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CAPSTAN WIRE FEEDER

Operation / Installation Manual

Manual Part Number: E8M5001
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1.0 GENERAL DESCRIPTION

- 1.1 The Capstan Wire Drive, Model WF-100, is designed specifically for automation. The Capstan's small size and light weight (less than 6 lbs. with out torch - less than 8 lbs. with 300 amp water cooled torch) allows the wire feeder to be placed directly on the automated fixture or robot wrist. Thus eliminating the wire guide liners normally associated with conventional wire drive systems. The Capstan also provides an increase in wire drive contact area by wrapping the wire around the wire drive wheel. This wire drive method has three major benefits:
1. Plastic deforms the filler wire, virtually eliminating existing wire cast.
 2. Increased drive force eliminates wire slip, flattening and damage to Wire surface.
 3. Integral wire straightener on the discharge side of the feeder allows the Wire Drive to precisely locate the filler wire independent of wire cast.
- 1.2 The WF-100 Capstan wire feed drive can be used with the CWT WFD-100 wire drive controller or connected directly to the CWT CDT –350 or CDT-450 synergic pulse power supply, replacing the standard wire feed assembly.
- 1.3 The Capstan Wire Drive can be purchased in various configurations as follows:

Motor Size	Speed	Feed Direction	PLL Controlled	Part No
9cm	Standard	Standard Hand	No	E2A5099
9cm	Standard	Opposite Hand	No	E2A5115
9cm	Slow	Standard Hand	No	E2A5112
9cm	Slow	Opposite Hand	No	E2A5181
9cm	Standard	Standard Hand	Yes	E2A5100
9cm	Standard	Opposite Hand	Yes	E2A5116
9cm	Slow	Standard Hand	Yes	E2A5113
12cm	Standard	Standard Hand	No	E2A5106

2.0 Wire Feed Mounting

- 2.1 The WF-100 capstan wire feeder has several mounting brackets, which can be used to adapt the WF-100 for a user specific application. Figure 1 shows the basic mounting dimensions and hole patterns for the WF-100 Standard Hand Capstan. Figure 2 shows the basic mounting dimensions and hole patterns for the WF-100 Opposite Hand Capstan. Refer to Appendix A for option mounting brackets. Due to the variety of applications the user may wish to fabricate a custom bracket for the particular installation.
- 2.2 The mounting brackets are attached to the wire feed block via 10-32 x 3/8 cap screws. The hole patterns for these mounting screws are shown in Figure 1 and 2. When fabricating a mounting bracket use these dimensions to locate the wire feeder mounting holes and torch centerline.

WARNING -The mounting holes are not through drilled. The maximum thread depth is 3/8".

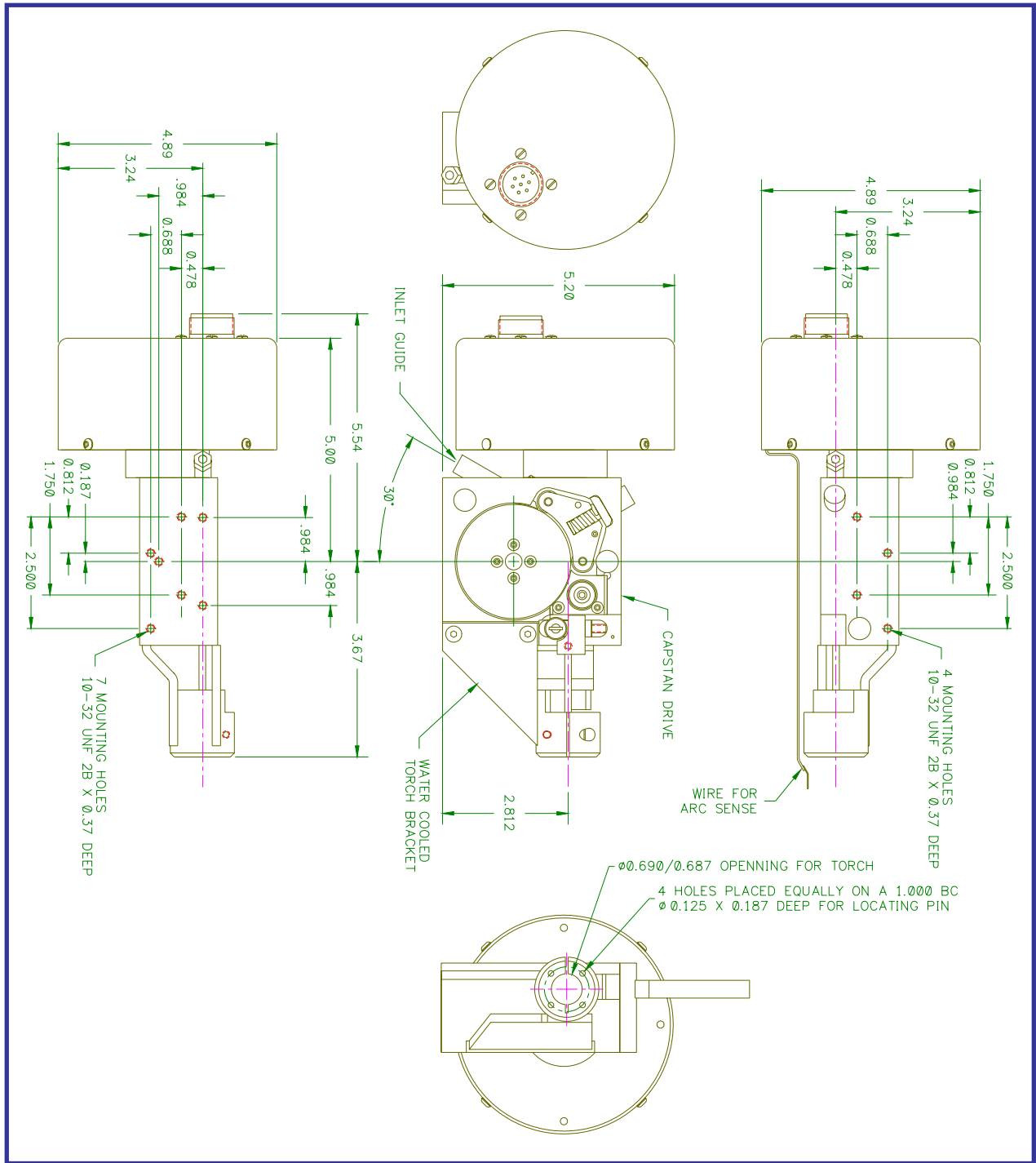


Figure 1 – Standard Hand Capstan Mounting Dimensions

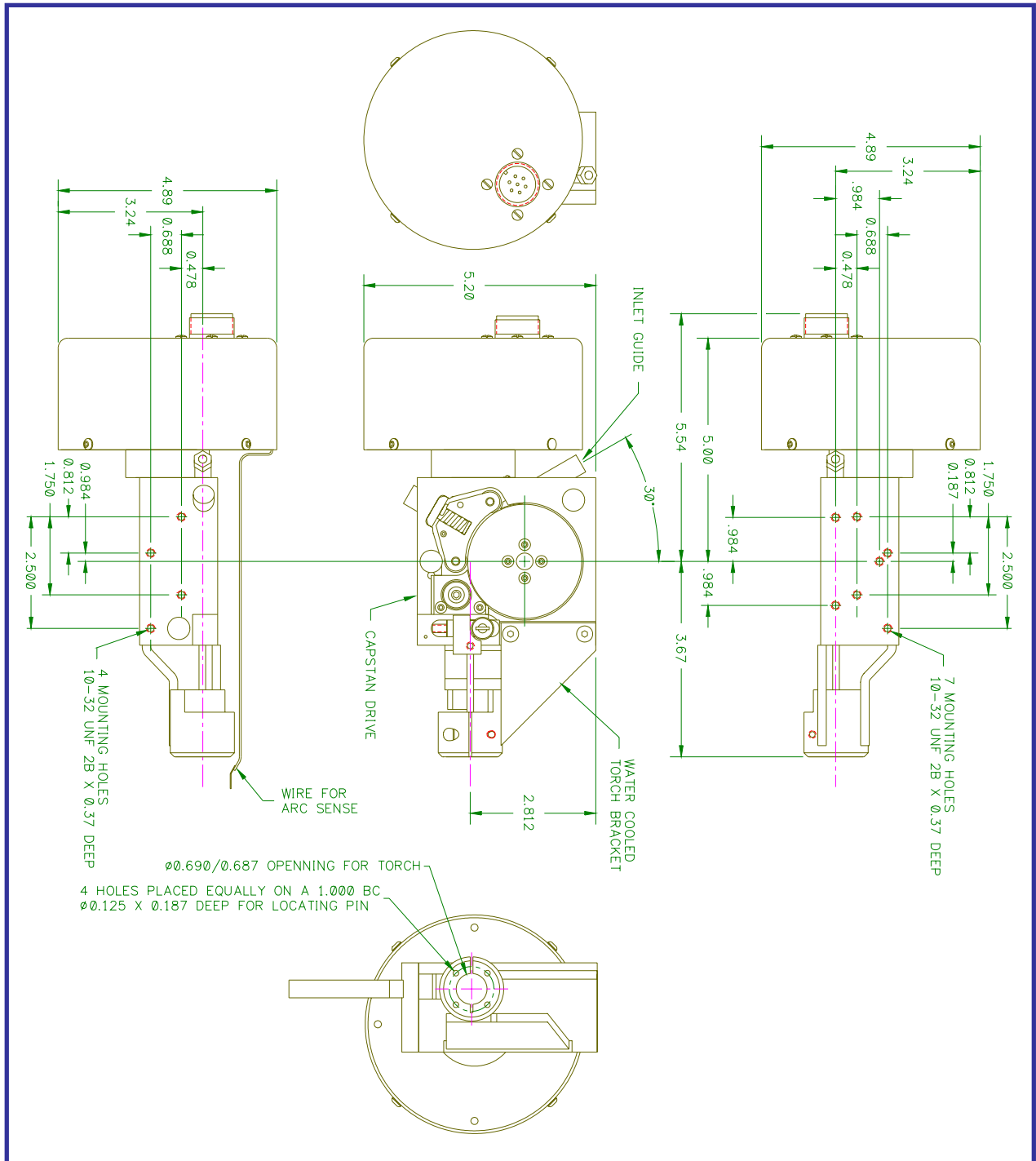


Figure 2 – Opposite Hand Capstan Mounting Dimensions

3.0 Wire Drive Wheel and Inlet Guide Installation

3.1 The WF-100 requires a different drive wheel and inlet wire guide for each diameter of filler wire used. To change the inlet wire guide and drive wheel, remove any existing filler wire from the capstan. Pull the existing inlet wire guide out of the capstan wire drive block. The capstan block has a spring-loaded plunger, which retains the inlet wire guide in the housing.

3.2 Remove the clear cover plate from the capstan by loosening the two captive fasteners.

WARNING: During the following procedure care should be taken as the tension roller spring is under compression. Do not operate the capstan with the cover plate removed.

3.3 To compress the pressure roller shoe assembly spring. Use a screwdriver to tighten the captive tension release screw located on the top of the capstan wire feed housing as shown in Figure 2. Tighten the captive fastener until the tension rollers clear the wire drive wheel. Remove the four-drive wheel retaining screws and remove the wire drive wheel.

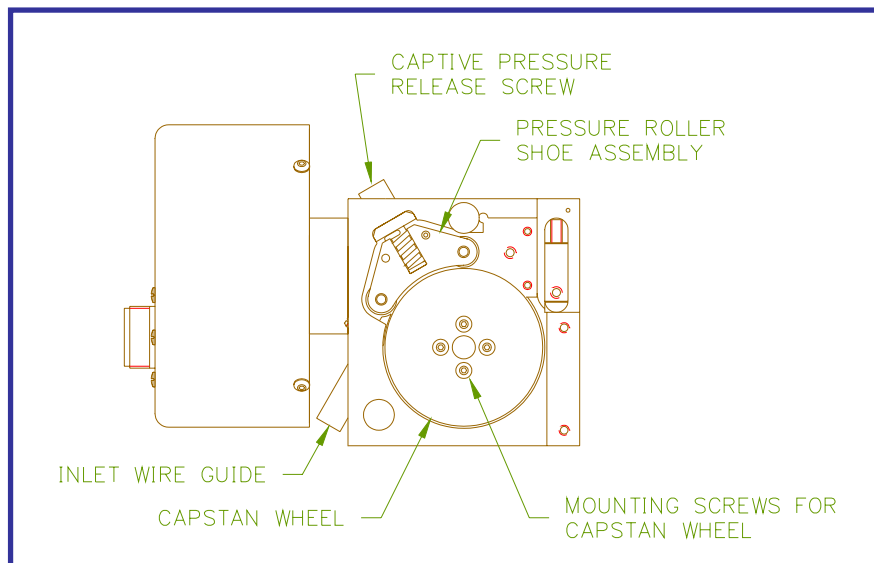


Figure 3 – Capstan Wheel Installation

3.4 Refer to next two chapters to select the correct drive wheel and inlet wire guide for the wire diameter and filler wire material required. Install the new drive wheel on the motor drive shaft and reinstall the four mounting screws. Release the pressure shoe spring by loosening the captive tension screw. Make sure that the pressure shoe guide pin is seated into the groove in the cavity. The pressure shoe should be seated flat against the bottom of the housing.

Reinstall the motor cover plate. Check to make sure that the cover is seated flat against the housing. Install the new wire guide inlet into the wire feed block. Make sure that the curved surface on the inlet guide is pointed towards the capstan drive wheel. Using the wire inch control feed the new filler wire into the capstan and check for proper operation.

4.0 Non-aluminum Wire Straightener Installation

- 4.1 When using a non-aluminum filler wire with the capstan, a Non-aluminum Wire Kit specifically made for each size wire must be installed on the capstan. Figure 4 and 5 show all the parts that are included in these kits. The capstan drive is not part of these kits.

Non-Aluminum Wire Kit

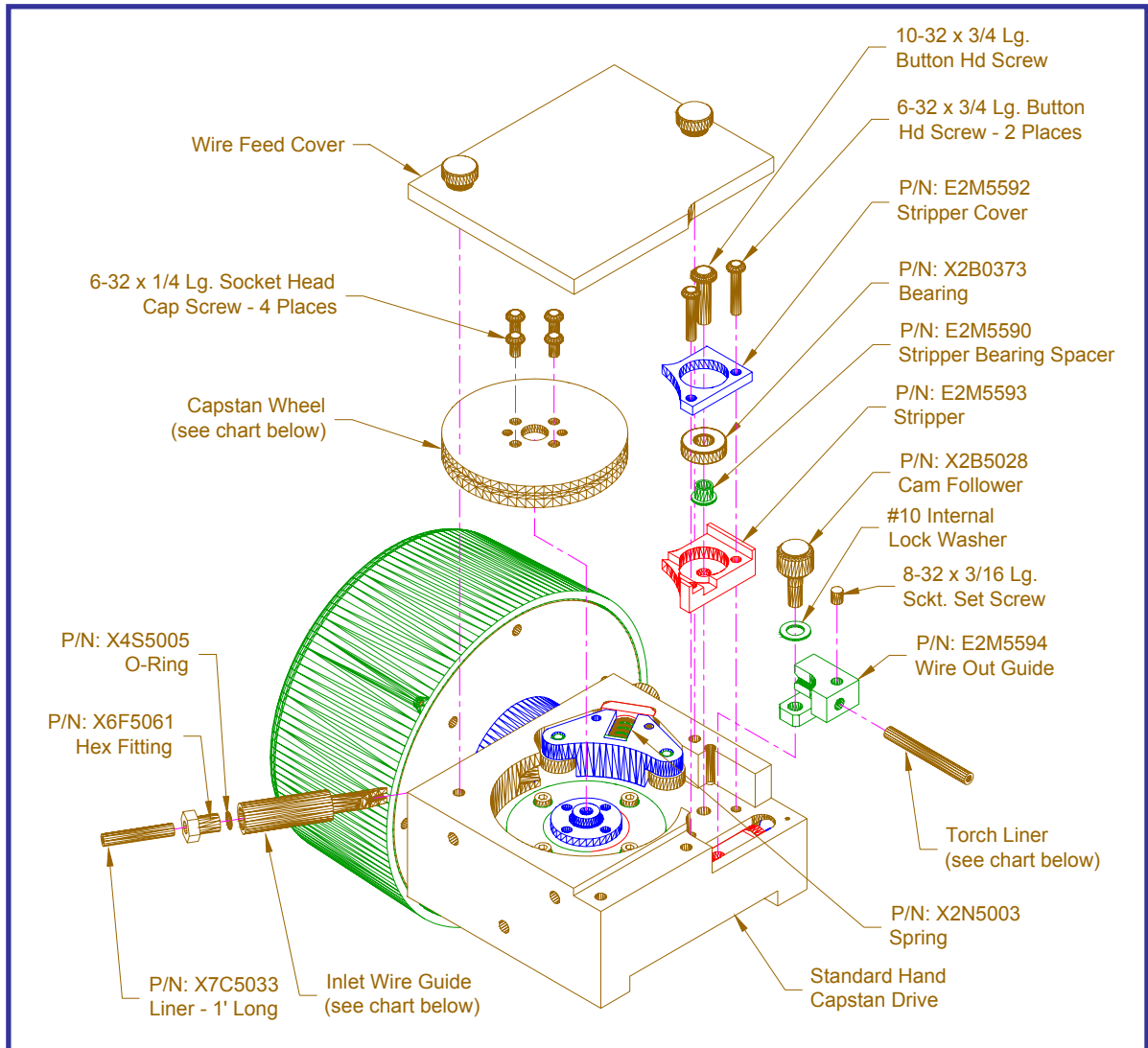
Wire Size Inc / mm	Standard Hand Part No	Opposite Hand Part No
0.030" / 0.76mm	E2A5164	E2A5169
0.035" / 0.89mm	E2A5165	E2A5170
0.040" / 1.0mm	E2A5166	E2A5171
0.045" / 1.14mm	E2A5167	E2A5172
0.047" / 1.19mm	E2A5167	E2A5172
0.052" / 1.32mm	E2A5168	E2A5173

- 4.2 All parts that are wire size specific in these kits are marked with color codes to prevent mixing incompatible parts.

Color Codes for Kits

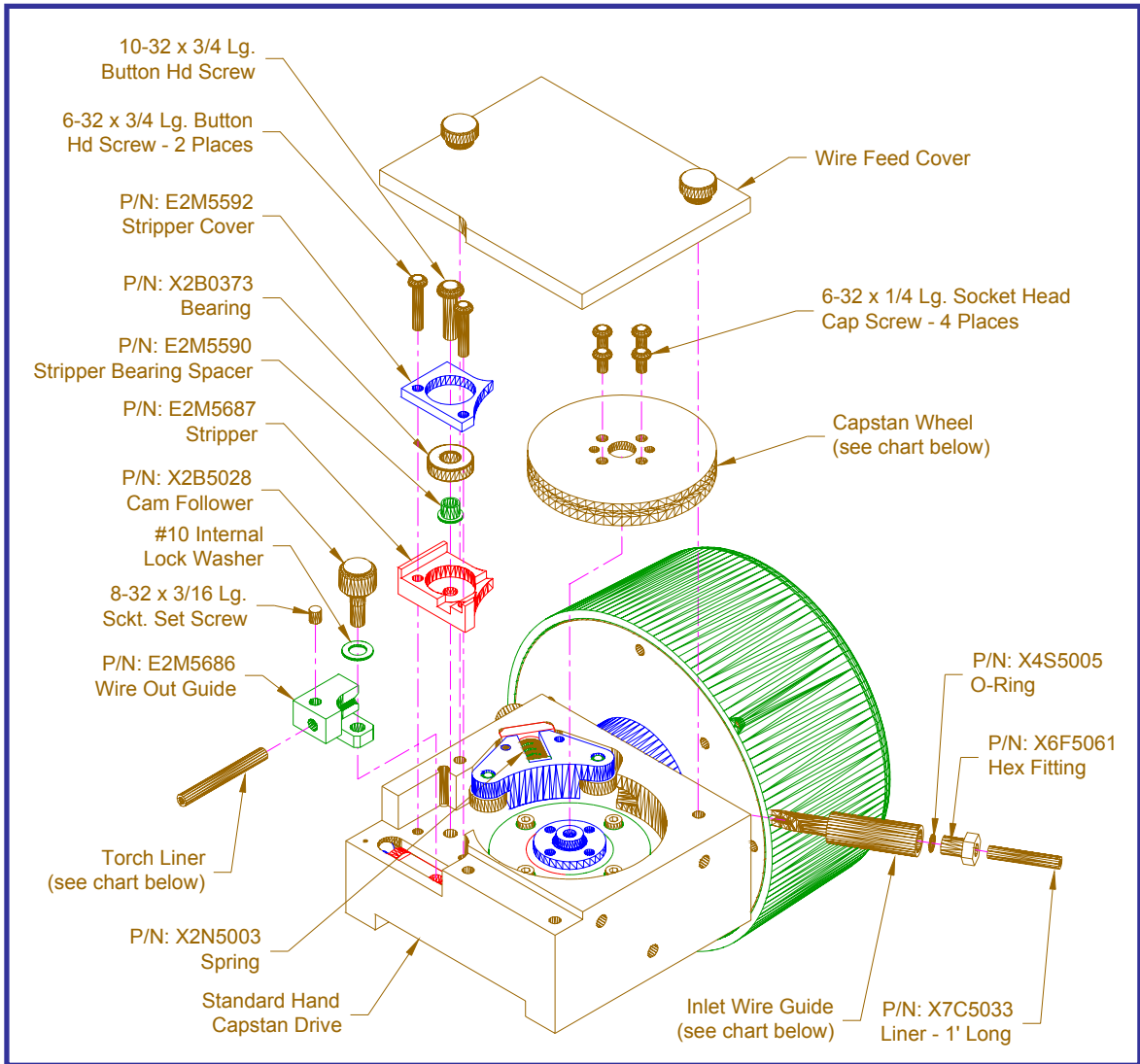
Wire Size Inc / mm	Color Code
0.030" / 0.76mm	White
0.035" / 0.89mm	Red
0.040" / 1.0mm	Gold
0.045" / 1.14mm	Yellow
0.047" / 1.19mm	Yellow
0.052" / 1.32mm	Blue
0.062" / 1.58mm	Green

- 4.3 Refer to section 3.0 for instruction on how to remove and install any inlet guide, capstan wheel and the pressure roller shoe spring.



Wire Diameter Inch / MM	Capstan Wheel	Inlet Wire Guide	Torch Liner	Color Code
.030" / .76mm	E2M5583	E2M5616	E7C5001	White
.035" / .89mm	E2M5157	E2M5617	E7C5001	Red
.040" / 1mm	E2M5633	E2M5634	E7C5001	Gold
.045" / 1.14mm	E2M5156	E2M5619	E7C5001	Yellow
.047" / 1.19mm	E2M5156	E2M5619	E7C5001	Yellow
.052" / 1.32mm	E2M5584	E2M5620	E7C5002	Blue

Figure 4 – Non-Aluminum Standard Hand Wire Drive Configuration



Wire Diameter Inch / MM	Capstan Wheel	Inlet Wire Guide	Torch Liner	Color Code
.030" / .76mm	E2M5583	E2M5616	E7C5001	White
.035" / .89mm	E2M5157	E2M5617	E7C5001	Red
.040" / 1mm	E2M5633	E2M5634	E7C5001	Gold
.045" / 1.14mm	E2M5156	E2M5619	E7C5001	Yellow
.047" / 1.19mm	E2M5156	E2M5619	E7C5001	Yellow
.052" / 1.32mm	E2M5584	E2M5620	E7C5002	Blue

Figure 5 – Non-Aluminum Opposite Hand Wire Drive Configuration

5.0 Aluminum Wire Pick-up Block Installation

- 5.1 When using an aluminum filler wire with the capstan, an Aluminum Wire Pick-up Block Kit specifically made for each size wire must be installed on the capstan. Figure 6 and 7 show all the parts that are included in these kits. The capstan drive is not part of these kits.

Aluminum Wire Pick-up Block Kit

Wire Size Inc / mm	Standard Hand Part No	Opposite Hand Part No
0.030" / 0.76mm	E2A5154	E2A5159
0.035" / 0.89mm	E2A5155	E2A5160
0.040" / 1.0mm	E2A5156	E2A5161
0.045" / 1.14mm	E2A5157	E2A5162
0.047" / 1.19mm	E2A5157	E2A5163
0.052" / 1.32mm	E2A5183	E2A5184
0.062" / 1.58mm	E2A5158	E2A5164

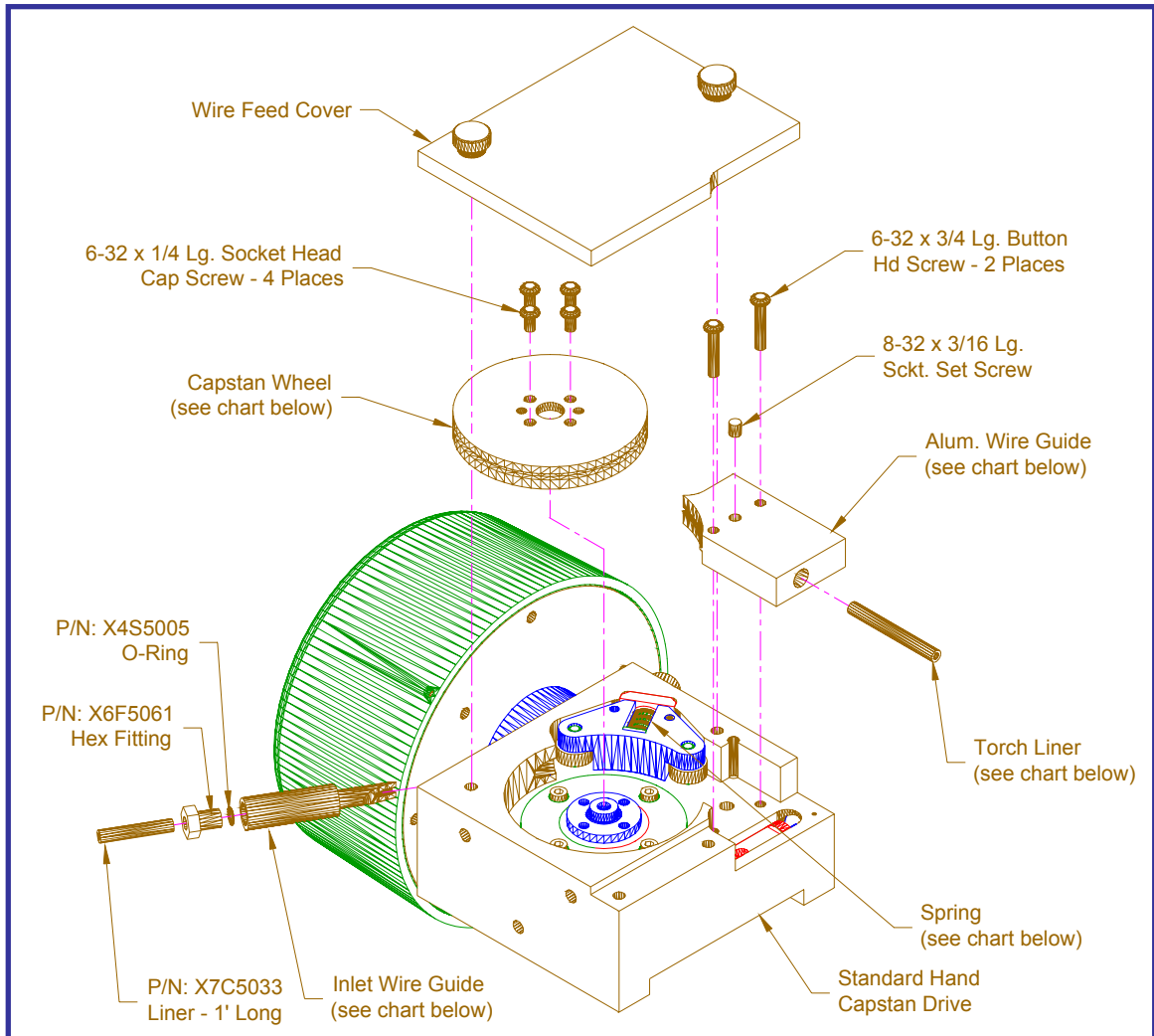
- 5.2 All parts that are wire size specific in these kits are marked with color codes to prevent mixing incompatible parts.

Color Codes for Kit

Wire Size Inc / mm	Color Code
0.030" / 0.76mm	White
0.035" / 0.89mm	Red
0.040" / 1.0mm	Gold
0.045" / 1.14mm	Yellow
0.047" / 1.19mm	Yellow
0.052" / 1.32mm	Blue
0.062" / 1.58mm	Green

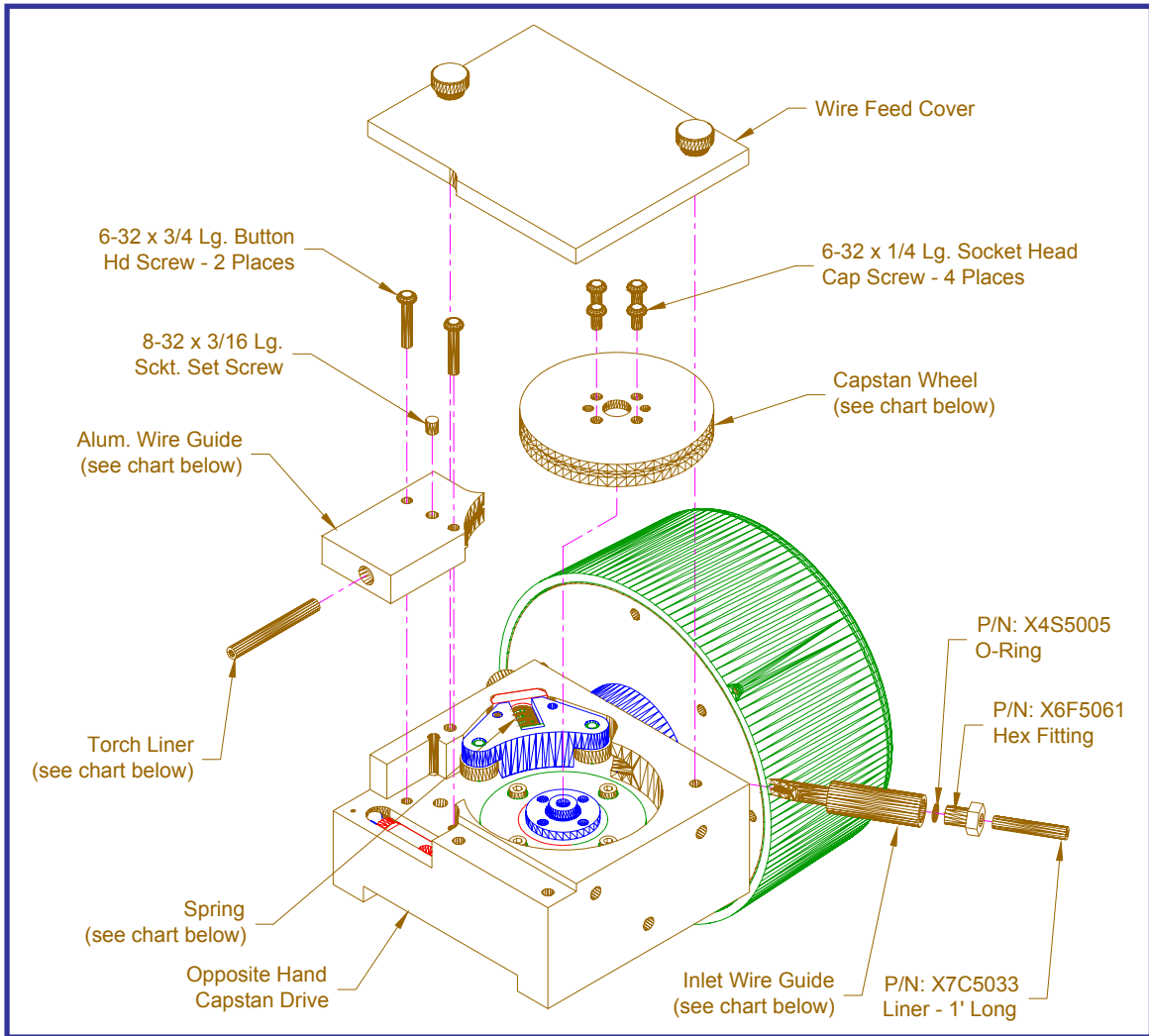
- 5.3 When using aluminum filler wire with the capstan the wire straightener must be removed and a nylon stripper block and inlet guide must be installed. The pressure spring must also be changed to prevent excessive deformation of the wire in the wire drive wheel groove. The nylon inlet guide is required to prevent wire injury and the wire straightener is removed to prevent bird nesting of the soft aluminum wire. The nylon stripper block provides complete support of the aluminum wire and also has a scraper blade, which picks the wire out of the capstan groove and directs it into the outlet guide.
- 5.4 Refer to section 3.0 for instruction on how to remove the inlet guide and the pressure roller shoe assembly. Unscrew the cam follower bearing on the wire outlet guide (movable portion of the wire straightener). Remove the torch liner set screw on the wire outlet guide block and remove the block. Remove the two mounting screws on the stripper plate assembly and remove the top plate. Unscrew the stripper plate bearing shoulder screw and remove the bearing and lower stripper plate.
- 5.5 Refer to Figure 6 and 7 to select the correct wire drive wheel, inlet guide, scraper plate and pressure roller shoe spring for the desired wire diameter. Install the new drive wheel on the motor drive shaft and reinstall the four mounting screws. Install the spring into the pressure roller assembly. Tilt the pressure shoe assembly with the spring setting against the pressure shoe cavity on the motor mounting block. Compress the spring until the pressure shoe assembly can be lowered into the cavity. Make sure that the pressure shoe guide pin is seated into the groove in the cavity. The pressure shoe should be seated flat against the bottom of the housing.

- 5.6 Slide the stripper block over the torch liner and slide the stripper block into the wire feed block. Align the two holes in the stripper block with the mounting holes and reinstall the two stripper plate screws. Install the torch liner set screw. Reinstall the motor cover plate. Check to make sure that the cover is seated flat against the housing. Install the new wire guide inlet into the wire feed block. Make sure that the curved surface on the inlet guide is pointed towards the capstan drive wheel. Using the wire inch control feed the new filler wire into the capstan and check for proper operation.



Wire Diameter Inch / MM	Capstan Wheel	Inlet Wire Guide	Aluminum Wire Guide	Spring	Torch Liner	Color Code
.030" / .76mm	E2M5583	E2M5622	E2M5636	X2N5013	E7C5003	White
.035" / .89mm	E2M5157	E2M5623	E2M5637	X2N5014	E7C5003	Red
.040" / 1mm	E2M5633	E2M5635	E2M5638	X2N5015	E7C5005	Gold
.045" / 1.14mm	E2M5156	E2M5625	E2M5601	X2N5012	E7C5005	Yellow
.047" / 1.19mm	E2M5156	E2M5625	E2M5601	X2N5012	E7C5005	Yellow
.052" / 1.32mm	E2M5584	E2M5626	E2M5639	X2N5016	E7C5005	Blue
.062" / 1.58mm	E2M5582	E2M5627	E2M5640	X2N5003	E7C5006	Green

Figure 6 – Aluminum Pick-up Block Standard Hand Wire Drive Configuration



Wire Diameter Inch / MM	Capstan Wheel	Inlet Wire Guide	Aluminum Wire Guide	Spring	Torch Liner	Color Code
.030" / .76mm	E2M5583	E2M5622	E2M5636	X2N5013	E7C5003	White
.035" / .89mm	E2M5157	E2M5623	E2M5637	X2N5014	E7C5003	Red
.040" / 1mm	E2M5633	E2M5635	E2M5638	X2N5015	E7C5005	Gold
.045" / 1.14mm	E2M5156	E2M5625	E2M5601	X2N5012	E7C5005	Yellow
.047" / 1.19mm	E2M5156	E2M5625	E2M5601	X2N5012	E7C5005	Yellow
.052" / 1.32mm	E2M5584	E2M5626	E2M5639	X2N5016	E7C5005	Blue
.062" / 1.58mm	E2M5582	E2M5627	E2M5640	X2N5003	E7C5006	Green

Figure 7 – Aluminum Pick-up Block Opposite Hand Wire Drive Configuration

6.0 Aluminum Wire Straightener Installation

- 6.1 When using an aluminum filler wire with the capstan, an Aluminum Wire Straightener Kit specifically made for each size wire must be installed on the capstan. Figure 8 and 9 show all the parts that are included in these kits. The capstan drive is not part of these kits.

Aluminum Wire Straightener Kit

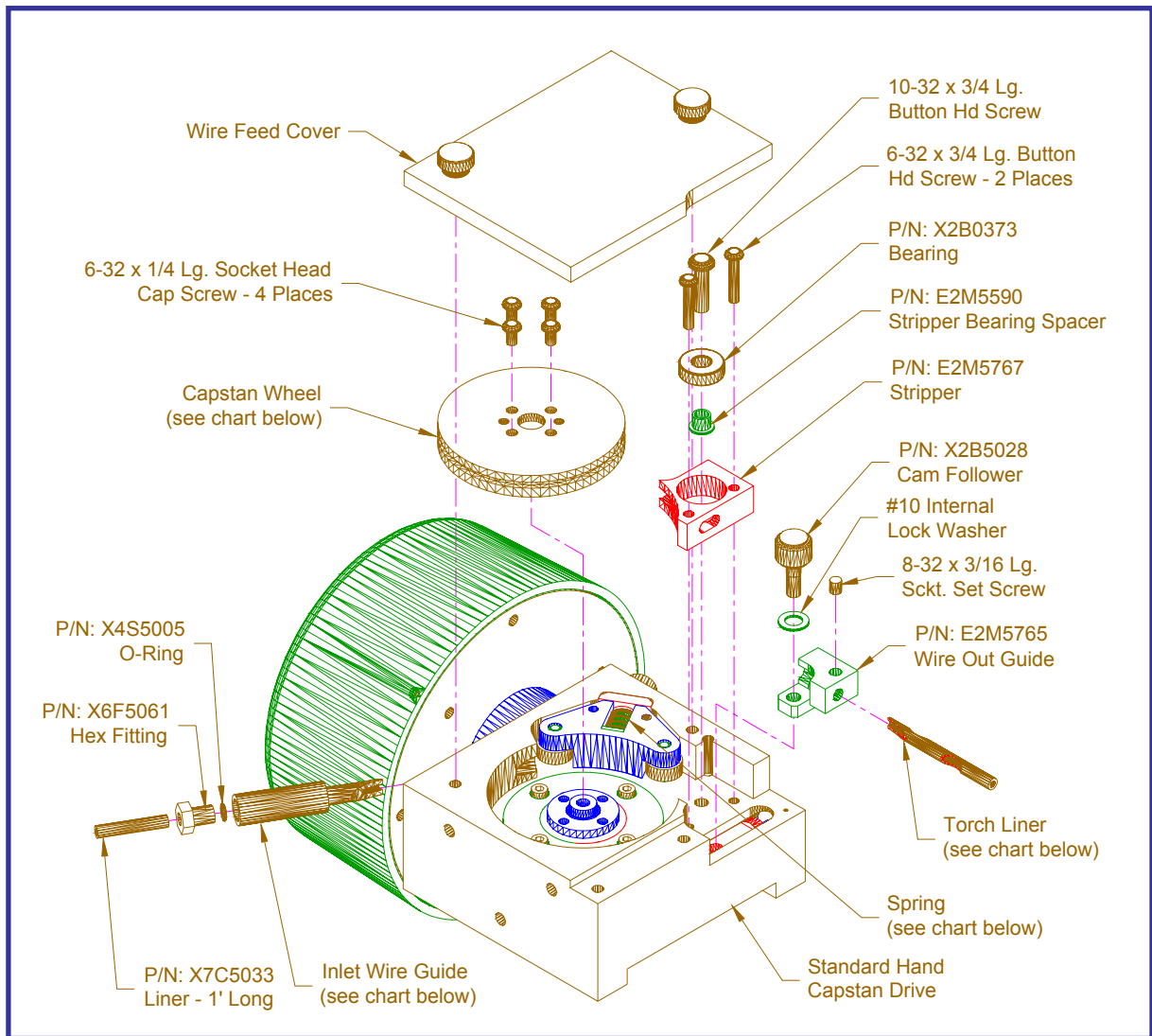
Wire Size Inch / mm	Standard Hand Part No	Opposite Hand Part No
0.030" / 0.76mm	E2A5146	E2A5150
0.035" / 0.89mm	E2A5147	E2A5151
0.040" / 1.0mm	E2A5148	E2A5152
0.045" / 1.14mm	E2A5149	E2A5153
0.047" / 1.19mm	E2A5149	E2A5153

- 6.2 All parts that are wire size specific in these kits are marked with color codes to prevent mixing incompatible parts.

Color Codes for Kit

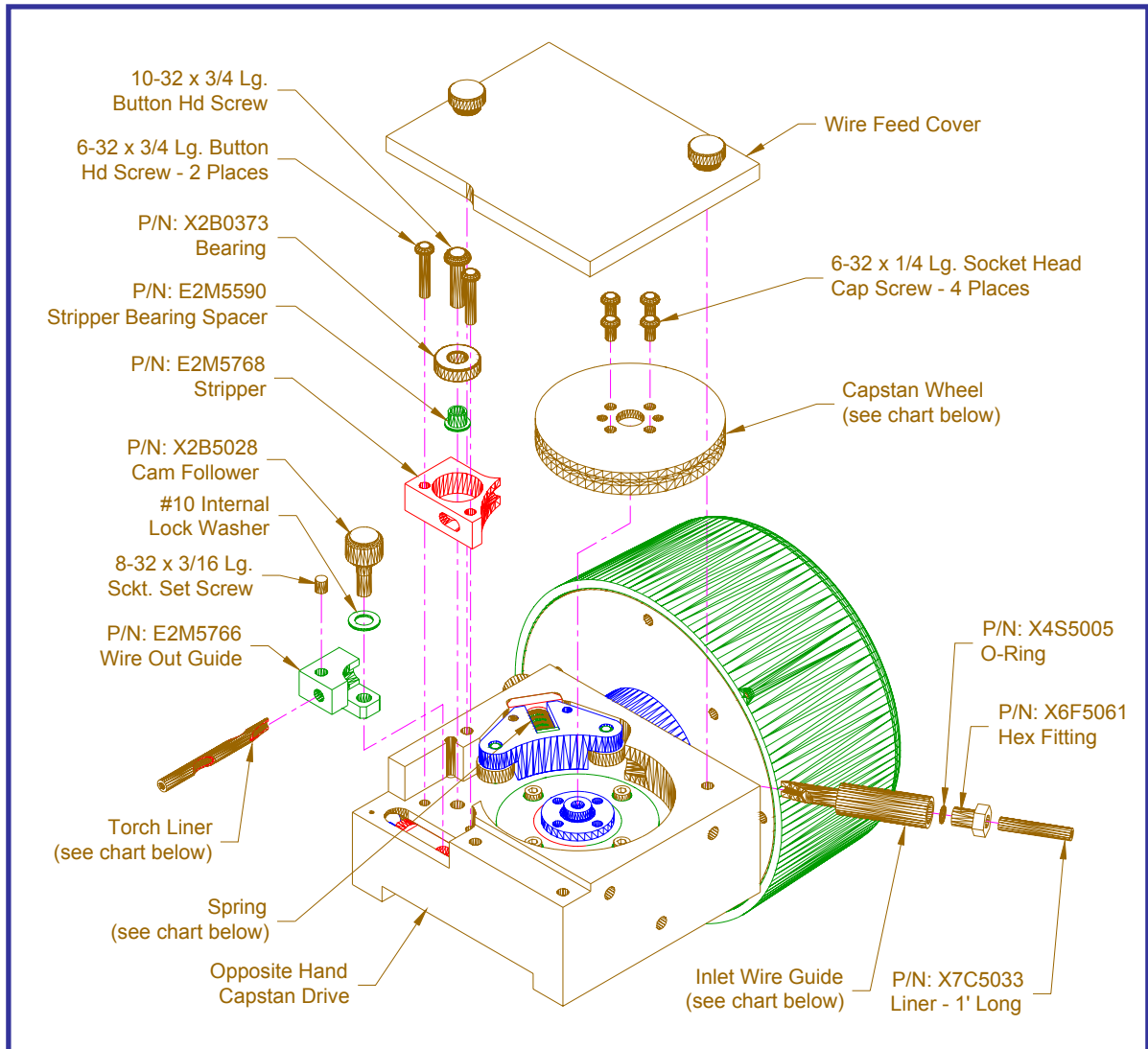
Wire Size Inc / mm	Color Code
0.030" / 0.76mm	White
0.035" / 0.89mm	Red
0.040" / 1.0mm	Gold
0.045" / 1.14mm	Yellow
0.047" / 1.19mm	Yellow
0.052" / 1.32mm	Blue
0.062" / 1.58mm	Green

- 6.3 Installation of the torch liner into the aluminum wire straightener is critical as it is most important to provide support for the aluminum filler wire for the entire length of the travel, from the capstan wheel to the torch contact tip, without restricting the wire movement. Commence the installation by removing the shielding gas nozzle, contact tip and gas diffuser from the welding torch and remove the torch from the Capstan Wire Drive assembly. Proceed by removing the bearing from the stripper block and the cam follower from the wire outlet guide. Loosen the setscrew, located in the wire guide outlet, and remove the existing torch liner from the assembly. Insert the new torch liner into the openings in the stripper block and outlet guide making certain that the tab on the torch liner is seated in the groove in the capstan wheel. Replace the bearing and cam follower in the stripper block and wire outlet guide respectively. Align the notches in the torch liner, making sure that the tab on the torch liner is still seated in the capstan wheel groove, with the reinstalled bearing and cam follower and secure the new torch liner in place using the set screw in the wire guide outlet. Insert the torch liner into the welding torch and remount the torch to the wire feeder in a secure manner. Using a razor blade knife, or other similarly sharp instrument, trim the torch liner to a length that allows an extension of 1/4" beyond the end of the threaded brass member to which the gas diffuser screws on. Please note that use of a tool such as side cutters to trim the torch liner has a tendency of distorting the liner, impeding the free movement of the filler wire, and causing wire feed problems while welding. Complete the installation by reinstalling the gas diffuser, contact tip and shielding gas nozzle.



