LOAD KING

CUSTOM TRUCK ONE SOURCE™

OPERATOR'S MANUAL

OUTBACK

OUTBACK 77-55D

REV A
MARCH 2025

C1077610

WARNING: Operating, servicing and maintaining this equipment can expose you to chemical including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the Sate of California to cause cancer and birth defects or other reproductive harm. These chemicals can be emitted from or contained in other various parts and systems, fluids and some component wear by-products. To minimize exposure, avoid breathing exhaust, do not idle the engine expect as necessary, service your equipment and vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your equipment or vehicle and after operation. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel.

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Introduction

Load King has been producing first-class heavy equipment since 1956. Cutting-edge innovation and engineering excellence make us the market leader. **Load King** is a key part of the Custom Truck One Source family of brands, offering standard and custom trailers, vocational equipment, and a full line of boom trucks and Truck Cranes. For more information, please visit **Load King's** website: www.loadkingmfg.com

About Custom Truck One Source

Custom Truck One Source is the first true single-source provider of specialized truck and heavy equipment solutions. With sales, rentals, aftermarket parts and services, equipment customization, re-manufacturing, financing solutions, and asset disposal; our team of experts, vast equipment breadth and integrated network of locations across North America offer superior service and unmatched efficiency for our customers.

Construction and Industrial Equipment Product Safety

It is the responsibility of the owner of the equipment to be knowledgeable about federal, state and local regulations that effect the total usage of the equipment, and responsibility to working personnel and the public. Since regulations are subject to change, and differ from one locality to another, this manual makes no attempt to provide such information.

Load King provides appropriate operation and maintenance manuals for various construction and industrial equipment products that it manufactures and sells. Appropriate national consensus standards, industry standards, and safety-related manuals are included with the shipment of each **Load King** product as applicable. It is company policy to provide this information for the owner or Operator of the equipment. It is expected that the owner or Operator will utilize these manuals and standards to provide the appropriate information and training to those people who are to operate, maintain, and supervise the use of equipment.

Construction and industrial equipment is designed and manufactured to perform heavy-duty work. Under normal usage, the equipment will wear. For this reason it is essential that the Owner/Operator establish and perform a periodic inspection of the equipment. The objective of inspection programs is to prevent accidents, reduce downtime and keep the equipment working efficiently. These inspection programs should be designed to discover worn, cracked, broken or deteriorated parts and loose or missing fasteners before they result in a problem.

Proper training and inspection programs are essential to avoid injuries to persons, damage to property and excessive maintenance costs.

Read and understand the manuals provided with this equipment. Assistance is available from the distributors of your **Load King** product and from the **Load King** manufacturing facility.

	When operating a hydraulic machine, the Operator should realize that hydraulic and structural competence, not tipping load, is often the determinant of lifting capacity. The Operator must be guided solely by the appropriate manufacturer's load rating chart when considering load weights. The manufacturer's rated loads must never be exceeded.

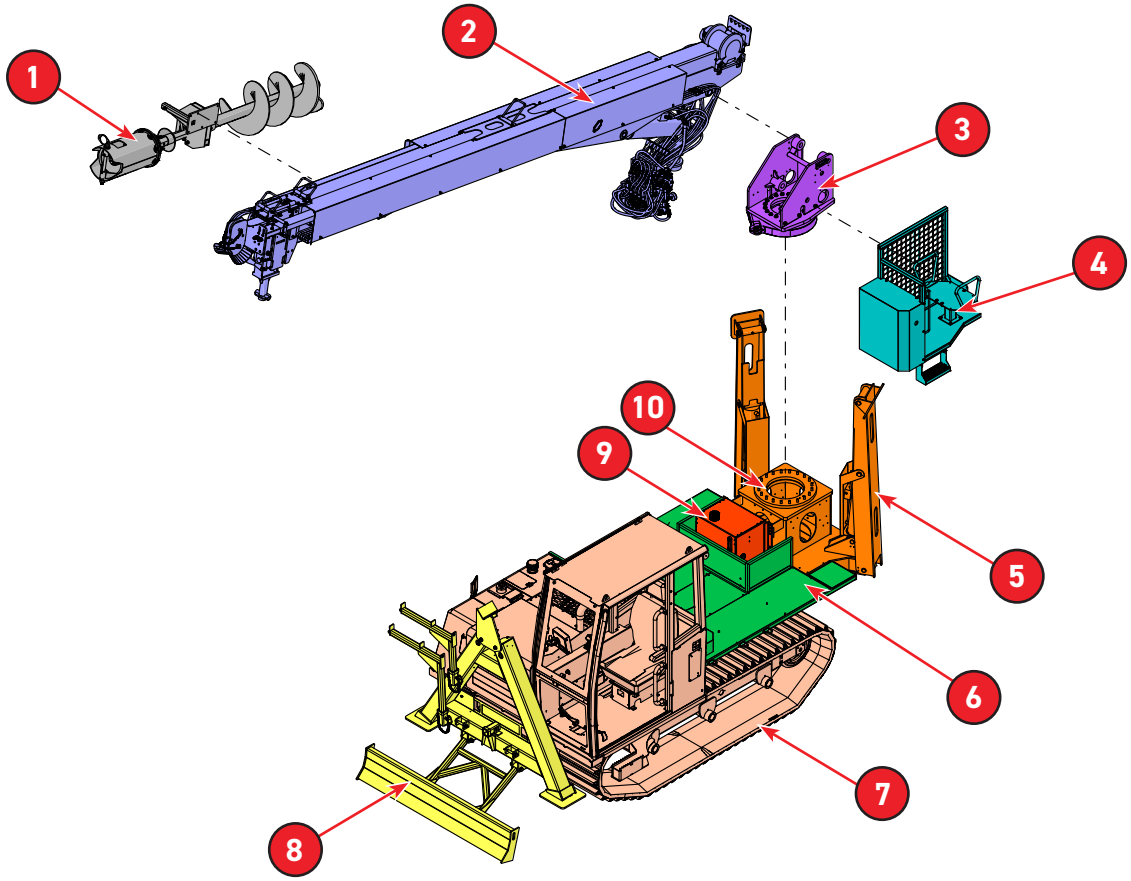
For any additional information regarding the care and operation of the machine, contact the **Load King** service representative. Include the machine model and serial number in all communication to aid service personnel in providing the correct information.

The information, specifications, and illustrations in this publication are based on the information in effect at the time of approval for printing. **Load King** reserves the right to make changes at any time without obligation.

Nomenclature

The Operator should not attempt to operate the machine before he has gained a thorough understanding of the material presented in the following pages. To aid in understanding the contents of this manual, the following terms will always have the meanings given whenever they are used.

1. Auger Drive Assembly
2. Boom Assembly
3. Turret Assembly
4. Operator Platform Assembly
5. Outrigger
6. Deck Assembly
7. Tracked Carrier Assembly
8. Blade (A-Frame Assembly)
9. Hydraulic Tank Assembly
10. Slab Assembly



77-55D

Intended Use

This **Load King** Outback 77-55D is designed to lift, lower, move, and position freely-suspended loads within its rated capacity while on firm, level ground. The machine is designed exclusively for assembly type, non-duty cycle operations. Use of this product in any other way is prohibited and contrary to its intended use. Other applications outside of the intended use statement above must be approved in writing by **Load King**.

This manual is intended for authorized personnel and users who have experience with **Load King** equipment. It is the Operator's responsibility to read and understand this manual before operating the **Load King** Outback 77-55D.

Bulletin Distribution and Compliance

Safety of product users is of paramount importance to **Load King**. Various service bulletins are used by **Load King** to communicate important safety and product information to dealers and machine owners. The information contained in these service bulletins is tied to specific machines using the machine's model number and serial number. Distribution of service bulletins is based on the most current owner on record, along with the associated dealer. It is important to register the machine and keep contact information up to date. To ensure the safety of personnel and the reliable continued operation of the machine, it is essential to implement the actions indicated in all relevant service bulletins.

Contacting the Manufacturer

When it is necessary to contact the manufacturer, please be prepared to supply the model name, and serial number of the machine, along with your name and contact information. At minimum, the manufacturer should be contacted for:

- Accident reporting
- Questions regarding product applications and safety
- Standards and regulations compliance information
- Questions regarding product modifications

Manufacturer contact information:

Custom Truck One Source

7701 Independence Ave.

Kansas City, MO 64125

Parts: (816) 241- 8387

Service: (833) 281-7911

info@customtruck.com

https://store.loadkingmfg.com

Limited Product Warranty

Load King LLC provides a ONE (1) year limited warranty on the entire machine.

Load King LLC provides a TWO (2) year limited warranty on Load King manufactured components. (Parts built and manufactured by Load King only)

Products designed and manufactured by Load King, Incorporated, are warranted to be free from defects in material and workmanship at the time of initial delivery subject to the following provisions:

For one (1) year following initial delivery of the product, Load King will, at its option, repair or replace any part found by Load King to be defective in material or workmanship. The customer is obligated to contact Load King, Inc. prior to any work being performed on equipment. A completed Load King Warranty Claim Form is required within thirty (30) days of the date of failure of any warranted part. Load King will inspect defective parts for approval prior to issuing credit to the customer. Defective parts shall be shipped to the factory pre-paid motor freight or UPS within 30 days of failure of any warranted part is factory requests return of said parts.

The Load King limited warranty does not cover: (a) products which have not been operated and maintained in accordance with Load King operators and maintenance schedules, programs, or bulletins; (b) products which have not been mounted in accordance with Load King installation procedures; (c) products not manufactured by Load King which are supplied by Load King (d) products which are repaired without using original Load King parts; or (e) transportation or delivery to a Load King service facility or the customer's location.

The battery, generator, hydraulic components, electrical components, drive motors, and or other parts/ equipment, but not limited to, not manufactured by Load King is subject to warranty guidelines set forth by the respective manufacturers and their allowed warranty period. Such warranties shall be handled direct through the respective manufacturer or one of its distributors.

This warranty is in lieu of any other warranties, express or implied. There is no warranty of merchantability or fitness for a particular purpose, nor is there any other warranty, express or implied, except as specifically stated herein. No associate, agent or representative of Load King is authorized to extend any warranty on Load King's behalf. Load King shall in no event be liable for any special, indirect, or consequential damages or claims of any third party against the Customer.

WARRANTY CLAIMS WILL NOT BE PROCESSED UNLESS THERE HAS BEEN PRIOR APPROVAL FROM THE FACTORY FOR THE REPAIR WORK THAT IS TO BE PERFORMED. (THIS EXCLUDES TRAVEL TIME AND OR MILEAGE WHICH IS NOT ALLOWED OR COVERED UNDER THE LOAD KING LIMITED WARRANTY). NO EXCEPTIONS WILL BE MADE.

Load King Warranty Data Record

Warranty Form Submission		Date	
Date of Delivery			
Model Number			
S/N			
Dealer			
Address			
Customer			
Address			

Record this information at the time that warranty registration form is completed and returned to **Load King.**

Specifications

The Outback 77-55D is a compact, rubber-tracked digger derrick designed for backyard work, offering a sheave height of up to 51 feet and a lifting capacity of 6,000 lbs. The easement digger is mounted on a Morooka MST-600VD track machine, with travel speeds up to 7.5 MPH. Built to navigate tight spaces and rough terrain, this ride-on digger reaches jobsites that standard utility trucks can't access. With 10,500 ft.-lbs. of auger digging torque, the Outback is equipped to handle tough conditions and help get the job done efficiently.

Features

Weight 18,600 lbs.

Length 21 ft. with width of 77 inches

Digging Radius 30 ft.

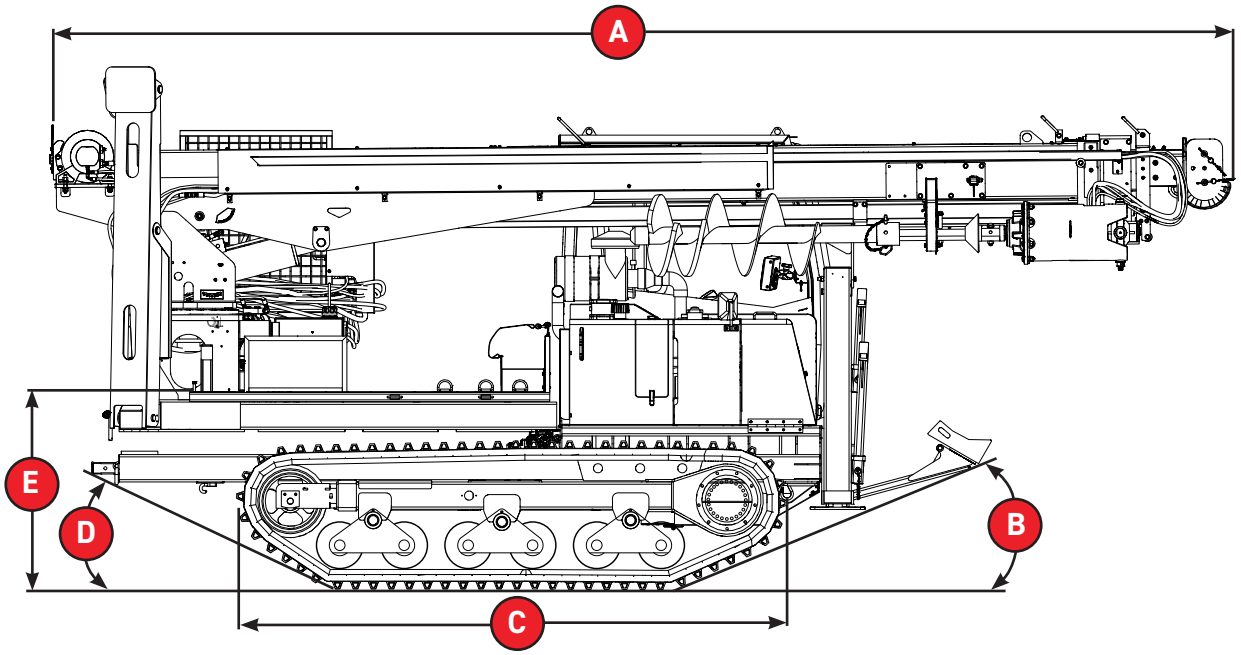
Winch Capacity 6,000 lbs.

