

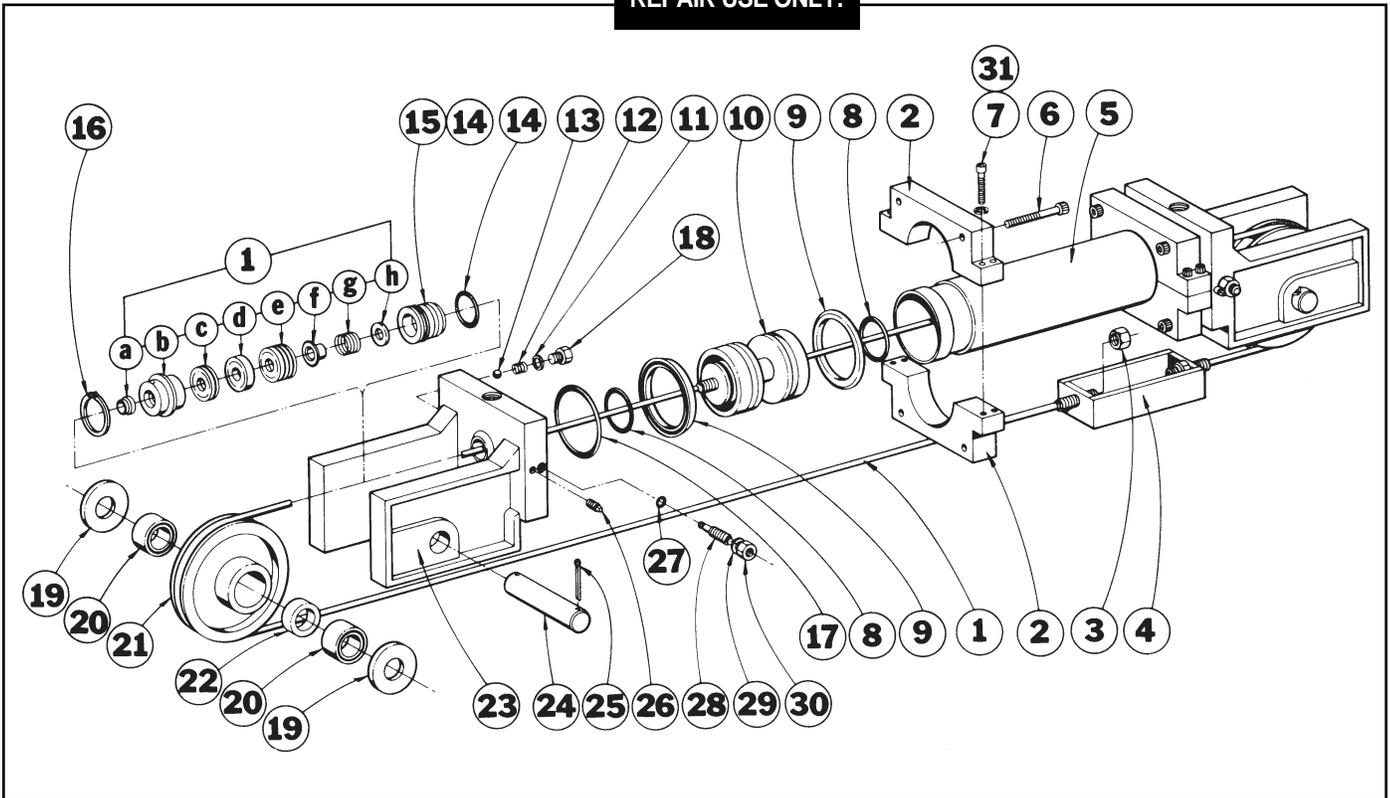


### Cable Cylinders

6-INCH BORE

**DISCONTINUED  
PRODUCT STYLE  
OR SIZE. PARTS  
SHEET IS FOR  
REPAIR USE ONLY.**

MODELS: CCS60  
CCS60H/HJ



### Parts Listing

Item	Part No.	Description	Quantity
	RKCCS60	Repair Kit (specify stroke)	1
†1.	CACCS60	Cable Assembly, 200-6	2
2.	1039-2039	Clamp Plate	2
*3.	1039-1058	Hex Nut	2
4.	1039-1057	Cable Bracket	1
5.	1039-1032	Steel Tube	1
6.	1039-2064	Bolt, Hex Head	8
7.	1039-2038	Socket Head Cap Screw	8
†8.	1039-1021	O-Ring	4
†9.	1039-1020	U-Cup	4
10.	1039-1040	Piston	1
*11.	1039-1048	Thread Seal	2
*12.	1039-1046	Spring	2
*13.	1039-1047	Ball	2
†14.	1039-1063	O-Ring	4
15.	1039-1043	Gland	2
16.	1039-1056	Retaining Ring	4
†17.	1039-1037	O-Ring	4

