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Form No. 1000132

Operating Instructions and Parts List for:

4083B
59048B

HYDRAULIC CYLINDER

Max. Capacity: 10 Ton at 8,950 PSI

SAFETY EXPLANATIONS

Two safety symbols are used to identify any action or lack of action that can cause personal injury. Your reading and understanding of these safety symbols is very important.

DANGER - Danger is used only when your action or lack of action will cause serious human injury or death.

WARNING - Warning is used to describe any action or lack of action where a serious injury can occur.

IMPORTANT - Important is used when action or lack of action can cause equipment failure, either immediate or over a long period of time.

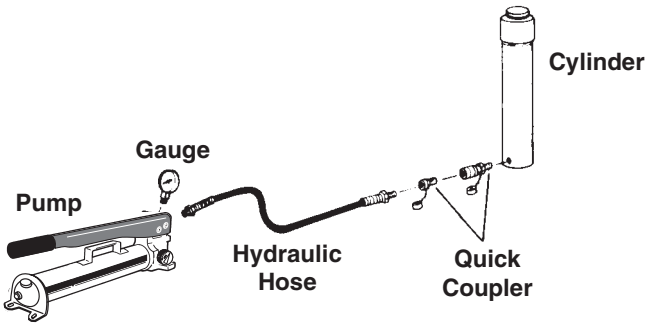
WARNING: It is the operator's responsibility to read and understand the following safety statements,

- **Only qualified operators should install, operate, adjust, maintain, clean, repair, or transport this machinery.**
- **These components are designed for general use in normal environments. These components are not specifically designed for lifting and moving people, agri-food machinery, certain types of mobile machinery or special work environments such as: explosive, flammable or corrosive. Only the user can decide the suitability of this machinery in these conditions or extreme environments. OTC will supply information necessary to help make these decisions.**

SINGLE-ACTING HYDRAULIC SYSTEMS

A basic single-acting hydraulic system consists of a manual or power pump that moves the hydraulic fluid, a hydraulic hose that carries the fluid, and a cylinder or ram that the fluid moves to do a job.

TYPICAL INSTALLATION



Since the single-acting cylinders have only one hose going to the cylinder, the cylinder can only apply force to extend its rod. The return stroke is accomplished by gravity or spring force.

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Litho in USA

SAFETY PRECAUTIONS

⚠ DANGER

- **When extending a cylinder or ram under load, always insure that the coupler(s) or port thread(s) has (have) not been damaged or do(es) not come in contact with any rigid obstruction. If this condition does occur, the coupler's attaching threads may become stripped or pulled from the cylinder or ram resulting in the instantaneous release of high pressure hydraulic fluid, flying objects, and loss of the load. All of these possible results could cause serious injury or death.**
- **Avoid off-center loads which could damage the cylinder or ram and/or cause loss of the load, possibly causing serious injury or death.**
- **Control the load at all times. Do not drop the load. Especially on locking collar cylinders or rams because the threads may shear and cause loss of the load.**
- **Properly rated adapters must be installed and used correctly for each application.**
- **Cylinders with weep hole stroke limiters will expel high pressure oil through the bleed hole to the atmosphere if extended beyond the visual maximum stroke indication. If this occurs, seals must be replaced.**

⚠ WARNING

- **All WARNING statements must be carefully observed to help prevent personal injury.**

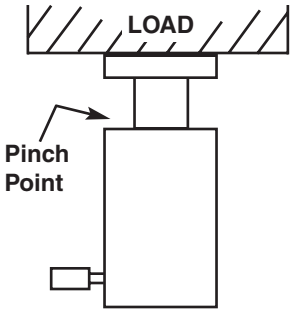
Hydraulic Hoses and Fluid Transmission Lines

- **Before operating the pump, all hose connections must be tightened with the proper tools. Do not overtighten. Connections should only be tightened securely and leak-free. Overtightening can cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.**
- **Should a hydraulic hose ever rupture, burst, or need to be disconnected, immediately shut off the pump and release all pressure. Never attempt to grasp a leaking pressurized hose with your hands. The force of escaping hydraulic fluid could cause serious injury.**
- **Do not subject the hose to potential hazard such as fire, sharp surfaces, extreme heat or cold, or heavy impact. Do not allow the hose to kink, twist, curl, crush, cut, or bend so tightly that the fluid flow within the hose is blocked or reduced. Periodically inspect the hose for wear, because any of these conditions can damage the hose and possibly result in personal injury.**
- **Do not use the hose to move attached equipment. Stress can damage the hose and possibly cause personal injury.**
- **Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects and some paints. Hose deterioration due to corrosive materials can result in personal injury. Consult the manufacturer before painting a hose. Never paint a coupler.**

SAFETY PRECAUTIONS (CONTINUED)

