For Shipping and Installation Only

SHOWN WITHOUT BELLows SHIELD

ITEM NO. | QTY. | PART NO. | DESCRIPTION | MATERIAL / VENDOR | SHT. NO.
--- | --- | --- | --- | --- | ---
1 | 1 | D020358-B | ACTUATOR PLATE ASSEMBLY | | |
2 | 1 | D020361-B | TOP FOUNDATION PLATE ASSEMBLY | | |
3 | 1 | D020362-B | SIDE FOUNDATION ASSEMBLY | | |
4 | 1 | D020364-B | BACK FOUNDATION PLATE ASSEMBLY | | |
5 | 1 | D020368-A | TRIPOD ASSEMBLY | | |
6 | 1 | D020374-00 | ACTUATOR BLEED TUBE ASSEMBLY | | |
7 | 1 | D020360-B | BELLows ASSEMBLY | | |
8 | 1 | D020365-B | MANIFOLD ASSEMBLY | | |
9 | 1 | D020363-B | SIDE FOUNDATION ASSEMBLY | | |
10 | 1 | D020369-B | BOTTOM FOUNDATION PLATE ASSEMBLY | | |
11 | 1 | D020296-A | RIGHT SIDE FOUNDATION PLATE | | |
12 | 1 | D020370-G | LIMIT ASSEMBLY | | |
13 | 1 | D020371-G | LIMIT ASSEMBLY | | |
14 | 1 | SCH CAP SCR 7/16-20 ~ 75 W/ WSH ASSEMBLY | | |
15 | 1 | - | H.C.S. 1/4-20 x 0.50 SST | | |
16 | 1 | D020367-G | ACTUATOR BLEED TUBE ASSEMBLY | | |
17 | 1 | D020366-G | TOP FOUNDATION PLATE ASSEMBLY | | |
18 | 1 | D020369-B | MANIFOLD ASSEMBLY | | |
19 | 1 | D020360-B | BELLows ASSEMBLY | | |
20 | 1 | D020365-B | MANIFOLD ASSEMBLY | | |
21 | 1 | D020368-A | TRIPOD ASSEMBLY | | |
22 | 1 | D020374-00 | ACTUATOR BLEED TUBE ASSEMBLY | | |
23 | 1 | D020369-B | BOTTOM FOUNDATION PLATE ASSEMBLY | | |
24 | 1 | D020296-A | RIGHT SIDE FOUNDATION PLATE | | |
25 | 1 | D020370-G | LIMIT ASSEMBLY | | |
26 | 1 | D020371-G | LIMIT ASSEMBLY | | |
27 | 1 | SCH CAP SCR 7/16-20 ~ 75 W/ WSH ASSEMBLY | | |
28 | 1 | - | H.C.S. 1/4-20 x 0.50 SST | | |
29 | 1 | D020367-G | ACTUATOR BLEED TUBE ASSEMBLY | | |
30 | 1 | D020366-G | TOP FOUNDATION PLATE ASSEMBLY | | |
31 | 1 | D020369-B | MANIFOLD ASSEMBLY | | |
32 | 1 | D020360-B | BELLows ASSEMBLY | | |
33 | 1 | D020365-B | MANIFOLD ASSEMBLY | | |
34 | 1 | D020368-A | TRIPOD ASSEMBLY | | |
35 | 1 | D020374-00 | ACTUATOR BLEED TUBE ASSEMBLY | | |
36 | 1 | D020369-B | BOTTOM FOUNDATION PLATE ASSEMBLY | | |
37 | 1 | D020296-A | RIGHT SIDE FOUNDATION PLATE | | |
38 | 1 | D020370-G | LIMIT ASSEMBLY | | |
39 | 1 | D020371-G | LIMIT ASSEMBLY | | |
40 | 1 | SCH CAP SCR 7/16-20 ~ 75 W/ WSH ASSEMBLY | | |
41 | 1 | - | H.C.S. 1/4-20 x 0.50 SST | | |
42 | 1 | D020367-G | ACTUATOR BLEED TUBE ASSEMBLY | | |
43 | 1 | D020366-G | TOP FOUNDATION PLATE ASSEMBLY | | |
44 | 1 | D020369-B | MANIFOLD ASSEMBLY | | |
45 | 1 | D020360-B | BELLows ASSEMBLY | | |
46 | 1 | D020365-B | MANIFOLD ASSEMBLY | | |
47 | 1 | D020368-A | TRIPOD ASSEMBLY | | |
48 | 1 | D020374-00 | ACTUATOR BLEED TUBE ASSEMBLY | | |
49 | 1 | D020369-B | BOTTOM FOUNDATION PLATE ASSEMBLY | | |