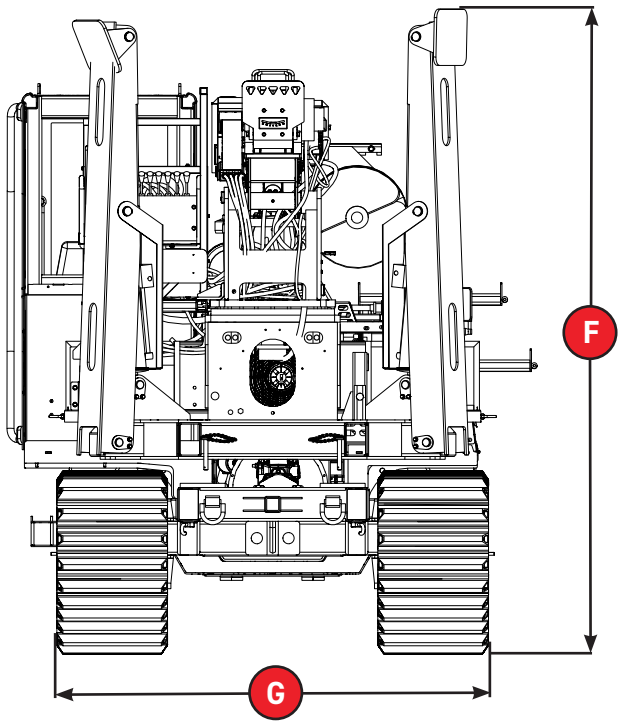
Sheave Height 51 ft.

Working Height 55 ft.

A-Frame Front/Radial Rear Outriggers

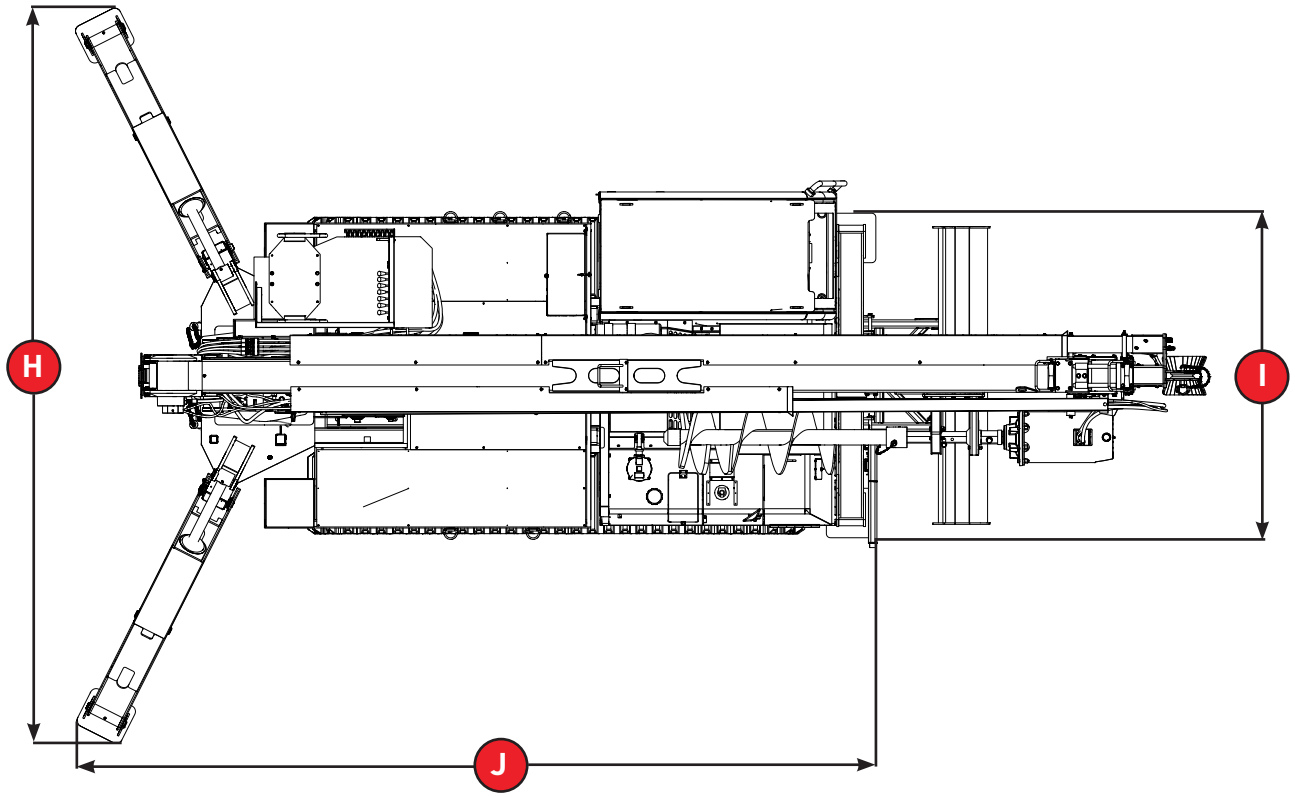
Machine Measurements



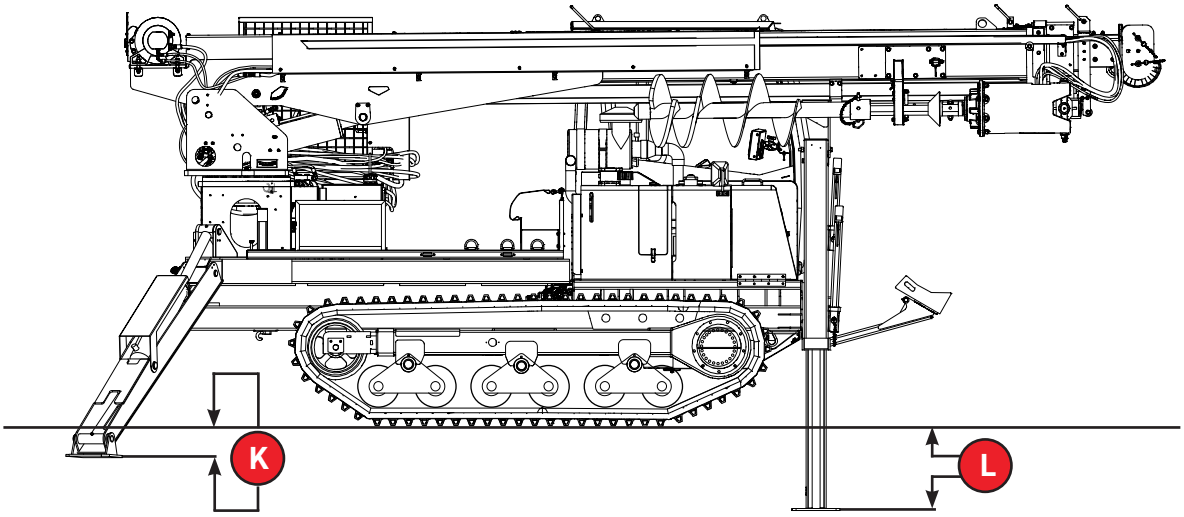


Outriggers Spread

BACK OF MACHINE



Ground Penetration



All dimensions listed are approximate, depending on the full dimensions of the chassis on which the crane body is mounted. If exact dimensions are required, contact your **Load King** service representative.

Reference Letter	Dimensions
A	21'-6"
B	24 Degrees
C	10'-1"
D	26 Degrees
E	3'-2"
F	9'-2"
G	6'-5"
H	15'7"
I	8'-1"
J	16'-8"
K	11"
L	17"

Safety

Owners, Users, and Operators

Load King appreciates your choice of our machine for your application. Our number one priority is user safety, which is best achieved by our joint efforts. We feel that you make a major contribution to safety if you, as the equipment users and Operator's:

- Comply with OSHA, federal, state, and local regulations.
- Read, understand, and follow the instructions in this and other manuals supplied with this machine.
- Follow safe work practices.
- Only have trained and competent Operator's, directed by informed and knowledgeable supervision, running the machine.

OSHA prohibits the alteration or modification of this machine without written manufacturer's approval. Use only factory-approved parts to service or repair this unit.

If there is anything in this manual that is not clear or you believe should be added, please send your comments to **Load King** machines, 7701 Independence Ave, Kansas City, MO 64125; or contact us by telephone at Parts: (816) 241- 8387 Service: (833) 281-7911.
Email: info@loadkingmfg.com

Many aspects of outback machine operation and testing are discussed in standards published by the American National Standards Institute. These standards are updated on an annual basis with addenda, that are sent by ASME to the original purchasers of the standard. **Load King** recommends owners purchase and refer to the following standards.

ANSI/ASME B30.5 - Mobile and Locomotive Machine (latest version)

These standards can be purchased from:

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
800-843-2763 (U.S/Canada)
001-800-843-2763 (Mexico)
973-882-1170 (outside North America)

Email:
CustomerCare@asme.org
www.asme.org

Safety Definitions Used in This Manual

The following table describes text and symbols used to highlight important information.

Signal Word	Symbol	Explanation
DANGER		Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING		Warning indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION		Caution indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
READ		Read is used to alert readers of information to be read on machinery.
NOTE		Note is used for a tip or suggestion to help readers carry out a procedure successfully.

Safety Guidelines

	These safety rules must be followed. All personnel are required to read and understand the Operator's Manual as there are instructions which are detailed specific to this machine.

Personal Protection Equipment

Before beginning operation, service, or maintenance, conduct a hazard assessment to determine appropriate personal protective equipment for the working conditions and the operating environment. For more information refer to the applicable OSHA 1910.132 standards, ANSI standards, federal, state, local, and job site regulations.

Common Types of PPE

Safety Glasses – Impact resistant lenses offering limited protection for the user's eyes from flying debris.

Ear Plugs – A device that is inserted into the ear canal to protect the user's hearing from loud noises or the intrusion of foreign bodies and dust.

Hard Hat – A helmet used to protect the user's head from injuries obtained from falling objects and debris.

Leather Gloves – Gloves used to protect the user's hands from minor cuts and other injuries.

Safety Boots – Boots designed to protect the user's feet from various types of injury such as cuts, puncture wounds, or crushed toes.

General Safety/Operation Guidelines

The following instructions are to be followed for proper operation of the **Load King** Outback 77-55D. **Load King** recommends any Operator's to be trained prior to operating the machine. Training can be arranged through your distributor or directly through **Load King**. Training can be arranged through your distributor or directly through **Load King**.

- **Load King** has no direct control over machine application, operation, inspection, lubrication or maintenance. The use of the **Load King** Outback 77-55D is subject to certain potential dangers that cannot be protected. Therefore, it is the Operator's responsibility to use good safety practices in these areas.
- Modifications to this **Load King** Outback 77-55D from the original design specifications without written consent from **Load King** are strictly forbidden. Any modifications will void the **Load King** factory warranty.

	Modifications may compromise the safety of the **Load King** Outback 77-55D, which could lead to serious injury or death.

- Do not exceed the rated load capacity of the **Load King** Outback 77-55D. Know the weight of the object that is to be handled. Stay within work zones shown on the load charts.
- Do not operate the **Load King** Outback 77-55D if any interlock or safety device is malfunctioning or has been tampered with.
- Do not operate the **Load King** Outback 77-55D if it is not functioning properly, making unusual noises or if there are any fluid leaks.
- Perform all daily and scheduled maintenance.
- Do not put a side load onto the machine. Maneuver boom assembly over object that is to be lifted.
- When transporting the Outback 77-55D, use designated tie down points on the machine to secure it to the trailer. Use the straps and winches provided with the machine.
- Always store attachments in correct location. When possible, secure attachments to machine's trailer during transportation.
- Inspect winch line daily. Do not tie winch lines together.
- Do not operate the boom assembly on trailer.
- Boom stows are to be lowered/pivoted out of the way before boom operation.
- Use the provided pins for all pinning locations. Bolts with threads contacting any fiberglass or other pinned surface may damage the component. This damage is not be covered under warranty.
- Do not walk beneath hoisted loads.

Safety Precautions

EVERY TRACK UNIT HAS INHERENT DANGERS ASSOCIATED WITH IT.

For Your Safety:

- Keep all guards and shields in place. Moving parts can crush and dismember.
- Check that all connections and bolts are tight before operating.
- Check all hoses and fittings before start-up and periodically during operation.
- Clear the area before equipment start up.
- Do not allow bystanders near the operating unit.
- Keep hands, feet, and loose clothing away from operating track unit. Exposed, moving parts can crush or dismember.
- Use caution when traveling over uneven terrain and when approaching stops.

THERE ARE ADDITIONAL HAZARDS ASSOCIATED WITH THE SERVICE AND MAINTENANCE OF A TRACK UNIT.

For Your Safety:

- Always wear eye protection when operating or servicing the unit.
- Do not depend on hydraulic pressure applied to blades or backhoe to elevate machine for track unit service. Always service track units and undercarriage from outside or from above the unit rather than from underneath.
- Escaping hydraulic fluid under pressure can penetrate the skin and cause serious injury. Relieve all pressure from the hydraulic system before connecting or disconnecting the lines or making repairs.
- Never make any alterations or modifications to this equipment.

	NEVER ATTEMPT TO CLEAN, OIL, OR ADJUST A MACHINE IN MOTION.