Cylinder

- **Use only approved accessories and approved hydraulic fluid. Hoses, seals and all components used in a system must be compatible with the hydraulic fluid used.**
- **Do not exceed the rated capacities of the cylinders. Excess pressure can result in personal injury.**
- **Inspect each cylinder and coupler before each use to prevent unsafe conditions from developing.**
- **Do not use cylinders if they are damaged, altered or in poor condition.**
- **Do not use cylinders with bent or damaged couplers or damaged port threads.**
- **Under certain conditions, the use of an extension with a hydraulic cylinder may not be advisable and could present a dangerous condition.**
- **Avoid pinch points or crush points that can be created by the load or parts of the cylinder.**
- **If this component is used to lift or lower loads, be certain that the load is under operator control at all times and that others are clear of the load. Do not drop the load.**



- **Never use extreme heat to disassemble a hydraulic cylinder or ram. Metal fatigue and/or seal damage will result and can lead to unsafe operating conditions.**
- **The guide cannot cover every hazard or situation so always do the job with SAFETY FIRST.**

IMPORTANT:

- **Keep the cylinder clean at all times.**
- **When the cylinder is not in use, keep the piston rod fully retracted and upside down.**
- **Use an approved, high-grade pipe thread sealant to seal all hydraulic connections. Teflon tape can be used if only one layer of tape is used and it is applied carefully (two threads back) to prevent the tape from being pinched by the coupler and broken off inside the pipe end. Any loose pieces of tape could travel through the system and obstruct the flow of fluid or cause jamming of precision-fit parts.**
- **Always use protective covers on disconnected quick couplers.**
- **Limiting the stroke on spring return cylinders will prolong spring life.**

INTRODUCTION

These instructions are written to help you, the user, more effectively use and maintain your hydraulic cylinders. If any questions, please call your nearest OTC facility.

Some of the information included in these instructions was selected from A.N.S.I. B30.1 and applies to the construction, installation, operation, inspection and maintenance of hydraulic cylinders. It is strongly recommended that you read A.N.S.I. B30.1 to answer any questions not covered in these instructions. The complete A.N.S.I. B30.1 standard which contains additional information can be obtained at a nominal cost from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th, New York, New York 10017.

An inspection checklist (Form No. 105503) is available on request from your nearest OTC facility.

SYSTEM EVALUATION

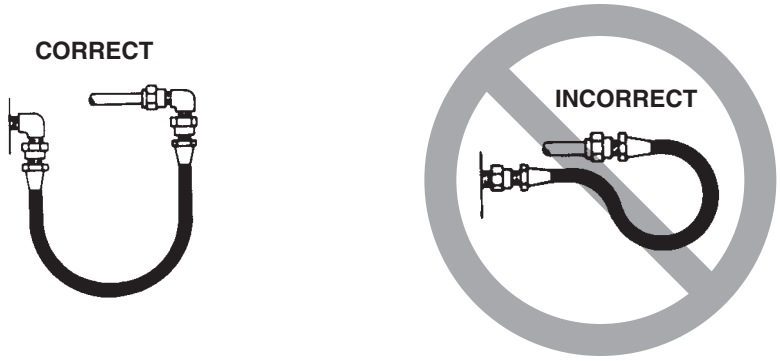
Your cylinder, hose(s), couplings and pump all must be rated for the same maximum operating pressure, correctly connected and compatible with the hydraulic fluid used. An improperly matched system can cause the system to fail and possibly cause serious injury. If you are in doubt, consult your nearest OTC facility.

SET-UP

HYDRAULIC CONNECTIONS

Remove the thread protectors or dust covers from the hydraulic ports if applicable. Clean the areas around the fluid ports of the pump and cylinder. Inspect all threads and fittings for signs of wear or damage, and replace as needed. Clean all hose ends, couplers and union ends. Connect all hose assemblies to the pump and cylinder. Use an approved, high-grade pipe sealant to seal all hydraulic connections. Tighten securely and leak-free but do not overtighten.

Hydraulic lines and fittings can act as restrictors as the cylinder or ram retracts. The restricting or slowing of the fluid flow causes back pressure that slows the cylinder's or ram's return. Return speed also varies because of the application, condition of the cylinder or ram, inside diameter of hose or fitting, length of the hose, and the temperature and viscosity of the hydraulic fluid.

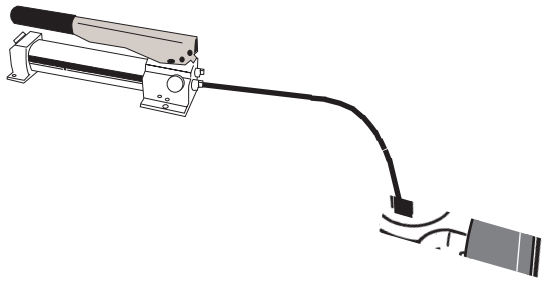


SET-UP (CONTINUED)

BLEEDING THE SYSTEM

After all connections are made, the hydraulic system must be bled of any trapped air. Refer to the diagram below.