Wire Diameter Inch / MM	Capstan Wheel	Inlet Wire Guide	Spring	Torch Liner	Color Code
.030" / .76mm	E2M5583	E2M5622	X2N5013	E2M5778	White
.035" / .89mm	E2M5157	E2M5623	X2N5014	E2M5794	Red
.040" / 1mm	E2M5633	E2M5635	X2N5015	E2M5795	Gold
.045" / 1.14mm	E2M5156	E2M5625	X2N5012	E2M5770	Yellow
.047" / 1.19mm	E2M5156	E2M5625	X2N5012	E2M5770	Yellow
.052" / 1.32mm	E2M5584	E2M5626	X2N5016	E2M5796	Blue

Figure 8 – Aluminum Wire Straightener Standard Hand Wire Drive Configuration



Wire Diameter Inch / MM	Capstan Wheel	Inlet Wire Guide	Spring	Torch Liner	Color Code
.030" / .76mm	E2M5583	E2M5622	X2N5013	E2M5778	White
.035" / .89mm	E2M5157	E2M5623	X2N5014	E2M5794	Red
.040" / 1mm	E2M5633	E2M5635	X2N5015	E2M5795	Gold
.045" / 1.14mm	E2M5156	E2M5625	X2N5012	E2M5770	Yellow
.047" / 1.19mm	E2M5156	E2M5625	X2N5012	E2M5770	Yellow
.052" / 1.32mm	E2M5584	E2M5626	X2N5016	E2M5796	Blue

Figure 9 – Aluminum Wire Straightener Opposite Hand Wire Drive Configuration

7.0 Installation for WIA CDT-450 Synergic Power Supply

- 7.1 To install the WF-100 with a CDT-450 synergic power supply, disconnect and remove the wire feed control cable from the existing CDT wire feeder. Slide a 6-inch piece of 1-inch shrink tubing over the control cable. Mount the WF-100 to the fixture or Robot wrist (Refer to section 2.0 for mounting details). Remove the two pin connector on the WF-100 motor and install two .25 quick connect male terminals on the RED and Black motor wires. Route the CDT wire feed control cable to the WF-100 wire feeder.
- 7.2 Connect the RED WF-100 motor wire to the RED wire from the CDT control cable. Connect the BLACK WF-100 motor wire to the RED/BLACK wire from the CDT control cable. Using a suitable length of 18-awg wire with a .25 quick connect terminal on one end. Connect the wire to the WHITE wire from the CDT control cable and connect the other end to the welding torch using a suitable connector. Using electrical tape, tape up the cable connections. Slide the piece of shrink tubing over the cable connections and shrink the tube over the cable.
- 7.3 If the CDT has a robotic interface installed no further connections are required / proceed to section 7.4. Remove the shell from the wire feed control cable and disconnect the GREEN (PIN 1) and GREEN/YELLOW (PIN 3) wire from the connector. Install a 2 conductor 16 awg cable through the connect shell and connect one wire to PIN 1 and connect the other wire to PIN 3. Reinstall the connector shell. Connect the other end of the two-conductor cable to the WELD ON switch or relay contact on the fixture or robotic controller.
- 7.4 Refer to the CDT operation manual and perform the wire feed control board calibration routine. Set the WF-100 drive wheel RPM to 79 rpm.

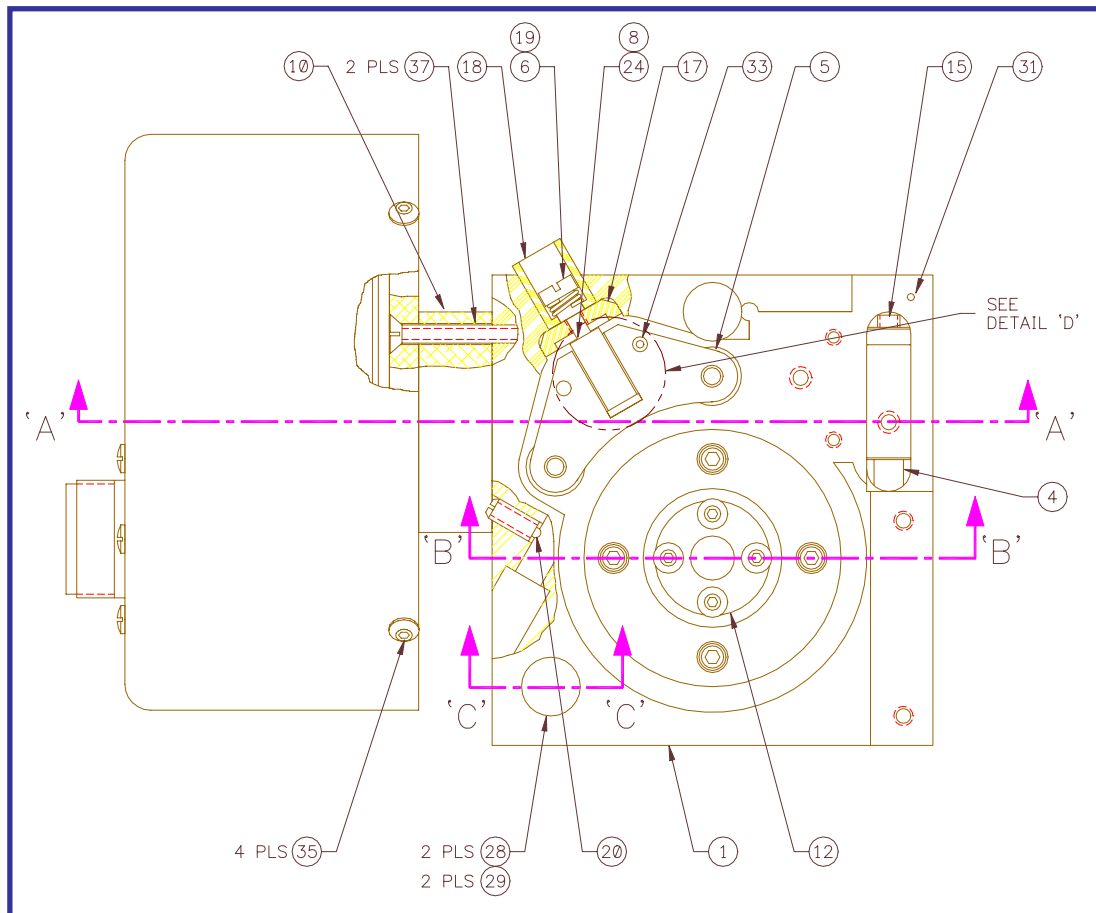
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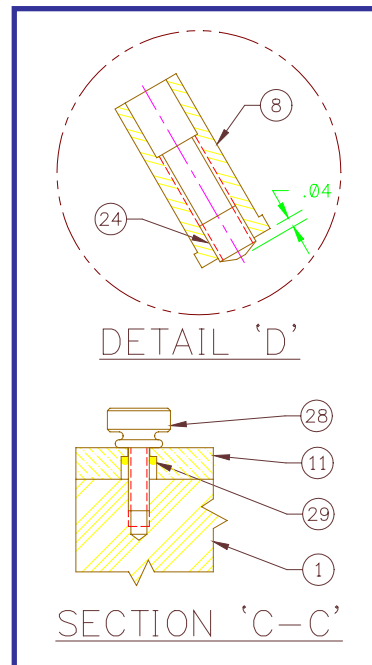
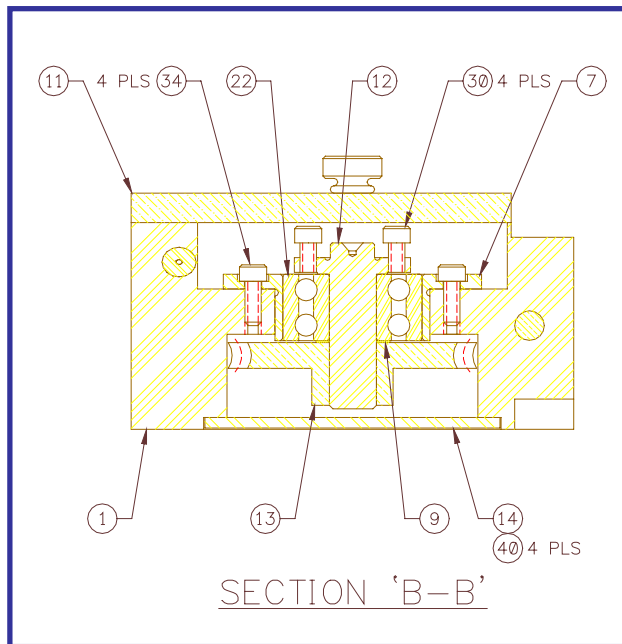
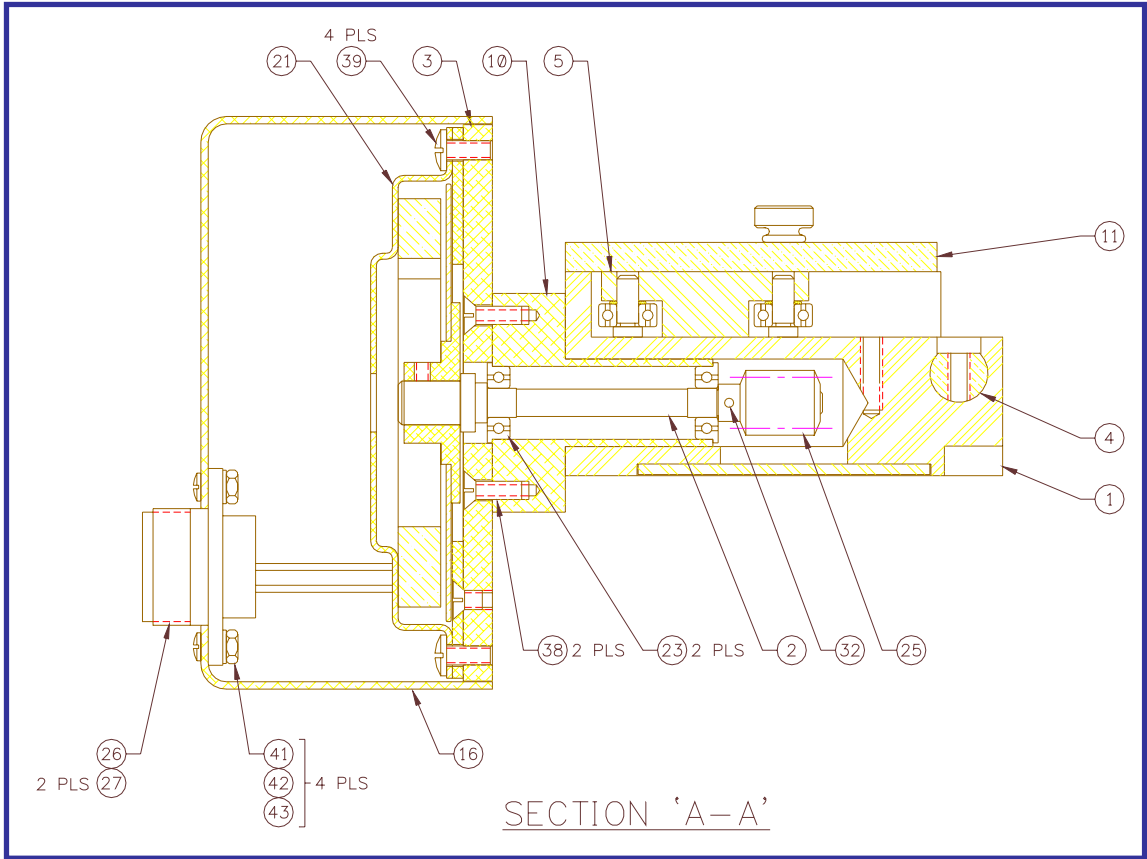
APPENDIX A WF-100 REPLACEMENT PARTS

The Capstan Wire Drive can be purchased in various configurations as follows:

Motor Size	Speed	Feed Direction	PLL Controlled	Part No
9cm	Standard	Standard Hand	No	E2A5099
9cm	Standard	Opposite Hand	No	E2A5115
9cm	Slow	Standard Hand	No	E2A5112
9cm	Slow	Opposite Hand	No	E2A5181
9cm	Standard	Standard Hand	Yes	E2A5100
9cm	Standard	Opposite Hand	Yes	E2A5116
9cm	Slow	Standard Hand	Yes	E2A5113
12cm	Standard	Standard Hand	No	E2A5106

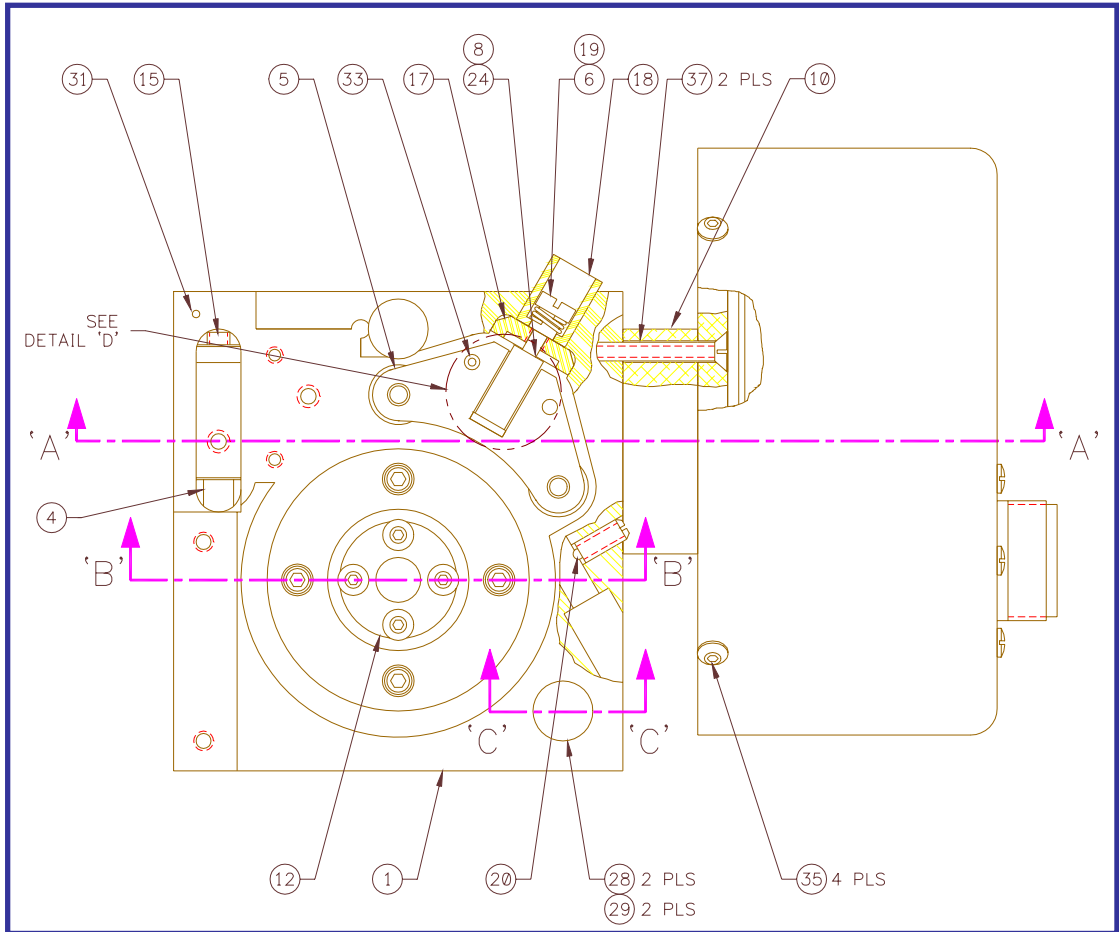
A1 Replacement Parts for Capstan P/N: E2A5099

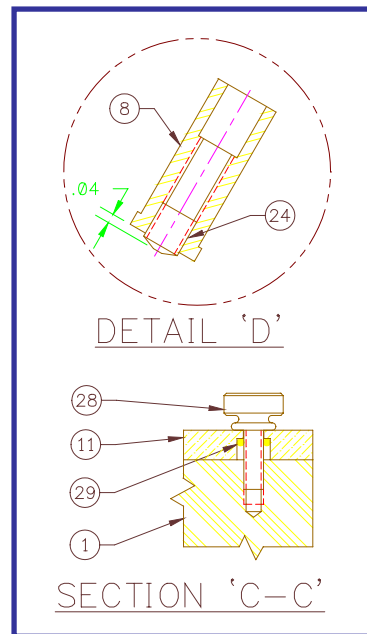
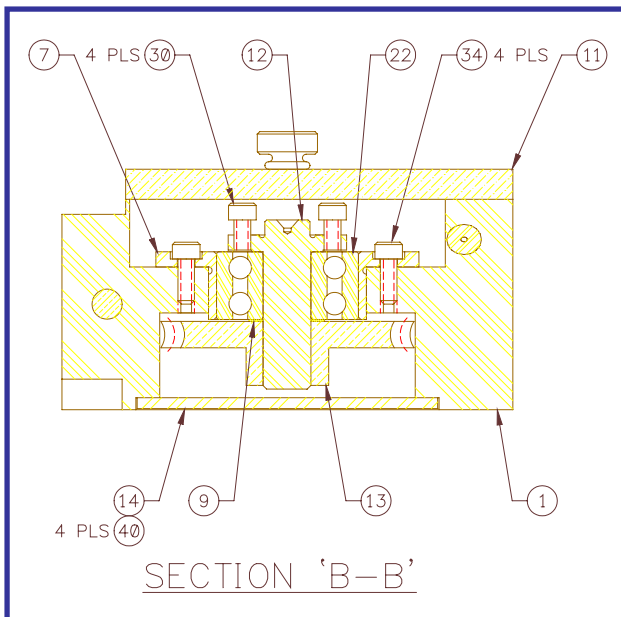
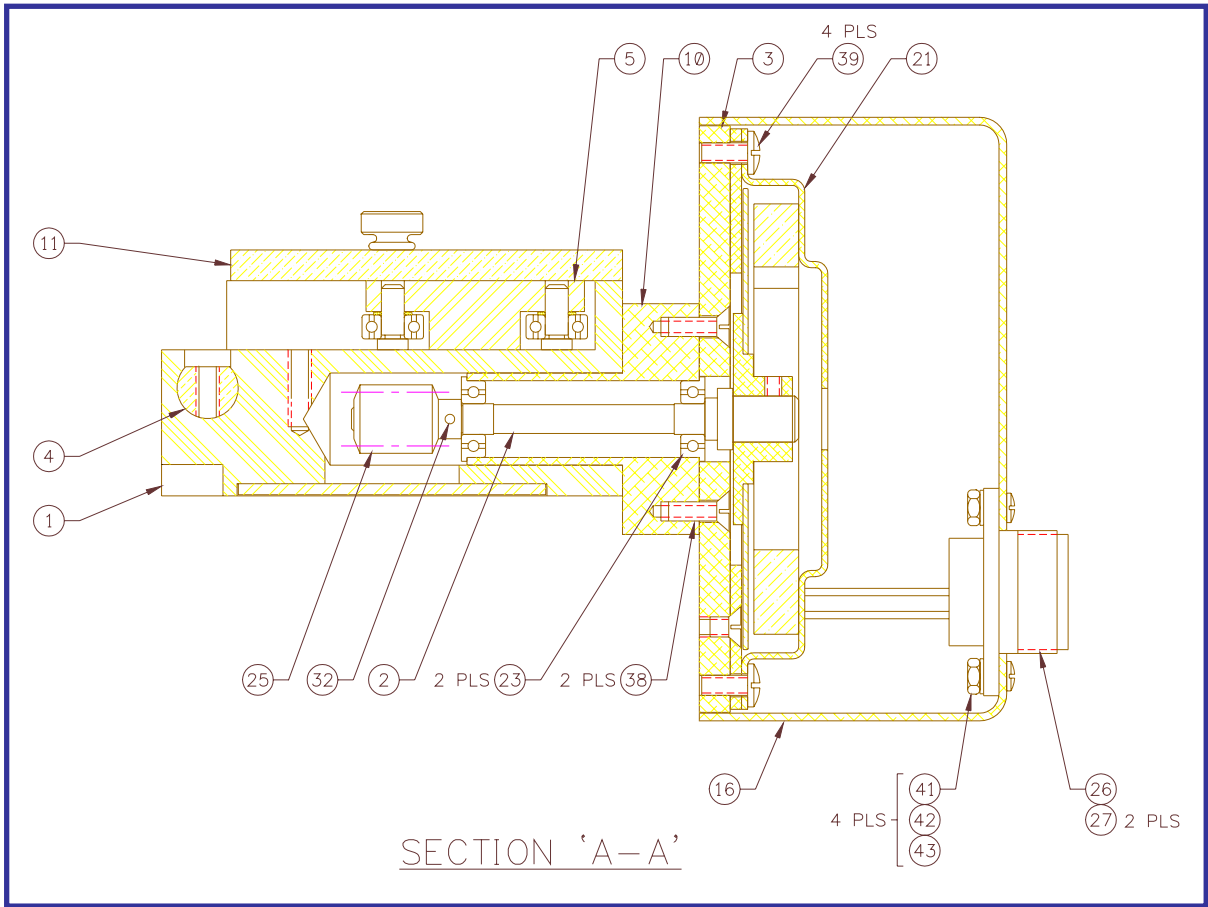




ITEM	QTY.	PART NO.	DESCRIPTION
1	1	E2M5597	WIRE FEEDER BLOCK
2	1	E2M5586	9 CM MOTOR WORM SHAFT
3	1	E2M5589	9 CM MOTOR PLATE
4	1	E2M5151	SLIDE BLOCK
5	1	E2A5129	PRESSURE ROLLER SHOE ASSEMBLY
6	1	E2M5750	CAPSTAN SCREW
7	1	E2M5162	BEARING SLEEVE
8	1	E2M5751	CAPSTAN SPRING HOLDER
9	1	E2M5520	BEARING SPACER
10	1	E2M5588	9 CM MOTOR BEARING CARTRIDGE
11	1	E2M5591	WIRE FEEDER COVER
12	1	E2M5608	DRIVEN SHAFT
13	1	E2M5596	MODIFIED WORM GEAR
14	1	E2M5610	GEAR COVER
15	1	E2M5611	KNOB SHAFT
16	1	E2M5614	9 CM MOTOR COVER
17	1	E2M5752	CAPSTAN SPRING GUIDE
18	1	E2M5753	CAPSTAN SPRING INSERT
19	1	X2N5019	SPRING
20	1	X6B5083	PLUNGER
21	1	X3M5024	MOTOR
22	1	E2B5001	BEARING
23	2	X2B0371	BEARING
24	1		#8-32 x 3/16" LG SOCKET SET SCREW
25	1	X2G5020	SINGLE THREAD WORM
26	1	X3P5144	9 CIRCUIT CPC CONNECTOR
27	2	X3P0300	CPC PIN
28	2	X6B5086	FINGER SCREW
29	2	X4S5005	O-RING
30	4		#6-32 x 1/4" LG BLK ALY SKT CAP HD SCREW
31	1		1/16" DIA x 3/4" LG BLK ALY ROLL PIN
32	1		5/64" DIA x 5/16" LG BLK ALY ROLL PIN
33	1		1/8" DIA x 5/8" LG BLK ALY ROLL PIN
34	4		#6-32 x 3/8" LG BLK ALY SKT CAP HD SCREW
35	4		#6-32 x 1/4" LG BLK ALY BUTTON HD SCREW
36	2		#6-32 x 3/4" LG BLK ALY BUTTON HD SCREW
37	2		#8-32 x 1-1/4" LG BLK ALY FLAT HD SCREW
38	2		#8-32 x 1/2" LG BLK ALY FLAT HD SCREW
39	4		#8-32 x 3/8" LG BLK ALY BINDER SCREW
40	4		#6-32 x 1/4" LG BLK ALY FLAT HD SCREW
41	4		#4-40 x 3/8" LG BLK ALY BINDER HD SCREW
42	4		#4-40 BLK ALY HEX NUT
43	4		#4 BLK ALY INTERNAL LOCK WASHER

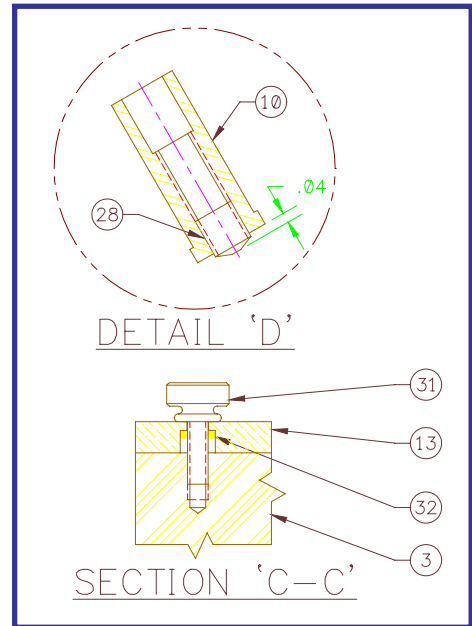
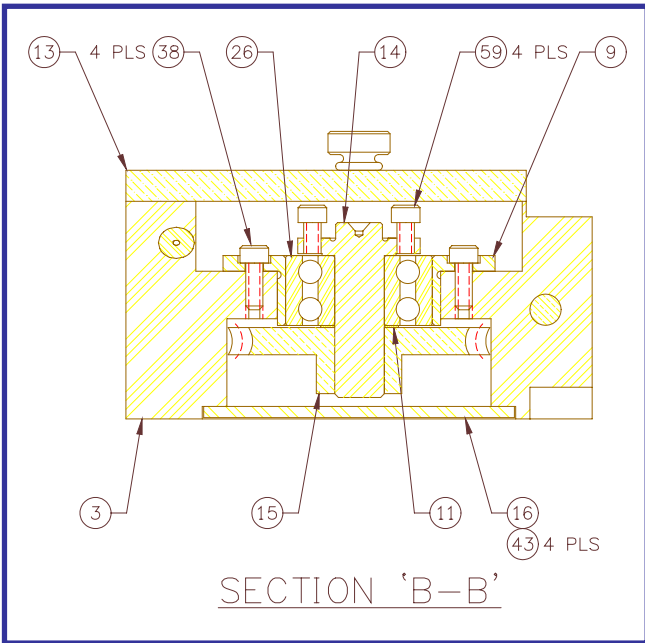
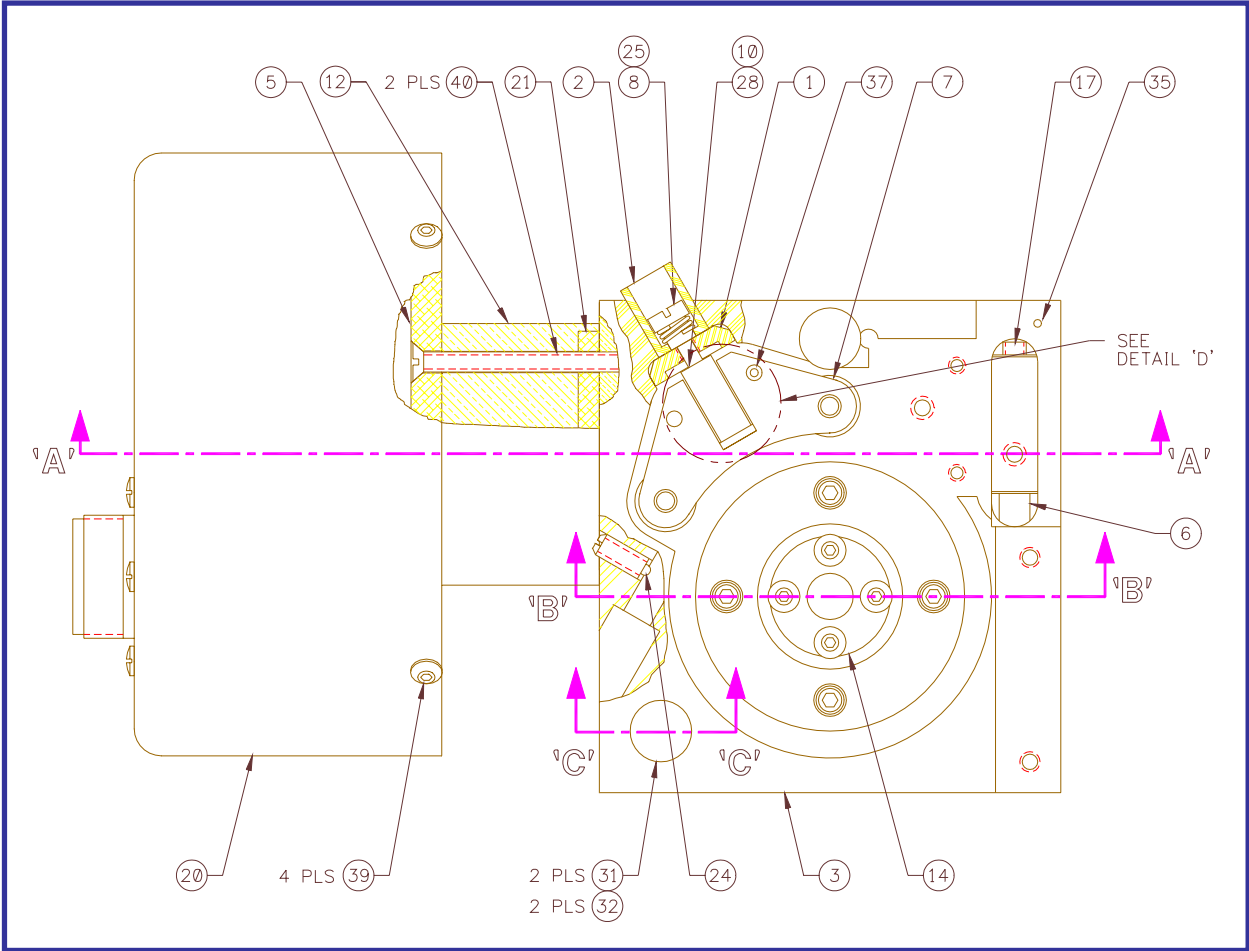
A2 Replacement Parts for Capstan P/N: E2A5115

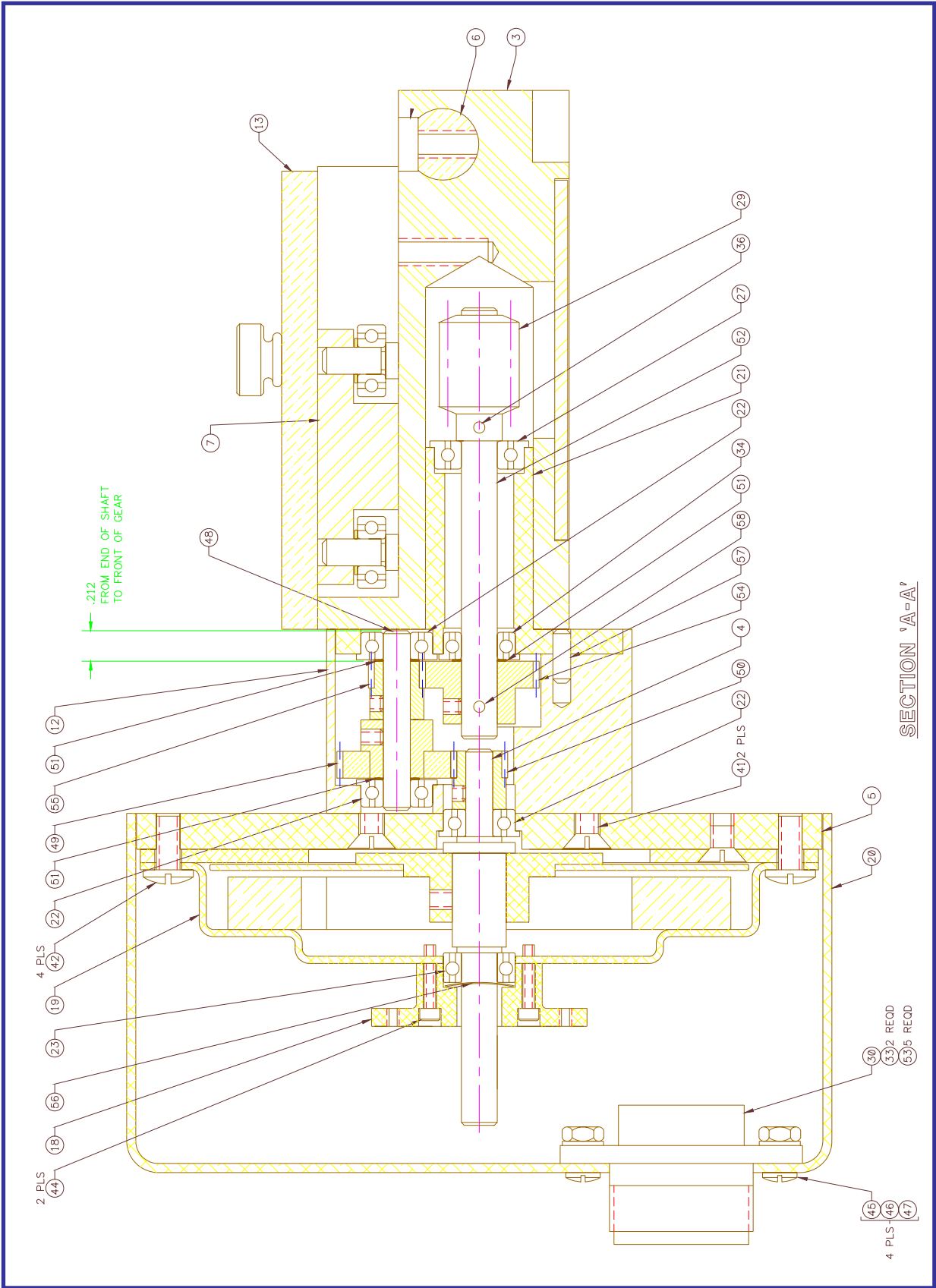




ITEM	QTY.	PART NO.	DESCRIPTION
1	1	E2M5684	WIRE FEEDER BLOCK
2	1	E2M5586	9 CM MOTOR WORM SHAFT
3	1	E2M5589	9 CM MOTOR PLATE
4	1	E2M5151	SLIDE BLOCK
5	1	E2A5129	PRESSURE ROLLER SHOE ASSEMBLY
6	1	E2M5750	CAPSTAN SCREW
7	1	E2M5162	BEARING SLEEVE
8	1	E2M5751	CAPSTAN SPRING HOLDER
9	1	E2M5520	BEARING SPACER
10	1	E2M5588	9 CM MOTOR BEARING CARTRIDGE
11	1	E2M5683	WIRE FEEDER COVER
12	1	E2M5608	DRIVEN SHAFT
13	1	E2M5596	MODIFIED WORM GEAR
14	1	E2M5610	GEAR COVER
15	1	E2M5611	KNOB SHAFT
16	1	E2M5614	9 CM MOTOR COVER
17	1	E2M5752	CAPSTAN SPRING GUIDE
18	1	E2M5753	CAPSTAN SPRING INSERT
19	1	X2N5019	SPRING
20	1	X6B5083	PLUNGER
21	1	X3M5024	MOTOR
22	1	E2B5001	BEARING
23	2	X2B0371	BEARING
24	1		#8-32 x 3/16" LG SOCKET SET SCREW
25	1	X2G5020	SINGLE THREAD WORM
26	1	X3P5144	9 CIRCUIT CPC CONNECTOR
27	2	X3P0300	CPC PIN
28	2	X6B5086	FINGER SCREW
29	2	X4S5005	O-RING
30	4		#6-32 x 1/4" LG BLK ALY SKT CAP HD SCREW
31	1		1/16" DIA x 3/4" LG BLK ALY ROLL PIN
32	1		5/64" DIA x 5/16" LG BLK ALY ROLL PIN
33	1		1/8" DIA x 5/8" LG BLK ALY ROLL PIN
34	4		#6-32 x 3/8" LG BLK ALY SKT CAP HD SCREW
35	4		#6-32 x 1/4" LG BLK ALY BUTTON HD SCREW
36	2		#6-32 x 3/4" LG BLK ALY BUTTON HD SCREW
37	2		#8-32 x 1-1/4" LG BLK ALY FLAT HD SCREW
38	2		#8-32 x 1/2" LG BLK ALY FLAT HD SCREW
39	4		#8-32 x 3/8" LG BLK ALY BINDER SCREW
40	4		#6-32 x 1/4" LG BLK ALY FLAT HD SCREW
41	4		#4-40 x 3/8" LG BLK ALY BINDER HD SCREW
42	4		#4-40 BLK ALY HEX NUT
43	4		#4 BLK ALY INTERNAL LOCK WASHER

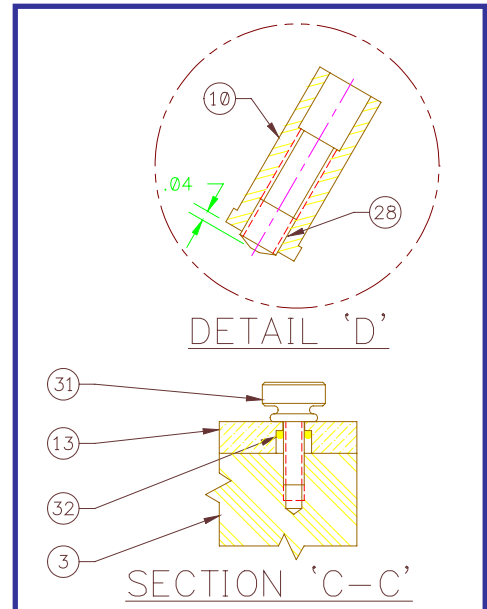
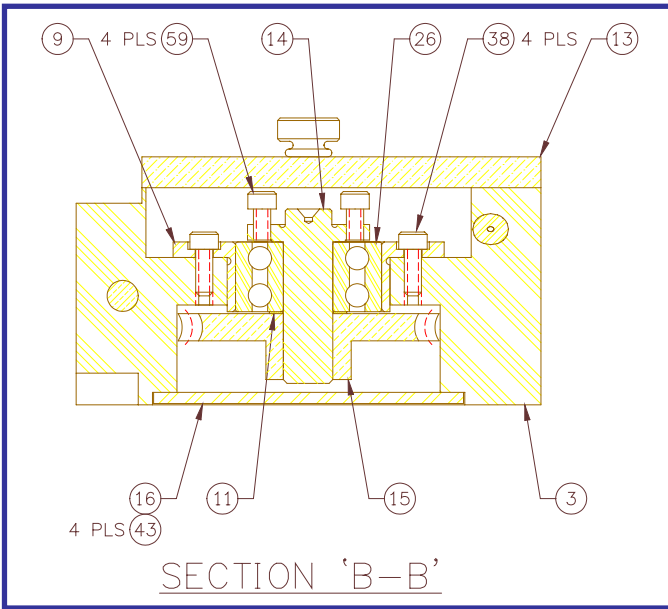
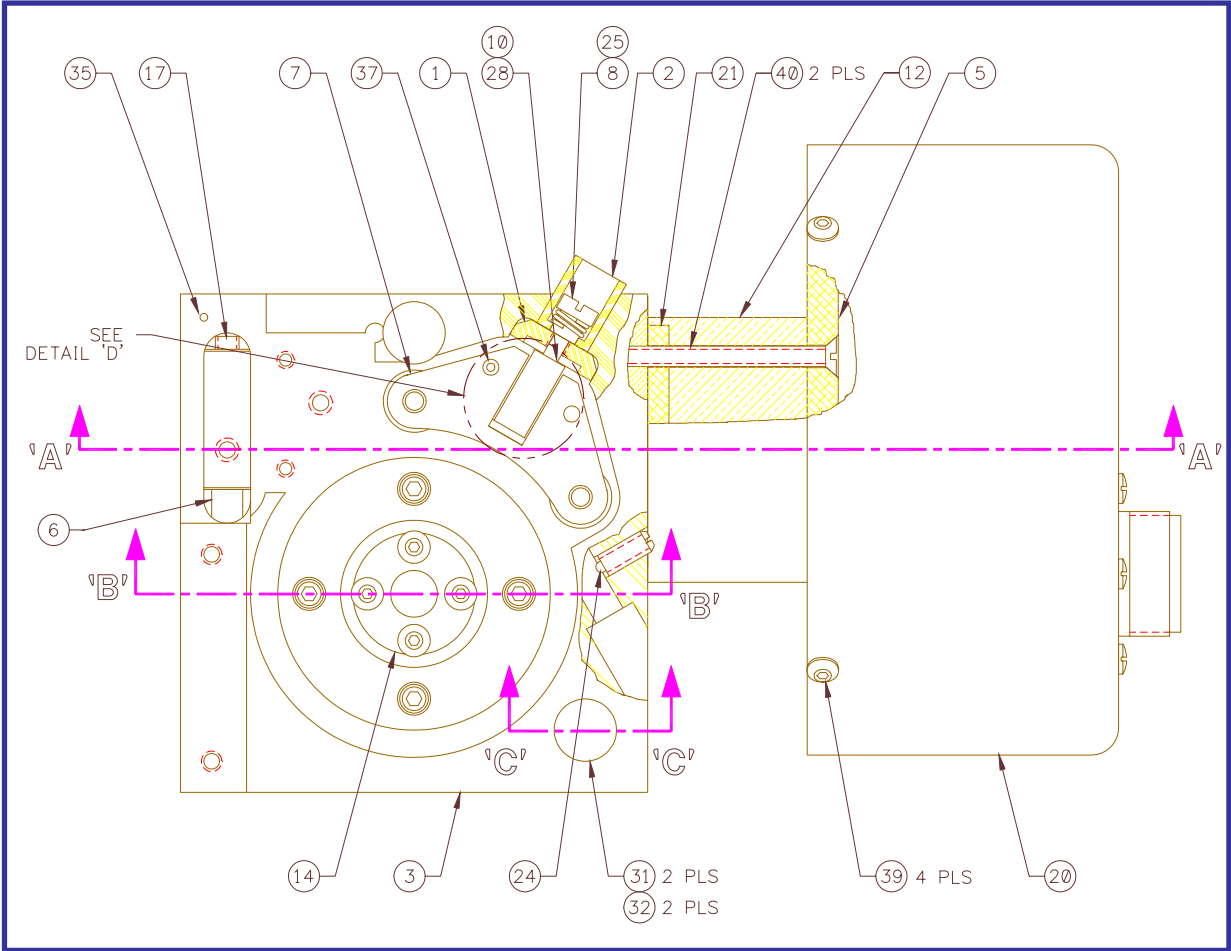
A3 Replacement Parts for Capstan P/N: E2A5112

