting progress, the crowd automatic mode must be adjusted to current ground conditions.



For special ground conditions, the "Imposed load" knob (28) and the "Crowd speed" knob (32) must be used in combination. The knob (28) can be set to a value between 0 and 10 and the "Crowd speed" knob (32) can be set to a value between 000 and 500.

Example for hard ground:

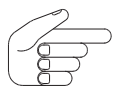


NOTE

When the set imposed load can no longer be maintained, the crowd speed is automatically decreased/increased until the set imposed load is reached again.



Knob position	Process
 32	<ul style="list-style-type: none"> Set the knob (32) to "500". ✓ Maximum crowd speed is set.
 28	<ul style="list-style-type: none"> Set knob (28) to the corresponding imposed load. ✓ The imposed load is set.

Example for soft ground:



NOTE

If the excavation material cannot be conveyed quickly enough, then the crowd speed must be reduced.

Knob position	Process
 32	<ul style="list-style-type: none"> Set the knob (32) to "500". ✓ Maximum crowd speed is set.
 28	<ul style="list-style-type: none"> Set knob (28) to "0". ✓ Maximum imposed load is set.

5.2.4 Adjusting the Imposed Load

Take the following steps to make sure that the potentiometer adjusts the imposed load correctly for operation in automatic crowd mode.

- Lower the cutter into the trench.

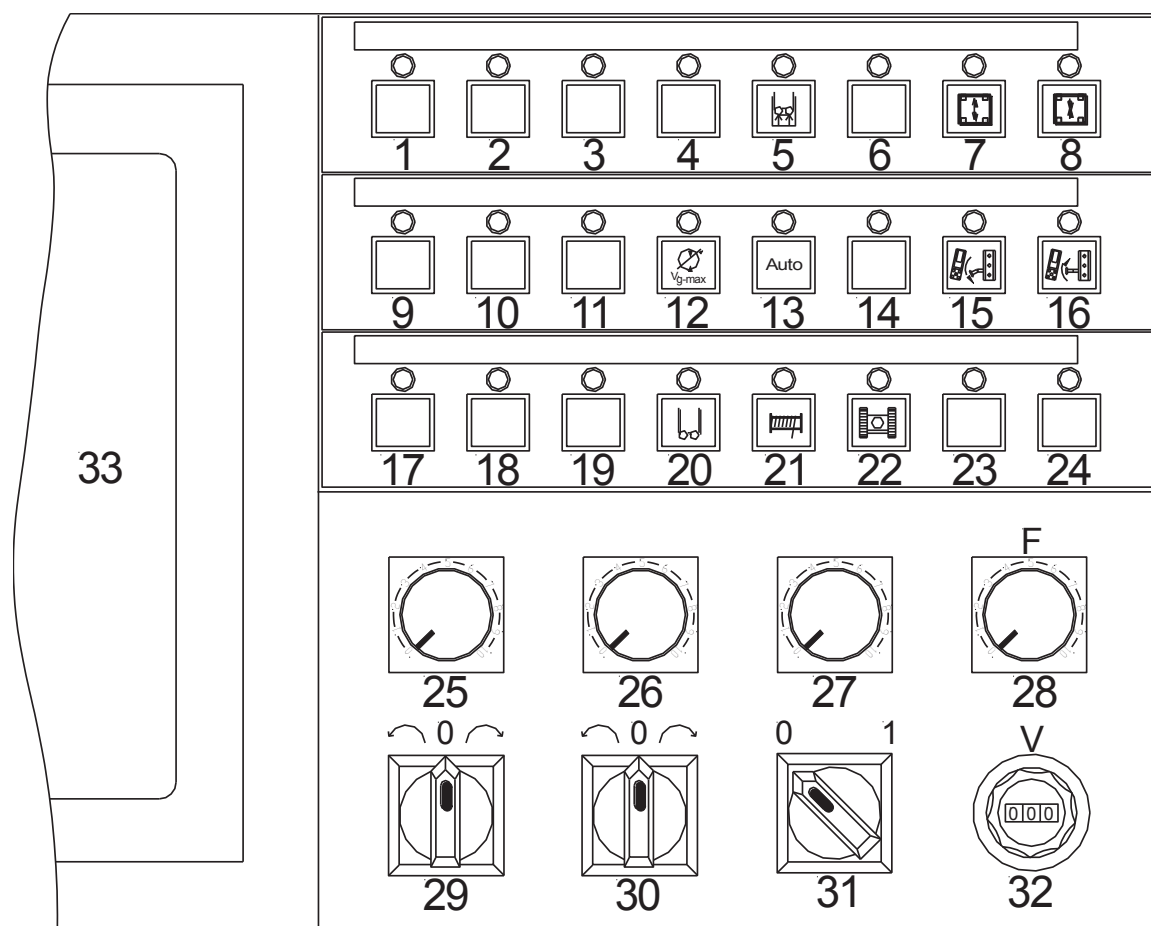


NOTE

The cutter must be immersed completely in bentonite.

- Press buttons **4** and **8** simultaneously.

The adjustment process is complete.



5.2.5 Controlling the Cutter

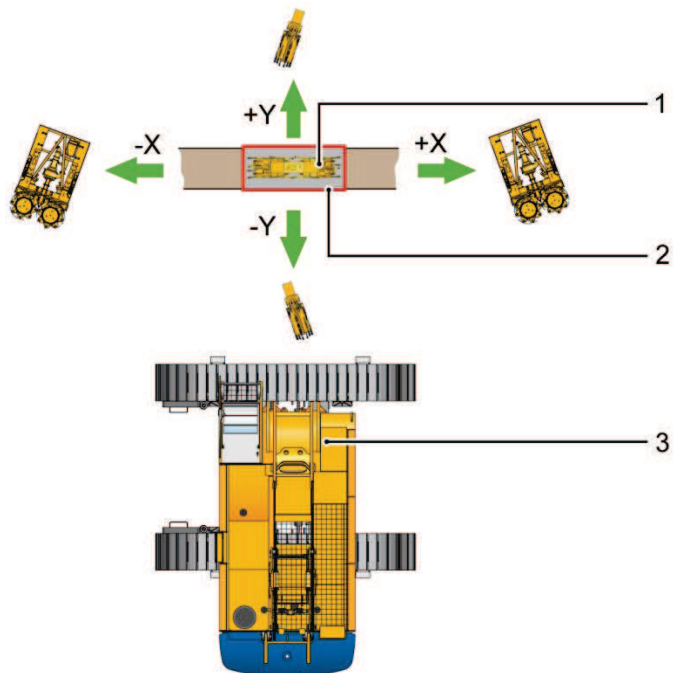
To show the precise progress of the cutting operation in the trench, the B-Tronic records the following values:

Inclination: Inclination of the cutter in the trench \Rightarrow current cutting direction.

Deviation: Deviation of the cutter from the vertical axis.

The directions of the deviations are defined as follows:

- 1 Cutter
- 2 Cutter starting point (guide frame)
- 3 Base machine



Before starting work:

- Position the measuring point (bar, pile, string, laser) outside the cutting area. Starting from this measuring point, it must be checked that the starting point is observed during the cutting procedure by performing a distance measurement.

Alternatively:

- Provide a template.

5.2.5.1 Steering Flaps

If, during cutting operation, the cutter deviates from the intended course, this can be corrected by using the steering flaps.

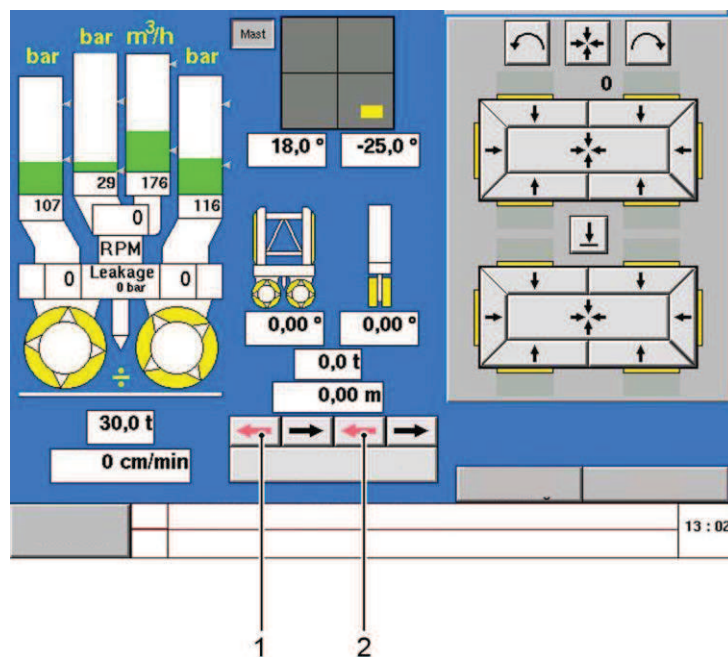
The steering flaps can be operated in two different ways:

- Automatically: → The computer automatically controls the steering flaps required for correction.
- Manually: → All steering flaps can be individually selected and adjusted by the operator.

Automatically:

Example:

The screen shows a deviation in X-direction and Y-direction.



The computer now proposes a correction of the cutter in the X- and Y-direction; the proposed directions are indicated by magenta arrows (1) and (2).

Touching these arrows carries out the suggested correction.

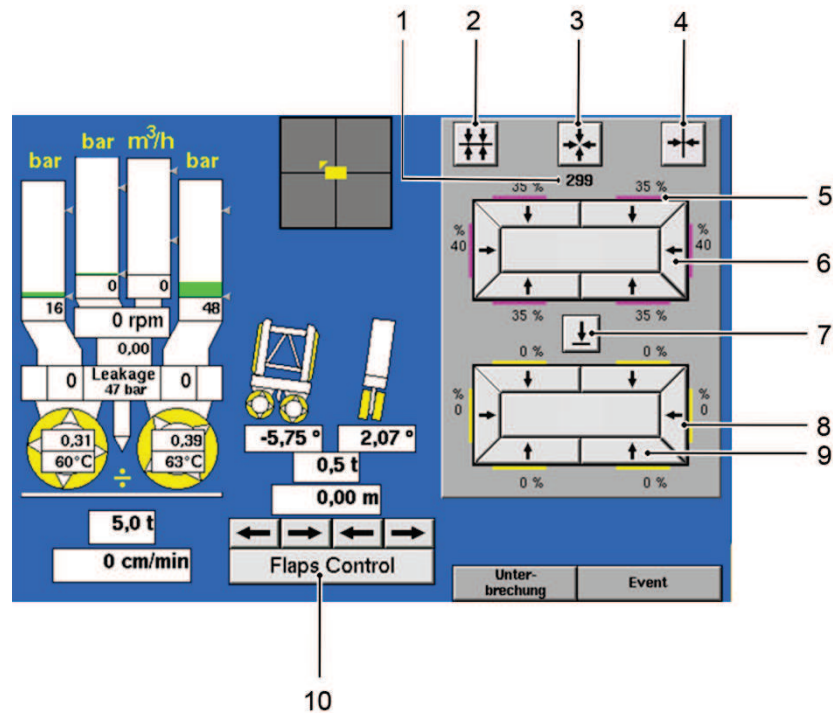


NOTE

As long as a steering flap arrow is touched, a field will appear on which the implemented movements and adjustments of the steering flaps are shown.

Manual:

If you press the "Flaps Control" field (13) on the operating screen, a control panel will appear on which you can control the steering flaps individually.



- | | |
|---|---|
| 1 Oil pressure on steering flaps | 7 Selection button: Extend/retract |
| 2 Moves the steering flaps to 35% | 8 Visual display and percentage indicator |
| 3 Fully retracts all steering flaps | – Yellow: fully retracted/extended |
| 4 Moves the side steering flaps to 40% | – Magenta: Position at 35% |
| 5 Visual display and percentage indicator | 9 The selected lower steering flap is retracted/extended (x6) |
| – Yellow: fully retracted/extended | |
| – Magenta: Position at 35% | |
| 6 The selected upper steering flap is retracted/extended (x6) | |

5.2.6 Operating the Cutter Wheels



Risk of causing damage to the cutter gear!





There is a risk of damage to the cutter gear if the oil temperature in the cutter gear rises to 110°C.

- Reduce the speed of the cutter wheels if a temperature of 110°C is displayed on the B-Tronic screen.
- Pull the cutter out of the trench and stop operation if the temperature does not fall below 110°C.



NOTE

To operate the cutter wheels, first connect the remote control.

Potentiometer	Process
 <p>29</p>	<ul style="list-style-type: none"> • Turn the potentiometer (29) to the left or right. ✓ The desired direction of rotation for the left cutter wheel is set. • Turn the potentiometer (29) to "0". ✓ The left cutter wheel is switched off.
 <p>30</p>	<ul style="list-style-type: none"> • Turn the potentiometer (30) to the left or right. ✓ The desired direction of rotation for the right cutter wheel is set. • Turn the potentiometer (30) to "0". ✓ The right cutter wheel is switched off.
 <p>25</p>	<ul style="list-style-type: none"> • Turn the potentiometer (25) to "0". ✓ Minimum speed is set for the left cutter wheel [0 rpm]. • Turn the potentiometer (25) to "10". ✓ Maximum speed is set for the left cutter wheel [25 rpm].
 <p>26</p>	<ul style="list-style-type: none"> • Turn the potentiometer (26) to "0". ✓ Minimum speed is set for the right cutter wheel [0 rpm]. • Turn the potentiometer (26) to "10". ✓ Maximum speed is set for the right cutter wheel [25 rpm].



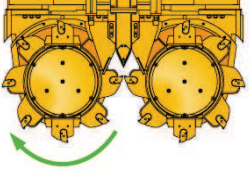


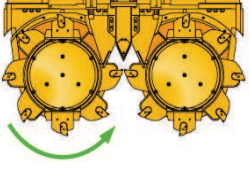
5.2.6.1 Adjusting the Direction of Rotation of the Cutter Wheels





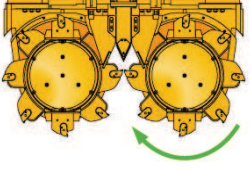


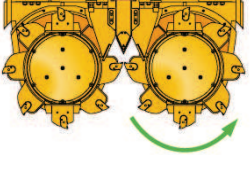
NOTE

The direction of rotation is described from the equipment operator's point of view.



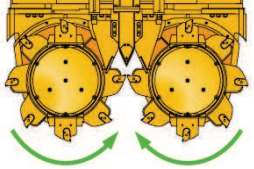


Left cutter wheel:

Potentiometer		Process	Direction of rotation
 29	 25	<ul style="list-style-type: none"> Turn the potentiometer (29) to the right and set the desired speed (25). ✓ The left cutter wheel is rotated clockwise. 	
 29	 25	<ul style="list-style-type: none"> Turn the potentiometer (29) to the left and set the desired speed (25). ✓ The left cutter wheel is rotated counterclockwise. 	

Right cutter wheel:

Potentiometer		Process	Direction of rotation
 30	 26	<ul style="list-style-type: none"> Turn the potentiometer (30) to the right and set the desired speed (26). ✓ The right cutter wheel is rotated clockwise. 	
 30	 26	<ul style="list-style-type: none"> Turn the potentiometer (30) to the left and set the desired speed (26). ✓ The right cutter wheel is rotated counterclockwise. 	

Operation:

Potentiometer		Process	Direction of rotation
 29	 30	<ul style="list-style-type: none"> Turn the potentiometer (29) to the left and the potentiometer (30) to the right. ✓ The left cutter wheel is rotated counterclockwise and the right cutter wheel clockwise. 	
 25	 26	<ul style="list-style-type: none"> Set the speed of the left cutter wheel (25) and the speed of the right cutter wheel (26) in accordance with the ground conditions. ✓ The speed for both cutter wheels is set. 	



NOTE



The speed of the cutter wheels should be identical when starting work.

5.2.6.2 Maximum Cutter Wheel Torque

This function uses maximum cutter gear torque and reduced speed.

Prerequisite:

- The speed and direction of rotation of the cutter wheels are set.


Button	Process
 12	<ul style="list-style-type: none"> • Press button (12). ✓ LED of button (12) lights up green and the maximum torque of the cutter gear is activated.
 12	<ul style="list-style-type: none"> • Press button (12). ✓ LED of button (12) goes out and the maximum torque of the cutter gear is deactivated.

5.2.7 Lifting the Cutter



When the "Lift cutter" button is pressed, the crowd automatic mode stops immediately and the cutter is lifted by approx. 0.2 m.

Prerequisite:

- Cutting mode  is switched on.

Button	Process
 5	<ul style="list-style-type: none"> • Press button (5). ✓ LED of button (5) illuminates green and the cutter is raised by 0.2 m.

5.2.8 Operating the Mud Pump

Potentiometer	Process
 <p>31</p>	<ul style="list-style-type: none"> • Turn the potentiometer (31) to the right. ✓ The mud pump is switched on. • Turn the potentiometer (31) to the left. ✓ The mud pump is switched off.
 <p>27</p>	<ul style="list-style-type: none"> • Turn the potentiometer (27) to "0". ✓ Minimum speed is set [0 rpm]. • Turn the potentiometer (27) to "10". ✓ Maximum speed is set.



CAUTION

Risk of causing damage to components!

Starting up the mud pump too quickly can cause damage to the pump shaft and the impeller.

- Before switching on the mud pump, switch the speed regulator for the mud pump (27) back to "0".



NOTE

The speed, conveying pressure and delivery rate of the mud pump can be read on the operating screen of the B-Tronic.

5.3 HTS OPERATION

5.3.1 Operating the HTS Manually

WARNING!

Danger of accident!

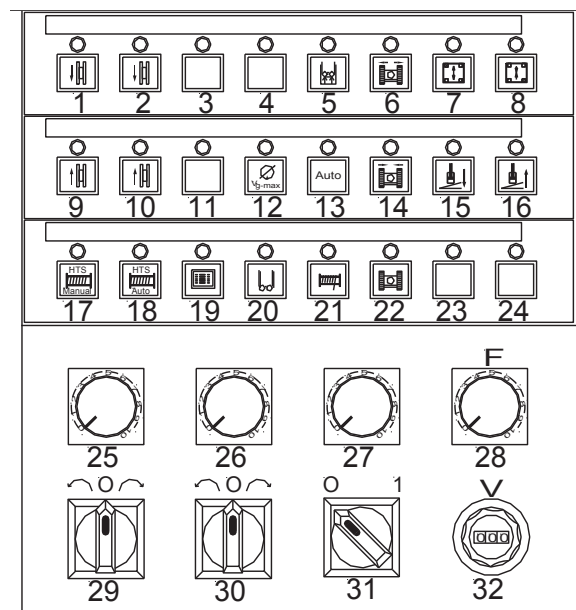


Manual HTS operation in cutting mode can result in damage to the hydraulic hose belt and/or the mud hose. The hydraulic hose belt and/or mud hose may tear and cause severe or fatal injuries.

- The hose tension winches must not be operated manually during the cutting mode.

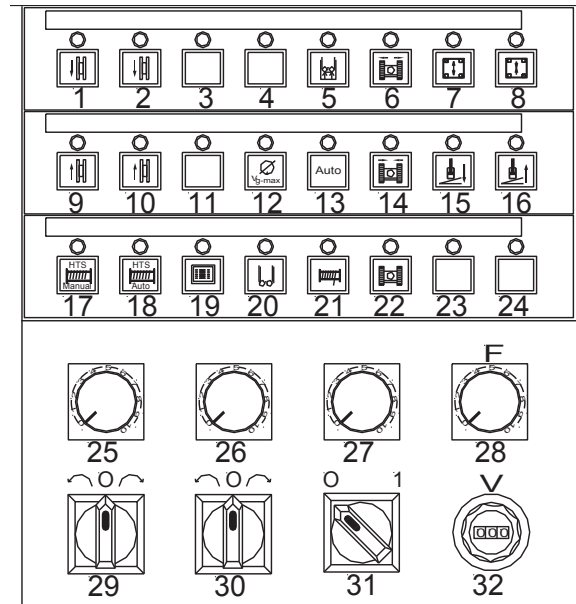
Mud hose tension winch

- Press button (17).
- ✓ The LED of button (17) lights up green and manual operation of the hose tension winches is selected.
- Press and hold button (1).
- ✓ The LED of button (1) lights up green and the mud hose wheel is lowered.
- Press and hold button (9).
- ✓ The LED of button (9) lights up green and the mud hose wheel is lifted.



Hydraulic hose tension winch

- Press button (17).
- ✓ The LED of button (17) lights up green and manual operation of the hose tension winches is selected.
- Press and hold button (2).
- ✓ The LED of button (2) lights up green and the hydraulic hose wheel is lowered.
- Press and hold button (10).
- ✓ The LED of button (10) lights up green and the hydraulic hose wheel is lifted.



5.3.2 Automatic HTS Control

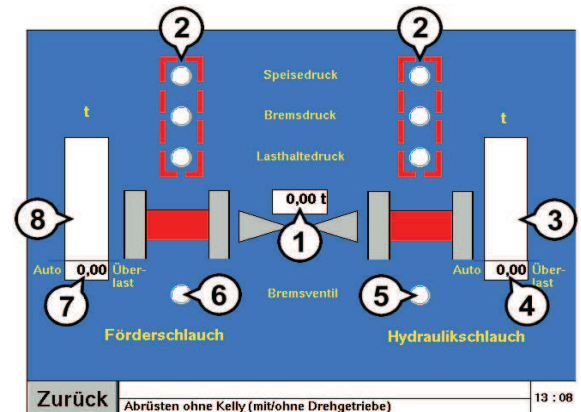


The hose tension winches must be in automatic mode at all times during cutting operation.

Before automatic operation of the HTS can be activated, the hoses must be pre-tensioned.

- Select the "HTS Information" menu in the B-Tronic.
- ✓ The "HTS Information" screen appears.

- Use the buttons on the cutter control panel to lift or lower the mud hose wheel manually.
- ✓ A green bar appears in the visual display (8).
- Use the buttons on the cutter control panel to lift or lower the hydraulic hose wheel manually.
- ✓ A green bar appears in the visual display (3).



- Start the automatic mode by pressing button (18) on the cutter control panel.



NOTE

The process for lifting and lowering the mud hose wheel and hydraulic hose wheel is described in the section entitled "Manual operation (Hose Tension System)".

Deactivating the HTS automatic mode

- Press button (18) again or button (17) on the cutter control panel.

5.4 STARTING A NEW TRENCH

5.4.1 Preparatory Measures

- Move the equipment to its operating position.
- Set the speed and direction of rotation of the cutter wheels.
- Activate pressure compensation.
- Have all components required for cutting operation available in sufficient quantities.

5.5 PRODUCING A TRENCH

WARNING!

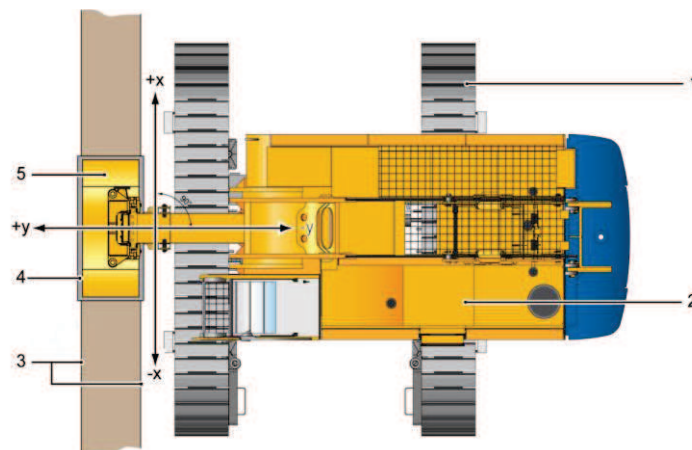


Danger of accident!

Sucked in steel components can block and/or damage the mud hose. This can cause the mud hose to tear and result in severe or fatal personal injuries.

- Avoid cutting steel components such as reinforcement cages.
- Replace damaged mud hoses with new ones.




- Select the travel mode for the base machine.
- Steer the machine parallel and as close as possible to the prepared guide wall of the trench (see figure).



1 Undercarriage
2 Upper carriage
3 Guide wall

4 Guide frame
5 Cutter

- Turn the upper carriage (2) until the cutter (5) (Y-axis) and the trench (X-axis) are at a right angle to one another (see figure).
- Use the boom control levers to lift or lower the boom until the cutter (5) is exactly in line with the planned trench.
- Place the guide frame (4) at the guide wall (3), within the marked area which indicates the location of the next trench.

- Enter the required data, including the construction site, operator and panel number, and then return to the operating screen.
- Open one of the short sides of the guide frame (4).
- Press  (18) to select the HTS automatic mode.
- The indicator light for the button illuminates.
- Select manual control of the cutter winch  (21).
- Push the right control lever forwards.
- The cutter is lowered into the pre-concreted trench.
- Proceed until both cutter wheels are completely in the trench. Then release the right control lever and let it return to its original position.
- Slowly travel with the base machine (1) and (2) parallel to the trench, until the cutter (5) is in the open guide frame (4).
- Close the guide frame (4).
- Connect the 2 hydraulic lines of the guide frame (4) to the connections on the connection plate of the base machine (1) and (2).
- Set the cutter (5) at the trial position ("X" and "Y" axis deviation = 0.00°) by moving the base machine (1) and (2).
- Press  (7) until the guide frame (4) is spread tightly against the guide wall (3).
- In order to be ready to begin cutting, press "Reset depth" on the operating screen to restart depth measuring.










NOTE

The "Reset depth" button only appears if a new panel number has been entered.

- Press "Reset depth".
- ✓ Depth measuring is restarted and the "Reset depth" button disappears.
- ✓ The "Start Cutting" button appears.

Cutting mode:

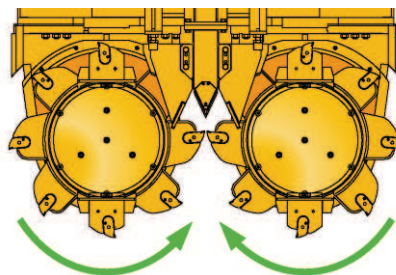
- Press  (20) to select the cutting mode.
- ✓ The indicator light for the button illuminates.
- Activate the automatic mode of the additional mud pump.
- Start the mud pump with  (31) and set the required speed by using the .
- Start the left cutter wheel in a counterclockwise direction (left) with  (29), and use the  potentiometer (25) above it to set the desired speed.
- Start the right cutter wheel in a clockwise direction (right) with  (30) and use the  potentiometer (26) above it to set the desired speed.
- ✓ The selected cutter wheel speed is shown on the operating screen.



CAUTION


Always check to ensure you have selected the correct direction of rotation for the cutter wheels!



Direction of rotation (view from operator's cab):



F00005453.PNG

The correct setting for the correct speed is very important in order to avoid damage to the cutter gear.

- Select the automatic mode for the winches  (13).
- ✓ The indicator light for the button illuminates.
- Press the "Start Cutting" button; the start time is then added to the work report.
- ✓ The "Start Cutting" button disappears and the "End Cutting" button appears.


- Set the required lowering speed using the  potentiometer (32).
- Set the required imposed load using the  potentiometer (28).


The system will then operate automatically and the operator can monitor the process on the operating screen. He can also change the following parameters at any time:

- Lowering speed
- Load
- Speed of the mud pump
- Speed of the cutter wheels

The crowd is now regulated automatically.

Once the required cutting depth has been reached:

- Pressing the "End Cutting" button will save the time at which the cutting operation ended in the work report.
- The "End Cutting" button disappears.
- Deactivate the automatic crowd mode  (13).
- ✓ The indicator light for the button goes out.


- End the cutting mode by pressing the  button (20).
- ✓ The indicator light for the button goes out.
- Select the manual cutter winch mode.
- ✓ The indicator light for the button illuminates.
- Pull back the right control lever and the winches will pull the cutter out of the trench.

WARNING!



Make sure there is nobody in the immediate vicinity when retrieving the cutter: Falling stones and earth can cause severe injury.

- If there are stones on the cutter, stop hoisting and remove the stones before proceeding.

- Press and hold the  button (8) to release the guide frame from the guide wall.
- Disconnect the guide frame supply lines from the system.
- Remove the guide frame with auxiliary crane.
- The operator decides what to do next.

6 START-UP/SHUT-DOWN

6.1 START-UP



CAUTION

Risk of causing damage to the cutter gears!

High-pressure or other piston pumps must not be used to supply the BC system with bentonite, as the bentonite could be pressed into the gear housing.

6.1.1 Initial Start-up

The initial start-up of the equipment concerns both the manufacturer and the future user, the customer. In general, the work involved will be performed jointly as part of training activities held at the manufacturer's premises or as part of a briefing on the construction site.

The operator of the equipment must be familiar with all the control elements and their capabilities before commencing with the initial start-up phase.

6.1.2 Visual Check Before Start-Up

A visual inspection and thorough check are required before putting the equipment into operation:

- Inspect the entire equipment for loose or missing pin/screw connections.
- Check all components for damage and wear.
- Check all electric lines for damage.
- Look for leaks and fluid spills.
- Check all oil and fluid levels.

6.1.3 Start-Up after a Long Standstill

If the cutter is being restarted or taken out of storage after a prolonged standstill, the following measures must be observed:

- Check all oil levels and top up if necessary.
- Check all of the hoses for cracks and ensure their permitted service life has not expired.
- Check all movable parts are free to move; make them run freely.

- When the system has been set up, test-run the cutter system for approx. 15 minutes. Then visually inspect the cutter all around.



CAUTION

All of the prescribed maintenance intervals apply even if the cutter has not been operated for a prolonged period. Maintenance work that has been omitted during a standstill must be carried out before the cutter is started up again.

6.1.4 Daily Start-Up



CAUTION

Risk of causing damage to the equipment!
Observe the instruction manual supplied with the base machine!

- Set the battery main switch to "On".
- Set all operating elements to position "0".
- Pull the Emergency STOP button.
- Start the engine by turning the ignition key.



CAUTION

Risk of causing damage to the engine!
Allow a cold engine to warm up at idle speed for approx. 10 minutes!



CAUTION

Risk of causing damage to the control system!
When starting using an external power source, first switch off main fuse F1 (BAUER component).

- Set the pilot control safety stick to the "On" position.