Item	Part No.	Description	Quantity
*18.	1039-1045	Hex Plug	2
19.	1039-1053	Pulley Shaft Spacer	4
20.	1039-1055	Bearing	4
21.	1039-1051	Pulley	2
22.	1039-1054	Bearing Spacer	2
*23.	1039-1042	Cylinder Head	2
24.	1039-1052	Pulley Shaft	2
25.	1039-1059	Cotter Pin	4
26.	1014-1065	1/8-27 NPT Plug	4
*27.	1039-1062	O-Ring	2
*28.	1039-1044	Cushion Needle	2
*29.	1039-1049	Thread Seal	2
30.	1014-1058	Hex Nut	2
31.	0804-1263	Lock Washer	8

† Contained in Repair Kit.

\* are available only as Head Assembly 1039-9004

**INSTALLATION**

When unpacking a Tol-O-Matic cable cylinder, BE EXTRA CAREFUL NOT TO SCRATCH OR MAR THE NYLON COVERING ON THE CABLE. The cylinder may be mounted using the bolt holes in the head. When attaching the cable bracket to the driven mechanism, be sure it is in perfect alignment and that it does not deflect the cable to the side. Misalignment can cause excessive wear.

**Pretensioning and proof-loading instructions:** All double-acting cable cylinders are shipped without being pretensioned. They must be pretensioned after mounting to insure maximum service life of the device. There are two types of stretch in cable— constructional and elastic. The constructional stretch is removed by proof-loading of the cable. The elastic stretch is removed by proper pretensioning of the cable.

**Proof-loading of cables (for cylinders without Auto Tensioners)**

1. Tighten the bracket terminal lock nuts equally with a torque wrench to torque requirements listed in Table A.
2. Let set for 30 seconds.
3. Loosen lock nuts to remove tension. (But leave them tight enough to eliminate any slack.)
4. Follow Pretensioning Instructions.

TABLE A: TORQUE TO PROOF-LOAD THE CABLE	
MODEL	REQUIRED TORQUE
CCS60	535 inch-pounds OR 60.45 Newton-meters

**Pretensioning of cables:**

1. Block the load some distance from the end of travel to keep cylinder from bottoming.
2. Apply pressure that is 15-20 percent higher than actual load pressure needed to move the load.

NOTE: Load pressure is defined as the actual pressure required to move the load. When the load is stopped externally before the piston bottoms, the relief valve or regulator setting becomes the load pressure.

**WARNING: The CCS60 cable cylinder develops up to 5,700 pounds (2,545 kilograms) for force at 200 PSI (14 Bar). Be certain the materials used to block the load are sufficient to withstand these forces.**

When pressurized, one cable becomes tight and the other becomes slack. Manually adjust out the slack. Release the pressure. Block the load on the opposite side and pressurize the other port. Repeat the manual adjustment on the other cable. Release pressure and remove blocks. Return the regulator or relief valve to the original load pressure.

The cylinder is now pretensioned. Additional manual adjustment should not be required. It is suggested however, that the cables be checked periodically.

**Alternate Method:** If the load cannot be blocked for cable pretensioning as stated above, tighten the bracket terminal lock nuts with a torque wrench to total pretensioning torque as stated in Table B.

TABLE B: TORQUE FOR UNBLOCKABLE LOADS				
Model	Pretensioning Torque	+	Starting Torque of Terminal Nuts	= Total Pretensioning Torque
CCS60	294.0in-lbs.	+	30 in.-lbs.	= 324 in.-lbs.
	33.218 N-m	+	3.3389 N-m	= 36.6 N-m

**NOTE:** For cylinders with Auto Tensioners, the cables must be proof-loaded and pretensioned before pressure is applied to the AT unit.