50 | 1 | D020296-A | RIGHT SIDE FOUNDATION PLATE | | |
51 | 1 | D020370-G | LIMIT ASSEMBLY | | |
52 | 1 | D020371-G | LIMIT ASSEMBLY | | |
53 | 1 | SCH CAP SCR 7/16-20 ~ 75 W/ WSH ASSEMBLY | | |
54 | 1 | - | H.C.S. 1/4-20 x 0.50 SST | | |
55 | 1 | D020367-G | ACTUATOR BLEED TUBE ASSEMBLY | | |
56 | 1 | D020366-G | TOP FOUNDATION PLATE ASSEMBLY | | |
57 | 1 | D020369-B | MANIFOLD ASSEMBLY | | |
58 | 1 | D020360-B | BELLows ASSEMBLY | | |
59 | 1 | D020365-B | MANIFOLD ASSEMBLY | | |
60 | 1 | D020368-A | TRIPOD ASSEMBLY | | |
61 | 1 | D020374-00 | ACTUATOR BLEED TUBE ASSEMBLY | | |
62 | 1 | D020369-B | BOTTOM FOUNDATION PLATE ASSEMBLY | | |
63 | 1 | D020296-A | RIGHT SIDE FOUNDATION PLATE | | |
64 | 1 | D020370-G | LIMIT ASSEMBLY | | |
65 | 1 | D020371-G | LIMIT ASSEMBLY | | |
66 | 1 | SCH CAP SCR 7/16-20 ~ 75 W/ WSH ASSEMBLY | | |
67 | 1 | - | H.C.S. 1/4-20 x 0.50 SST | | |
68 | 1 | D020367-G | ACTUATOR BLEED TUBE ASSEMBLY | | |
69 | 1 | D020366-G | TOP FOUNDATION PLATE ASSEMBLY | | |
70 | 1 | D020369-B | MANIFOLD ASSEMBLY | | |
71 | 1 | D020360-B | BELLows ASSEMBLY | | |
72 | 1 | D020365-B | MANIFOLD ASSEMBLY | | |
73 | 1 | D020368-A | TRIPOD ASSEMBLY | | |
74 | 1 | D020374-00 | ACTUATOR BLEED TUBE ASSEMBLY | | |
75 | 1 | D020369-B | BOTTOM FOUNDATION PLATE ASSEMBLY | | |
76 | 1 | D020296-A | RIGHT SIDE FOUNDATION PLATE | | |
77 | 1 | D020370-G | LIMIT ASSEMBLY | | |
78 | 1 | D020371-G | LIMIT ASSEMBLY | | |
79 | 1 | SCH CAP SCR 7/16-20 ~ 75 W/ WSH ASSEMBLY | | |
80 | 1 | - | H.C.S. 1/4-20 x 0.50 SST | | |
81 | 1 | D020367-G | ACTUATOR BLEED TUBE ASSEMBLY | | |
82 | 1 | D020366-G | TOP FOUNDATION PLATE ASSEMBLY | | |
83 | 1 | D020369-B | MANIFOLD ASSEMBLY | | |
84 | 1 | D020360-B | BELLows ASSEMBLY | | |
85 | 1 | D020365-B | MANIFOLD ASSEMBLY | | |
86 | 1 | D020368-A | TRIPOD ASSEMBLY | | |
87 | 1 | D020374-00 | ACTUATOR BLEED TUBE ASSEMBLY | | |
88 | 1 | D020369-B | BOTTOM FOUNDATION PLATE ASSEMBLY | | |
89 | 1 | D020296-A | RIGHT SIDE FOUNDATION PLATE | | |
90 | 1 | D020370-G | LIMIT ASSEMBLY | | |
91 | 1 | D020371-G | LIMIT ASSEMBLY | | |
92 | 1 | SCH CAP SCR 7/16-20 ~ 75 W/ WSH ASSEMBLY | | |
93 | 1 | - | H.C.S. 1/4-20 x 0.50 SST | | |
94 | 1 | D020367-G | ACTUATOR BLEED TUBE ASSEMBLY | | |
95 | 1 | D020366-G | TOP FOUNDATION PLATE ASSEMBLY | | |
96 | 1 | D020369-B | MANIFOLD ASSEMBLY | | |
97 | 1 | D020360-B | BELLows ASSEMBLY | | |
98 | 1 | D020365-B | MANIFOLD ASSEMBLY | | |
99 | 1 | D020368-A | TRIPOD ASSEMBLY | | |
100 | 1 | D020374-00 | ACTUATOR BLEED TUBE ASSEMBLY | | |
NOTE: ENGRAVE D020285-B-(SN)
Actuation Plate
Small Pin Valve
D020359-D-E Part 1
Mat'l: 17-4 PH
(2) required