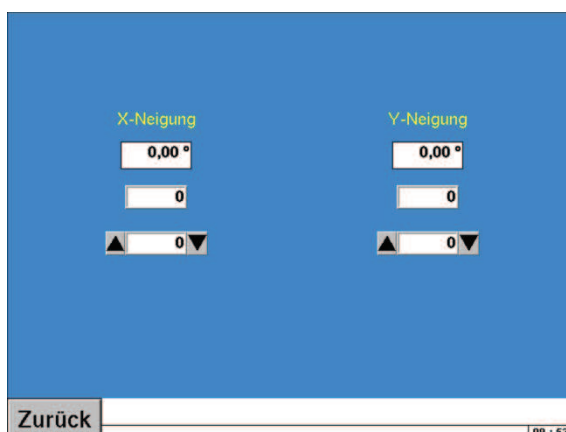
6.1.4.1 Adjusting the Measuring Systems

The measuring systems must be re-adjusted after every fitting and removal procedure, after each repair, after each software update or every 250 operating hours/every month at the latest.

Calibrating the inclination measuring system

To check for correct functionality of the inclination measuring system, or to recalibrate, proceed as follows:

- Place the cutter on level ground with the necessary load-bearing capacity and, with the aid of a theodolite, position it so it is exactly vertical.
- Open the "Adjust inclination" menu by touching the "Adjust inclination" button in the "Calibration menu".



The values in the fields "Inclination in X-axis" and "Inclination in Y-axis" should now be $0^\circ \pm 0.01$. If this is not the case, a separate adjustment is required in each direction.



NOTE

When re-calibrating the inclination measuring system, both inclination directions (x and y) must always be adjusted.

The adjustment process is conducted in 2 stages:

- First, the presetting is conducted on the inclinometer,
- then fine adjustment is conducted on the control screen (see above).

Presetting

The inclinometer is located in the lower electric box of the cutter.

The presetting is carried out using the 3 available adjusting screws.

- Use the available adjusting screws on the inclinometer to set both the values shown on the monitor to $0^\circ \pm 0.2^\circ$.

Fine adjustment

The fine adjustment is carried out using the monitor unit in the base machine.

The adjustment is carried out as follows:

Adjusting the cutter inclination in X-direction

- Use the arrow keys for "Inclination in X-axis" until the value is exactly 0.00° .

Adjusting the cutter inclination in Y-direction

- Use the arrow keys for "Inclination in Y-axis" until the value is exactly 0.00° .

6.1.4.2 Process Equipment



CAUTION

Risk of causing damage to the equipment!

Observe the instruction manual supplied with the base machine!

- Turn the potentiometer on the cutter control panel to "0".
- Start the base machine (see base machine operating instructions).
- Conduct any necessary "preadjustments" (as required).

Before cutting can commence, the cutter gears must be brought to an operating temperature of between 10° C and 40° C. If the cutter gear temperature is not displayed on the B-Tronic screen, let the cutter gears run for a minimum of 5 minutes. The cutter should remain outside the trench while warming up.

WARNING!




Risk of getting pulled in!

Nobody must be standing in the danger zone.



NOTE

To warm up the cutter wheels, activate the  function or set the speed of the cutter wheels to 15 rpm.

- Allow the cutter gear to warm up.
- Check the "Cutter gear oil pressure" and "Cutter gear temperature" displays on the "operating screen".
- Check the "Gear data" (Gearbox Information) indicators in the B-Tronic screen.



NOTE

In the event of faulty sensors or damaged cables, an error message will be displayed on the B-Tronic screen.

- ✓ The equipment is ready for operation.

6.1.5 Safety Checks Before Starting Work

WARNING!



Risk of severe accident!

Faulty safety devices are dangerous.

All equipped safety devices must be tested prior to starting work, and any faults found must be repaired by skilled personnel or the After Sales Service.

Only work with the equipment after the faults have been corrected.

Initial situation:

- Diesel engine is running.

6.1.5.1 Checking the Emergency STOP

- Press the EMERGENCY STOP button.
All operating and control elements must be disabled and the diesel engine must come to a stop.

6.1.5.2 Checking the Pilot Control Safety Stick

- Set the pilot control safety stick to the "Off" position.
All hydraulic functions must be disabled. The diesel engine remains on.

6.1.5.3 Checking the Emergency STOP Function on the Remote Control for the Cutter Wheels

- Press the EMERGENCY STOP button.
The cutter wheels must come to an immediate stop.

6.1.5.4 Checking the Limit Switches

Initial situation: Drilling mode selected

– Hoist limit switches (HS 1 and HS 2)

- Select the main winch.
- Wind in the rope and slowly lift the attached load (approx. 100 kg) by the winch until the load block hits the hoist limit switch contactor weight.
→ The winch must come to an immediate stop.
- Repeat the procedure with the other winch.

6.1.6 Switching On the Control System



CAUTION

Damage to the computer program!

When starting the computer it is imperative that the following points are observed.

Non-observance can result in damage to the program and prevent the equipment from functioning properly and safely or it could even result in total failure of the equipment.

- Do not touch the screen while the computer is booting up.
- Only touch the screen when either "Mode Selection" or "Operating Screen" appears on the display.
- If the computer booting process is interrupted or stopped by an error, reset the computer by disconnecting the operating voltage.

Selecting the Work Application

The computer starts up and displays the "Mode selection" screen once the "Ownership security" window has been acknowledged.

When the system is switched on, the last selected work application is highlighted in green.

Only the work applications which are intended for the equipment are displayed.

The operator has 10 seconds to select a different work application by pressing it.

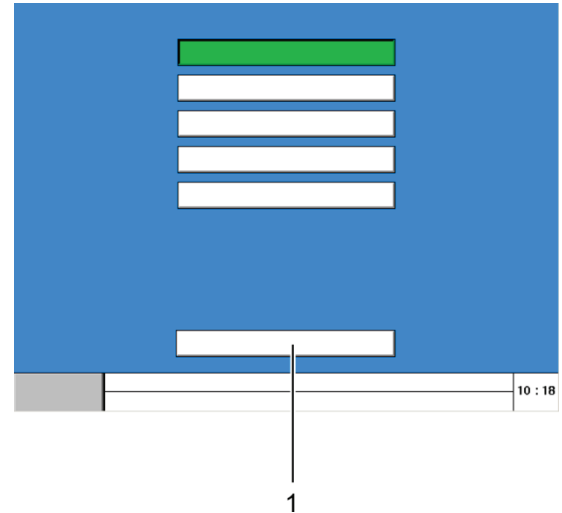
The operating screen of the selected work application is displayed by pressing the "End" (1) button.

If no other work application is selected with this 10-second period, the display automatically changes to the operating screen of the previous work application.

The colors used in the displays mean the following:

green → selected

white → available



6.2 SHUT-DOWN

6.2.1 Daily Shut-Down

- Position the equipment on horizontal and level ground with sufficient load-bearing capacity.
- Position the equipment in such a way that it does not cause an obstruction to traffic.



NOTE

For further information, please refer to the additional documentation of the working modes.

- Position the upper carriage parallel to the undercarriage and in the main direction of travel.
- Set the boom to an inclination of 70°.
- Activate the swing brake.
- Lock the upper carriage to the undercarriage.
- Set all operating elements to position "0".
- Switch off the hydraulic pilot control.



CAUTION

Risk of causing damage to the diesel engine!

A diesel engine running at full load can be damaged if it is shut down suddenly.

- Let the diesel engine run at idle speed for 5 minutes.

- Switch off the engine by turning the ignition key to position "0".
- Remove the ignition key.
- Press the Emergency STOP button.
- Set the battery main switch to position "0".
- Lock the cab, maintenance flaps and other doors when leaving the equipment.
- ✓ The equipment has been shut down.

6.2.2 Shutting Down for a Longer Period

6.2.2.1 Diesel Tank

- Before longer periods of standstill, fill the diesel tank completely with diesel for protection against corrosion.

6.2.2.2 Process Equipment

If the process equipment is being taken out of service or put into storage for a longer period of time, the following measures are necessary:

- Check all oil levels and refill if necessary.
- Contaminated oil must be changed before the equipment is shut down.
- Check to ensure the oil in the cutter gears is free of air bubbles.
- The cutter gears remain mounted on the mixing head.
- Lubricate all movable parts.
- Protect all hose assemblies from environmental influences.
- Clean all components and preserve them accordingly.
- Dry all components and store them in a dry place free of dust.



NOTE

For further information please refer to the "Maintenance" section of the instruction manual.

6.2.3 Shutting Down Due to High Wind Speeds

If certain wind speeds are exceeded (see section "Maximum permissible wind speeds"), the equipment must be derigged.

- Position the equipment on horizontal and level ground with sufficient load-bearing capacity.
- Position the equipment so that it does not block traffic.
- Position the upper carriage parallel to the undercarriage in the main direction of travel.
- Set the cutter down on the ground (see section entitled "Removing the cutter").
- Remove the hose wheels (see section entitled "Removing the hose wheels").
- Lower the lower fix point (see section entitled "Removing the lower fix point").
- Lower the boom.



NOTE

For further information, please refer to the enclosed additional documentation for the base machine!

- Activate the swing brake.
- Lock the upper carriage to the undercarriage.
- Set all operating elements to position "0".
- Switch off the hydraulic pilot control.



CAUTION

Risk of causing damage to the diesel engine!

A diesel engine running at full load can be damaged if it is shut down suddenly.

- Let the diesel engine run at idle speed for 5 minutes.

- Switch off the engine by turning the ignition key to position "0".
- Remove the ignition key.
- Press EMERGENCY STOP.
- Set the battery main switch to position "0".
- Lock the cab, maintenance flaps and other doors when leaving the equipment.
- ✓ The equipment has been shut down.

7 RIGGING / DERIGGING

7.1 GUIDELINES FOR RIGGING/DERIGGING

- Assembly work should always be performed by trained personnel.



Risk of severe accident!

The operator must be familiar with all the control elements and their capabilities before starting rigging operations.

WARNING!



Risk of falling!

Personnel working on the mast or on the upper carriage must wear the prescribed fall protection equipment.

- Provide an unobstructed and level area for assembly.
- Before assembling, check all parts for possible damage resulting from transport.
- Before starting assembly work, inspect the equipment for a film of protective wax. All protective wax must be removed completely (see section "Wax removal").
- For lifting and loading work, use only the supplied, original lifting slings.
- Secure the individual assemblies at the designated attachment points only.



Danger of equipment tipping over!

During rigging operations, the upper carriage must be in line with the undercarriage and locked to it.

7.1.1 Hydraulic Connection

WARNING!



Danger of accident!

If the hydraulic "leak oil/return" line is not mounted in the correct order, components of the hydraulic system/hydraulic lines could be damaged and burst. Persons could be struck as a result and suffer severe or fatal injuries.

- Mount the hydraulic "leak oil/return" line first when the hydraulic connections on the equipment/rig have been established.
- Remove the hydraulic "leak oil/return" line last when the hydraulic connections on the equipment/rig have been disconnected.

WARNING!



Danger of accident!

If the hydraulic supply to detachable hydraulic cylinders has not been fully established, components of the hydraulic system/hydraulic lines could be damaged and burst.

Persons could be struck as a result and suffer severe or fatal injuries.

- Ensure the hydraulic supply to detachable hydraulic cylinders is fully established.
- Check to ensure the hydraulic supply is complete prior to start-up.

WARNING!



Risk of injury!

If the hydraulic connections are not mounted properly, it can result in components of the hydraulic system falling off. Personnel could be struck by these components and seriously or fatally injured from escaping media.

- Before starting-up the equipment/rig, check to ensure the hydraulic connections are secure and in proper working order.
- Ensure detachable hydraulic cylinders are fully connected.

All of the components in the hydraulic system must be checked with the designated maximum operating pressure, which can be achieved by taking all of the intended applications into account.

- Check all of the components in the hydraulic system for leaks.
- Check to ensure the hydraulic system is complete and in proper working order.
- Protect all of the hydraulic lines from damage during operation.



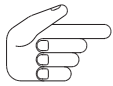
NOTE

The hydraulic lines and the connection plate on the equipment/process equipment are provided with corresponding symbols (for example, numbers and letters) or color-coded markings.

- Connect hydraulic connections with the same symbol or the same color-coded marking to one another.
- Mount the hydraulic "leak oil/return" line first when the hydraulic connections on the equipment/rig have been established.
- Remove the hydraulic "leak oil/return" line last when the hydraulic connections on the equipment/system have been disconnected.

7.2 WAX REMOVAL

- Prior to start-up, remove all protective wax with a hot water jet at a temperature of 90 - 95°C.



NOTE

Alternatively, the equipment can be washed down with a cold water detergent.

Repeat the treatment until the equipment is completely free of protective wax.



CAUTION

Risk of causing damage to components!

The cleaning agents that are used must not be harmful to seals etc.

Check the suitability of cleaning agents prior to use.

7.3 ASSEMBLING THE SYSTEM

7.3.1 Assembling the Base Machine

WARNING!

**Danger of equipment tipping over!**

If the equipment tips over, this can lead to severe injury.

It is imperative that the work procedures are carried out in the described order.

Observe the instruction manual supplied with the base machine!

WARNING!

**Danger of accident, shearing hazard, danger of getting crushed, hitting hazard!**

If anyone becomes trapped between the equipment and suspended loads, body parts may be crushed or severed. Persons may be hit by falling loads and thus seriously or fatally injured.

- Only attach individual components to the designated attachment points.
- Only use suitable lifting devices.
- Remove all tools, devices and work equipment from the unit when installation is complete.

WARNING!

**Risk of injury and risk of causing damage!**

Suddenly escaping media (for example hydraulic oil) can result in lacerations and cutting injuries.

- Ensure that components filled with media (for example hydraulic hoses) are depressurized prior to assembly/disassembly.

Assembly must be carried out in the following order:

- Start the base machine (see base machine instruction manual).
- Extend the crawler (see base machine instruction manual).
- Mount the counterweights (see base machine instruction manual).
- Assemble the boom (see base machine instruction manual).

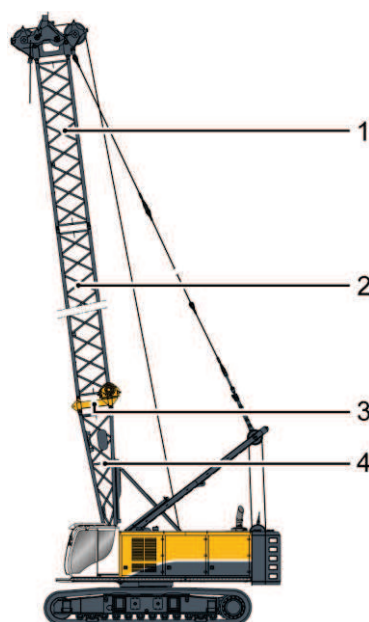
**NOTE**

The crossbeam must be installed with the hose tension winches between the boom butt and the first boom section.

- Connect the supply lines of the crossbeam to the upper carriage.
- Remove the lock between the upper carriage and undercarriage (see base machine instruction manual).
- Mount the boom head (see base machine instruction manual).
- Mount the upper fix point.

7.3.2 Adjusting the Boom to the HTS

- 1 Boom top
- 2 Boom insert
- 3 Crossbeam with hose tension winches
- 4 Boom butt



Adjust the boom to the planned cutting depth.

Cutting depth	(4)	(3)	Boom insert (2) [m]					(1)
52 m	Boom butt	Crossbeam	+ 6	+ 6	+ 6	-	-	Boom top

7.3.3 Pulling in the Cutter Rope

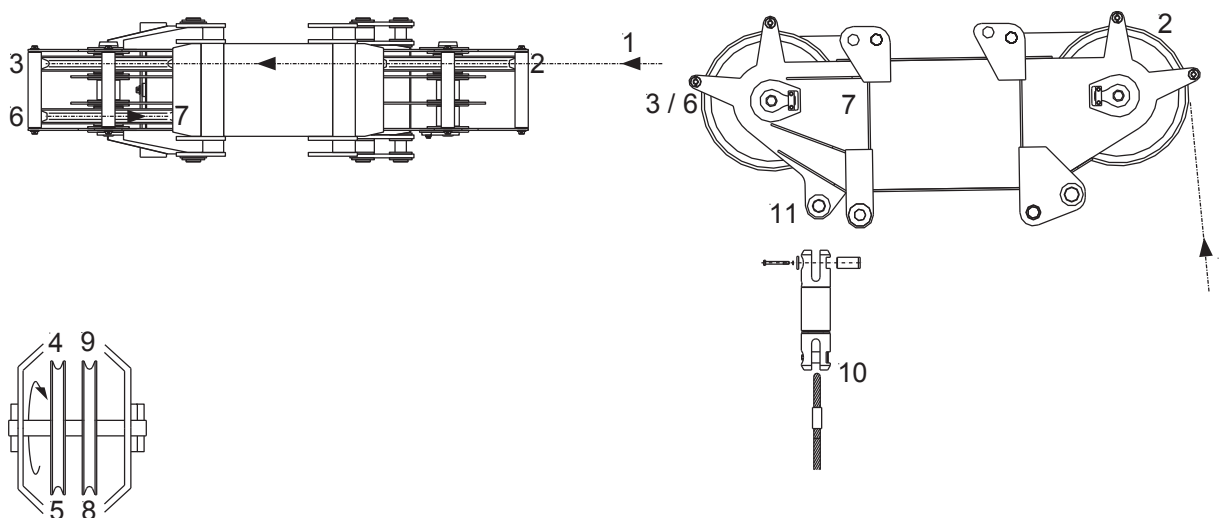
WARNING!

Danger of accident!



Incorrect threading of the rope can lead to the rope breaking and consequently parts falling, thereby resulting in serious injuries.

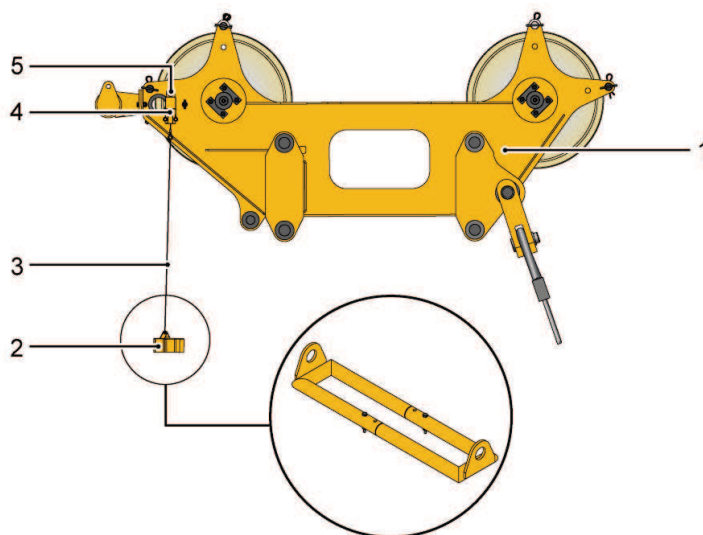
- It is imperative that the work procedures are carried out in the described order.
- The position of the rope must be checked while raising the boom



Thread the rope in the following order:

- Cutter winch (1)
- Boom head rope sheave (2) + (3)
- Hoist limit switch
- Rope sheave on the pulley (4) + (5)
- Hoist limit switch
- Rope sheave on the boom (6) + (7)
- Rope sheave on the pulley (8) + (9)
- Rope end on rope swivel (10)
- Rope swivel on the boom head (11)

Hoist limit switch



- | | |
|---------------------------------------|----------------------|
| 1 Boom head | 4 Padlock |
| 2 Hoist limit switch contactor weight | 5 Hoist limit switch |
| 3 Slinging rope | |

Initial situation:

- Hoist limit switch mounted on the boom head (1).
- Hoist limit switch contactor weight (2) mounted on slinging ropes (3).
- Mount the slinging rope (3) to the hoist limit switch (5) using a padlock (4).
- Thread the cutter rope through the hoist limit switch contactor weight (2).



NOTE

To facilitate the threading process for the cutter rope, open the hoist limit switch contactor weight (2) by removing 2 screw connections and then push it over the cutter rope. Then close the hoist limit switch contactor weight (2) by mounting the two screw connections and then mount the two slinging ropes (3) to the hoist limit switch (5) by using the padlocks (4).

7.3.4 Pulling in the Hose Tension Ropes

WARNING!

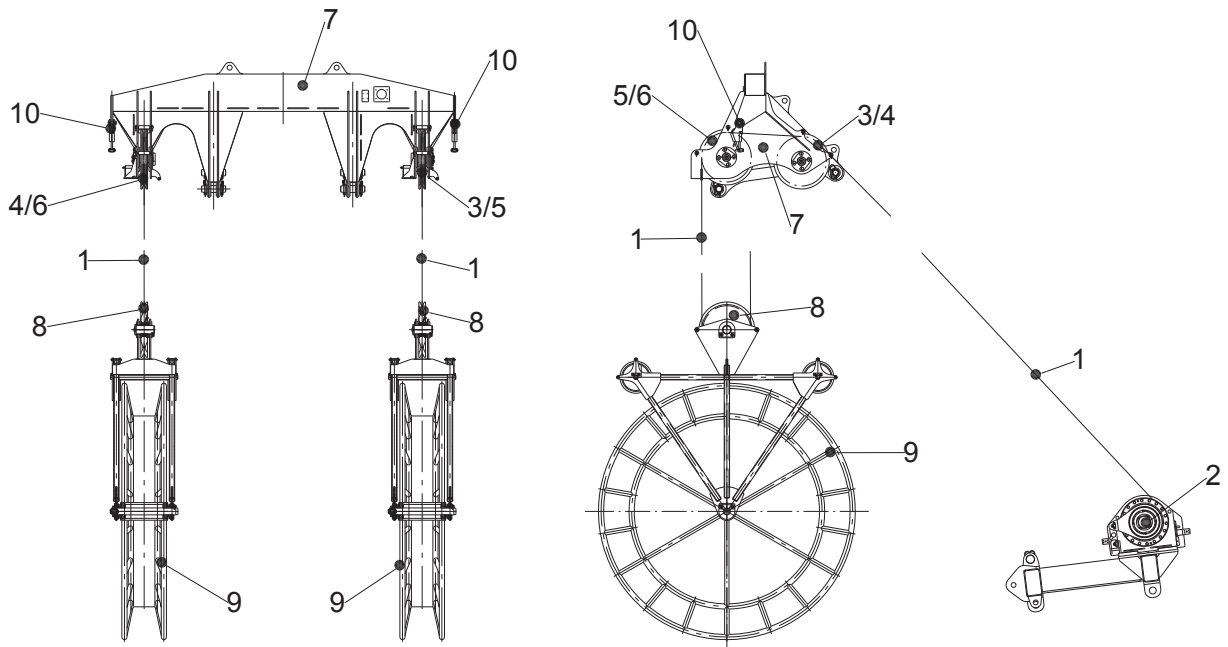
Danger of accident!

Incorrect threading of the rope can lead to the rope breaking and consequently parts falling, thereby resulting in serious injuries.



- It is imperative that the work procedures are carried out in the described order.
- The position of the rope must be checked while raising the boom

- Unwind the hose tension rope (1) from the respective hose tension winch (2). Pass the rope (1) over the rope sheaves (3-5 or 4-6) in the upper fix point (7) and thread each rope through the relevant hoist limit switch.
- Then, pass the rope (1) through guide roller (8) on the respective hose wheel (9).
- Mount the sockets and wedges to the rope end and connect these to the boom head attachment (7) with the anchor sockets (10).
- Run the electric cable from the boom head to the base machine.
- Lift the boom, slowly stress the hose tension ropes (1) and erect the hose wheels (9).



The figure shown may differ from the original

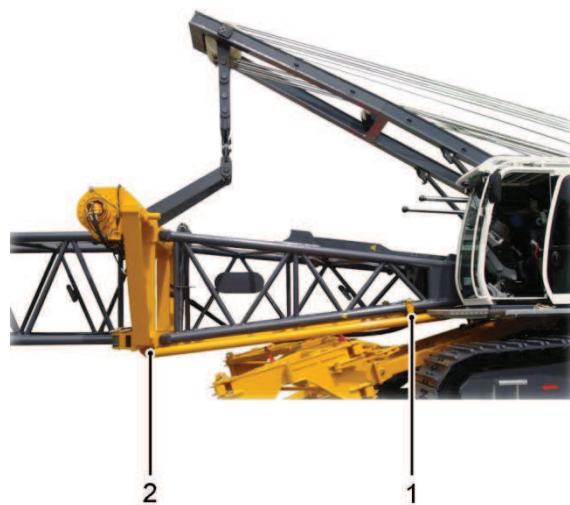
7.3.5 Mounting the Supports on the Crossbeam

- Mount both supports to the crossbeam using the relevant plug connections (2).



NOTE

The supports can be fixed to the boom butt with a plug connection (1) whilst the boom is being raised.



FQ01104088.jpg

7.3.6 Raising the Boom

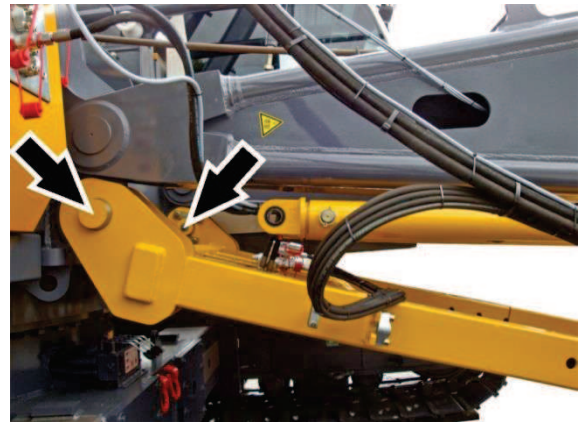


NOTE

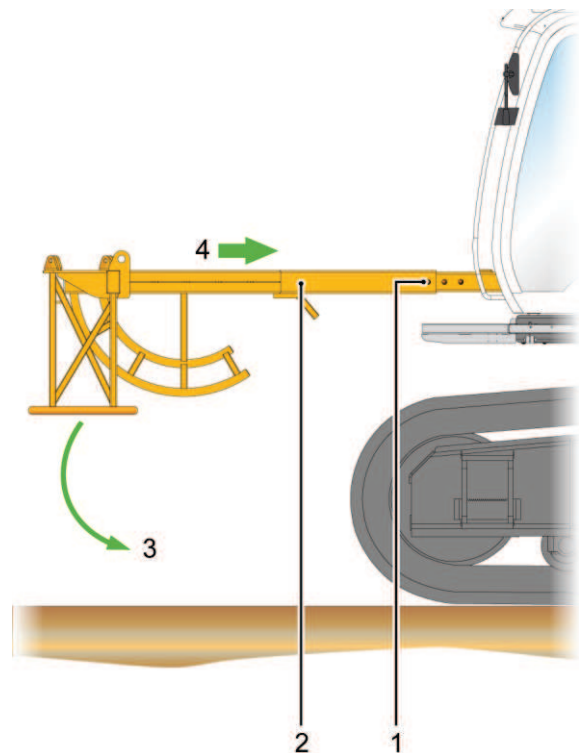
For further information, please refer to the enclosed additional documentation entitled "Base machine"!

7.3.7 Mounting the Lower Fix Point

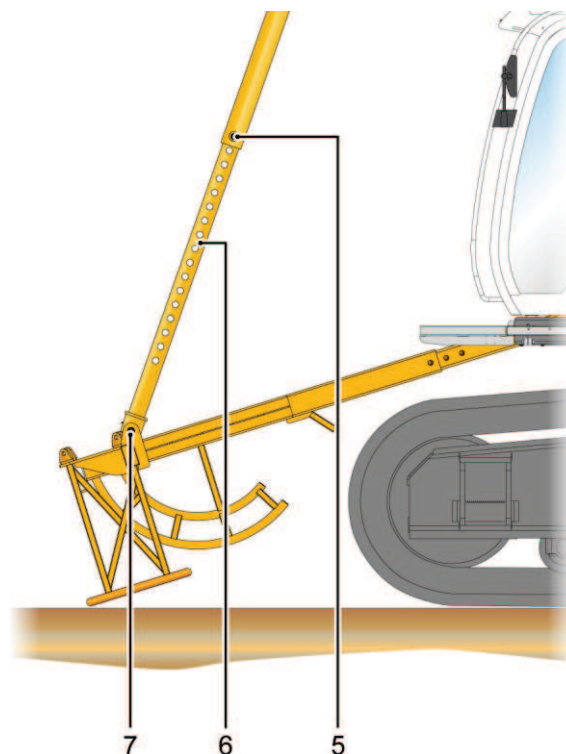
- Mount the frame to the upper carriage with the designated plug connections.



- Bring the frame to a horizontal position using a suitable lifting device (2).
- Push the tubes of the lower hose guide onto the supports of the frame (4).
- Establish the plug connection (1) between the frame and the lower hose guide.
- Set the lower fix point down on the ground (3).



- Remove the fitting of the supports (6) on the boom butt.
- Lower the boom until the supports can be mounted on the lower hose guide with the designated plug connections.
- Mount the plug connections (7).
- Remove the plug connections of the length adjustment component (5) on the supports (6).
- Slightly lift the boom.
- Mount the plug connections of the length adjustment component (5) on the supports (6).



- Lift the boom until it is within the permissible operating range for the cutting mode.
- ✓ The lower hose guide is aligned horizontally.



NOTE

If the lower hose guide is not horizontal, lower the boom again and adjust the length adjustment component.

- Use a lifting device to position the hose attachment approx. 1 m under the crossbeam.
- ✓ The lower fix point is mounted.

7.3.8 Mounting the Cutter



Risk of causing damage to the equipment!

There is a risk of damage to the work attachment if the hydraulic hoses, mud hoses or recovery ropes used are too short or too long!

- Adjust the length of the hydraulic hoses and mud hoses before mounting the work equipment.
- Adjust the length of the recovery ropes before mounting the work equipment.



NOTE

Please consult the section entitled "Mud hose maintenance" prior to mounting!

- Adjust the length of the hydraulic hose bundle according to the intended use of the HTS:

Operating position		Segment lengths of the hydraulic hose bundle [m]					
Cutter at a right angle to the upper carriage	Cutter	57		-	-	-	Base machine connection pate

- Mount the mud hose on the swivel joint of the cutter.
- Adjust the length of the mud hose according to the intended use of the HTS:

Operating position		Segment lengths of the mud hose [m]					
Cutter at a right angle to the upper carriage	Cutter	13.7	34.5		-	-	Flowmeter

Preparation of the cutter for mounting:

- Lay down the cutter on square timbers, lengthwise in front of the base machine.