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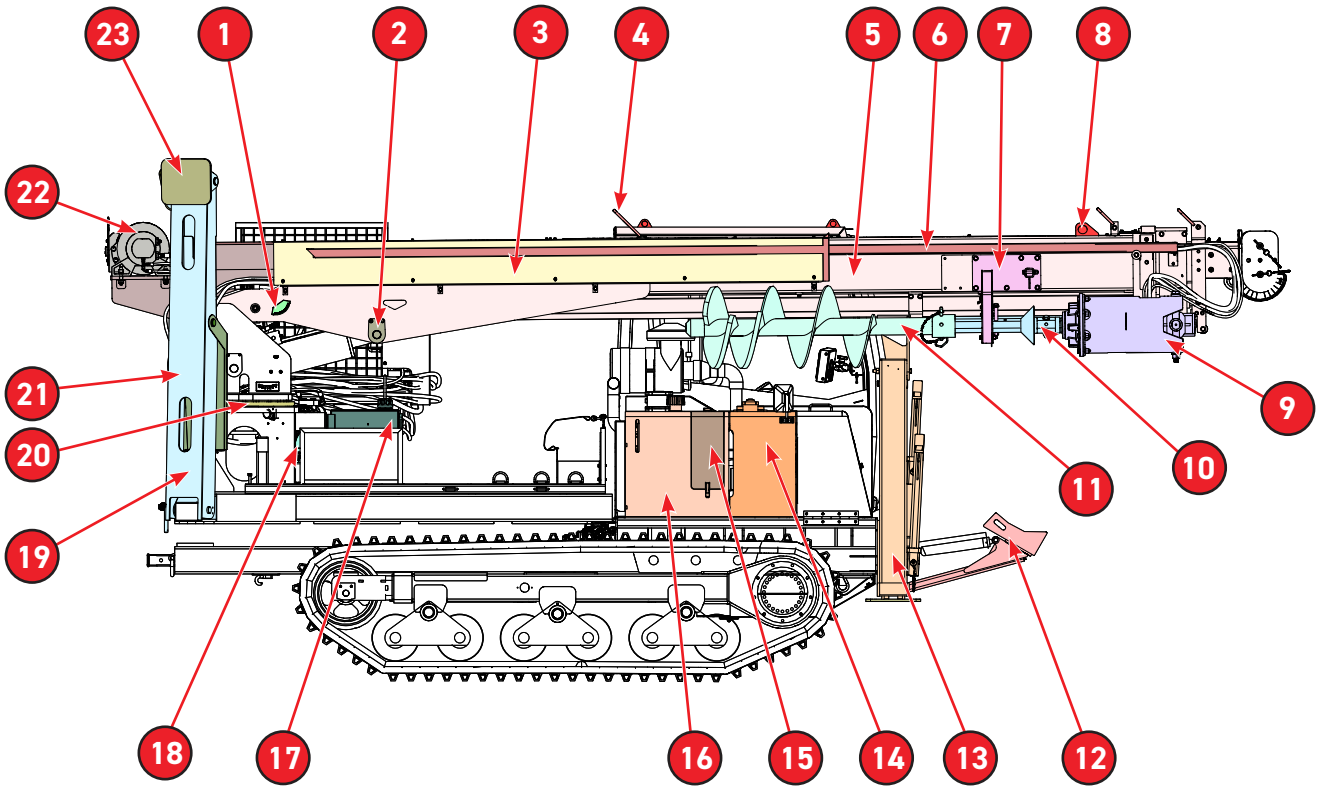
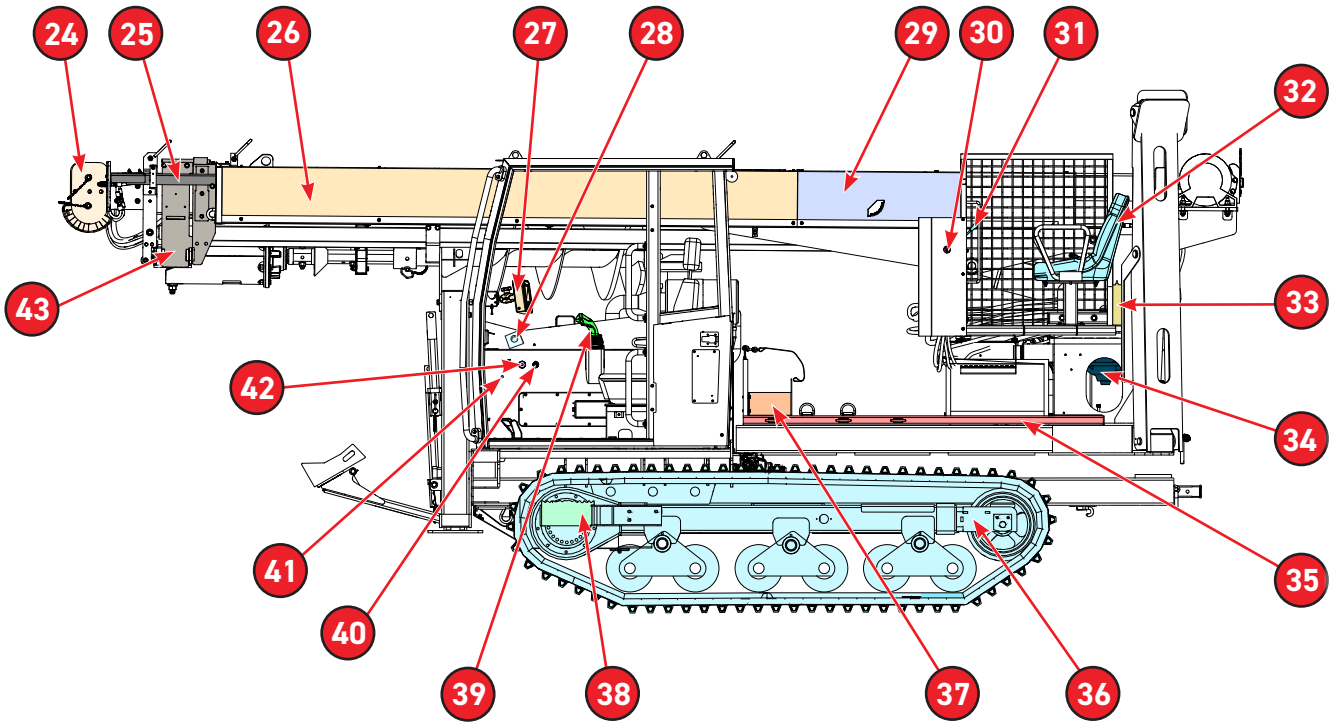
Description of Machine

Machine Component Identification

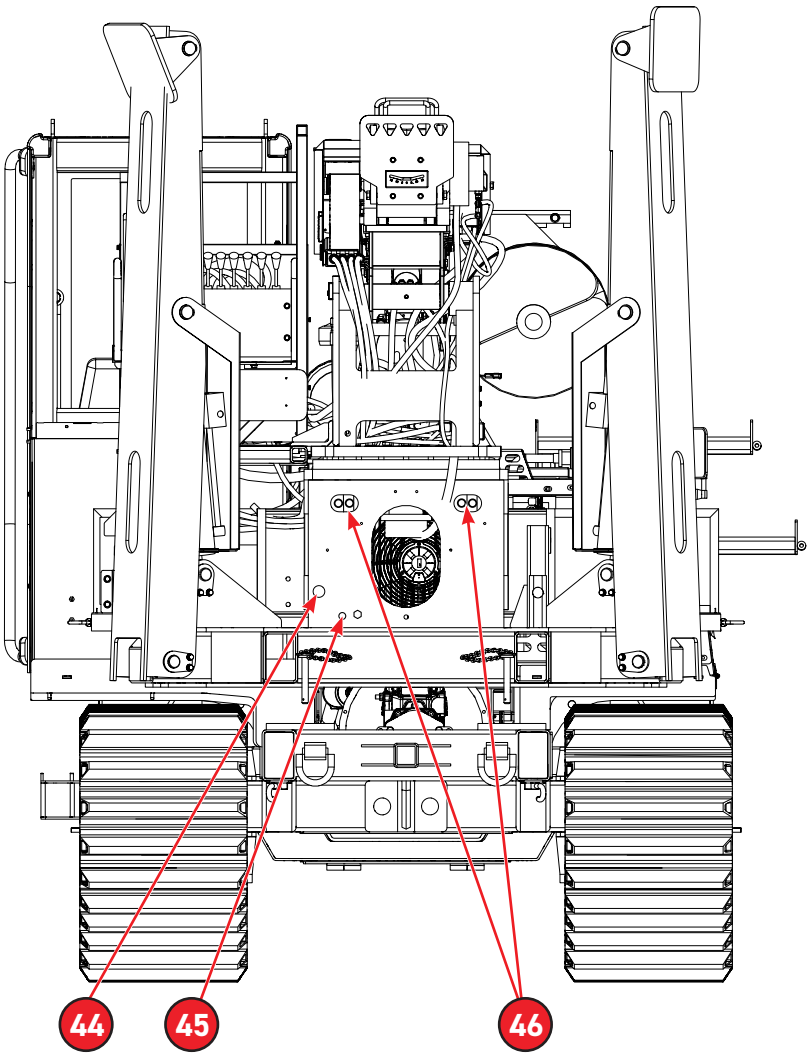


1	Boom Angle Indicator	13	A-Frame Outrigger Leg
2	Boom, Lift Cylinder Pin	14	Diesel Fill
3	Auger Cattrack Cover	15	Track Carrier Hydraulic Tank
4	Winch Rope Guide	16	Track Carrier Hydraulic Return Filter
5	Main Boom	17	Digger Derrick Hydraulic Tank
6	Floating Tube, Steel	18	Digger Derrick Hydraulic Oil Cooler
7	Auger Stow	19	Right, Rear Outrigger Leg
8	Main Boom Eyelet	20	Rotation Gear
9	Auger Housing	21	Rear, Outrigger Cylinder Cover
10	Kelly Bar	22	Main Boom Winch
11	Auger	23	Outrigger Leg Foot Pad
12	Blade		

Machine Component Identification

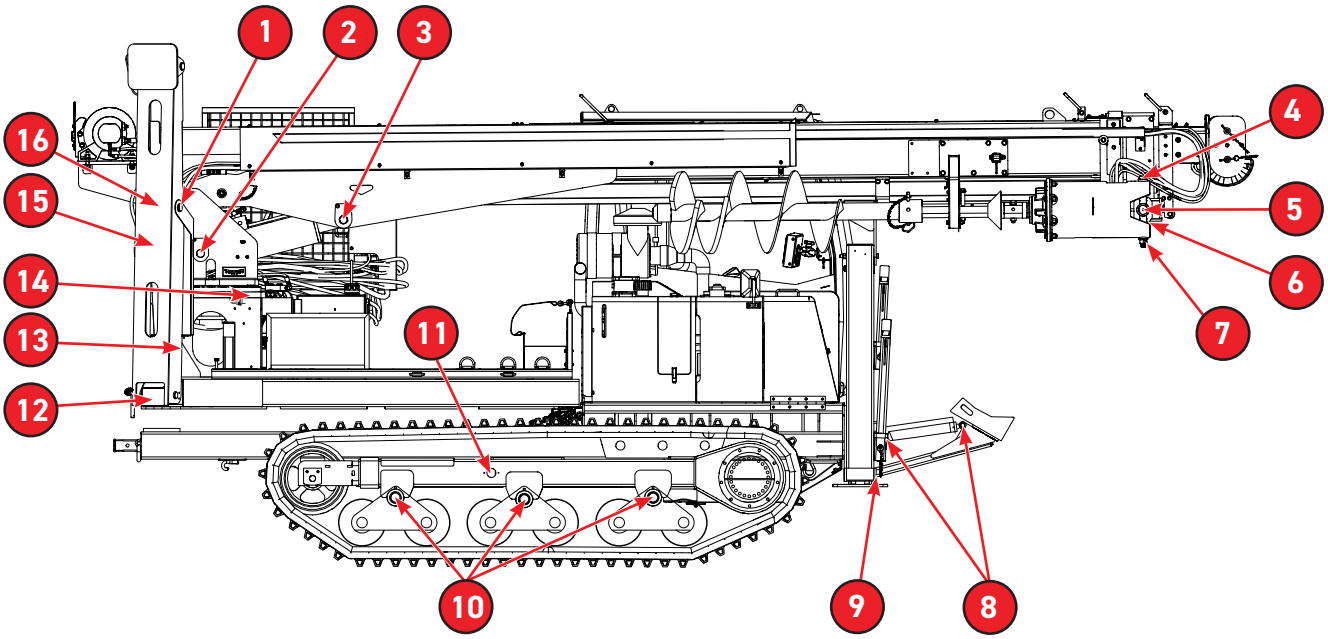


24	Sheave Head	34	Continous Rotation Manifold
25	Floating Tube, Fiberglass	35	Platform Deck
26	Cattrack Cover, Long	36	Track Undercarriage
27	Engine Diagnostic Display Screen	37	Outrigger Pad Storage Box
28	Slope Gauge	38	Step
29	Cattrack Cover, Extension	39	Drive Controls
30	Auger/Winch Selector	40	Ignition Key Switch
31	Boom Function Controls	41	Cabin
32	Operator Platform	42	Hydraulic E-Stop
33	Remote Receiver	43	Auger Hanger



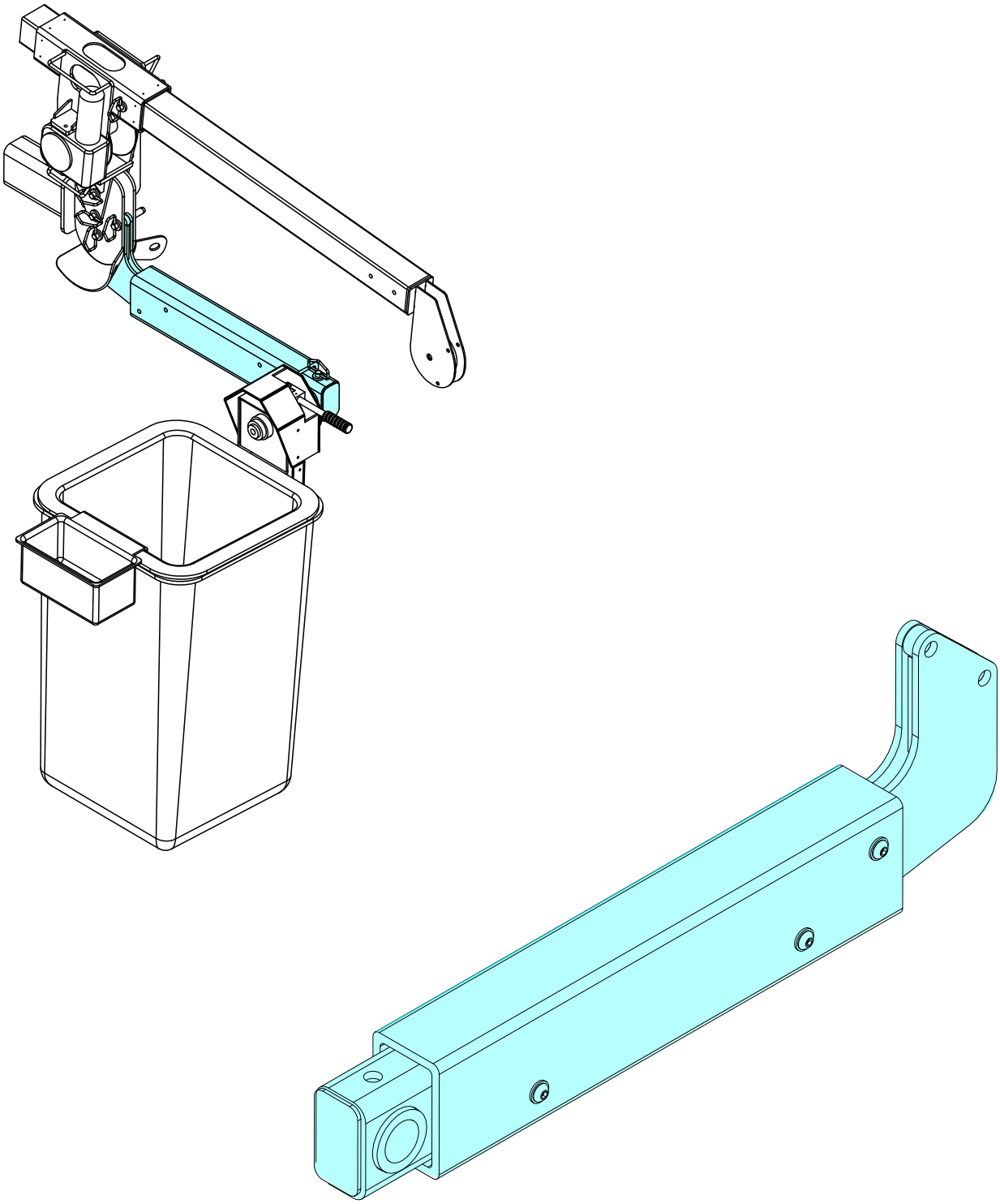
44	Outrigger/Derrick Selector Valve
45	Tool Circuit
46	Outrigger Controls

