

# Hydraulic Impact Wrench [1" Drive]

910193

## Operating Manual



# Hydraulic Impact Wrench [1" Drive]

## 910193

### Record of Changes

Rev No.	Date	Description of Changes
Rev 1		Initial release.
Rev 2	10.2019	Update format, add parts list
Rev 2.1	4.2021	Update Service Parts List
Rev 2.2	12.2022	Add 476833 Anvil to service parts list
Rev 2.3	3.2023	Add Environment and PPE statements

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## Section 1: Overview and Safety

### Hydraulic Impact Wrench Overview

Racine Railroad Products designs and manufactures equipment primarily for the repair and new construction of rail and railroad tie track maintenance.

The 1" Impact Wrench's compact design allows the operator greater flexibility in tighter work areas. Ergonomic handles give handhold positioning for either horizontal track bolts or working vertically for lag screws. Optional auger adapter is available for tie drilling applications. Assist handle and whip hoses can be orientated to operator preference.

The unit produces up to 2,500 ft-lbs of torque from the heavy-duty dual impact mechanism. Cast steel motor body and trigger are durable with no formed metal fabricated parts.

**Do not** use this machine for other than its intended purpose.

Please read these instructions when using this tool, which can only be used for the specified purpose. This instruction manual should be kept throughout the life of the tool.

The operator of this tool should:

- Have access to this operation instruction.
- Read and understand this operation instruction.

Note: Information in this document is subject to change without notice.

### Environmental Protection



Comply with relevant national waste disposal laws and regulations. Waste electronic devices cannot be treated as household waste.

Equipment, accessories, and packaging shall be recyclable.



Don't throw the discarded equipment in trash cans.

## Safety Information

For safe installation and operation of this equipment, carefully read and understand the contents of this manual. Improper operation, handling, or maintenance can result in equipment damage and personal injury.

Only trained and authorized personnel should be allowed to operate this machine. In addition, all personnel at the worksite should be aware of the safety concerns and their individual responsibilities prior to working this machine.

Please read and comply with all the safety precautions in this manual **before** operating this machine. Your safety is at risk.

## Safety Terms



**DANGER** indicates a hazardous operating procedure, practice, or condition. If the hazardous situation is not avoided death or serious injury will occur.



**WARNING** indicates a hazardous operating procedure, practice, or condition. If the hazardous situation is not avoided death or serious injury could occur.



**CAUTION** indicates a potentially hazardous operating procedure, practice, or condition. If the hazardous situation is not avoided moderate or minor injury could occur.

## Machine Use and Safety Precautions



Failure to follow safety precautions when operating this equipment can result in serious injury or death to the operator or other persons in the area.

**Observe the following precautions whenever you are operating, working on or near this equipment.**

**Do not** use this machine for other than its intended purpose.

**Do not** make any modifications without authorization or written approval from Racine Railroad Products. Replace all Racine Railroad Products and OEM parts with genuine Racine Railroad Products and OEM parts. Using non-OEM parts may compromise the safety of the machine.

**Do not** wear loose clothing, jewelry, radio belts, etc., when operating, working on or near this equipment. They can be caught in moving parts and may result in severe injury.

**Always** wear appropriate personal protective clothing when operating this equipment: e.g., orange safety vest, hard hat, safety glasses with side shields, hearing protection, steel-toed safety boots, leather gloves, dust respirator, etc.

**Always** lift heavy objects with the knees and legs, not the arms and back.

**Always** keep hands, arms, feet, head, clothing, etc., out of the operating area and away from all rotating or moving components when operating, working on or near this machine.

**Always** make sure that all guards, covers, belts, hoses, and operating components are in good working order and that all controls are in the appropriate position before starting the engine.

**Always** make sure that all safety equipment installed properly and are in good working order. Do not operate the machine until unsafe conditions have been corrected.

**Always** operate in a well-ventilated area and make sure that the air filters, air filter covers, and muffler are in good condition.

**Always** keep the machine clean and free of debris. Operate the machine in a safe and responsible manner. Exercise caution when fueling, working on or near rotating or moving components, hot components and fuel systems. Be aware of potential fire hazards and prevent sparks, exhaust, etc., from starting fires on the machine and/or work area.

**Always** comply with all instructions provided on any decals or placards installed on the machine and with any relevant amplifying information provided in this manual or other general operating procedures.

**Always** disconnect the power source and make sure that all controls are in a safe position and install all appropriate locking and safety devices before doing any of the following:

- Lubricating
- Adjusting
- Installing Tooling
- Making Repairs
- Performing Service



**WARNING**

**Hydraulic fluid under pressure could cause skin injection injury. If you are injured by hydraulic fluid, get medical attention immediately.**

**Never use this tool when working around electrified rail unless it is de-energized or you have been properly trained to work on electrified rail. If you are not sure the rail is live or not, you must treat it as being live and dangerous to life.**

## Section 2: Specifications and Installation

### Specifications

Drive Size.....	1-inch Square
Drive Weight.....	26 lbs / 12 kg
Overall Length.....	14-1/2-inch / 37 cm
Width.....	4-inch / 11 cm
Pressure Range.....	1500-2000 psi / 105-140 bar
Flow Range.....	7-12 gpm / 20-45 lpm
Optimum Flow.....	8 gpm / 30 lpm
System Type.....	Open Center, HTMA Type II or III
Porting.....	8 SAE O-Ring
Output Speed (free spin).....	2000 rpm at 5 gpm / 19 lpm
Input Speed.....	1200 Impacts per Minute
Connect Size and Type.....	3/8-inch Male Pipe Adapter
Torque.....	500-2500 lbf-ft / 680-3400 Nm
Sound Power Level.....	113.2 dBA
Vibration Level.....	49.7 m/s <sup>2</sup>
Vibration Level with Upright Extended Handle.....	18.1 m/s <sup>2</sup>
Sound Pressure Level @1m.....	100.2 dBA

### Components

Adapter.....	1-inch to 3/4-inch Drive
Extension.....	10 inch, 1-inch Drive
Socket Retainer Pin.....	1-inch Square Drive Socket
Socket Retainer Ring.....	1-inch Square Drive Socket



## Torque Information

**Note:** This impact wrench is not a torque wrench.

If the torque setting of a particular fastener type is critical, the wrench should be set as close to the desired torque as possible, and a calibrated torque wrench used to verify or check the fastener torque periodically.

### Factors that Affect Torque

An impact wrench is a rotary hammer that impacts the head of a bolt or nut.

It does not apply a slow steady torque as a standard torque wrench. Therefore, several factors affect the result of torque when using impact wrenches:

#### Long Bolts

Long bolts having high-friction threads with lubrication under the bolt head or associated nut can twist when impacted, then untwist before the next impact.