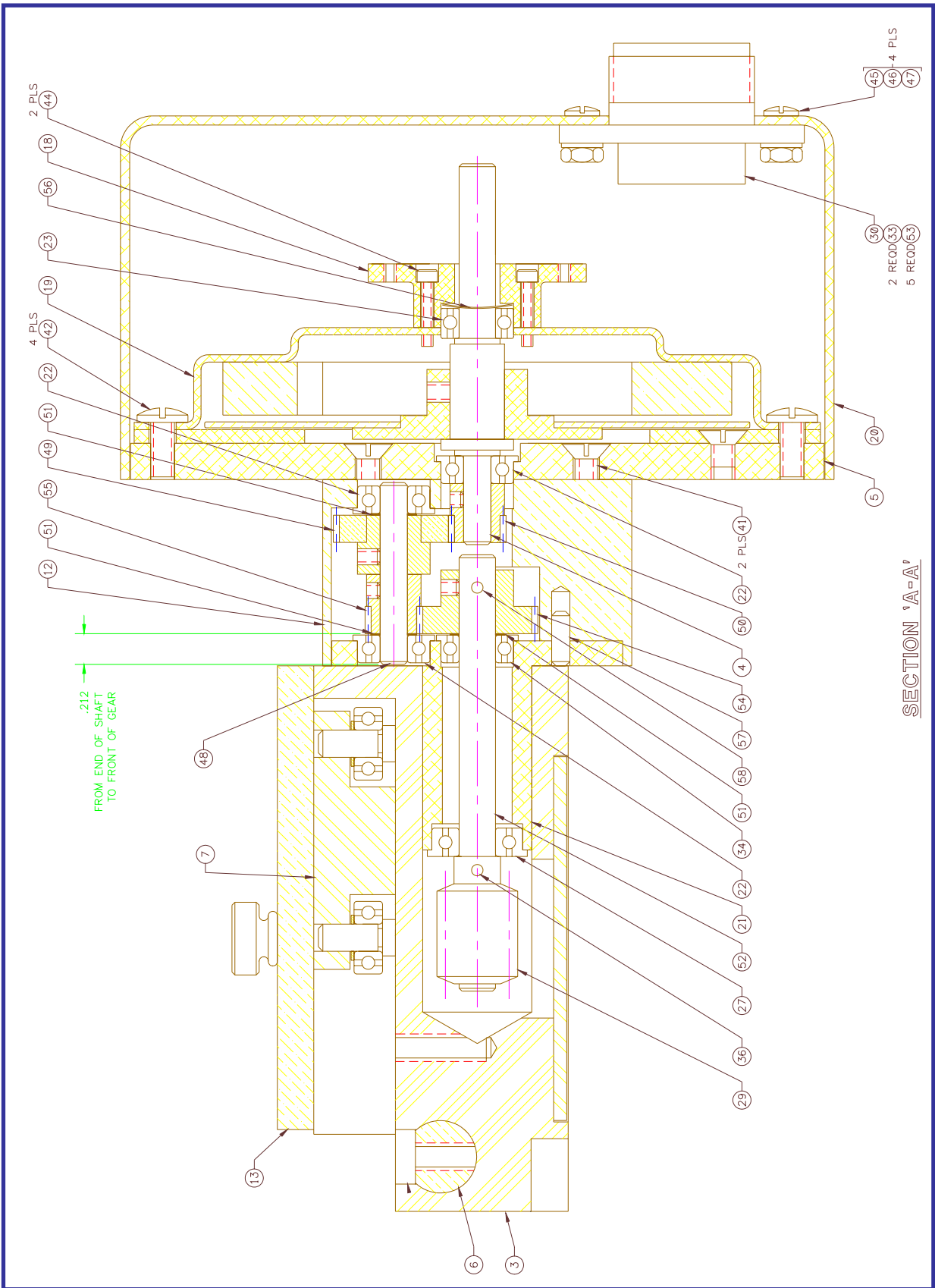




ITEM	QTY.	PART NO.	DESCRIPTION
1	1	E2M5752	CAPSTAN SPRING GUIDE
2	1	E2M5753	CAPSTAN SPRING INSERT
3	1	E2M5597	WIRE FEEDER BLOCK
4	1	E2M5698	5:1 PLL MOTOR SHAFT
5	1	E2M5695	5:1 MOTOR PLATE
6	1	E2M5151	SLIDE BLOCK
7	1	E2A5129	PRESSURE ROLLER SHOE ASSEMBLY
8	1	E2M5750	CAPSTAN SCREW
9	1	E2M5162	BEARING SLEEVE
10	1	E2M5751	CAPSTAN SPRING HOLDER
11	1	E2M5520	BEARING SPACER
12	1	E2M5697	5:1 HOUSING
13	1	E2M5591	WIRE FEEDER COVER
14	1	E2M5608	DRIVEN SHAFT
15	1	E2M5596	MODIFIED WORM GEAR
16	1	E2M5610	GEAR COVER
17	1	E2M5611	KNOB SHAFT
18	1	E2M5694	5:1 ENCODER MOUNT
19	1	E2M5612	WF-100PLL MODIFIED 9FP MOTOR
20	1	E2M5614	9 CM MOTOR COVER
21	1	E2M5696	BEARING CARTRIDGE
22	3	X2B5045	BEARING
23	1	X2B5044	BEARING
24	1	X6B5083	PLUNGER
25	1	X2N5019	SPRING
26	1	E2B5001	BEARING
27	1	X2B0371	BEARING
28	1		#8-32 x 3/16" LG SOCKET SET SCREW
29	1	X2G5023	SINGLE THREAD WORM
30	1	X3P5144	9 CIRCUIT CPC CONNECTOR
31	2	X6B5086	FINGER SCREW
32	2	X4S5005	O-RING
33	2	X3P0300	CPC PIN
34	1	X2B0370	BEARING
35	1		1/16" DIA x 3/4" LG BLK ALY ROLL PIN
36	1		3/16" DIA x 5/16" BLK ALY ROLL PIN
37	1		1/8" DIA x 5/8" LG BLK ALY ROLL PIN
38	4		#6-32 x 3/8" LG BLK ALY SKT CAP HD SCREW
39	4		#6-32 x 1/4" LG BLK ALY BUTTON HD SCREW
40	2		#8-32 x 1-1/4" LG BLK ALY SKT FLAT HD SCREW
41	2		#8-32 x 1/2" LG BLK ALY SKT FLAT HD SCREW
42	4		#8-32 x 3/8" LG BLK ALY BINDER SCREW
43	4		#6-32 x 1/4" LG BLK ALY FLAT HD SCREW
44	2		#2-56 x 7/16" LG BLK ALY SKT CAP HD SCREW
45	4		#4-40 x 3/8" LG BLK ALY BINDER HD SCREW
46	4		#4-40 BLK ALY HEX NUT
47	4		#4 BLK ALY INTERNAL LOCK WASHER
48	1		3/16" DIA x 1-1/4" LG SHAFT
49	1		38T DELRIN GEAR
50	1		17T ALUMINUM GEAR
51	3		SHIM
52	1		1/4" DIA x 2-7/8" LG SHAFT
53	5		CABLE TIE
54	1		38T SS GEAR
55	1		17T SS GEAR
56	1		CURVED SPRING
57	1		0.125" DIA x 3/8" POWEL PIN
58	1		3/32" DIA x 1/2" LG BLK ALY ROLL PIN
59	4		#6-32 x 1/4" LG BLK ALY SKT CAP HD SCREW

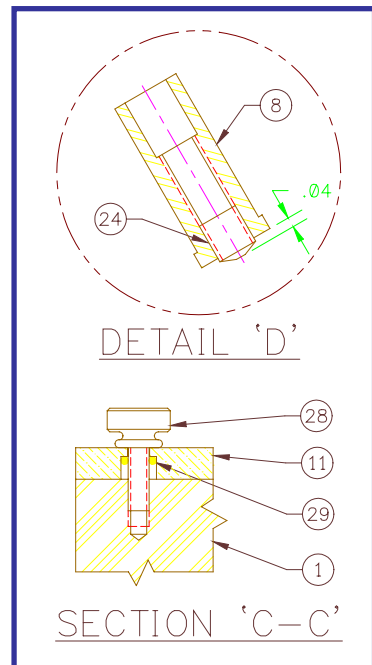
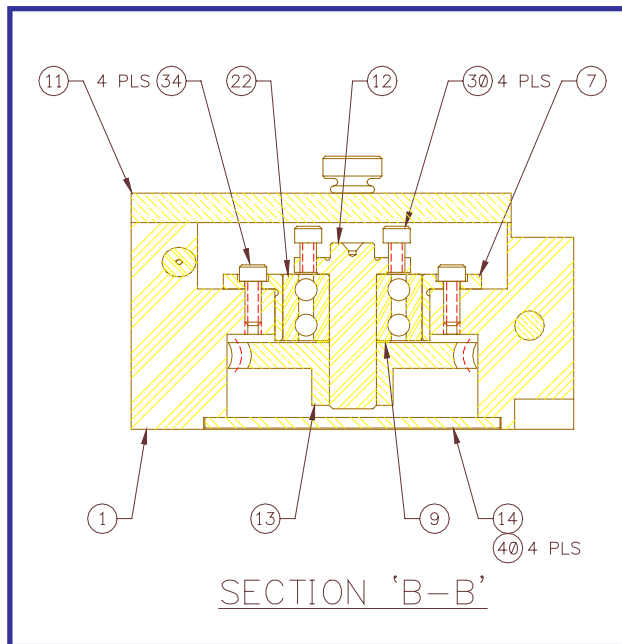
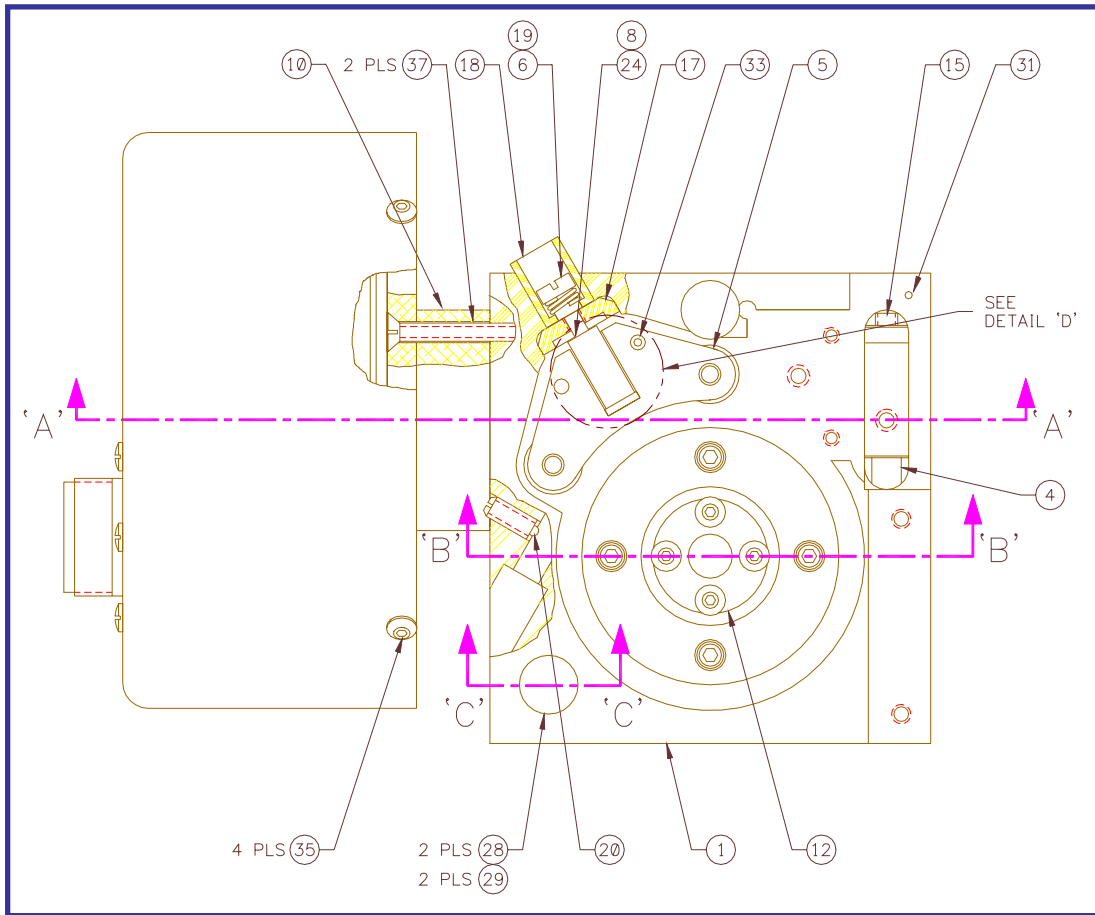
A4 Replacement Parts for Capstan P/N: E2A5181

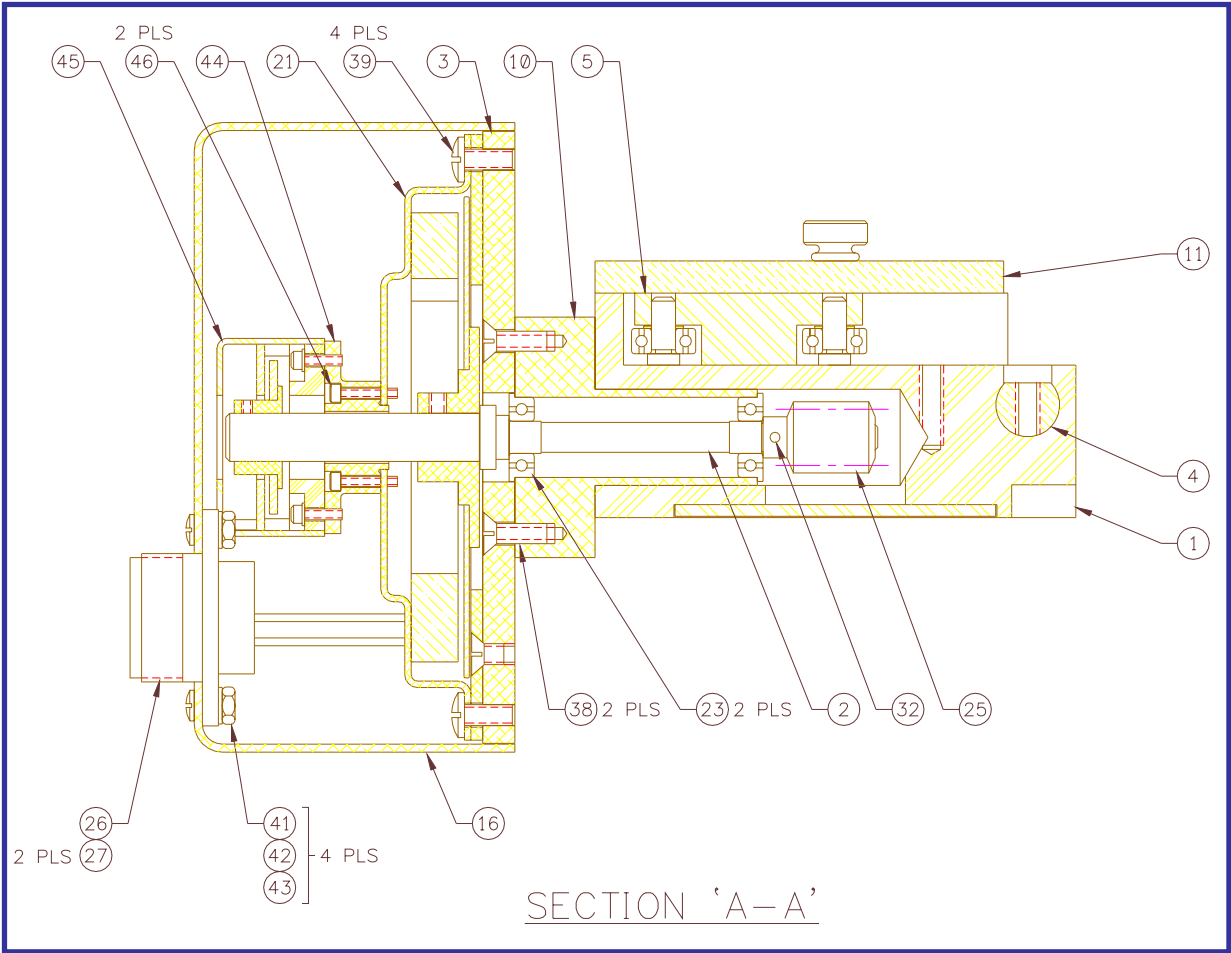




ITEM	QTY.	PART NO.	DESCRIPTION
1	1	E2M5752	CAPSTAN SPRING GUIDE
2	1	E2M5753	CAPSTAN SPRING INSERT
3	1	E2M5684	WIRE FEEDER BLOCK
4	1	E2M5698	5:1 PLL MOTOR SHAFT
5	1	E2M5695	5:1 MOTOR PLATE
6	1	E2M5151	SLIDE BLOCK
7	1	E2A5129	PRESSURE ROLLER SHOE ASSEMBLY
8	1	E2M5750	CAPSTAN SCREW
9	1	E2M5162	BEARING SLEEVE
10	1	E2M5751	CAPSTAN SPRING HOLDER
11	1	E2M5520	BEARING SPACER
12	1	E2M5697	5:1 HOUSING
13	1	E2M5683	WIRE FEEDER COVER
14	1	E2M5608	DRIVEN SHAFT
15	1	E2M5596	MODIFIED WORM GEAR
16	1	E2M5610	GEAR COVER
17	1	E2M5611	KNOB SHAFT
18	1	E2M5694	5:1 ENCODER MOUNT
19	1	E2M5612	WF-100PLL MODIFIED 9FP MOTOR
20	1	E2M5614	9 CM MOTOR COVER
21	1	E2M5696	BEARING CARTRIDGE
22	3	X2B5045	BEARING
23	1	X2B5044	BEARING
24	1	X6B5083	PLUNGER
25	1	X2N5019	SPRING
26	1	E2B5001	BEARING
27	1	X2B0371	BEARING
28	1		#8-32 x 3/16" LG SOCKET SET SCREW
29	1	X2G5023	SINGLE THREAD WORM
30	1	X3P5144	9 CIRCUIT CPC CONNECTOR
31	2	X6B5086	FINGER SCREW
32	2	X4S5005	O-RING
33	2	X3P0300	CPC PIN
34	1	X2B0370	BEARING
35	1		1/16" DIA x 3/4" LG BLK ALY ROLL PIN
36	1		3/16" DIA x 5/16" BLK ALY ROLL PIN
37	1		1/8" DIA x 5/8" LG BLK ALY ROLL PIN
38	4		#6-32 x 3/8" LG BLK ALY SKT CAP HD SCREW
39	4		#6-32 x 1/4" LG BLK ALY BUTTON HD SCREW
40	2		#8-32 x 1-1/4" LG BLK ALY SKT FLAT HD SCREW
41	2		#8-32 x 1/2" LG BLK ALY SKT FLAT HD SCREW
42	4		#8-32 x 3/8" LG BLK ALY BINDER SCREW
43	4		#6-32 x 1/4" LG BLK ALY FLAT HD SCREW
44	2		#2-56 x 7/16" LG BLK ALY SKT CAP HD SCREW
45	4		#4-40 x 3/8" LG BLK ALY BINDER HD SCREW
46	4		#4-40 BLK ALY HEX NUT
47	4		#4 BLK ALY INTERNAL LOCK WASHER
48	1		3/16" DIA x 1-1/4" LG SHAFT
49	1		38T DELRIN GEAR
50	1		17T ALUMINUM GEAR
51	3		SHIM
52	1		1/4" DIA x 2-7/8" LG SHAFT
53	5		CABLE TIE
54	1		38T SS GEAR
55	1		17T SS GEAR
56	1		CURVED SPRING
57	1		0.125" DIA x 3/8" POWEL PIN
58	1		3/32" DIA x 1/2" LG BLK ALY ROLL PIN
59	4		#6-32 x 1/4" LG BLK ALY SKT CAP HD SCREW

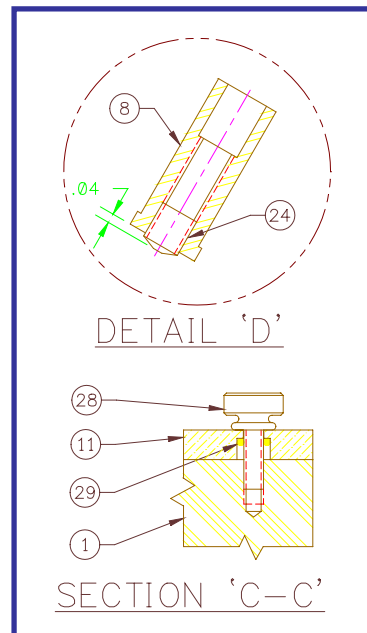
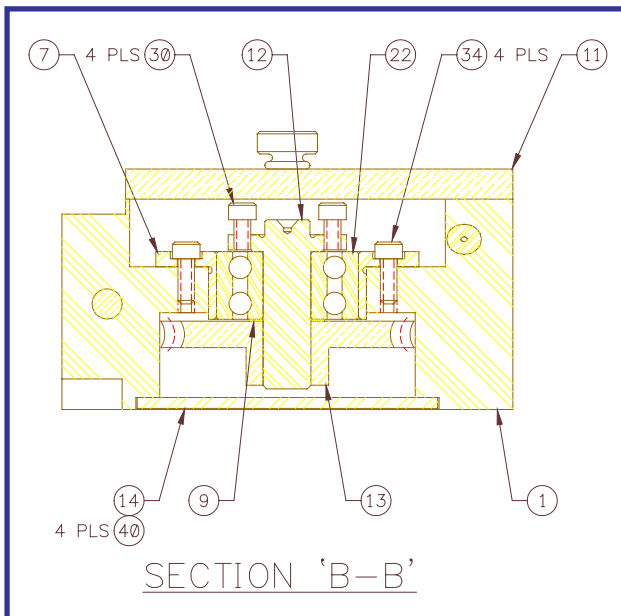
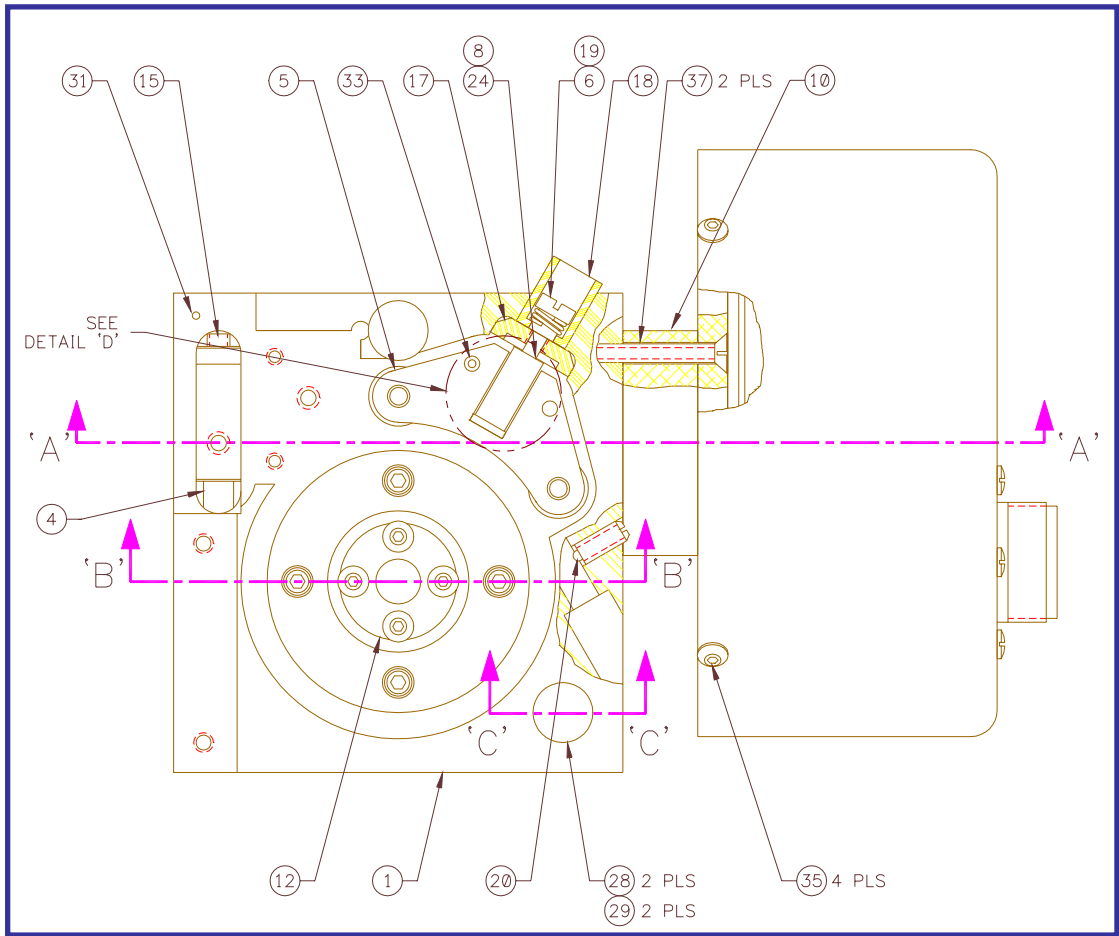
A5 Replacement Parts for Capstan P/N: E2A5100

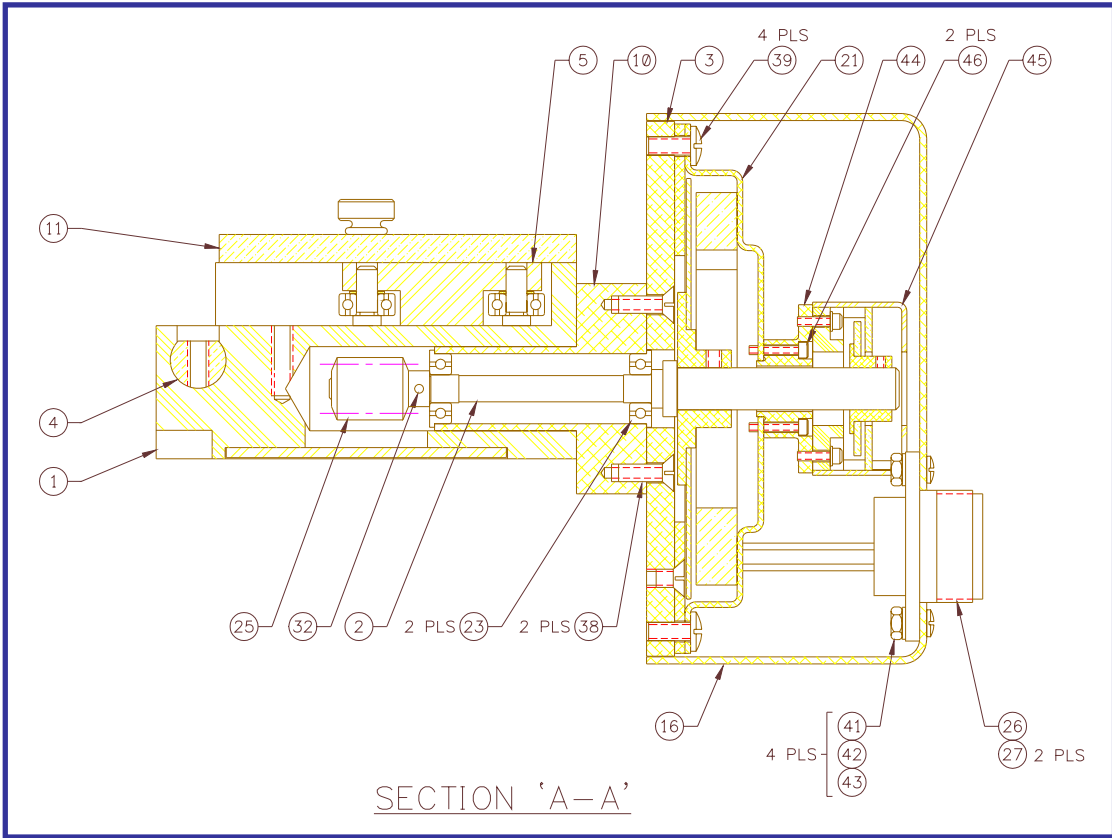




ITEM	QTY.	PART NO.	DESCRIPTION
1	1	E2M5597	WIRE FEEDER BLOCK
2	1	E2M5586	9 CM MOTOR WORM SHAFT
3	1	E2M5589	9 CM MOTOR PLATE
4	1	E2M5151	SLIDE BLOCK
5	1	E2A5129	PRESSURE ROLLER SHOE ASSEMBLY
6	1	E2M5750	CAPSTAN SCREW
7	1	E2M5162	BEARING SLEEVE
8	1	E2M5751	CAPSTAN SPRING HOLDER
9	1	E2M5520	BEARING SPACER
10	1	E2M5588	9 CM MOTOR BEARING CARTRIDGE
11	1	E2M5591	WIRE FEEDER COVER
12	1	E2M5608	DRIVEN SHAFT
13	1	E2M5596	MODIFIED WORM GEAR
14	1	E2M5610	GEAR COVER
15	1	E2M5611	KNOB SHAFT
16	1	E2M5614	9 CM MOTOR COVER
17	1	E2M5752	CAPSTAN SPRING GUIDE
18	1	E2M5753	CAPSTAN SPRING INSERT
19	1	X2N5019	SPRING
20	1	X6B5083	PLUNGER
21	1	E2M5612	WF-100PLL MODIFIED 9FP MOTOR
22	1	E2B5001	BEARING
23	2	X2B0371	BEARING
24	1		#8-32 x 3/16" LG SOCKET SET SCREW
25	1	X2G5020	SINGLE THREAD WORM
26	1	X3P5144	9 CIRCUIT CPC CONNECTOR
27	5	X3P0300	CPC PIN
28	2	X6B5086	FINGER SCREW
29	2	X4S5005	O-RING
30	4		#6-32 x 1/4" LG BLK ALY SKT CAP HD SCREW
31	1		1/16" DIA x 3/4" LG BLK ALY ROLL PIN
32	1		5/64" DIA x 5/16" LG BLK ALY ROLL PIN
33	1		1/8" DIA x 5/8" LG BLK ALY ROLL PIN
34	4		#6-32 x 3/8" LG BLK ALY SKT CAP HD SCREW
35	4		#6-32 x 1/4" LG BLK ALY BUTTON HD SCREW
36	2		#6-32 x 3/4" LG BLK ALY BUTTON HD SCREW
37	2		#8-32 x 1-1/4" LG BLK ALY FLAT HD SCREW
38	2		#8-32 x 1/2" LG BLK ALY FLAT HD SCREW
39	4		#8-32 x 3/8" LG BLK ALY BINDER SCREW
40	4		#6-32 x 1/4" LG BLK ALY FLAT HD SCREW
41	4		#4-40 x 3/8" LG BLK ALY BINDER HD SCREW
42	4		#4-40 BLK ALY HEX NUT
43	4		#4 BLK ALY INTERNAL LOCK WASHER
44	1	E2M5587	WF-100PLL ENCODER MOUNT
45	1	X3M5030	ENCODER
46	2		#2-56 x 7/16" LG BLK ALY SKT HD CAP SCREW

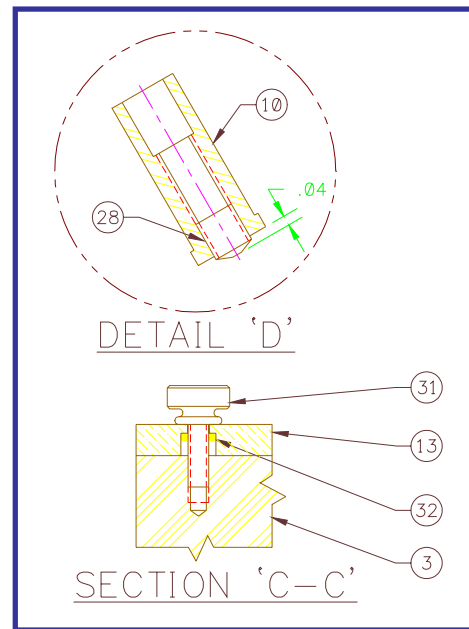
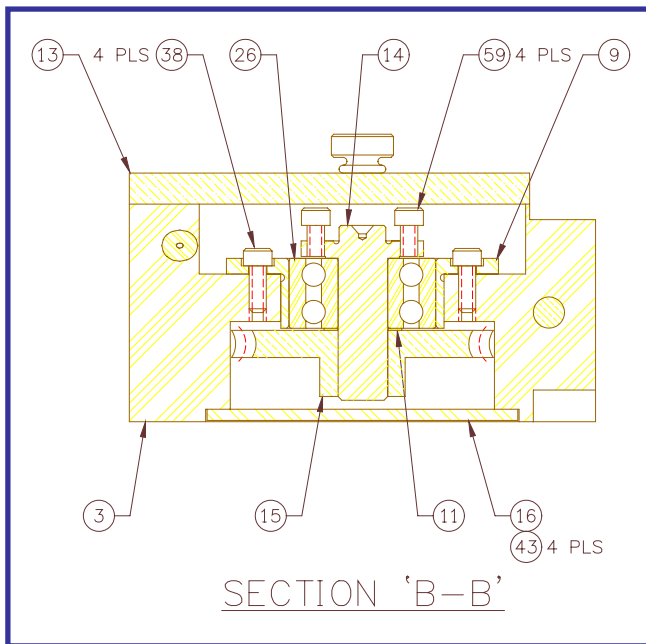
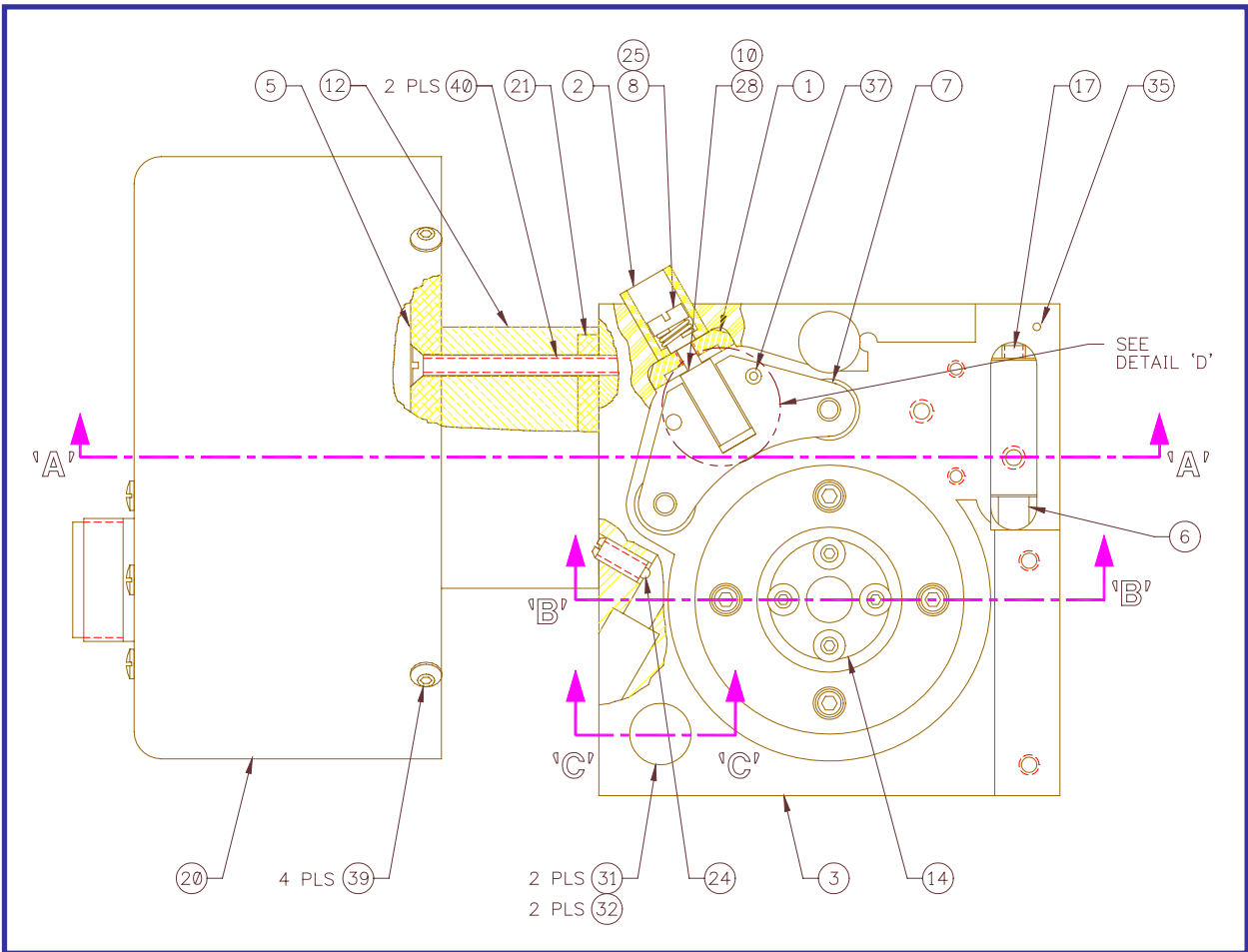
A6 Replacement Parts for Capstan P/N: E2A5116

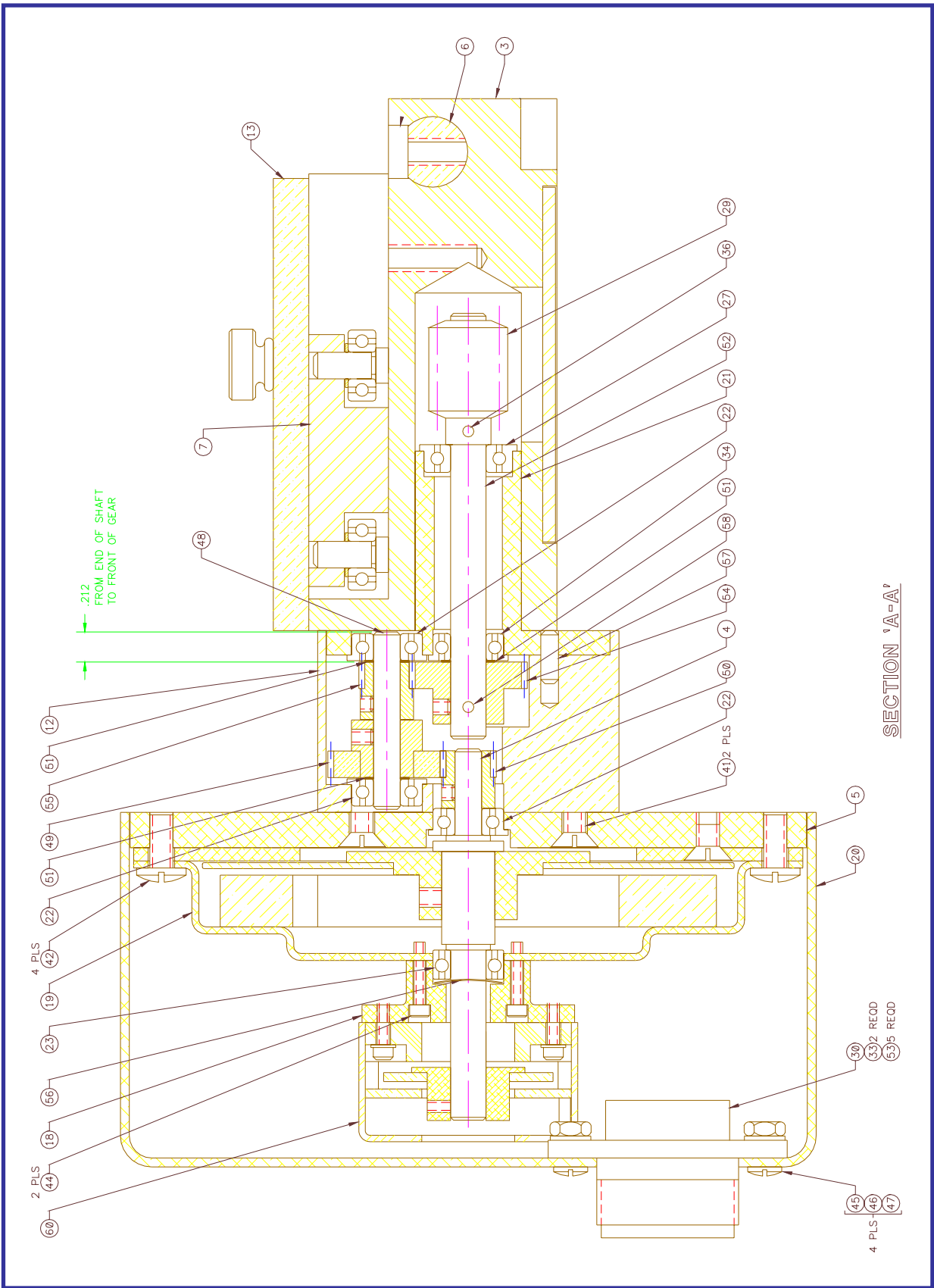




ITEM	QTY.	PART NO.	DESCRIPTION
1	1	E2M5684	WIRE FEEDER BLOCK
2	1	E2M5586	9 CM MOTOR WORM SHAFT
3	1	E2M5589	9 CM MOTOR PLATE
4	1	E2M5151	SLIDE BLOCK
5	1	E2A5129	PRESSURE ROLLER SHOE ASSEMBLY
6	1	E2M5750	CAPSTAN SCREW
7	1	E2M5162	BEARING SLEEVE
8	1	E2M5751	CAPSTAN SPRING HOLDER
9	1	E2M5520	BEARING SPACER
10	1	E2M5588	9 CM MOTOR BEARING CARTRIDGE
11	1	E2M5683	WIRE FEEDER COVER
12	1	E2M5608	DRIVEN SHAFT
13	1	E2M5596	MODIFIED WORM GEAR
14	1	E2M5610	GEAR COVER
15	1	E2M5611	KNOB SHAFT
16	1	E2M5614	9 CM MOTOR COVER
17	1	E2M5752	CAPSTAN SPRING GUIDE
18	1	E2M5753	CAPSTAN SPRING INSERT
19	1	X2N5019	SPRING
20	1	X6B5083	PLUNGER
21	1	E2M5612	WF-100PLL MODIFIED 9FP MOTOR
22	1	E2B5001	BEARING
23	2	X2B0371	BEARING
24	1		#8-32 x 3/16" LG SOCKET SET SCREW
25	1	X2G5020	SINGLE THREAD WORM
26	1	X3P5144	9 CIRCUIT CPC CONNECTOR
27	5	X3P0300	CPC PIN
28	2	X6B5086	FINGER SCREW
29	2	X4S5005	O-RING
30	4		#6-32 x 1/4" LG BLK ALY SKT CAP HD SCREW
31	1		1/16" DIA x 3/4" LG BLK ALY ROLL PIN
32	1		5/64" DIA x 5/16" LG BLK ALY ROLL PIN
33	1		1/8" DIA x 5/8" LG BLK ALY ROLL PIN
34	4		#6-32 x 3/8" LG BLK ALY SKT CAP HD SCREW
35	4		#6-32 x 1/4" LG BLK ALY BUTTON HD SCREW
36	2		#6-32 x 3/4" LG BLK ALY BUTTON HD SCREW
37	2		#8-32 x 1-1/4" LG BLK ALY FLAT HD SCREW
38	2		#8-32 x 1/2" LG BLK ALY FLAT HD SCREW
39	4		#8-32 x 3/8" LG BLK ALY BINDER SCREW
40	4		#6-32 x 1/4" LG BLK ALY FLAT HD SCREW
41	4		#4-40 x 3/8" LG BLK ALY BINDER HD SCREW
42	4		#4-40 BLK ALY HEX NUT
43	4		#4 BLK ALY INTERNAL LOCK WASHER
44	1	E2M5587	WF-100PLL ENCODER MOUNT
45	1	X3M5030	ENCODER
46	2		#2-56 x 7/16" LG BLK ALY SKT HD CAP SCREW