Grease Fitting Points

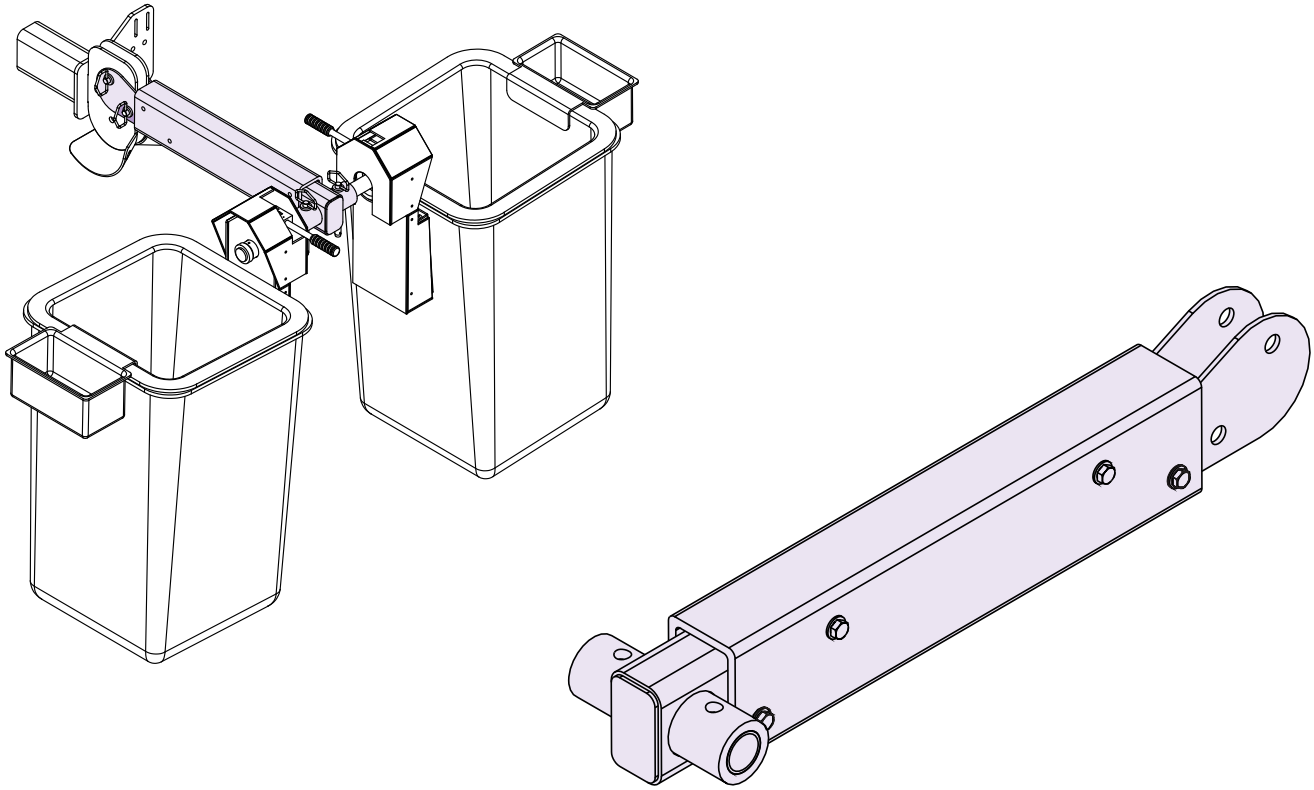


1	Radial Outrigger Cylinder Pin
2	Turret Lift Cylinder Pin
3	Main Boom Lift Cylinder Pin
4	Auger Housing Pin
5	Auger Housing Tube Pin
6	Auger Hanger
7	Auger Housing Pin
8	Blade Cylinder Pins
9	Blade Pivot
10	Track Undercarriage Bogie Swivel
11	Track Undercarriage Tensioner
12	Radial Outrigger Leg Pin
13	Radial Outrigger Cylinder Pin
14	Rotation Gear
15	Rotation Gear, Turret
16	Main Boom Pivot

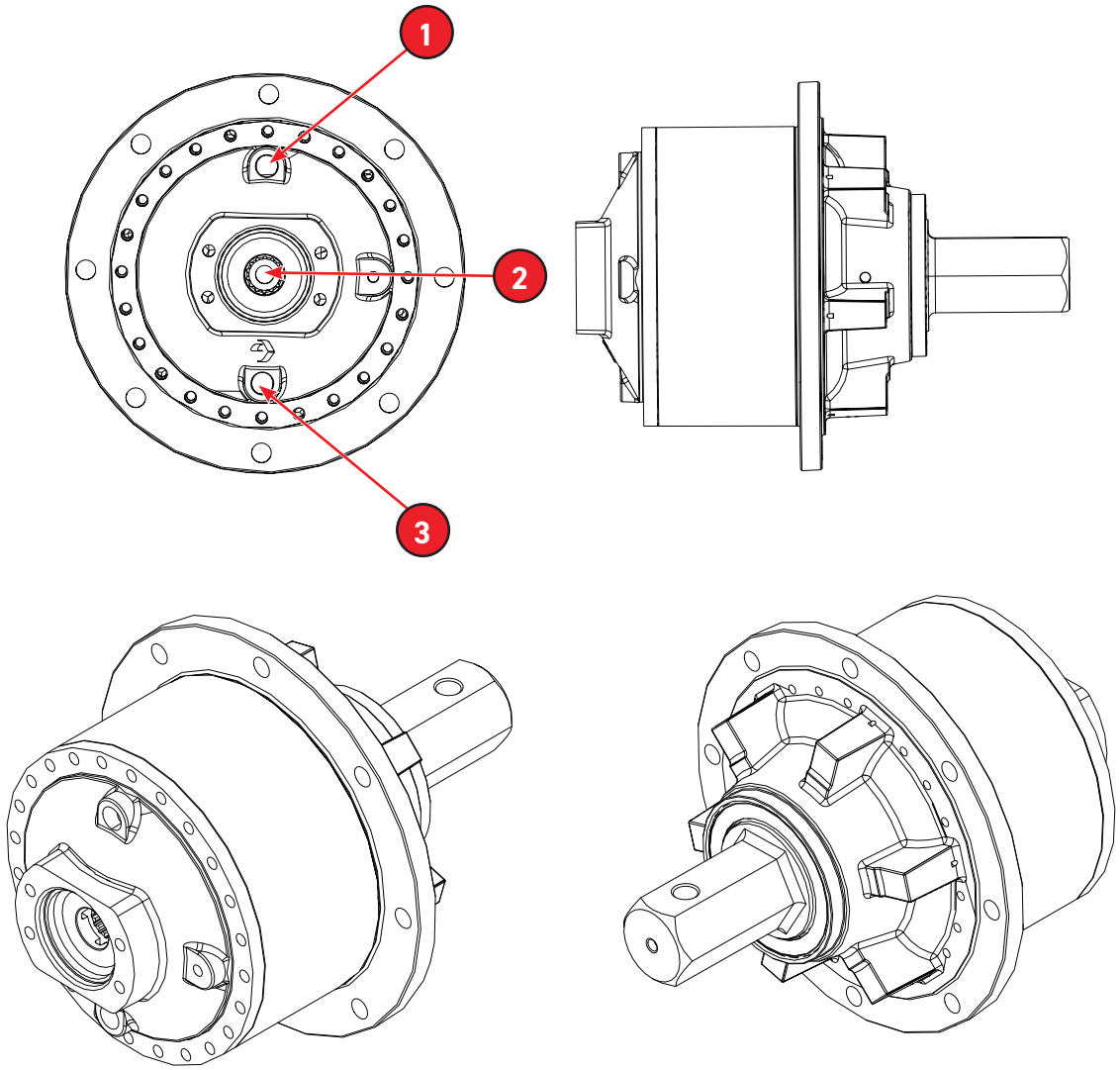
Single Bucket Arm Adapter



Dual Bucket Adapter



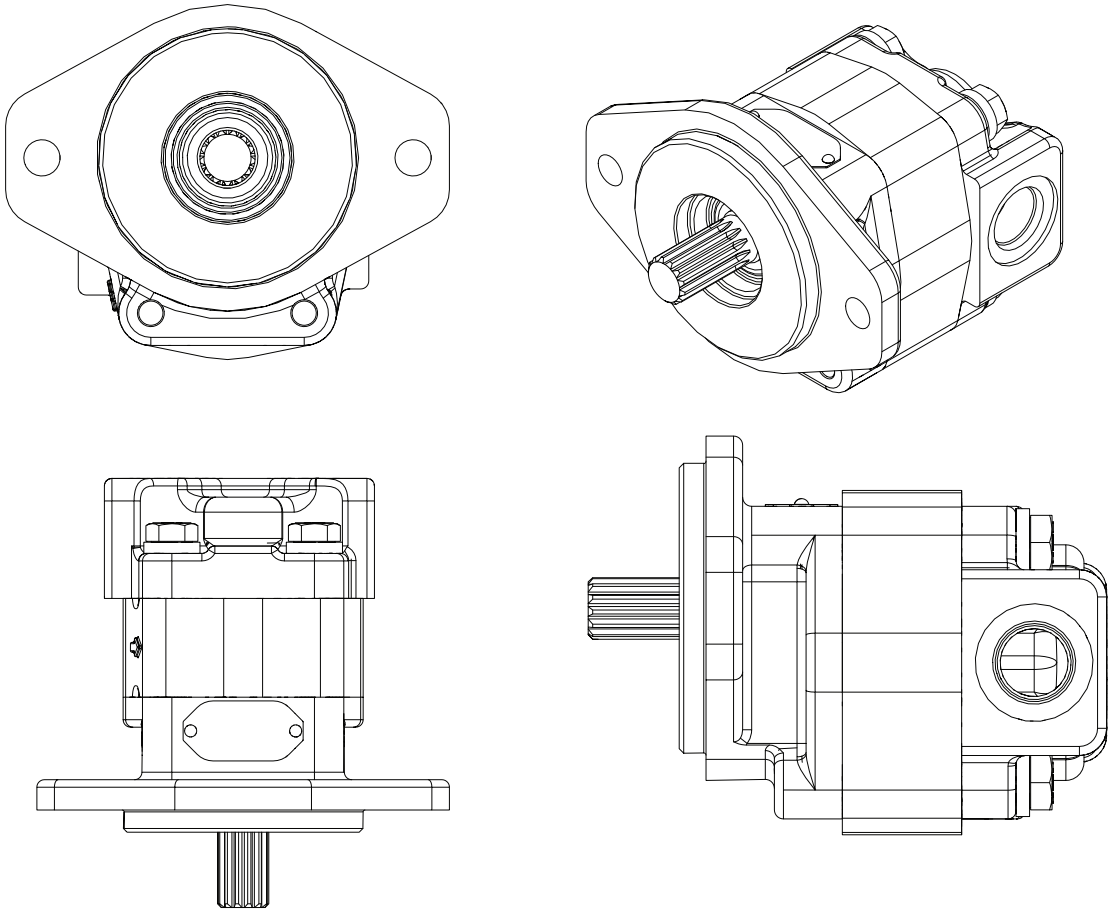
Planetary Gear Reducer



1	Filter Plug
2	Oil Level Check
3	Magnetic Drain Plug

Gear Lube Requirements	
Sae Viscosity Grade	80w-90
Change Interval (Initial)	50 Hours
Change Interval (Subsequent)	1000 Hours or Yearly Whichever Occurs First

Hydraulic Pump



Installation and Operating Instructions

Slew Drives

Safety

	Prior to starting work switch off all energy supplies and safeguard them from being switched on again. If the power supply is switched on by unauthorized personnel, a life-threatening danger exists for persons in the danger zone.
	Prior to starting work ensure that there is adequate free space for installation. Handle open, sharp-edged components carefully. Ensure order and cleanliness at the installation location! Parts and tools that are lying loose or on top of each other are accident hazards! Mount components properly. Maintain the prescribed bolt torque and fastening torque. Secure the components so that they do not fall down or fall over. Improper installation and commissioning may cause serious personal injury and/or property damage.
	Never position yourself under a suspended load! Swinging or falling parts may cause injury or life-threatening danger.
	Carefully supervise the lifting processes and transport. Only use the transport methods described here. A life threatening crushing hazard exists if the components fall.
	Proceed with caution when transporting objects! Comply with instruction symbols on the packages and only use the prescribed attachment points. Improper transport may cause significant damage.
	Avoid impact when transporting! Improper transport may cause significant damage.
	Seals shall not be overpainted! Overpainting may cause significant damage.
	Prevent damage to coating and painting of slew drives. Please contact our customer service if the coating is damaged.
	Follow the instructions provided in the operating manuals for the drive motors (hydraulic or electric), as well as the instructions provided with the optional potentiometer or permanent brake.

Personnel

Only trained, skilled personnel should perform installation and commissioning work.

Personal Protective Equipment

Wear the following protective equipment for all installation and commissioning work:

- Protective work clothing
- Safety footwear
- Protective gloves

	The warnings in this chapter make special reference to additional protective equipment that is required for certain tasks.

Preparation

Lubricating Prior to Commissioning

Slew drives have been lubricated in the factory prior to delivery. Nevertheless, prior to commissioning the slew drive must be lubricated (Refer "Lubricating the slew drive").

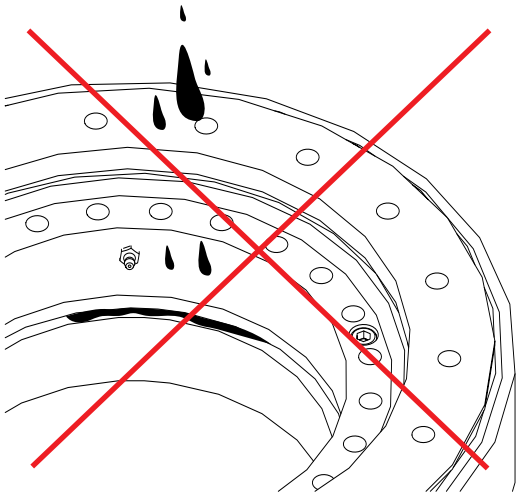
Cleaning the Slew Drive and Mounting Structure

Wear the following additional protective equipment for cleaning work:

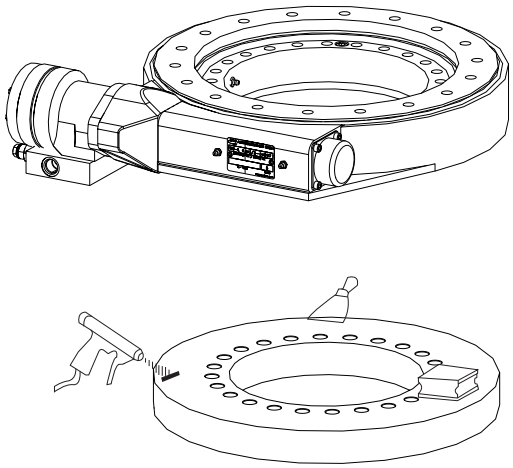
PPE	
	**Face Protection:** To protect the eyes and face from solvents.
	**Chemical-Resistant Protective Gloves:** To protect hands from aggressive substances. Check protective gloves for leaks prior to use. Clean the gloves before pulling them off, store them in a well-ventilated location.