**TO REBUILD THE CYLINDER**

1. Remove cylinder from machinery.
2. Disconnect Cable (1) from the Cable Bracket (4) and remove Pulleys (21) on both ends of the cylinder.
3. Remove internal retaining rings (16) from both heads (23) and remove one head from cylinder by removing the four Socket Head Cap Screws (7)
4. Pull Piston (10) towards the open tube end and remove from Tube (5).
5. Disconnect cables from Piston (10) and pull back through Head with Gland to remove.
6. Install new U-Cups (9) and O-Rings (8 and 17) on the Piston (10) and rethread new cables through Heads (23) and connect them to the Piston, applying Loctite® onto the Ferrule threads before screwing them into the Piston.
7. Being careful not to damage the cable, or the “V” packing, carefully install the cable seal items (1) individually into the Seal Gland (15). Then, insert the Gland (15) into the cylinder Head (23). Compress the complete Seal Assembly and reinstall Retaining Rings (16). (Always lubricate seals when installing.)
8. Push the piston back into tube by gently tucking in the U-Cup (9) with a dull screwdriver or pencil. Mount Head back on cylinder with four Socket Head Cap Screws (7). Replace pulleys (21) and connect cable to Cable Bracket (4).
9. Operate the cylinder back and forth by hand several times to be sure it is properly assembled before applying air or hydraulic service.
10. Reinstall cylinder on machinery.

**IMPORTANT NOTE:** Apply (Blue) Loctite® #242 or equivalent to threaded cable terminal before connecting to the piston.

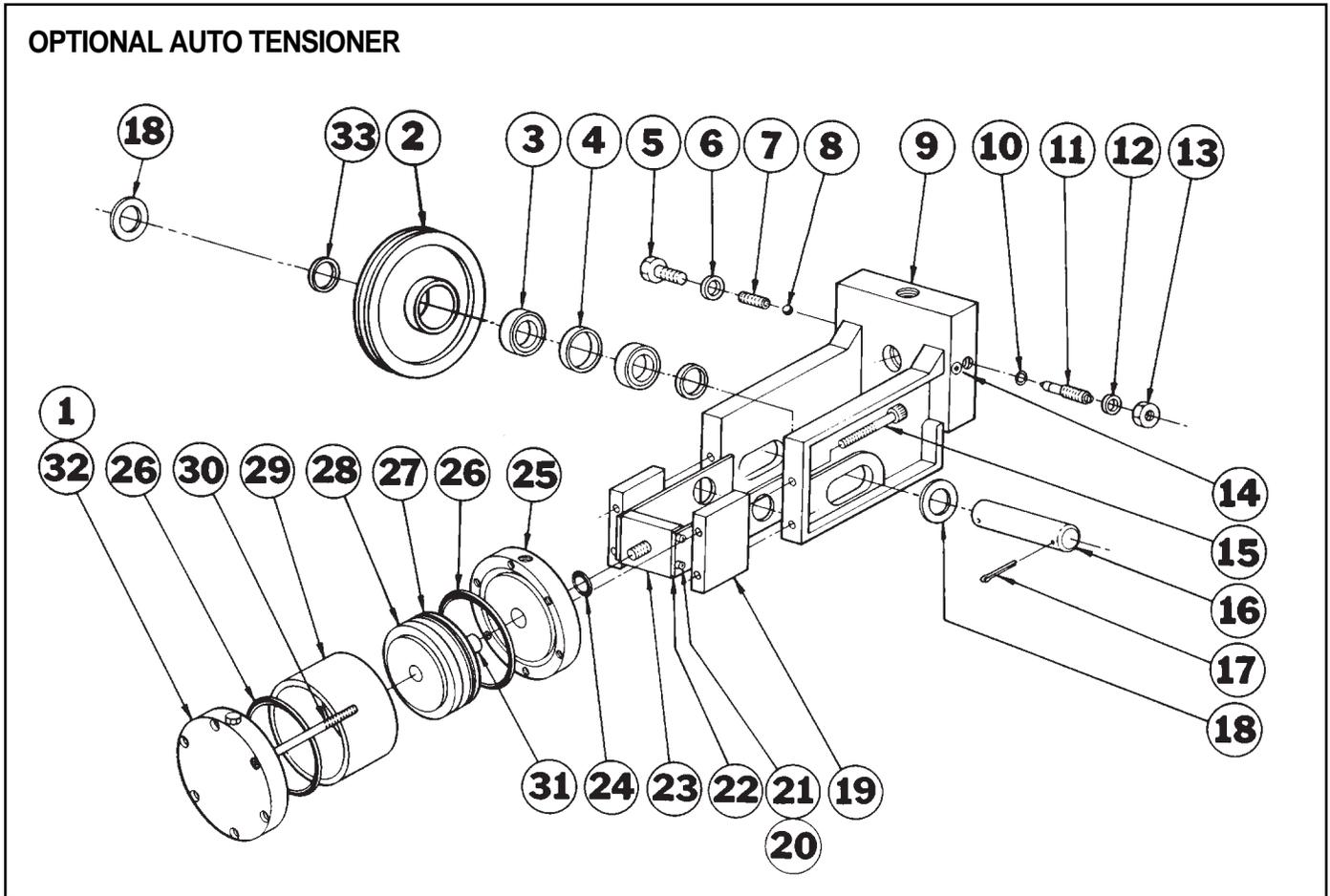
**NOTE:** A cylinder’s stroke length is on its identification tag. If that tag is missing, measure the length of the cylinder, including the heads at both ends. Consult the Cable Cylinder Catalog dimensional drawings “stroke-plus” length to determine your cylinder’s stroke length.