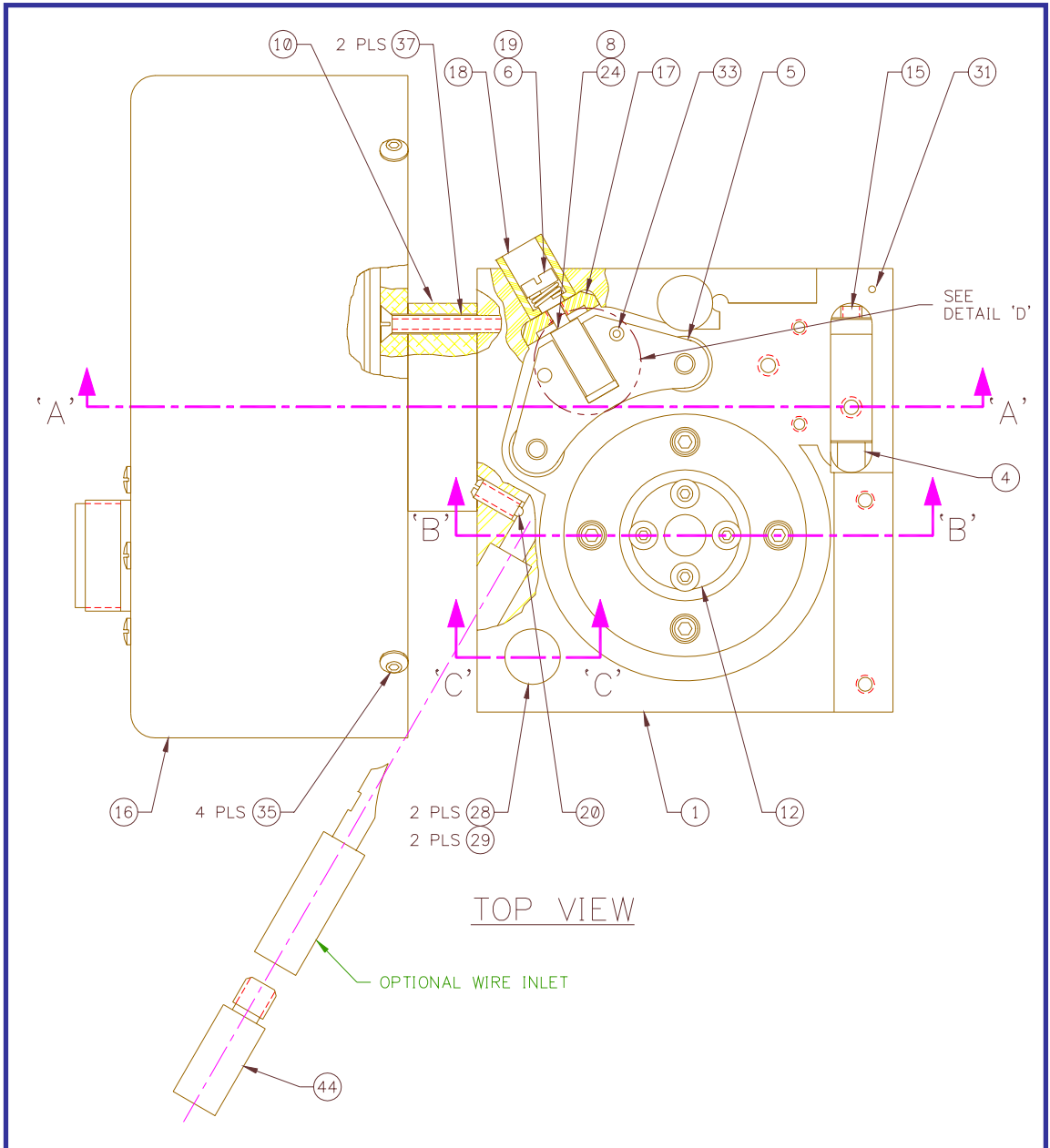
A7 Replacement Parts for Capstan P/N: E2A5113

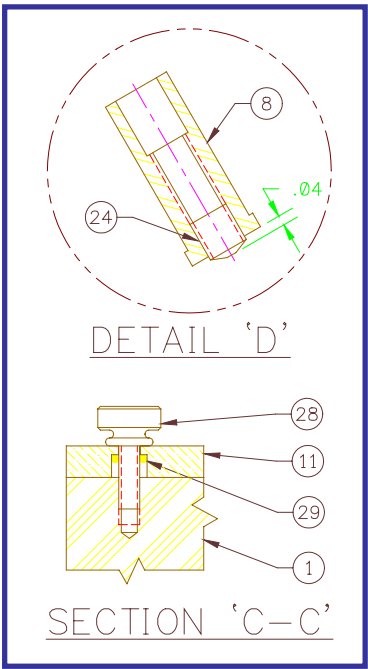
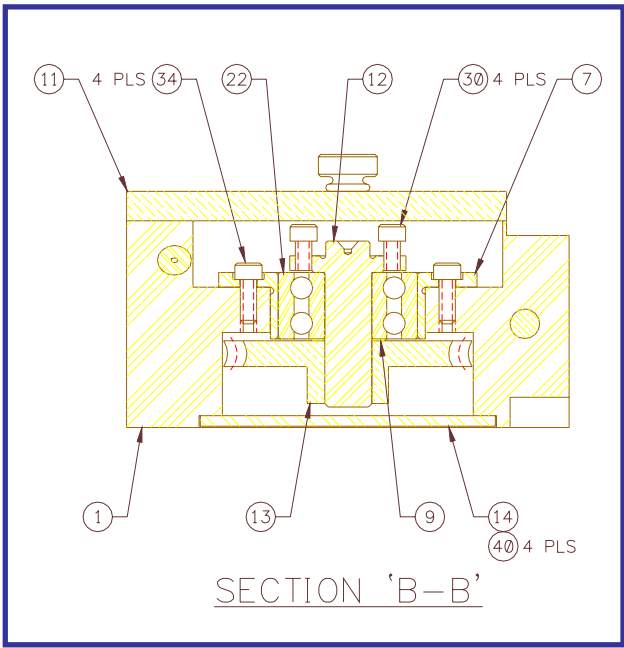
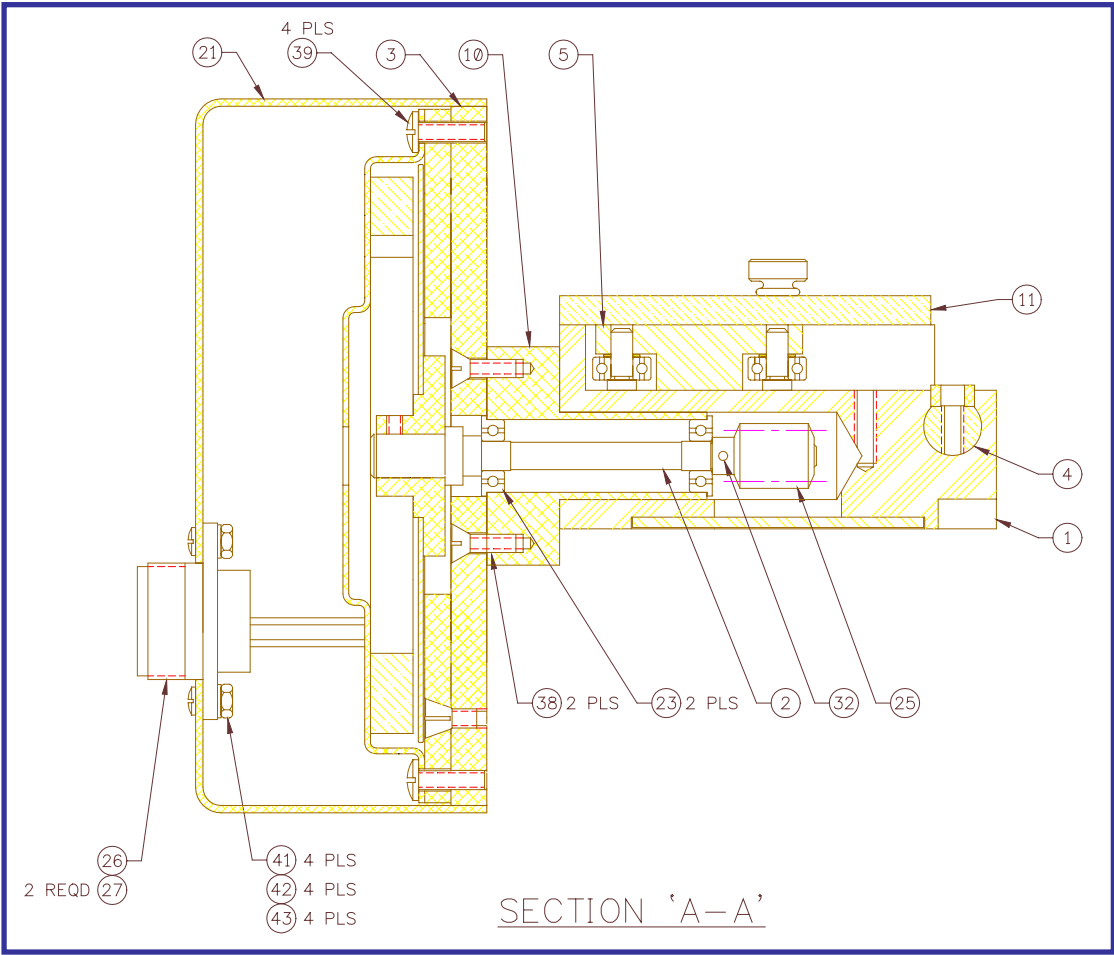




ITEM	QTY.	PART NO.	DESCRIPTION
1	1	E2M5752	CAPSTAN SPRING GUIDE
2	1	E2M5753	CAPSTAN SPRING INSERT
3	1	E2M5597	WIRE FEEDER BLOCK
4	1	E2M5698	5:1 PLL MOTOR SHAFT
5	1	E2M5695	5:1 MOTOR PLATE
6	1	E2M5151	SLIDE BLOCK
7	1	E2A5129	PRESSURE ROLLER SHOE ASSEMBLY
8	1	E2M5750	CAPSTAN SCREW
9	1	E2M5162	BEARING SLEEVE
10	1	E2M5751	CAPSTAN SPRING HOLDER
11	1	E2M5520	BEARING SPACER
12	1	E2M5697	5:1 HOUSING
13	1	E2M5591	WIRE FEEDER COVER
14	1	E2M5608	DRIVEN SHAFT
15	1	E2M5596	MODIFIED WORM GEAR
16	1	E2M5610	GEAR COVER
17	1	E2M5611	KNOB SHAFT
18	1	E2M5694	5:1 ENCODER MOUNT
19	1	E2M5612	WF-100PLL MODIFIED 9FP MOTOR
20	1	E2M5614	9 CM MOTOR COVER
21	1	E2M5696	BEARING CARTRIDGE
22	3	X2B5045	BEARING
23	1	X2B5044	BEARING
24	1	X6B5083	PLUNGER
25	1	X2N5019	SPRING
26	1	E2B5001	BEARING
27	1	X2B0371	BEARING
28	1		#8-32 x 3/16" LG SOCKET SET SCREW
29	1	X2G5023	SINGLE THREAD WORM
30	1	X3P5144	9 CIRCUIT CPC CONNECTOR
31	2	X6B5086	FINGER SCREW
32	2	X4S5005	O-RING
33	2	X3P0300	CPC PIN
34	1	X2B0370	BEARING
35	1		1/16" DIA x 3/4" LG BLK ALY ROLL PIN
36	1		3/16" DIA x 5/16" BLK ALY ROLL PIN
37	1		1/8" DIA x 5/8" LG BLK ALY ROLL PIN
38	4		#6-32 x 3/8" LG BLK ALY SKT CAP HD SCREW
39	4		#6-32 x 1/4" LG BLK ALY BUTTON HD SCREW
40	2		#8-32 x 1-1/4" LG BLK ALY SKT FLAT HD SCREW
41	2		#8-32 x 1/2" LG BLK ALY SKT FLAT HD SCREW
42	4		#8-32 x 3/8" LG BLK ALY BINDER SCREW
43	4		#6-32 x 1/4" LG BLK ALY FLAT HD SCREW
44	2		#2-56 x 7/16" LG BLK ALY SKT CAP HD SCREW
45	4		#4-40 x 3/8" LG BLK ALY BINDER HD SCREW
46	4		#4-40 BLK ALY HEX NUT
47	4		#4 BLK ALY INTERNAL LOCK WASHER
48	1		3/16" DIA x 1-1/4" LG SHAFT
49	1		38T DELRIN GEAR
50	1		17T ALUMINUM GEAR
51	3		SHIM
52	1		1/4" DIA x 2-7/8" LG SHAFT
53	5		CABLE TIE
54	1		38T SS GEAR
55	1		17T SS GEAR
56	1		CURVED SPRING
57	1		0.125" DIA x 3/8" POWEL PIN
58	1		3/32" DIA x 1/2" LG BLK ALY ROLL PIN
59	4		#6-32 x 1/4" LG BLK ALY SKT CAP HD SCREW
60	1	X3M5030	ENCODER

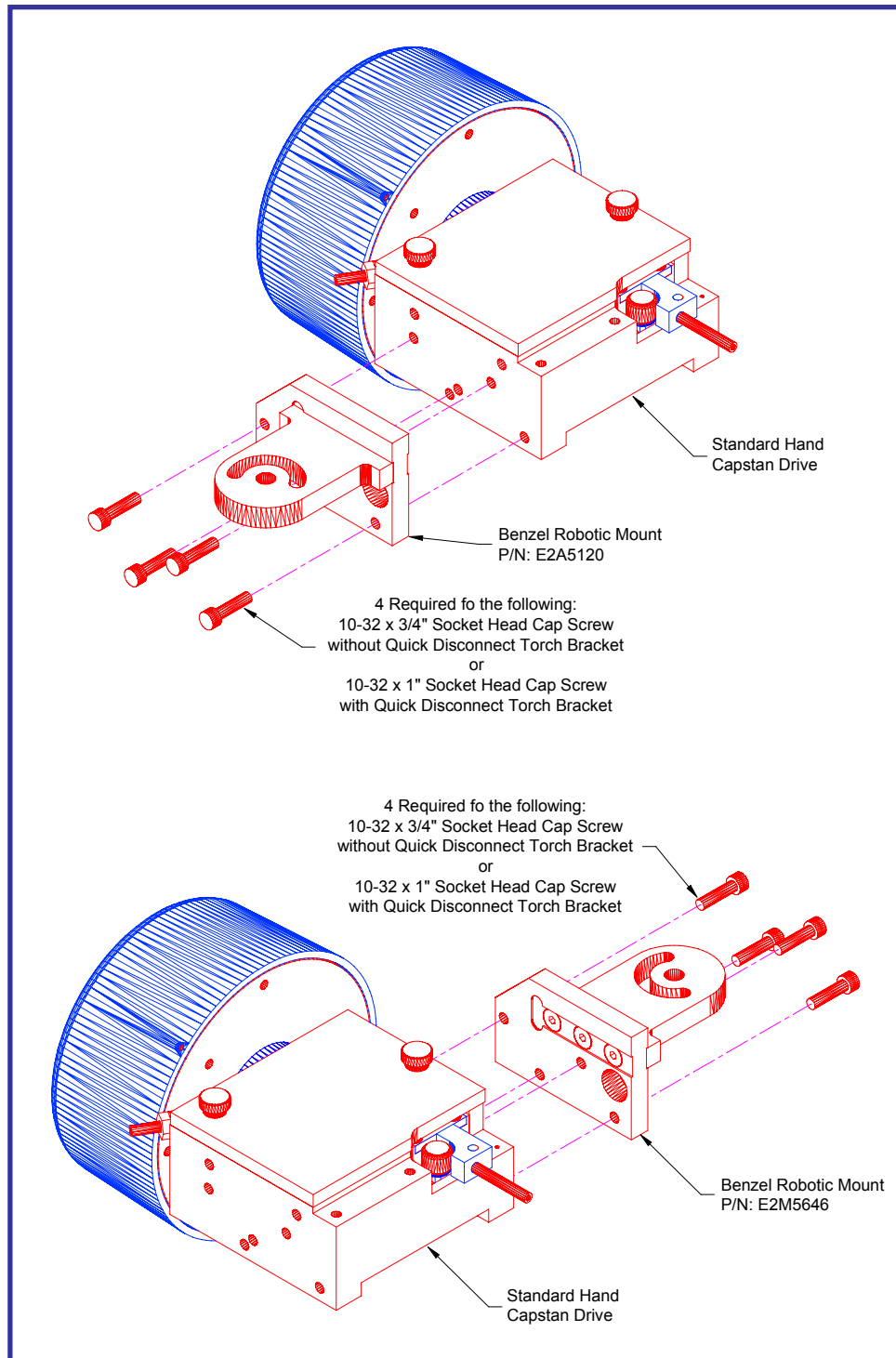
A8 Replacement Parts for Capstan P/N: E2A5106



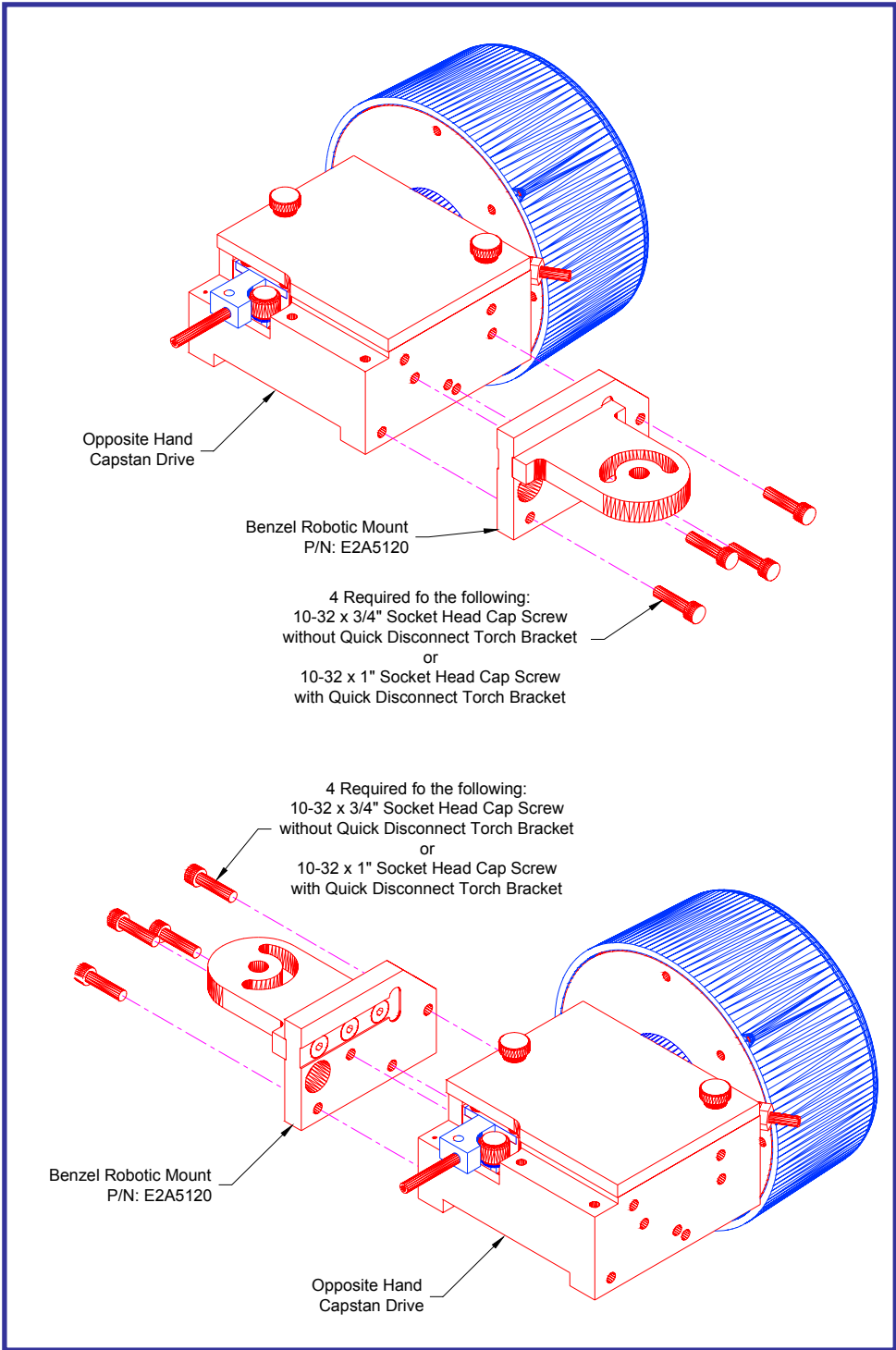


ITEM	QTY.	PART NO.	DESCRIPTION
1	1	E2M5597	WIRE FEEDER BLOCK
2	1	E2M5651	12 CM MOTOR SHAFT
3	1	E2M5653	12 CM MOTOR PLATE
4	1	E2M5151	SLIDE BLOCK
5	1	E2A5129	PRESSURE ROLLER SHOE ASSEMBLY
6	1	E2M5750	CAPSTAN SCREW
7	1	E2M5162	BEARING SLEEVE
8	1	E2M5751	CAPSTAN SPRING HOLDER
9	1	E2M5520	BEARING SPACER
10	1	E2M5588	9 CM MOTOR BEARING CARTRIDGE
11	1	E2M5591	WIRE FEEDER COVER
12	1	E2M5608	DRIVEN SHAFT
13	1	E2M5596	MODIFIED WORM GEAR
14	1	E2M5610	GEAR COVER
15	1	E2M5611	KNOB SHAFT
16	1	E2M5659	12 CM MOTOR COVER
17	1	E2M5752	CAPSTAN SPRING GUIDE
18	1	E2M5753	CAPSTAN SPRING INSERT
19	1	X2N5019	SPRING
20	1	X6B5083	PLUNGER
21	1	X3M0017	MOTOR
22	1	E2B5001	BEARING
23	2	X2B0371	BEARING
24	1		#8-32 x 3/16" LG SOCKET SET SCREW
25	1	X2G5020	SINGLE THREAD WORM
26	1	X3P5144	9 CIRCUIT CPC CONNECTOR
27	2	X3P0300	CPC PIN
28	2	X6B5086	FINGER SCREW
29	2	X4S5005	O-RING
30	4		#6-32 x 1/4" LG BLK ALY SKT CAP HD SCREW
31	1		1/16" DIA x 3/4" LG BLK ALY ROLL PIN
32	1		5/64" DIA x 5/16" LG BLK ALY ROLL PIN
33	1		1/8" DIA x 5/8" LG BLK ALY ROLL PIN
34	4		#6-32 x 3/8" LG BLK ALY SKT CAP HD SCREW
35	4		#6-32 x 1/4" LG BLK ALY BUTTON HD SCREW
36	2		#6-32 x 3/4" LG BLK ALY BUTTON HD SCREW
37	2		#8-32 x 1-1/4" LG BLK ALY FLAT HD SCREW
38	2		#8-32 x 1/2" LG BLK ALY FLAT HD SCREW
39	4		#8-32 x 3/8" LG BLK ALY BINDER SCREW
40	4		#6-32 x 1/4" LG BLK ALY FLAT HD SCREW
41	4		#4-40 x 3/8" LG BLK ALY BINDER HD SCREW
42	4		#4-40 BLK ALY HEX NUT
43	4		#4 BLK ALY INTERNAL LOCK WASHER
44	1	E2M5808	CAPSTAN INLET EXTENSION

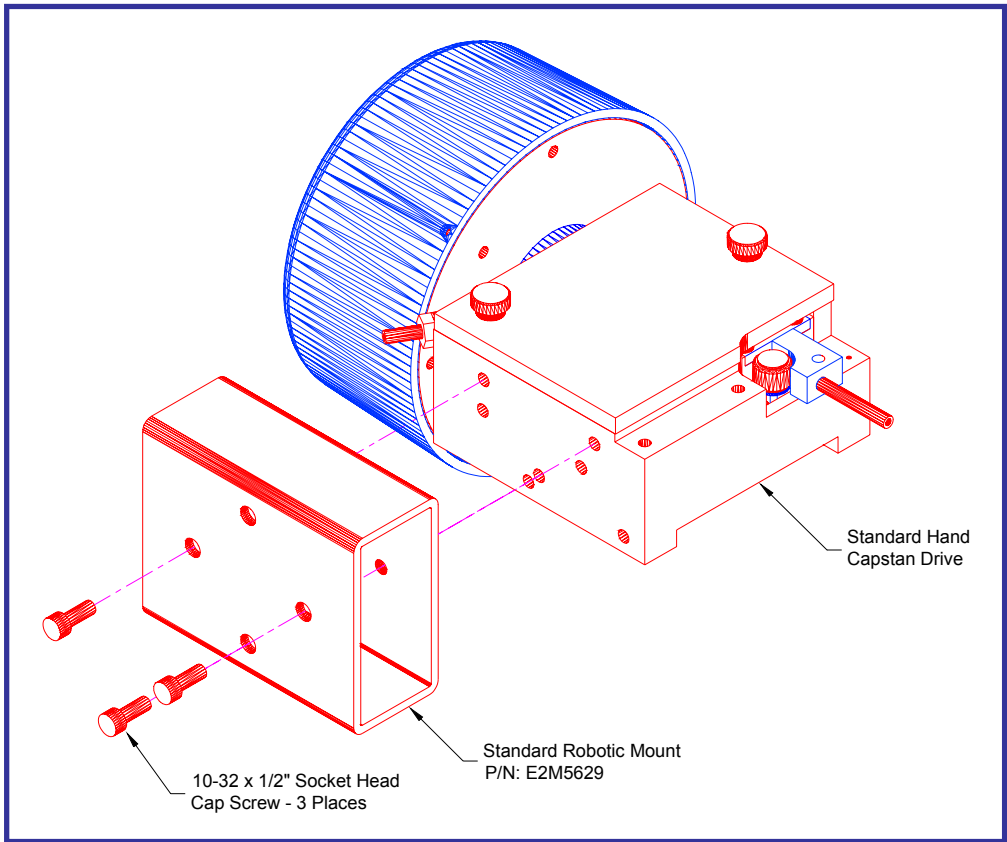
APPENDIX B FIXTURE MOUNTING BRACKETS



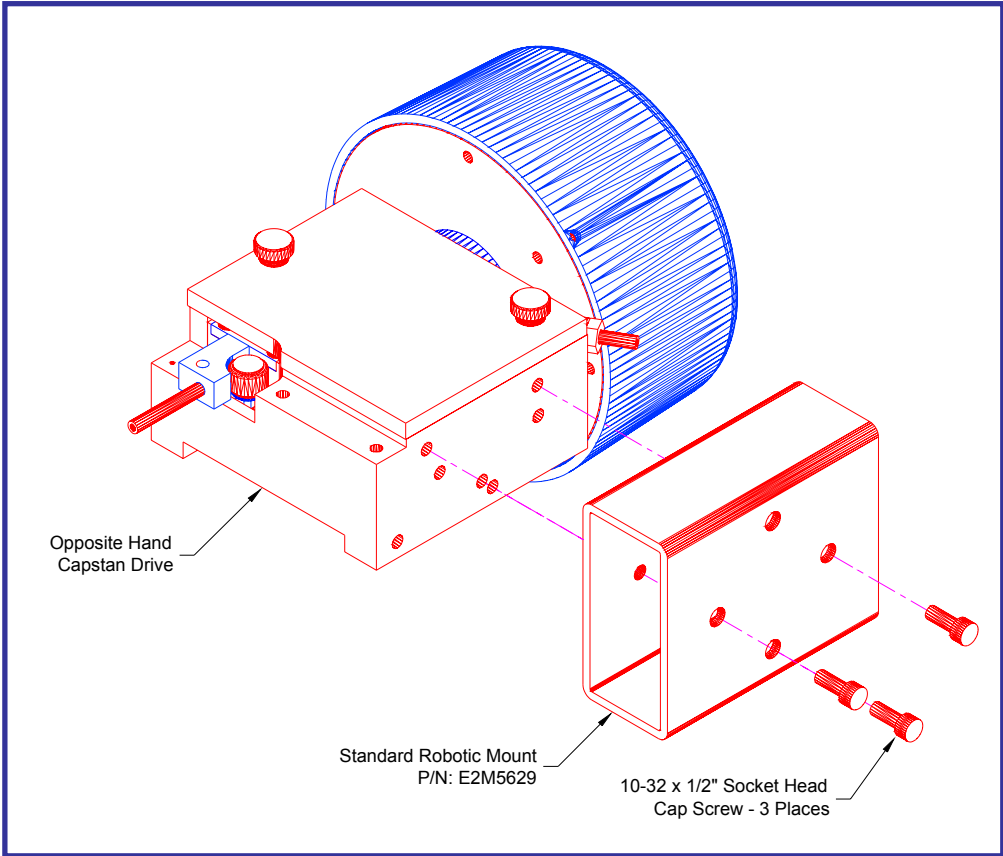
Standard Hand Capstan with Benzil Robotic Mount



Opposite Hand Capstan with Benzil Robotic Mount

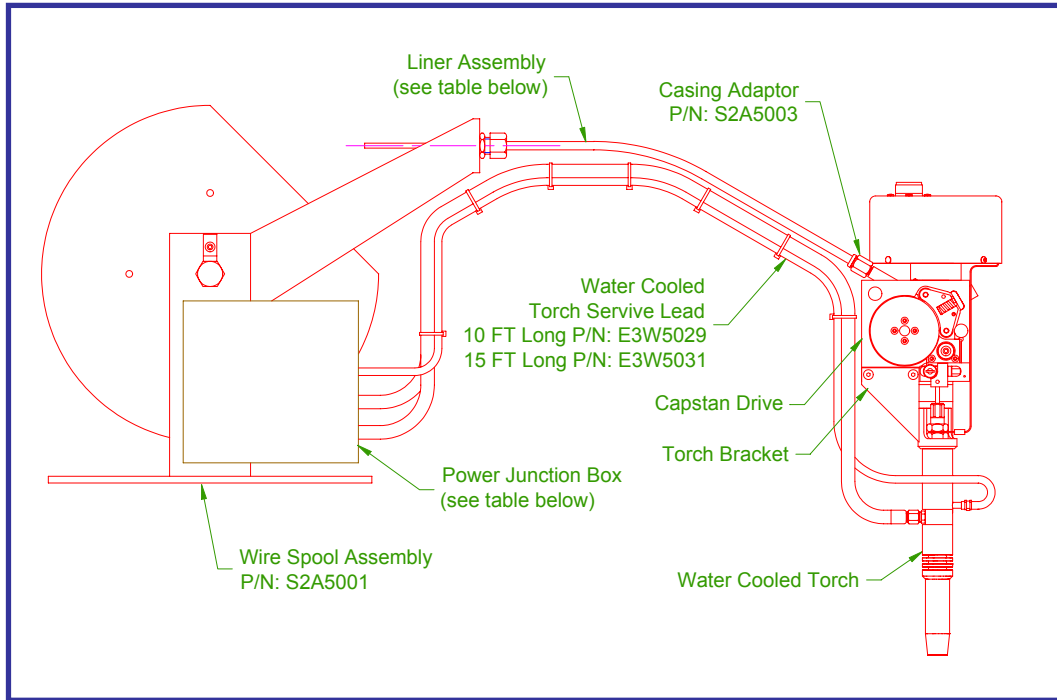


Standard Hand Capstan with Standard Robotic Mount



Opposite Hand Capstan with Standard Robotic Mount

APPENDIX C WATER COOLED MIG TORCH SPECIFICATIONS



Liner Assembly Chart

WIRE MATERIAL	WIRE DIAMETER INCH / MM	10 FT LONG PART NO	15 FT LONG PART NO
Non-Aluminum	0.030" / 0.8mm to 0.047" / 1.2mm	E7A5001	E7A5002
Non-Aluminum	0.052" / 1.3mm to 0.062" / 1.6mm	E7A5003	E7A5004
Aluminum	0.030" / 0.8mm to 0.035" / 0.9mm	E7A5005	E7A5006
Aluminum	0.040" / 1.0mm to 0.052" / 1.3mm	E7A5007	E7A5008
Aluminum	0.062" / 1.6mm	E7A5009	E7A5010

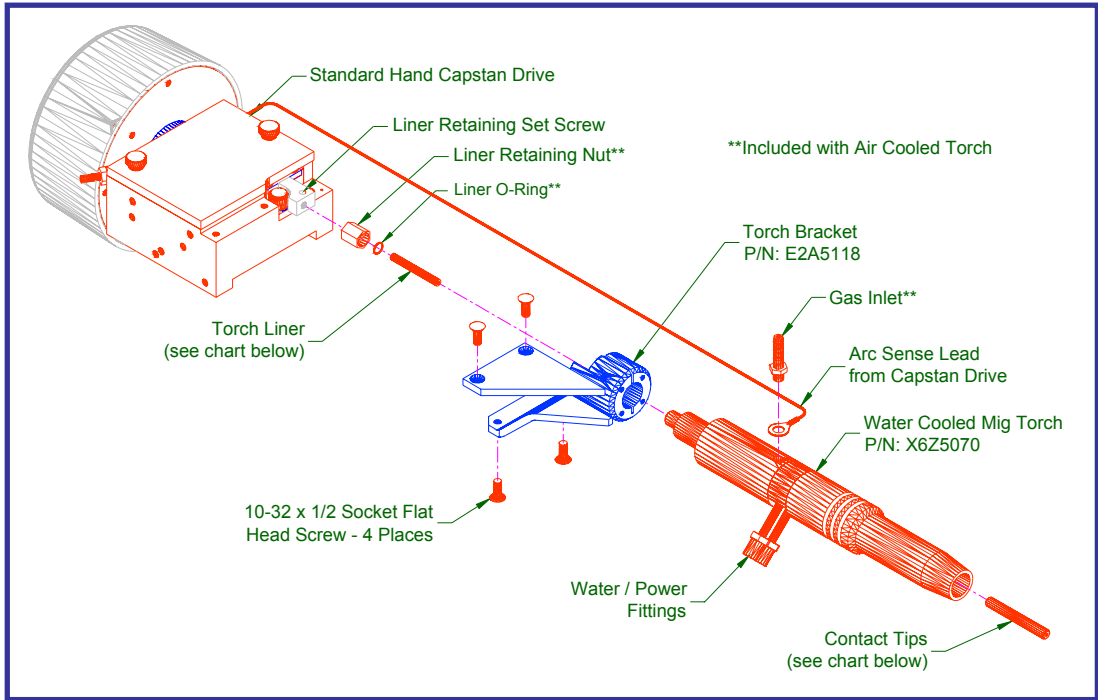
Torch Consumable Chart

DESCRIPTION	PART NO
Insulating Washer	X7N5026
Liner O-ring	X7N5027
Nozzle Insulator	X7N5011
Gas Diffuser	X7N5013
Conical Nozzle	X7N5014
0.030 H & FC Contact Tip	X7T5021
0.030 Aluminum Contact Tip	X7T5037
0.035 H & FC Contact Tip	X7T5010
0.035 Aluminum Contact Tip	X7T5022
0.045 H & FC Contact Tip	X7T5011
0.045 Aluminum Contact Tip	X7T5023
0.052 H & FC Contact Tip	X7T5024
0.052 Aluminum Contact Tip	X7T5036
0.062 Aluminum Contact Tip	X7T5012

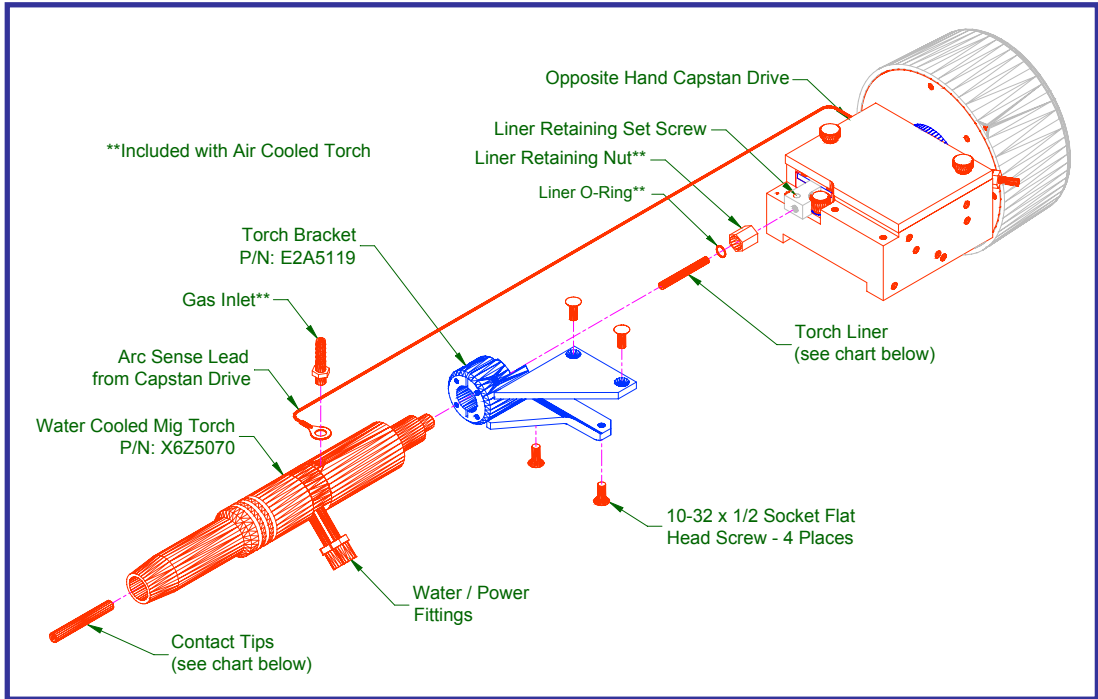
Power Junction Box Chart

DESCRIPTION	PART NO
Power Junction Box with no gas or water solenoids	S3A5038
Power Junction Box with only gas solenoid	S3A5056
Power Junction Box with gas and water solenoids	S3A5057

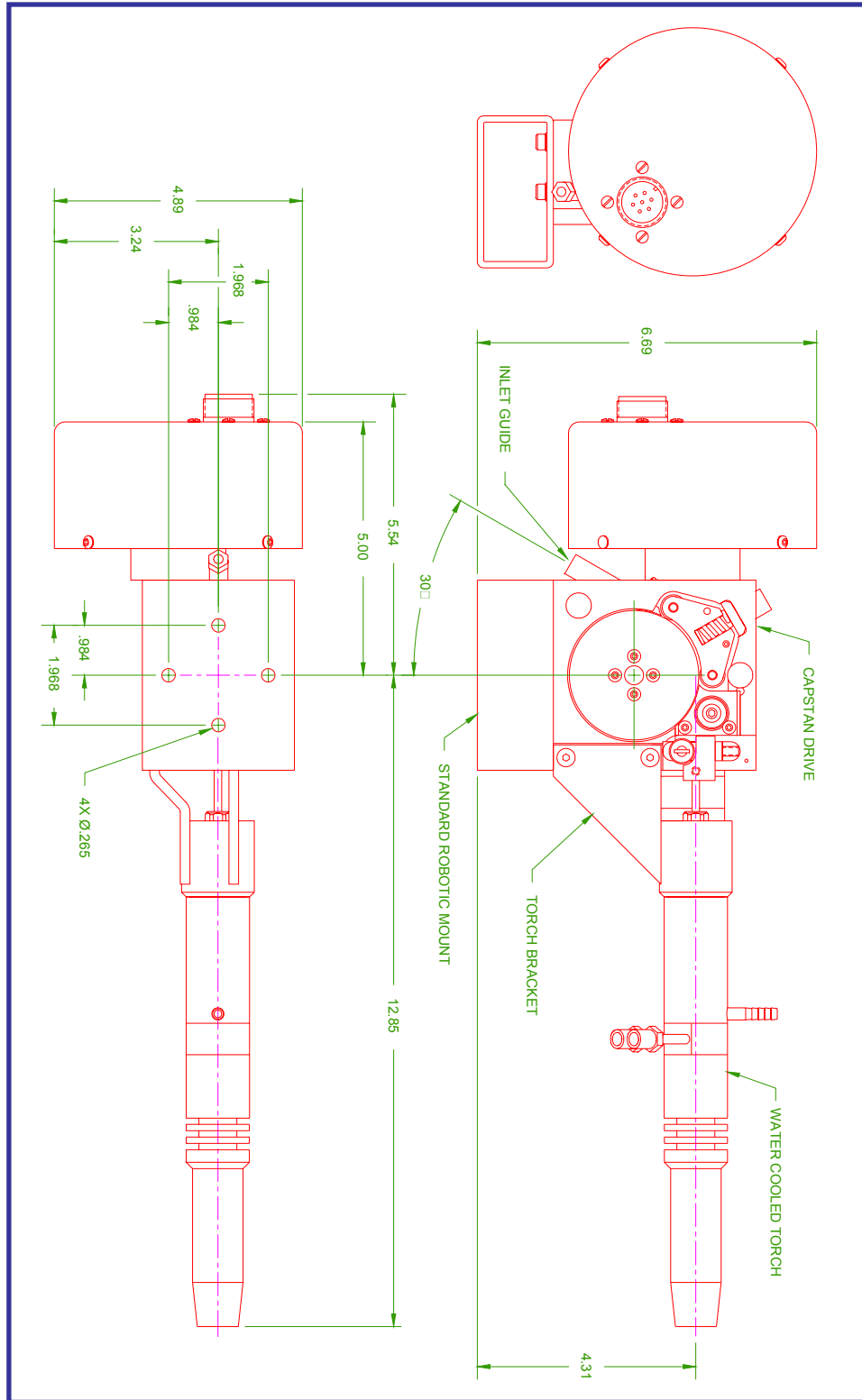
Water Cooled Torch System Configuration



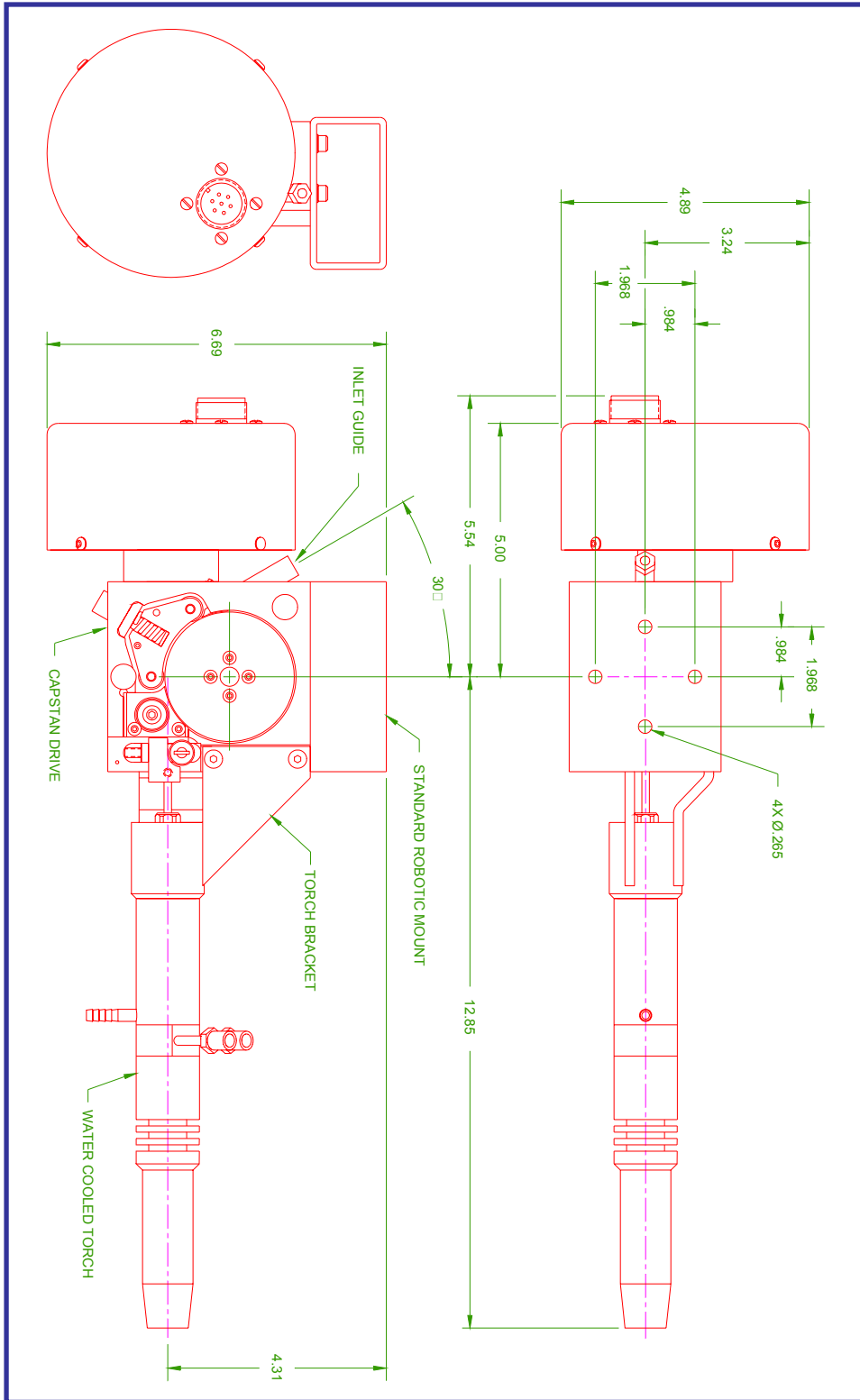
Standard Hand Capstan Torch Configuration