With no load on the system and the pump vented and positioned higher than the cylinder or ram, cycle the system several times. If you are in doubt about venting your pump, read the operating instructions for your pump. Check the reservoir for possible low fluid level and fill to proper level with approved, compatible hydraulic fluid as necessary.



IMPORTANT: Some spring return cylinders or rams have a cavity in the rod which forms an air pocket. This type of cylinder or ram should be bled when positioned upside down or lying on its side with the port facing upward.

INSPECTION

Before each use, visually inspect for the following items:

1. Cracked or damaged cylinder
2. Excessive wear, bending, damage, or insufficient part engagement
3. Leaking hydraulic fluid
4. Scored or damaged piston rod
5. Improperly functioning swivel heads and caps
6. Loose bolts
7. Damaged or improperly assembled accessory equipment
8. Modified, welded, or altered equipment
9. Bent or damaged couplers or port threads

Preventive Maintenance (yearly or sooner, if the cylinder or ram condition suggests damage) - Visual examination by the operator or other designated personnel with a dated and signed equipment record.

MAINTENANCE

- **Always use clean, approved hydraulic fluid and change as needed.**
- **Any exposed threads (male or female) must be cleaned and lubricated regularly, and protected from damage.**
- **If a cylinder or ram has been exposed to rain, snow, sand, grit-laden air, or any corrosive environment it must be cleaned, lubricated, and protected immediately after exposure.**

PERIODIC CLEANING

A routine should be established to keep the hydraulic system as free from dirt as possible. All unused couplers must be sealed with dust covers. All hose connections must be free of dirt and grime. Any equipment attached to the cylinder must be kept clean. Use only OTC hydraulic fluid and change as recommended or sooner if the fluid becomes contaminated (never exceed 300 hours).

MAINTENANCE (CONTINUED)

STORAGE

Single-acting and Center Hole Cylinders

Single-acting and center hole cylinders and rams should be stored in a vertical position with the rod end down in a ***dry***, well-protected area where they will not be exposed to corrosive vapors, dust or other harmful elements.

When a single-acting cylinder or ram has not been used for a period of three (3) months it should be connected to a pump and be fully extended and then retracted. This cycle will lubricate the cylinder walls thereby reducing the potential for rust formation on the cylinder walls.

TROUBLESHOOTING GUIDE

IMPORTANT:

- **The following troubleshooting and repair procedures should be performed by qualified personnel familiar with this equipment. Use the proper equipment when troubleshooting!**

NOTE:

- **All the following statements may not apply to your particular model of cylinder or ram. Use the guide as a general reference for troubleshooting.**

PROBLEM	CAUSE	SOLUTION
Erratic action	1. Air in system or pump cavitation	1. Add fluid, bleed air and check for leaks
	2. Internal leakage in double-acting cylinders or external leakage in single-acting cylinders	2. Replace worn packings. Check for excessive contamination or wear. Replace contaminated fluid as necessary.
	3. Cylinder sticking or binding	3. Check for dirt or leaks. Check for bent, misaligned, worn parts or defective packings.
Cylinder/Ram does not move	1. Loose couplers	1. Tighten couplers
	2. Faulty coupler	2. Verify that female coupler is not locked up (ball wedged into seat). Replace both female and male couplers.
	3. Improper pump valve position	3. Close release valve or shift to new position
	4. Low or no hydraulic fluid in pump reservoir	4. Fill and bleed the system
	5. Air-locked pump	5. Prime pump per pump operating instructions
	6. Pump not operating	6. Check pump's operating instructions
	7. Load is above the capacity of the system	7. Use the correct equipment
	8. Fluid leaks out of rod end relief valve (double-acting cylinders only)	8. Make sure all couplers are fully coupled. Contact your nearest Authorized Hydraulic Service Center.