This will especially happen if there is low friction between the bolt head or nut and the mating surface.

#### Heavy, Loose or Multiple Adapters

Heavy, loose, or multiple adapters between the wrench and socket can dissipate the intensity of the impact to the bolt head or nut.

#### Amount of Impact

Maximum torque results can be obtained by allowing continuous impacting of the socket against the bolt head or nut for at least 10 seconds.

#### Hydraulic Flow Rate

If the flow rate to the tool is too low, the hammer (or impact) speed is reduced.

If the flow is correct, a change in the relief pressure does not affect the impact force.

Poorly designed hydraulic circuits can result in lower flow rates and reduced impact speeds when pressure is required during impacting.

#### Bolt Grade and Thread Recommendations

Allowable bolt torque is limited by both bolt thread diameter and grade of steel in the bolt. The Hydraulic Impact Wrench is recommended for use on the following bolt grade and thread sizes:

SAE Grade 2	1-1/8 to 1-7/8 inch [28.5 - 47.6 mm]
SAE Grade 5	1 to 1-5/8 inch [25.4 - 41.2 mm]
SAE Grade 8	7/8 to 1-3/8 inch [22.2 – 35 mm]



**Sockets not designed to be used with impact wrenches can break apart causing injury to operator or bystanders.**

## Installation

### Unpacking Instructions

Upon receiving your Hydraulic Impact Wrench promptly remove it from the shipping container. Always keep top side of container up. Inspect unit for damage which may have incurred during shipping and report it to carrier for claim.

### Tool Preparations

The Hydraulic Impact Wrench requires some assembly before use. If the tool is used in cold weather, preheat the hydraulic fluid by running power source at low engine speed.

Fluid temperature should be at or above 50° F/10° C (400-ssu / 82 centistoke) before use, when using recommended fluids. Using too thick of fluid may result in tool damage.

**WARNING**

**Never stick foreign objects, fingers, or other extremities into moving mechanism. Failure to follow these instructions may lead to severe personal injury or tool damage.**

### Check Power Source

1. Using a calibrated flow meter and pressure gauge, check that the hydraulic power source develops a flow of 7-12 gpm [20-45 lpm] at 1000-2000 psi [70-140 bar].
2. Check that the hydraulic power source is equipped with a relief valve set to open at 2100 psi [145 bar] minimum.
3. Check that the hydraulic circuit matches this impact wrench for open-center operation.

An *Open Center Hydraulic Circuit* is a hydraulic system in which the oil circulates at all times.

When the impact wrench is connected in the hydraulic circuit and not activated, the oil bypasses the impact wrench's motor returning to hydraulic reservoir.

Only when the trigger is activated, is the hydraulic oil is diverted by an activation spool into the gerotor motor.

**CAUTION**

**Do not use the Impact Wrench with closed center system or tool damage may occur.**

## Hose Requirements

Check hydraulic hoses for cracks, leakage, and damage. If the hoses or couplers show any of these wear characteristics, replace them before operating the tool. **Never** attempt to locate leaks with your hands, personal injury may occur from pressure system.

It is not often necessary or advisable to use long hoses. All hoses must have an oil resistant inner surface and an abrasion resistant outer surface. Each hose must have male pipe ends for most application.

Longer hoses can be used when necessary but can affect the operation of the tool due to resistance in the hose.

If small diameter or long hoses are used, or if restrictive fittings are connected to the supply and return ports, the pressure required to push the fluid through the system and back to the tank will be higher. This will reduce tool power.

**Important:** Oil should always flow from the male coupler through the female coupler.

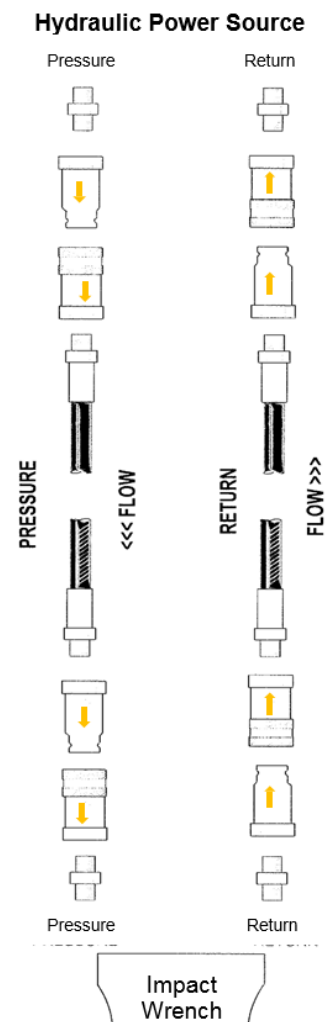
**Note:** The pressure increases in uncoupled hoses left in the sun. This may make them difficult to connect. When possible after use, connect the free ends of the operating hoses together.

The recommended minimum hose diameter for the pressure line hose is 1/2" inside diameter. The pressure line hose must have a minimum working pressure rating of 2500 psi [17.3 MPa].

It is recommended that the hose diameter for the return line hose is 5/8" diameter. If possible, should be greater than the pressure line hose diameter.

These recommendations are intended to keep return line pressure (back pressure) to a minimum acceptable level to ensure maximum tool performance.

All hydraulic hose must meet or exceed specifications set forth by SAE J517.



## Hose Types

Hydraulic hose types authorized for use with the Hydraulic Impact Wrench are:

1. **Labeled and certified non-conductive.**

- This is the only hose authorized for use near electrical conductors.
- Constructed of thermoplastic or synthetic rubber inner tube, synthetic fiber braid reinforcement, and weather resistant thermoplastic or synthetic rubber cover.

2. **Wire braided** (conductive)

- This hose is conductive and must **never** be used near electrical conductors.
- Constructed of synthetic rubber inner tube, single or double wire braid reinforcement, and weather resistant synthetic rubber cover

3. **Fiber braided** (not certified or labeled non-conductive)

- This hose is conductive and must **never** be used near electrical conductors.
- Constructed of thermoplastic or synthetic rubber inner tube, synthetic fiber braid reinforcement, and weather resistant thermoplastic or synthetic rubber cover.

The rated working pressure of the hydraulic hose must be at least 175 bar (2500 psi).