Cleaning

⚠	Only use cold solvents (e.g., white spirit, diesel oil, Kaltryl KEV) that do not corrode the sealing material. Ensure that the cleaning agent does not get into the slew drive. Do not use a high-pressure cleaner to clean the slew drive. Unsuitable trichloroethylene-based or perchloroethylene-based cleaning agents, or other aggressive cleaners damage the seal and may cause bearing damage.



Do not let cleaning agents get into the slew drive



Cleaning

- When using cleaning agents, ensure adequate ventilation.
- Maintain a strict ban on smoking.
- Remove old grease, dust, and fouling with lint-free cloths.
- Remove foreign material from the support surface of the mounting structure (including paint residue, welding beads, burrs).
- If necessary clean the support surface of the slew drive.
- Strictly comply with industrial safety regulations.

Determination of Flatness Deviation, and Perpendicularity Deviation and Deformation of the Mounting Structure

	If there are impermissibly high deviations in flatness and perpendicularity in the mounting structure, then rotational resistance of the slew drive may significantly increase and damage the entire slew drive. In the worst case the slew drive may block.

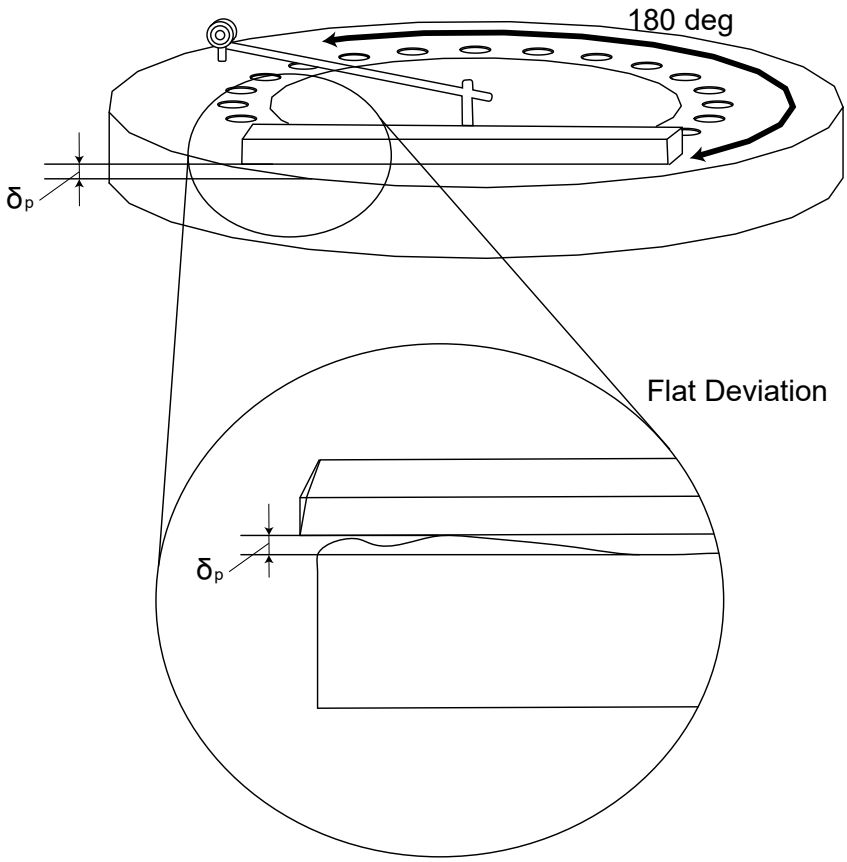
	If the permissible values for flatness or perpendicularity deviation are exceeded, the mounting structure of the slew drive shall be replaced or reworked.

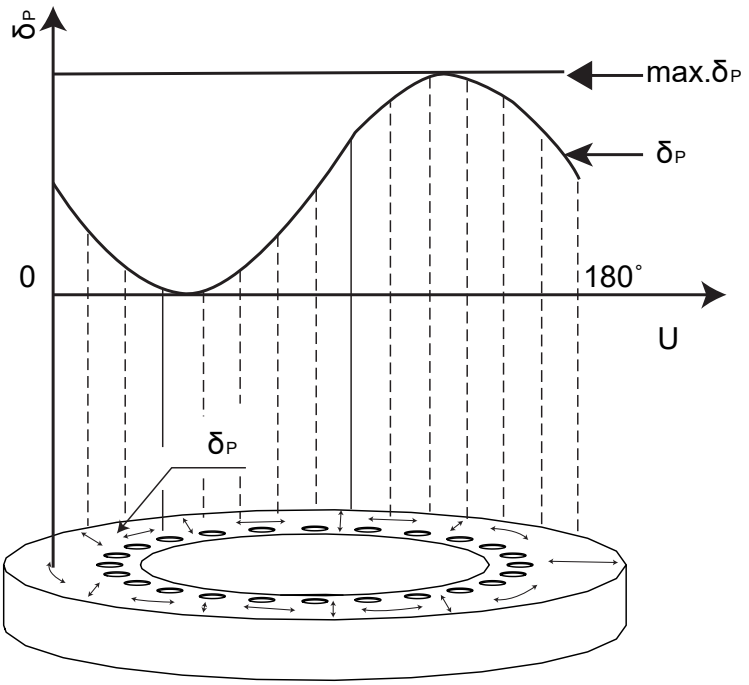
Determination of Flatness Deviation, and Perpendicularity Deviation of the Mounting Structure

The mounting structure can be measured using a measuring plate and dial gauges.

Laser processes and measuring with 3D systems have also proven to be effective. These systems can be used without additional auxiliary material, and they can document the actual gradient of the mounting structure and process it accordingly.

Flatness Deviation





Permissible Flatness Deviation of the Mounting Structure

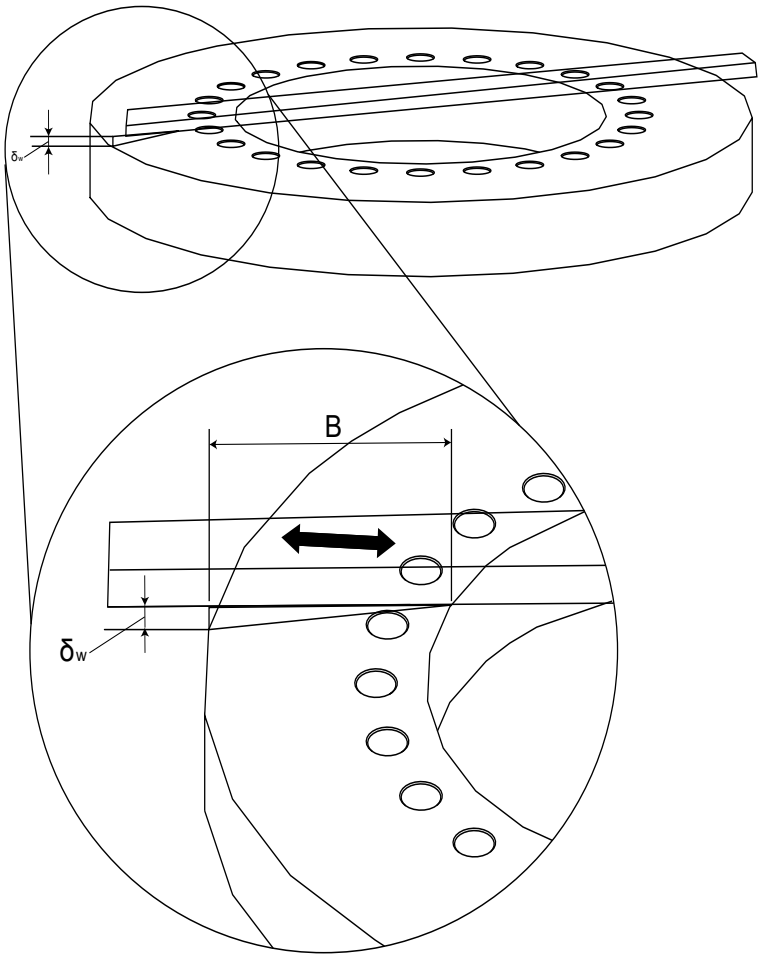
δp = flatness deviation

max. δp = maximum flatness deviation

U = circumference

The maximum residual value for flatness deviation δp in the circumferential direction should only be reached once on half of the circumference. The gradient must look like a sinus curve that slowly rises or falls.

Perpendicularity Deviation



Perpendicularity Deviation

δw = perpendicularity deviation

B = flange width

The permissible perpendicular deviation δw (tilting) is based on the actual flange width and should only be half of the values from the tables below.

XX - X(X) XXXX / X - XXXXX

1

Drawing Number

The size of the slew drive (WD-H) or of the running circle diameter DL (WD-L/SP) is indicated in the drawing number at position (1) and is shown in all documents and the type plate.

	For slew drives that are between the specified sizes, always assume the smaller value. For slew drives that are larger than the largest diameter, use the largest specified value.

	The slew drive must be supported by the mounting structure up to the diameter specified in the slew drive drawing.

Permissible Flatness and Perpendicularity Deviation for Series WD-L and SP Slew Drives

Running Circle Diameter [mm]		**≥100**	**≥250**	**≥500**	**≥750**	**≥1000**	**≥1250**
Permissible flatness deviation including perpendicularity deviation per support surface	[mm]	0.04	0.06	0.08	0.09	0.10	0.11
	[in]	0.0016	0.0024	0.0032	0.0036	0.0040	0.0044

Tab-1

Permissible Flatness and Perpendicularity Deviation for Series WD-H Slew Drives

Size of the Slew Drive		**≥146**	**≥220**	**≥300**	**≥373**	**≥490**	**≥625**
Permissible flatness deviation including perpendicularity deviation per support surface	[mm]	0.06	0.06	0.07	0.07	0.08	0.09
	[in]	0.0024	0.0024	0.0028	0.0028	0.0032	0.0036

Tab-2

Determining the Deformation of the Mounting Structure

Under maximum operating load an appropriate deformation of the mounting structure occurs. The dimensions can be detected via dial gauges, laser measurement processes, or 3D measuring systems.

Because in some cases measurement in operation is difficult, determination of deformation can also be executed mathematically, e.g., with the finite element method. Alternatively you can also reference comparable measurements on test rigs.

	For slew drives that are between the specified sizes, always assume the smaller value. For slew drives that are larger than the largest diameter, use the largest specified value.

	The slew drive must be supported by the mounting structure up to the diameter specified in the slew drive drawing. All the installed dimensions as specified in the drawing must be complied with.

Permissible Deformation of the Mounting Structure, Under Maximum Load for Series WD-L and SP Slew Drives

Running Circle Diameter [mm]		≥100	≥250	≥500	≥750	≥1000	≥1250
Permissible deformation of the mounting structure per support surface	[mm]	0.13	0.16	0.21	0.24	0.27	0.29
	[in]	0.0052	0.0063	0.0083	0.0095	0.0106	0.0114

Tab-3

Permissible Deformation of the Mounting Structure, Under Maximum Load for Series WD-H Slew Drives

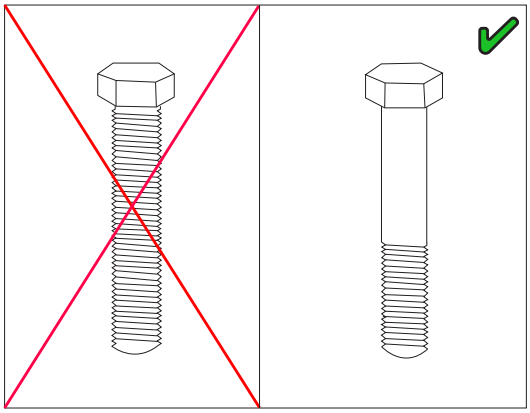
Size of the Slew Drive		≥146	≥220	≥300	≥373	≥490	≥625
Permissible deformation of the mounting structure per support surface	[mm]	0.10	0.11	0.12	0.13	0.15	0.16
	[in]	0.0040	0.0044	0.0048	0.0052	0.0059	0.0063

Tab-4

	Axial deflection, tilting, radial extention (or radial contraction) of the mounting structure under max. load causes deformation of the mounting structure.

Selecting the Mounting Elements

	Only use mounting elements of the correct size, number and quality. Do not reuse bolts, nuts, and washers. Using unsuitable mounting elements may cause the bolted union to fail and thus the entire construction to fail.

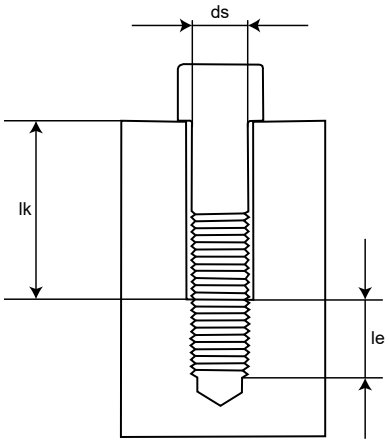


Do not use continuous thread

The function and service life, as well as the durability of the bolted union are highly dependent on grip ratio, the type of bolt, and the dimensions of the bolts. Consequently select the mounting elements on the basis of the following:

- Do not use any bolts with a fully threaded shaft.
- Only use new, quality class 10.9 (metric) bolts or SAE Grade 8.

- Maintain the grip ratio (grip length to the diameter of the bolt) of at least ≥ 5 to maximum ≤ 10.
- Select bolt length to ensure that the minimum insertion depth is reached (Tab. 5).
- If the permissible interfacial pressure is exceeded use appropriate washers (Tab. 6).



Mounting Element

ds = bolt diameter

lk = grip length

le = insertion depth

ℹ	If the specifications cannot be satisfied, please contact our Customer Service.

Minimum Bolt Insertion Depth Depending on Fracture Strength of the Mounting Structure

Fracture Strength Rm of the Mounting Structure		**Minimum Insertion Depth (le)**
in N/mm²	**in lbf/in²**	**Strength class 10.9 / Grade 8**
500 to 700	72520 to 101525	le = 1.4*ds
700 to 900	101525 to 130535	le = 1.1*ds
Over 900	Over 130535	le = 0.9*ds

Tab-5

ℹ	Mounting structures with fracture strength under 500 N/mm² or 72520 lbs/in² are prohibited.