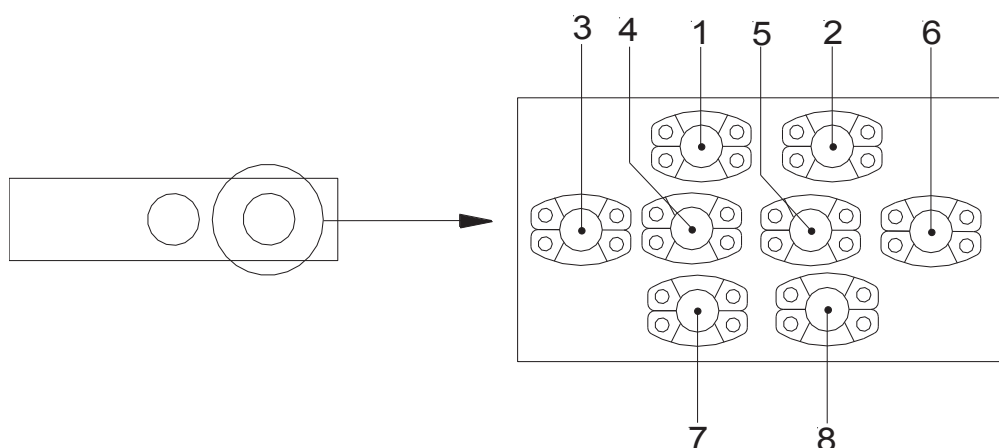


NOTE

For BC systems with HTS, the hydraulic hose belt and the mud hose must be transported on the cutter in a horizontal position. These then remain connected to the cutter.

To connect the hydraulic hoses and electric cables:

- Set the hydraulic hose belt down in front of the cutter frame.
- Mount the safety ropes on the cutter frame.
- Connect the hydraulic lines according to the following connection plate configuration:



- 1 Leak-oil line
- 2 Mud pump, return line
- 3 Electric cable
- 4 Mud pump, feed line

- 5 Left cutter wheel, feed line
- 6 Right cutter wheel, return line
- 7 Right cutter wheel, feed line
- 8 Left cutter wheel, return line

- Pass the electric cable through the connection plate until it reaches the upper electric box.
- Open the electric box.
- Insert the plug of the electric cable into the designated socket.
- Close the electric box.
- ✓ The hydraulic hoses and electric cables are connected.

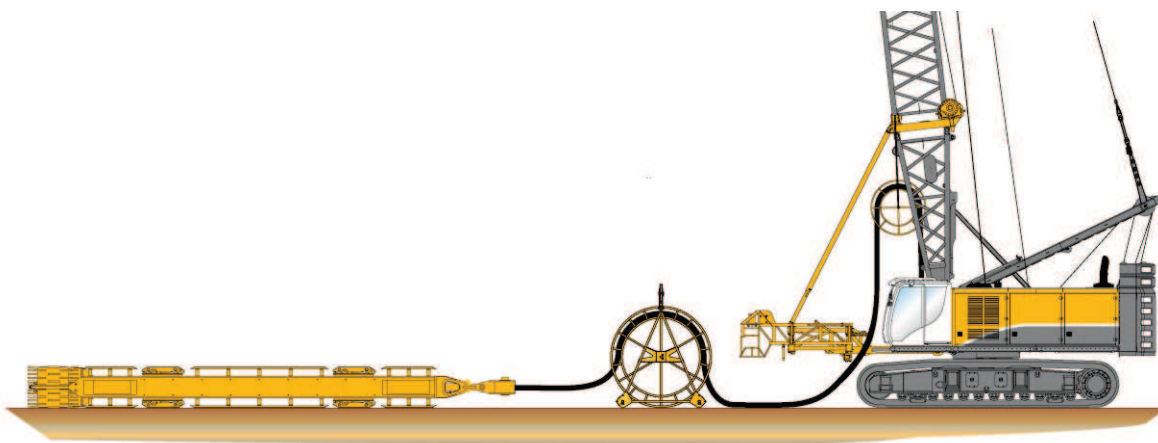
7.3.9 Installing Hoses on the Hose Wheels and the Lower Hose Guide



The figure may differ from the original.

NOTE

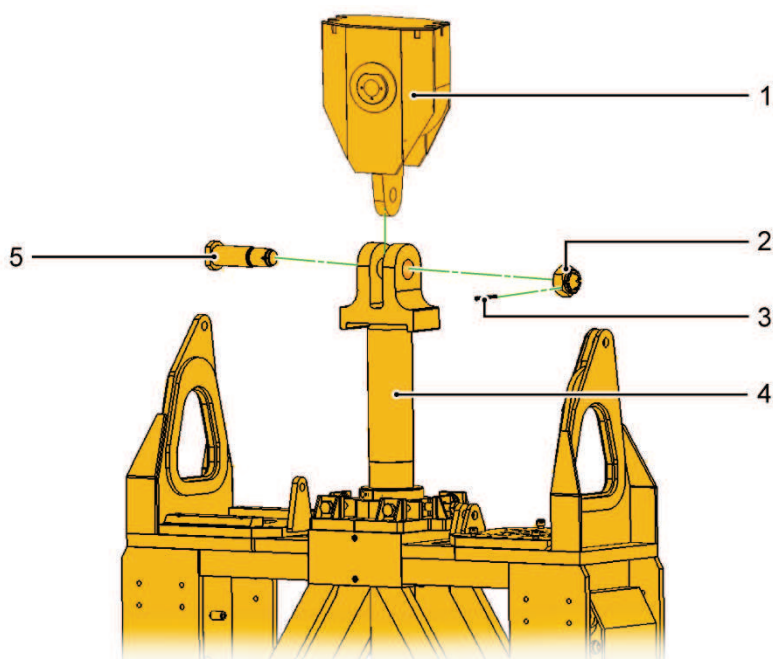
- Set the guide wheels down on the ground in front of the lower fix point.



- Guide the hydraulic hose belt and mud hose over the relevant guide wheel.
- Lower the pulley blocks of the guide wheels and mount them on the guide wheels.
- Guide the recovery ropes over the corresponding plastic rollers and attach them to the lower fix point.
- Mount the flowmeter on the lower fix point.
- Mount the mud hose to the flowmeter on the lower fix point.
- Open the clamping strip for the hydraulic hose belt on the lower fix point.
- Guide the hydraulic hose belt under the hose guide on the lower fix point, then over the clamping strip and the hose guide wheel.
- Mount the hydraulic hoses and electric cable to the connection plate on the base machine in accordance with the diagram.
EXCEPTION: Attach the leak-oil line to the filter at the lower fix point.

7.3.10 Attaching the Cutter to the Pulley Block

- Move the base machine towards the cutter; when doing so, take care not to damage the hoses.
- Lower the pulley block and mount the screw connection (see drawing).



- 1 Pulley block
- 2 Castellated nut
- 3 Locking pin

- 4 Support
- 5 Pin



CAUTION

Always secure the castellated nut (2) of the screw connection (5) and (2) with a locking pin (3)!

7.3.11 Erecting the Cutter



The figure may differ from the original.

NOTE

- Adjust the cutter wheels so that 4 cutter teeth make contact with the ground while you are erecting the cutter.

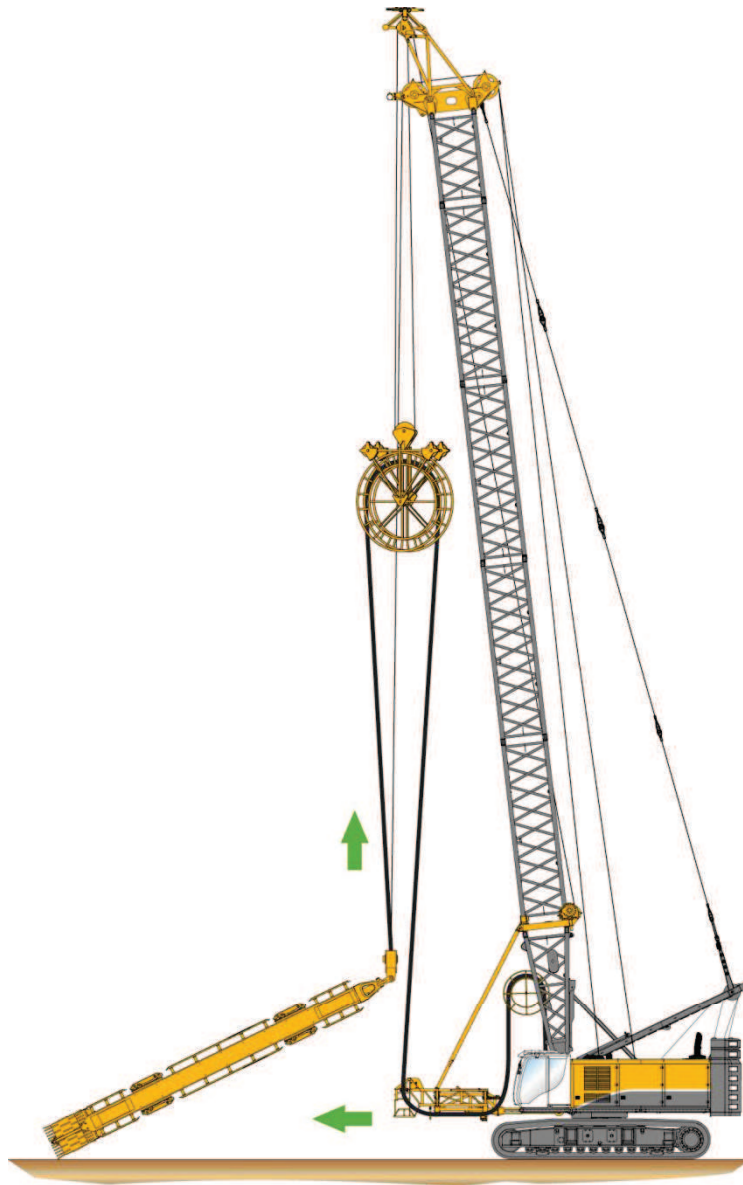


CAUTION

When erecting the cutter, make sure the base machine is moved slowly towards the cutter to prevent horizontal stresses from forming. Also lift the guide wheels individually and alternately to avoid overloading the upper hose guide.

- Wind in the cutter winch rope whilst slowly traveling towards the cutter with the base machine.
- Lift both hose wheels alternately.
- Gradually move the cutter into an upright position.
- ✓ The cutter is vertical.
- Lift the left hose wheel until the mud hose is lightly tensioned.
- Re-tension the recovery ropes of the mud hose.
- Lift the right hose wheel until the hydraulic hose belt is lightly tensioned.

- Close the clamping strip on the lower fix point in order to secure the hydraulic hoses.
- Re-tension the safety ropes of the hydraulic hose belt.



FQ00005445.PNG

7.4 DISASSEMBLING THE SYSTEM

The BAUER cutter is disassembled in the opposite sequence to the assembly process.

WARNING!



Danger of accident, shearing hazard, danger of getting crushed, hitting hazard!

If anyone becomes trapped between the equipment and suspended loads, body parts may be crushed or severed. Persons may be hit by falling loads and thus seriously or fatally injured.

- Only attach individual components to the designated attachment points.
- Only use suitable lifting devices.
- Always apply enough tensile stress to the attached lifting devices to prevent the component from tilting away or sliding down when the relevant connection elements are disconnected.
- Remove all tools, devices and work equipment from the unit once disassembly is complete.

WARNING!



Risk of injury and risk of causing damage!

Suddenly escaping media (for example hydraulic oil) can result in lacerations and cutting injuries.

- Ensure that components filled with media (for example hydraulic hoses) are depressurized prior to assembly/disassembly.



CAUTION

Risk of causing damage!

Seal the plugs of hydraulic lines and electric cables with dust caps immediately after disconnecting.



NOTE

Before starting disassembly, make sure there is sufficient free space around the equipment. The ground should be level and the equipment easy to reach from all sides. For lifting and loading work, use only the supplied, original lifting devices.

7.4.1 Removing the Cutter

- Align the upper carriage lengthwise to the undercarriage.
- The cutter is crosswise to the upper carriage.
- Close the ball cocks on the hydraulic lines to the cutter on the base machine connection plate.
- Place square timbers on the ground to lay the cutter on.
- Open the clamping strip on the lower fix point
- Disconnect safety ropes from the lower hose guide.
- Remove gear shields with the cutter wheels (if necessary).
- Activate manual mode of the HTS.
- Slowly reverse the base machine.
- Slowly lower the cutter and hose wheels.



CAUTION

Lower the two upper hose wheels, working with each wheel alternately to avoid excessive bending stress on the upper hose guide. The safe operating radius of the crane may not be exceeded and the cutter must be freely suspended by the cutter rope.

- Lay the cutter down on the prepared square timbers.
- Remove the pulley block from the cutter.
- Lift the pulley block.



NOTE

If the hydraulic hose belt and mud hose cannot be transported on the cutter in a horizontal position, they can be removed from the cutter at this stage.

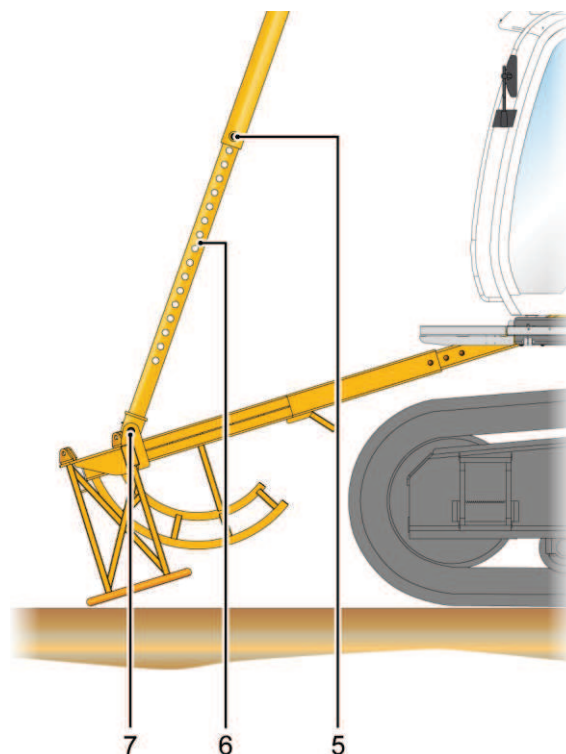
7.4.2 Removing the Hose Wheels

- Continue to reverse the base machine.
- Lower both hose guide wheels, set them down on the ground and secure them against toppling over.
- Undo the plug connection between the hose wheels and the corresponding pulley blocks.
- Lift the pulley blocks.
- Remove the safety ropes from the plastic rollers on the hose wheels.
- Lift the mud hose and hydraulic hoses from the hose wheels.
- Remove the hose wheels from the operating area.

7.4.3 Removing the Lower Fix Point

- Secure the hydraulic hose belt from rolling back by using the hose attachment.
- Slightly lower the hose attachment.
- Unplug the electric cable from the base machine connection plate.
- Remove the hydraulic lines of the cutter from the base machine connection plate.
- Remove the leak-oil line of the cutter from the leak-oil filter on the lower fix point.
- Carefully lift the hydraulic hose belt off the hose attachment and release it from the guide on the lower hose guide.
- Position the hydraulic hose belt on the cutter.
- Disconnect the mud hose from the flowmeter on the lower hose guide.
- Position the mud hose on the cutter.
- Disconnect the supply lines of the lower hose guide from the base machine.

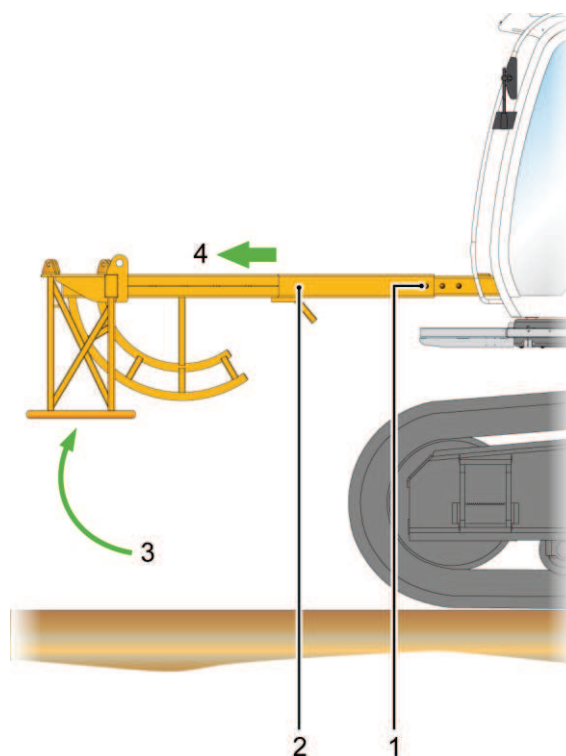
- Lower the boom until the supports of the lower hose guide touch the ground.
- Remove the plug connection of the length adjustment component (5) on the supports (6).
- Lower the boom further until the supports are completely retracted.
- Mount the plug connection of the length adjustment component (5) on the supports (6).
- Disconnect the lower hose guide from the supports by undoing the plug connection (7).



- Slightly lift the boom.
- Attach the supports to the boom butt with the plug connection (1).
- Connect the lower hose guide to a suitable lifting device.



- Lift the lower hose guide until it is horizontal.
- Secure the frame against falling.
- Remove the plug connection (1).
- Remove the lower hose guide from the frame (4).
- Disconnect the frame from the upper carriage by undoing the plug connections.
- ✓ The lower fix point is removed.



7.4.4 Lowering the Boom



For further information, please refer to the enclosed additional documentation entitled "Base machine"!

NOTE

7.4.5 Removing the Upper Fix Point

- Remove the pulley blocks of the hose wheels from the hose tension ropes.



The pulley blocks should be remounted on the hose wheels for transport.

NOTE

- Completely wind the hose tension ropes onto the hose tension winches.



If required, the rope sheaves can also be removed for transport.

NOTE

- Disconnect and separate the supply lines to the upper fix point.
- Connect the upper fix point to a suitable lifting device.
- Undo the plug connections between the boom head and the upper fix point.
- ✓ The upper fix point is removed.

7.4.6 Disassembling the Base Machine

- Disconnect the supply lines of the crossbeam from the upper carriage.
- Disassemble the base machine as described in the base machine instruction manual.

8 TRANSPORT

8.1 SAFETY GUIDELINES FOR TRANSPORT

- Only use hoisting equipment and lifting slings that have sufficient load-bearing capacity.

WARNING!



Risk of severe accident!

Attach lifting gear to the designated attachment points only. Attachment points for the equipment are painted GREEN and have a hook symbol. In addition, the weight that can be lifted is specified at each attachment point.

Attachment points for assemblies are painted RED.



CAUTION

The rope must be vertical at all times to prevent swinging. If the load begins to swing, set it down immediately and readjust until the rope is vertical again.

- Arrest and secure movable parts of the equipment.
- Check the work platforms are safely latched to the upper carriage.
- Store detached accessories only where they will not cause an obstacle (for example to traffic on public roads or on a construction site) and their security cannot be compromised by unintentional or unauthorized actions.
- Additionally, cover up and secure sharp edges, projecting points and cutting blades.
- The driver of the transporting vehicle is responsible for ensuring all of the equipment and accessories are restrained from movement and that they are properly tied down to the deck of the vehicle.
- The haulage contractor is fundamentally responsible for transporting the equipment and accessories.
- The haulage contractor must be informed of the transport dimensions, the weights and the route.
- A road permit must be obtained.

8.2 TRANSPORT MEASURES

8.2.1 Base Machine

The equipment must be in its transport position before it can be driven on the low-loading truck or lifted by a crane.

The equipment is in its transport position when

- all of the work equipment has been removed from the boom.
- the boom is removed.
- the upper carriage is in line with the undercarriage and locked to it.
- the crawlers are retracted.
- the counterweights have been removed (only if necessary).

After loading

- Move the pilot control safety stick to the "Off" position.
- Stop the engine and remove the ignition key.
- Lock the operator's cab and remove the key.
- Set the battery main switch to the "Off" position.
- Secure the equipment to the deck and tie it down.

8.2.2 Process Equipment

Before loading

The process equipment is in its transport position when:

- all movable parts are tied down.
- all supply lines are tied down.
- all components have been removed as described in the section "Rigging/derigging".

After loading

- Secure all process equipment components and tie them down to the deck.

Cutter gear shield



Risk of corrosion!

Corrosion may lead to serious damage on the cutter gear!

- The cutter gear must be filled with gear oil at all times - even during transport!

Gear shields can be transported in 2 different ways:

– **Horizontally mounted in the cutter**

Condition: Pressure compensator
connected



– **Upright in the transport frame**

Condition: Cover with pressure
relief/non-return valve
mounted on the gear



8.3 TYING DOWN

WARNING!



Risk of severe accident!

Attach the lashing chains only at the designated tying points.
Lashing chains must have sufficient load-bearing capacity.

8.3.1 Base Machine

Tying down

- Tie the equipment down on the transporting vehicle in a professional manner and in compliance with national regulations.
In principle, the haulage contractor is responsible for tying down the equipment properly.

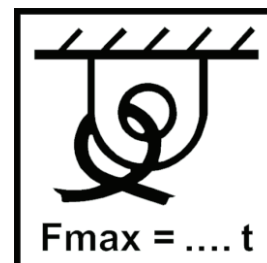
Example of tying points



8.3.2 Process Equipment

Tying points

- Tying points bear a hook symbol and indicate the max. pulling force to be applied or are color-coded.



Tying down

- Tie the process equipment down on the transporting vehicle in a professional manner and in compliance with regulations in the country of assignment.



NOTE

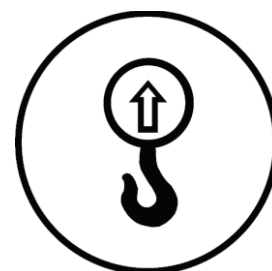
In principle, the haulage contractor is responsible for tying down the equipment properly.

8.4 LOADING AND UNLOADING

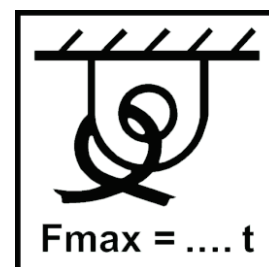
8.4.1 General

The lifting points on the equipment and its components or accessories are provided with corresponding color-coded symbols.

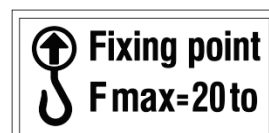
Example: Hook symbol to designate a lifting point.



Example: Tying point with specified maximum permissible pulling force.



Example: Lifting point with specified maximum permissible pulling force.



8.5 LOADING AND UNLOADING THE CUTTER



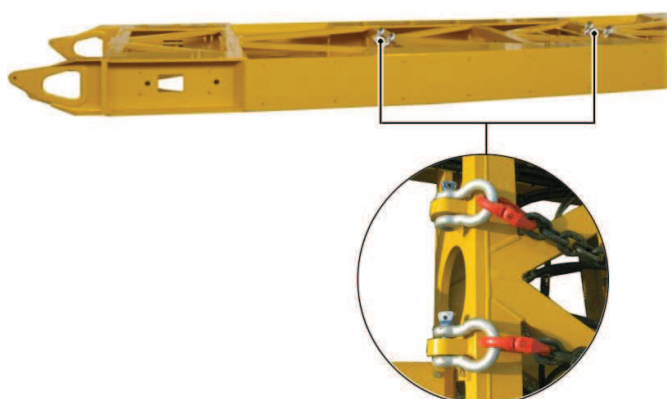
Danger of accident!

Unsuitable lifting devices and/or incorrect loading/unloading can result in the lifting device, the equipment or the transporting vehicle tipping over or the load falling off. Persons in the vicinity of the equipment could be hit and suffer severe or fatal injuries.

- It is fundamentally prohibited for persons to stand or work under suspended loads.
- Only use approved and undamaged lifting devices.
- Attach lifting accessories only to designated lifting points.
- Please note the change in weight distribution and the center of gravity with suspended loads.

8.5.1 Attaching the Cutter without Cutter Gear

- Attach a suitable lifting device to the cutter's central lifting points.



FG00004006.jpg

- Lift the cutter using a suitable auxiliary crane.



NOTE

For more information on the weight and dimensions of the cutter, please refer to the section "Transport data".

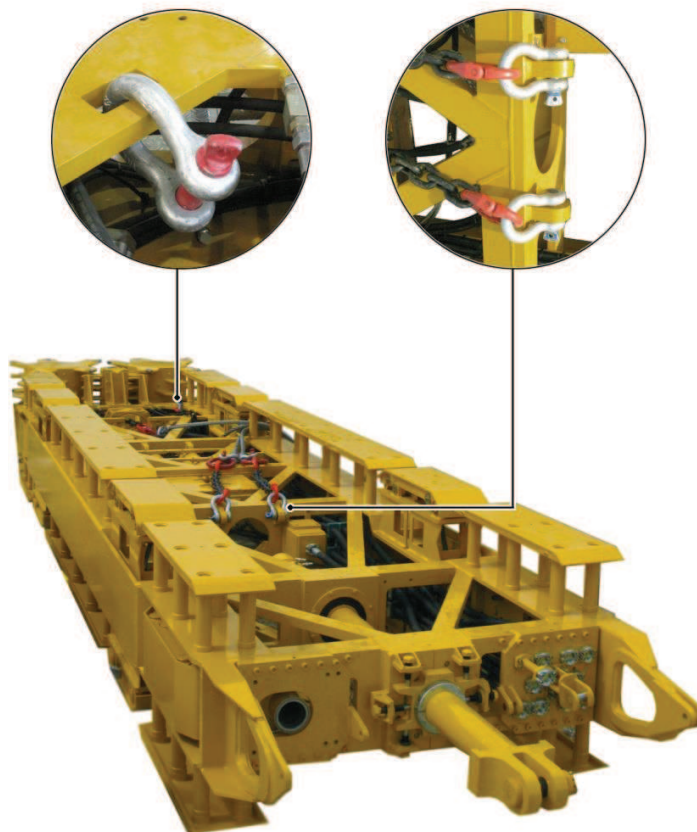
- Set the cutter down properly on the ground on square timbers.



F00004045.jpg

8.5.2 Attaching the Cutter with Cutter Gear

- Attach a suitable lifting device to the cutter's upper and lower lifting points.



FG00004007.jpg

- Lift the cutter using a suitable auxiliary crane.



NOTE

For more information on the weight and dimensions of the cutter, please refer to the section "Transport data".

- Set the cutter down properly on the ground on square timbers.