## Hydraulic Hose Recommendation

Hydraulic Hose Recommendation								
Flow Per Circuit		Length Each Hose		Use	Inside Diameter		SAE Spec Hose (Wire Braid)	SAE Spec Hose (Fiber Braid)
GPM	LPM	Feet	Meter		Inch	MM		
5 to 8	19 to 30	To 50	To 15	Both	1/2	13	SAE 100R1-8	100R7-8
5 to 8	19 to 30	51 to 100	15 to 30	Both	5/8	16	SAE 100R2-10	SAE 100R8-10
5 to 8	19 to 30	100 to 300	30 to 90	Pressure Return	5/8 3/4	16 19	SAE 100R2-10 SAE 100R1-12	SAE 100R8-10 SAE 100R7-12
9 to 12	34 to 45	To 50	To 15	Both	5/8	16	SAE 100R2-10	SAE 100R8-10
9 v 12	34 to 45	51 to 100	15 to 30	Pressure Return	5/8 3/4	16 19	SAE 100R2-10 SAE 100R3-12	SAE 100R8-10 SAE 100R7-12
9 to 12	24 to 45	100 to 200	30 to 60	Pressure Return	3/4 1	19 25.4	SAE 100R2-12 SAE 100R1-16	SAE 100R8-12 SAE100R7-16

The rated working pressure of the hydraulic hose must be at least 2500 psi / 173 bar.

## Hydraulic Fluid Recommendation

Inspect hoses for cuts, crushing, leaks, or abrasion, which may be a safety hazard or reduce fluid flows.

The following fluids work well over a wide temperature range at startup, allow moisture to settle out, and resist biological growth likely in cool operating hydraulic circuits.

Others that meet or exceeds the specifications of these fluids may also be used.

Type	Hydraulic fluid
Amsoil	AWH ISO 32
Chevron	Rando HD Premium Oil MV ISO VG 32 Rando HDZ ISO 32
Gulf	Harmony AW ISO Multi-Grade 32
Mobil	DTE Oil Excel 32
Schaeffer	Dilex Supreme Hydraulic Fluid w/ Dynavis ISO 46.
Shell	Shell Tellus S2 VX 32
Sunoco	Sunvis 1032 HVI Hydraulic Oil

## Tool Connecting Procedures

1. Stop the engine before connecting the tool and or hoses to the power unit, and when switching hoses or tools.
2. Turn the hydraulic on/off valve to the off position before starting the engine.

Make sure all hoses are connected for correct flow direction to and from the tool being used.

When routing hose in the work area, position them where personnel will not be at risk of tripping over them where vehicles can run over the hoses. Do not lay hose over sharp objects.



**WARNING** Pressurized fluid escaping from a damaged hose can penetrate the skin and be injected in the body causing injury or death.

**Do not pull on hoses to drag the power unit or tool.**

### Connecting Hoses

1. Wipe quick couplers with a clean lint free cloth before connecting them.
2. Depressurize the system.
3. Allow system and hydraulic fluid to cool if too hot to handle.
4. Connect the circuit *pressure* hose (with male quick disconnect) is connected to the **IN** port.
5. Connect the circuit *return* hose (with female quick disconnect) is connected to the opposite port.

Do not reverse circuit flow. This can cause damage to internal seals.

Observe the flow indicators stamped on the main body assembly and the hose couplers to ensure that the flow is in the proper directions. The female couple on the tools IN" port is the inlet (pressure) coupler.

It is recommended that you connect the return hoses first and disconnect last to minimize or avoid trapping pressure within the tool.

When connecting the quick couplers, the flow should run from male coupler to the female coupler. The female coupler on the tool is the inlet. Quick couplers are marked with a flow direction arrow.



**WARNING**

**Pressurized fluid escaping from a damaged hose can penetrate the skin and be injected in the body causing injury or death.**

**Do not pull on hoses to drag the power unit or tool.**

**Note:** When possible, connect the free ends of uncoupled hoses to prevent build up in the hoses. The sun can also increase pressure in the hoses and make connecting them difficult.

## Disconnecting Hoses

1. Stop the hydraulic power source.
2. Rotate the hydraulic circuit control valve in the OFF position.
3. Depressurize the system.
4. Allow system and hydraulic fluid to cool.
5. Disconnect the supply (pressure) hose to the power source (pressure port) from the tool (IN port).
6. Disconnect the return (tank) hose to the hydraulic power source (return port) from the tool (OUT port).
7. To prevent contamination, always install dust caps over the hydraulic ports of the tool when disconnected.

## Section 3: Tool Operation

### Personal Protective Equipment



Before operating this machine, make sure that all general safety precautions are observed, and that proper personal protective clothing is worn as described below.

At a minimum, operators should wear the following Personal Protective Equipment:

1. Safety Glasses
2. Hearing Protection
3. Hard Hat
4. High Visibility Safety Vest
5. Leather Work Gloves
6. Steel Toed Safety Shoes

### Operation

**Note:** Do not reverse impact wrench rotation direction by changing fluid flow direction. Release the trigger if the power supply has been interrupted.

When working near electrical conductors, always assume that all conductors are energized and that insulation, clothing and hoses can conduct electricity. Use hose labeled and certified as non-conductive.

This Racine Railroad Product impact wrench is designed for 1-inch square drive.

The 1-inch drive configuration is used with drive sockets for high impact installation and removal of fasteners. (500-2500 lbf-ft / 680-3400 Nm)

During normal operation it is common to see some grease leakage from around the anvil during hard use.

Use at the low end of the 500-2500 lbf-ft [680-3400 Nm] torque range during continuous use over long periods of time (impact times exceeding 10 seconds). The high temperature generated in the impact mechanism can reduce steel part and lubricant durability within the wrench.

1. Before operating the Hydraulic Impact Wrench, perform a daily inspection of the power tool.
2. This impact wrench may be operated from either side of the rail. Remove ballast that may hinder the proper placing of the Hydraulic Impact Wrench verses the rail work area.
3. Move the hydraulic circuit control valve to the ON position to operate the wrench.



#### **WARNING**

**Always use sockets and accessories designed for impact type applications.**

**Do not use standard sockets or accessories. These can crack or fracture during operation.**

4. Select the direction of impact desired using the reversing valve located on the side of the wrench.
  - a. For clockwise direction, place the valve in the up position.
  - b. For counterclockwise direction, place the valve in the down position.

5. Squeeze the trigger to activate the wrench.
6. Release the trigger to stop the wrench.

Allow a 10 second interval between impact wrench applications.



**When you leave this tool, even for a short time, shut off the hydraulic circuit control valve and disengage the hydraulic supply hoses.**

## Cold Weather Operation

If the hydraulic impact wrench is used during cold weather, preheat the hydraulic fluid at low engine speed.


When using the normally recommended hydraulic oil, fluid temperature should be at or above 50° F/10° C (400 ssu / 82 centistokes) before use.

Damage to the hydraulic system or wrench can result from use with fluid that is too viscous or too thick.



## Section 4: Maintenance

It is highly recommended to practice regular check-ups and maintenance in accordance with the usage frequency to keep your tool in better condition and reduces total running costs.