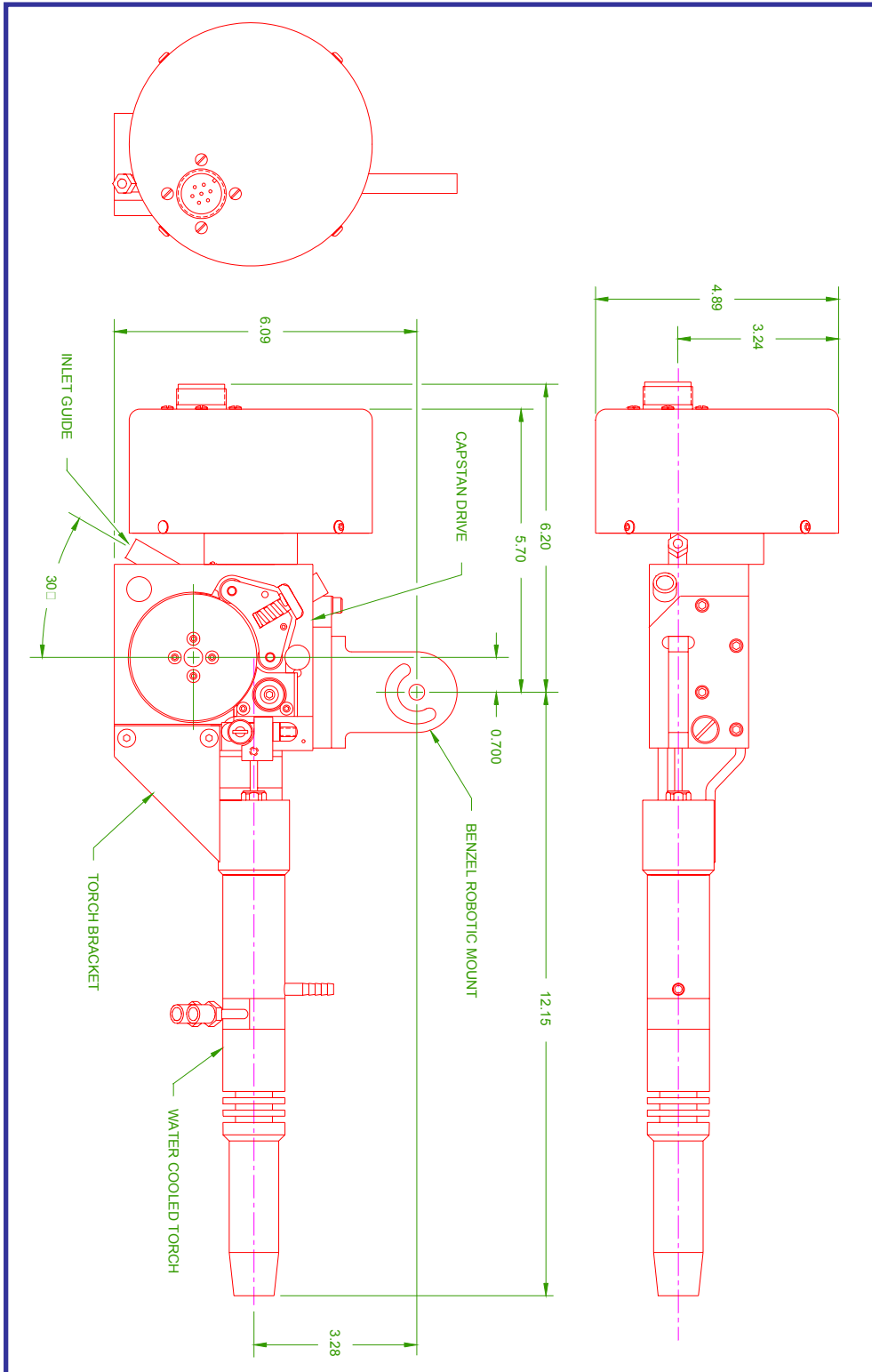
Opposite Hand Capstan Torch Configuration



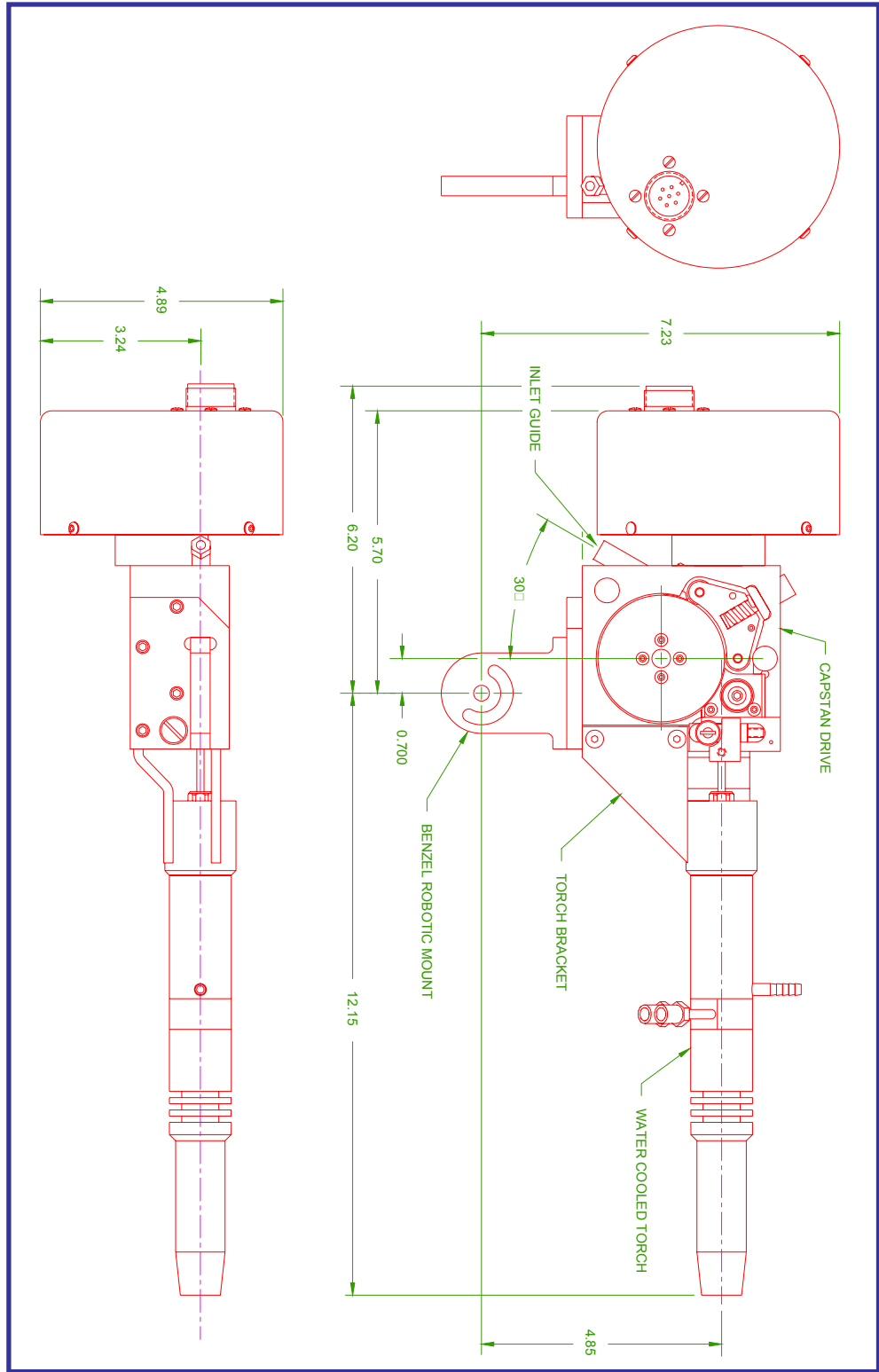
**9cm Standard Hand Standard Speed Capstan
with Standard Robotic Mount**



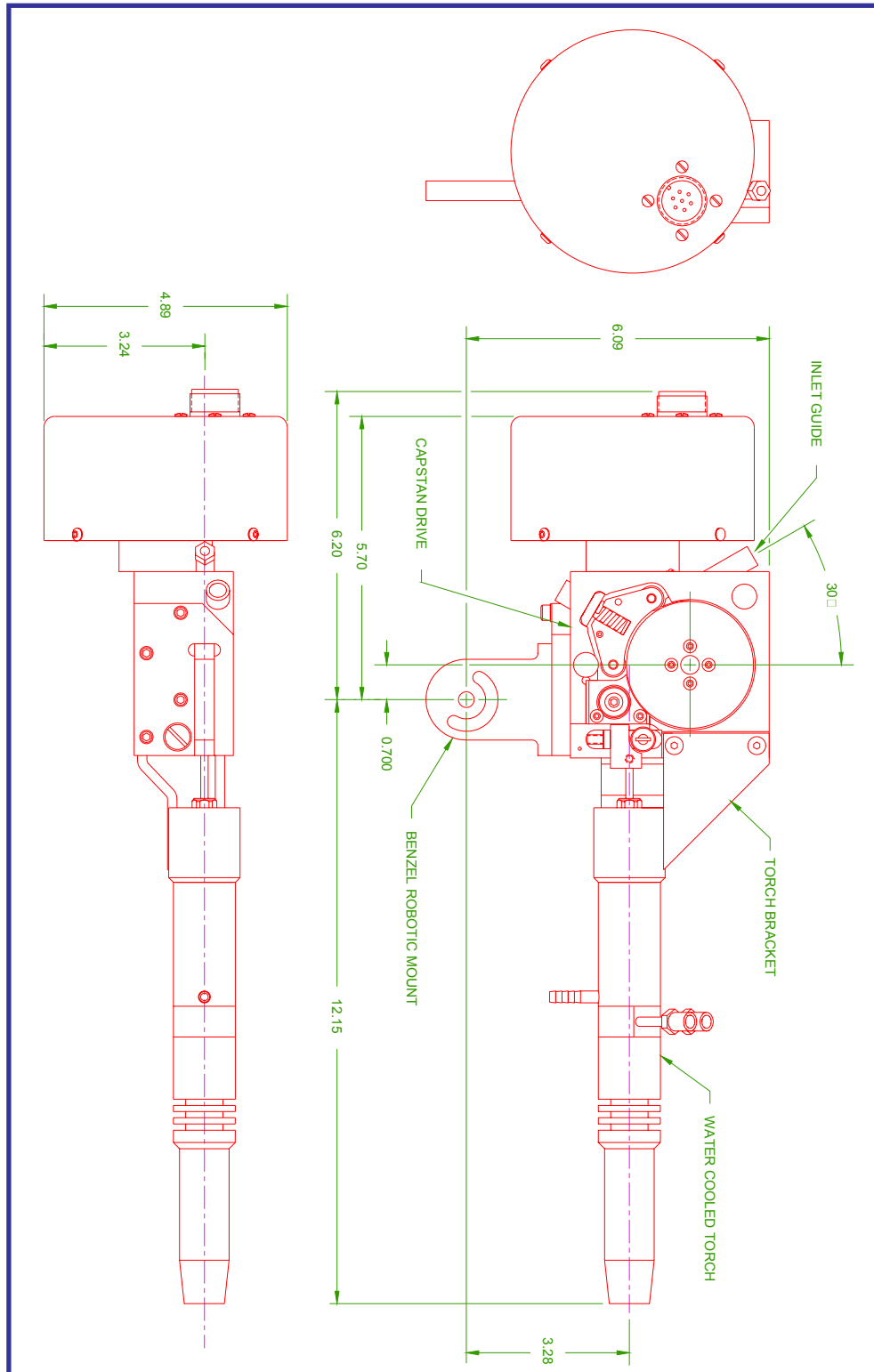
**9cm Opposite Hand Standard Speed Capstan
 with Standard Robotic Mount**



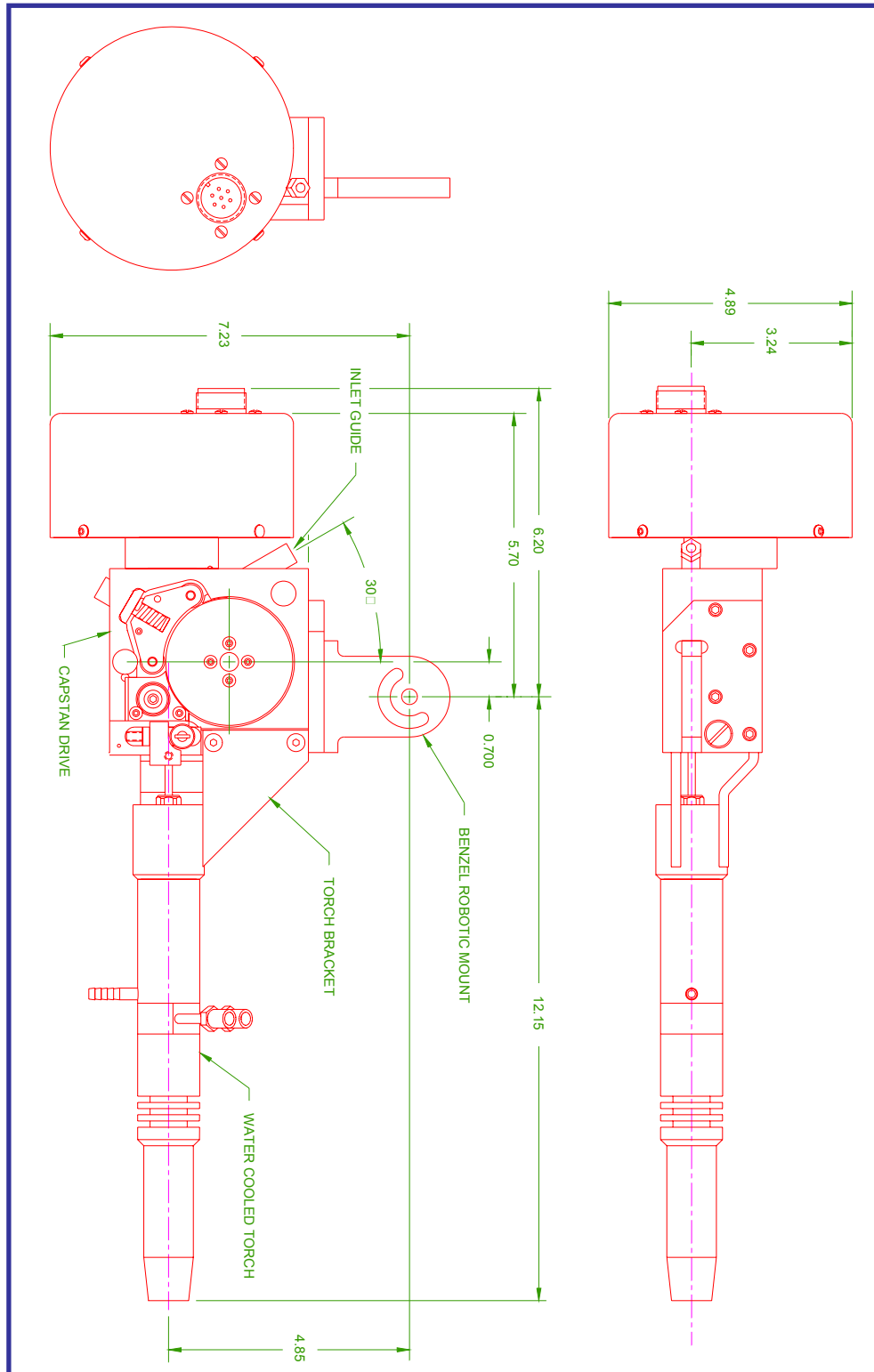
9cm Standard Hand Standard Speed Capstan with Benzil Robotic Mount



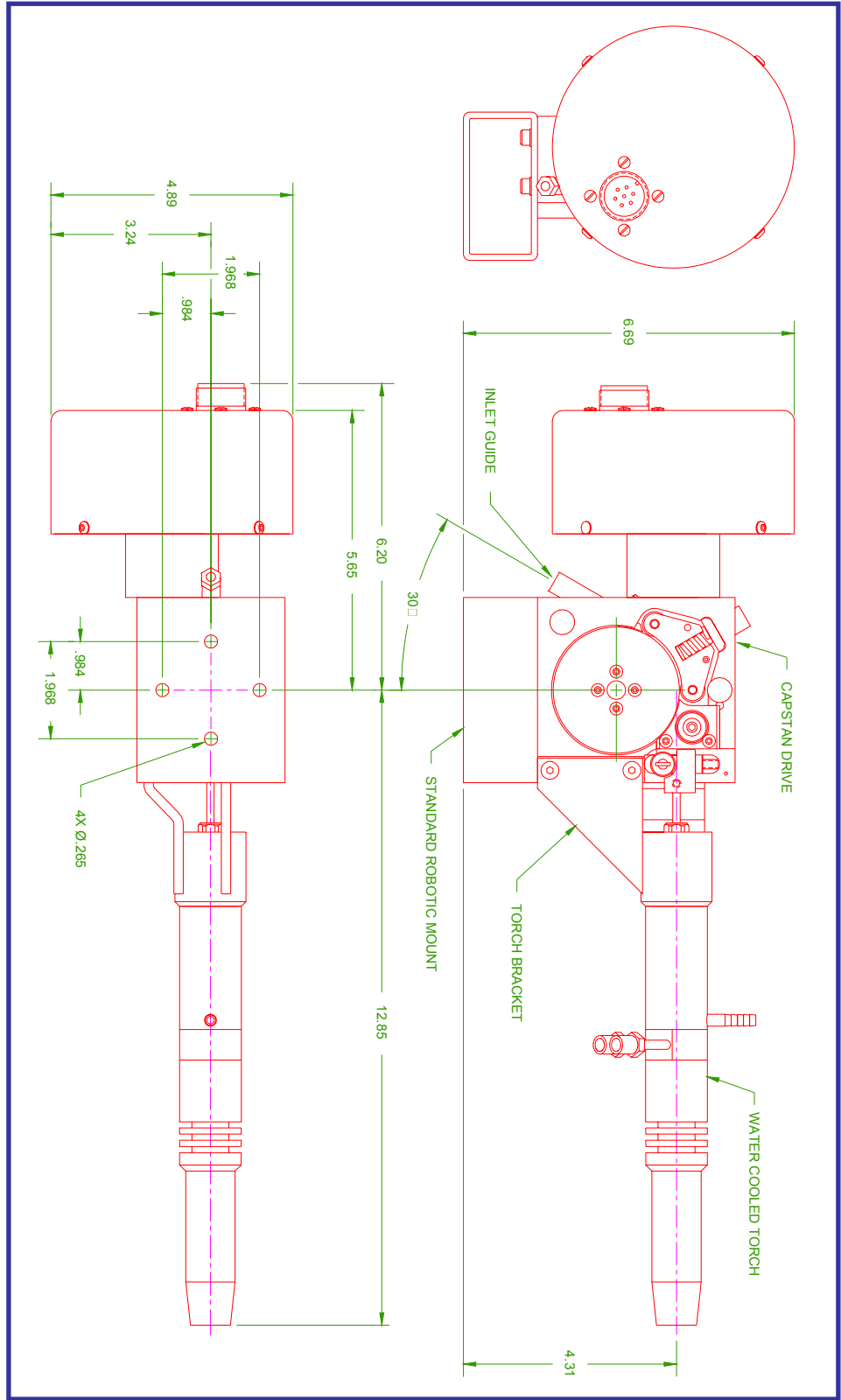
**9cm Standard Hand Standard Speed Capstan
with Benzil Robotic Mount**



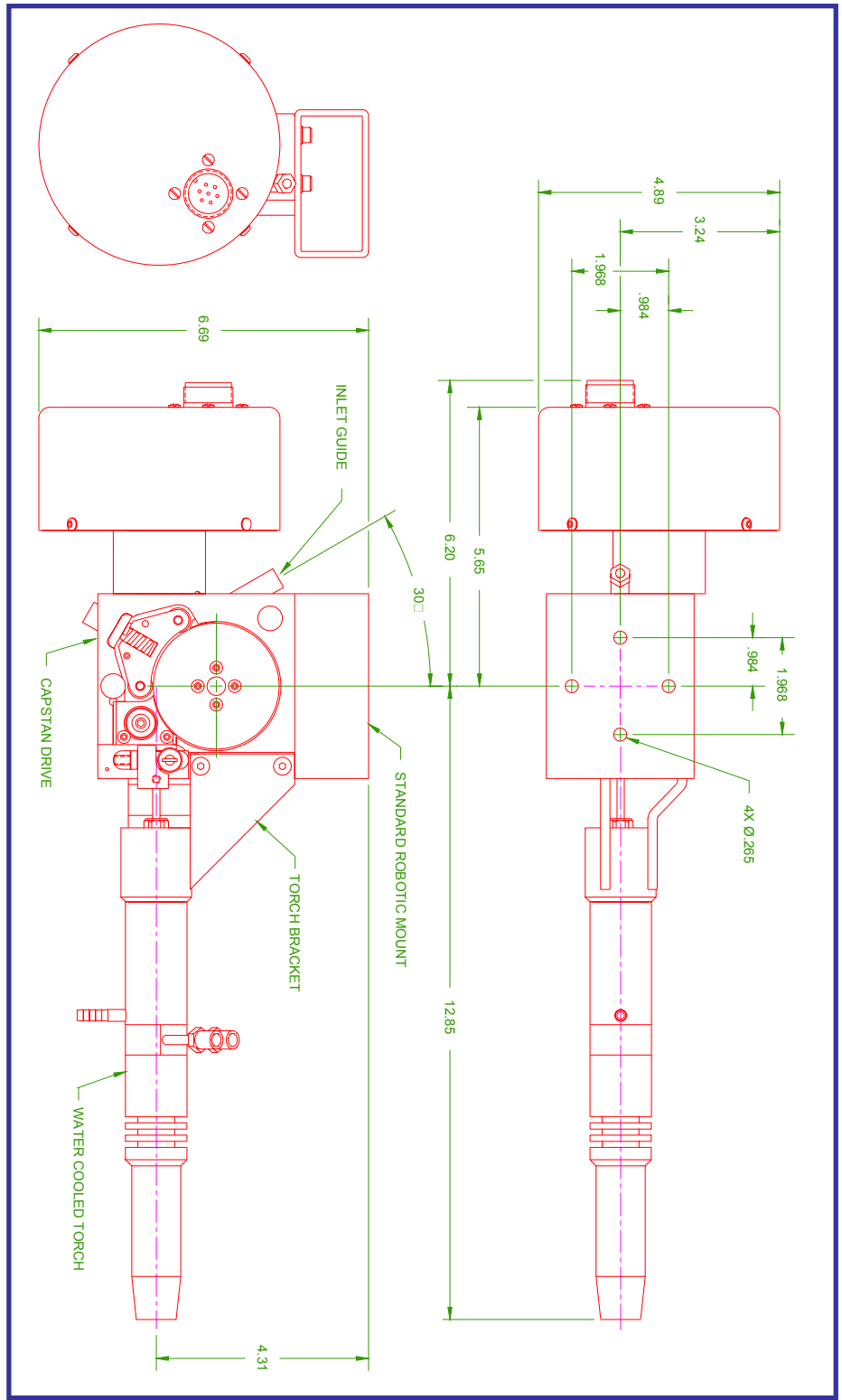
**9cm Opposite Hand Standard Speed Capstan
with Benzil Robotic Mount**



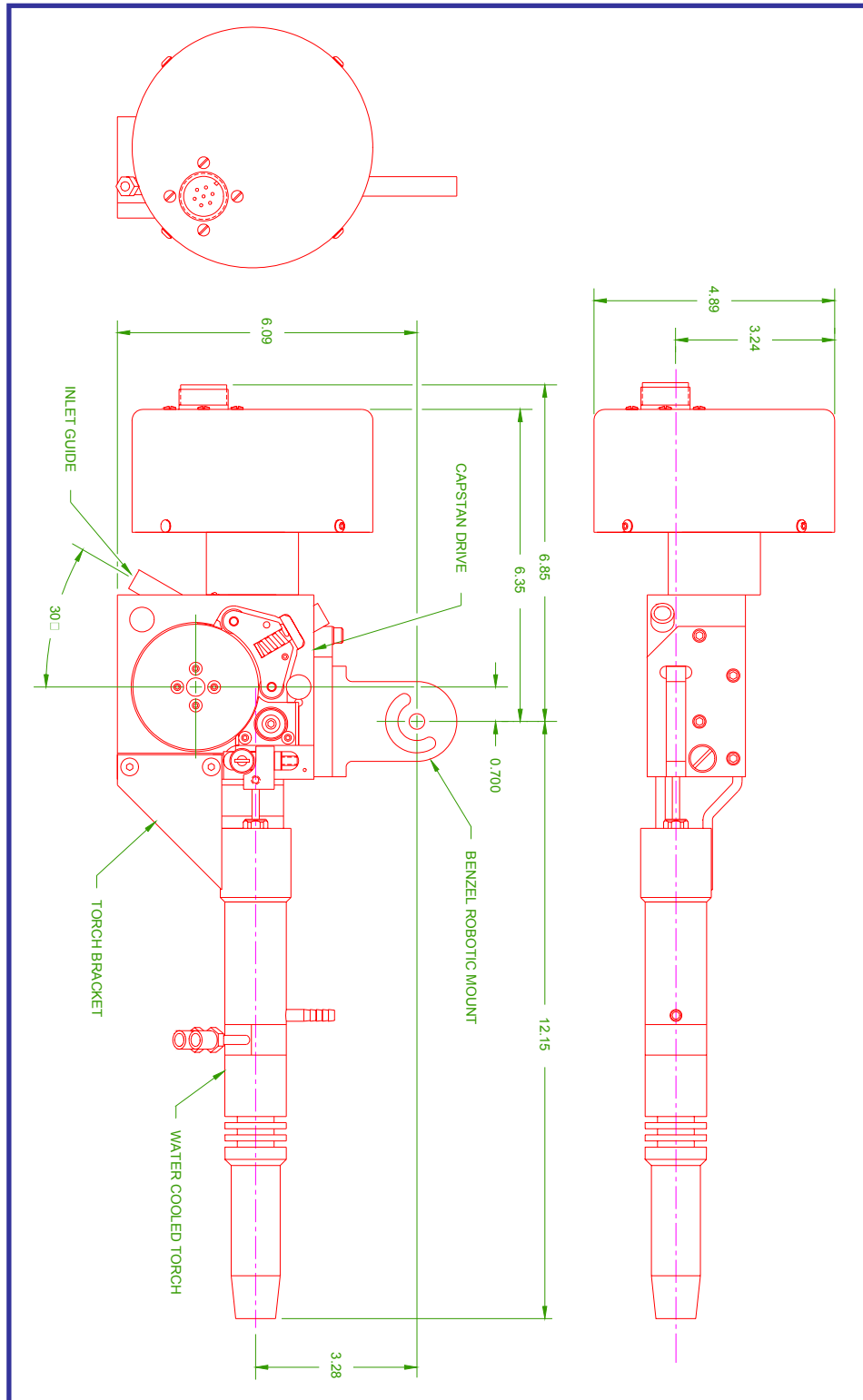
**9cm Opposite Hand Standard Speed Capstan
with Benzil Robotic Mount**



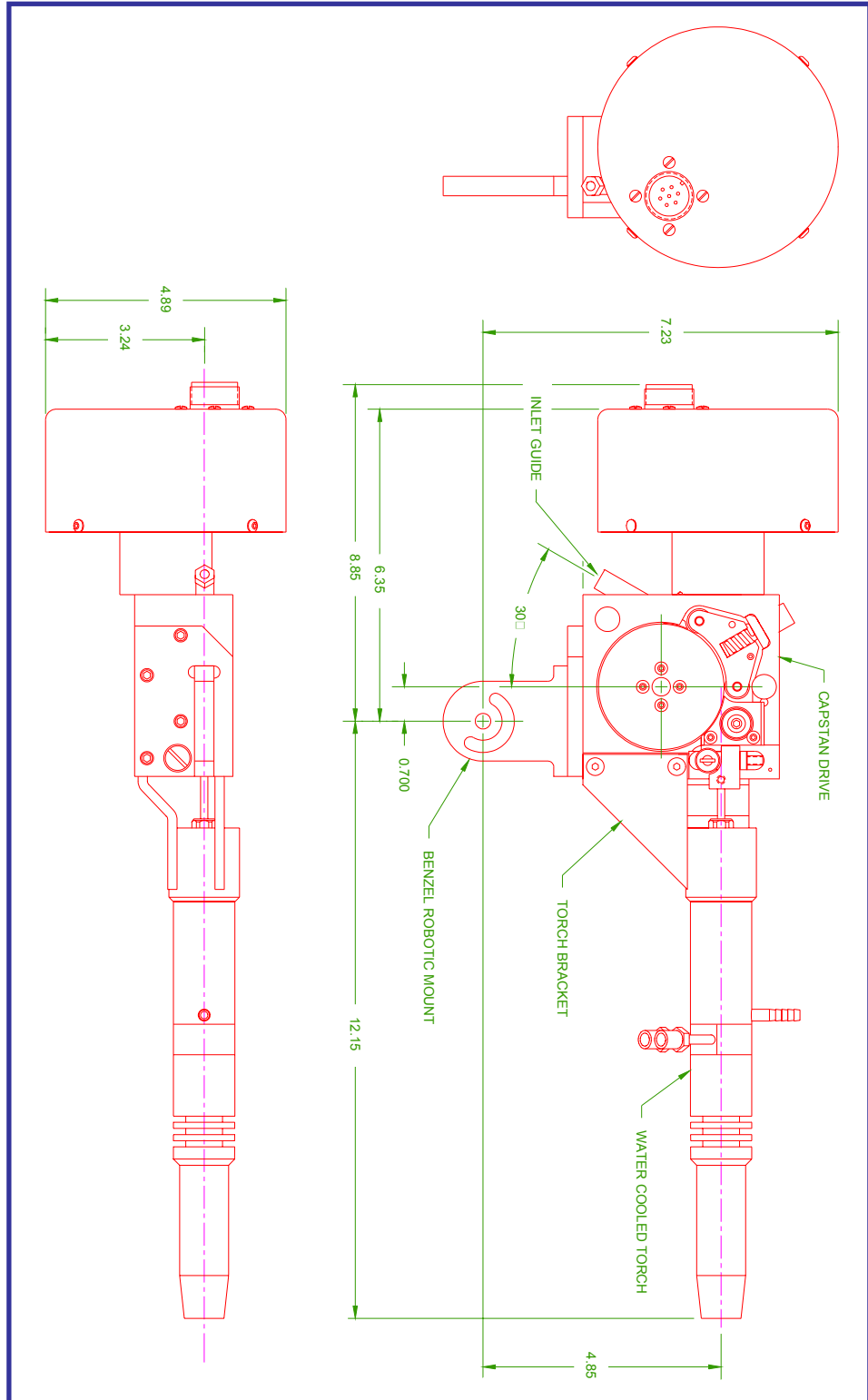
**9cm Standard Hand Slow Speed Capstan
with Standard Robotic Mount**



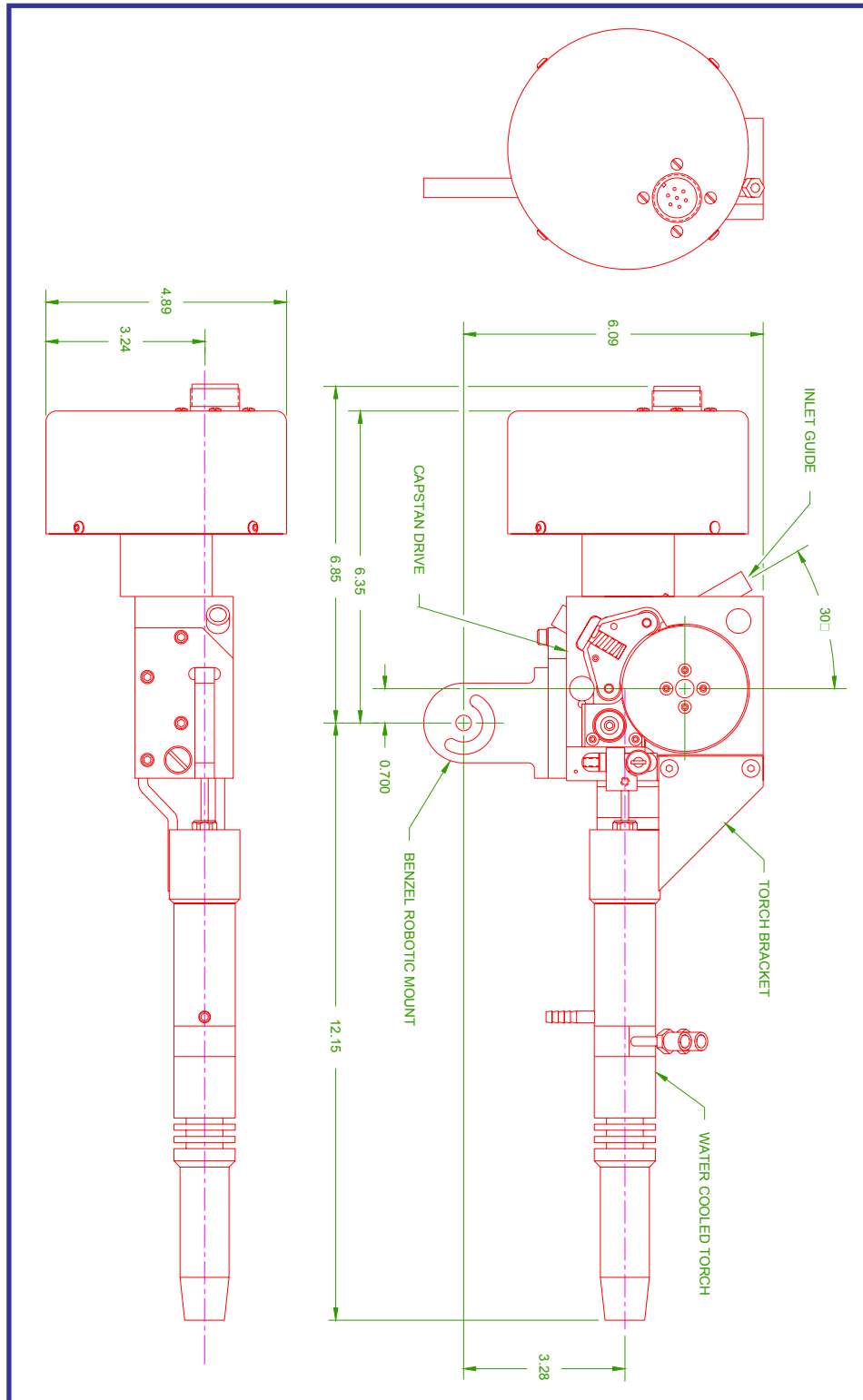
**9cm Opposite Hand Slow Speed Capstan
 with Standard Robotic Mount**



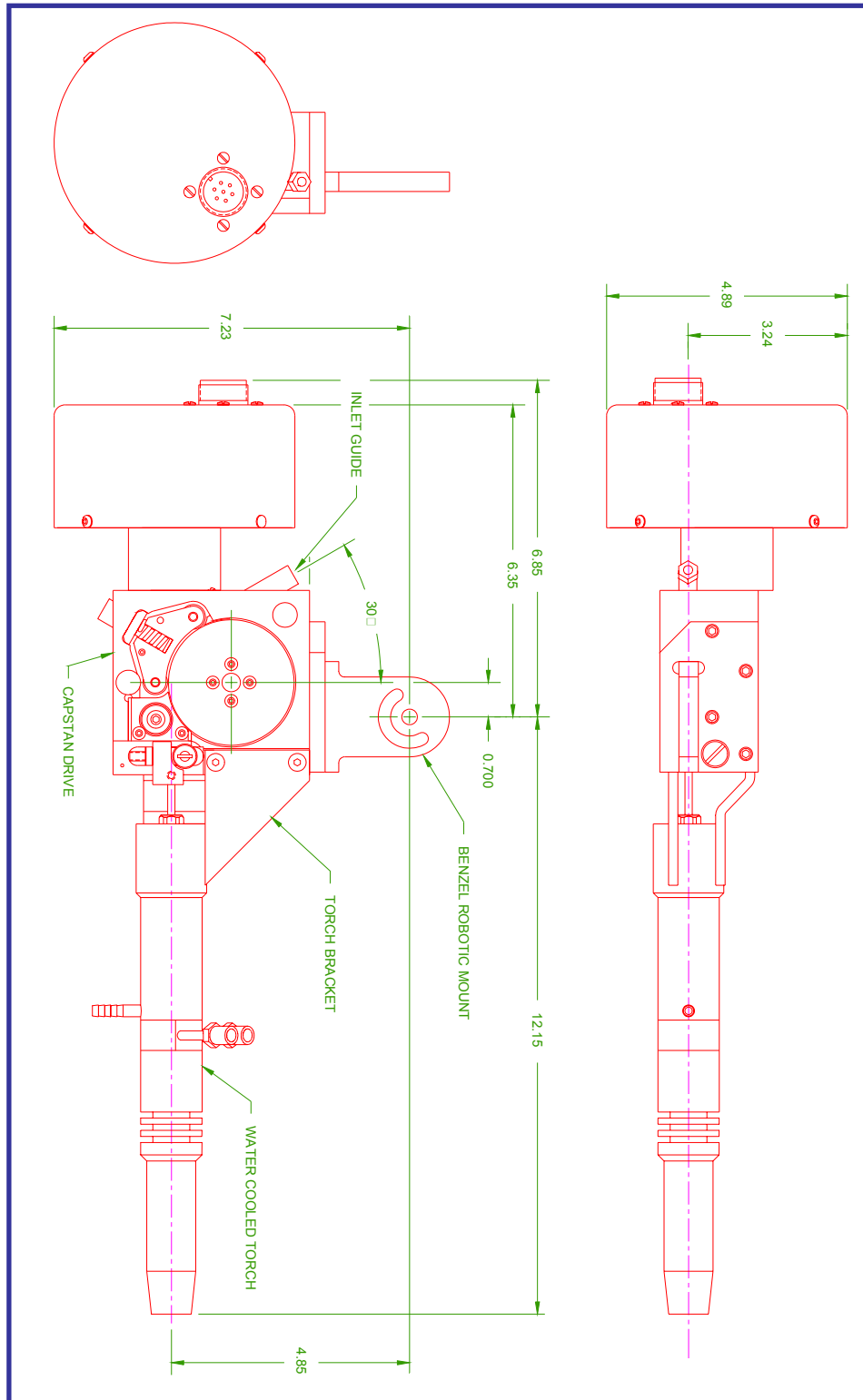
**9cm Standard Hand Slow Speed Capstan
with Benzil Robotic Mount**



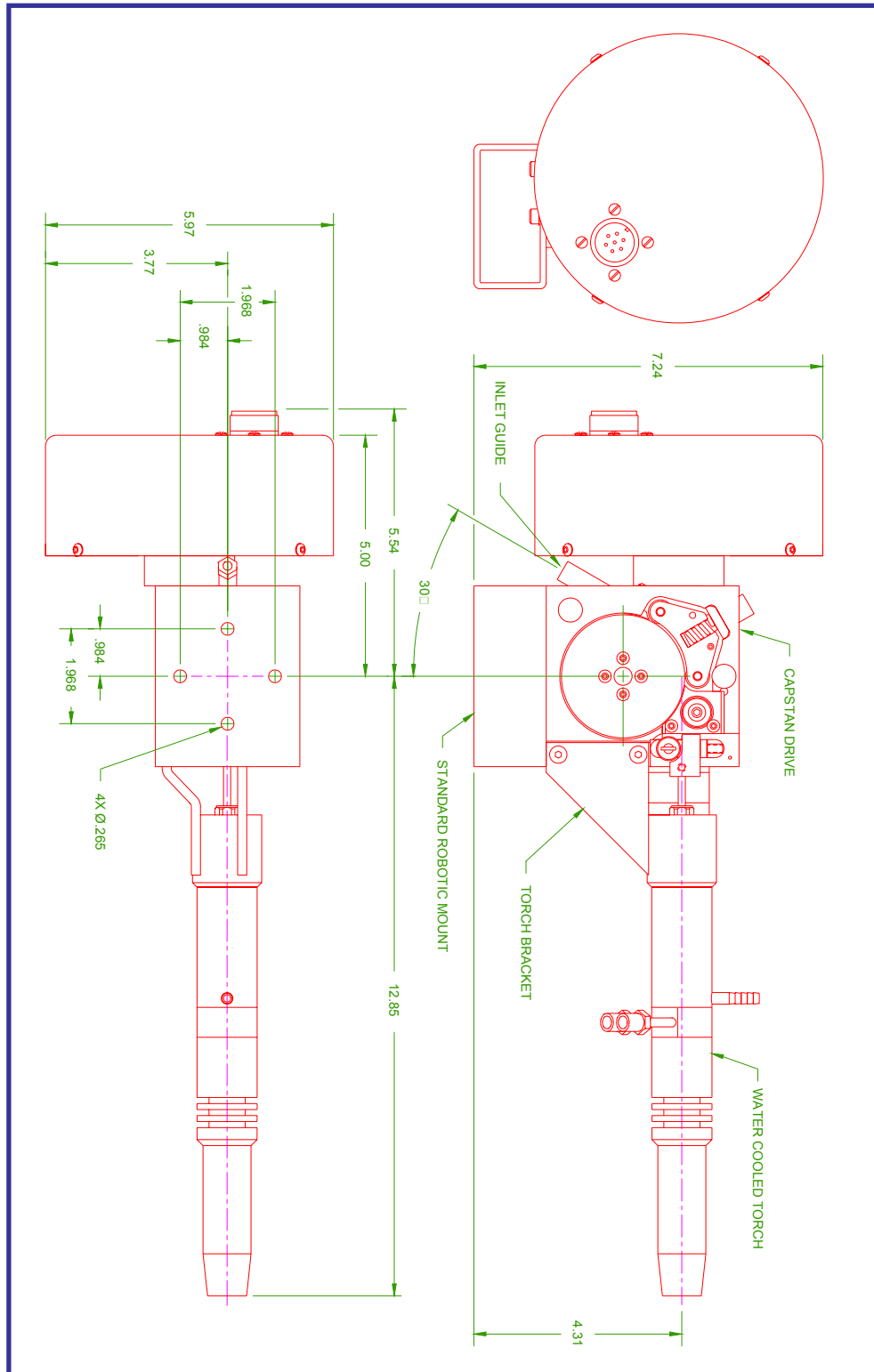
**9cm Standard Hand Slow Speed Capstan
with Benzil Robotic Mount**



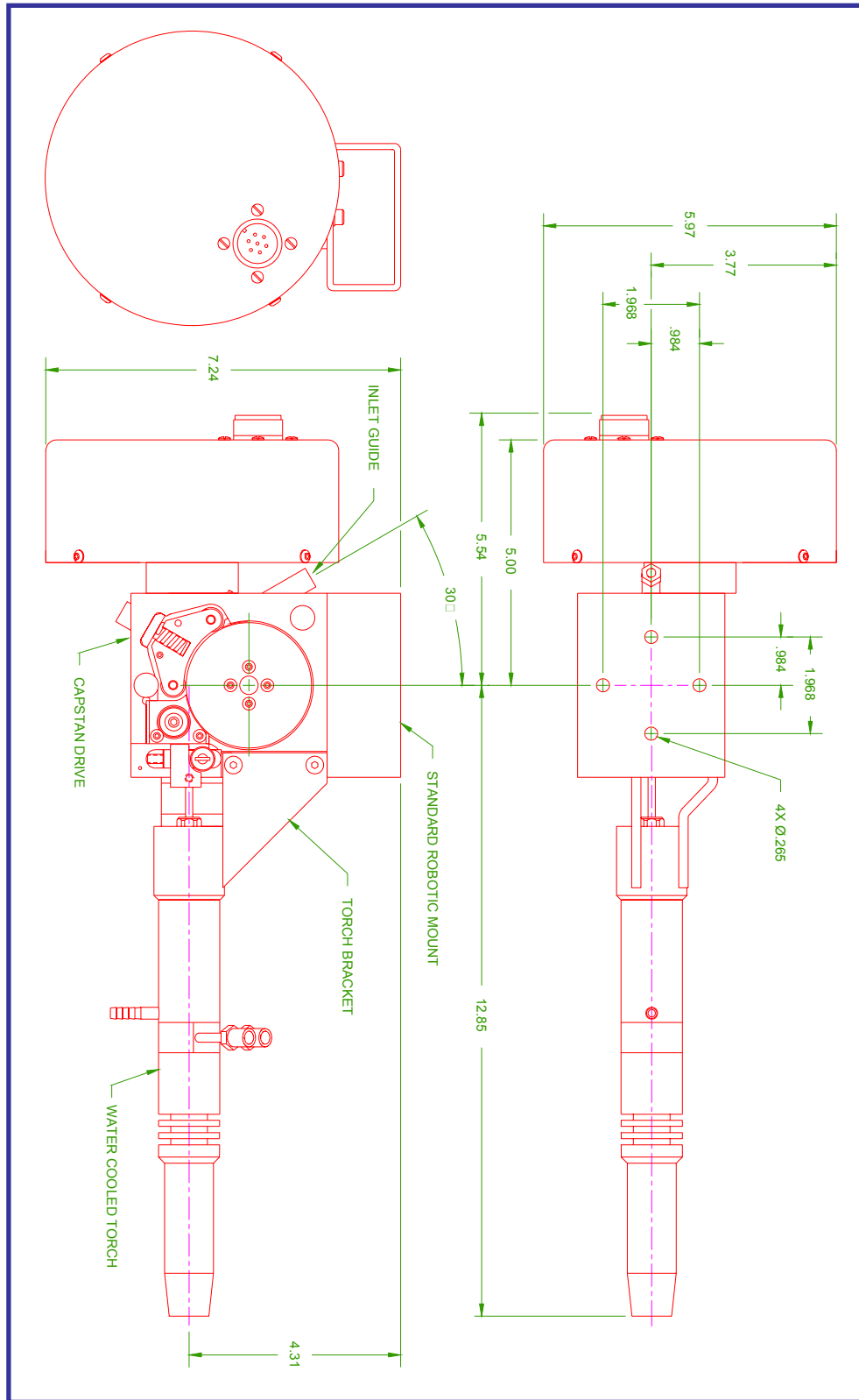
**9cm Opposite Hand Slow Speed Capstan
with Benzil Robotic Mount**