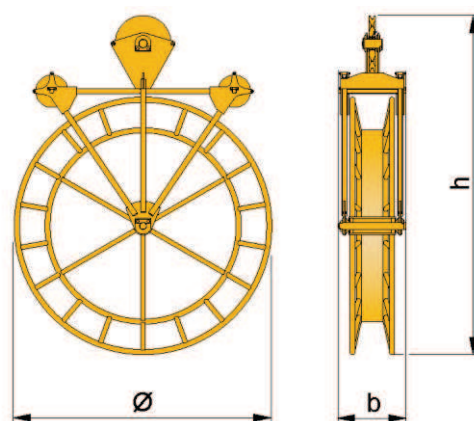
F00004046.jpg

8.6 TRANSPORT DATA

8.6.1 Process Equipment

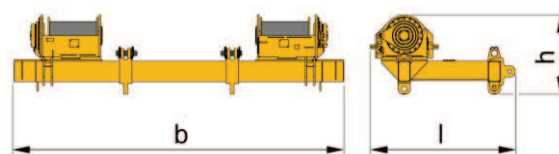
Hose wheel (2x)

Dimensions [mm]:	Diameter	(\emptyset)	2400
	Width	(b)	640
	Height	(h)	3160
Weight [t]:	per piece		0.55



Crossbeam with hose tension winches and ropes

Dimensions [mm]:	Length	(l)	1960
	Width	(b)	3854
	Height	(h)	1140

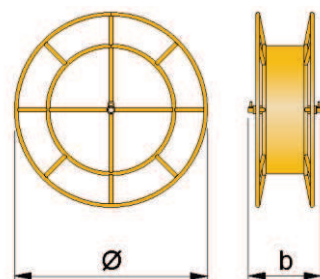


Weight [t]:	3.0
-------------	-----

Hose attachment

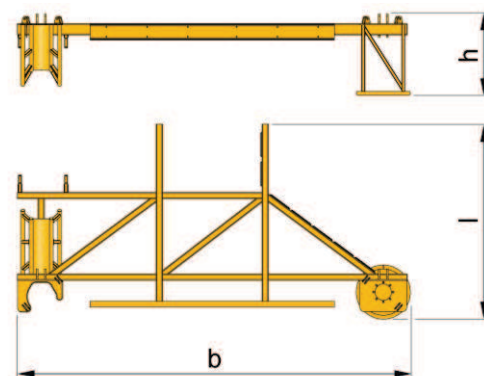
Dimensions [mm]:	Diameter	(\emptyset)	1530
	Width	(b)	500

Weight [t]:	0.1
-------------	-----



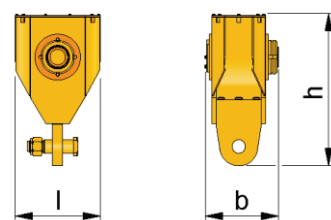
Lower hose guide

Dimensions [mm]:	Length	(l)	2200
	Width	(b)	4830
	Height	(h)	1074
Weight [t]:			1.2



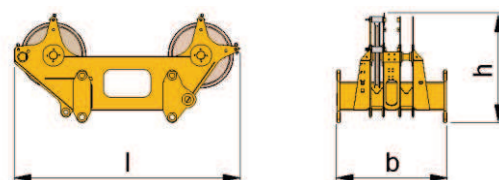
Pulley block

Dimensions [mm]:	Length	(l)	750
	Width	(b)	378
	Height	(h)	1340
Weight [t]:			0.6



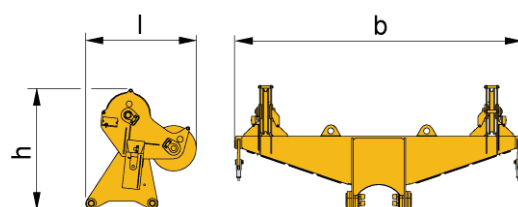
Boom head

Dimensions [mm]:	Length	(l)	2655
	Width	(b)	700
	Height	(h)	960
Weight [t]:			1.4



Fix point top

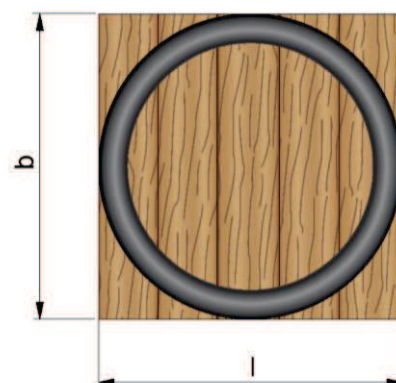
Dimensions [mm]:	Length	(l)	1195
	Width	(b)	3280
	Height	(h)	1415
Weight [t]:			0.9



Mud hose (34.5 m) on pallet

Dimensions [mm]:	Length	(l)	2400
	Width	(b)	2400
	Height	(h)	1300

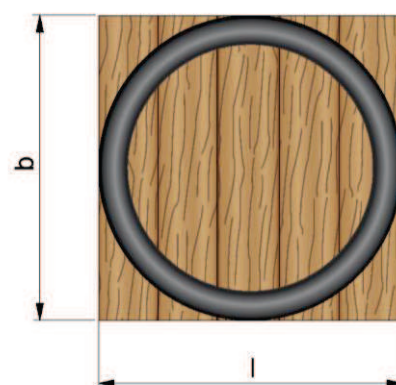
Weight [t]: 1.1



Mud hose (13.7 m) on pallet

Dimensions [mm]:	Length	(l)	2400
	Width	(b)	2400
	Height	(h)	1300

Weight [t]: 0.5



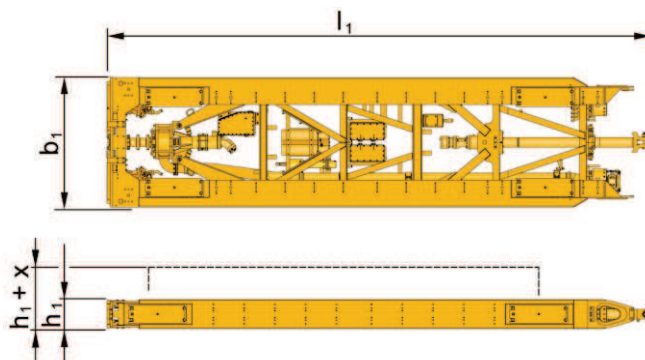
Component	Weight [t]
Hydraulic hoses	2.8

8.6.2 Cutter BC 40 # 0330 Working Width 916

without cutter gear

Dimensions [mm]:	Length	(l ₁)	11239
	Width	(b ₁)	2660
	Height	(h ₁)	916
		(x)	500

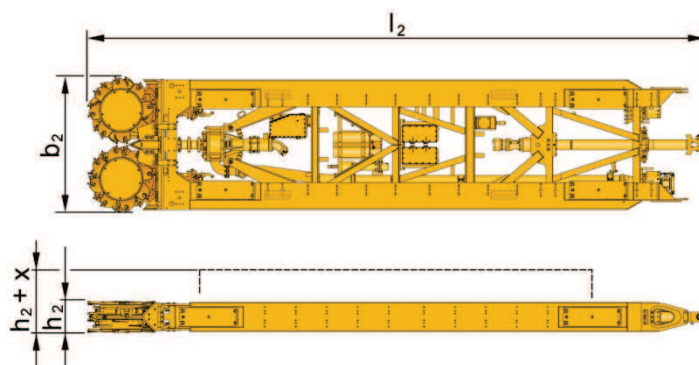
Weight [t] 25.6



with cutter gear

Dimensions [mm]:	Length	(l ₂)	12578
	Width	(b ₂)	2800
	Height	(h ₂)	916
		(x)	500

Weight [t] 35.4



Component	Weight [t]
Cutter gear (per piece)	4.28
Cutter wheels (4 pieces) with standard cutting teeth	2.31
Guide frame	0.96
Transport rack for cutter gear	0.23

9 MAINTENANCE

9.1 SAFETY GUIDELINES FOR MAINTENANCE

- Have maintenance work carried out by the after sales service only or by skilled personnel authorized by the after sales service.
- Only use genuine BAUER Maschinen GmbH spare parts.
- Observe the enclosed "Operating and safety instructions" booklet.
- Carry out maintenance at the prescribed intervals.
- Observe the maintenance instructions issued by the manufacturers of the equipment components.

9.1.1 Connection Elements

Screw connections and plug connections should always be manufactured according to the applicable standards of good practice.

Bolt torque values for bolts and screws can be found in generally accepted tables if no specific indication is made regarding the bolt torque values in the instruction manual or spare parts list.

9.1.2 Welding Work

General guidelines before starting any welding work:

- Shut down the equipment (see section "Shut-down").
- Disconnect the equipment from the power supply (actuate the battery main switch).
- Disconnect the cables from the negative terminals on the batteries.
- Protect heat-sensitive and combustible components on the equipment and surrounding area from heat radiation.
- Also protect sensitive electronic components from energy transfer. This includes removing the main connector from the control device.
- Connect the earth terminal of the welding tool to the weld point (always as close as possible to the weld point).

9.1.3 Pressure Containers

Pressure containers must be inspected, maintained, repaired, used and transported in accordance with country-specific or regional laws, regulations, guidelines and standards (in Germany, for example, according to DIN EN 13445 Part 2, among others).

Only have the pressure containers inspected by specially trained persons and serviced by appropriately authorized skilled personnel.

9.2 MAINTENANCE INTERVALS

Maintenance intervals must always be observed. In terms of maintenance, the value that is reached first is decisive (operating hours or time periods).

The maintenance intervals are specified as follows:

- **Every 10 hours of operation or daily**
- **Every 50 hours of operation or weekly**
- **Every 250 hours of operation or monthly**
- **Every 500 hours of operation or every three months**
- **Every 1000 hours of operation or yearly**
- **Every 2000 hours of operation or yearly**
- **Every 3000 hours of operation or every two years.**



NOTE

The operating hours specified in the instruction manual correspond to the number of hours displayed on the operating hours meter.

The operating hours meter can be found in the base machine cab.

For normal operation, the intervals are cumulative, meaning that when the 1000 hours maintenance is due, the 10, 50, 250 and 500 hours servicing will also have to be carried out again.

If the equipment is used under extremely wet and dusty conditions, it may be necessary to reduce the maintenance intervals.



NOTE

Maintenance work prescribed by the manufacturer must be carried out regularly, in full and documented accordingly.

Maintenance carried out on the equipment must be documented completely by a responsible person in the "Maintenance and Repair Log" and countersigned accordingly.

Defects liability claims can only be granted if the "Maintenance and Repair Log" has been completed consistently.

In case of claims for defects liability, BAUER shall have the right to consult the "Maintenance and Repair Log".

9.3 MAINTENANCE PLAN

9.3.1 Entire Equipment

Table: Entire equipment

Assemblies Task	Maintenance interval							Comment
	10 h / daily	50 h / weekly	250 h / monthly	500 h / every 3 months	1000 h / yearly	2000 h / yearly	3000 h / every 2 years	
Entire equipment								
Visual inspection								
- Missing or damaged parts	X							
- Load-bearing steel components (e.g. the undercarriage, upper carriage, boom, auxiliary boom, supporting boom, winch trestles and the connection between the eye joints to hydraulic cylinders and piston rods) should be visually inspected to check for cracks and other damage		X						
- Missing or loose pins/screw connections	X							
- Missing or damaged safety equipment, such as fire extinguishers, first aid box, warning signs	X							
- Leaks	X							
Function checks								
- Controls and indicators	X							
- Safety devices such as Emergency STOP, pilot control safety stick, limit switches, hoist limit switches	X							
- Free-fall function (optional)	X							
Work platforms								
- Check for missing or loose pin/screw connections	X							
- Check the locks for functionality and ease of movement		X						
Expert inspection						X		

* only during the running-in period

9.3.2 Hydraulic System

Assemblies Task	Maintenance interval						Comment
	10 h / daily	50 h / weekly	250 h / monthly	1000 h / yearly	1500 h / yearly	2000 h / yearly	
Hydraulic system							
Check the entire hydraulic system for tightness and inspect for damage	X						
Take an oil sample and check for foreign particles			X				
Take an oil sample and conduct a chemical analysis				X			

9.3.3 Attachments

Assemblies Task	Maintenance interval						Comment
	10 h / daily	50 h / weekly	250 h / monthly	1000 h / yearly	1500 h / yearly	2000 h / yearly	
Boom head							
Visually check steel components to ensure they are complete and intact (damage, cracks, wear, corrosion)	X						
Check to ensure the connection elements are complete and in proper working order.	X						
Check to ensure the limit switches are in proper working order	X						
Clean	X						whenever necessary
Check to ensure rope sheaves are intact, exhibit low play and are in proper working order.		X					
Check to ensure all screw connections are secure; re-tighten if necessary.			X				
Check rope sheaves for impermissible deviations in dimension and shape.			X				
Lubricate the rope sheave bearings.			X				
Hose tension device							
Visually check steel components to ensure they are complete and intact (damage, cracks, wear, corrosion)	X						
Check to ensure the connection elements are complete and in proper working order.	X						
Clean	X						whenever necessary
Hose tension winch							
Further information can be found in the enclosed additional documentation.							

MAINTENANCE



Assemblies Task	Maintenance interval						Comment
	10 h / daily	50 h / weekly	250 h / monthly	1000 h / yearly	1500 h / yearly	2000 h / yearly	
Ropes, rope fasteners, thimbles and sleeves							
Further information can be found in the enclosed additional documentation.							
Check for proper working order	X						
Clean	X						whenever necessary
Apply corrosion protection							Depending on the weather and ambient conditions.
Replace ropes with new ones							According to the specifications of the rope manufacturer

9.3.4 Process Equipment

9.3.4.1 HTS

Assemblies Task	Maintenance interval						Comment
	10 h / daily	50 h / weekly	250 h / monthly	1000 h / yearly	1500 h / yearly	2000 h / yearly	
Upper fix point							
Visually check steel components to ensure they are complete and intact (damage, cracks, wear, corrosion)	X						
Check to ensure the connection elements are complete and in proper working order.	X						
Check to ensure the limit switches are in proper working order	X						
Clean	X						whenever necessary
Check to ensure rope sheaves are intact, exhibit low play and are in proper working order.		X					
Check to ensure all screw connections are secure; re-tighten if necessary.			X				
Check rope sheaves for impermissible deviations in dimension and shape.			X				
Lubricate the rope sheave bearings.			X				
Lower fix point							
Visually check steel components to ensure they are complete and intact (damage, cracks, wear, corrosion)	X						
Check to ensure the connection elements are complete and in proper working order.	X						
Check to ensure the connection elements for the flowmeter are complete and in proper working order.	X						
Clean	X						whenever necessary
Check to ensure all screw connections are secure; re-tighten if necessary.			X				

Assemblies Task	Maintenance interval						Comment
	10 h / daily	50 h / weekly	250 h / monthly	1000 h / yearly	1500 h / yearly	2000 h / yearly	
Supports							
Visually check steel components to ensure they are complete and intact (damage, cracks, wear, corrosion)	X						
Check to ensure the connection elements are complete and in proper working order.	X						
Clean	X						whenever necessary
Lubricate joints of the supports			X				
Flowmeter							
Further information can be found in the enclosed additional documentation.							
Hydraulic hose belt							
Clean	X						whenever necessary
Check for proper working order	X						
Mud hose							
Clean	X						whenever necessary
Check for proper working order	X						
Hose wheels							
Visually check steel components to ensure they are complete and intact (damage, cracks, wear, corrosion)	X						
Check to ensure the connection elements are complete and in proper working order.	X						
Clean	X						whenever necessary
Check to ensure rope sheaves are intact, exhibit low play and are in proper working order.		X					
Check rope sheaves for impermissible deviations in dimension and shape.			X				

9.3.4.2 Cutter

Assemblies Task	Maintenance interval						Comment
	10 h / daily	50 h / weekly	250 h / monthly	1000 h / yearly	1500 h / yearly	2000 h / yearly	
Complete cutting system							
Service Log File							
Visual check	X						
Check tightness of all bolts and fasteners on ladders, handrails and walkways.		X					
Check the functionality of control units.	X						
Check to ensure all pins are firmly tightened	X						
Check hydraulic hoses and electric cables for wear and damage.	X						
Check the functionality of safety devices such as the Emergency STOP, pilot control safety stick, hoist limit switches and load limiters.	X						
Adjust the inclinometer			X				
Expert inspection				X			
Check all screwed connections for correct torque		X					
Clean oil bubbles of pressure compensator (mud pump and cutter wheels).					X		Specialized personnel only
Turning device oil change				X			
Renew drying agent of electrical box.				X			
Check hydraulic hoses and mud hose for damage.	X						
Grease pivots of mud hose.			X				Only by BAUER after sales service
Rope guide sheaves:							
Check for wear, damage, and excessive play			X				
Check for ease of movement			X				
Check center pins are firm			X				
Check sheaves for burrs and edges, check contact surfaces for correct diameter.					X		

Assemblies Task	Maintenance interval						Comment
	10 h / daily	50 h / weekly	250 h / monthly	1000 h / yearly	1500 h / yearly	2000 h / yearly	
Cutter							
Mud pump:							
Check the oil level.	X						
Take an oil sample and check for solids, bentonite, water and other impurities.		X					
Check the upper bearing ring seal.		X					In cold condition
Flush the lower bearing ring seal		X					
Change the oil			X				
Retighten bolts.		X					
Cutter gear:							
Check oil level	X						
Check leak oil (inspect bearing ring seal).		X					
Take an oil sample and check for solids, bentonite, water and other impurities (stage 1).	X						
Let the oil sample stand for approx. 10 hours and then check it (stage 2).	X						
Retighten bolts.		X					
Check wear plates and wear washers for wear.	X						
Oil change and oil analysis (lab)			X				
Oil analysis report							to BAUER
Cutter gear service					X		
Cutter wheels:							
Clean	X						
Check for wear and replace teeth (if necessary)	X						
Check clearance between cutter tooth and suction device	X						
Check flipper teeth for wear and proper function	X						
Suction device:							
Check for wear		X					
Check all inlet openings for correct diameter		X					Ø max. 90 mm
Check the tightness of all screw connections; retighten as necessary	X						

Assemblies Task	Maintenance interval						Comment
	10 h / daily	50 h / weekly	250 h / monthly	1000 h / yearly	1500 h / yearly	2000 h / yearly	
Cutter							
Steering flaps:							
Check for wear.			X				
Check all steering flap cylinders for tightness.			X				
Check wear plates on either side of the gear shields and tighten bolts.		X					Thickness: min. 3 mm
Inspect the cutter frame and extensions for wear and damage; check to ensure all connection elements are in order.	X						
Change the mounting ring between the flowmeter and mud hose.						X	Or when worn
Pulley block:							
Change the oil						X	
Grease connection to the cutter.						X	
Flowmeter:							See appendix

9.4 MAINTENANCE DURING LONGER PERIODS OF STANDSTILL

9.4.1 Cutter

9.4.1.1 Shutting Down for a Longer Period

If the cutter is being shut down or put into storage for a prolonged period, the following measures must be observed:

- Check all oil levels and top up if necessary.
- If the oil is visibly contaminated, it must be changed before shutting down the equipment.
- Check to ensure the oil in the cutter gear is free of air bubbles.



NOTE

All of the instructions for checking and changing the oil can be found in section 9: Maintenance

- The cutter gears must remain mounted in the cutter frame and the pressure compensator must remain connected to the cutter gears.
- All hydraulic cylinders must be fully retracted. Piston rods which are kept extended during rest must be oiled to protect them from corrosion.
- All moving parts must be oiled or lubricated.
- All hoses must be covered / protected from sunlight.

9.4.1.2 Start-up after a Prolonged Standstill

If the cutter is being restarted or taken out of storage after a prolonged standstill, the following measures must be observed:

- Check all oil levels and top up if necessary.
- Check all of the hoses for cracks and ensure their permitted service life has not expired.
- Check all movable parts are free to move; make them run freely.
- When the system has been set up, test-run the cutter system for approx. 15 minutes. Then visually inspect the cutter all around.



CAUTION

All of the prescribed maintenance intervals apply even if the cutter has not been operated for a prolonged period. Maintenance work that has been omitted during a standstill must be carried out before the cutter is started up again.

9.5 ROPE ACCESSORIES

9.5.1 Rope Swivel

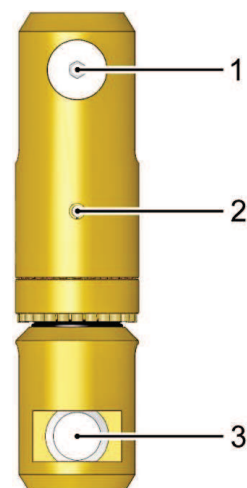
Every 10 operating hours or daily:

- Lubricate the rope swivel (2) until grease exits from the side of the housing.
- Check rotatability.

Check rotatability manually with no suspended load.

If the rope swivel will not rotate properly after it has been relubricated, repair or replace it with a new one.

- Check mounting bolts (1; 3) are secure.
Re-tighten any loose mounting bolts. Replace the bolts if they are worn or exhibit excessive play.



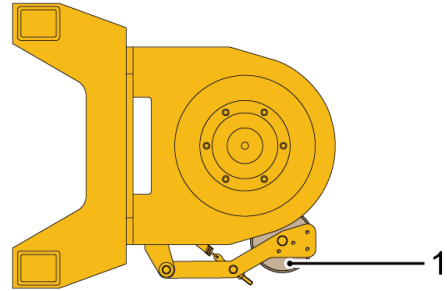
CAUTION

If the Kelly bar is accidentally dropped and is then restrained by the main rope, inspect the swivel **immediately** and with the greatest care.

9.5.2 Rope Hold-down Rollers

Every 50 operating hours or weekly:

- Check the rope hold-down rollers (1) for wear and proper function.
- Check the rope hold-down roller (1) is parallel to the rope drum.
- Check to ensure the mounting bolts are secure.
- Adjust the tension screws until all tension springs are equal. Do not excessively tension worn tension springs but replace them with new ones.
- Realign any protecting bars that are bent, or replace them with new ones.
- Replace the center pins, sleeves and spacers if they demonstrate excessive play.
- If grooves have been created in a rope hold-down roller (1), reface the roller (by turning it on a lathe), or replace it with a new one.
Note that a refaced rope hold-down roller (1) will have a diminished diameter so that the pre-stressing of the tension springs must be adjusted accordingly.



9.5.3 Rope Fasteners, Thimbles and Sleeves

Every 10 operating hours or daily:

- Check to ensure the wire rope is firmly in place in the fitting.
- With poured rope fittings, inspect for broken wires and corrosion directly where the rope exits the fitting.
- With swaged-on rope fittings, inspect for broken wires next to the fitting, cracks in the material and firm seizure of the rope.



CAUTION

Danger of the wire rope breaking!

If defects occur, shorten the rope and reconnect it.

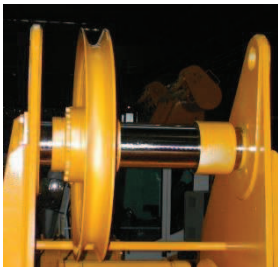
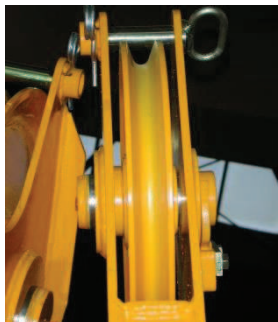


9.5.4 Rope Sheaves



Risk of causing damage to the rope!

Sluggish or seized rope sheaves result in excessive wear of the wire rope. Repair or replace sluggish or seized rope sheaves if the defect cannot be corrected by lubrication.

Lubricating rope sheaves

Rope sheave type	Maintenance interval	Maintenance instructions
Rope sheaves with floating bearings 	10 operating hours/daily	
Rope sheaves with rolling bearings 	1000 operating hours/yearly	Risk of causing damage to the bearing seal!  CAUTION Lubricate while the rope sheave is rotating. Press grease in very slowly to prevent the bearing seal from being squeezed out.
Rope sheaves lubricated by the central lubrication system 	Automatic	

Check rope sheaves

Task	Maintenance interval	Maintenance instructions
Check rotatability of the rope sheave.	250 operating hours/ monthly	
Check bearing play and attachment of the rope sheave pins.	250 operating hours/ monthly	
Check groove radii for deviations in dimension and edge formation.	1000 operating hours/yearly	In the event of deviations re-machine the grooves and/or replace the rope sheaves.

9.6 CUTTER

9.6.1 Cutter Gear

WARNING!

Danger of accident!



Due to rotary movements of the cutting wheel, persons may be hit or entangled and seriously or fatally injured as a result.

- Do not insert any body parts between moving components.
- When working on the cutter, press the EMERGENCY STOP on the remote control for the cutting wheels.

Risk of causing damage to components!



Incorrectly performed welding work can damage the teeth, bearings, and seals.

- Always connect the earth terminal of the welding tool as close as possible to the weld point.
- Do not guide the earth terminal of the welding tool over teeth, bearings or seals.
- Contact BAUER after sales service.

9.6.1.1 General Service and Maintenance Information

Cutter gears generate powerful forces in order to process various layers of soil with the cutter wheels. In addition, the cutter gears are subjected to abrasive wear by the slurry. Seals (e.g. bearing ring seals) which prevent oil from mixing with water and bentonite are subjected to high loads during operation.

If the wear limit of these seals has been reached, foreign particles (such as water, bentonite and suspension) can contaminate the gear oil.



CAUTION

Risk of causing damage to the cutter gear!

If operation is continued with contaminated gear oil, there is a risk of damage to the cutter gear. The cutter gear will then no longer be operational.

- Do not operate the cutter gear if the gear oil is contaminated.
- Observe the operation chart for contaminated gear oil.

The degree of wear of a seal depends on the type and amount of contamination of the gear oil.

Reasons for contaminated gear oil in the cutter gear:

- Bearing ring seal has reached its wear limit.
- Pressure compensator has not been checked correctly.
- Flipper tooth has not been checked correctly.
- Welding work on the cutter wheel has been carried out improperly
- New gear oil has been contaminated with water due to incorrect storage on-site.
- Malfunctions which adversely affect the pressure compensation system.

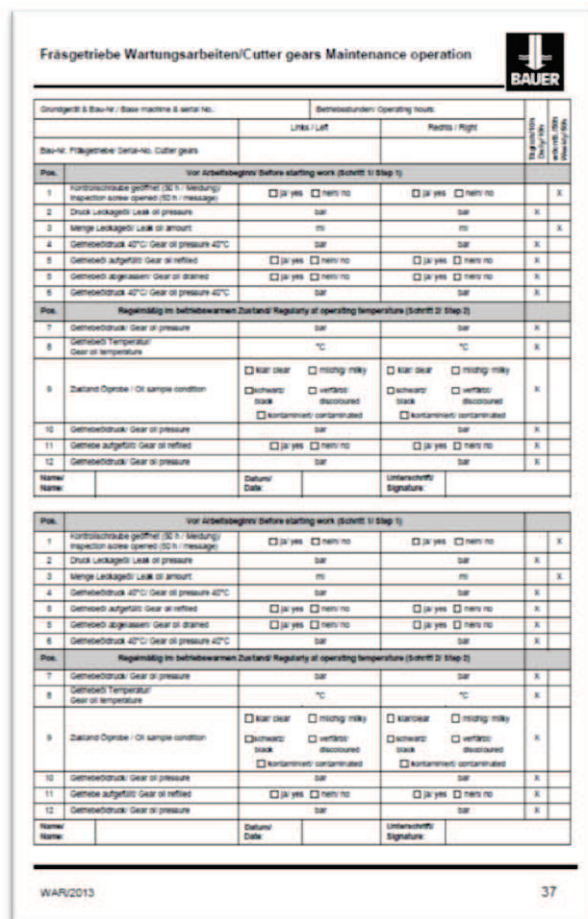
Documenting maintenance work for the cutter gear

The condition of the oil in the cutter gears is one of the most important factors affecting the service life and service costs of the cutter gear.

All maintenance work on the cutter gear must be documented (see Maintenance and Repair Log "Cutter gear maintenance work") and implemented from the initial start-up phase.

The "Operation chart for contaminated gear oil" must be followed in the event of impurities in the gear oil.

An analysis of the oil sample must be implemented at regular intervals (see maintenance plans). The result of this analysis and the data from the B-Tronic service log file must be made available to BAUER's after sales service.



Pos.	Process
1.	<ul style="list-style-type: none"> Open the leak oil drain screw (see section "Checking the leak oil").
2	<ul style="list-style-type: none"> Check the leak oil pressure on the B-Tronic screen (see B-Tronic operating instructions).
3	<ul style="list-style-type: none"> Collect the leak oil in a suitable container (see section "Checking the leak oil").
4	<ul style="list-style-type: none"> Check the gear oil pressure on the B-Tronic screen (see B-Tronic operating instructions) before draining/topping up the oil.
5	<ul style="list-style-type: none"> Fill/drain the gear oil in the cutter gear as described in the sections "Checking the gear oil", "Filling gear oil" and "Topping up gear oil").
6	<ul style="list-style-type: none"> Check the gear oil pressure on the B-Tronic screen (see B-Tronic operating instructions) after draining/topping up the oil.
7	<ul style="list-style-type: none"> When operating temperature is reached, check the gear oil pressure on the B-Tronic screen (see B-Tronic operating instructions).

Pos.	Process
8	<ul style="list-style-type: none"> When operating temperature is reached, check the temperature of the gear oil on the B-Tronic screen (see B-Tronic operating instructions).
9	<ul style="list-style-type: none"> Take an oil sample and analyze the quality of the oil. Have the oil analyzed at regular intervals (see section "Checking the gear oil").
10	<ul style="list-style-type: none"> After taking the oil sample check the gear oil pressure on the B-Tronic screen (see B-Tronic operating instructions).
11	<ul style="list-style-type: none"> Top up the gear oil if necessary (see section "Topping up gear oil").
12	<ul style="list-style-type: none"> After topping up the gear oil check the gear oil pressure on the B-Tronic screen (see B-Tronic operating instructions).

Operation chart for contaminated gear oil

The "Operation chart for contaminated gear oil" (see section "Checking the gear oil") is aimed at reducing wear and increasing the service life of components. The use of the operation chart and documentation in the Maintenance and Repair Log should ensure that timely measures can be taken to prevent costly repair or total losses.

Slight leak:

A slight leak exists if there is water or bentonite in the gear oil, but there are no visible external leaks.

Recommended measures:

- Check and follow the operation chart for contaminated gear oil.
- Carry out and document maintenance in accordance with the maintenance plans and Maintenance and Repair Log.

Extensive leak:

An extensive leak exists if oil is visible around the bearing ring seal on the cutter gear.

Recommended measure:

- Shut down the cutter gear.
- Service the cutter gear.

Internal mechanical wear:

Internal mechanical wear exists if an internal component can no longer carry out its intended function. This is made visible by a large quantity of metal cuttings in the gear oil. The size and shape of the cuttings are relevant.

Recommended measure:

- Shut down the cutter gear.
- Service the cutter gear.

9.6.1.2 Checking the Gear Oil



Risk of causing damage to the cutter gear!

Impurities in the gear oil can damage the cutter gear!

- Have the oil analyzed by a certified laboratory or BAUER's after sales service every time the oil is changed and if the oil is thought to be contaminated.
- Refer to the "Oil quality control" information sheet from the service kit.
- If the oil is found to be contaminated (for example with water, bentonite, refraction anomalies, metallic particles, etc.), the cutting operation must be stopped immediately.
- Check and follow the operation chart for contaminated gear oil.
- Have the cutter gears serviced by BAUER service personnel or authorized skilled personnel.

The oil in the cutter gears must be checked at operating temperature and refilled if necessary. The process for checking the gear oil is divided into "stage 1" and "stage 2".

Stage 1: Take an oil sample using the sample container intended for this purpose (see BAUER "Oil quality check" service kit).
Visually inspect the sample for water, bentonite, refraction anomalies, metallic particles and other impurities.

Stage 2: Store any previous oil samples safely (see BAUER "Oil quality control" service kit).
Store the oil sample for at least 10 hours and then check for deposits such as water, bentonite, metallic particles and other impurities.

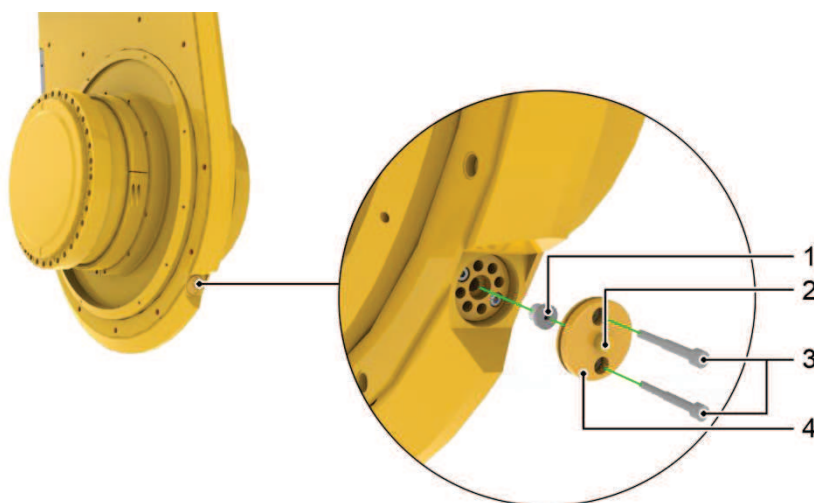


NOTE

Cutting operation may be continued during "stage 2" if the preconditions of "stage 1" are fulfilled.

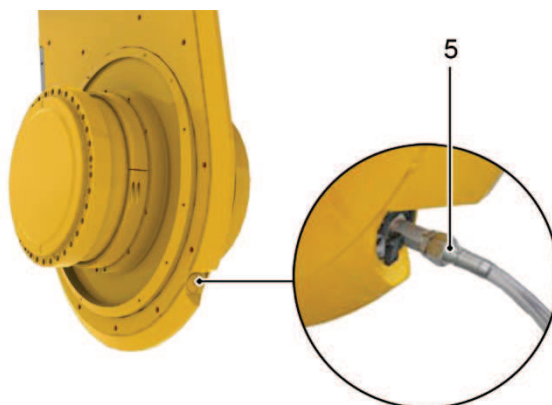
Prerequisite:

- The gear shield has been thoroughly cleaned around the screw cap.
- The sample container from the BAUER "Oil quality control" service kit is available and ready for use.
- A sufficient quantity of fresh gear oil is available.
- The oil in the cutter gears is at operating temperature.
- The Emergency STOP button on the remote control for the cutter wheels has been pressed and the cutter shut down.