 **WARNING** Do not perform maintenance on the Hydraulic Impact Wrench while the hydraulic power unit is running with the hoses connected.

Note: To more accurately tighten bolts, lubricate threads, check with a torque wrench, and duplicate time of impacting for other bolts of the same length and thread size.

Shut off the power source engine, ensure that all controls are in a safe position and install all appropriate locking and safety devices before doing any of the following:

- Lubricating
- Adjusting
- Making Repairs
- Performing Service

Comply with all Lock Out / Tag Out Procedures and other safety procedures established for your work environment

The most important maintenance practice is to keep the hydraulic fluid clean at all times. Contaminated hydraulic fluid causes rapid wear and/or failure of internal parts.

Never disassemble the main housing unless proper troubleshooting procedures have isolated the problem to an internal part. Then, disassemble the tool only to the extent necessary to replace the defective part.

 **CAUTION** Keep contaminants such as dirt and grit away from internal parts at all times

The impact mechanism is subject to grease *squeeze out*. Impact, heat accumulation and centrifugal force will contribute to throwing the grease away from moving parts and an expansion pressure pushing lubricant out the anvil bushing.

Maintenance intervals vary with daily cycles, impact energy intensity and lubricant quality.

It is very important that an inspection schedule be established to ensure that parts inside the mechanism are well lubricated. Remove any grease that appears to be burned. Make sure grease is packed around all parts.

Always determine and correct the cause of the problem prior to reassembly. Further wear and tool failure can result if the original cause is not corrected

### Before Disassembling

1. Clean the exterior of the tool.
2. Obtain impact grease.
3. Obtain a seal kit for this impact wrench so all seals exposed during disassembly can be **replaced** during re-assembly.

## Impact Mechanism Removal, Cleaning, and Installation

See Impact Mechanism Assembly Drawing on page 24.

### Removal

1. Remove the four 5/16 – 18 X 1 1/2" socket head caps crews (57) and lock washers (56) securing the hammer case assembly (48) to the main body assembly.
2. Hold the wrench with the impact mechanism pointing down.
3. Press the trigger while pulling the hammer case, gasket, and impact mechanism away from the housing assembly.
4. Remove the thrust bearing (40) and two thrust races (39), if they were not removed with the impact mechanism.
5. Turn the hammer case anvil up. The impact mechanism components will drop into your hand.
6. Remove the two hammer pins (51) from the hammer frame (52).
7. The hammer (53) and anvil (50) can be removed at this time.

### Installation

See Impact Mechanism Assembly Drawing on page 24.

1. Thoroughly clean all parts of the mechanism.
2. Using the correct impact grease lubricate the inside of the hammer frame and install the hammer, anvil and two hammer pins.

The inside of the hammer case should be free of grease to avoid over-lubrication.

3. Lubricate the hammer case bushing and slide onto the anvil.
4. Grease the thrust bearing and thrust races.
5. Install the thrust race, thrust bearing and remaining thrust race on the main shaft in this order.
6. Install a new hammer case O-ring (12).
7. Slide the hammer case assembly (48) onto the anvil (50) and secure with 4 5/16 – 18 X 1 1/2" socket head cap screws (57) and lock washers (56).

Tighten to a torque of 13-15 lbf-ft [17.6-20.3 Nm].

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## Wrench Disassembly and Reassembly for Repair

### Motor Disassembly

See Motor Housing & Valve Handle Assembly Drawing on page 28.

1. Remove the impact mechanism as described in the Impact Mechanism Removal and Installation section (Refer to Page # 13).
2. Remove the eight 1/2 - 13 socket head cap screws (24) and lock washers (23) securing the motor housing assembly (13) to the valve handle assembly (19).
3. With the motor housing assembly (13) in a vise, press on the splined end of the main shaft (17) with one hand and support the valve handle assembly (19) with the other.

Press the valve handle assembly, gears, and O-ring out of the motor housing assembly

**Do not** pry or in any way excessively force the valve handle assembly off of the motor housing assembly.

4. Remove the large O-ring (16) from the motor housing assembly.
5. Remove the idler gear (18), idler shaft (15) and main shaft (17).
6. If the relief adjustment screw (42), O-ring (41) requires replacement, loosen the jam nut (43), and remove the relief adjustment screw. Be sure to count the number of turns required to remove it so it can be replaced in the same position.

## Motor Cleaning and Inspection

### Cleaning

Clean all parts with a degreasing solvent. Blow dry with compressed air and wipe clean. Use only lint-free cloths.

### Bushing (Motor Housing and Valve Handle)

The inside of the bushings (14) should be gray in color. If a significant amount of yellow-bronze shows, bushing replacement is required. Inspect shafts for corresponding wear and replace as required.

### Gear Chamber (Motor Housing)

The gear chamber bores, and end faces around the bores should be polished, not rough or grooved. The flat surfaces around the chamber and bolt holes should be flat and free of nicks and burrs that could cause misalignment or leaks.

### Gears

Both gears should have flat, straight tips without nicks. They should have a smooth even polish on the teeth and end faces. Discard the gear if cracks are present.

### Motor Housing Assembly

The gear running surfaces should show two inter-connecting polished circles without a step or roughness.

**Note:** If abnormal wear occurs in excess of normal polishing, both shafts and associated bushings must be replaced. The hydraulic system should be thoroughly flushed and the filter replaced before further operation of the wrench.

## Shafts

The main diameter at the bushing locations must be smooth. Grooves, roughness, or a reduced diameter indicates fluid contamination and damaged bushings

## Motor Housing Disassembly

See Motor Housing & Valve Handle Assembly Drawing on page 28.

1. Remove the internal hex set screw (30) securing the reversing spool lever (31) and remove the lever from the reversing spool (29).
2. Remove the retaining ring (22) at the opposite end of the reversing spool (29).
3. Pressing on the retaining ring end of the reversing spool, carefully slide the reversing spool in just far enough to gain access to the back-up ring (21) and O-ring (20) on the lever side.
  - Remove the back-up ring with the appropriate O-ring tool.
4. Pressing on the lever end of the reversing spool, carefully slide the reversing spool out of the main housing.
  - Remove the back-up ring (21) and O-ring (20) with the appropriate O-ring tool.
5. Remove roll pin (27) securing the trigger to the valve handle assembly.
6. Remove the trigger (28).
7. Unscrew the spool cap (3) and remove the headed push pin (5).
8. Remove the O-rings (2) and wiper (1).
9. Slide the valve spool (6), relief seat (7), relief poppet (8), spring rest (11) and two springs (9) & (10) out of the valve handle assembly.

**Note:** If the valve sleeve requires replacement, the valve handle assembly should be returned to Racine Railroad Products for repair.

The valve sleeve will remain in the main housing and ***is not removable***.