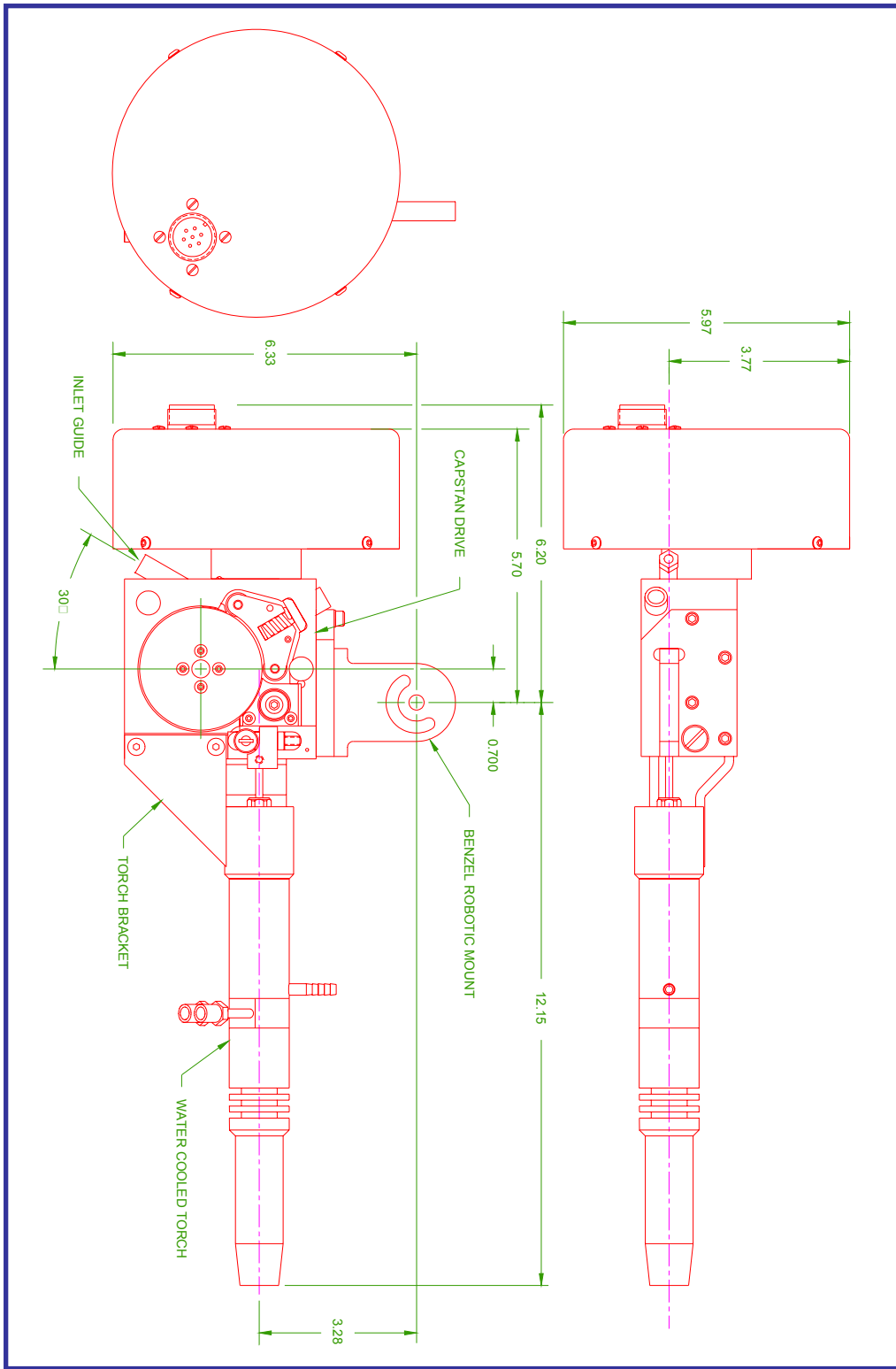
**9cm Opposite Hand Slow Speed Capstan
with Benzil Robotic Mount**



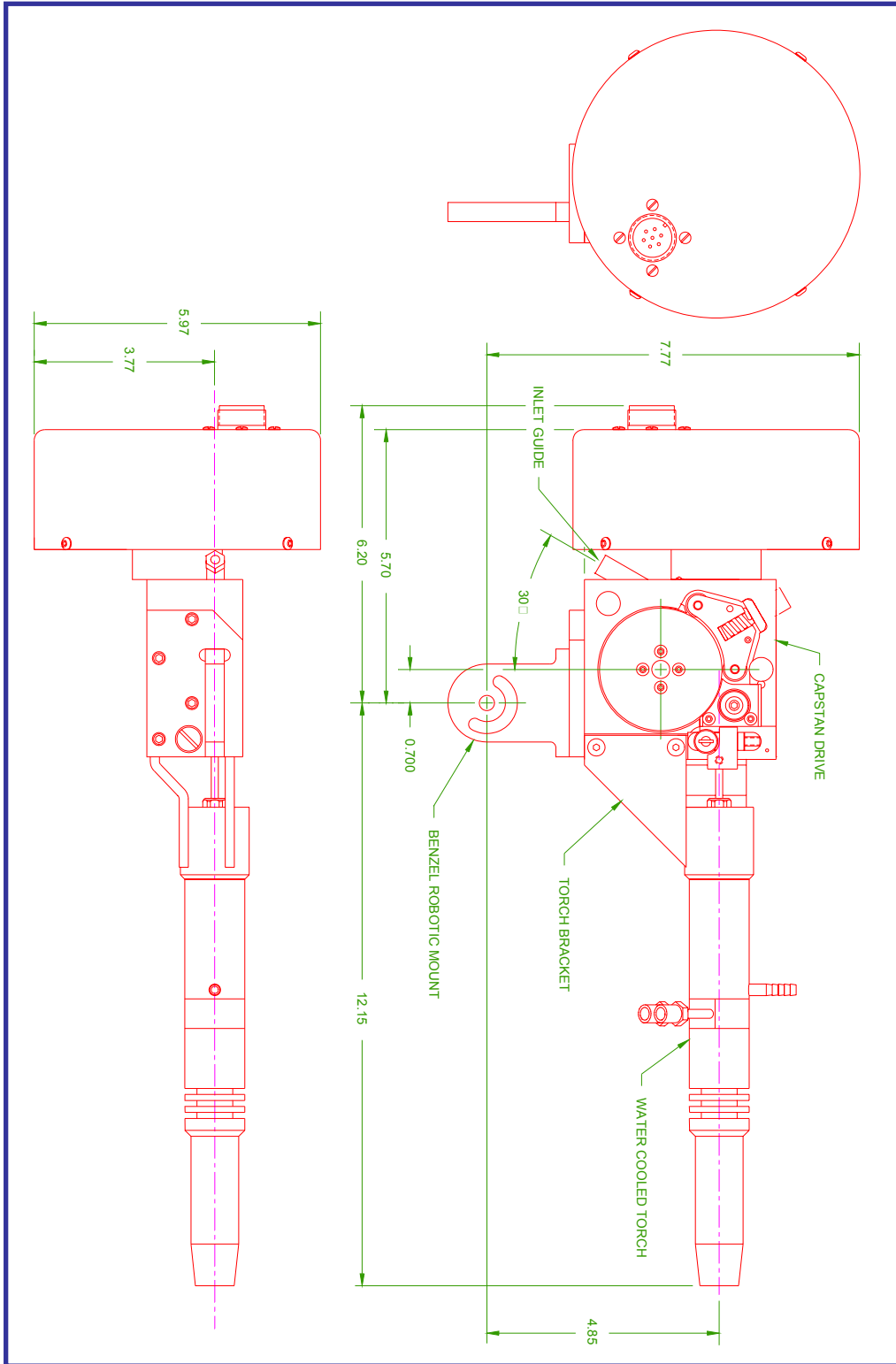
**12cm Standard Hand Standard Speed Capstan
with Standard Robotic Mount**



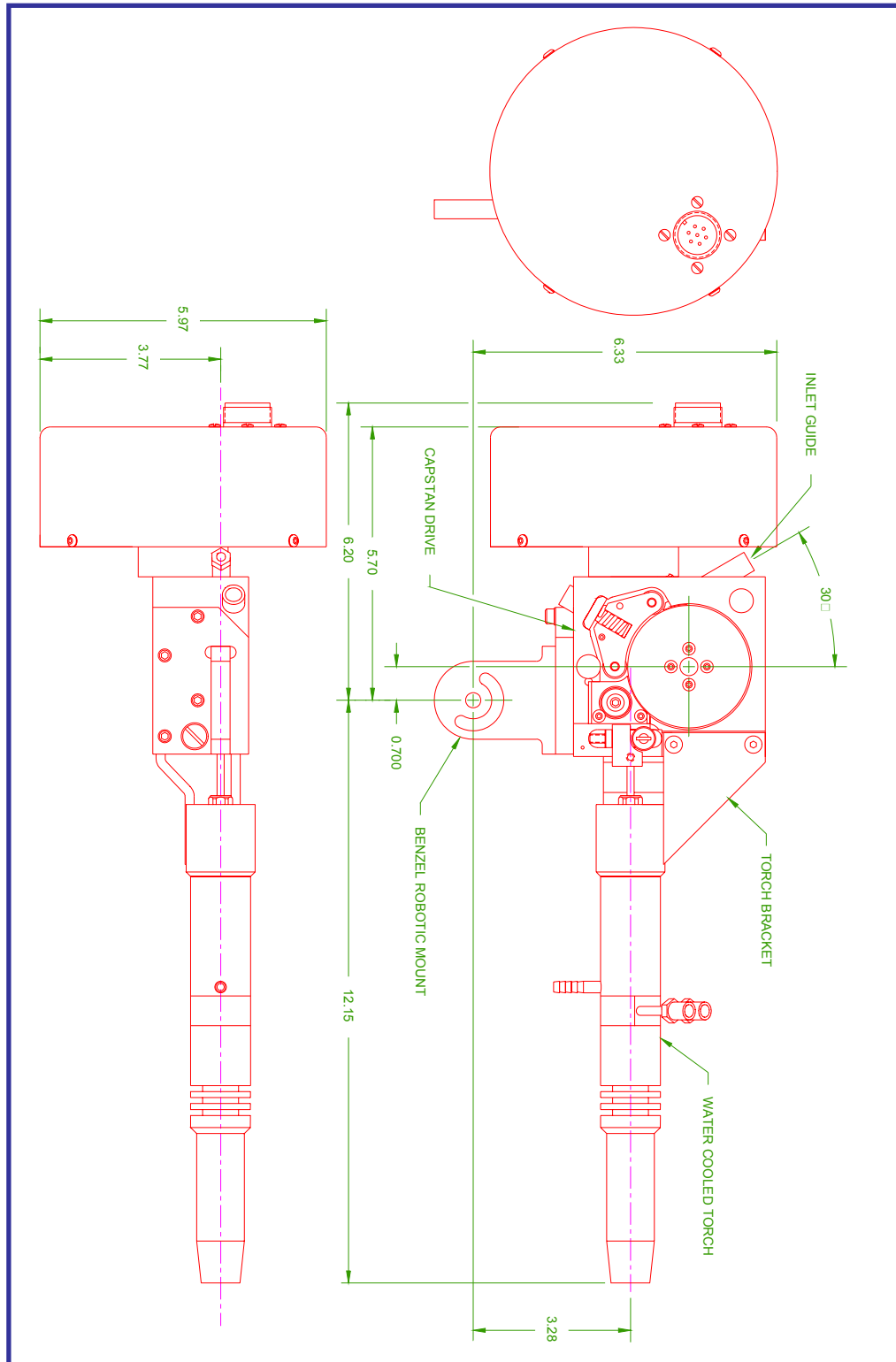
**12cm Standard Hand Standard Speed Capstan
with Standard Robotic Mount**



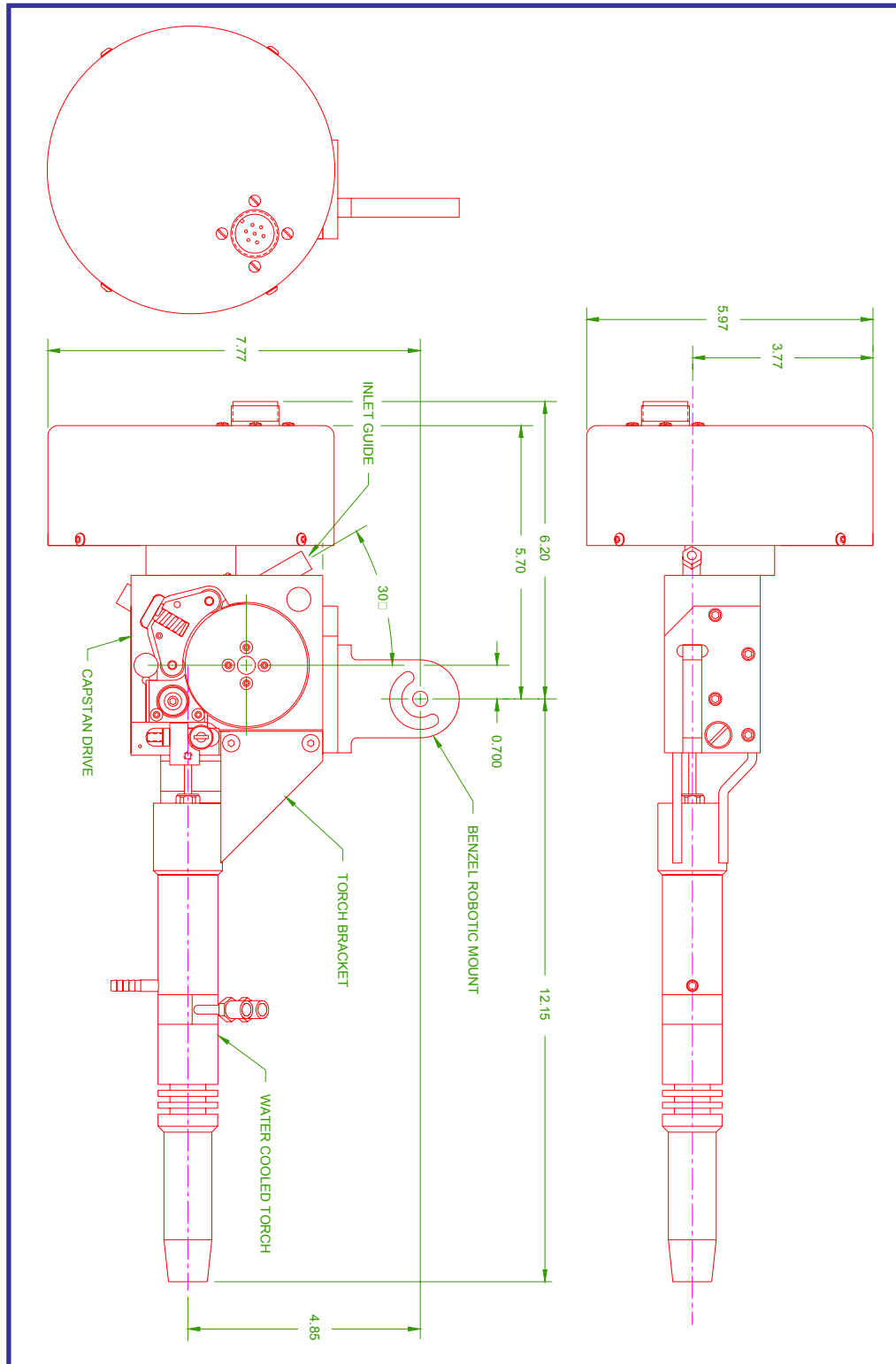
**12cm Standard Hand Standard Speed Capstan
 with Benzil Robotic Mount**



**12cm Standard Hand Standard Speed Capstan
with Benzil Robotic Mount**

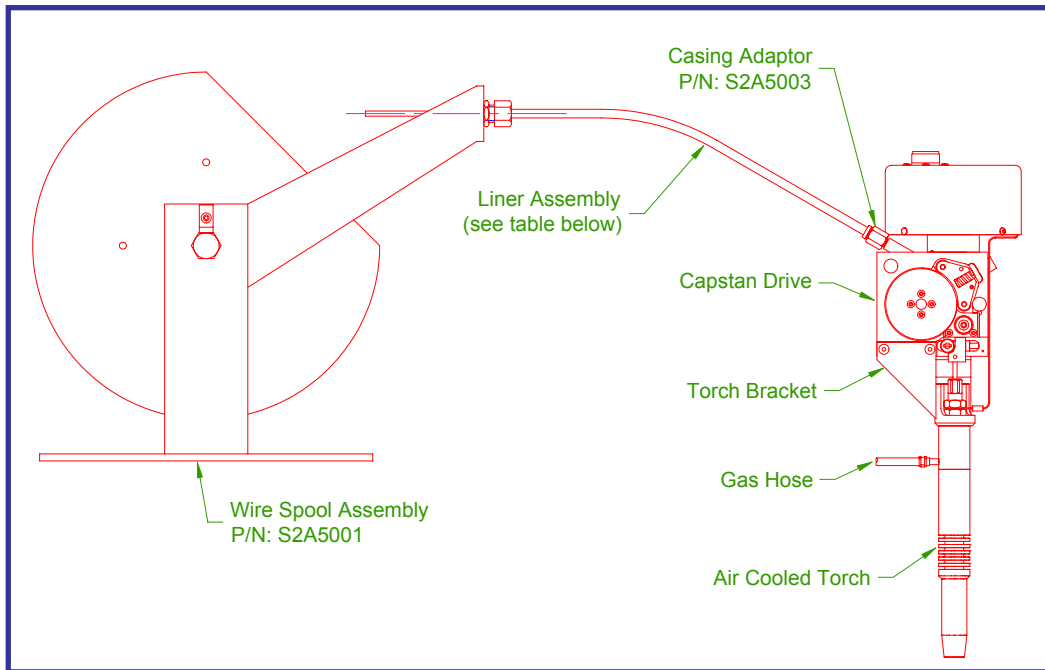


**12cm Opposite Hand Standard Speed Capstan
 with Benzil Robotic Mount**



**12cm Opposite Hand Standard Speed Capstan
with Benzil Robotic Mount**

APPENDIX D AIR COOLED MIG TORCH SPECIFICATIONS



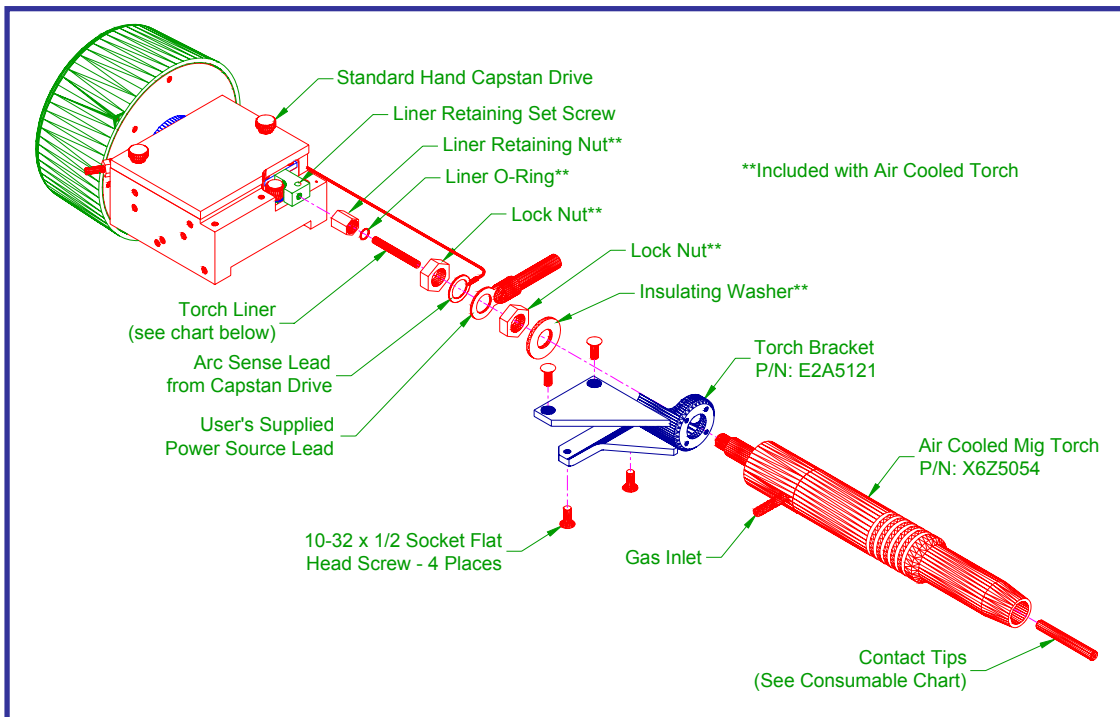
Liner Assembly Chart

WIRE MATERIAL	WIRE DIAMETER INCH / MM	10 FT LONG PART NO	15 FT LONG PART NO
Non-Aluminum	0.030" / 0.8mm to 0.047" / 1.2mm	E7A5001	E7A5002
Non-Aluminum	0.052" / 1.3mm to 0.062" / 1.6mm	E7A5003	E7A5004
Aluminum	0.030" / 0.8mm to 0.035" / 0.9mm	E7A5005	E7A5006
Aluminum	0.040" / 1.0mm to 0.052" / 1.3mm	E7A5007	E7A5008
Aluminum	0.062" / 1.6mm	E7A5009	E7A5010

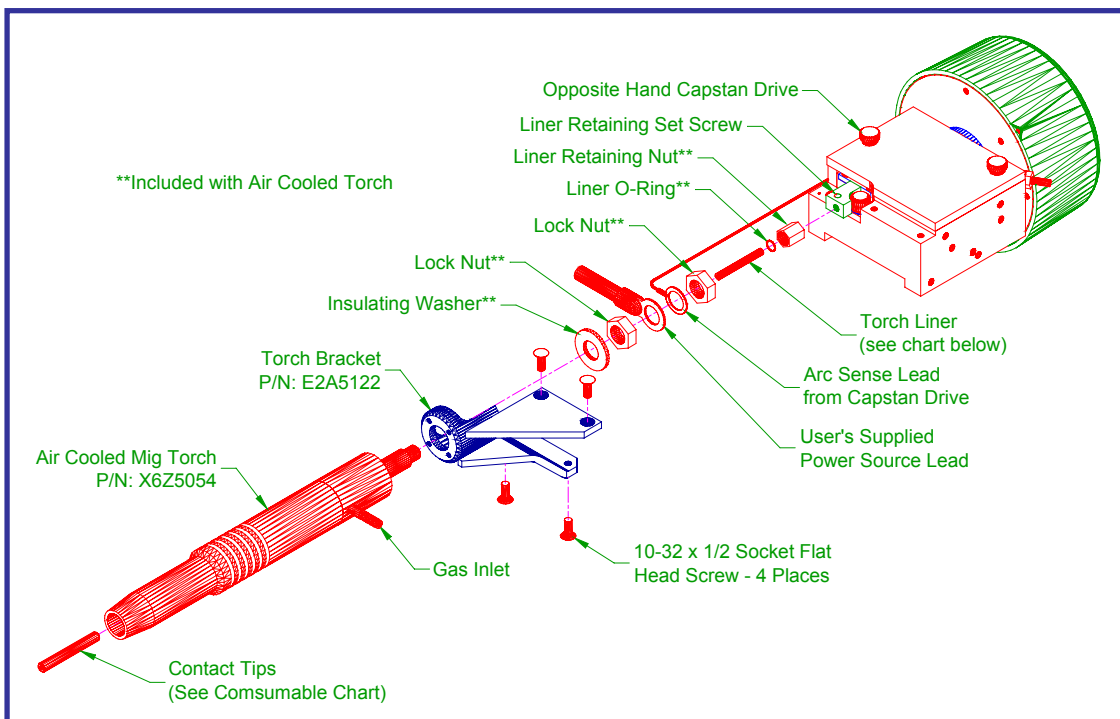
Torch Consumable Chart

DESCRIPTION	PART NO
Insulating Washer	X7N5026
Liner O-ring	X7N5027
Nozzle Insulator	X7N5011
Gas Diffuser	X7N5013
Conical Nozzle	X7N5014
0.030 H & FC Contact Tip	X7T5021
0.030 Aluminum Contact Tip	X7T5037
0.035 H & FC Contact Tip	X7T5010
0.035 Aluminum Contact Tip	X7T5022
0.045 H & FC Contact Tip	X7T5011
0.045 Aluminum Contact Tip	X7T5023
0.052 H & FC Contact Tip	X7T5024
0.052 Aluminum Contact Tip	X7T5036
0.062 Aluminum Contact Tip	X7T5012

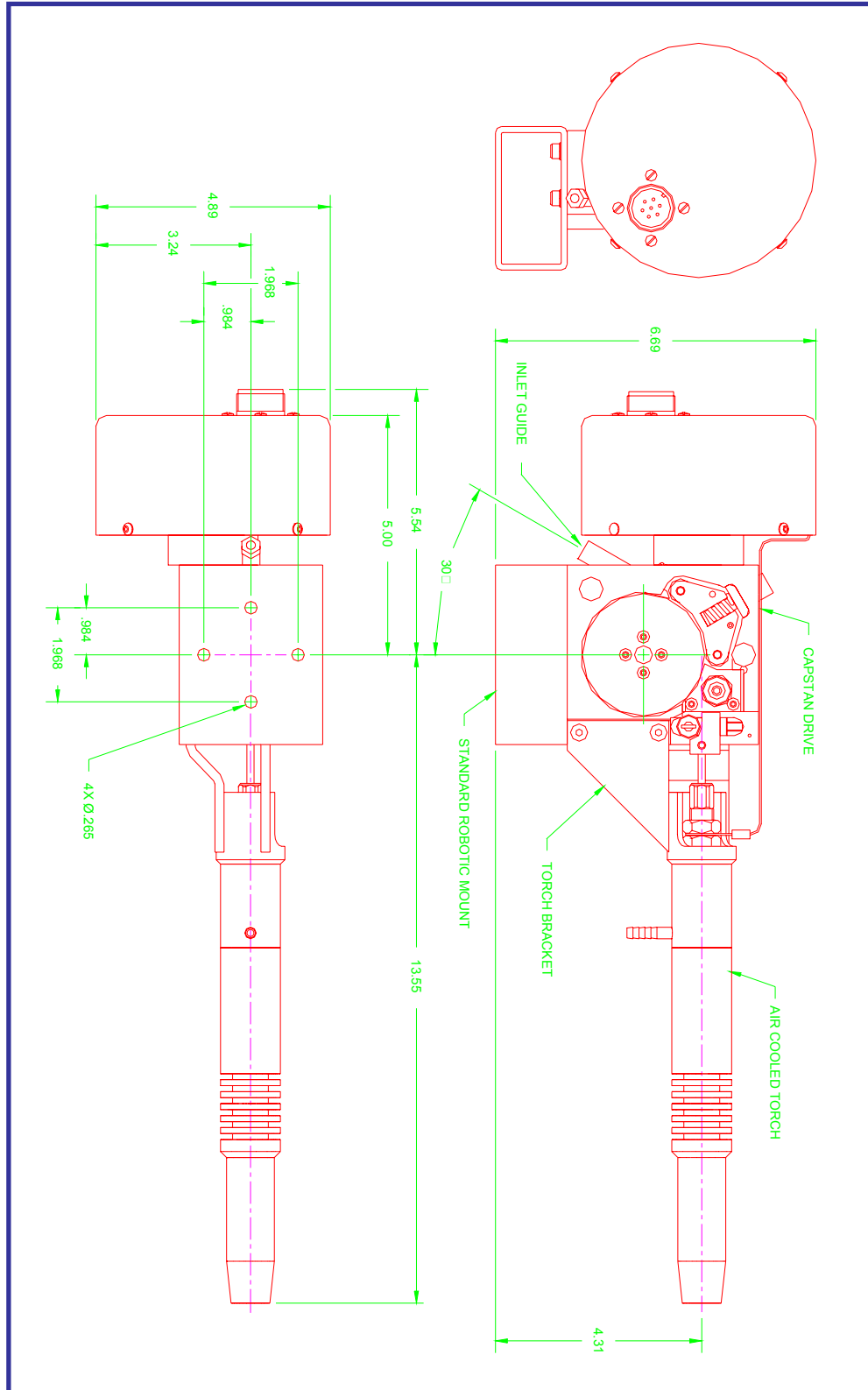
Air Cooled Torch System Configuration



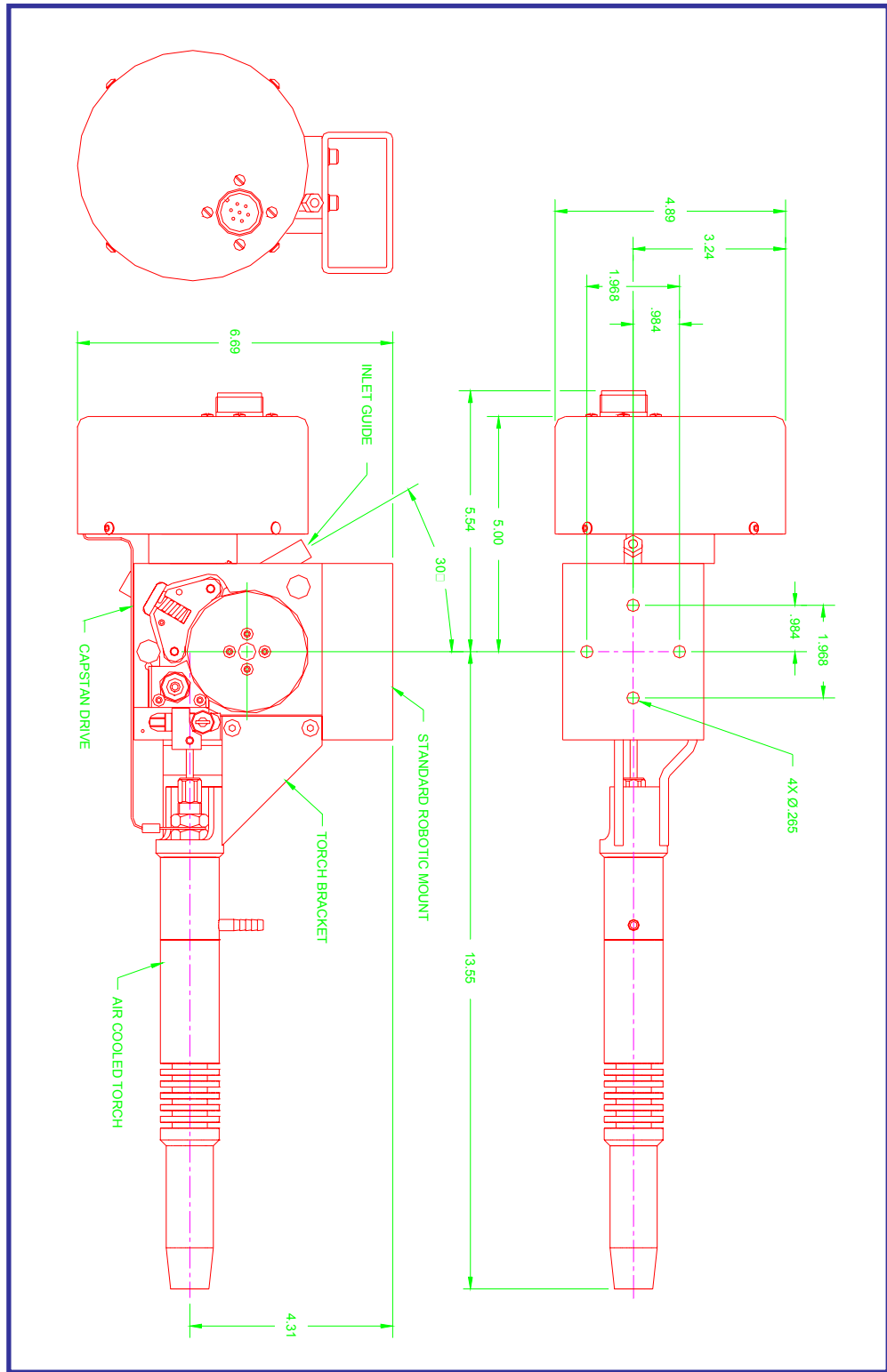
Standard Hand Capstan Torch Configuration



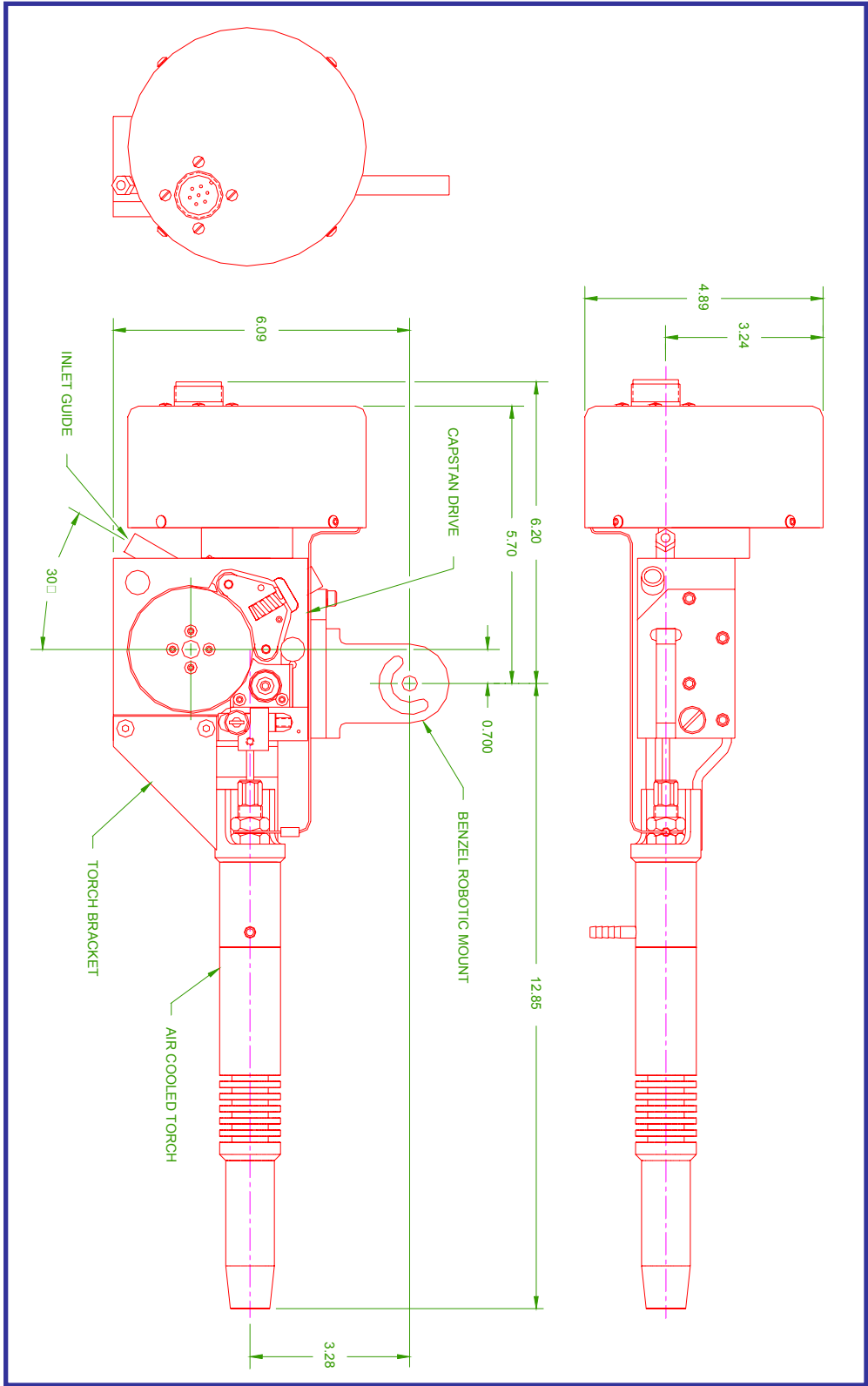
Opposite Hand Capstan Torch Configuration



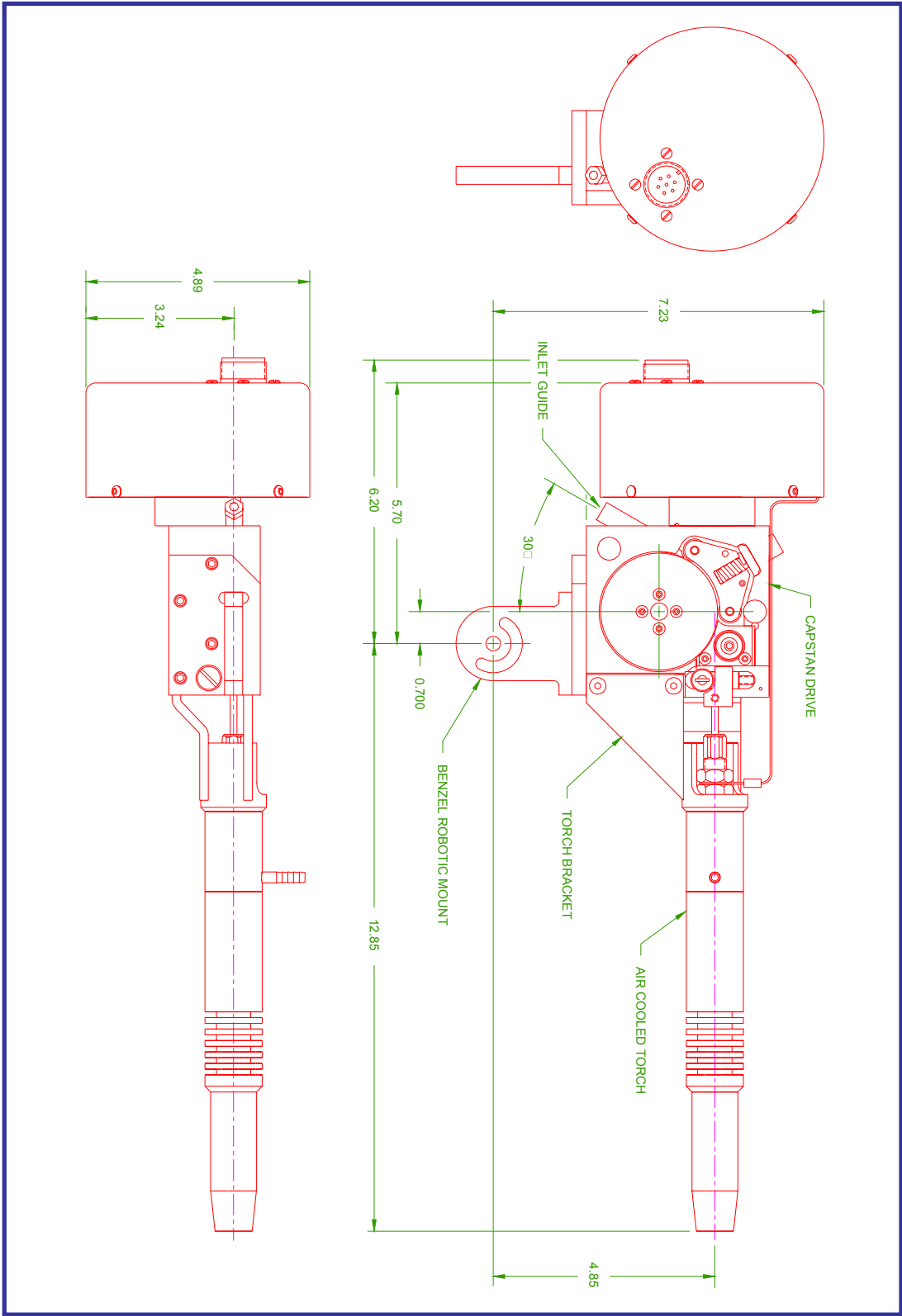
**9cm Standard Hand Standard Speed Capstan
with Standard Robotic Mount**



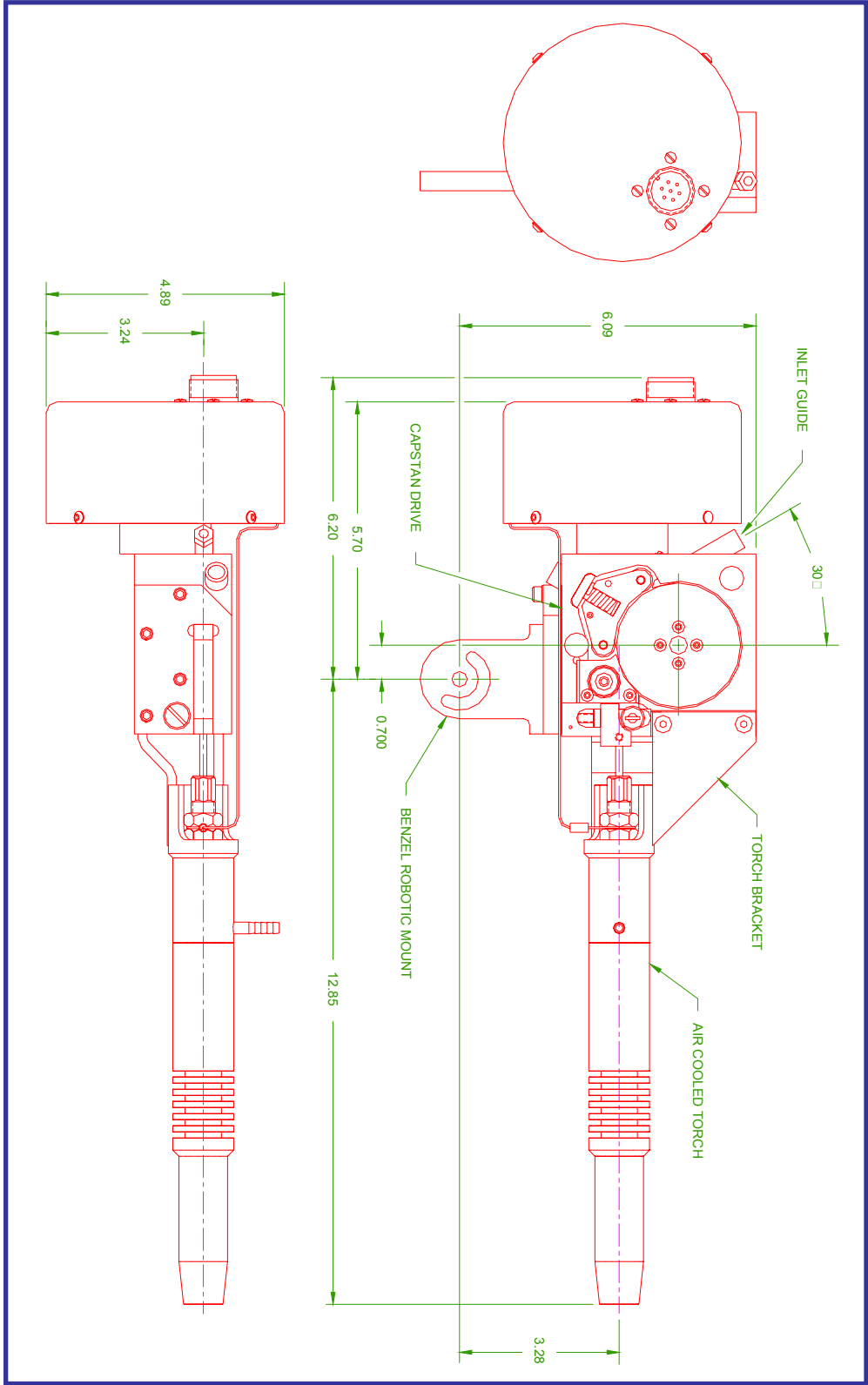
**9cm Opposite Hand Standard Speed Capstan
 with Standard Robotic Mount**