Stage 1:

- Remove the cover (4) with the relevant screw connections (3).
 - Remove the screw connection (1).
 - Attach the adapter (5) for taking the oil sample to the relevant filler hole.
 - Drain approximately 100 ml of oil into the sample container (see BAUER service kit).
 - Visually inspect the sample for water, bentonite, refraction anomalies, metallic particles and other impurities.
- ✓ No impurities present: The cutter gear is ready for operation.
- ✓ Impurities present: The cutter gear is not ready for operation.



- Check/change the gear oil as described in the "Operation chart for contaminated gear oil".
- ✓ The gear oil has been checked and deemed in good condition.
- Remove the adapter (5).
- Mount the screw connection (1).
- Mount the cover (4) with the relevant screw connections (3).
- ✓ "Stage 1" for checking the gear oil has been carried out correctly.

Stage 2:

- Allow the oil sample from "Stage 1" to settle for at least 10 hours.
- Visually inspect this oil sample checking for water, bentonite, refraction anomalies, metallic particles and other impurities.
- ✓ No impurities present: The cutter gear is ready for operation. "Stage 2" test procedure has been carried out correctly.
- ✓ Impurities present: The cutter gear is not ready for operation. Observe the operation chart for contaminated gear oil.
- Check/change the gear oil as described in the "Operation chart for contaminated gear oil".
- Have the cutter gear serviced if necessary.

9.6.1.3 Operation Chart for Contaminated Gear Oil

The "Operation chart for contaminated gear oil" (see section "Checking the gear oil") is aimed at reducing wear and increasing the service life of components. The use of the operation chart and documentation in the Maintenance and Repair Log should ensure that timely measures can be taken to prevent costly repair or total losses.

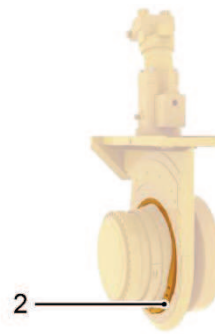
Cutter gear	Causes	Recommended measures
Slight leak	<ul style="list-style-type: none"> - Water or bentonite are detected in the gear oil. - External leakage is not visible. 	<ul style="list-style-type: none"> – Check and follow the operation chart for contaminated gear oil. – Implement and document maintenance work in accordance with the maintenance plans.
Extensive leak	<ul style="list-style-type: none"> - Oil is visible in the area of the bearing ring seal. 	<ul style="list-style-type: none"> – Shut down the cutter gear. – Have the cutter gear serviced by the manufacturer.
Internal mechanical wear	<ul style="list-style-type: none"> - Internal component does not fulfill its function. - Various metal particles visible in the gear oil (size and shape of the metal particles are relevant here). 	<ul style="list-style-type: none"> - Shut down the cutter gear - Have the cutter gear serviced by the manufacturer.

Initial situation:

- The first oil sample is contaminated
- The cutter gears have been cleaned.

Goal:

- The bearing ring seal in the cutter gear is checked for proper function.



- Visual inspection of the cutter gear for oil residues (2).
- ✓ No oil residues in the form of droplets/rivulets on the cutter gear.

↓ Yes

↓ No

- Change the gear oil.
- Clean and vent the pressure compensator.
- Let the cutter wheels turn for 10 minutes at a minimum cutter gear operating temperature of 40 °C.

- Have the cutter gear serviced.
- ✓ The cutter gear is not ready for operation.

↓ Yes

- Visual inspection of the cutter gear for oil residues (2).
- Take a second oil sample from the cutter gear.
- ✓ No oil residues in the form of droplets/rivulets on the cutter gear.
- ✓ Gear oil is not contaminated.

↓ Yes

↓ No

- Send both oil samples to an appropriate laboratory/BAUER after sales service for analysis.
- ✓ The cutter gear is ready for operation.

- Have the cutter gear serviced.
- ✓ The cutter gear is not ready for operation.

↓ Yes

- Check to ensure proper condition of the gear oil on a daily basis.
- ✓ Gear oil is not contaminated.
- ✓ Laboratory/BAUER after sales service confirms proper condition of the gear oil.



Yes

- ✓ The cutter gear is ready for operation.
- ✓ Bearing ring seal is not defective.
- Maintain the cutter gear in accordance with the maintenance plans.



No

- Have the cutter gear serviced.
- ✓ The cutter gear is not ready for operation.

9.6.1.4 Filling in Gear Oil



Risk of causing damage to the cutter gear!

Air in the cutter gear and the hose lines can cause damage to the cutter gear.

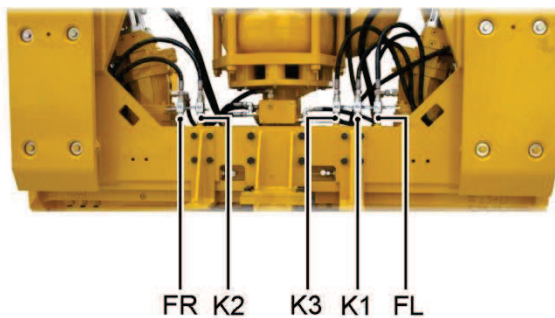
- The gear oil, which drains out near the ball cock, must be free from air bubbles.
- If the refiller has sucked in any air, it must be pre-pumped again until the refiller hose is filled.

Prerequisite:

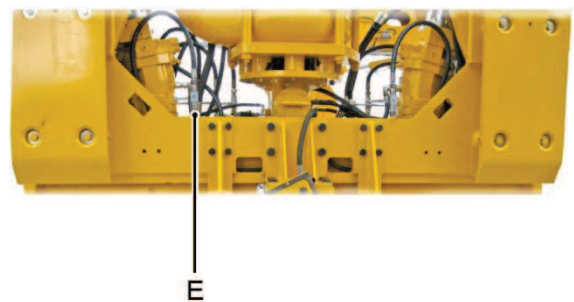
- The cutter is shut down
- A sufficient quantity of fresh gear oil is available.
- A suitable container for the waste oil is available.

Left cutter gear:

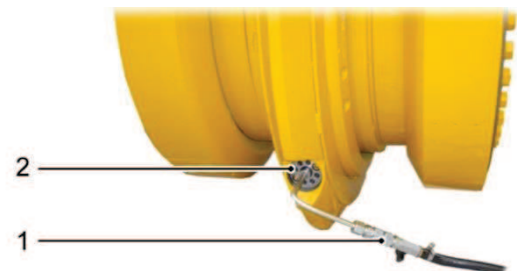
Front view



View from the rear



- Remove the ball cock (FL) and the ball cock (E) from the cutter frame.
- Open the ball cock (E).
- Pre-pump the refiller (1) until the refiller hose is full.
- Connect the refiller (1) to the filler hole (2).

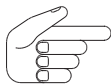


Risk of causing damage to the bearing ring seal!


There is a risk of damage to the bearing ring seal if the oil is pumped into the cutter gear with excessive pressure.

- The oil must be pumped slowly into the cutter gear (6 to 8 strokes per minute).

- Slowly pump the oil (6 to 8 strokes per minute) until it escapes from the ball cock (E) without any air bubbles (at least 2 liters).
- Close the ball cock (E) and mount on the cutter frame.
- Open the ball cock (FL).
- Slowly pump the oil (6 to 8 strokes per minute) until it escapes from the ball cock (FL) without any air bubbles (at least 3 liters).
- Close the ball cock (FL) and mount on the cutter frame.
- Remove the refiller (1) from the filler hole (2) and replace the cover and the relevant screw connections.



NOTE

Warm up the cutter gear using the  button or set the speed to 15 rpm.

- Allow the left cutter gear to warm up to 40 °C.

Risk of causing damage to the pressure compensator!



CAUTION

If the oil pressure in the cutter gear is too high and/or the bladder in the pressure compensator is too old, the bladder may be pressed out of the pressure compensation reservoir and damaged.

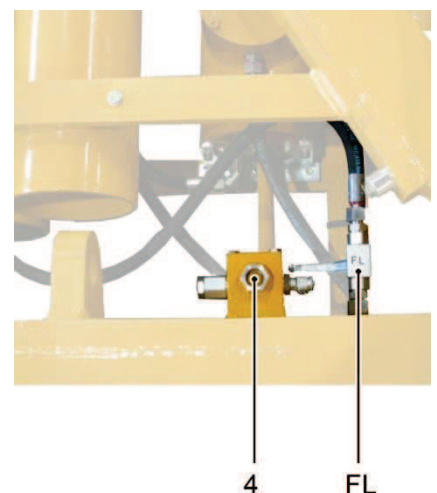
- Check the oil pressure in the cutter gear and adjust if necessary.
- Change/replace the pressure compensator bladder.

- Top up (4) or drain (FL) oil on the pressure compensator until an oil pressure between 0.4 and 0.5 bar is displayed on the B-Tronic operating screen.
- ✓ The pressure compensation bladder is not pressed out of the pressure compensation reservoir.
- ✓ The left cutter gear is filled with oil.



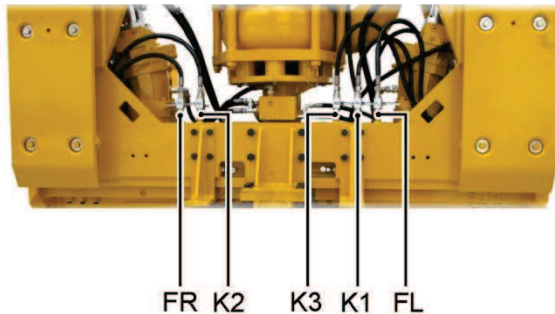
NOTE

The gear oil can be filled via the filler hole on the cutter gear (2) and via the filler hole on the pressure compensator (4).

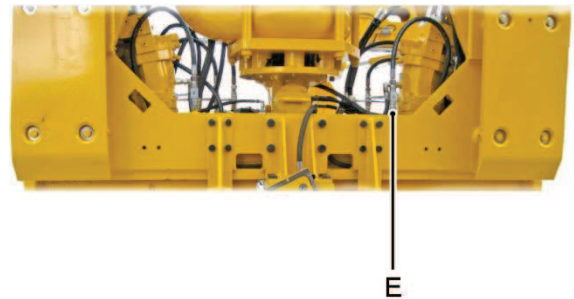


Right cutter gear:

Front view



View from the rear



- Remove the ball cock (FR) and the ball cock (E) from the cutter frame.
- Open the ball cock (E).
- Pre-pump the refiller (1) until the refiller hose is full.
- Connect the refiller (1) to the filler hole (2).



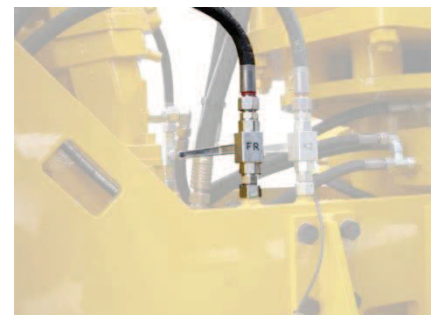
CAUTION

Risk of causing damage to the bearing ring seal!

There is a risk of damage to the bearing ring seal if the oil is pumped into the cutter gear with excessive pressure.


- The oil must be pumped slowly into the cutter gear (6 to 8 strokes per minute).

- Slowly pump the oil (6 to 8 strokes per minute) until it escapes from the ball cock (E) without any air bubbles (at least 2 liters).
- Close the ball cock (E) and mount on the cutter frame.
- Open the ball cock (FR).
- Slowly pump the oil (6 to 8 strokes per minute) until it escapes from the ball cock (FR) without any air bubbles (at least 3 liters).
- Close the ball cock (FR) and mount on the cutter frame.
- Remove the refiller (1) from the filler hole (2) and replace the cover and the relevant screw connections.





NOTE

Warm up the cutter gear using the  button or set the speed to 15 rpm.

- Allow the right cutter gear to warm up to 40 °C.



CAUTION

Risk of causing damage to the pressure compensator!

If the oil pressure in the cutter gear is too high and/or the bladder in the pressure compensator is too old, the bladder may be pressed out of the pressure compensation reservoir and damaged.

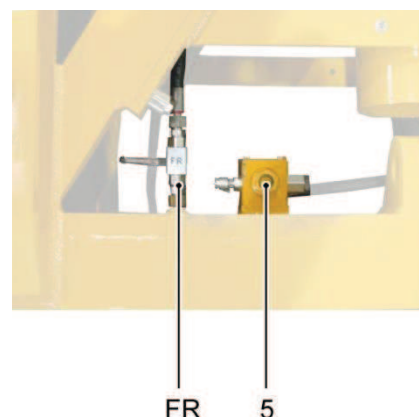
- Check the oil pressure in the cutter gear and adjust if necessary.
- Change/replace the pressure compensator bladder.

- Top up (5) or drain (FR) oil on the pressure compensator until an oil pressure between 0.4 and 0.5 bar is displayed on the B-Tronic operating screen.
- ✓ The pressure compensation bladder is not pressed out of the pressure compensation reservoir.
- ✓ The right cutter gear is filled with oil.



NOTE

The gear oil can be filled via the filler hole on the cutter gear (2) and via the filler hole on the pressure compensator (5).



9.6.1.5 Topping Up Gear Oil



CAUTION

Risk of causing damage to the cutter gear!

If the ambient pressure is higher than the oil pressure in the cutter gears, the cutter gears could get damaged.

- The oil pressure in the cutter gear must always be higher than the ambient pressure.



CAUTION

Risk of causing damage to the bearing ring seal!

There is a risk of damage to the bearing ring seal if the oil is pumped into the cutter gear with excessive pressure.

- The oil must be pumped slowly into the cutter gear (6 to 8 strokes per minute).

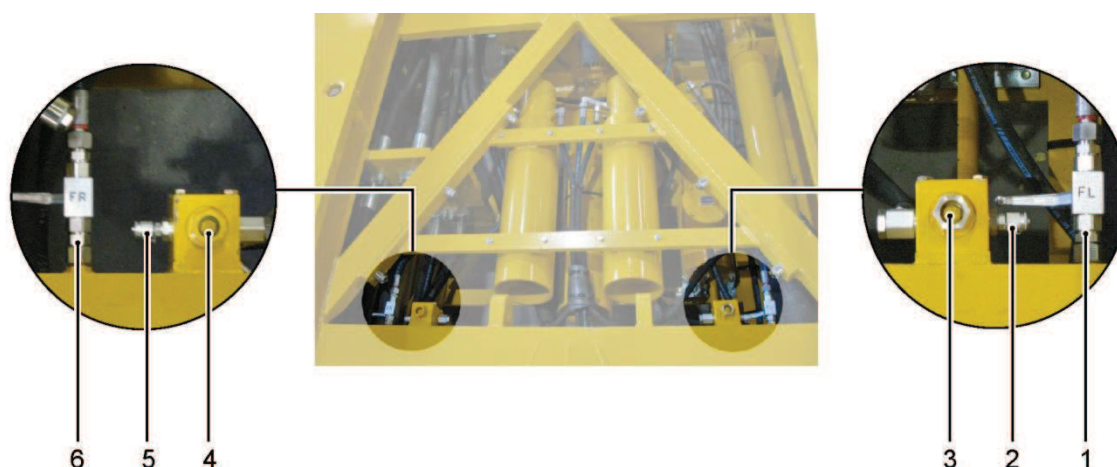


CAUTION

Risk of causing damage to the pressure compensator!

If the oil pressure in the cutter gear is too high and/or the bladder in the pressure compensator is too old, the bladder may be pressed out of the pressure compensation reservoir and damaged.

- Check the oil pressure in the cutter gear and adjust if necessary.
- Change/replace the pressure compensator bladder.




- | | |
|--|---|
| 1 Ball cock (FL) for pressure compensator, left | 3 Filler hole for pressure compensator, right |
| 2 Measuring point: Left cutter gear oil pressure | 4 Measuring point: Right cutter gear oil pressure |
| 3 Filler hole for pressure compensator, left | 6 Ball cock (FR) for pressure compensator, right |

Prerequisite:

- The cutter is shut down.
- A sufficient quantity of fresh gear oil is available.
- The oil pressure in the cutter gear is below 0.4 bar after warm-up.



NOTE

Warm up the cutter gear using the  button or set the speed to 15 rpm.

Left cutter gear:

- Pre-pump the refiller until the refiller hose is full.
- Connect the refiller to the filler hole (3).
- Slowly pump oil (6 to 8 strokes per minute), until an oil pressure between 0.4 and 0.5 bar is displayed on the B-Tronic operating screen for the left cutter gear.
- Remove the refiller from the filler hole (3) and assemble the relevant screw connection.
- ✓ The pressure compensation bladder is not pressed out of the pressure compensation reservoir.
- ✓ The oil in the left cutter gear is refilled.

Right cutter gear:

- Pre-pump the refiller until the refiller hose is full.
- Connect the refiller to the filler hole (4).
- Slowly pump oil (6 to 8 strokes per minute), until an oil pressure between 0.4 and 0.5 bar is displayed on the B-Tronic operating screen for the right cutter gear.
- Remove the refiller from the filler hole (4) and assemble the relevant screw connection.
- ✓ The pressure compensation bladder is not pressed out of the pressure compensation reservoir.
- ✓ The oil in the right cutter gear is refilled.



NOTE

The gear oil can be filled in through the filler hole on the cutter gear and through the filler hole on the pressure compensator.

9.6.1.6 Changing the Gear Oil


Prerequisite:

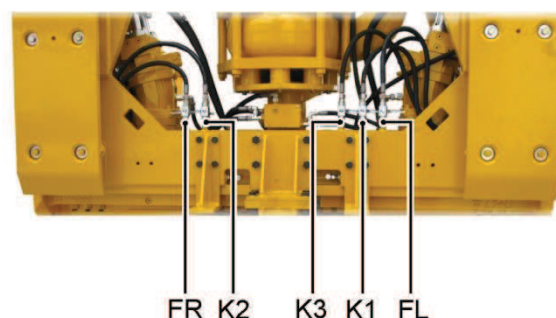
- Thoroughly clean the gear shield around the cover (3).
- A suitable container for the waste oil is available.
- A sufficient quantity of fresh gear oil is available.
For recommended oils, see section "Lubricants/Tables"

Left cutter gear:

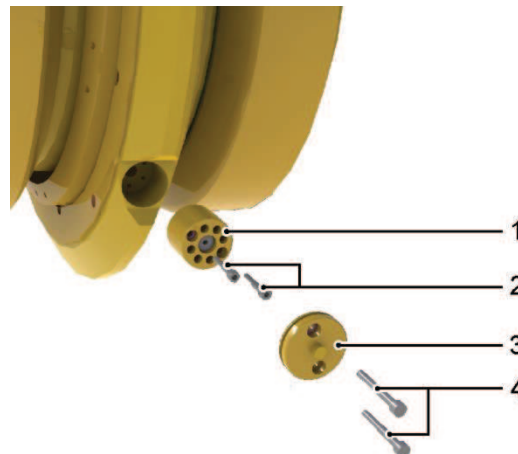


NOTE

Warm up the cutter gear using the  button or set the speed to 15 rpm.



- Let the gear run for approx. 1 minute, stop operation and press the Emergency STOP button on the remote control for the cutter wheels.
- Remove the ball cock (FL) from the cutter frame.
- Open the ball cock (FL).
- Unscrew the cover (3) of the maintenance and filler hole by removing the screw connection (4).
- Remove the non-return valve (1) by loosening the screw connection (2).
- Drain waste oil into a suitable container.




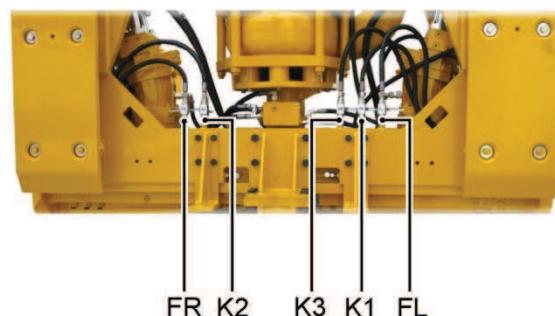
- Clean the pressure compensation system and replace the pressure compensator bladder if the gear oil is contaminated (for example with water, bentonite, refraction anomalies, metallic particles, etc.).
- Insert the non-return valve (1) into the gear shield and secure it in place using the screw connection (2).
- Fill in gear oil as described in the section "Filling gear oil".

Right cutter gear:

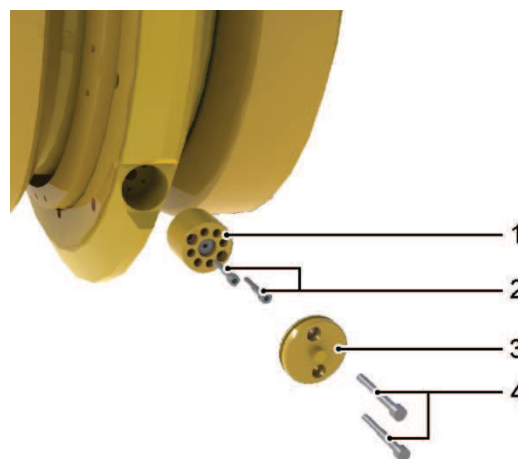


NOTE

Warm up the cutter gear using the  button or set the speed to 15 rpm.



- Let the gear run for approx. 1 minute, stop operation and press the Emergency STOP button on the remote control for the cutter wheels.
- Remove the ball cock (FR) from the cutter frame.
- Open the ball cock (FR).
- Unscrew the cover (3) of the maintenance and filler hole by removing the screw connection (4).
- Remove the non-return valve (1) by loosening the screw connection (2).
- Drain waste oil into a suitable container.



- Clean the pressure compensation system and replace the pressure compensator bladder if the gear oil is contaminated (for example with water, bentonite, refraction anomalies, metallic particles, etc.).
- Insert the non-return valve (1) into the gear shield and secure it in place using the screw connection (2).
- Fill in gear oil as described in the section "Filling gear oil".

9.6.1.7 Checking the Gear Oil Pressure/Ambient Pressure

The pressure in the cutter gear must always be higher than the measured ambient pressure. If the gear oil pressure is not higher than the ambient pressure, the indicator on the B-Tronic screen changes to red and the cutter must be pulled out of the suspension.

- Check the gear oil pressure and refill with gear oil if necessary.
- The gear oil has been checked and deemed in good condition.

9.6.1.8 Checking the Leak Oil

The internal pressure is measured inside the mounting jar with a pressure sensor. If the amount of leak oil in the mounting jar increases, the internal pressure in the mounting jar rises.

If a certain pressure in the mounting jar is exceeded, an error message will be displayed on the B-Tronic screen.

Initial situation:

- Maintenance according to the maintenance plan and/or error message on the B-Tronic screen.

Prerequisite:

- A suitable container for the waste oil is available.
- The Emergency STOP button on the remote control for the cutter wheels has been pressed and the cutter shut down.



NOTE

The screw connections for draining the leak oil can be found on the front of the cutter (see figure).



NOTE

When the leak oil drain screw is opened, the B-Tronic display indicates a reading of 0.00 bar. If the B-Tronic display does not show 0.00 bar, the pressure sensor may be faulty.

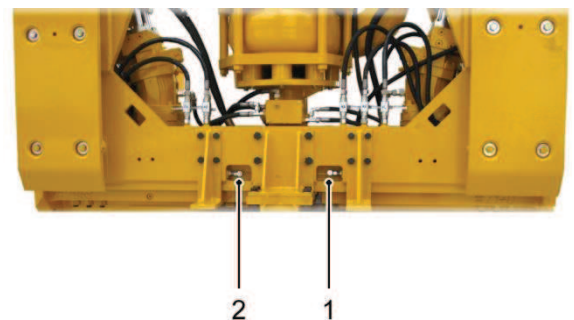
- Remove the screw connections (1) and (2).



NOTE

It may take a short while for the leak oil to drain at low ambient temperature.

- Drain the leak oil of the left cutter gear (1) and the right cutter gear (2) into two suitable containers.



- Reinsert the screw connections (1) and (2).



NOTE

More than 0.6 l of leak oil every 10 hours/per day in one of the cutter gears indicates a defective bearing ring seal.

9.6.1.9 Cutter Gear Service

The cutter gear is a component that is put under a great deal of strain.

This component must be specially checked and monitored in order to guarantee the highest possible availability.

As with all other components, the cutter gear components are also subject to natural wear.

Wear is highly dependent on the respective operating conditions (ground conditions, cutter wheel equipment, etc.)

Following many years of experience, we at BAUER Maschinen GmbH have noticed that an extensive gear service is required after 1,500 operating hours.

When used in difficult conditions, in rock or with erratic blocks, this special service must be carried out more frequently to avoid damage to the cutter gears.

During servicing, extensive maintenance work which requires professional expertise concerning the individual gear components is carried out on the gear.

To avoid damage, some components which are important for the equipment to function properly are replaced as a preventative measure.



NOTE

For example, if an inspection is not performed in due time, damage to the cutter wheels' bearing ring seals may only be detected once bentonite has penetrated the gear.

Performing corrective maintenance on a gear into which bentonite has penetrated is normally a complex procedure involving the repair and replacement of numerous components.

If the penetration of bentonite into the gear is not detected in time, the bearings and cogwheels can be so badly damaged that the entire gear box needs to be replaced.



CAUTION

Gear service must only be carried out by BAUER or by an authorized dealer.

Neglect in this respect will result in loss of the equipment warranty.

9.6.1.10 Checking the Gear Shield

Wear plate:

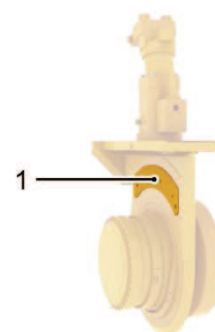


Risk of causing damage to the gear shields!

Excessive wear to the wear plate can cause damage to the gear shields.

- Please observe the maintenance intervals of the gear shield wear parts.

- Check the wear plates (1) of both gear shields for wear and tightness.
- Replace the wear plates (1) of both gear shields with new wear plates (1) when they are less than the minimum thickness of 3 mm.



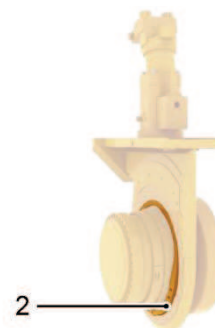
Distance ring:

- Check the distance rings (2) of both gear shields for wear and tightness.
- Replace the distance ring (2) of both gear shields, when 1.5 mm are worn.



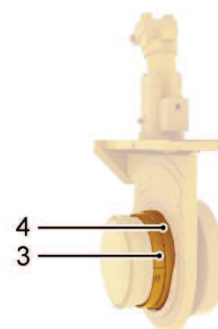
NOTE

Additional information can be found in the section "Maintenance of the flipper teeth".

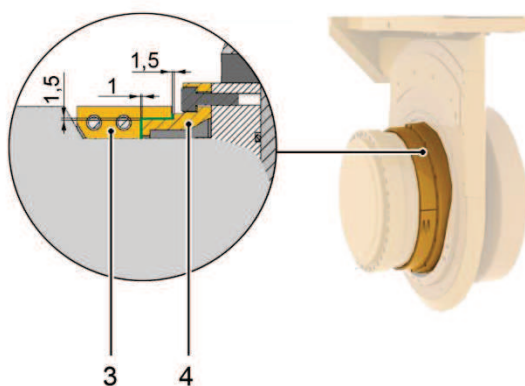


Clamp ring and wear washer:

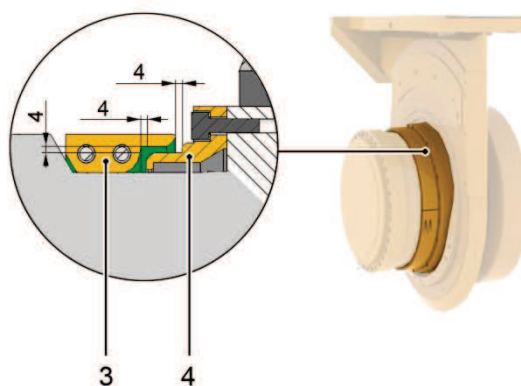
- Check the clamp rings (4) and wear washers (3) of both gear shields for wear and tightness.
- Replace the clamp rings (4) and wear washers (3) at a wear limit of 4 mm.



New condition:



Wear limit:



Welding the gear shield



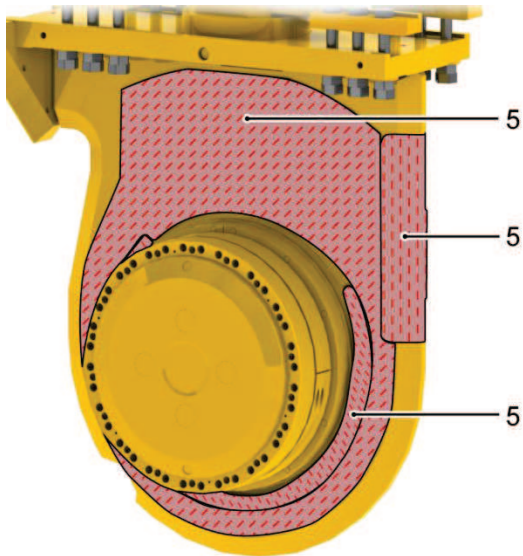
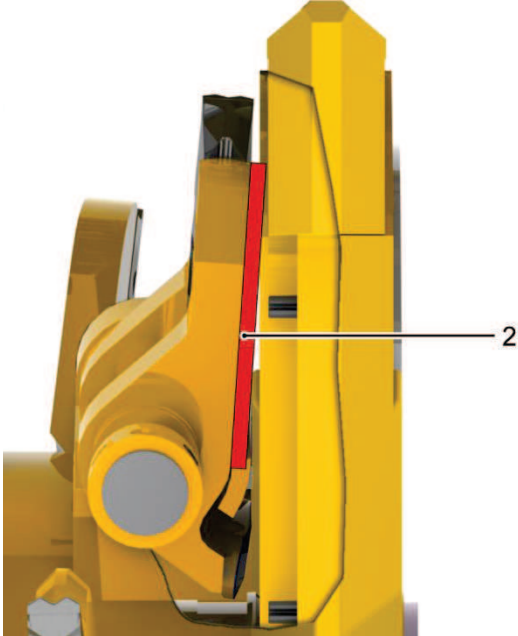
Risk of causing damage to components

Welding on the original surfaces of the flipper tooth/gear shield can result in the flipper tooth colliding with the gear shield.