There is only a small visual difference between the valve spool (6) used the open-center or closed-center wrenches. ***Do not*** confuse them when reassembling the impact wrench.

An open-center spool has outer ring widths of less than 0.3 inches [7 mm] while the closed-center spool has outer ring widths of over 0.4-inches [10 mm].

The Racine Railroad Impact Wrench ***is open-centered***.

10. Remove the retaining ring (35) at the impact mechanism end of the motor housing.
11. Remove the back-up ring (33) and O-ring (32).

The O - ring is subject to severe wear and should be replaced whenever the main shaft is serviced.

## Before Reassembling

Clean all parts with a degreasing solvent. Ensure that all seals exposed during disassembly are replaced with new parts.

Apply clean grease or O-ring lubricant to all parts during assembly

## Motor Housing Assembly

See Motor Housing & Valve Handle Assembly Drawing on page 28.

1. Lubricate and install the relief seat (7) in the valve spool (6) (notched end aligned with strut), followed by the relief poppet (8), small spring (10) and spring seat (11).

See assembly drawings for correct orientation of the spring seat.

2. Set the large spring (9) on the open end of the reversing spool (29).
3. Slide the components assembled above into the valve handle assembly.
4. Lubricate and install the two O-rings (2 & 4) and rod wiper (1) on the spool cap (3).
5. Insert the headed push pin (5) into the spool cap.
6. Screw the spool cap (3) into the main housing. Tighten securely.
7. Install the trigger using the roll pin.
8. Lubricate and install the O-ring (41) in the relief adjustment screw bore in the motor housing.
9. Install the relief adjustment screw (42) with the jam nut (43) positioned near the screw head.  
Install with the same number of turns counted when disassembled to maintain the correct impact force. Tighten the jam nut (see *Impact Intensity Adjustment*).
10. Install the main shaft (17), idler gear (18) and idler shaft (15) in the motor housing.
11. Lubricate and install the large O-ring (16) in the groove of the motor housing.
12. Carefully slide the valve housing over the main shaft until it seats securely against the motor housing.
13. Lube with Loctite 242 and install the (8) socket head cap screws (24) and washers (23).

Tighten to a torque of 5 lbf-ft.

14. Lubricate and install the O-ring (32) on the main shaft (28). Install the back-up ring (33), back-up washer (34) and retaining ring (35).
15. Grease the thrust bearing (40) and thrust washers (39) and install on the main shaft (28).

Install the hammer case O – ring (12) and replace the mechanism. See parts illustration for thrust bearing part sequence.

16. Install the four socket head cap screws (57) and lock washers (56).

Tighten to a torque of 13-15 lbf-ft. [17.6-20.3 Nm].

17. Lubricate and install the O-ring (20) and back-up ring (21).

O-ring toward the center, then the back-up ring toward end, on the retaining ring end of the reversing spool (29).

18. Slide the reversing spool (29) into the valve handle housing.

Install only far enough to install the O-ring (20) and back-up ring (21) on the lever side of the reversing spool with the back-up ring toward the end.

19. Center the reversing spool and install the retaining ring (22).

20. Turn the reversing spool so the hole will be pointing up. Align the hole in the lever with the hole in the reversing spool and install the lever (31).

Secure with the internal hex set screw (30). Tighten the set screw securely.

## Impact Intensity Adjustment

When shipped the impact wrench has been set to produce approximately 500 - 2500 lbf-ft [680 - 3400 Nm] of torque.

For other circuit flows, bolt types and torque requirements, the impact intensity can be adjusted by loosening the jam nut on the relief adjustment screw (on back of the motor cap, just above the handle) and turning the relief adjustment screw clockwise for more torque or counterclockwise for less torque



**This impact wrench is not a torque wrench.**

**If the torque setting of a particular fastener type is critical, the wrench should be set as close to the desired torque as possible, and a calibrated torque wrench used to verify or check the fastener torque periodically.**



**Do not operate the wrench with relief adjustment screw turned in more than one turn from the bottom or less than three turns from the top of its travel.**

**Never operate the wrench without securing the relief screw jam nut.**

1. Determine the characteristics of the circuit that will be used to power the wrench.

The hydraulic circuit and wrench should be at operating temperature. **Do not** exceed the maximum flow (10 gpm) or pressure (2000 psi) for the wrench.

2. Attach a hydraulic flow meter and pressure tester to the pressure port of the impact wrench. Connect hoses normally and activate the hydraulic power supply.

If the power source is of unknown output, it is good practice to turn the relief adjustment screw counter-clockwise

**No more than three turns from the top of its travel** to ensure that the operating pressure remains below 1500 psi [104 bar]. Tighten the jam nut securely before operating the wrench.

3. Install the appropriate sockets/adapters to the impact wrench and tighten the bolt or fastener you wish to set the wrench for.

Watch the flow and pressure tester to be certain that maximum flow and pressure are not being exceeded.

4. Check the fastener with a torque wrench to determine the actual torque being delivered by the impact wrench.

- To increase the torque, turn the relief adjustment screw clockwise **No more than one turn from the bottom.**
- To reduce torque, turn the relief adjustment screw counterclockwise **No more than three turns from the top of its travel.**

Check the torque with a torque wrench.

5. When adjustment is complete, securely tighten the jam nut.

## Troubleshooting

If symptoms of poor performance develop, the following chart can be used as a guide to correct the problem.

When diagnosing faults in operation of the wrench, always check that the hydraulic power source is supplying the correct hydraulic flow and pressure to the tool as listed in the following table.

Use a flow meter known to be accurate. Check the flow with the hydraulic fluid temperature at least 80° F / 20° C.

Problem	Possible Cause	Resolution
Low performance or Impact	Incorrect hydraulic flow.	Check that the hydraulic power source is producing 7-12 gpm / 20-45 lpm at 1500-2000 psi   05-140 bar.
	Worn impact mechanism.	Repair or replace the impact mechanism. See Service Mechanism Removal Cleaning and Installation procedure to extend mechanism life.
	Defective quick disconnects.	Check each quick disconnect.
	Hammer pins broken.	Replace with integral frame (with pins). Check relief adjustment screw setting. Job may require a larger wrench.
	Spools incorrectly installed.	Valves incorrectly reassembled. See Service Instructions.
	Incorrect grease or periodic maintenance of the impact mechanism is not being performed.	See Service Instructions.
	Sockets or adapters too heavy or loose.	Use the correct impact type sockets or adapters.
	Long bolt with lubricated head.	Lubricate threads only.