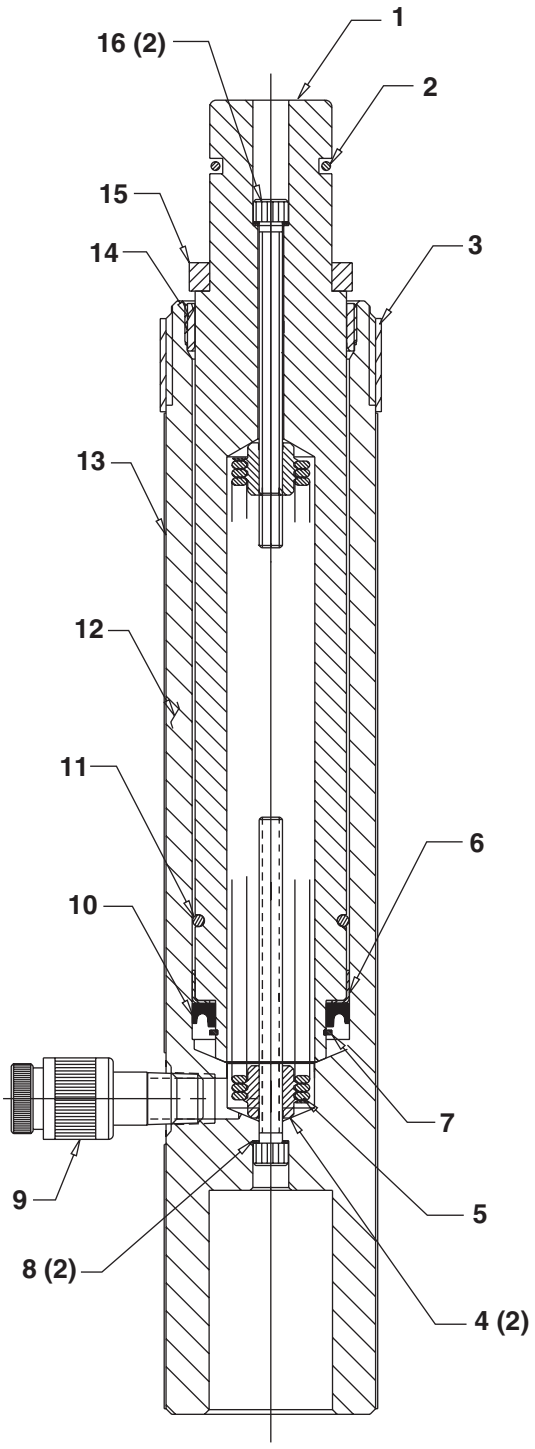
TROUBLESHOOTING GUIDE (CONTINUED)

PROBLEM	CAUSE	SOLUTION
Cylinder/Ram extends only partially	1. Pump reservoir is low on hydraulic fluid	1. Fill and bleed the system
	2. Load is above the capacity of the system	2. Use the correct equipment
	3. Cylinder piston rod binding	3. Check for dirt or leaks. Check for bent, misaligned, worn parts or defective packings.
Cylinder/Ram moves slower than normal	1. Loose connection or coupler	1. Tighten
	2. Restricted hydraulic line or fitting	2. Clean and replace if damaged
	3. Pump not working correctly	3. Check pump operating instructions
	4. Cylinder seals leaking	4. Replace worn seals. Check for excessive contamination or wear
Cylinder/Ram moves but does not maintain pressure	1. Leaky connection	1. Clean, reseal with thread sealant and tighten connection
	2. Cylinder seals leaking	2. Replace worn seals. Check for excessive contamination or wear. Replace contaminated fluid as necessary.
	3. Pump or valve malfunctioning	3. Check pump or valve operating instructions
Cylinder/Ram leaks hydraulic fluid	1. Worn or damaged seals	1. Replace worn seals. Check for excessive contamination or wear. Replace contaminated fluid as necessary.
	2. Loose connections	2. Clean, reseal with thread sealant and tighten connection
Cylinder/Ram will not retract or retracts slower than normal	1. Pump release valve closed	1. Open pump release valve
	2. Loose couplers	2. Tighten couplers
	3. Blocked hydraulic lines	3. Clean and flush
	4. Weak or broken retraction springs	4. Send to service center for repair
	5. Cylinder damaged internally	5. Send to service center for repair
	6. Pump reservoir too full	6. Drain hydraulic fluid to correct level

SINGLE-ACTING, SPRING RETURN

HYDRAULIC CYLINDER

Maximum Capacity: 10 Ton At 8,950 PSI



Item No.	Part No.	No. Req'd	Description
1	**59046B**	1	Piston Rod
2	**12598**	1	Ext. Retaining Ring (1.25 x .094)
3	**252346**	1	Thread Protector
4	**201431**	1	Spring (.83 OD x 6.13 x .13)
5	**201360**	2	Retainer, Spring
6	**252341**	1	Bushing
7	**16076**	1	Ext. Retaining Ring (1.12 x .043)
8	**10442**	2	Washer, Copper (.37 x .25)
9	**260105**	1	Cylinder Half Coupler
10	**16067**	1	U-cup (1.69 x 1.19 x .25 H)
11	**252399**	1	Retaining Ring (1.39 I.D.)
12	**501114B**	1	Cylinder Body
13	**504904B**	1	Complete Coverage Decal
14	**351354**	1	Retainer Nut (1-7/8-12)
15	**253117**	1	Ring (1-3/4 O.D. x 1-5/16 I.D.)
16	**16064**	2	Screw, Soc Hd (1/4-20 x 3-1/2)