This can cause damage to components of the gear shield and/or the flipper tooth.

- No additional welding on the original surfaces.
- Only weld on those surfaces approved by the manufacturer.
- Always use original parts for maintenance and repair work.

The original surfaces of the gear shield and the collision area between the gear shield and the flipper tooth are illustrated graphically in the following table.

Original surfaces of the gear shield (5)	Collision area due to welding (2)
	

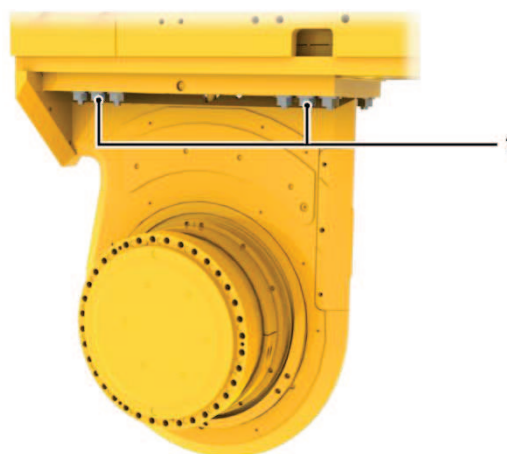


NOTE

Further information about welding on the gear shield can be found in the section "Maintenance/repair - Cutter wheels".

9.6.1.11 Changing the Gear Shield

- Remove the cutter wheels.
- Loosen and remove the mounting bolts on the drive unit.
- Remove the drive unit from the gear (if necessary with the chain hoist attached to the cutter wheel).
- Install the transport cover on the gear.
- Remove the supply lines from the gear and cover any open connections.
- Loosen the gear shield mounting bolts (see fig. on the right).
- Secure the gear shield to stop it from rotating and falling over.



Use the transport rack for the gear shield, if supplied.

NOTE

- Loosen the gear shield mounting bolts (see fig. on the right).
- Lift the cutter.
- Clean the cutter gear mounting bolts and check for damage. Replace damaged bolts with new ones.
- Check the suction device (see section "Suction device").
- Have a new gear ready.
- Slowly lower the cutter onto the gear. The mounting jar must be guided through the recess on the cutter frame.
- Insert the mounting bolts, but do not tighten them yet.
- Check the seal rings on the drive unit, replace and grease if necessary.
- Remove the transport cover from the cutter gear.
- Carefully set down the drive unit onto the gear.

- Bolt the drive unit to the cutter gear.
- Connect supply lines and electric cables.
- Adjust the distance between the cutter gears and from the cutter gears to the suction device.



Risk of causing damage!


Collisions between cutter teeth and other components (e.g. gear shield, reamer plates, etc.) may cause severe damage to the steel structure and the cutter gears!

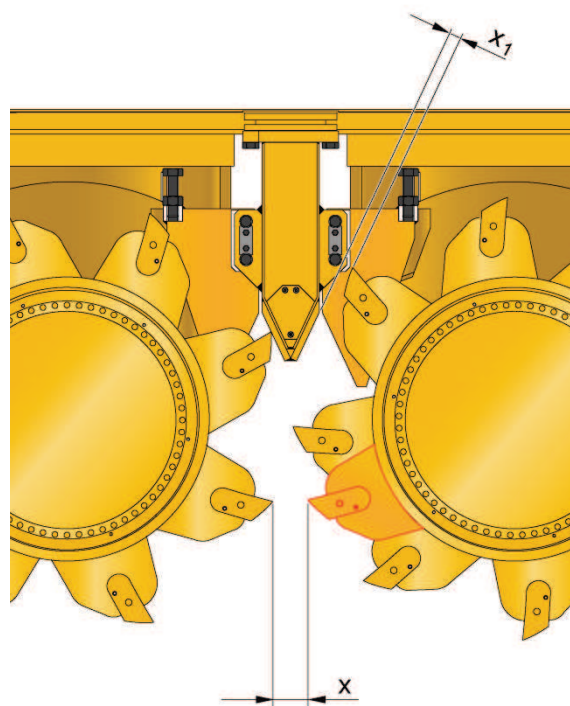
- Rotating cutter wheels must not damage any other components.

- The maximum distance (X) between the two cutter wheels is 10 mm.
- The maximum distance (X_1) between the cutter wheels and the suction box is 5 mm.

- Tighten the mounting bolts.
- Vent the cutter gear as described in the section "Topping up gear oil".

During the running-in period:

- Check the speed of both cutter gears:
 - Max. speed: 24 rpm
 - Speed with activated : 15 rpm



Compare the speed measured at the cutter gears and the speed displayed on the operating screen.

- Monitor the idle pressure on the B-Tronic operating screen.



Risk of causing damage to the cutter gear!

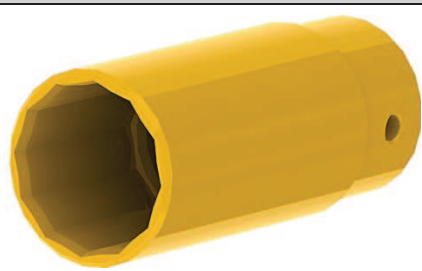
- If the measured values differ from the specified values, contact the BAUER after sales service department!

9.6.1.12 Replacing the Cutter Gear Sensors

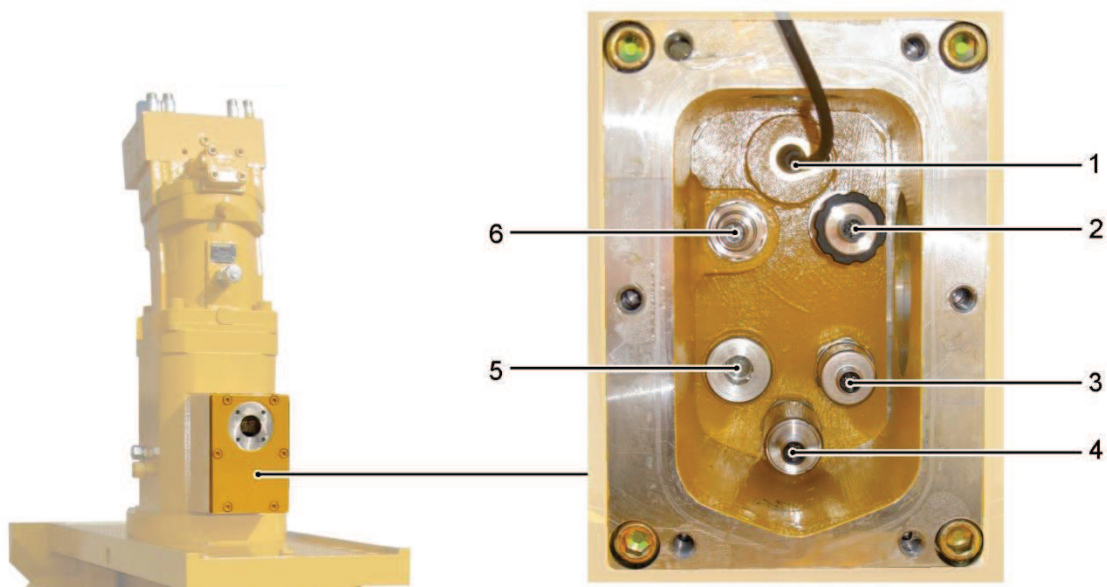


The corresponding special tool is to be inferred from the "Standard tools" accessories.

NOTE

Variants	Figure
SW 22	
SW 24	
SW 27	

Overview:



- 1 Speed sensor
- 2 Leakage oil pressure sensor
- 3 Cutter gear pressure sensor

- 4 Oil condition sensor
- 5 -
- 6 Gear data

Description of components:

Sensor	Function
Leakage oil pressure sensor	Measures the oil pressure in the mounting jar.
Cutter gear pressure sensor	Measures the oil pressure in the cutter gear.
Water content sensor in the cutter gear	Measures the temperature and the water content in the cutter gear.
Oil condition sensor	Measures the oil parameters.
RFID sensor	Determines and transmits gear data.

Prerequisite:

- The Emergency STOP button on the remote control for the cutter wheels has been pressed and the cutter shut down.
- Remove the cover with the relevant screw connections.
- Remove the corresponding sensor.
- Install the new sensor.
- Check the seal of the cover for damage, replace as required.
- Lubricate the seal of the cover.
- Reinstall the cover with the relevant screw connections.

9.6.2 Cutter Wheels

9.6.2.1 General Information

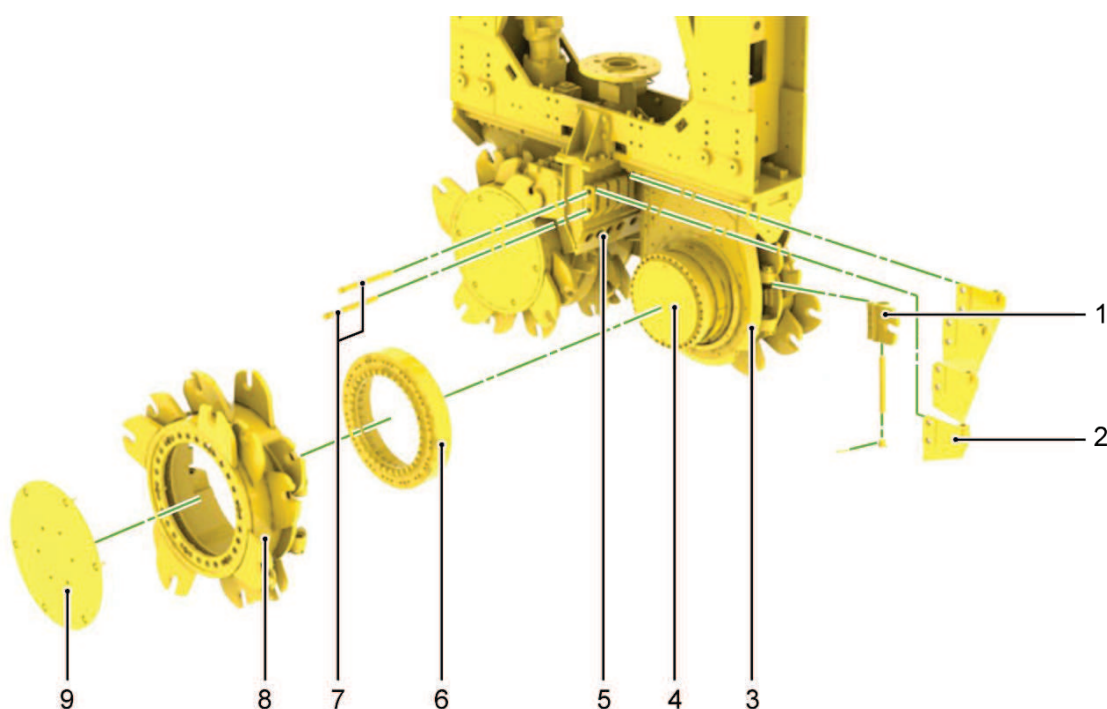


CAUTION

Risk of damage to the cutter gear!

Maintenance and repair work carried out on cutter wheels may damage the cutter gears!

- Remove the cutter wheels from the gear shield before carrying out any repairs!

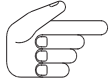


- | | | | |
|---|----------------|---|---------------------------------|
| 1 | Flipper tooth | 6 | Damper |
| 2 | Reamer plates | 7 | Locking bolts for reamer plates |
| 3 | Gear shield | 8 | Cutter wheel |
| 4 | Gear box | 9 | Cover |
| 5 | Suction device | | |

9.6.2.2 Removing the Cutter Wheels

- Separate the weld seams between the cover and the cutter wheel.
- Loosen the mounting bolts on the cover.
- Remove the flipper teeth.
- Remove the reamer plates.
- Loosen the mounting bolts on the cutter wheel.
- Carefully remove the cutter wheel from the damping.
- ✓ The cutter wheel is removed.

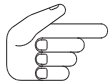
9.6.2.3 Installing the Cutter Wheels



NOTE

The flipper teeth and the cutter wheel cover must be removed before a cutter wheel can be installed!

- Push the cutter wheel over the damping until the mounting ring comes into contact with the damping.



NOTE

The receptacles for the flipper teeth always point in the direction of the gear shield!

- Attach the cutter wheel to the gear.



CAUTION

Risk of damage to the cutter gear!

Incorrect installation of the cutter wheels can result in the flipper teeth colliding!

- Cutter wheels must be installed at opposite ends on the gear!
The flipper teeth of the two cutter wheels on a cutter gear must not touch each other!

- Mount the flipper teeth.
- Mount the reamer plates onto the suction device.
- Lightly brace the reamer plates against the stop trestle using the adjusting screws.
- Let the cutter wheels rotate briefly.



CAUTION

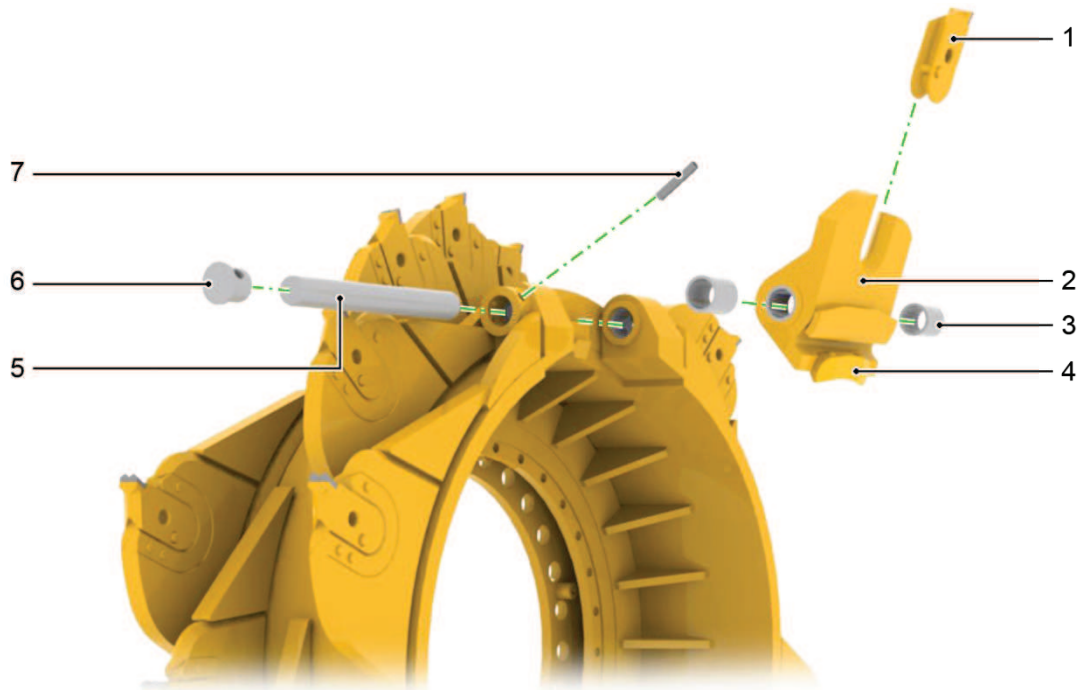
Risk of causing damage!

Collisions between the cutter wheels and other components can cause severe damage!

- Let the cutter wheels rotate briefly after installation.
The cutter teeth must not damage any other component (e.g. reamer plates, suction device, flipper teeth, etc.).

- Install the cover on the cutter wheel and secure it in place using the screw connections.
- Additionally secure the cover with a short weld seam.
- ✓ The cutter wheel is mounted on the gear shield.

9.6.2.4 Replacing the Flipper Tooth



Prerequisite:

- The Emergency STOP button on the remote control for the cutter wheels has been pressed and the cutter shut down.
- The cutter wheel has been thoroughly cleaned around the flipper tooth.
- The cutter wheel is mounted on the gear shield.

- Remove the locking elements (7) and (6).
- Remove the plug connection (5).
- Remove the flipper tooth (2) with cutter tooth (1) and wear block (4).
- ✓ The flipper tooth is removed from the cutter wheel.
- Mount the wear block (4) to the flipper tooth (2) using the screw connections provided and weld in place to secure against loosening.
- Mount the bushing (3).
- Fit the flipper tooth (2) into the mounting on the cutter wheel.
- Mount the plug connection (5) with the designated locking elements (6) and (7).
- Check the flipper tooth (2) for ease of movement.
- ✓ The flipper tooth has been replaced and can be moved easily in every position.

9.6.2.5 Checking the Flipper Tooth

Checking the flipper tooth

Caution!

Risk of causing damage to the cutter gear!

Loose or excessively worn wearing parts can result in a collision between the flipper tooth and the cutter gear, thus damaging components.



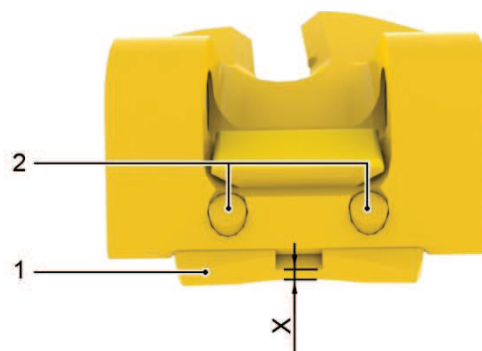
- Check wear parts for firm seating.
- Observe the prescribed maintenance intervals and perform the maintenance as specified.

Prerequisite:

- The cutter is shut down.

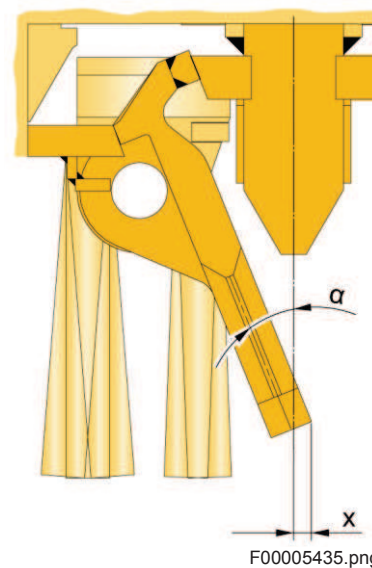
Checking the wear block:

- Check the wear block (1) on the flipper tooth for wear and replace if the remaining thickness (x) is approx. 9 mm.
- Check to ensure the screw connections (2) are secure.

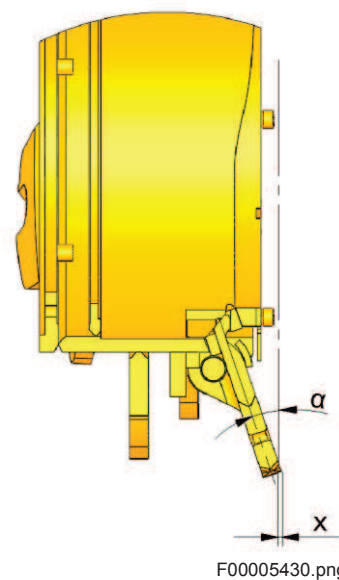


Checking the flipper function:

- x [mm] = Overlapping of the cutter tooth with the middle of the gear shield.
 α [°] = Angle between the flipper tooth axis and the middle of the gear shield.



- x [mm] = 5
 α [°] = 18.5
 Prerequisite: Clamp ring, distance ring, wear washer and wear block are not worn out.
 Measure: No measures necessary.

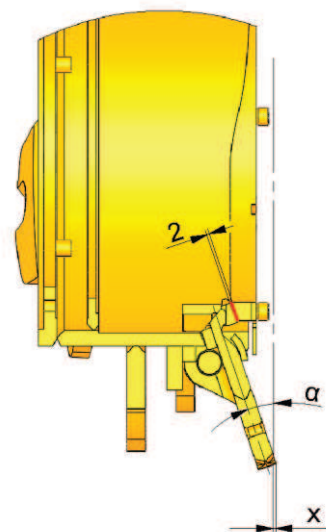


x [mm] = 0

α [°] = 17

Prerequisite: Distance ring on gear shield or wear block is worn out.

Measure: Check the distance ring and wear block and replace if necessary.



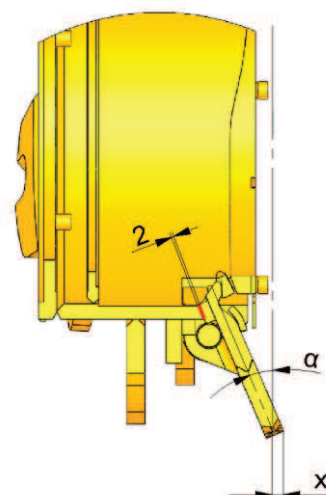
F00005431.png

x [mm] = 20

α [°] = 23

Prerequisite: Stop on the cutter wheel is worn out.

Measure: Weld a new stop to the cutter wheel.



F00005432.png



NOTE

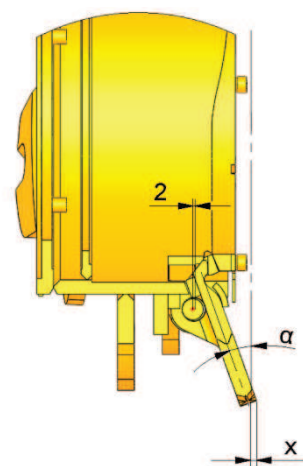
A gauge for welding the stop is available from the manufacturer.

x [mm] = 10

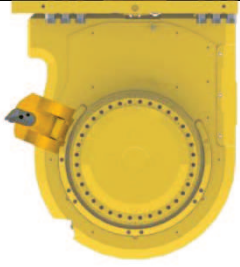


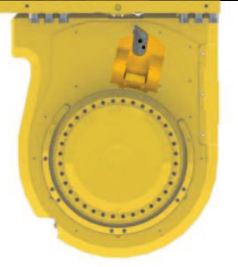
α [°] = 20

Prerequisite: Plug connection and locking elements of the flipper tooth are worn out and the flipper tooth is loose.

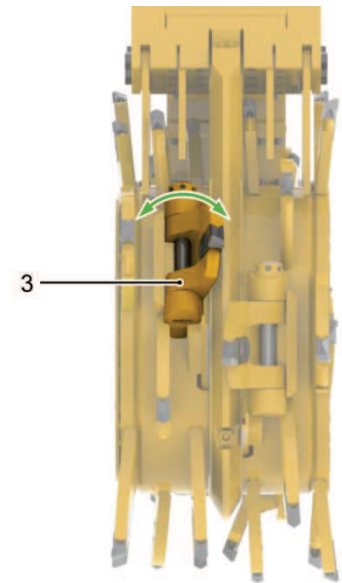
Measure: Check the plug connection and locking elements and replace if necessary.



Checking play of the flipper tooth:

Flipper tooth test position			
Position 1	Position 2	Position 3	Position 4
			

- Check to ensure the flipper tooth (3) has sufficient play in every position (see table "Flipper tooth test position").
- ✓ Flipper tooth (3) can be moved approx. 5 mm in every position.



Welding the flipper tooth

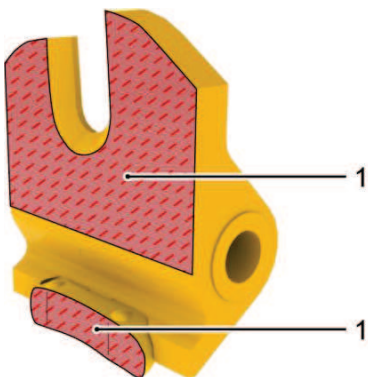
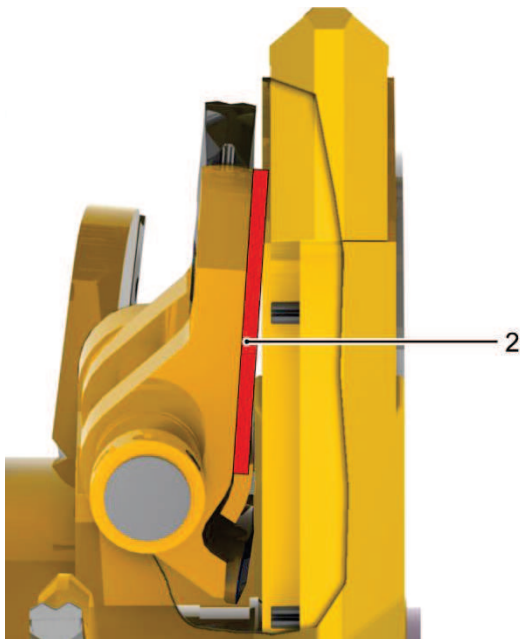
Caution!



Welding on the original surfaces of the flipper tooth/gear shield can result in the flipper tooth colliding with the gear shield. This can cause damage to components of the gear shield and/or the flipper tooth.

- No additional welding on the original surfaces.
- Only weld on those surfaces approved by the manufacturer.
- Always use original parts for maintenance and repair work.

The original surfaces of the flipper tooth and the collision area between the gear shield and the flipper tooth are illustrated graphically in the following table.

Original surfaces of flipper tooth (1)	Collision area due to welding (2)
	

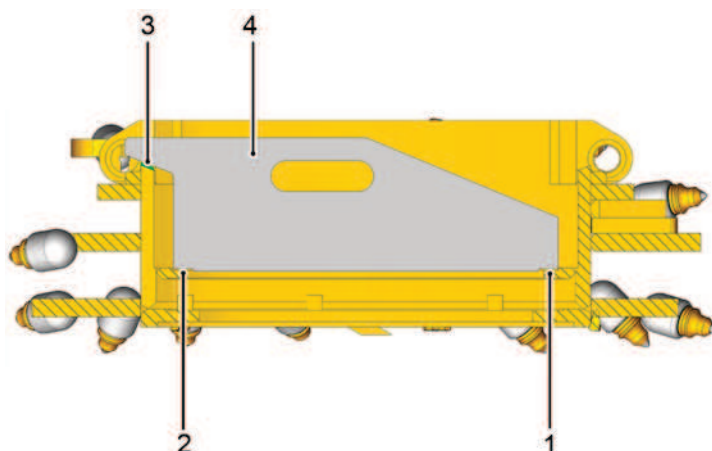


NOTE

Further information about welding on the gear shield can be found in the section "Maintenance/repair - Cutter wheels".

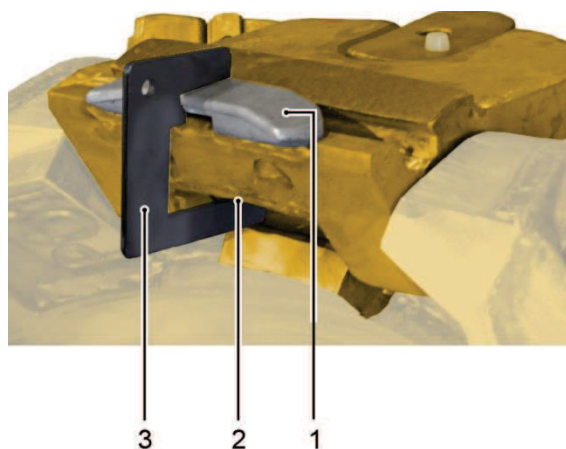
9.6.2.6 Welding the Stop to the Cutter Wheel

- Remove the cutter wheel.
- Remove the damping.
- Weld the stop (3).
- Insert the gauge (4) as shown.
- ✓ Gauge is located at points (1), (2) and (3).
- ✓ The stop is correctly welded onto the cutter wheel.



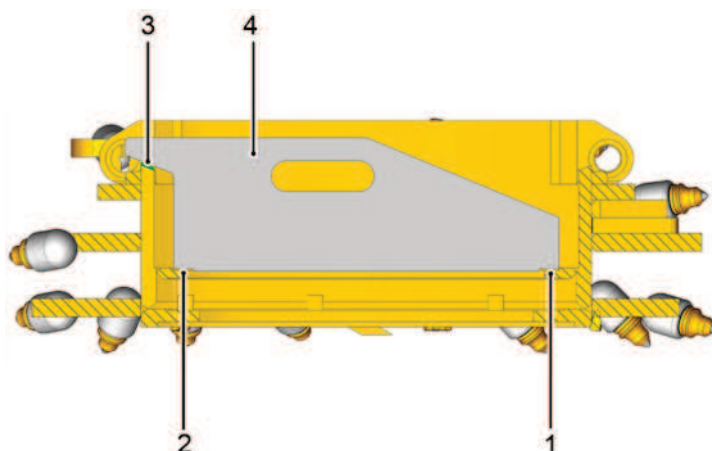
9.6.2.7 Welding the Stop to the Flipper Tooth

- Remove the cutter wheel.
- Weld the stop (2).
- Insert the gauge (3) as shown.
- ✓ Gauge is located on the wear block (1) and stop (3).
- ✓ Stop has been properly welded to the flipper tooth.



9.6.2.8 Checking Functionality of the Flipper Tooth

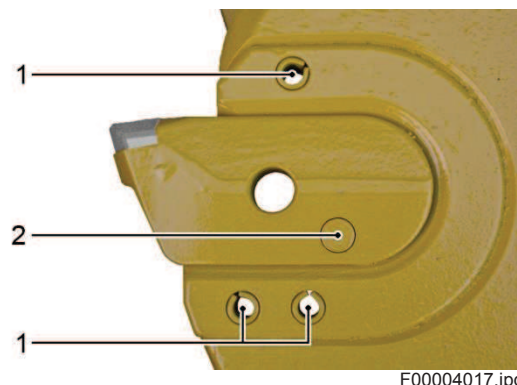
- Remove the cutter wheel.
- Remove the damping.
- Insert the gauge (2) as shown.
- ✓ Gauge is located at points (1) and (3).
- ✓ Flipper tooth exhibits low play
- ✓ Functionality of the flipper tooth has been checked.



9.6.2.9 Changing the Cutter Teeth

Overview

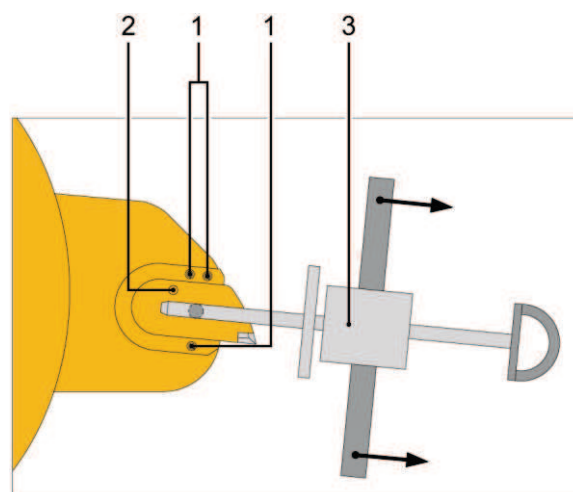
- 1 Tooth holder locking pin
- 2 Cutter tooth locking pin



F00004017.jpg

Changing the cutter tooth

- Use a suitable tool to knock out the locking pin (2).
- Use an extractor (3) to remove the cutter tooth.
- Clean the contact surfaces.
- Insert a new cutter tooth.
- Knock in the locking pin (2).