Problem	Possible Cause	Resolution
Wrench runs too fast. Impact mechanism or screws broken.	Incorrect hydraulic flow (too high).	Check that hydraulic power source is producing 7-12 gpm /20-45 lpm at 1500-2000 psi / 105-140 bar.
	Supply and return hoses reversed.	Install hoses correctly. Refer to Operation Instructions in this manual.
	Relief sleeve or spring damaged.	Remove and replace spool assembly.
	Adjusting screw is in too far.	Adjust correctly.
Grease leaks at anvil busing, wrench warm.	Hard duty cycle and heat forces grease out.	Normal unless greasing instructions in Service Instructions are not followed.
Grease leaks at anvil busing, wrench cold.	Main shaft O-ring leaking.	Replace as required.
Oil leak at motor cap	Fasteners loose.	Tighten to recommended torque.
	Face O-ring worn or missing	Replace as required face.
	Motor cap/main housing damaged.	Replace as required.
Oil leaks at reversing spool.	Damaged O-rings.	Replace as required. Check Service Instructions to avoid cutting O-rings on cross holes in the spool bore.
	Wrong hydraulic fluid. Circuit too hot.	Refer to Operation Instructions for correct fluid/circuit specifications.



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## Section 5: Parts and Service Support

Telephone and web-based technical support is available for current production models through our Technical Service Department. Service Manuals and limited technical support may be available for models that are no longer in production.

### Telephone and E-mail Technical Support

Telephone and e-mail technical support is available on normal U.S. business days from 8:00 AM to 5:00 PM U.S. Central Time Zone (GMT +6 (+5 Daylight Savings Time)). Contact us at:

Phone: (262) 637-9681

E-mail: [techserv@racinerailroad.com](mailto:techserv@racinerailroad.com)

### Non-Warranty Technical or Field Service Support

Depending upon the circumstances and availability of technical service personnel, we may provide technical assistance and/or field service support, *at the customer's expense*, to assist in the correction of non-warranty related problems. Contact our Technical Service Department to coordinate Non-Warranty Technical or Field Service Support.

### Warranty Technical or Field Service Support

Depending upon the circumstances and availability of technical service personnel, we may provide technical assistance and/or field service support, *at no charge to the customer*, to assist in the correction of warranty related problems. Contact our Technical Service Department to coordinate Warranty Technical or Field Service Support.

### Warranty Parts & Service

Warranty parts and service are coordinated through our Technical Service Department.

### Warranty Parts Claims

Material claimed to be defective must be returned to our factory for evaluation. Defective materials will be replaced, or your account will be credited if replacement materials have already been purchased. Please contact our Technical Service Department at the address provided below if you have any questions or problems.

### Warranty Service Support

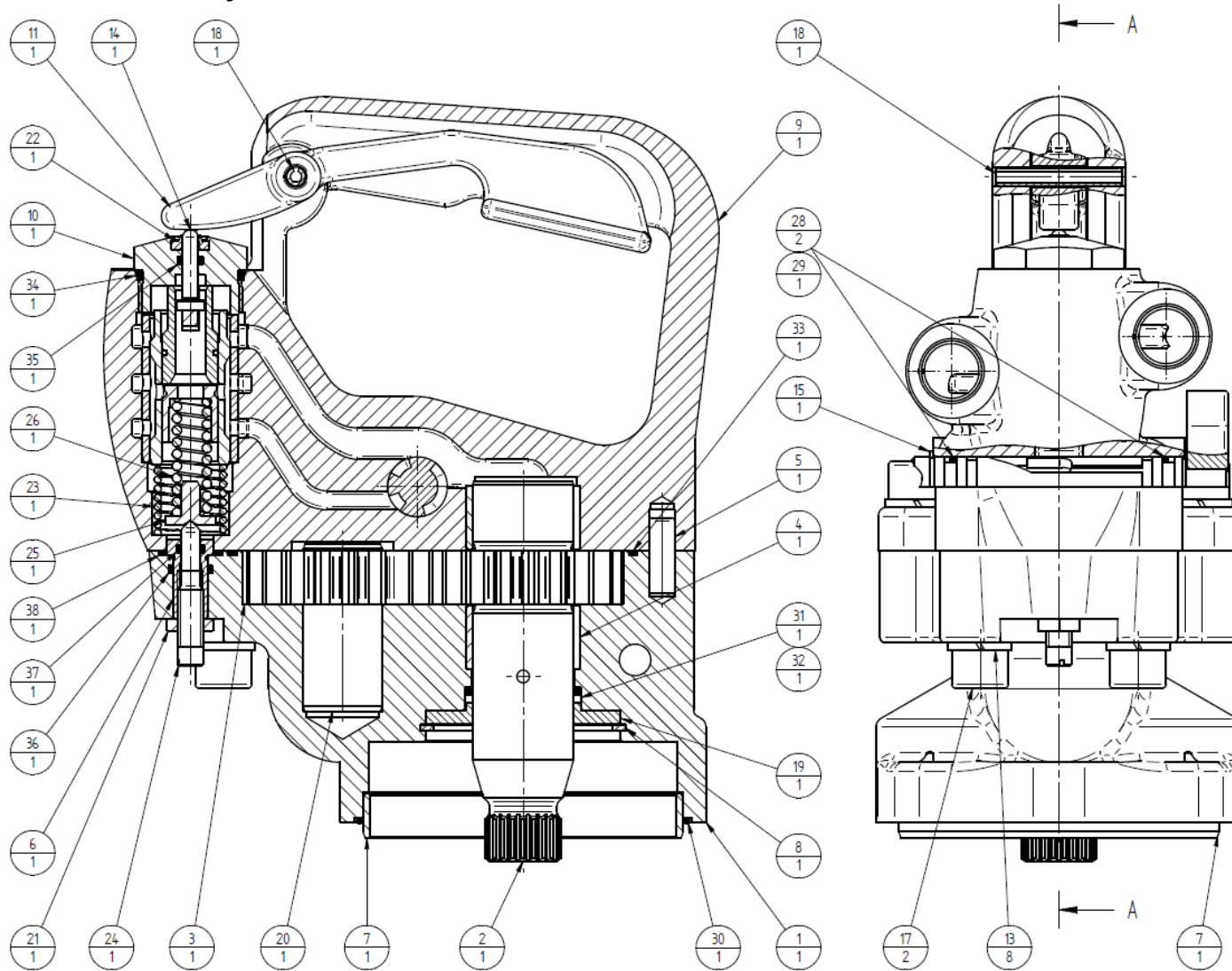
Depending upon the circumstances and availability of technical service personnel, we may provide technical assistance and/or field service support, at no charge to the customer, to assist in the correction of warranty related problems. Contact our Technical Service Department at the address provided below to coordinate Warranty Technical or Field Service Support.