Permissible Interfacial Pressure for Various Materials

Material	**Max. Surface Pressure**	
	in N/mm²	**in lbs/in²**
St52/C45N/46Cr2N	600	87023
46Cr4V/42CrMo4V	800	116030

Tab-6

Tightening Bolts with a Torque Wrench

Normally the mounting bolts are adequately secured through correct pretension.

Do not use impact screwdrivers. Using an impact screwdriver may cause impermissible deviations between the bolt tightening forces. Failure of the bolted union with the mounting structure may cause severe personal injury or material damage.

If there are shock loads or vibration additional screwlocking devices may be necessary. In this case use Loctite or Nord-Lock® bolt lock washers.

- Do not use split rings, spring washers, etc.
- Do not reuse bolts, nuts, and washers, etc.
- Only use hardened and tempered washers.
- Adjust the limit torque in accordance with bolt size and quality.
- Use a precisely indicating torque wrench.

Tightening Torques and Bolt Tightening Forces for Metric Coarse-Pitched Thread in Accordance with Din 13 when Using a Torque Wrench:

Mounting Bolt Dimensions	Tightening Torque M_A [1] Strength Class 10.9 in		Mounting Pretension Force F_M [2] Strength Class 10.9 in	
	Nm	ft-lbs	kN	lbs
M4	3.31	2.44	5.95	1338
M5	6.77	4.99	9.74	2190
M6	11.5	8.5	13.7	3080
M8	28.0	20.6	25.2	5665
M10	55.8	41.2	40.2	9037
M12	97.7	72.1	58.5	13151
M16	246	181	111	24954
M18	336	248	134	30124
M20	481	355	173	38892
M22	661	487	216	48559
M24	830	612	249	55977
M27	1230	907	328	73737
M30	1661	1225	398	89474

Tab-7

[1] M_A in accordance with VDI guideline 2230 (February 2003) for μK=0.08 and μG=0.12

[2] F_M in accordance with VDI guideline 2230 (February 2003) for μG=0.12

Tightening Torques and Bolt Tightening Forces for Inch Thread in Accordance with ANSI B1.1 when Using a Torque Wrench:

Mounting Bolt Dimensions	Tightening Torque M_A[1] Strength Class Grade 8 in		Mounting Pretension Force F_M[2] Strength Class Grade 8 in	
	Nm	ft-lbs	kN	lbs
0.1900 - 24 UNC	4.80	3.54	7.15	1607
0.2160 - 24 UNC	7.69	5.67	10.1	2271
1/4 - 20 UNC	11.7	8.6	13.2	2967
5/16 - 18 UNC	24.4	18.0	22.1	4968
3/8 -16 UNC	43.7	32.2	33.0	7419
7/16 - 14 UNC	70.1	51.7	45.4	10206
1/2 -13 UNC	108	80	61.0	13713
9/16 - 12 UNC	156	115	78.6	17670
5/8 - 11 UNC	216	159	97.8	21986
3/4 - 10 UNC	385	285	146	32822
7/8 - 9 UNC	625	461	202	45411
1-8 UNC	938	692	266	59799
1 1/8 - 7 UNC	1328	979	334	75086
1 1/4 - 7 UNC	1889	1393	428	96218

Tab-8

[1] M_A in accordance with VDI guideline 2230 (February 2003) for μK=0.08 and μG=0.12

[2] F_M in accordance with VDI guideline 2230 (February 2003) for μG=0.12

	For mounting bolts from M30 or 1 1/8 - 7 UNC use a hydraulic bolt-tensioning cylinder (Refer "Tightening bolts with a hydraulic bolt-tensioning cylinder").

	When using bolts with fine-pitched thread or other bolt sizes or qualities, please contact our Customer Service.

	For further information about bolts, please refer to the IMO main catalogues.

Tightening Bolts with a Hydraulic Bolt-Tensioning Cylinder

	Comply with the instructions provided in the operating manual for the hydraulic fixture! The operating manual for the hydraulic bolt-tensioning cylinder specifies how the hydraulic pressure is converted to the pretension force.

	The prescribed hydraulic pressure should not be exceeded when pretensioning the bolts. Excess hydraulic pressure may cause failure of the bolted union with the mounting structure and may cause severe personal injury or material damage.

	When using other threaded bolts or other strength classes you have to contact our Customer Service.

Bolt Tension Forces when Using a Hydraulic Bolt-Tensioning Cylinder for Metric Coarse-Pitched Thread in Accordance with Din 13:

Mounting Bolt Dimensions	Mounting Pretension Force F_M [1] Strength Class 10.9 in	
	kN	lbs
M24	282	63396
M27	367	82505
M30	448	100714
M33	554	124544
M36	653	146800
M42	896	201429
M45	1043	234476
M48	1177	264600
M52	1405	315857
M56	1622	364640
M60	1887	424215
M64	2138	480642
M68	2441	548759

Tab-9

[1] F_M for hydraulic bolt-tensioning cylinder pretensioned to 85% of yield strength

Bolt Tension Forces When Using a Hydraulic Bolt-Tensioning Cylinder for Inch Thread in Accordance with ANSI B1.1:

Mounting Bolt Dimensions	Mounting Pretension Force F_M[1]) Strength Class 10.9 in	
	kN	lbs
1 – 8 UNC	301	67668
1 1/8 – 7 UNC	379	85203
1 1/4 – 7 UNC	481	108133
1 3/8 – 6 UNC	573	128816
1 1/2 – 6 UNC	697	156692
1 5/8 – 6 UNC	832	187041
1 3/4 – 5 UNC	942	211770

The prescribed hydraulic pressure should not be exceeded when pretensioning the bolts. Excess hydraulic pressure may cause failure of the bolted union with the mounting structure and may cause severe personal injury or material damage.

When using other threaded bolts or other strength classes you have to contact our Customer Service.

Bolt Tension Forces when Using a Hydraulic Bolt-Tensioning Cylinder for Metric Coarse-Pitched Thread in Accordance with Din 13:

Mounting Bolt Dimensions	Mounting Pretension Force F_M[1]) Strength Class 10.9 in	
	kN	lbs
M24	282	63396
M27	367	82505
M30	448	100714
M33	554	124544
M36	653	146800
M42	896	201429
M45	1043	234476
M48	1177	264600
M52	1405	315857
M56	1622	364640
M60	1887	424215
M64	2138	480642
M68	2441	548759

Tab-10

[1]) F_M for hydraulic bolt-tensioning cylinder pretensioned to 85% of yield strength

Bolt Tension Forces When Using a Hydraulic Bolt-Tensioning Cylinder for Inch Thread in Accordance with ANSI B1.1:

Mounting Bolt Dimensions	Mounting Pretension Force FM[1]) Strength Class 10.9 in	
	kN	lbs
1 – 8 UNC	301	67668
1 1/8 – 7 UNC	379	85203
1 1/4 – 7 UNC	481	108133
1 3/8 – 6 UNC	573	128816
1 1/2 – 6 UNC	697	156692
1 5/8 – 6 UNC	832	187041
1 3/4 – 5 UNC	942	211770
2 – 4.5 UNC	1239	278538
2 1/4 – 4.5 UNC	1608	361493
2 1/2 – 4 UNC	1981	445347
2 3/4 – 4 UNC	2442	548984

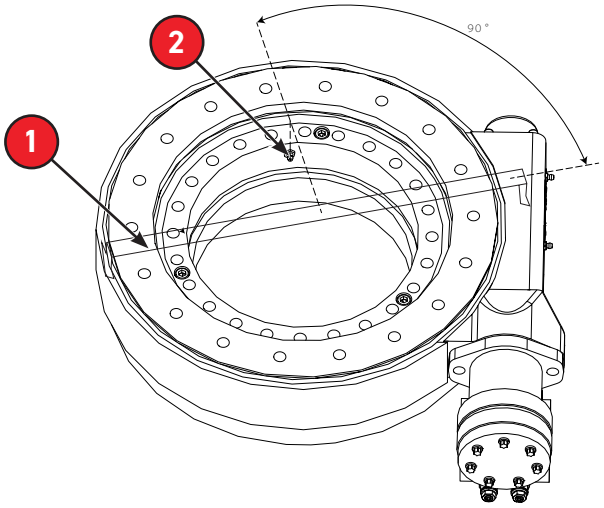
Tab-11

[1]) F_M for hydraulic bolt-tensioning cylinder pretensioned to 85% of yield strength

Installing the Slew Drive

Hardness Gap

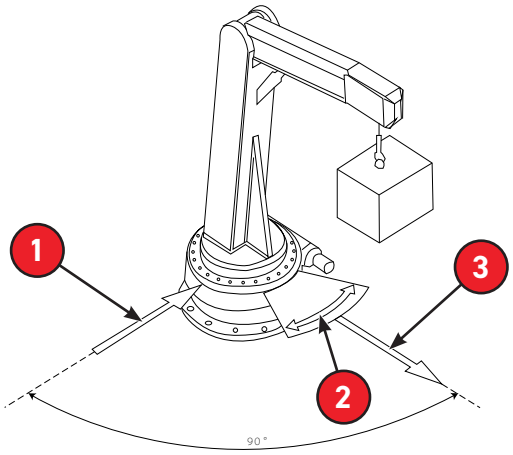
The hardness gap occurs with the raceway hardening and is located between the end and the beginning of the hardening. For the WD-L series the hardness gap must be arranged with an offset by 90° relative to the main load-carrying zone. The hardness gap is marked by a filling plug or a stamped “S”.



Hardness Gap Marking

1	Main load-carrying zone
2	Filling plug or S-mark

Positioning the Slew Drive



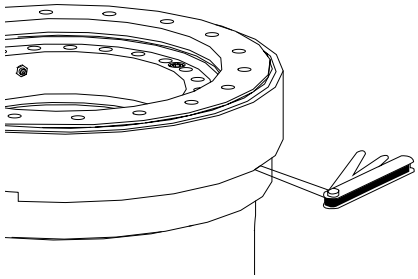
Main Load-Carrying Zone

1	Hardness gap
2	Main slewing range
3	Main load-carrying zone

1. Determine the main load-carrying zone. The main load-carrying zone is that area of the slewing ring that is subject to the highest load, taking all aggressive forces and torques, and all occurring load cases into account.
2. Arrange the hardness gap (Refer "Hardness Gap") of the bearing ring charged with point load so that it is offset by 90° relative to the main load-carrying zone. The main load carrying zone is in the main slewing range.

	The hardness gap or the filling plug in a slewing ring constitute a zone of decreased load-carrying capacity. The service-life of the slew drive will be reduced significantly, if the hardness gap is in the main slewing range. Fracture of bearing ring for example may cause slew drive failure. Consequently place this marked point in a reduced load zone if possible.

3. Use a feeler gauge to check whether the support surface of the slew drive is completely supported by the mounting structure. If this is not the case, the support surface of the mounting structure must be reworked (Refer "Determining flatness deviation, and perpendicularity deviation and deformation").



Check the Support Surface

Bolting the Slew Drive

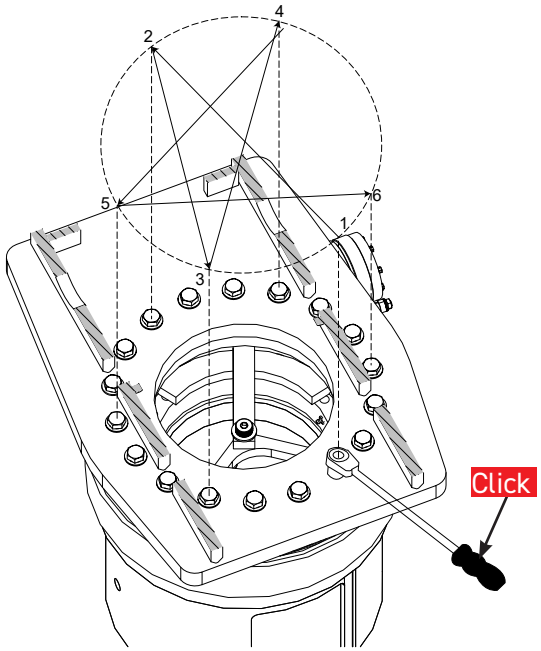
	Do not use impact screwdrivers. Using an impact screwdriver may cause impermissible deviations between the bolt tightening forces. Failure of the bolted union with the mounting structure may cause severe personal injury or material damage.

	Mount the slew drive in unstressed state.

Strictly comply with the procedure specified below to avoid impermissible deviations between the bolt tightening forces:

	First fasten the housing, then fasten the toothed bearing ring!

1. Lightly oil the bolt thread (not when using bolt locking devices with adhesive).
2. Pretension the bolts, with washers if required, crosswise in 3 steps, 30%, 80%, and 100% of the tightening torque, or the hydraulically applied pretension force.
3. In this process turn the unscrewed ring several times. Repeat the procedure for the bearing ring that has not yet been bolted.



Tighten Crosswise

If using a hydraulic bolt-tensioning cylinder the tensioning forces for the bolt pretension should not exceed 90% of yield strength (Tab. 10 and 11).

ℹ	The end customer or the operating company must be instructed which tightening process was used. The process must also be used when servicing the unit to check the bolted union.