F00005410.png

Changing the cutter tooth with tooth holder insert

- Use a suitable tool to knock out the three locking pins (1).
- Use an extractor (3) to remove the cutter tooth with the tooth holder insert.
- Clean and grease the contact surfaces.
- Insert a new tooth holder insert.
- Knock in the three locking pins (1).
- Insert a new cutter tooth.
- Knock in the locking pin (2).



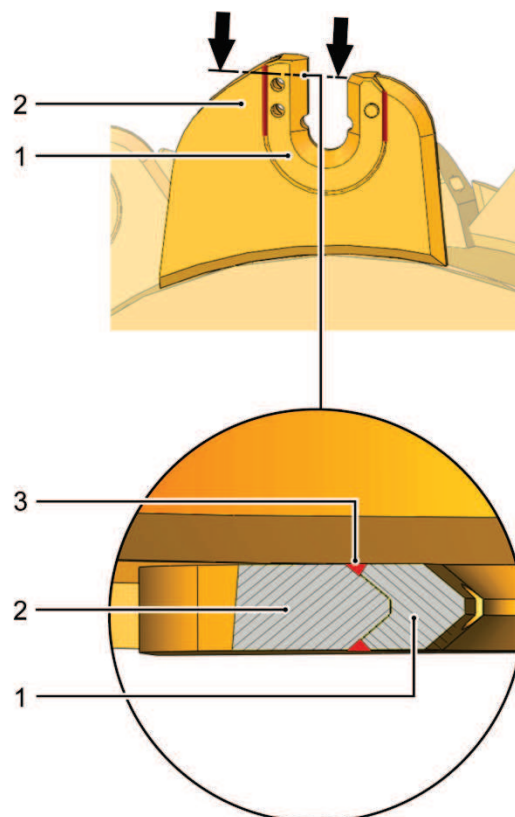
NOTE

The extractor is supplied with the standard tools.

9.6.2.10 Welding the Tooth Holder Insert

Initial situation:

- New tooth holder insert (1) is mounted.
- Tooth holder insert (1) exhibits play in the tooth holder (2).
- Weld (3) tooth holder insert (1) to the tooth holder (2).
- ✓ Tooth holder insert (1) is firmly secured to the tooth holder (2).



9.6.2.11 Other Maintenance Work on the Cutter Wheel

The following maintenance work needs to be carried out in accordance with the service plan:

- The tightness of all screw and plug connections must be checked once a week.
- Worn tooth holders and cutter wheels can be welded:
Approved electrodes:
 - Citodur 600
 - Dur 600
 - Gridur G 44



CAUTION

Risk of causing damage to components!

Incorrectly performed welding work can damage the teeth, bearings and seals in the cutter gear!

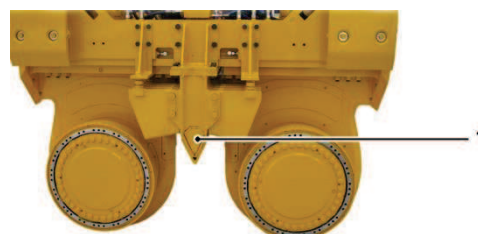
- Always connect the earth terminal of the welding tool as close as possible to the weld point.
-

9.6.3 Suction Device

9.6.3.1 Suction Device Maintenance

Cleaning the suction device

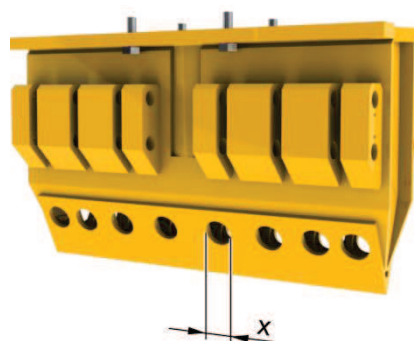
- Remove the cover (1).
- Clean the suction device.
- Mount the cover (1).
- ✓ Suction device has been cleaned.



Checking the suction holes

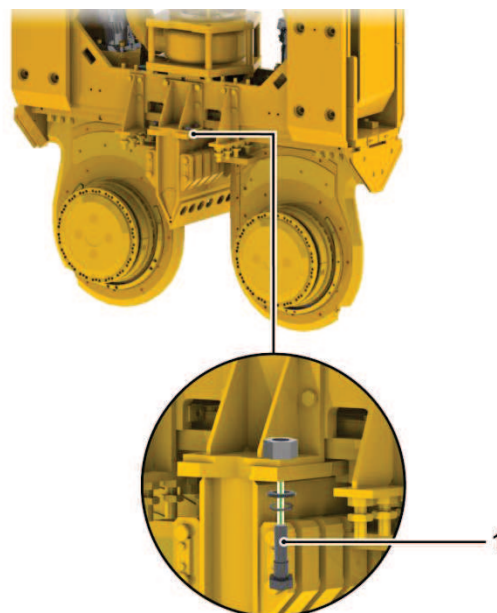
Permissible diameter of the suction openings: $X = 70$ to 90 mm

- Check the suction openings for proper working order and, if necessary, build up the openings or replace the wear plate.
- ✓ Suction device has been properly checked.

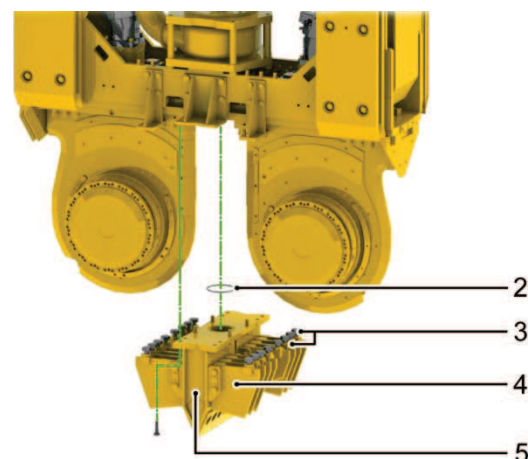


9.6.3.2 Changing the Suction Device

- Remove the cutter wheels.
- Remove the reamer plates (4).
- Attach a suitable lifting device to the suction device (5).
- Remove the screw connections (1).
- Remove the suction device (5).
- ✓ The suction device is removed.
- Check to ensure the seal (2) is in proper working order; replace if necessary.



- Mount the new suction device (5).
- Mount the screw connections (1).
- Mount the reamer plates (4).
- Adjust the amount of play of the reamer plates via the screw connections (3).
- ✓ Reamer plates do not exhibit any play.
- ✓ Suction device has been changed.



9.6.4 Mud Pump

WARNING!



Risk of injury!

Maintenance work on the mud pump whilst it is running may lead to severe injuries (high hydraulic pressure and moving components)!

- Carry out work on the mud pump only when the entire system is at a standstill.
- Activate the Emergency STOP in the cab.

9.6.4.1 Checking the Oil Level

A mud pump pressure compensation system is mounted on the cutter to prevent foreign particles getting into the mud pump bearing casing. The functional reliability of the pressure compensation system is ensured when sufficient oil is present in the mud pump pressure compensator (see table "Oil level in pressure compensator").



CAUTION

Risk of causing damage to components!

If the oil level in the mud pump pressure compensator is below the specified minimum level and operation is continued, it could result in damage to the mud pump.

- Check the oil level of the mud pump pressure compensator before starting the mud pump and vent the pressure compensator if necessary.

Prerequisite:

- The cutter is shut down.
- Read the oil level from the dipstick (1).
- If necessary, top up with fresh oil as described in "Refilling the pressure compensator with oil".
- ✓ Oil level has been properly checked.

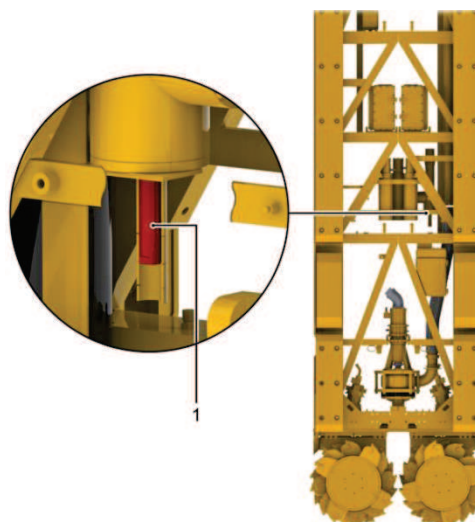
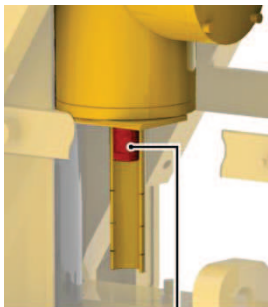
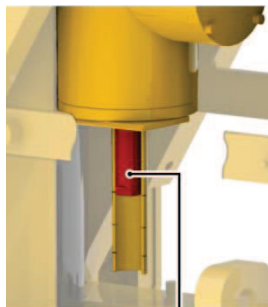
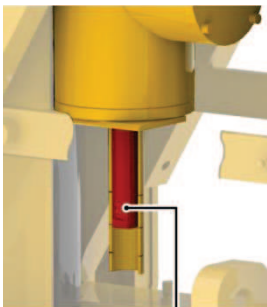
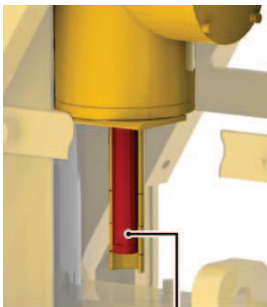


Table: Oil level in pressure compensator

Oil level/marking on dipstick			
Marking 1 No oil in pressure compensator.	Marking 2 Minimum oil level in pressure compensator.	Marking 3 Maximum oil level in pressure compensator.	Marking 4 Too much oil in pressure compensator.
			
1	2	3	4
The cutter must not be used.	The cutter must not be used.	The cutter may be used.	The cutter must not be used.
<ul style="list-style-type: none"> Bleed the pressure compensator. 	<ul style="list-style-type: none"> Refill the pressure compensator with oil. 	-	<ul style="list-style-type: none"> Empty oil from the pressure compensator.

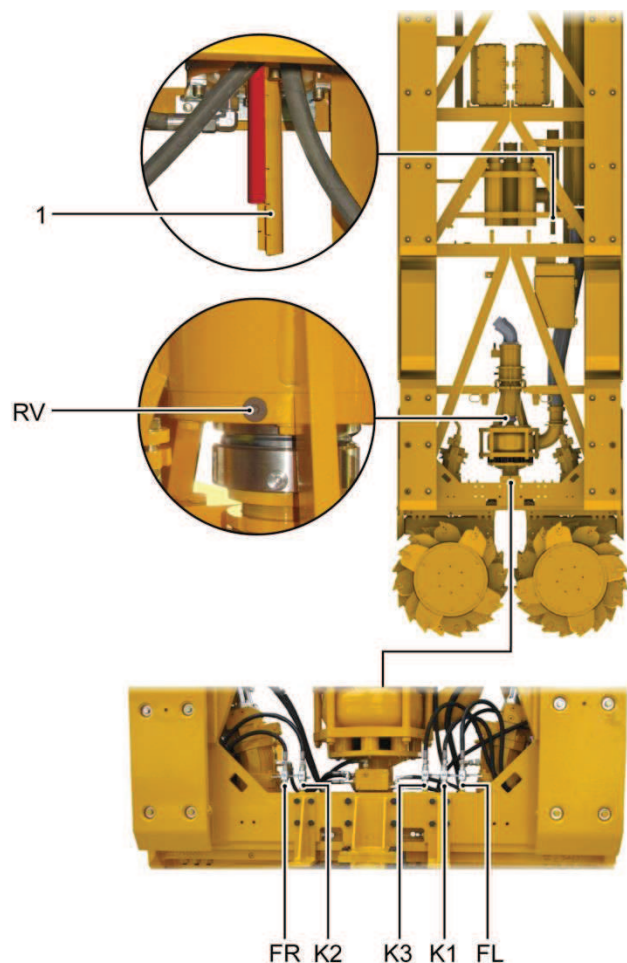
9.6.4.2 Filling in Oil and Venting the Pressure Compensator

This procedure must always be performed if the oil level in the pressure compensator falls below the minimum level (see section "Checking the oil level").

Prerequisite:

- A suitable container for the waste oil is available.
- A sufficient quantity of fresh gear oil is available.
- The mud pump has been thoroughly cleaned in the vicinity of the screw plug.

- Remove ball cocks (K1), (K2) and (K3) from the cutter frame.
- Remove the screw plug (RV).
- Pre-pump the refiller until the refiller hose is full.
- Connect the refiller to the filler hole (RV).
- Set ball cocks (K1), (K2) and (K3) to the "Open" position.
- Slowly pump oil into the pressure compensator (approx. 6 to 8 strokes per minute) until oil escapes from ball cock (K1) without any air bubbles.
- Set ball cock (K1) to the "Closed" position and mount on the cutter frame.
- Slowly pump oil (approx. 6 to 8 strokes per minute) until the maximum fill level (1) is indicated (see section "Checking the oil level").
- Remove the refiller from the filler hole (RV).
- Mount the screw plug (RV).



- Mount the refiller on ball cock (K1).
- Slowly pump oil (approx. 6 to 8 strokes per minute) until oil escapes from ball cock (K3).
- Set ball cock (K3) to the "Closed" position.
- ✓ The oil level display for the mud pump (1) indicates the maximum fill level (see section "Checking the oil level").
- Set ball cock (K2) to the "Closed" position.
- Remove the refiller from ball cock (K2).
- Mount ball cocks (K2) and (K3) on the cutter frame.
- ✓ The pressure compensator has been vented.

9.6.4.3 Refilling the Pressure Compensator with Oil



CAUTION

Risk of causing damage to components!

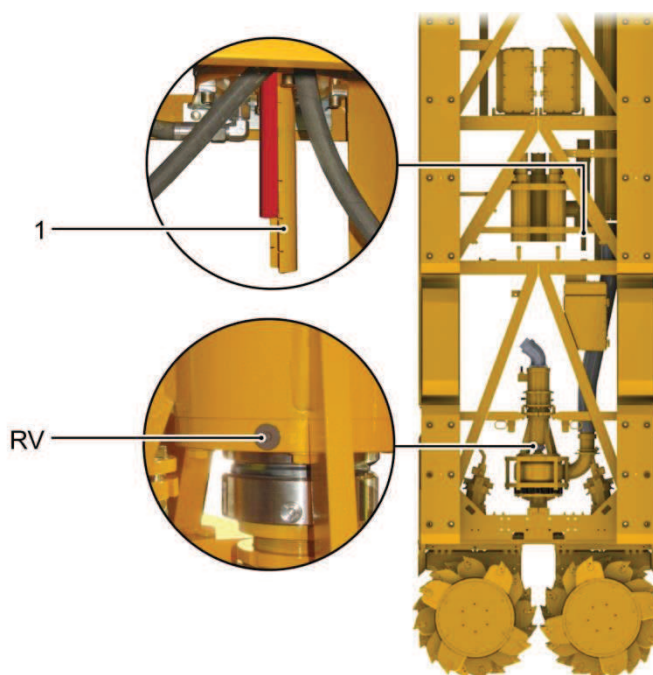
If the oil level in the mud pump pressure compensator is below the specified minimum level and operation is continued, it could result in damage to the mud pump.

- Check the oil level of the mud pump pressure compensator before starting the mud pump and vent the pressure compensator if necessary.

Prerequisite:

- A sufficient quantity of fresh gear oil is available.
- The mud pump has been thoroughly cleaned in the vicinity of the screw plug.

- Remove the screw plug (RV).
- Pre-pump the refiller until the refiller hose is full.
- Connect the refiller to the filler hole (RV).
- Slowly pump oil (approx. 6 to 8 strokes per minute) until the maximum fill level (1) is indicated (see section "Checking the oil level").
- Remove the refiller from the filler hole (RV).
- Mount the screw plug (RV).
- ✓ The pressure compensator has been refilled with oil.



9.6.4.4 Checking the Quality of the Oil



CAUTION

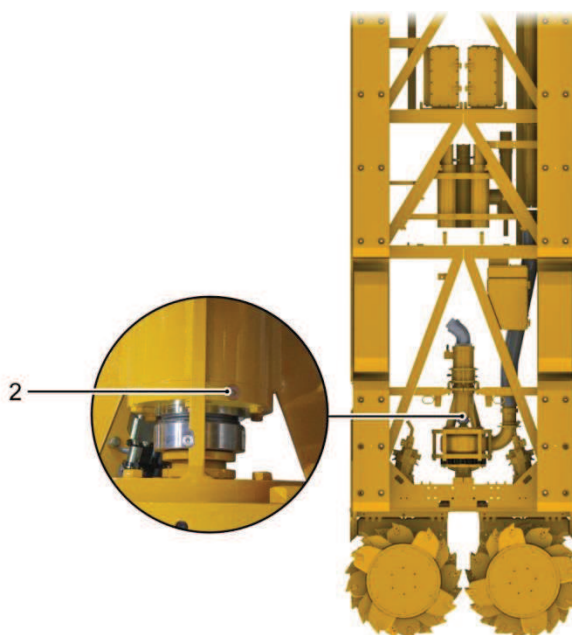
Risk of causing damage to the mud pump!

Impurities in the gear oil can damage the mud pump.

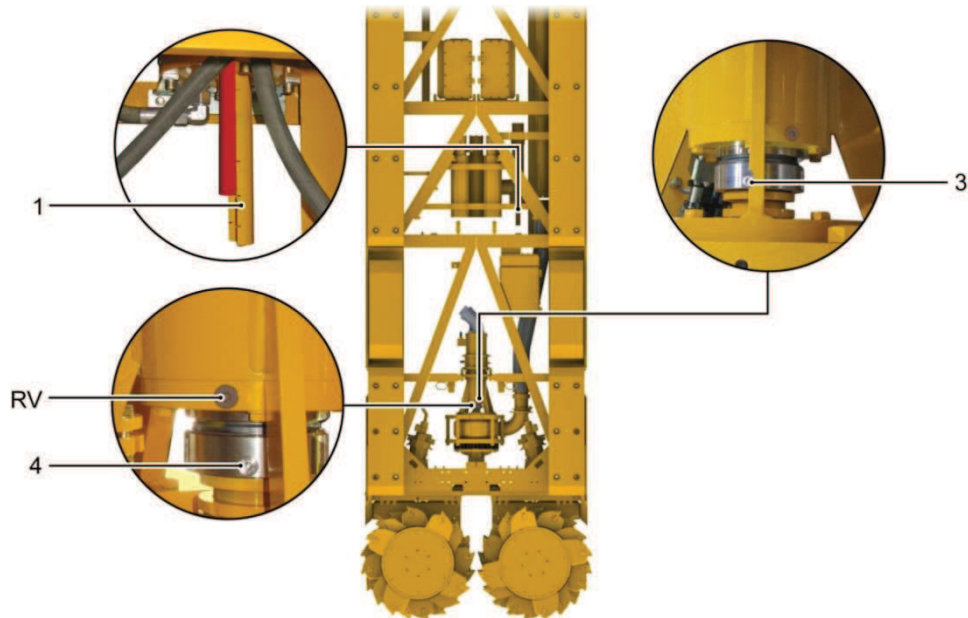
- If impurities are detected in the oil (e.g. Bentonite or sand) then cutting operation must be stopped immediately to avoid further damage to components.

Prerequisite:

- The cutter is shut down.
- The mud pump has been thoroughly cleaned in the vicinity of the screw plugs.
- A suitable container for the waste oil is available.
- The mud pump oil is at operating temperature.
- Remove the screw plug (2).
- Drain an oil sample of approximately 100 ml into a suitable container.
- Mount the screw plug (2).
- Check the oil sample for impurities.
 - ✓ No impurities present: Mud pump is ready for operation.
 - ✓ Impurities present: Mud pump is not ready for operation.
- Allow the oil sample to settle for at least 10 hours.
 - ✓ No impurities present: Mud pump is ready for operation.
 - ✓ Impurities present: Mud pump is not ready for operation.
 - ✓ The gear oil has been checked for proper condition.



9.6.4.5 Flushing the Bearing Ring Seal



Prerequisite:

- The cutter is shut down.
- The mud pump has been thoroughly cleaned in the vicinity of the screw plugs.
- A suitable container for the waste oil is available.
- Remove the screw plug (RV).
- Pre-pump the refiller until the refiller hose is full.
- Connect the refiller to the filler hole (RV).
- Top up the oil and vent the pressure compensator if necessary.
 - ✓ The dipstick shows the maximum oil level in the pressure compensator.
- Remove the screw plug (4).
- Slowly pump oil (approx. 6 to 8 strokes per minute) until approx. 1 liter of oil has escaped from the discharge hole (4).
- Mount the screw plug (4).
- Remove the screw plug (3).
- Slowly pump oil (approx. 6 to 8 strokes per minute) until approx. 1 liter of oil has escaped from the discharge hole (3).
- Mount the screw plug (3).
- Top up the oil and vent the pressure compensator if necessary.
 - ✓ The dipstick shows the maximum oil level in the pressure compensator.
- ✓ Bearing ring seal is flushed.

9.6.4.6 Changing the Oil

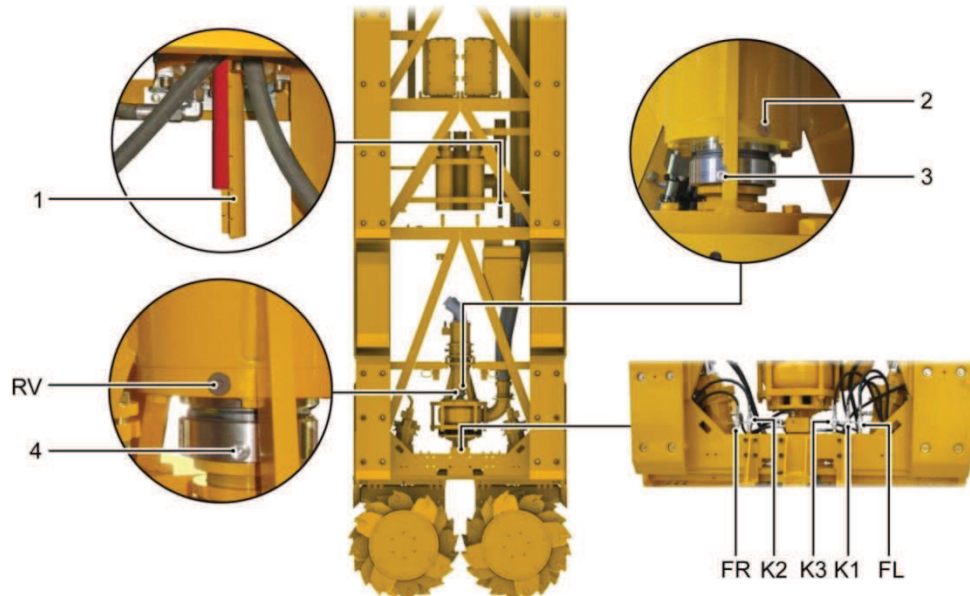


NOTE

The mud pump has a filler hole for filling oil and a discharge hole for draining oil. The filler hole is equipped with a non-return valve to prevent oil from escaping. The filler hole screw plug is marked with "RV". The discharge hole screw plug is located opposite the filler hole.

Prerequisite:

- A suitable container for the waste oil is available.
- A sufficient quantity of fresh gear oil is available.
- The mud pump has been thoroughly cleaned in the vicinity of the screw plugs.



- Remove the ball cock (K1) from the cutter frame.
- Remove the screw plugs from the discharge holes (2) and (4).
- Drain waste oil into a suitable container.
- Remove the screw plug from the discharge hole (3).
- Flush the bearing ring seal (see section "Flushing the Bearing Ring Seal").
- Mount the screw plugs (2), (3) and (4).
- Connect the refiller to the filler hole (RV).
- Fill with oil (see section "Bleeding the pressure compensator").
- Mount the ball cock (K1) on the cutter frame.
- ✓ The oil has been properly changed.

9.6.4.7 Checking the Bearing Ring Seals

The mud pump contains two bearing ring seals. The upper bearing ring seal and lower bearing ring seal are located on the mud pump drive shaft.



NOTE

At low temperatures it may take a while for leakage oil to escape.

Prerequisite:

- The cutter is shut down.
- A suitable container for the waste oil is available.
- The mud pump has been thoroughly cleaned in the vicinity of the screw plug.

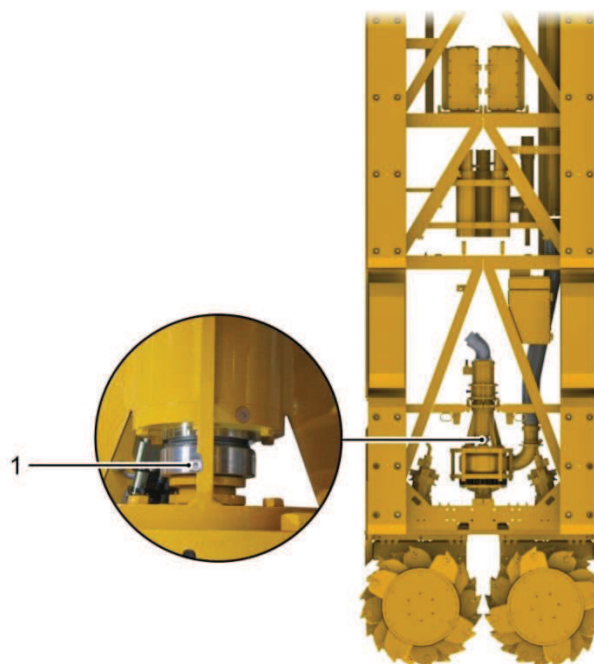
Checking the upper bearing ring seal



NOTE

If the drained leak oil contains hydraulic oil, this indicates a damaged oil motor.

- Remove the screw plug (1).
- Drain all the leakage oil into a suitable container.
- Mount the screw plug (1).
- Measure the amount of drained oil.



CAUTION

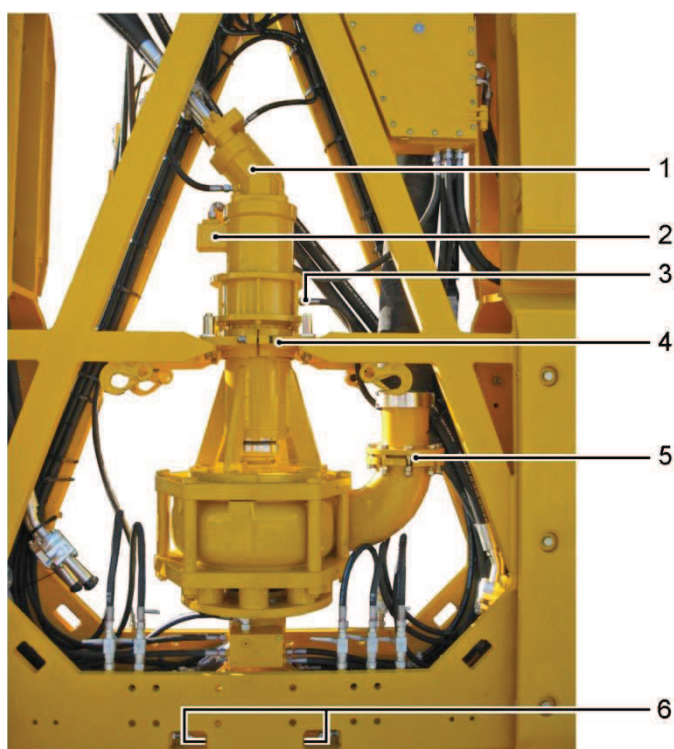
Risk of causing damage to components!

If the leakage oil volume is greater than 0.3 l/10h (0.08 gal/10h) or the leakage oil contains hydraulic oil then the drive unit and the speed sensor might be damaged. Have the unit serviced by the manufacturer.

- Oil volume is greater than 0.3 l (0.08 gal) within 10 hours.
 - ✓ Bearing ring seal is defective.
- Have the defective bearing ring seal replaced with a new one by suitably authorized skilled personnel.
- Oil volume is less than 0.3 l (0.08 gal) within 10 hours.
 - ✓ Bearing ring seal is not defective.
 - ✓ Mud pump is ready for operation.
- ✓ The upper bearing ring seal is checked.

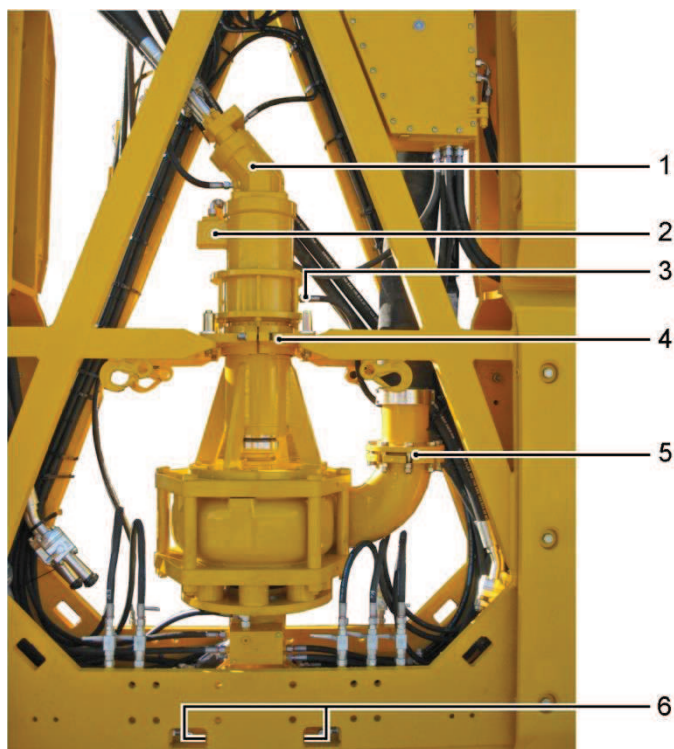
9.6.4.8 Removing the Mud Pump

- Loosen the mounting bolts of the oil motor (1) and lift the motor upwards.
- Disconnect the mud hose line from the pump by opening the connecting flange (5).
- Disconnect the electric cable to the speed transmitter (2).
- Remove and seal the hydraulic hose of the pressure compensator (3).
- Attach the mud pump to the lifting equipment.
- Remove the mounting bolts of the pump retainer ring (4).
- Loosen the screws (6, on the cutter frame) on the pump support and pull the pump sideways out of the cutter.