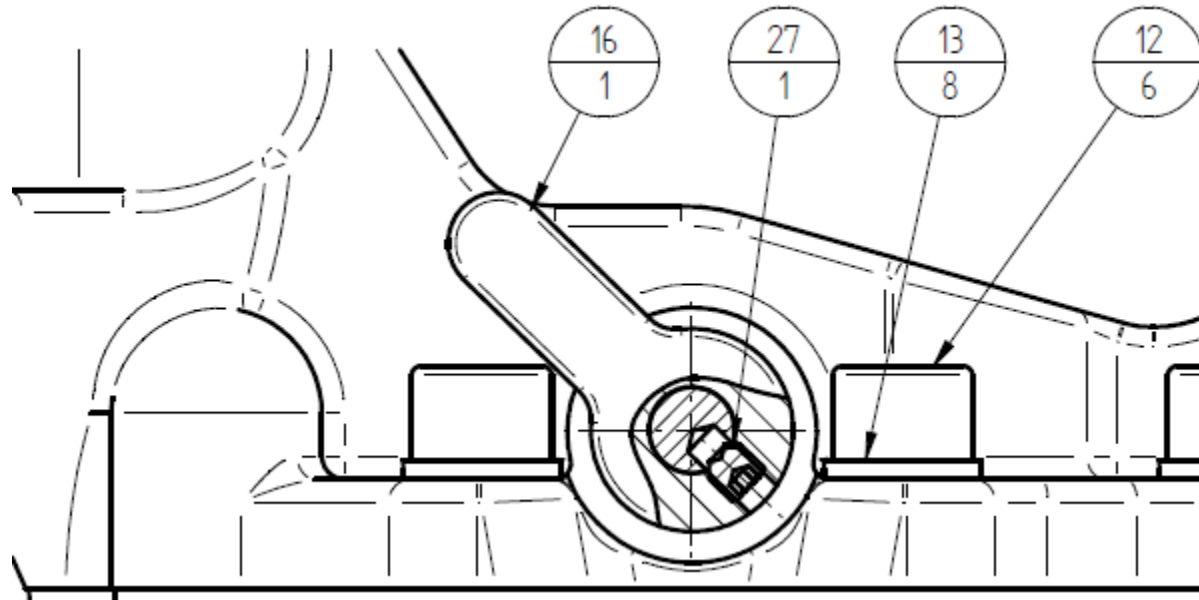
**Impact Wrench Assembly Service Parts**

FOR SERVICE ONLY

NO.	QTY	DESCRIPTION	PART NO.
1	REF	ANVIL	476833
2	REF	HANDLE, ASSIST	475793
3	REF	HANDLE, VALVE	475943
4	REF	KIT, REBUILD	473871
5	REF	KIT, SEAL	473870
6	REF	KIT, TRIGGER NUT	473869
7	REF	LEVER	474810
8	REF	SCREW, SET	474811