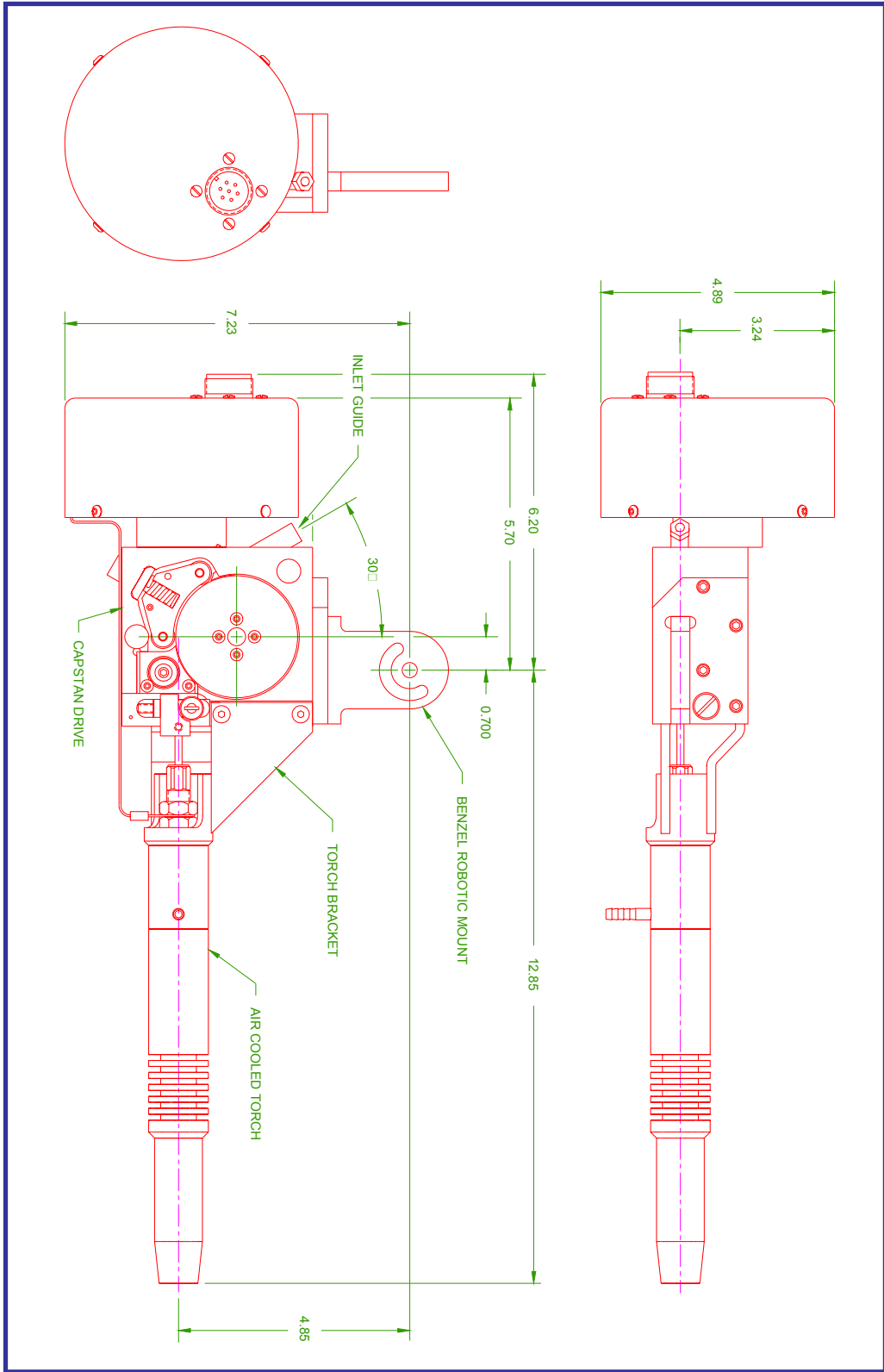
**9cm Standard Hand Standard Speed Capstan
 with Benzil Robotic Mount**



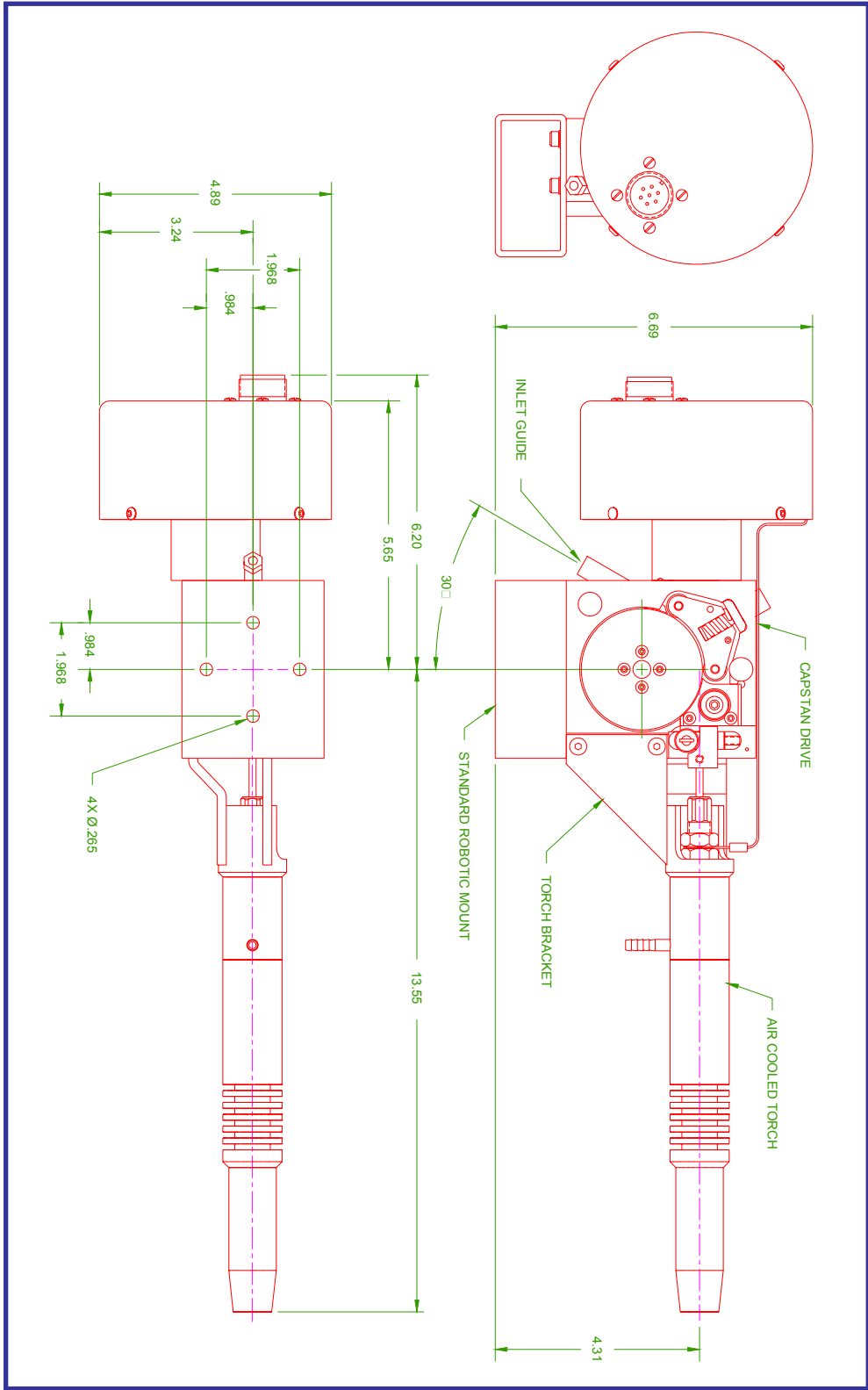
**9cm Standard Hand Standard Speed Capstan
with Benzil Robotic Mount**



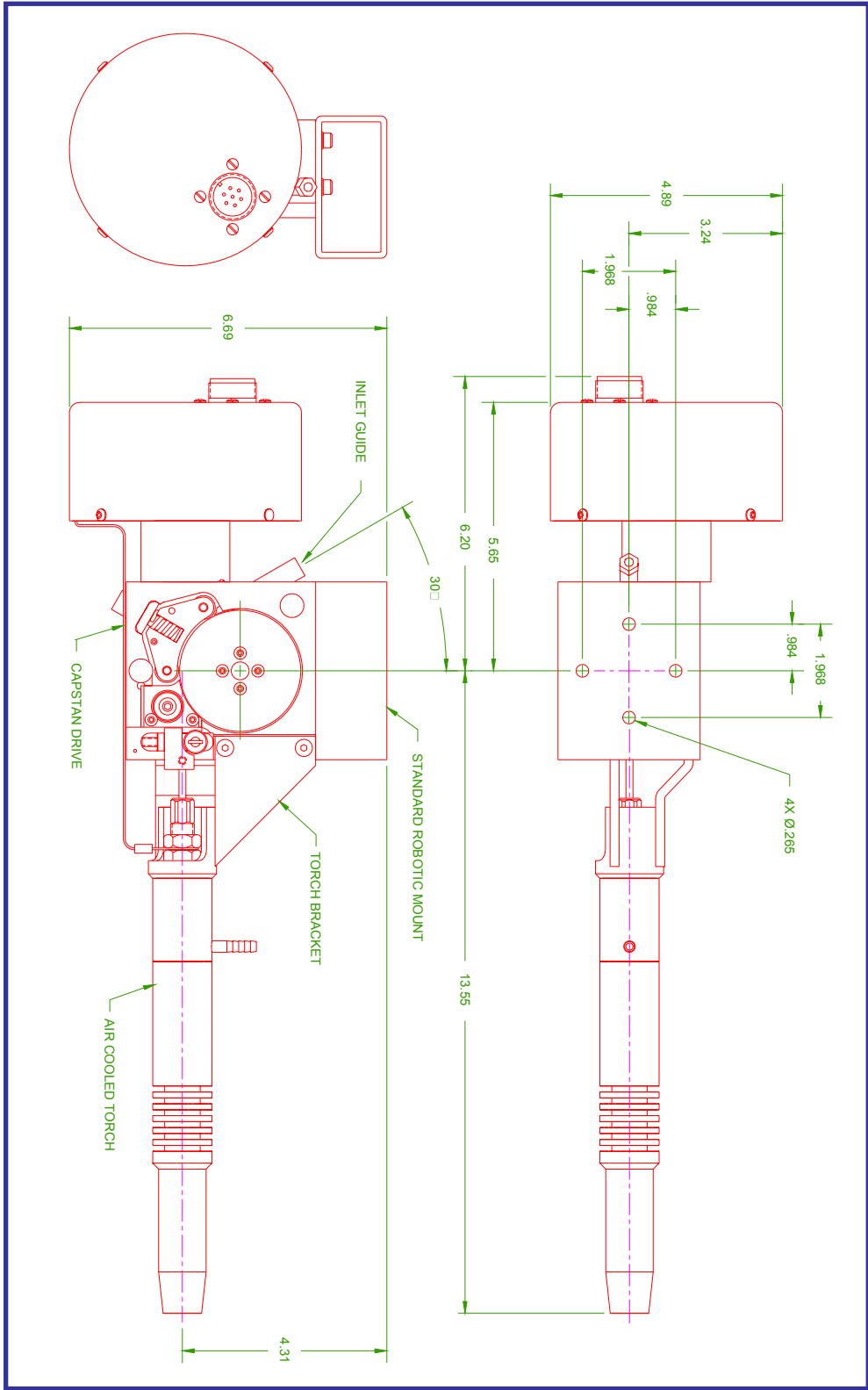
**9cm Opposite Hand Standard Speed Capstan
 with Benzil Robotic Mount**



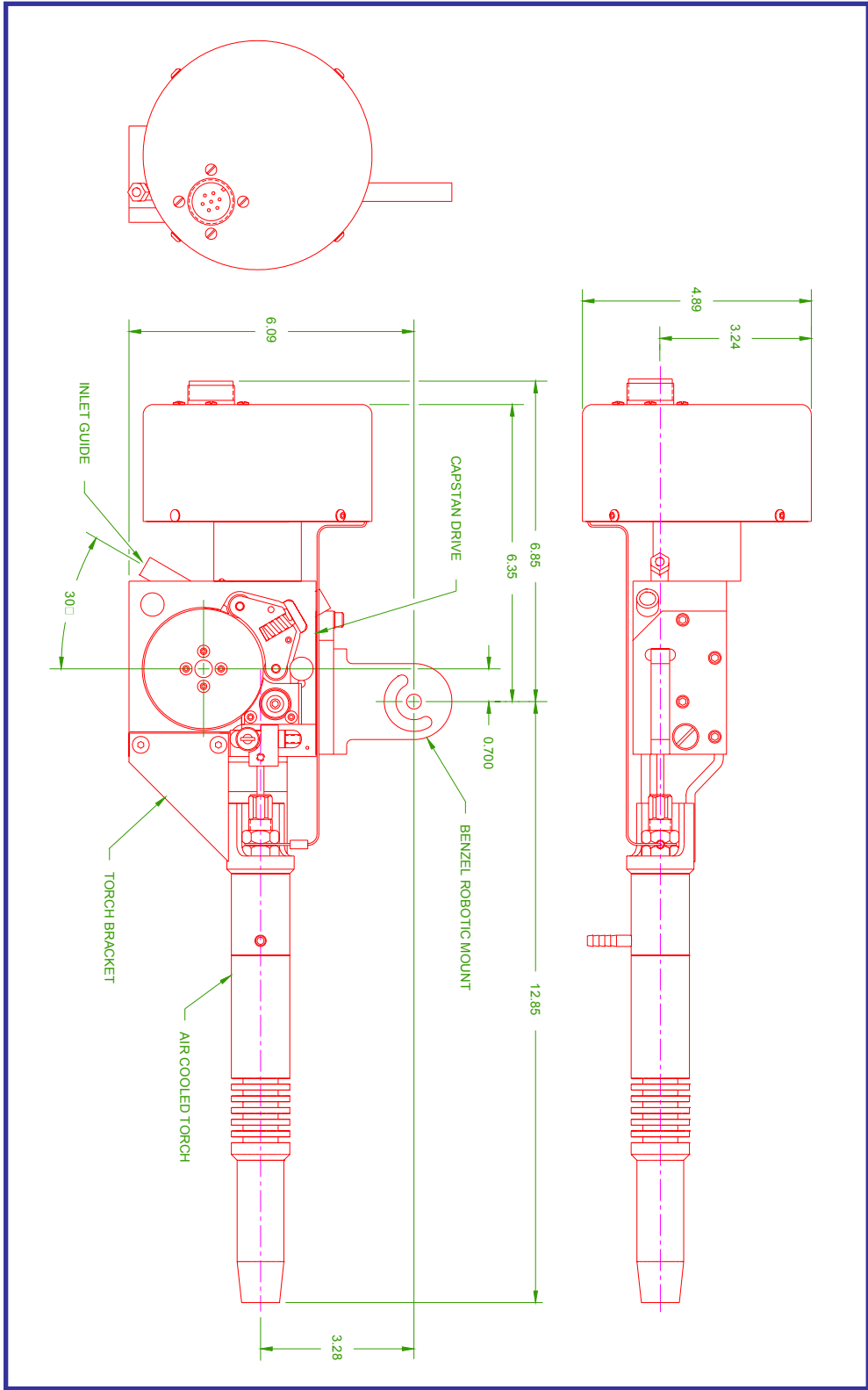
**9cm Opposite Hand Standard Speed Capstan
with Benzil Robotic Mount**



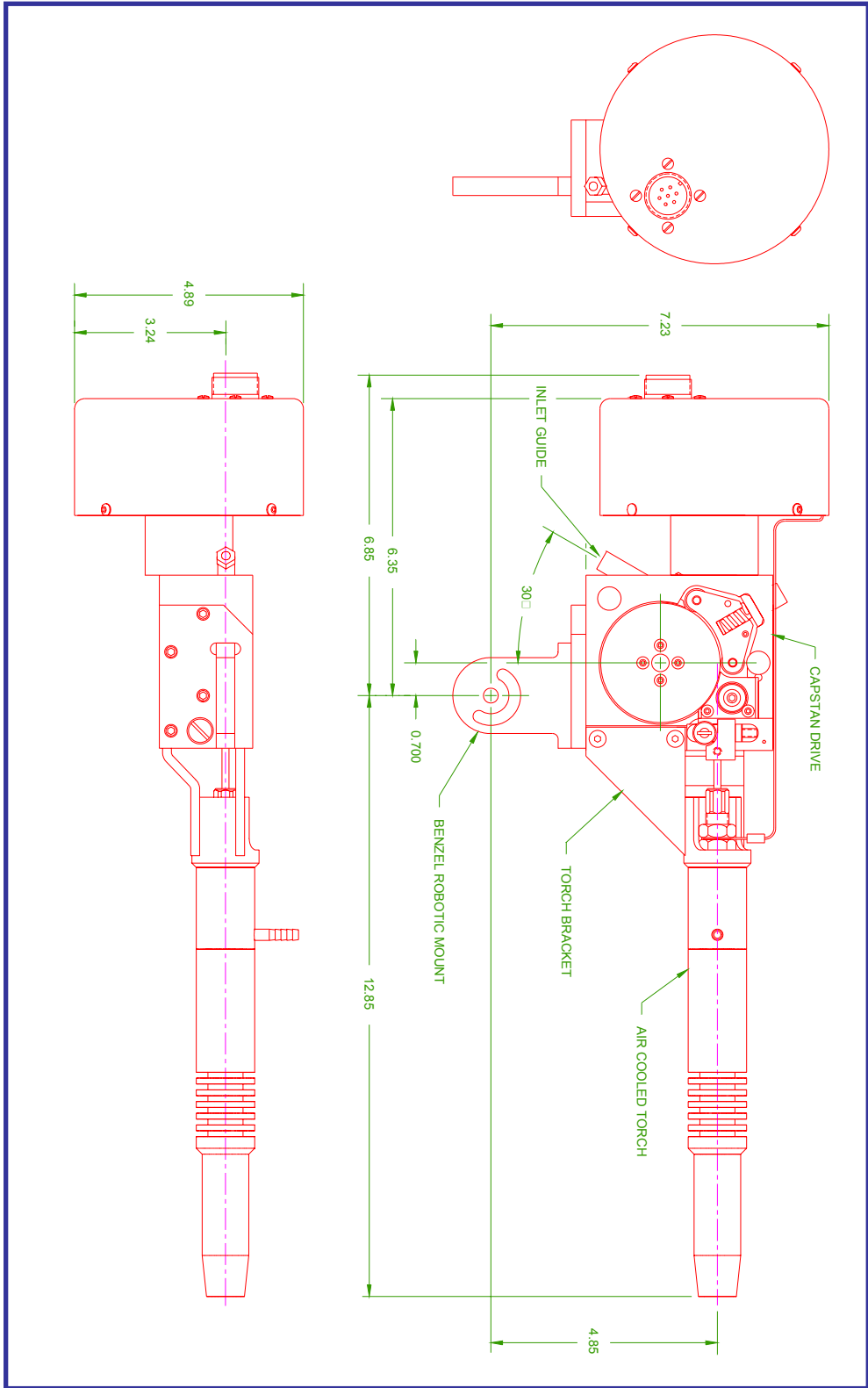
**9cm Standard Hand Slow Speed Capstan
with Standard Robotic Mount**



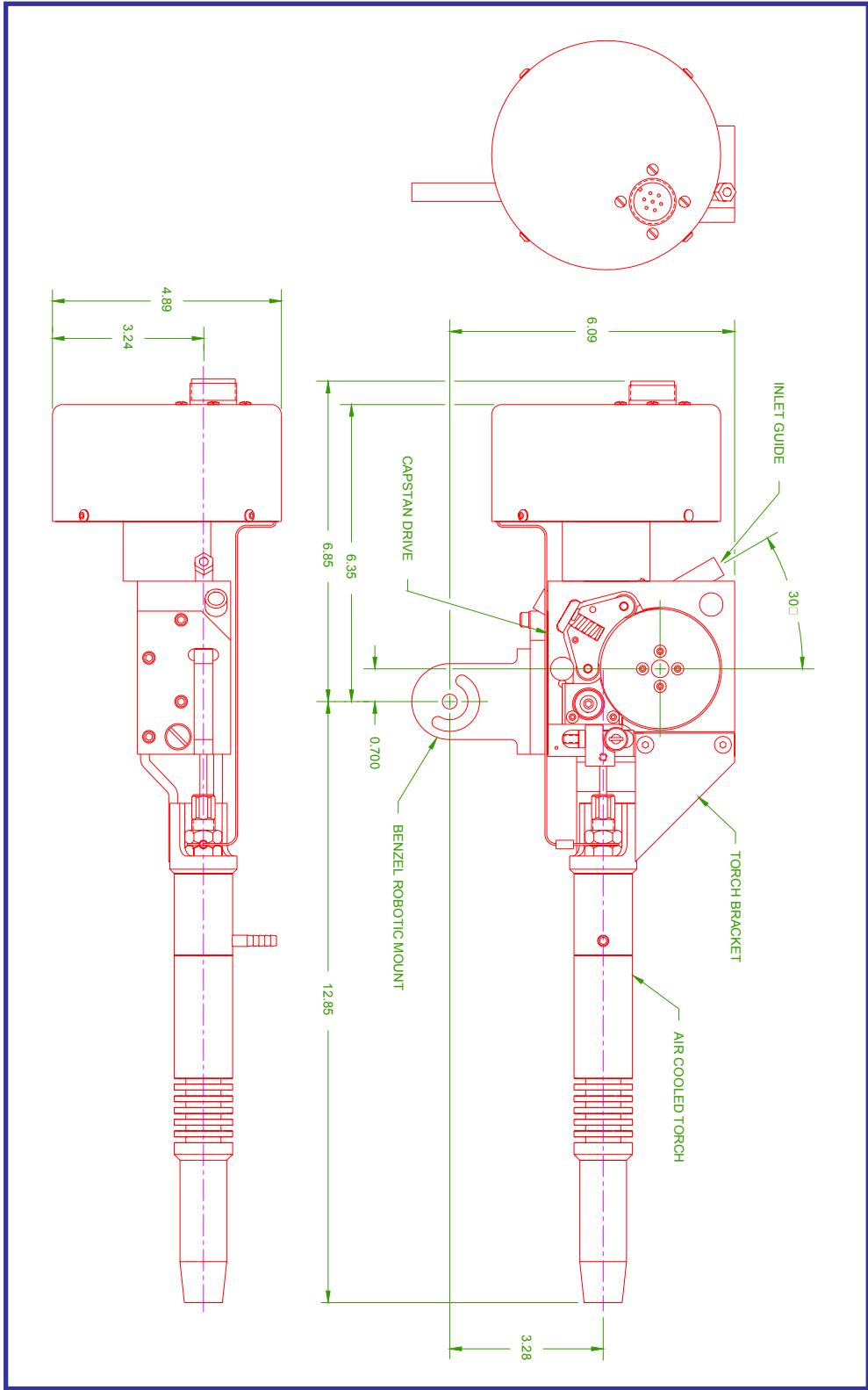
**9cm Opposite Hand Slow Speed Capstan
 with Standard Robotic Mount**



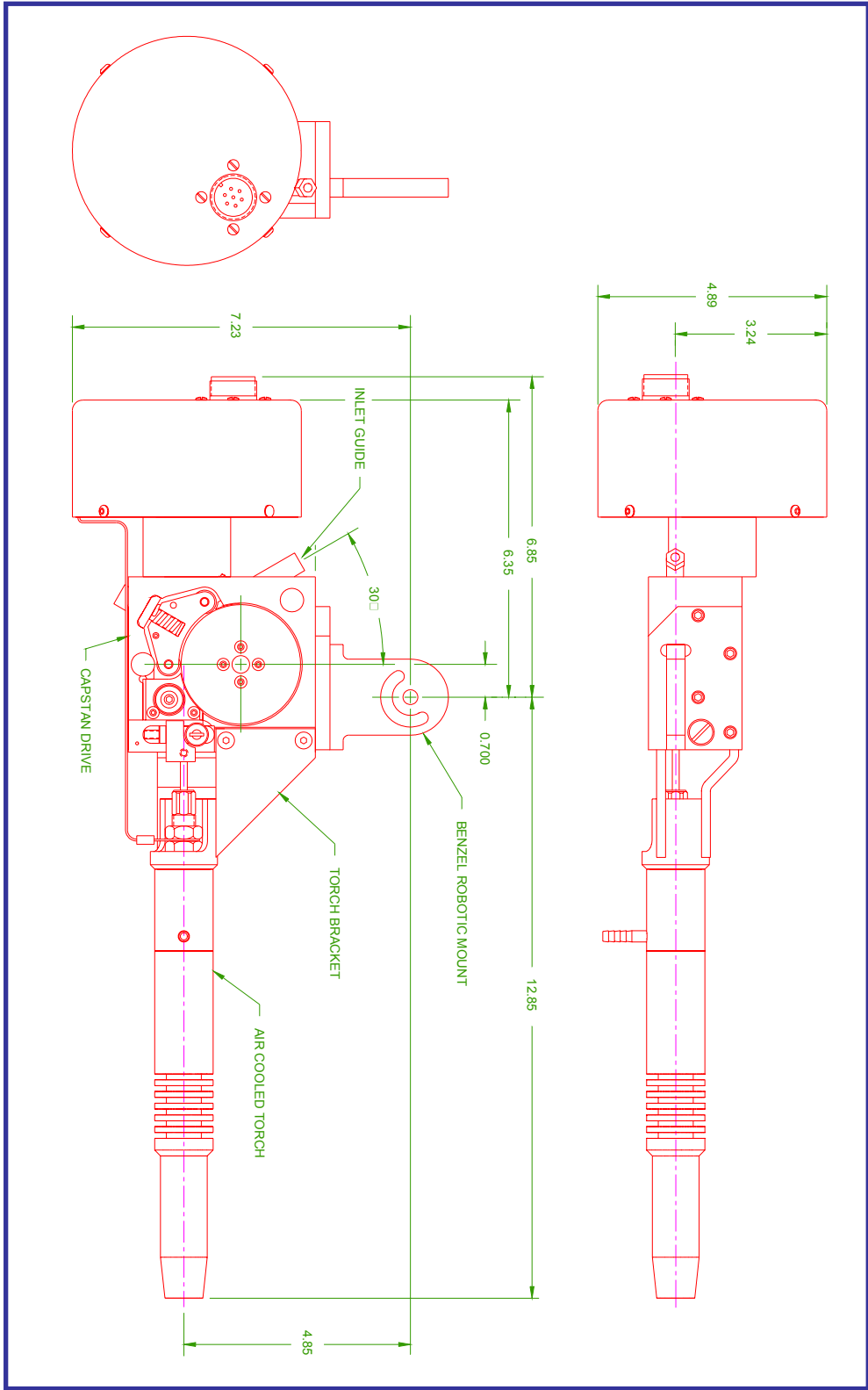
**9cm Standard Hand Slow Speed Capstan
 with Benzil Robotic Mount**



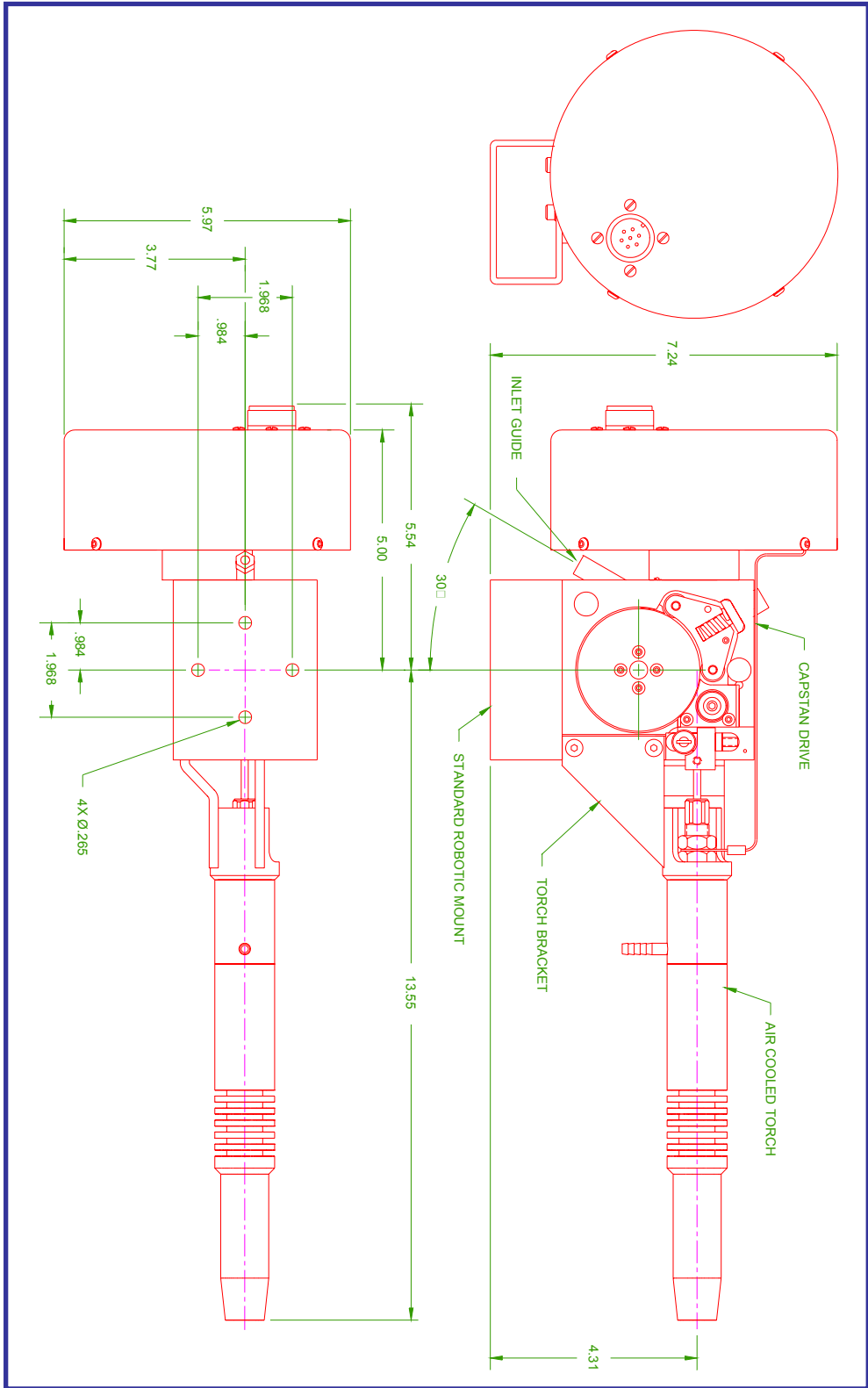
**9cm Standard Hand Slow Speed Capstan
with Benzil Robotic Mount**



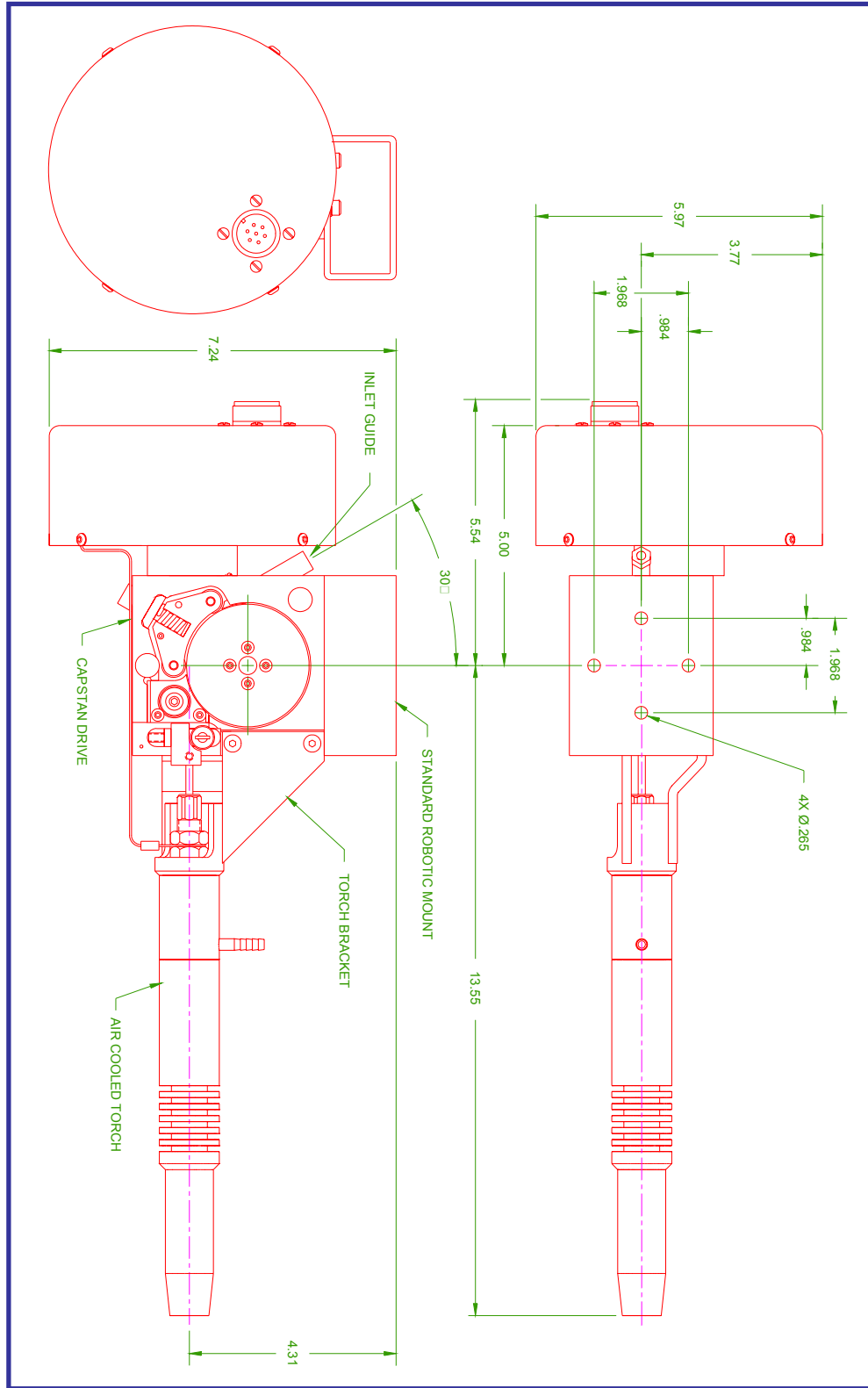
**9cm Opposite Hand Slow Speed Capstan
 with Benzil Robotic Mount**



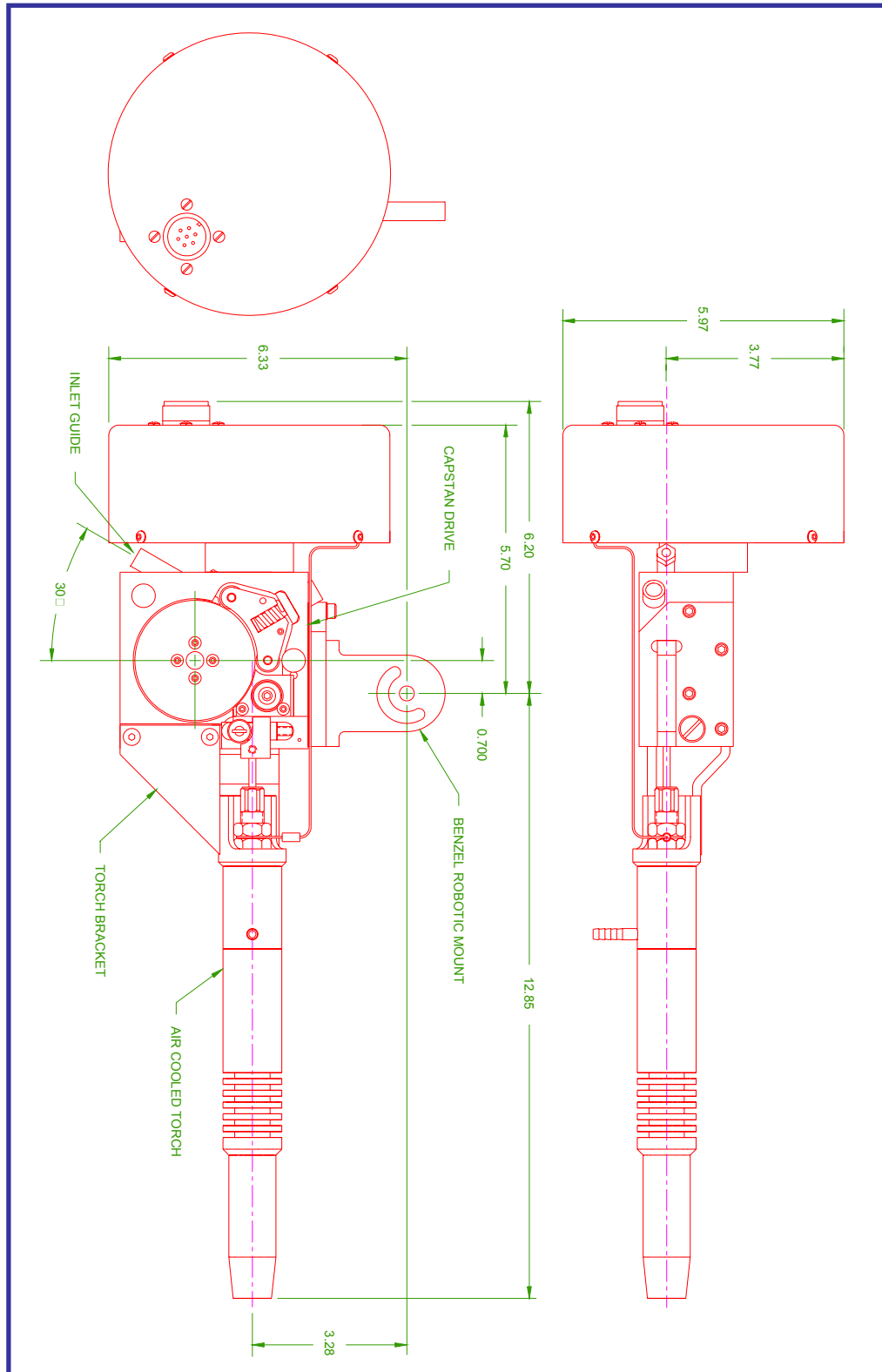
**9cm Opposite Hand Slow Speed Capstan
with Benzil Robotic Mount**



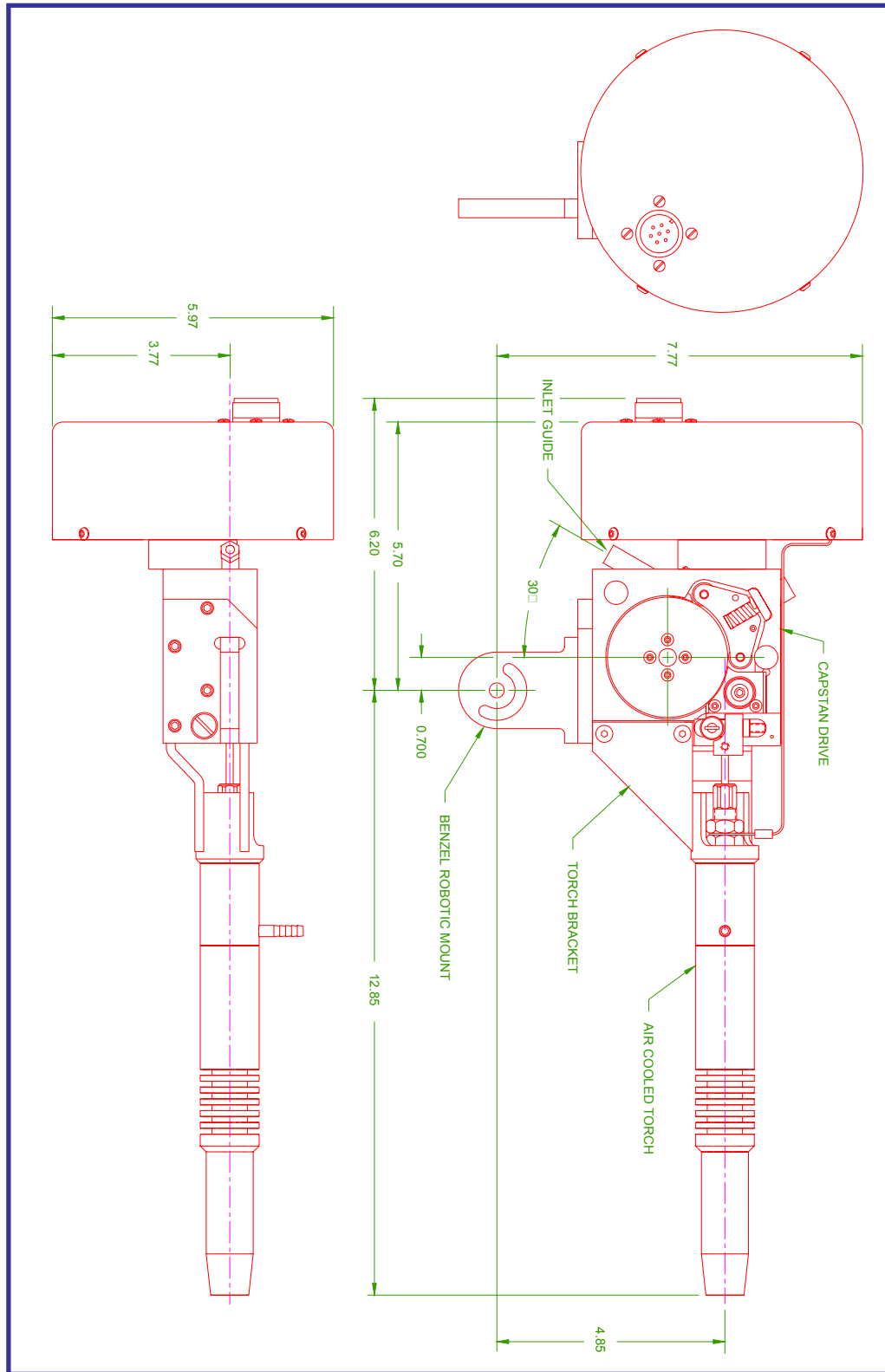
**12cm Standard Hand Standard Speed Capstan
with Standard Robotic Mount**