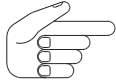


9.6.4.9 Installing the Mud Pump

- Grease and insert the suction device seal ring.
- Lift the pump sideways into the cutter.
- Establish the screw connection (6) between the cutter frame and the pump support.
- Establish the screw connection between the cutter frame and the pump retainer ring (4).
- Insert the oil motor (1) from above and tighten the mounting bolts.
- Grease and insert the mud hose line seal ring.
- Position the mud hose line at the pump outlet and establish the screw connection (5).
- Establish the hydraulic connection to the pressure compensator (3).
- Connect the electric cable to the speed transmitter (2).
- Perform a test run.



9.6.4.10 Changing/Replacing the Speed Sensor



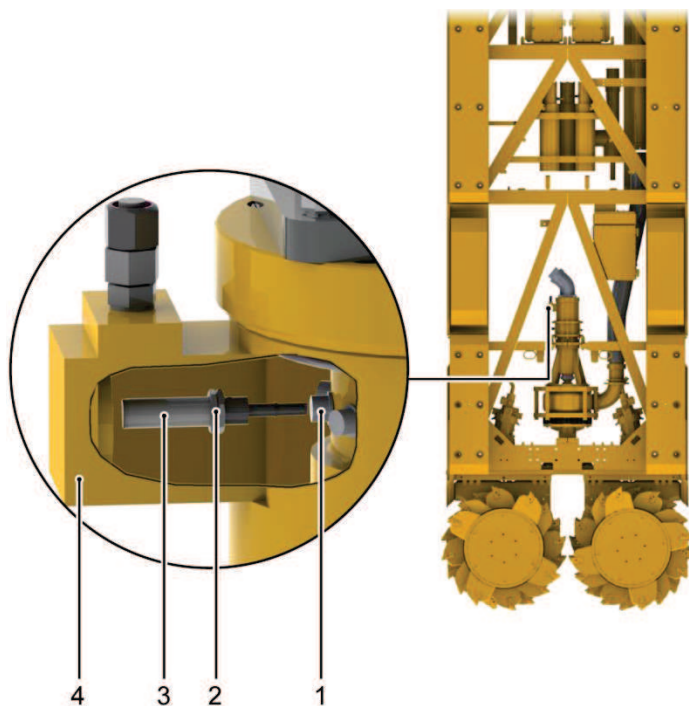
The speed sensor is located in a housing next to the drive shaft. It is factory-set and requires no maintenance.

NOTE

Prerequisite:

- The cutter is shut down.

- Remove the maintenance flap (4) with the designated screw connections.
- Disconnect the cable connection to the speed sensor (3).
- Remove the locking elements (2).
- Remove the speed sensor (3).
- ✓ The defective speed sensor is removed.
- Rotate the gear slowly until the screw connection (1) becomes visible through the hole in the speed sensor (3).
- Tighten the new speed sensor (3) without using any tools.
- Unscrew the speed sensor (3) by two rotations.
- Mount the locking element (2).
- Connect the cable connection to the speed sensor (3).
- ✓ The speed is displayed in the B-Tronic.
- Check to ensure the seal of the maintenance flap (4) is in proper working order, lubricate and replace if necessary.
- Mount the maintenance flap (4) with the designated screw connections.
- ✓ The speed sensor has been changed correctly.

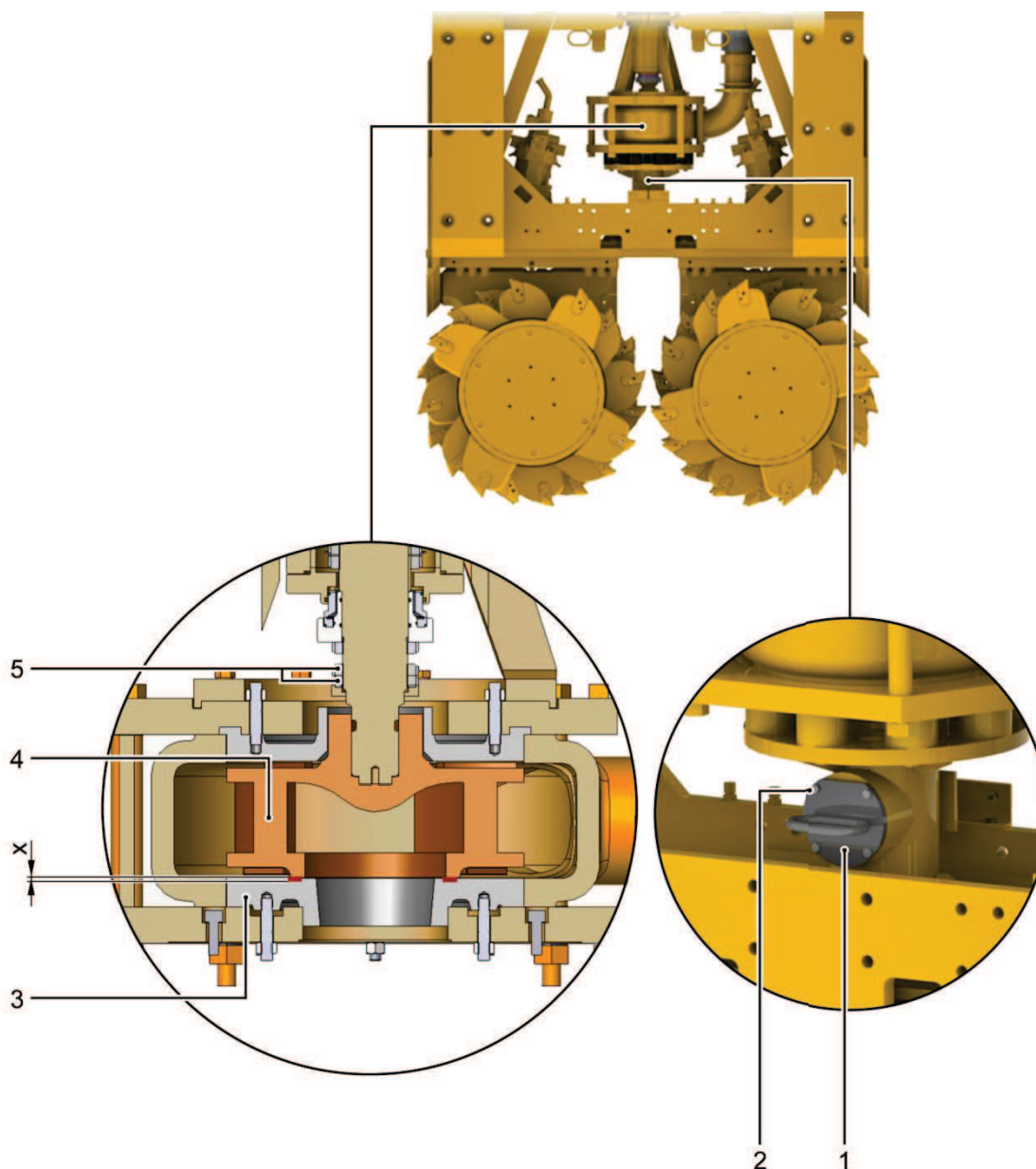


9.6.4.11 Checking and Adjusting the Impeller

If the performance of the pump deteriorates, this can be due to an excessively large gap between the suction-side wear plate (3) and the impeller (4).

Prerequisite:

- The cutter is shut down.
- The pumping system has been emptied and cleaned.



Checking the impeller

- Remove the maintenance flap (1) with the designated screw connections (2).
- Check to ensure the impeller is in proper working order.
- ✓ The pump's impeller can be turned properly.
- Check the gap dimensions.
- ✓ Gap dimensions have been properly checked ($x = 0.5$ to 1.0 mm).

Adjusting the impeller

- Remove the maintenance flap (1) with the designated screw connections (2).
- Check the gap dimensions.
- ✓ Gap dimensions are set incorrectly ($x = 0.5$ to 1.0 mm).
- Loosen the locking elements (5) by approx. 2 mm.
- Turn the impeller (4) in the corresponding direction until the gap dimensions are set correctly.
- ✓ Gap dimensions are set correctly ($x = 0.5$ to 1.0 mm).
- Tighten the locking elements (5).
- Remove the maintenance flap (1) with the designated screw connections (2).
- ✓ The impeller has been checked and adjusted.

9.6.5 Adjusting the Cutting Width

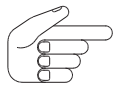
WARNING!



DANGER OF EQUIPMENT TIPPING OVER!

Stability becomes invalid when the work equipment is changed and the machine can tilt or topple over.

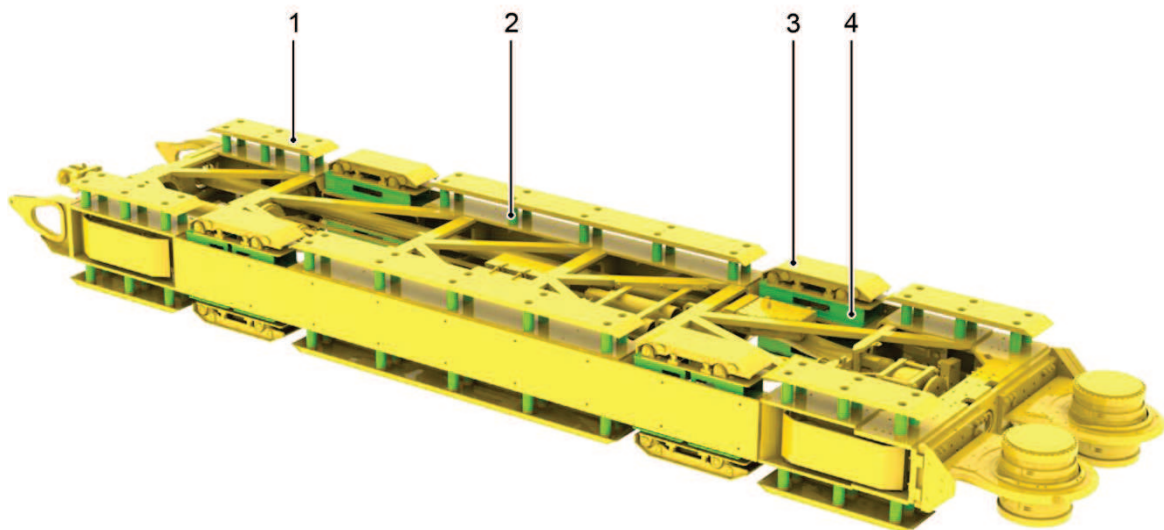
- Ensure that the stability is valid for the relevant cutting width.



NOTE

The relevant cutter wheel set, the suction device with the corresponding reamer plates and the relevant extension set comprising the supporting structures and the corresponding connection elements, are required to change the cutting width.

- Remove the cutter wheel set (see section "Maintenance - cutter").
- Remove the reamer plates and the suction device (see section "Maintenance - cutter").



- Remove the extension plates (1) on the side to be extended/reduced.
- Remove the steering flaps (3) on the side to be expanded/reduced.
- Install suitable supporting structures (4).
- Mount the steering flaps (3).

- Mount the concrete head with components (2) and auger Kelly (1) using the associated screw connections.
 - Repeat the procedure on the opposite side.
 - Mount a suitable suction device and reamer plates.
 - Mount an appropriate cutter wheel set.
 - Collect the disconnected components, store them together and protect them from corrosion.
- ✓ The cutting width has been adjusted.

9.6.6 Turning Device

The drive components of the turning device are housed in an oil-filled container.

Every 250 hours of operation or monthly:

- Check the oil level.
- Check the oil for contamination.

Every 2000 hours of operation or once a year and/or in case of contaminated oil:

- Change the oil (see following page). The amount and type of oil is specified in the section "Lubricants/Tables".



NOTE

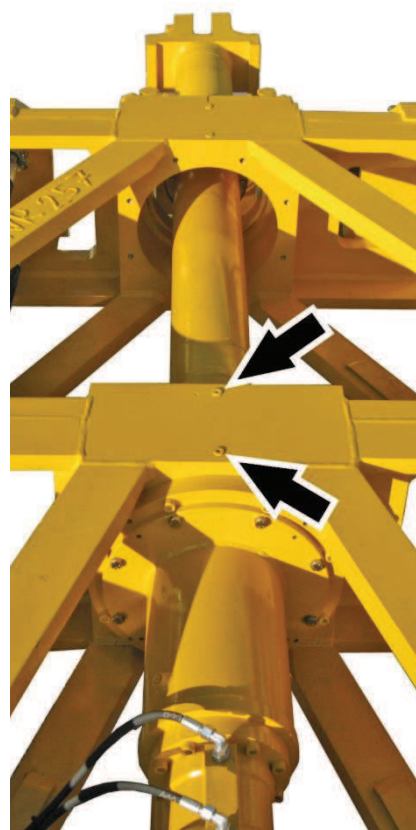
To perform oil changes or checks, place the cutter horizontally on the ground, resting on supports.

9.6.7 Turning Device

9.6.7.1 Changing the Oil

The oil in the turning device must be changed every 1000 operating hours or every year.

- Set the cutter down on support frames.
- Position the waste oil container underneath the drain screw.
- Remove the drain screw (underside).
- Drain the oil.
- Remove the filler screw (top side).
- Insert the drain screw.
- Top up with fresh oil until the turning device has been completely filled.
- Insert the filler screw.



NOTE

BC 32: One screw
BC 35: Two screws
BC 40: Two screws

Same arrangement on the opposite side.

9.6.8 Inclinometer



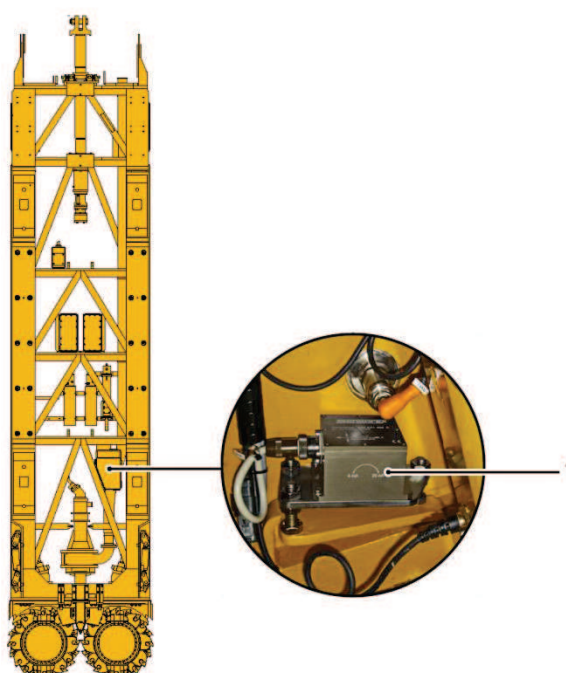
Further information can be found in the "B-Tronic" operating instructions.

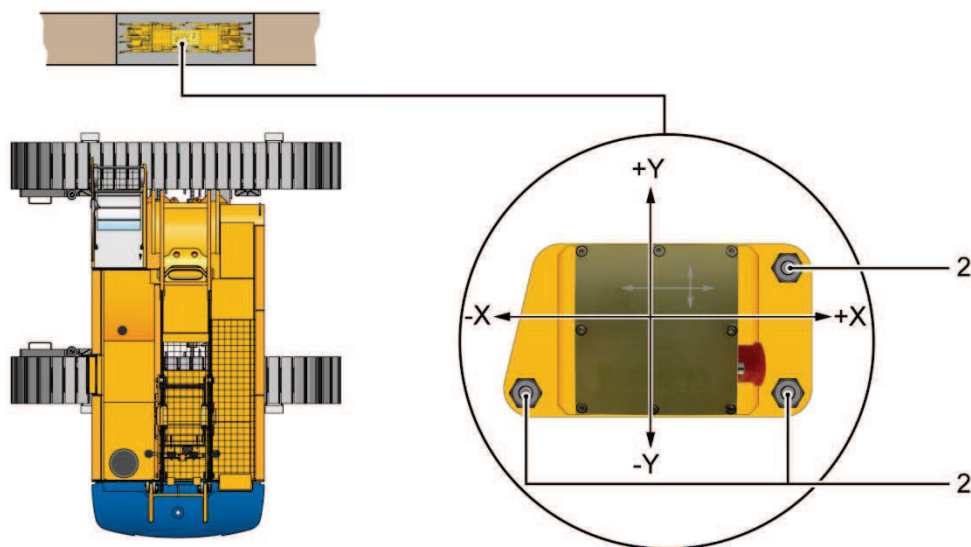
NOTE

The inclinometer (1) is located in the lower area of the base frame and has to be preadjusted before fine adjustment.

Prerequisite:

- Cutter is mounted on the base machine.
- The base machine is on horizontal, even ground with sufficiently firm surface.
- Cutter is on horizontal, level ground that has sufficient load-bearing capacity in front of the base machine.
- The front maintenance flap of the storage box is open and secured against falling.





- Align and check the cutter (for example with the help of a theodolite).
- Adjust the screw connections (2) until a value between 0° and 0.2° is displayed for the X-axis and Y-axis on the B-Tronic screen.
- ✓ The inclinometer (1) is preset.

9.7 MUD HOSE MAINTENANCE

Mud hoses are highly-stressed, safety-relevant components and they must be regularly inspected prior to each use, as they are subjected to operational wear.

WARNING!

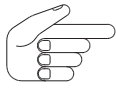


Danger of accident!

Maintenance/repair work on the mud hose carried out in an untimely or improper manner can cause accidents during operation and result in severe or fatal personal injuries.

- Always carry out all specified maintenance tasks and adhere to the intervals prescribed in the instruction manual.
- Replace damaged or worn parts with new ones.

- Visually check the mud hose each day according to the following criteria:
 - Check for correct condition (no signs of external damage, cracks, bubbles on the hose surface and cuts in the surface of the rubber hose that could result in damage to the material).
 - Linear alignment of the support fastenings with the hose
 - No leaks in the hose wall or the support connection
 - No restrictions (reductions in cross-section) when depressurized and/or on the hanging hose, especially behind the supports
- Mud hoses must be replaced immediately if at least one of the above criteria is not fulfilled.
- Check to ensure the connecting clamps are secure on a daily basis and retighten the screw connections with the required torque if necessary.
- Mud hoses that have been overstressed by pressure, vacuum, bending or axial load, must be replaced immediately.



NOTE

The service life of the mud hose can be increased if:

- the mud hose is regularly turned by 60°,
- the mud hose is regularly reversed (changing the direction of flow).



CAUTION

Risk of causing damage to the mud hose!

Incorrect storage of the mud hose can cause material fatigue and/or damage to the mud hose.

- Place the mud hoses on a surface that is clean, free of sharp objects, dry and at room temperature.
- If the mud hoses are rolled up and stored, make sure that they are free of tension (no over-expansion or kinking).
- Do not store in the vicinity of fuels or materials that contain solvents.
- Avoid exposure to ozone that is produced, for example, by electric motors or strong light sources.
- Avoid contact between mud hoses and oil, grease or paint.

WARNING!



Danger of accident!

Incorrect installation of the mud hose can lead to accidents and thus to serious or fatal personal injuries.

- Check mud hoses for damage prior to installation.
- Do not use sharp-edged tools or fastening elements.
- Mount mud hoses free of twists.
- Ensure the hose clamps are mounted correctly (no canting, screw connections firmly mounted, O-ring positioned in the corresponding groove).
- Do not use any sharp lifting accessories such as wire ropes, chains or hooks for transporting and assembling the mud hoses and always connect mud hoses to at least 2 points.

10 LUBRICANTS/TABLES

10.1 LUBRICANTS

10.1.1 General Information

- Observe the instructions in the enclosed "Operating and safety instructions" booklet on this subject.
- Use only oils and greases that are prescribed or suitable for the application in question.
- Before changing to another kind of lubricant, check it is compatible with the previous one used.
- Only use fresh lubricants.



CAUTION

Risk of causing damage to components!

Damage resulting from non-observance of the lubrication instructions in this manual is not covered by the equipment warranty.



NOTE

The lubricants listed in the lubricant tables of this manual are suitable for ambient temperatures from -20° C to +40° C. Information on applications below -20° C and above +40° C can be obtained from the after sales service.

10.1.2 Lubricant Table

The following table lists the lubricants with which the equipment is filled when leaving the factory.



NOTE

The quantities specified in the table are guideline values. The definitive values are to be determined from specifications on the nameplates and the actual fill level identified during checks.

Alternative lubricants are listed on the following pages.

Initial lubricant fill table

Application	Specification	Viscosity class/designation	Manufacturer	Manufacturer designation	Quantity [l]
Gear oil, petroleum	CLP				
Gear oil, petroleum	API				
Hose tension winch (2 piece)		SAE 90	ARAL	Gear oil HYP 90	2.8 (5.6)
Gear oil, petroleum	ATF	At 40° C: 38 mm ² /s at 100° C: 7.1 mm ² /s			
Gear oil, synthetic	CLP PG				
Cutter winch		ISO VG 220		synth PG 220	13.5
Gear oil, synthetic	CLP HC				
Cutter gear BC 40 (2 piece)		ISO VG 150	CASTROL	Alphasyn EP 150	80 (160)
Pressure compensator (3 piece)		ISO VG 150	CASTROL	Alphasyn EP 150	18 (54)
Mud pump		ISO VG 150	CASTROL	Alphasyn EP 150	4
Pulley block		ISO VG 150	CASTROL	Alphasyn EP 150	2
Turning device		ISO VG 150	CASTROL	Alphasyn EP 150	16

Application	Specification	ISO viscosity class / designation	Manufacturer	Manufacturer designation	Quantity [l]
Hydraulic oil, petroleum	HVLPD				
Hydraulic oil, biodegradable	HEES				
Engine oil, petroleum	API CH-4				
Grease, petroleum	KP2N-20 NLGI class 2	Multipurpose grease based on lithium soap			
Rolling bearing/floating bearing			ARAL	Aralub HLP 2	as needed
Central lubrication system			ARAL	Aralub HLP 2	As needed

10.1.3 Lubricant Selection Lists

10.1.3.1 Gear Oils, Petroleum – CLP

Table of gear oils, petroleum – CLP

Application	Specification DIN 51517 / DIN 51502			
Gear oil, petroleum	CLP			
	Viscosity classes ISO-VG / DIN 51519 at 40° C in mm ² /s			
Manufacturer <div>Designation</div>		VG 100	VG 150	VG 220
ARAL		ARAL Degol BG 100	ARAL Degol BG 150	ARAL Degol BG 220
SHELL		SHELL Omala 100	SHELL Omala 150	SHELL Omala 220
BP		BP Energol GR-XP 100	BP Energol GR-XP 150	BP Energol GR-XP 220
MOBIL		Mobilgear 627	Mobilgear 629	Mobilgear 630
AVIA		Avilub RSX 100	Avilub RSX 150	Avilub RSX 220
CASTROL		Alpha SP 100	Alpha SP 150	Alpha SP 220
CHEVRON		NL Gear Compound 100	NL Gear Compound 150	NL Gear Compound 220
ESSO		Spartan EP 100	Spartan EP 150	Spartan EP 220
FINA			Giran 150	Giran 220
GULF			EP Lubricant HD 150	EP Lubricant HD 220
TEXACO			Meropa 150	Meropa 220
TOTAL			Carter EP 150	Carter EP 220
KLÜBER		Unimoly Oil 100	Unimoly Oil 150	Unimoly Oil 220
ELF		Reductelf SP 100	Reductelf SP 150	Reductelf SP 220
FUCHS				Renep Compound 106
AGIP		Blasia 100	Blasia 150	Blasia 220
DEA		Falcon 100	Falcon 150	Falcon 220
PANOLIN				Mecano ISO 220

10.1.3.2 Gear Oils, Synthetic – CLP PG

Table of gear oils, synthetic – CLP PG

Application	Specification DIN 51517 / DIN 51502			
Gear oil, synthetic	CLP PG			
	Viscosity classes ISO-VG/DIN 51519 at 40°C in mm ² /s			
Manufacturer / Designation		VG 100	VG 150	VG 220
ARAL			ARAL Degol GS 150	ARAL Degol GS 220
SHELL			SHELL TIVELA WA	SHELL Tivela WB
BP			BP Enersym SG-XP 150	BP Enersym SG-XP 220
MOBIL			Mobil Glygoyle 22	Mobil Glygoyle 30
AVIA			Avilub VSG 150	Avilub VSG 220
CASTROL				
CHEVRON				
ESSO				Circulation oil S 220
FINA				
GULF				
TEXACO				
TOTAL				
KLÜBER			Klübersynth GH 4-150	Klübersynth GH 4-220
ELF				Syntherma P 270
FUCHS				Renodiol PGP 220
AGIP				
DEA				
PANOLIN				

10.1.3.3 Gear Oils, Petroleum – API

Table of gear oils, petroleum – API

Application	Specification DIN 51502			
Gear oil, petroleum	API GL-5 / MIL-L-2105 B			
	Viscosity classes SAE/DIN 51511			
MANUFACTURER Designation		SAE 90	SAE 85W-90	
ARAL		Gear oil HYP 90	Gear oil HYP SAE 85W-90	
SHELL		SHELL SPIRAX MB 90		
BP		Energear Hypo 90	Energear Hypo 85W-90	
MOBIL		Mobilube HD-A 90	Mobilube HD 85W-90	
AVIA		AVIA HYPOID 90 EP		
CASTROL		Castrol EPX 90		
CHEVRON			RPM Universal Gear Lubricants SAE 80W-90	
ESSO		ESSO GEAR OIL GX-D 90	ESSO GEAR OIL GX-D 85W-90	
FINA			FINA PONTONIC MP 85W-90	
GULF		Gulf Multi-Purpose Gear Lubricant SAE 90		
TEXACO				
TOTAL				
KLÜBER				
ELF			TRANSELF TYP B SAE 90	
FUCHS		Fuchs Titan Gear Hypoid 90	Fuchs Titan Gear 8090 MC	
AGIP			Agip Rotra MP	
DEA			Daegear EP-B SAE 85W90	
PANOLIN		Panolin Super Duty SAE 90	Panolin Super Duty SAE 80W-90	

10.1.3.4 Greases, Semi-synthetic – KP2N

Table of greases, semi-synthetic – KP2N

Application	Specification NLGI class 2 / Multipurpose grease EP			
Grease, semi-synthetic	KP2N-30			
		Designation		
MANUFACTURER	Designation	Multipurpose grease based on lithium soap		
BAUER		Long-life EP grease		
ARAL				
SHELL				
BP				
MOBIL				
ESSO				
FINA				
ELF				
FUCHS		Lagermeister TS		
AGIP				
PANOLIN				

10.1.3.5 Greases, Petroleum – KP2K

TABLE OF GREASES, PETROLEUM – KP2K

Application	Specification NLGI class 2 / Multipurpose grease EP			
Grease, petroleum	KP2K-30			
		Designation		
MANUFACTURER	Designation	Multipurpose grease based on lithium soap		
ARAL		Aralub HLP 2		
SHELL		Retinax EP 2		
BP		Energrease LS-EP 2		
MOBIL		Mobilux EP 2		
ESSO		Beacon EP 2		
FINA		Marson EPL 2A		
ELF		Epexa 2		
FUCHS		Renolit MP		
AGIP		GR MUEP 2		
PANOLIN		EP Grease 2		

10.2 CONVERSION TABLE

Measures for power					
N	dyn	kp	Mp	p	
1	105	0.102	1.02·10 ⁻⁴	102	
10 ⁻⁵	1	1.02·10 ⁻⁴	1.02·10 ⁻⁹	1.02·10 ⁻²	
9.81	9.81·105	1	10 ⁻³	103	
9.81·103	9.81·108	103	1	106	
9.81·10 ⁻³	981	10 ⁻³	10 ⁻⁶	1	

Measures for energy and operating efficiency					
J	erg	kpm	kWh	kcal	ev
1	107	0.102	2.78·10 ⁻⁷	2.39·10 ⁻⁴	6.24·10 ¹⁸
10 ⁻⁷	1	1.02·10 ⁻⁸	2.78·10 ⁻¹⁴	2.39·10 ⁻¹¹	6.24·10 ¹¹
9.81	9.81·10 ⁻⁷	1	2.72·10 ⁻⁶	2.34·10 ⁻³	6.12·10 ¹⁹
3.60·106	3.60·10 ¹³	3.67·105	1	860	2.25·10 ²⁵
4187	4.19·10 ¹⁰	427	1.16·10 ⁻³	1	2.61·10 ²²
1.6·10 ⁻¹⁹	1.6·10 ⁻¹²	1.63·10 ⁻²⁰	4.45·10 ⁻²⁶	3.83·10 ⁻²³	1

Measures for output					
W	kW	kpm/s	PS	kcal/s	kcal/h
1	10 ⁻³	0.102	1.36·10 ⁻³	2.39·10 ⁻⁴	0.86
103	1	102	1.36	0.239	860
981	9.81·10 ⁻³	1	1.33·10 ⁻²	2.34·10 ⁻³	8.43
735.5	0.7355	75	1	0.1757	632
4187	4.19	427	5.69	1	3600
1.16	1.6·10 ⁻³	0.119	1.58·10 ⁻³	2.78·10 ⁻⁴	1

Measures for pressure					
at	atm	bar	N/m ²	Torr	Psi
1	0.968	0.981	98100	736	14.22
1.033	1	1.0133	101330	760	14.69
1.02	0.987	1	105	750	14.5
1.02·10 ⁻⁵	9.87·10 ⁻⁶	10 ⁻⁵	1	75·10 ⁻⁴	14.5·10 ⁻⁵
1.36·10 ⁻³	1.32·10 ⁻³	1.33·10 ⁻³	133	1	19.28·10 ⁻³
0.070	0.0680	0.0689	0.145	51.72	1

Measures for length					
in	ft	yd	mm	m	km
1	0.08333	0.02778	25.4	0.0254	-
12	1	0.3333	304.8	0.3048	-
36	3	1	914.4	0.9144	-
0.03937	3281·10 ⁻⁶	1094·10 ⁻⁶	1	0.001	10 ⁻⁶
39.37	3.281	1.094	1000	1	0.001
39370	3281	1094	106	1000	1