**MAINTENANCE**

Keep the cylinder as clean as possible around pulleys, glands, etc. Pneumatic service should be adequately lubricated with SAE 10 or 20 grade non-detergent oil.

Pulleys have permanently lubricated bearings and will require no maintenance. Check the cylinder’s cables periodically to help prevent premature or unexpected failures.

Your Tol-O-Matic Cable Cylinder will give you many cycles of trouble free service. However, should a leak occur, a rebuilding kit may be obtained which enables you to replace all the seals in a cylinder to return it to normal operating condition.



**OPTIONAL ACCESSORIES PART LISTING**

Auto Tensioner Kit Part Number: 1039-9008

**AUTO TENSIONER**

Item	Part No.	Description	Quantity
1.	1042-1052	End Plate	1
*2.	1039-1051	Pulley	1
*3.	1039-1055	Ball Bearing	2
*4.	1039-1054	Bearing Spacer	1
5.	1039-1045	Hex Head Cap Screw	1
6.	1039-1048	Gasket	1
7.	1039-1046	Spring	1
8.	1039-1047	Check Valve Ball	1
9.	1039-1038	Tensioner Head	1
10.	1039-1062	Buna-N O-Ring	1
11.	1039-1044	Cushion Needle	1
12.	1039-1049	Thread Seal	1
13.	1014-1058	Hex Nut	1
14.	1014-1065	Pipe Plug	2
15.	1042-2036	Socket Head Cap Screw	4
16.	1039-1052	Pulley Shaft	1
17.	1039-1059	Cotter Pin	2

Item	Part No.	Description	Quantity
18.	1039-1064	Shaft Washer	2
19.	1042-1054	Spacer	2
20.	1104-1011	Socket Head Cap Screw	4
21.	0802-1262	Lock Washer	4
22.	1042-1056	Tensioner Side Plate	2
23.	1042-1050	Tie Plate	1
24.	0701-1004	O-Ring, Buna-N	1
25.	1042-1059	End Plate	1
26.	1042-1035	O-Ring, Buna-N	1
27.	1042-1038	O-Ring, Buna-N	1
28.	1042-1058	Piston	1
29.	1042-3001	Tube	1
30.	1042-2037	Socket Head Cap Screw	6
31.	1042-1055	Piston Shaft	1
32.	1042-1021	Breather Plug	1
33.	1039-1060	Shaft Spacer	2

\* Available only as Pulley Assembly 1039-9005

**AUTO TENSIONER OPTION**

All cable cylinder models with Auto Tensioner units should be plumbed with a separate, non-fluctuating pressure source which is a set percentage of the actual operating pressure.

BORE SIZE (in.)	% OF LOAD PRESSURE
.75	22%
1.0	40%
1.5	86%
2.0	32%
2.0 (500 PSI)	24%
2.5	51%
3.0	54%
4.0	96%
5.0	75%
6.0	57%
8.0	102%

In the above table, load pressure is defined as the pressure required to move the load, NOT the regulated pressure (pneumatic) or the relief valve setting (hydraulic).

NOTE: If the load will be stopped mechanically prior to the piston bottoming, then the regulator pressure or the relief valve setting must be considered to be the load pressure.

If the application is hydraulic, a pressure-reducing valve must be used to ensure a non-fluctuating pressure source to the tensioner(s) or the pressure source must be an independent circuit that will maintain the required differential.

When installing cable cylinder models with Auto tensioner units, take up the cable slack manually according to the pretensioning instructions under General Installation and Maintenance.

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