Impact Wrench Assembly



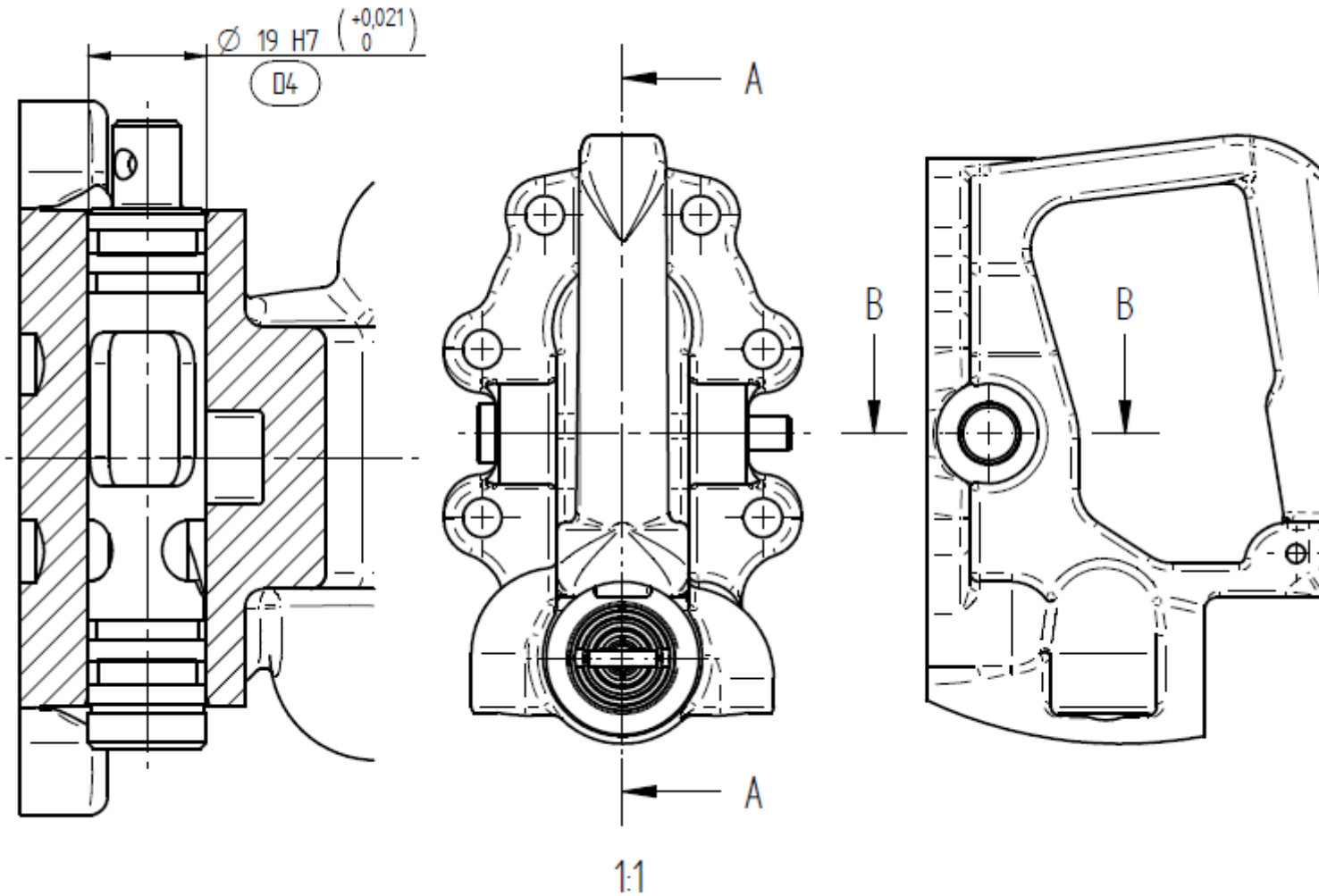


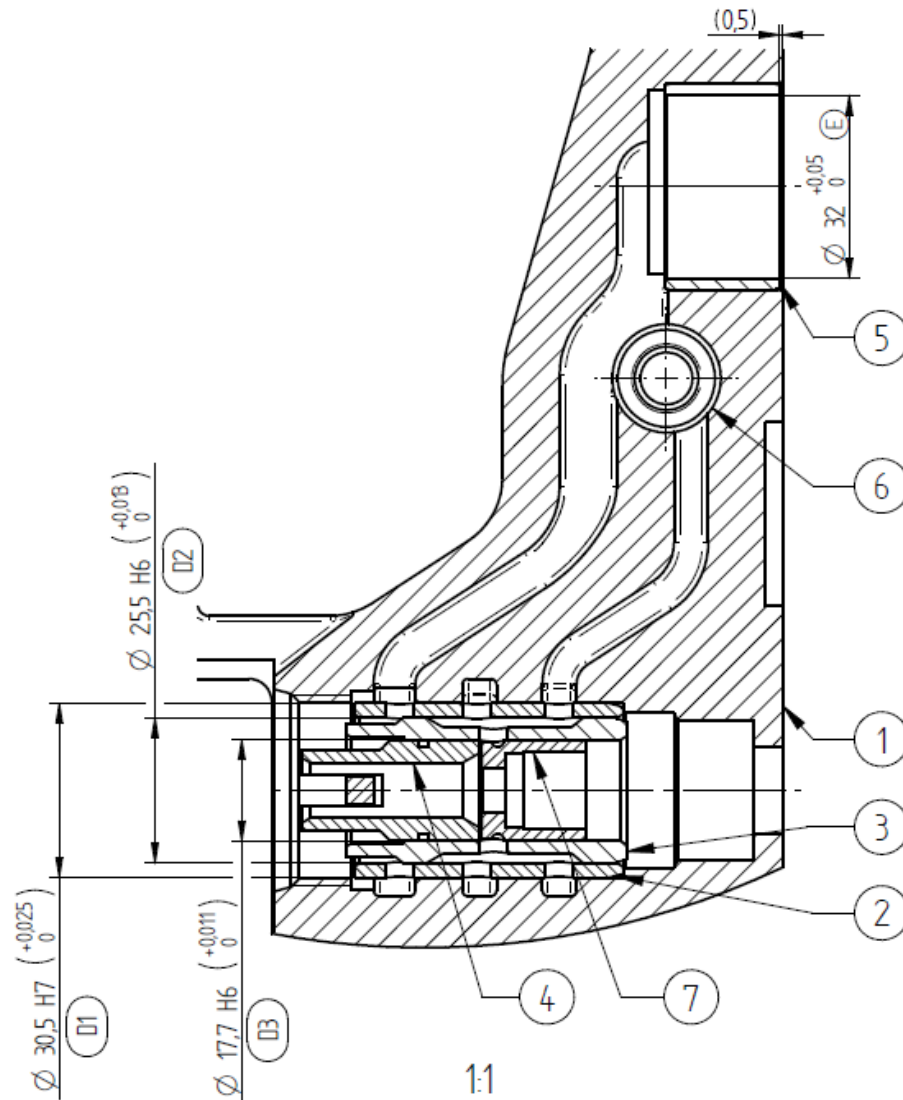
Parts List

Pcs.	Description	Qvant.
1	MOTOR HOUSING	1
2	DRIVE GEAR	1
3	FULL DRIVEN GEAR	1
4	BUSHING	1
5	PIN	1
6	BUSH ADJUSTING SCREW	1
7	HOLLOW DOWEL	1
8	RETAINING RING 62	1
9	HANDLE ASSY	1
10	NUT VALVE	1
11	TRIGGER	1
12	SCREW M12x45	6
13	WASHER 12	8
14	TRIGGER PIN	1
15	RETAINING RING 19	1
16	REVERSE LEVER	1
17	SCREW M12x55	2
18	ROLL PIN	1
19	COVER SHAFT SEAL	1

20	STUD DRIVEN GEAR	1
21	NUT M8	1
22	WIPER PW5/S	1
23	SPRING	1
24	ADJUSTING SCREW	1
25	SUPPORT SPRING	1
26	SPRING	1
27	SCREW 1/4-20UNCx1/4	1
28	O-RING 15x2	2
29	BACK-UP RING 16x19x1,4	2
30	O-RING 103x2	1
31	O-RING 32x2,5	1
32	BACK-UP RING 32,21x2,18x1,4	1
33	O-RING 105x2	1
34	O-RING 29,6x2,9	1
35	O-RING 4,5x1,8	1
36	O-RING 11x1,8	1
37	O-RING 6x1,8	1
38	O-RING 16,5x2	1
39*	HELICOIL SCREW-LOCK	4

Handle Assembly





1	VALVE HANDLE
2	VALVE SLEEVE
3	VALVE SPOOL-OPEN
4	RELIEF SEAT
5	BUSHING
6	REVERSING SPOOL
7	RELIEF POPPET

## Section 6: Warranty Terms and Conditions

### Warranty Period

Each new machine and new parts of our manufacture are warranted against defects in material and workmanship for one year from the date of shipment from our factory.

When contacting customer service for factory parts, service or warranty support please provide the:

- Racine Railroad Products Model
- Serial Number
- Any locally assigned identification

### Vendor Parts Warranty Period

Other equipment and parts used, but not manufactured by Racine Railroad Products, Inc., are covered directly by the manufacturer's warranty for their products.

### Warranty Parts and Service

We will repair or replace, without charge, F.O.B. factory, Racine, Wisconsin, USA, any part Racine Railroad Products manufactures which is proven to be defective during the warranty period.

Material claimed defective must be returned, if requested, to the factory within 30 days from the date of the claim for replacement. Ordinary wear and tear, abuse, misuse and neglect are not covered by this warranty. Depending upon the circumstances, we may provide technical assistance and/or technical service support, without charge, to assist in the correction of warranty related problems.

### Non-Warranty Parts and Service

Material damaged through normal wear and tear, abuse, misuse and/or neglect are not covered by our warranty and should be ordered directly from our Customer Service.

**Note:** Parts for models that are no longer in production may not be available.

### Non-Warranty Parts Orders

When placing a parts order please provide the following information:

- Company Name and Billing Address
- Purchase Order Number and Issuing Authority
- Shipping Address
- Special Handling Instructions
- Contact Phone Number
- Machine Model and Serial Number
- Part Numbers and Quantities Being Ordered

**Note:** *Please use Racine Railroad Products part numbers when ordering parts.* Racine Railroad Products part numbers are shown in the parts lists and drawings of this manual and have only six (6) numbers.

Any part number with other than six numbers (e.g., contains alpha-numeric characters) is a Vendor Part Number and **not** a Racine Railroad Products part number