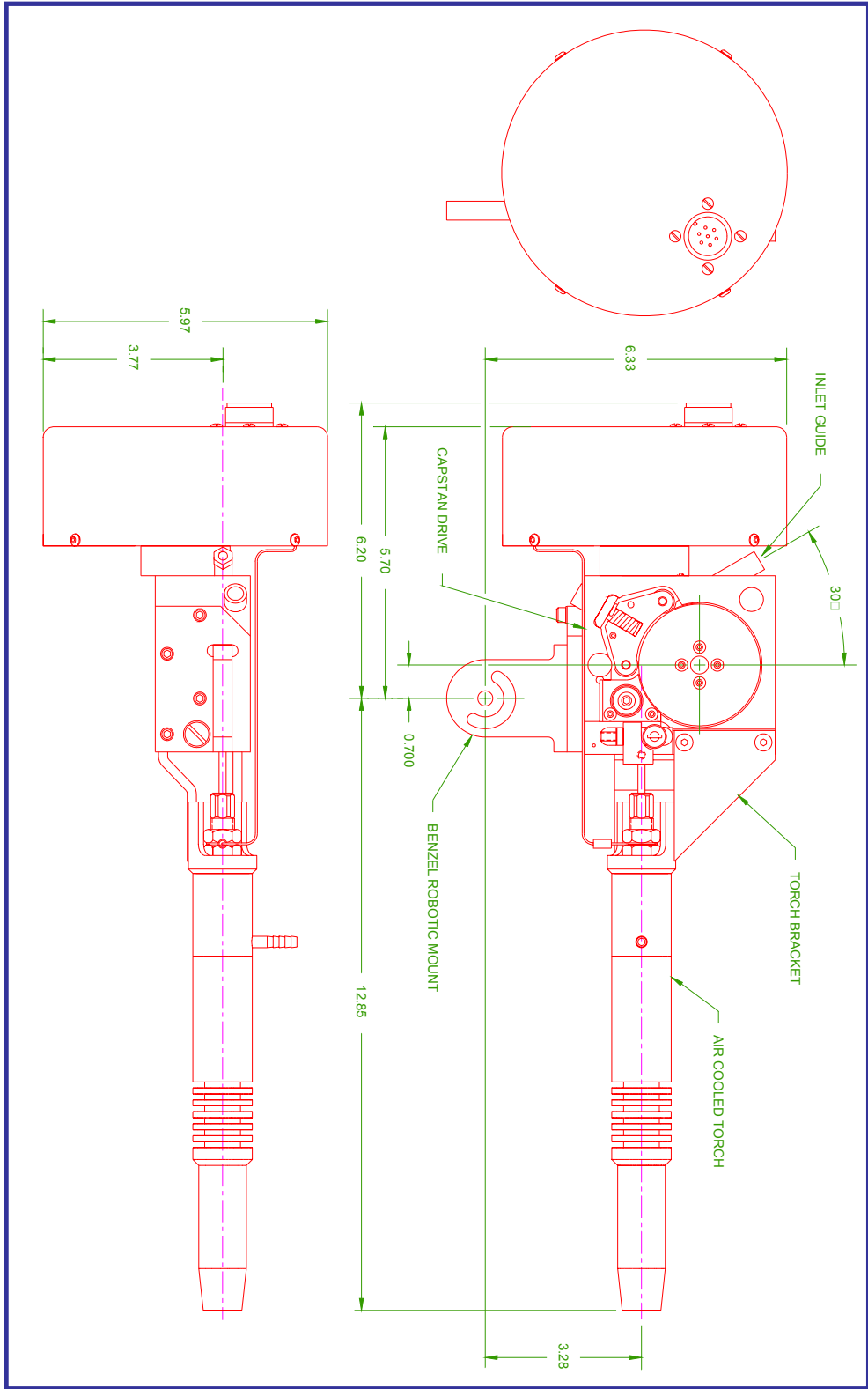
**12cm Opposite Hand Standard Speed Capstan
 with Standard Robotic Mount**



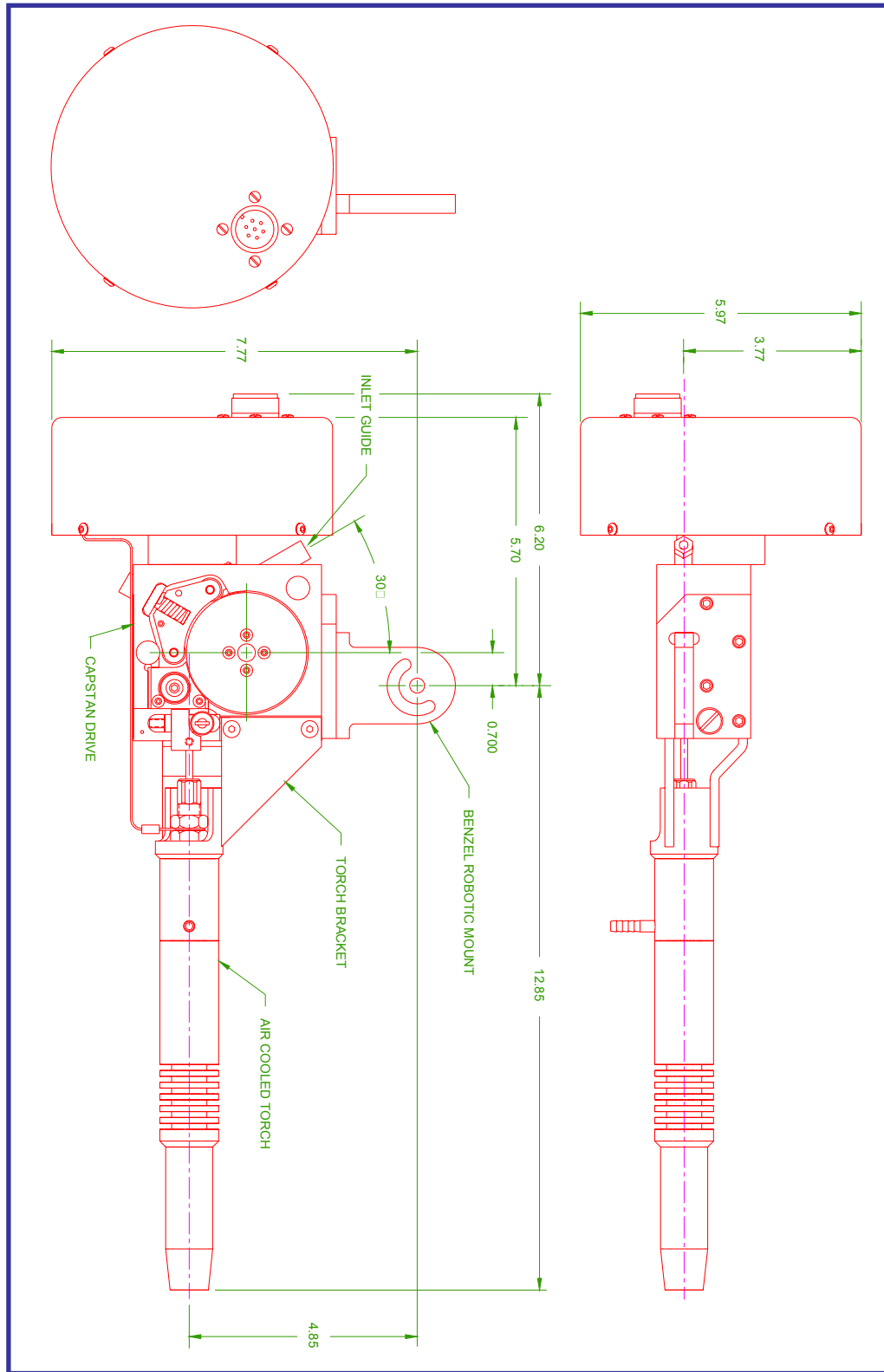
**12cm Standard Hand Standard Speed Capstan
 with Benzil Robotic Mount**



**12cm Standard Hand Standard Speed Capstan
with Benzil Robotic Mount**



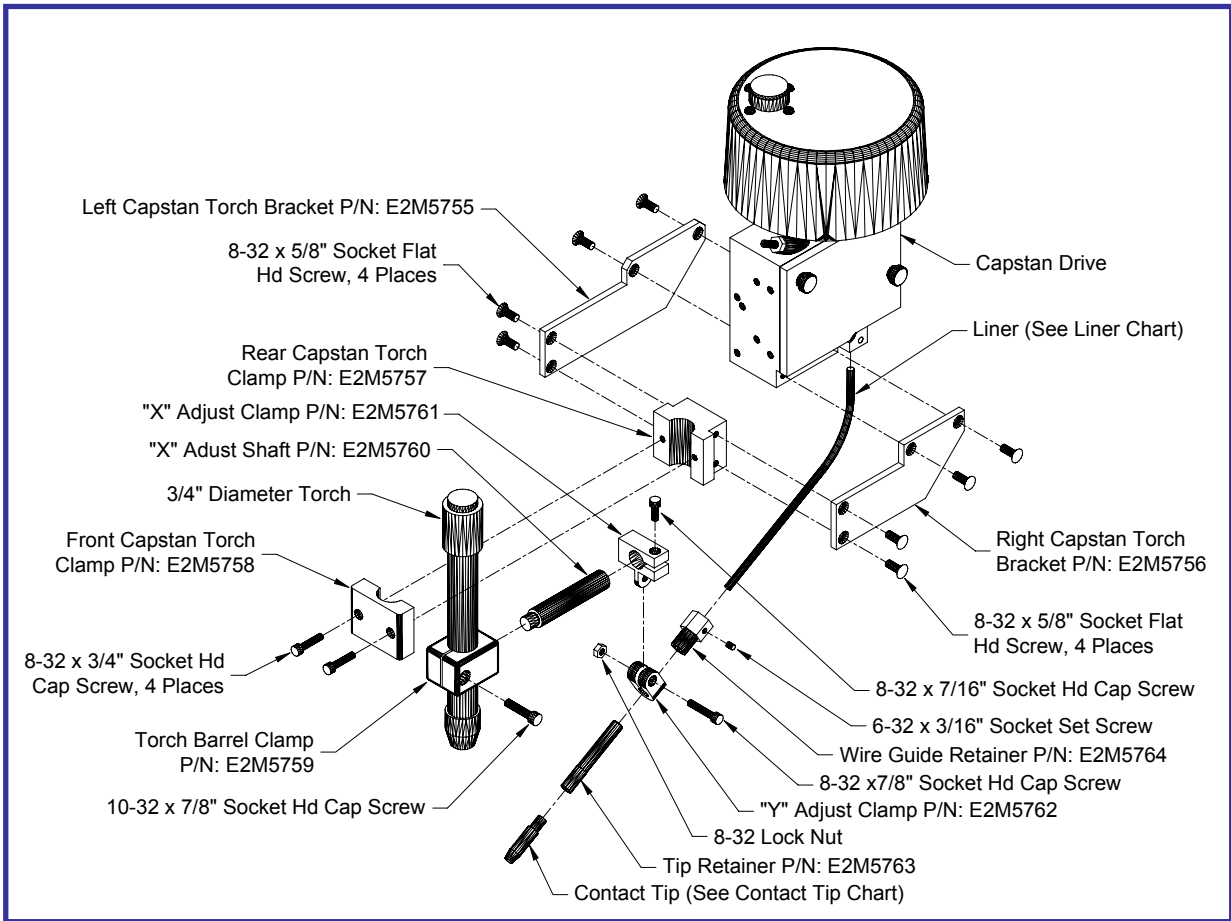
**12cm Opposite Hand Standard Speed Capstan
 with Benzil Robotic Mount**



**12cm Opposite Hand Standard Speed Capstan
with Benzil Robotic Mount**

APPENDIX E COLD WIRE TIG ARTICULATOR SPECIFICATIONS

3/4" Diameter Cold Wire TIG Articulator Assembly

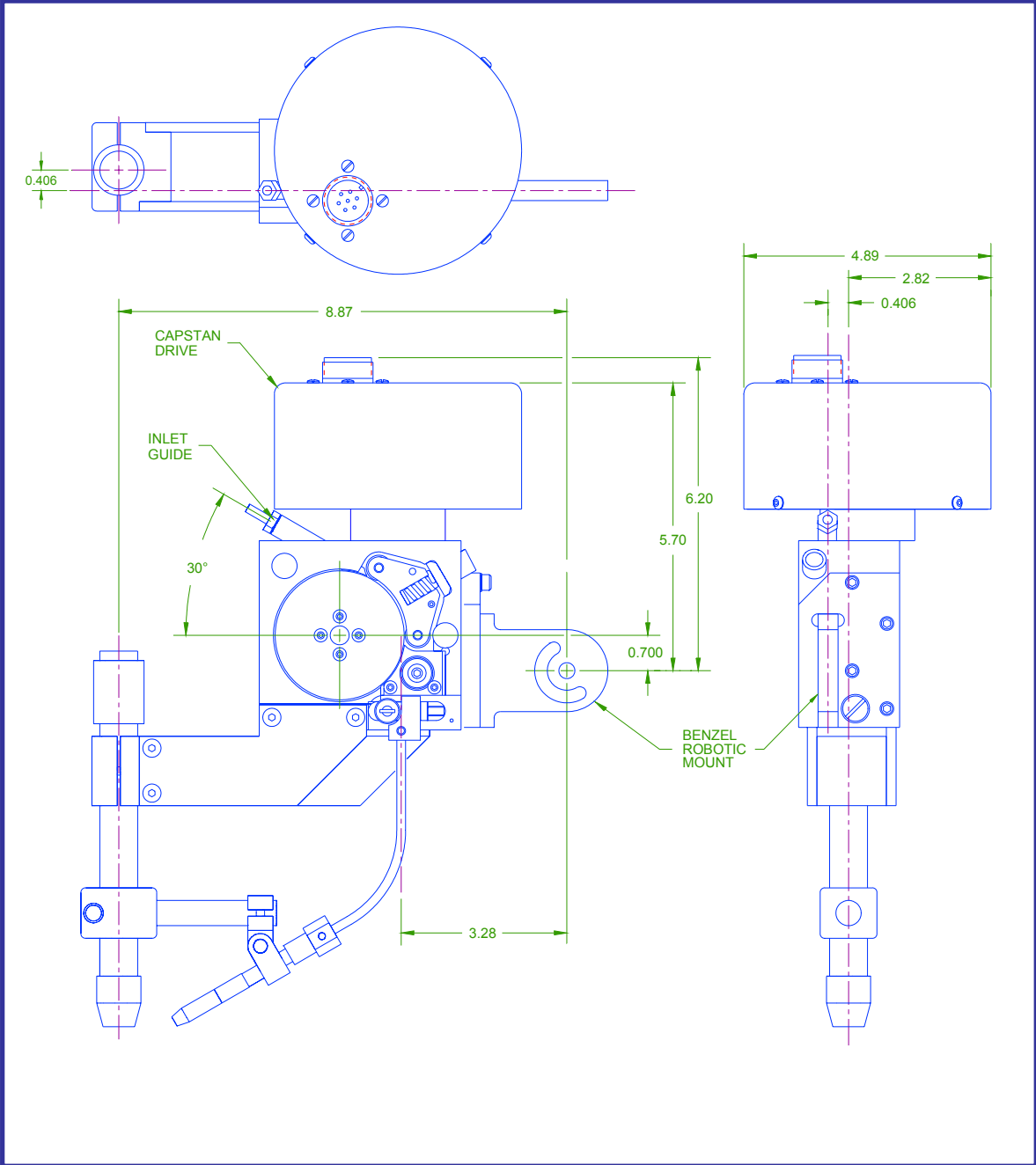


Liner Chart

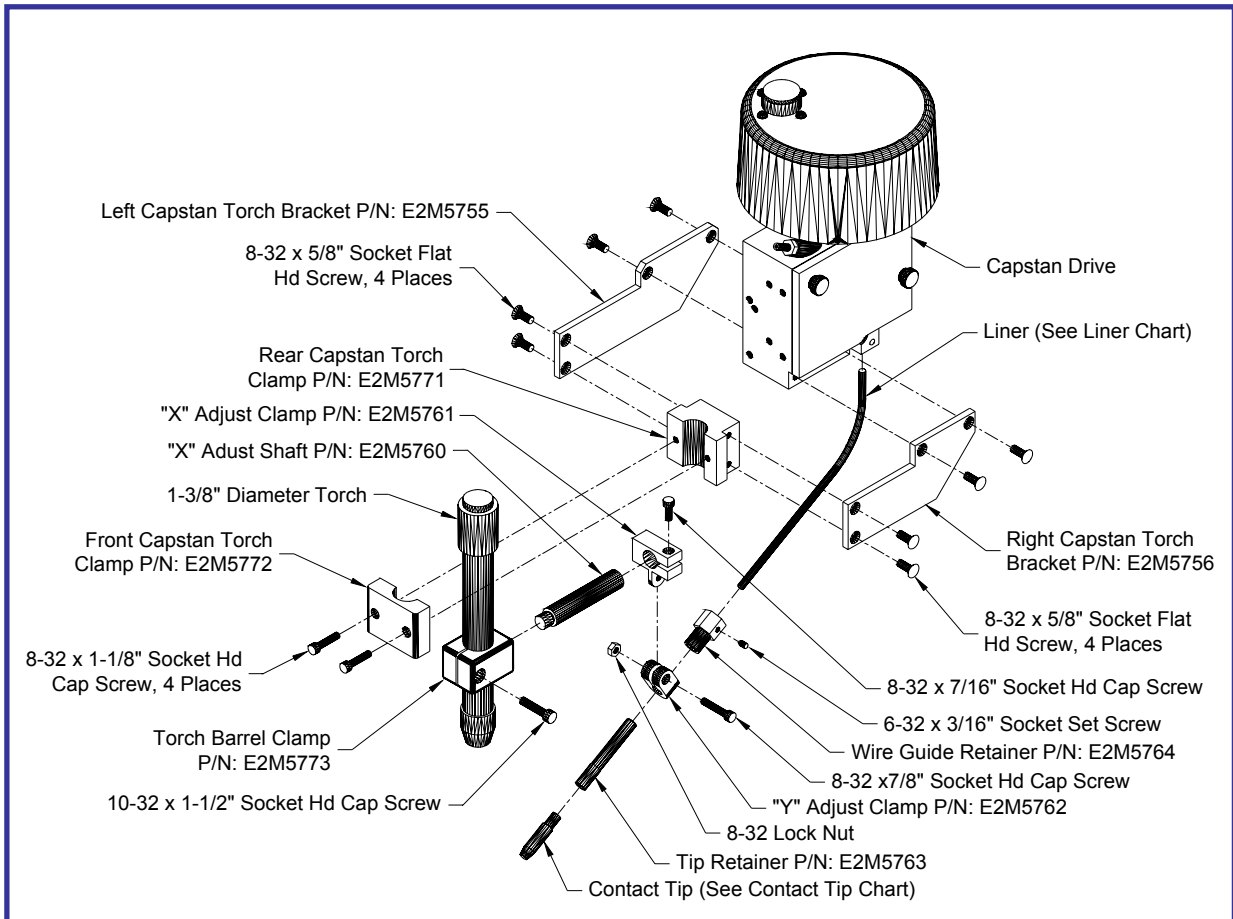
Wire Diameter Inch / MM	Non-Aluminum Wire Part Number	Aluminum Wire Part Number
0.030" / .76mm	E7C5001	E7C5003
0.035" / .89mm	E7C5001	E7C5003
0.040" / 1mm	E7C5001	E7C5005
0.045" / 1.14mm	E7C5001	E7C5005
0.047" / 1.19mm	E7C5001	E7C5005
0.052" / 1.32mm	E7C5002	E7C5005
0.062" / 1.58mm		E7C5006

Contact Tip Chart

Wire Diameter Inch / MM	Non-Aluminum Wire Part Number	Aluminum Wire Part Number
0.030" / .76mm	X7T5005	X7T5034
0.035" / .89mm	X7T5003	X7T5020
0.040" / 1mm	X7T5004	X7T5002
0.045" / 1.14mm	X7T5004	X7T5002
0.047" / 1.19mm	X7T5004	X7T5002
0.052" / 1.32mm	X7T5033	X7T5035
0.062" / 1.58mm		X7T5027



1-3/8" Diameter Cold Wire TIG Articulator Assembly

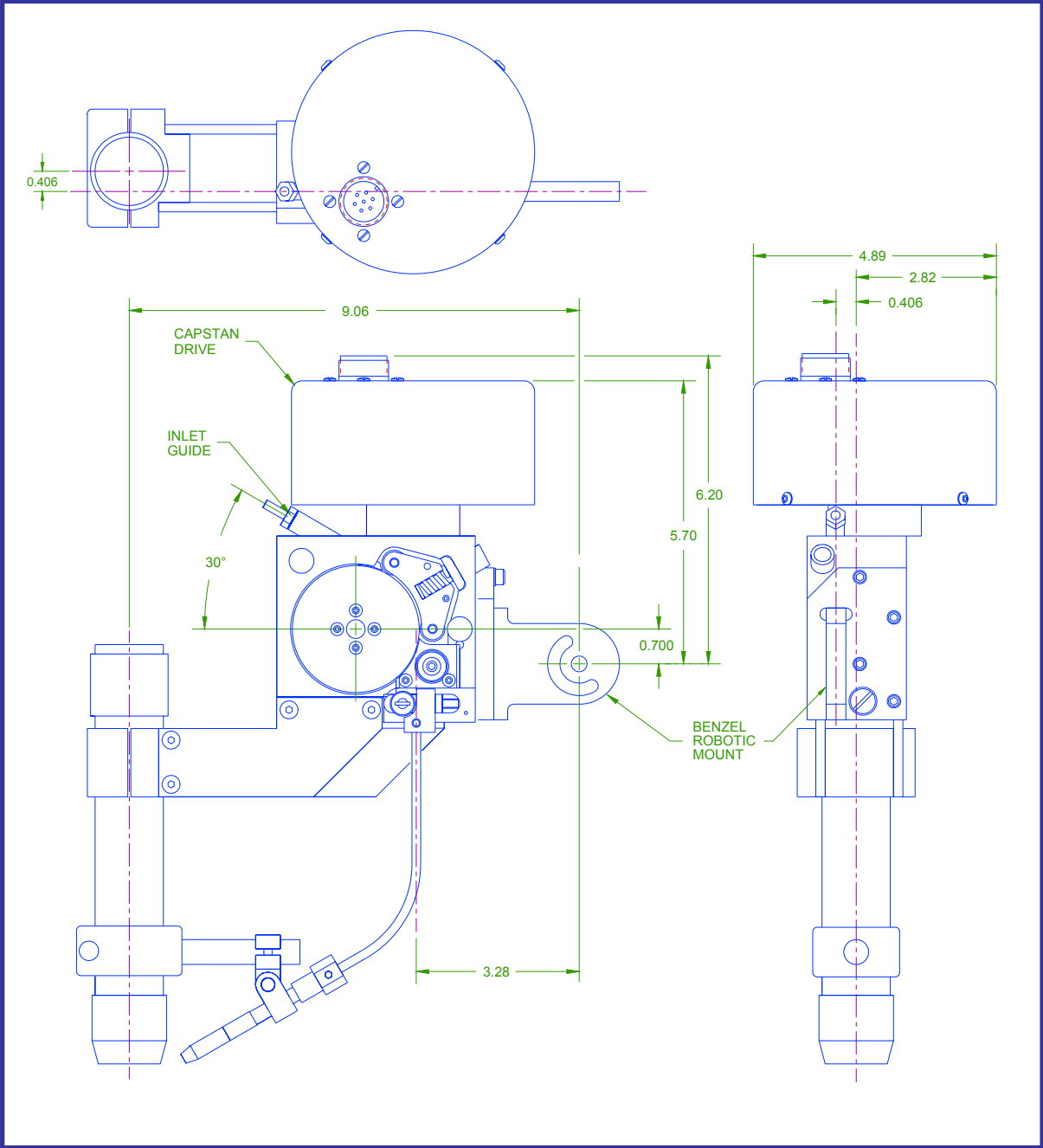


Liner Chart

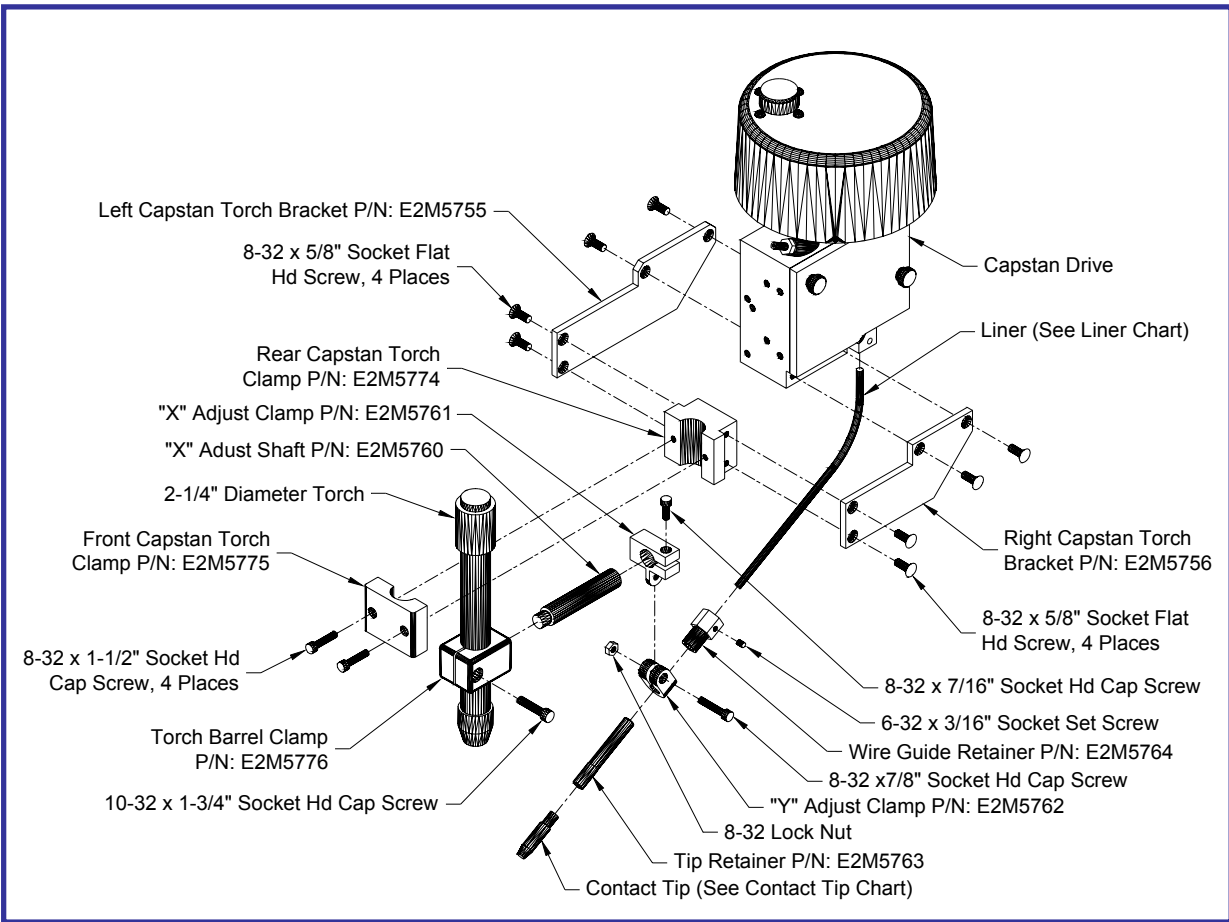
Wire Diameter Inch / MM	Non-Aluminum Wire Part Number	Aluminum Wire Part Number
0.030" / .76mm	E7C5001	E7C5003
0.035" / .89mm	E7C5001	E7C5003
0.040" / 1mm	E7C5001	E7C5005
0.045" / 1.14mm	E7C5001	E7C5005
0.047" / 1.19mm	E7C5001	E7C5005
0.052" / 1.32mm	E7C5002	E7C5005
0.062" / 1.58mm		E7C5006

Contact Tip Chart

Wire Diameter Inch / MM	Non-Aluminum Wire Part Number	Aluminum Wire Part Number
0.030" / .76mm	X7T5005	X7T5034
0.035" / .89mm	X7T5003	X7T5020
0.040" / 1mm	X7T5004	X7T5002
0.045" / 1.14mm	X7T5004	X7T5002
0.047" / 1.19mm	X7T5004	X7T5002
0.052" / 1.32mm	X7T5033	X7T5035
0.062" / 1.58mm		X7T5027



2-1/4" Diameter Cold Wire TIG Articulator Assembly

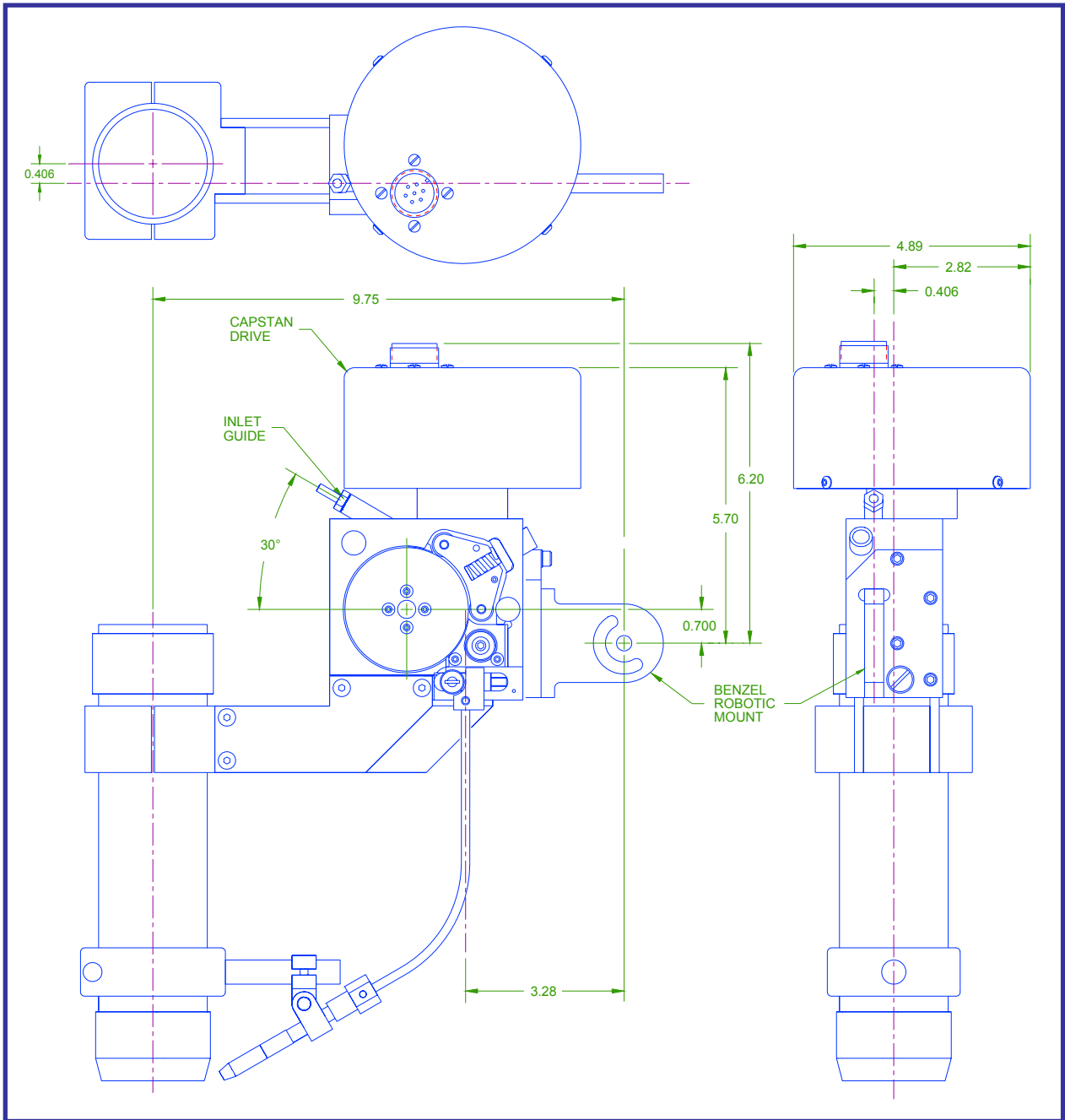


Liner Chart

Wire Diameter Inch / MM	Non-Aluminum Wire Part Number	Aluminum Wire Part Number
0.030" / .76mm	E7C5001	E7C5003
0.035" / .89mm	E7C5001	E7C5003
0.040" / 1mm	E7C5001	E7C5005
0.045" / 1.14mm	E7C5001	E7C5005
0.047" / 1.19mm	E7C5001	E7C5005
0.052" / 1.32mm	E7C5002	E7C5005
0.062" / 1.58mm		E7C5006

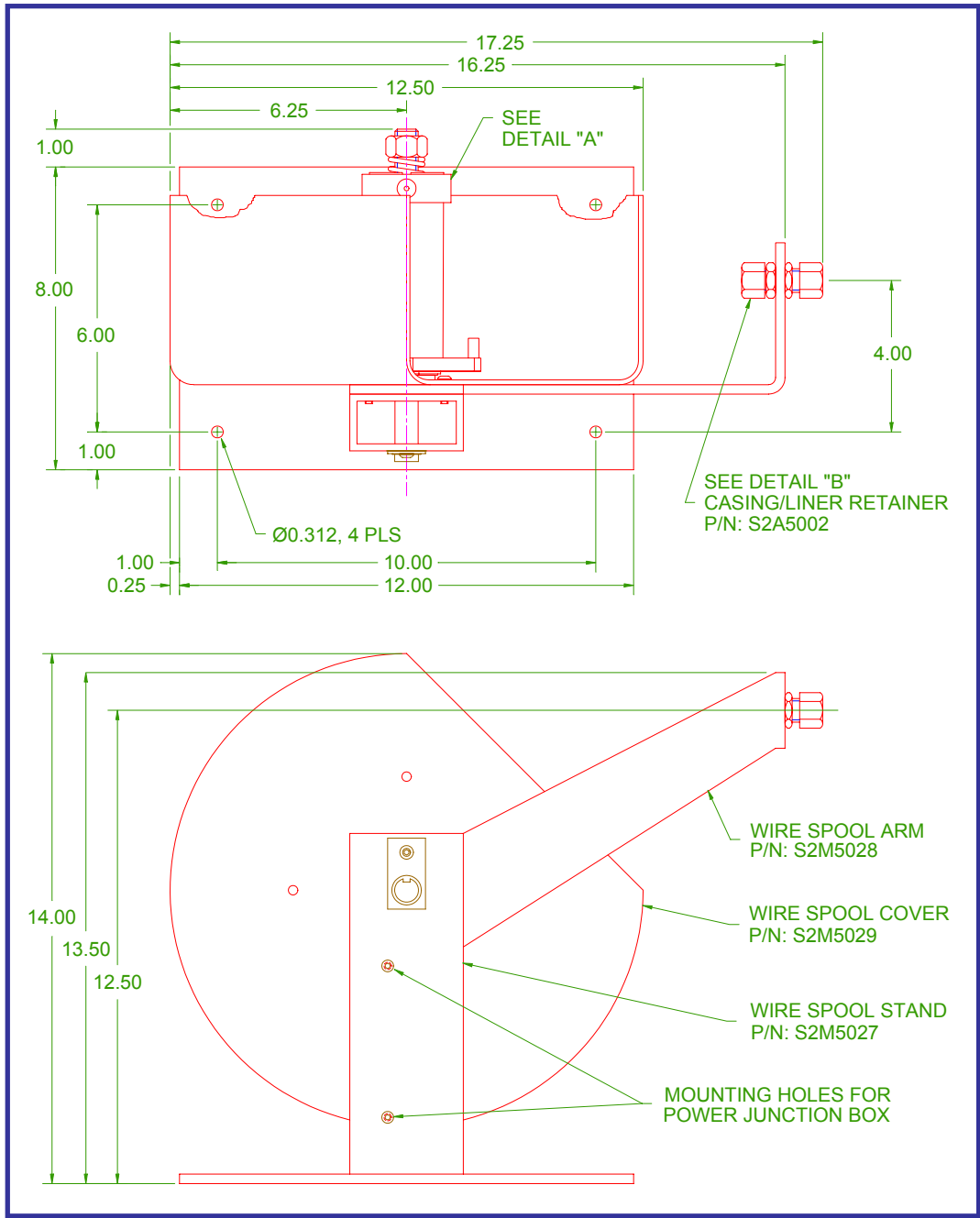
Contact Tip Chart

Wire Diameter Inch / MM	Non-Aluminum Wire Part Number	Aluminum Wire Part Number
0.030" / .76mm	X7T5005	X7T5034
0.035" / .89mm	X7T5003	X7T5020
0.040" / 1mm	X7T5004	X7T5002
0.045" / 1.14mm	X7T5004	X7T5002
0.047" / 1.19mm	X7T5004	X7T5002
0.052" / 1.32mm	X7T5033	X7T5035
0.062" / 1.58mm		X7T5027

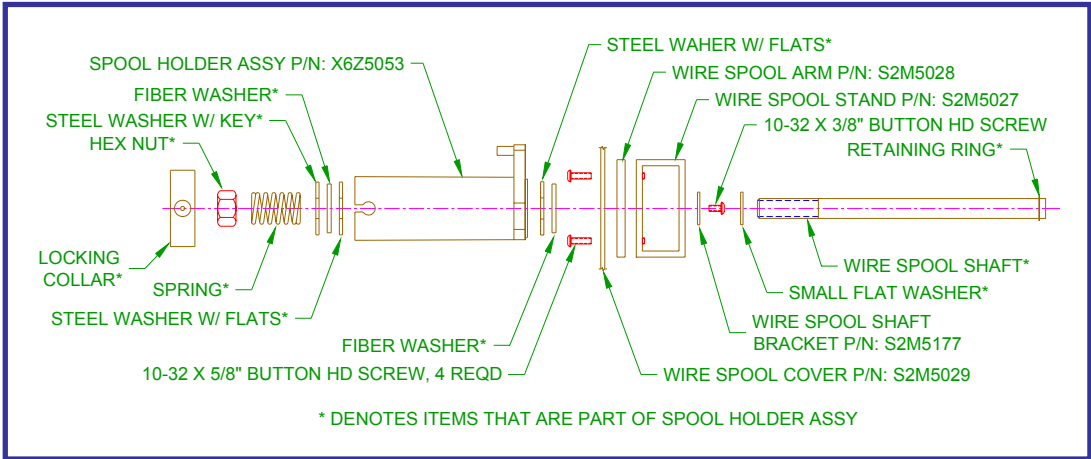


APPENDIX F WIRE SPOOL ASSEMBLY

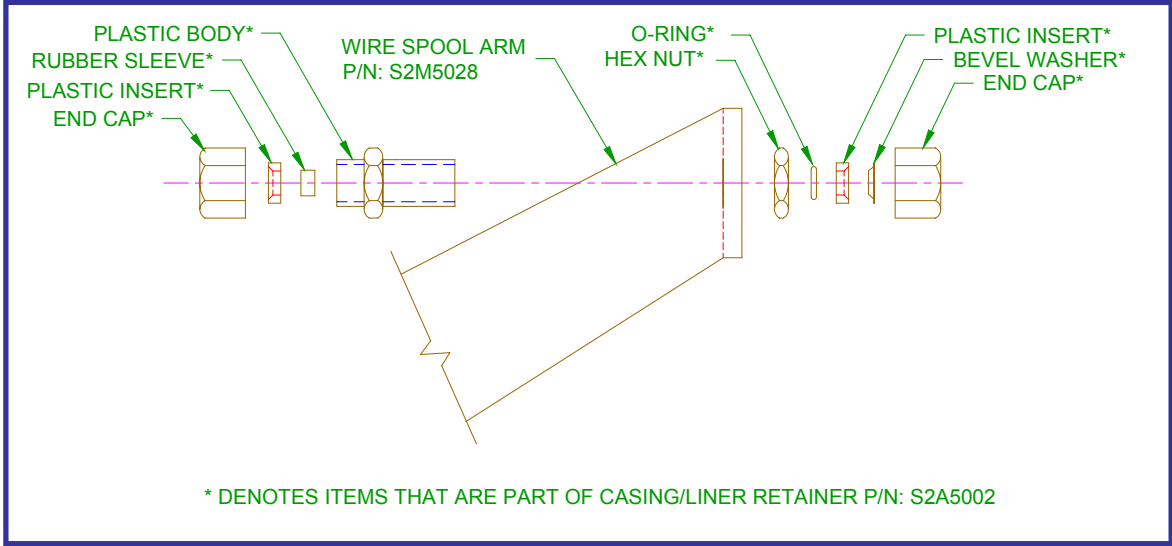
WIRE SPOOL ASSEMBLY – P/N: S2A5001 REVISION: A



MOUNTING DIMENSIONS AND COMPONENT PARTS

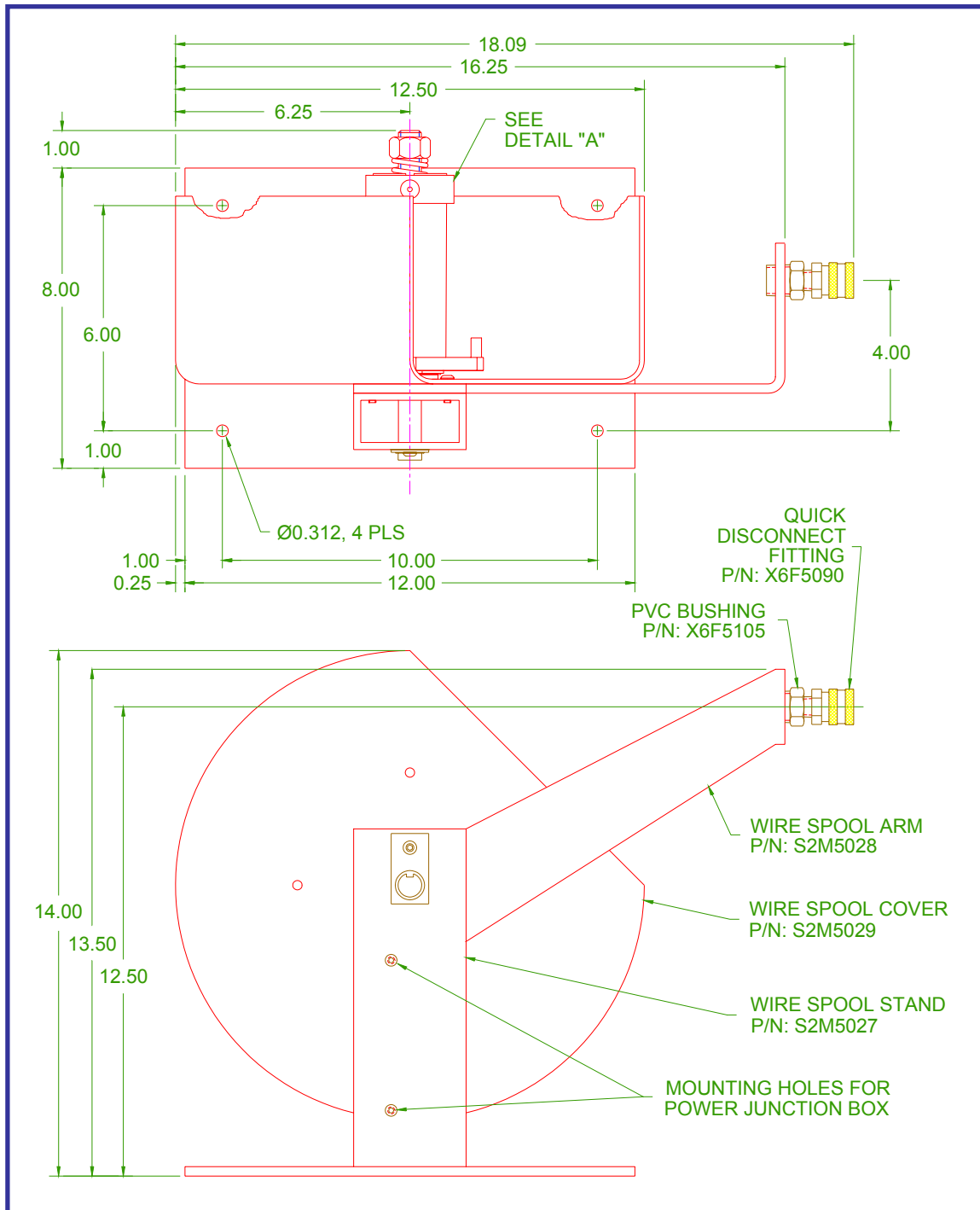


WIRE SPOOL ASSEMBLY - DETAIL "A"

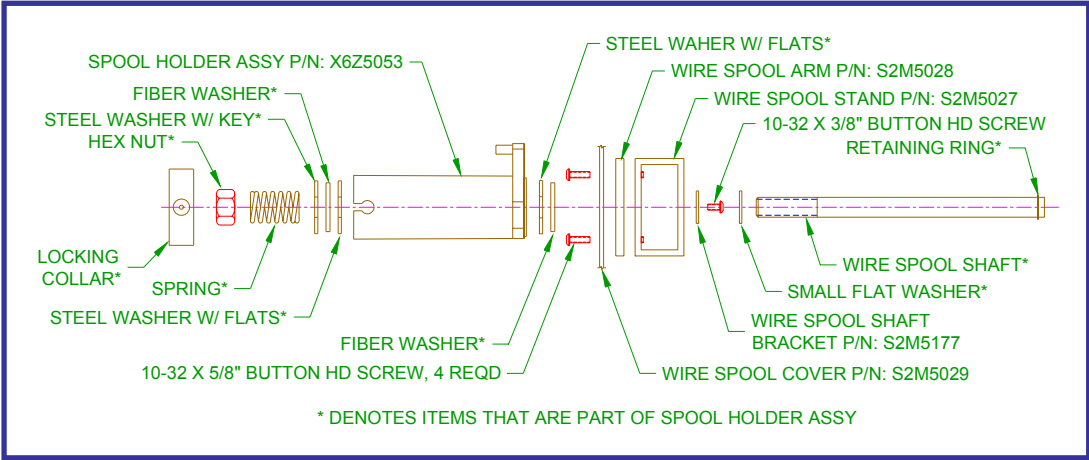


WIRE SPOOL ASSEMBLY - DETAIL "B"

WIRE SPOOL ASSEMBLY – P/N: S2A5001 REVISION: B



MOUNTING DIMENSIONS AND COMPONENT PARTS



WIRE SPOOL ASSEMBLY - DETAIL "A"