Tightening Torque M_A in Nm with Incremental Tightening

Mounting Bolt Dimensions	Step 1 30%	Step 2 80%	Step 3 100%
	Tightening torque M_A in Nm Strength class 10.9		
M6	3.50	9.20	11.5
M8	8.40	22.4	28.0
M10	16.7	44.6	55.8
M12	29.3	78.2	97.7
M16	73.8	197	246
M20	144	385	481
M24	249	664	830
M30	498	1329	1661

Tab-12

Tightening Torque M_A in Nm with Incremental Tightening

Mounting Bolt Dimensions	Step 1 30%	Step 2 80%	Step 3 100%
	Tightening torque M_A in Nm Strength class SAE Grage 8		
1/4 - 20 UNC	3.50	9.30	11.6
5/16 - 18 UNC	7.30	19.4	24.3
3/8 - 16 UNC	13.1	34.9	43.6
7/16 - 14 UNC	21.1	56.2	70.2
5/8 - 11 UNC	64.4	172	215
3/4 - 10 UNC	115	308	385
7/8 - 9 UNC	187	498	622
1 1/8 - 7 UNC	397	1060	1324

Tab-13

Tightening Torque M_A in ft-lbs with Incremental Tightening

Mounting Bolt Dimensions	Step 1 30%	Step 2 80%	Step 3 100%
	Tightening torque M_A in ft-lbs Strength Class 10.9		
M6	2.50	6.80	8.50
M8	6.20	16.5	20.7
M10	12.3	33.0	41.2
M12	21.6	57.6	72.0
M16	54.3	145	181
M20	107	284	355
M24	184	490	612
M30	368	980	1225

Tab-14

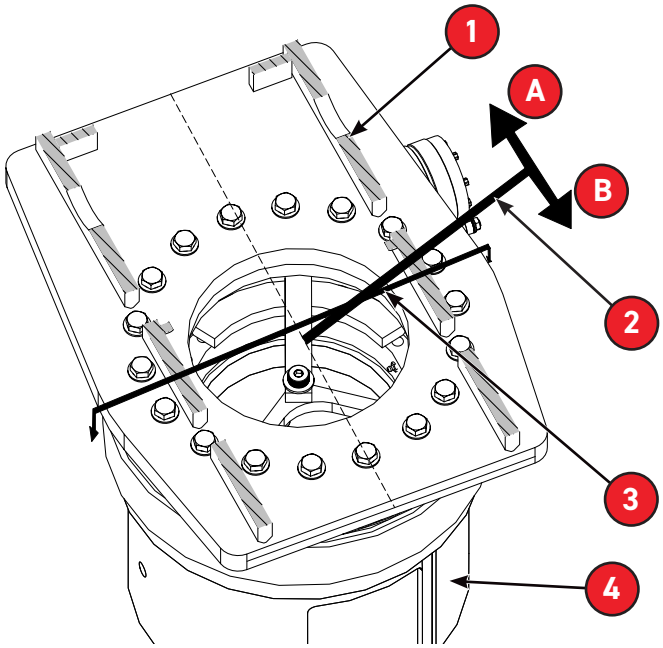
Tightening Torque M_A in ft-lbs with Incremental Tightening

Mounting Bolt Dimensions	Step 1 30%	Step 2 80%	Step 3 100%
	Tightening torque M_A in ft-lbs Strength class SAE Grade 8		
1/4 - 20 UNC	2.60	6.90	8.60
5/16 - 18 UNC	5.40	14.4	18.0
3/8 - 16 UNC	9.70	25.8	32.3
7/16 - 14 UNC	15.6	41.6	52.0
5/8 - 11 UNC	47.7	127	159
3/4 - 10 UNC	85.5	228	285
7/8 - 9 UNC	138	369	461
1 1/8 - 7 UNC	294	785	981

Tab-15

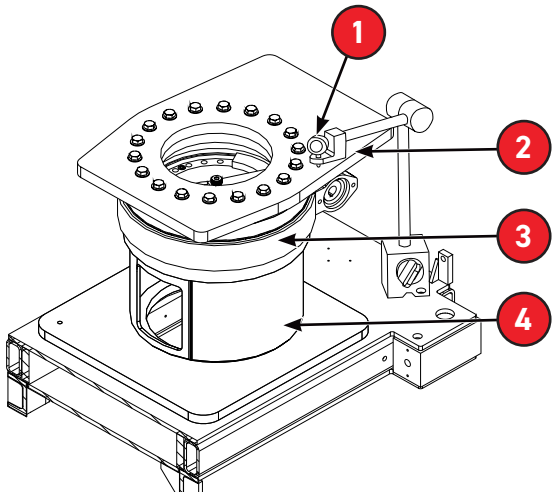
Determining the Tilting Clearance

Tilting clearance increases as raceway system wear increases. To determine the increase in tilting clearance a basic measurement must be executed in installed status and prior to first-time operation. This is the only way to determine changes.



Determine Tilting Clearance

1	Upper mounting structure
2	Tilting direction
3	Main load-carrying zone
4	Lower mounting structure



Measurement Setup

1	Dial gauge
2	Upper mounting structure
3	Slew Drive
4	Lower mounting structure

Procedure:

Tilting Clearance Measurement

1. Switch off the system and safeguard it from being turned on again.
2. Permanently mark the measuring point in the main load direction on the housing and on the bearing ring.
3. Attach the dial gauge as shown in Fig. Measurement setup.
4. Apply defined tilt torque, at least 50% of max. operating load, in direction “A”.
5. Set dial gauge to zero.
6. Apply defined tilt torque, at least 50% of max. operating load, in direction “B”.
   The displayed measured value m1 corresponds to the existing tilting clearance and serves as the base value that will be used for comparison in later inspections.
7. Log and document all measured values.

- All inspections at a later point in time must be executed on the same measuring point, with the same loads, at the same relative position of the bearing rings, and in the same sequence.
- At pure axial or radial load check the tilting clearance by applying an additional tilting load.

Determining the Circumferential Backlash

Toothing wear causes increased circumferential backlash. Consequently it is necessary to check circumferential backlash in accordance with the maintenance intervals (Refer "Maintenance Schedule").

	Do not exceed the specified values for the circumferential backlash angle of the worm shaft (Tab. 17). Exceeding the specified values may result in failure of the slew drive and damage to the connecting components.

1. Switch off the system and safeguard it from being restarted.
2. Determine the measuring point in the main load-carrying zone, both on the housing as well as on the worm gear or on the toothed ring and permanently mark these points.
3. Remove the drive with the goal of ensuring that the worm shaft can be freely and easily moved by hand.

- If using a front-end brake (Flanged-mounted between motor and slew drive):
  - Remove front-end brake and motor (Operating manual for the front-end brake and motor).
- If using a brake that is bolted to the slew drive opposite side of the motor:
  - Vent brake (Operating manual for the brake).
- If using a permanent brake (Series WD-L):
  - Remove brake (Operating manual for the permanent brake).

4. Determine the circumferential backlash angle of the worm shaft in the area in which the worm gear is meshed the majority of the time.

   The determined measured value serves as the comparison value for subsequent checks.

- Limit values, Refer section "Checking the circumferential backlash".
- Log and document the measured values.
- All measurements at a later point in time must be performed on the same measuring point.

Function Test

The slew drive must rotate uniformly. Deviations in the mounting structure as well as the influence of exterior loads can significantly affect the friction torque.

1. Turn the mounted slew drive several complete revolutions.
2. Check whether the slew drive turns uniformly and without jerking.
3. Perform additional test runs under full load.
4. After the function test, check the tightening torque of the mounting bolts.

Maintenance

	Follow the instructions provided in the operating manuals for the drive motors (hydraulic or electric), as well as the instructions provided for the optional potentiometer or permanent brake.

Safety

	Prior to starting work switch off all energy supplies and safeguard them from being switched on again. When performing maintenance tasks there is danger of the energy supply being switched on without authorization. This poses a life-threatening hazard for persons in the danger zone.

	Prior to starting work ensure that there is adequate free space for installation. Ensure order and cleanliness at the installation location! Parts and tools that are lying loose or on top of each other are accident hazards! If components have been removed, ensure that they are properly reinstalled, that all fastening elements are re-installed, and that all threaded connections are tightened with the specified torque. Improper maintenance may cause serious injury or property damage.

Personnel

- Only qualified, specialized personnel shall perform maintenance and inspection work.
- Only qualified electricians should perform work on the electrical equipment.

Personal Protective Equipment

Wear the following personal protective equipment for all maintenance work:

- Protective work clothing
- Protective gloves
- Safety footwear

Environmental Protection

Comply with the following instructions for environmental protection when performing maintenance work:

- At all lubricating points where lubricant is applied by hand, remove escaping, used, or excess grease, and dispose of it in accordance with applicable local regulations.
- Collect hydraulic fluids and oils in suitable containers and dispose of these substances in accordance with applicable local regulations.

Cleaning

⚠	Use cold solvent (e.g., white spirit, diesel oil, Kaltryl KEV) that does not corrode the sealing material. Ensure that the cleaning agent does not get into the slew drive. Do not use a high-pressure cleaner to clean the slew drive. Unsuitable trichloroethylene-based or perchloroethylene-based cleaning agents, or other extremely aggressive cleaners damage the seal and may cause bearing damage.

Wear the following additional protective equipment for cleaning work:

PPE	
	**Face Protection:** To protect the eyes and face from solvents.
	**Chemical-Resistant Protective Gloves:** To protect hands from aggressive substances. Check protective gloves for leaks prior to use. Clean the gloves before pulling them off, store them in a well-ventilated location.

Maintenance Schedule

Maintenance tasks are described in the sections below that are required for optimal and trouble-free operation.

If increased wear is detected during regular inspections, then reduce the required maintenance intervals according to the actual indications of wear.

If you have questions concerning maintenance tasks and intervals, please contact our Customer Service.

Interval	Maintenance Task	To Be Executed By
Weekly	Check seal	Specialist
After 100 operating hours	Tighten bolts	Specialist
	Check tilting clearance	Specialist
After every additional 700 operating hours or at least every 6 months	Tighten bolts Reduce the inspection interval if there is heavy wear or continuous operation.	Specialist
	Check tilting clearance Reduce the inspection interval to 200 operating hours if the detected increase in tilting clearance is approximately 75% of the permissible tilting clearance increase. After further increase reduce the interval between inspections to 50 - 100 hours.	Specialist
	Check circumferential backlash Reduce the inspection interval to 200 operating hours if the detected increase in circumferential backlash is approximately 75% of the permissible circumferential backlash increase. After further increase reduce the interval between inspections to 50 - 100 hours.	Specialist

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Lubrication

General re-lubrication of slew drives:

- After each cleaning
- Before and after longer periods of standstill, e.g., for cranes and construction machines during the winter months.

	The main cause for slewing ring failure is inadequate lubrication. The lubrication intervals essentially depend on existing working and environmental conditions, as well as the version of the slew drive. Precise lubrication intervals can only be determined by tests under normal operating conditions.

If comparable results are not available, the following table can be used as a guide value:

Work Conditions	Lubricating Interval	Executed By
Dry and clean workshop hall (rotary tables, robots, etc.)	Approx. every 300 operating hours, at least every 6 months	Specialist
Severe conditions on open terrain (cranes, excavators, etc.)	Approx. every 100 to 200 operating hours, at least every 4 months	Specialist
Aggressive climatic conditions, (ocean, desert, arctic climate, extremely polluted environment, ›70 operating hours per week	Every 50 operating hours, at least every 2 months	Specialist
Extreme conditions (tunnel boring machines, steel works, wind turbines)	Continuous lubrication (through central lubrication or grease cups)	Specialist

Tab-17

The specified values are valid for the following conditions:

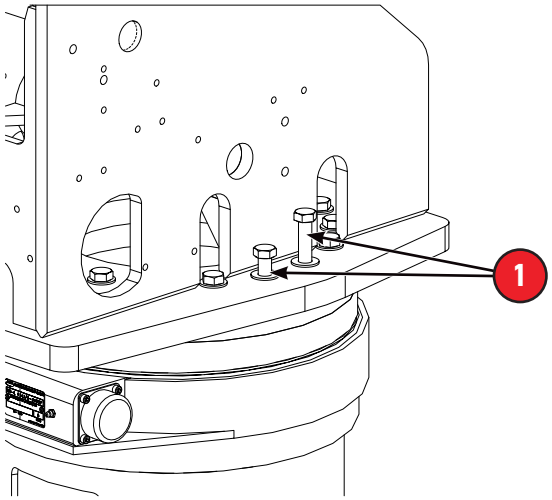
- Operating temperature on the slew drive < 70° C (158° F).
- Circumferential speed < 0.5 m/s (1.64 ft/sec) for SP slew drives.
- Output speed < 5 rpm for WD slew drives.
- Low to moderate load.

	Comply with the instructions in the operating manual provided by the manufacturer, for lubrication of optional intermediate gear units, brakes, and motors. If necessary re-lubricate permanent brakes. For this only use the special grease SHELL RETINAX HDX2.

Maintenance Tasks

Inspecting the Mounting Bolts

	To compensate for settling, the bolts must be retightened with the prescribed tightening torque. Retightening must be executed without exerting additional external stress on the bolted union.



Inspecting the Mounting Bolts

1	Detached bolt

Execution only by a specialist.

- Special tools required:
  - Torque wrench
  - Hydraulic clamping fixture
- Replace loose and detached bolts or nuts and washers with new bolts, nuts and washers.
- Use the same bolt size and bolt quality.

	If a hydraulic clamping fixture was used to tighten the bolts, then a hydraulic clamping fixture must also be used to check the bolt pretension. Always use the same tightening procedure as specified for installation of the slew drive when checking the bolted union.

Checking the Tilting Clearance

Wear in the raceway system results in an increase in tilting clearance. Consequently it is necessary to check the tilting clearance in accordance with the maintenance intervals (Refer, "Maintenance Schedule").

	If the maximum permissible tilting clearance increase is reached, then the system must be brought to a standstill and the slew drive must be replaced immediately, as safe operation can no longer be ensured.

Checking the tilting clearance increase d_K directly on the slew drive

The measured value m1 determined at installation serves as the base value (Refer "Determination of tilting clearance").

Determine the value mx as described in section (Refer "Determination of tilting clearance").

Subtract the base value m1 from the value mx determined in the inspection measurement:

$$d_K = mx - m1 \leq d_K perm$$

$$d_K perm = 0.45 \text{ mm}$$

$$d_K perm = 0.0177 \text{ in}$$

Checking the tilting clearance increase d_K but not directly on the slew drive

Proportionally convert the tilting clearance increase each time a measurement is taken (after the installation measurement) and compare with $d_K$perm.

Checking the Circumferential Backlash

	Toothing wear causes increased circumferential backlash. When the maximum permissible circumferential backlash is reached, then the system must be brought to a standstill and the slew drive must be replaced immediately, as safe operation can no longer be ensured.

1. Determine the circumferential backlash in accordance with ("Determining the circumferential backlash").
2. Compare the determined value with the permissible values of the table.

- See the type plate for the module specification.
- For a module that is between the specified values, use the value for the smaller module.

Circumferential Backlash Angle Limit Values

Module of the Toothing	Limit of Circumferential Backlash Angle	Module of the Toothing	Limit of Circumferential Backlash Angle
3	34°	6	28°
4	32°	6/2 convolution	14°
4/2 convolution	16°	7	28°
4,5	31°	7/2 convolution	14°
5	30°	8	27°
5/2 convolution	15°	8/2 convolution	13.5°

Tab-18

Lubricating the Slew Drive

	Regularly lubricate the slew drives to prolong their service life and ensure safe operation.

	Always use the lubricants specified in the order drawing. If using other lubricants pay attention to the relative mixability of the substances. The standard lubricants used are “r.tecc Norplex LKP2” from Rhenus, or the grease “Optimol Longtime PD0” from Castrol. If in doubt, or if there is no specification on the drawing, consult our Customer Service.

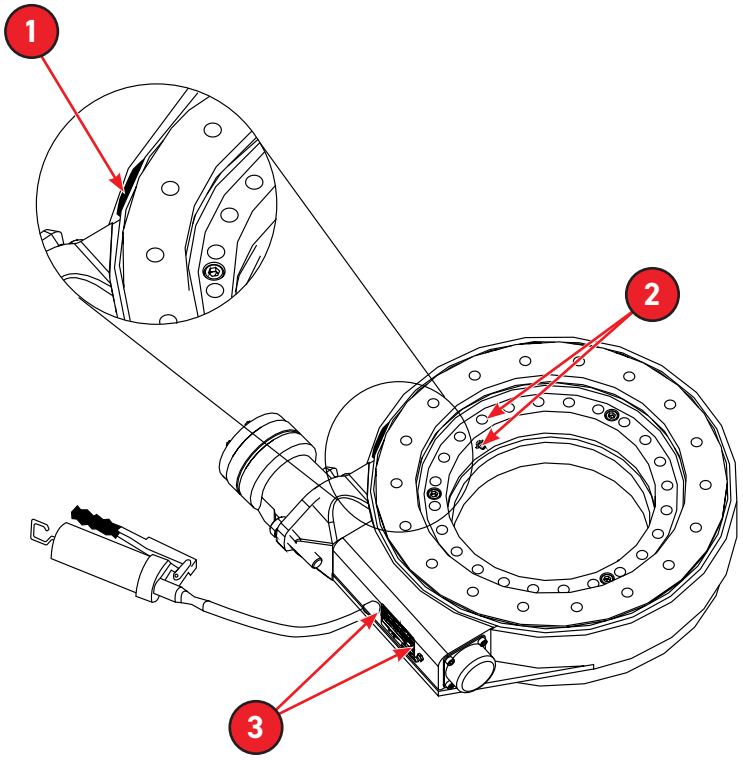
	Using the wrong lubricant may cause damage to the slew drives and reduce the service life. In this case, any warranty shall be excluded. Comply with the instructions provided by the lubricant manufacturer!

If possible use a central lubrication system to lubricate the raceway system. In this regard ensure that the hoses are filled with grease at commissioning and that the storage tanks are regularly topped up with grease.

	An automatic re-lubricating system significantly facilitates relubrication for the raceway system and the toothing. Functional safety as well as wear behavior are improved.

	Comply with the instructions in the operating manual provided by the respective manufacturer for lubrication of optional intermediate gear units, brakes, and motors.

	If it is evident that moisture has penetrated into the slew drive, or has been absorbed by the grease, you must re-lubricate more intensively.



Lubricating the Slew Drive

1	Fresh lubricant
2	Lubricating nipple, bearing ring
3	Lubricating ring housing

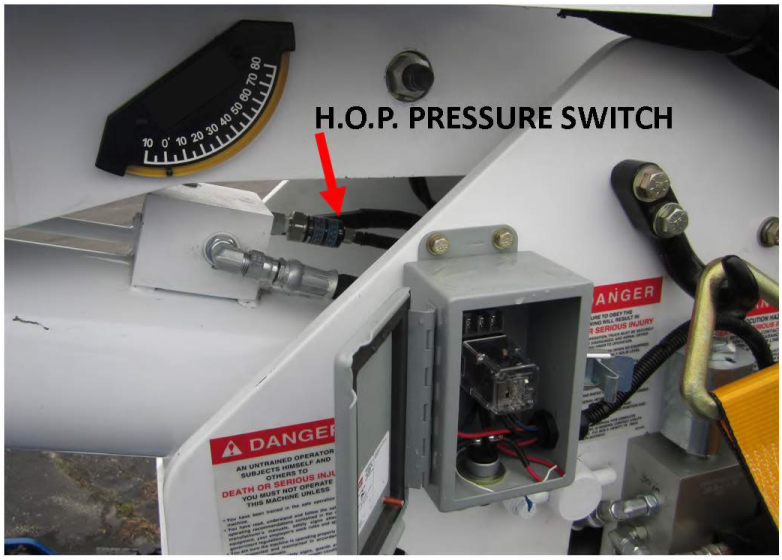
Hydraulic Overload Protection Calibration Procedure (Electric Version)

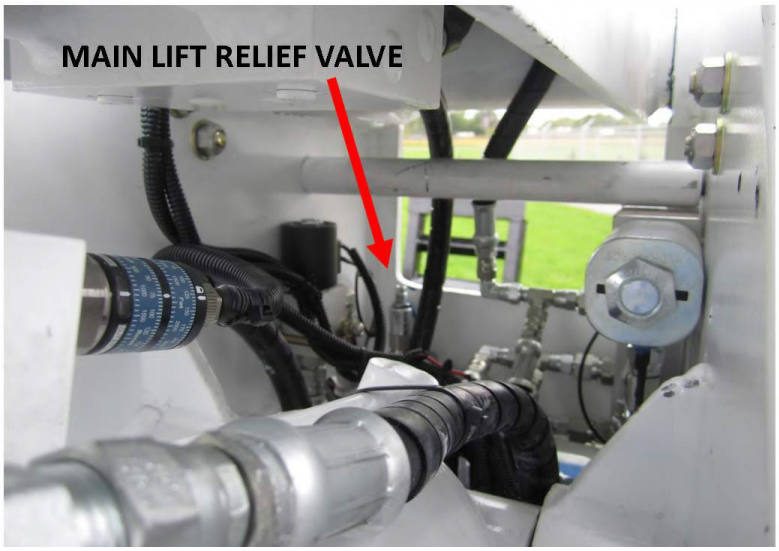
Outback 77-55D units only

Requirements for test:

2,000 lbs. plus 200 lbs. is required for this procedure.

- Set main control valve pressure to 3,000 PSI at full throttle.
- Set outriggers.
- Rotate boom 90˚ to side of machine at 0˚ level.
- Extend boom 2 (Steel) until winch line reaches 20' from center of turret.
- Adjust main lift relief valve to lift 2,000 lbs. at full throttle.
- Add 200 lbs. proceed to lift; main lift relief valve will prevent lift function.
- If main lift relief valve does not prevent lift function, readjust.
- Initial setting of hydraulic overload protection pressure switch 1,900 set, 1,100 reset.
- Adjust hydraulic overload protection pressure switch to lift 2,000 lbs. with winch function at full throttle.
- Adjust reset pressure 800 PSI lower than set pressure.
- Add 200 lbs. proceed to winch up, hydraulic overload protection will prevent winch up, boom 1 extend, boom 2 extend, and boom down. Check auger function so that it operates in both directions. If pressure switch does not prevent previous functions readjust. Ensure locking ring is in lock position on switch.
- Winch down to relieve hydraulic overload protection system.
- Remove weights, return boom to boom stow position.


H.O.P. PRESSURE SWITCH
DANGER


MAIN LIFT RELIEF VALVE

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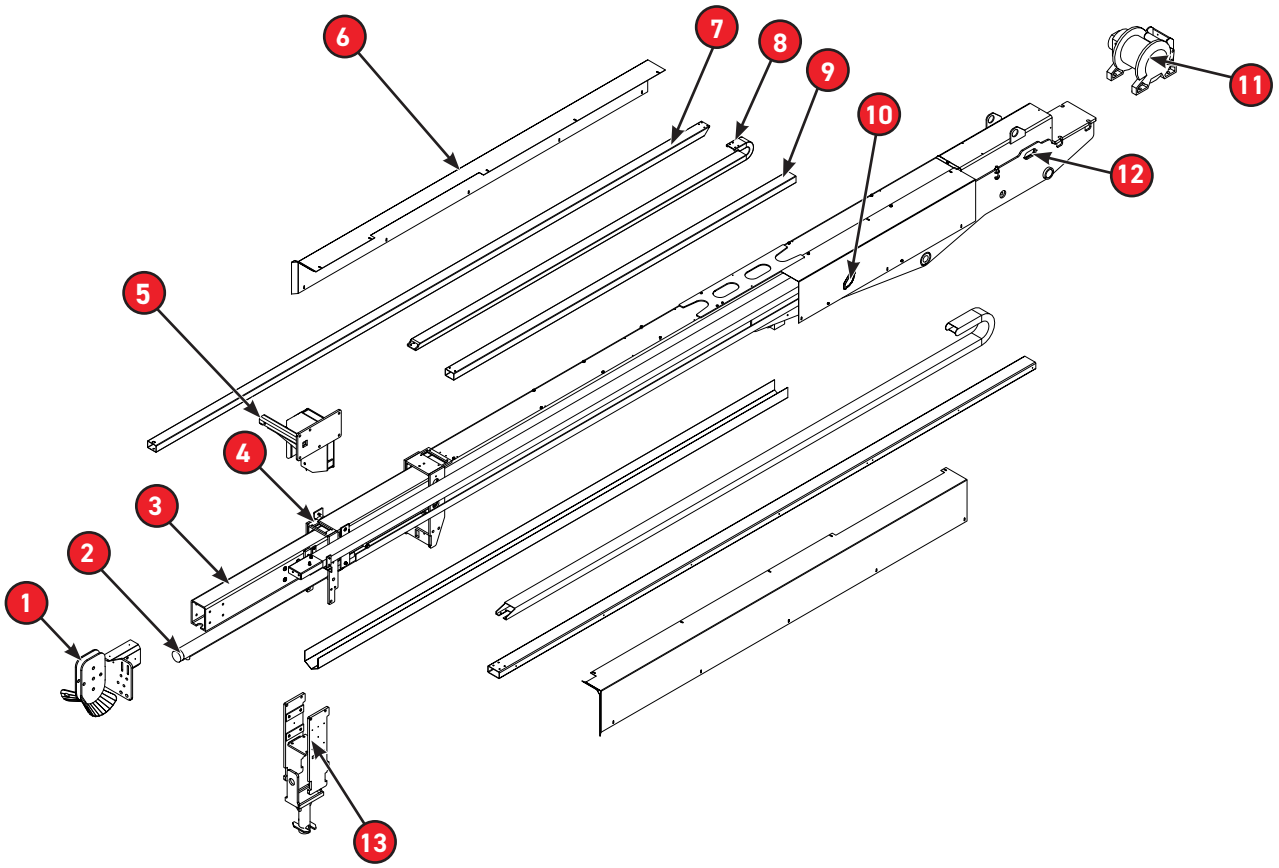
Boom Assembly

Description



Item Number	Description
1	Shimless Sheevehead
2	Internal Extension Cylinder
3	Fiberglass Boom Assembly W/Wear Pads
4	Secondary Boom
5	Auger Stow Bracket
6	Auger Cattrack Cover
7	Floating Cattrack Auger Tube 50'
8	Auger Side Cattrack, Plastic
9	Auger Cattrack Tube Assembly, 50'
10	Inclinometer, Left
11	Main Boom Winch
12	Cattrack Cover, Large
13	Auger Hanger

Maintenance Issues with Fiberglass Booms

The Most Common Maintenance Issues with Fiberglass Booms

1. Not keeping the boom clean inside and out
    - A dirty boom does not shed rain as well and can fail periodic dielectric tests.
2. Cleaning with harsh abrasive cleaners
    - Abrasives and solvent cleaners are not recommended as they can scratch or soften the surface coatings. There are a number of cleaners recommended for cleaning booms or soap and water can be used. Consult the service department of the manufacturer for their recommendations.
3. Washing with high-pressure water
    - This can cause water to diffuse through the fiberglass requiring elevated temperatures or extended time to dry out. Wash by hand and park the boom in a position that allows water to drain. A boom dielectrically tested while it is still wet can cause permanent damage
4. Surface cracks due to weather, age or improper paint preparation
    - These kinds of problems will require refinishing. However, refinishing the exterior of the booms without masking the interior can cause paint overspray to settle on the inside. Research has shown that this overspray will trap moisture and prevent water from beading on this rough, sandpaper-like surface. This moisture can then lead to failed dielectric tests.
5. Dielectric testing over 1mA (1000 micro-amps) return current
    - This process can harm the boom by causing it to burn. If the return current is closed to 1000 micro - amps during the dielectric test, stop the test immediately and examine the boom for any hot spots present. Examine the boom for any contamination such as; dirt, mositure, sticks or other debris. Let the boom cool and remove the contamination. (Dirt or moisture can cause the fiberglass to be burnt beyond repair).
6. Overloading
    - Even if the boom does not break, overloading can cause stress cracks and shorten the life of the fiberglass boom. A single overload can shorten a booms service life by months or years. A boom used at the rated load should remain in service for many years.
7. Not strapping down the boom during travel
    - Subjecting a boom to repeated jolts can shorten the life of the fiberglass. This shock loading will fatigue the fiberglass and can create impact damage in the area of the boom rest.
8. Cable cuts and saw cuts
    - Cuts can weaken the boom in the specific area of the damage. Consult the manufacturer before repairing this type of damage.
9. Sunshine and ultraviolet radiation
    - Sunlight and UV can attack an unpainted area of a fiberglass boom causing the exposed area to look fuzzy as the fibers are exposed. Repair surface scratches, to seal out the sun and moisture, to prevent this problem.
10. Improper repairs
    - Using substandard material and improper repair procedures can cause problems. There are two types of repairs. The first is periodic surface repair that involves the outside coating. Second is the structural repair that involves the boom itself. Structural repair should be referred to the manufacturer for a case-by-case study. Examples of structural damage include: cracks, cuts, delamination and impact damage from tree limbs or tools.

11. Improper storage
    - Storing fiberglass booms in direct sunlight, untarped or covered, and directly on the ground are both methods of improper storage which could cause blistering and dielectric failure. Improper storage could also void the warranty. Storage of booms should always be off the ground for air ventilation and away from direct sunlight.

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Checklist and Inspection form

Machine Inspection Chart

This checklist is to be used in addition to the information provided in this manual to properly operate and maintain the machine.

	This inspection intervals are recommended by **Load King**. If there are further maintenance questions, contact **Load King**.

INSPECTION	SERVICE	DAILY	WEEKLY	3 MONTHS	6 MONTHS	1 YEAR
Hydraulic Oil	Check level	X				
	Drain oil and replace					X
Hydraulic Return Filter	Replace				X	
Hydraulic Hose(s) & Fittings	Check for leaks/cracks. Repair leaks immediately.	X				
Engine Oil	Check level	X				
	Change oil (check engine manual)					
Engine Air Filter	Clean and inspect	X				
Track Undercarriage	If equipped: Check track tension(er)	X				
Track Undercarriage Slide Bars	Grease slider bar contact area		X			
Boom	Grease all fittings	X				
Main Boom Lift Cylinder	Grease fittings with an EP grease			X		
Nylon Sheaves	Check for sharp edges and cuts		X			
Rotation Bearing	Check torque on bolts	X				
Rotation Bearing Bolts	Check torque on bolts. Torque to 159 ft-lbs.			X		
Rotation Bearing	Grease with an EP grease			X		
Outriggers	Grease all fittings, sockets and pins	X				
Winch Line Hook	Inspect hook and latch	X				
Winch Line	Inspect for wear and broken strands	X				
Auger Strap	Inspect for wear and broken strands	X				
Pin Retainers	Make sure pin retainers are in place and tightly bolted	X				
Tie Down Hooks	Make sure bolts are tight	X				
Wheel Lug Nuts	If equipped: Make sure bolts are tight	X				

Notes

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