for use only on
D020365-B Manifold
Assembly

Actuation Plate
Small Pin Valve
D020359-D-E Part 1A
Mat'l: 17-4 PH
(3) required

for use only on
D020358-B Resistor
Stack Sub-Assembly
Actuator Plate Plug
D020359-D-E Part 2
Mat'l: 304-L
(5) required

3/8-24 thread w/full thread relief

Broach for Standard 3/16 Allen Wrench Hex .150 depth

Scallop for thumb screws approx. as shown with best shop Practice. Tip for both Details D020359-2 & D020359-2A

Actuator Plate Plug
D020359-B-E Part 2A
Mat'l: 6061-T6
(5) required

3/8-24 thread w/full thread relief

1/32" X 45.00°

MALCOLM    CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

TOLERANCES:
XX: ± .005"  XXX: ± .010"

ANGULAR: ± 30°

FINISH: 32 RMS

NAME DATE UNLESS OTHERWISE SPECIFIED:
REDRAWN             Fall' 02     Hammond
DRAWN                 4/02          Hardham
REDRAWN             8/12/03        Spjeld

HEPI Actuation Plate, Plug and Small Pin Valve

E030373-00-E

ANODIZE ALL ALUMINUM
COLOR: CLEAR

ANODIZE ALL ALUMINUM
COLOR: CLEAR

ANODIZE ALL ALUMINUM
COLOR: CLEAR

HEPI Actuation Plate, Plug and Small Pin Valve

E030373-00-E

ANODIZE ALL ALUMINUM
COLOR: CLEAR

ANODIZE ALL ALUMINUM
COLOR: CLEAR

ANODIZE ALL ALUMINUM
COLOR: CLEAR

HEPI Actuation Plate, Plug and Small Pin Valve

E030373-00-E

ANODIZE ALL ALUMINUM
COLOR: CLEAR
Break all Sharp Edges

NOTE:  HEAT TREAT H-900
FLATNESS CRITICAL
6 tapped holes
8 - 32 THRU
equally spaced 60°
on a 3.625 B.C.

DETAIL A
SCALE 4 : 1

4.910
φ .005 A

4.250

SECTION C-C
SCALE 1.5 : 1

3.625±.001

4.250

φ .005 A B

60.00°
typ

φ 3.25

φ 4.79

233 .001
170 .002 A B
133 .002
0 .010

4.986-28 UNF-2B
Thread

0.005
0.001

1 Required for
each actuator

NOTES: (UNLESS OTHERWISE SPECIFIED)

FILE NAME/LOCATION:
CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

FINISH
SCALE:
C
SIZE COMMENTS:
NAME DATE UNLESS OTHERWISE SPECIFIED:
MATERIAL DWG. NO.

SYSTEM SUB-SYSTEM
HEPINEXT ASSY

PART NAME

REV DCN # REV DATEDRAWING TREE #
6 holes equally spaced 60° apart on a 3.625" B.C.

Note: these surfaces may be cut radially, or on a chord parallel to the diameter.
6 holes equally spaced 60° apart on a 3.625" B.C
Φ .005 A
Φ .002 B

60.00°

Φ .002 B

Φ .170 THRU
Φ .332 X 100°
5.330

4.830

3.885±.003

3.955

T

SECTION T-T

3.699±.005

3.499

3.685±.002

Chamfer 3/32 x 45 deg.

NOTE: CHECK FIT WITH TOP PLATE

Top Bellow Slug
D020291 Part 1
(1) required per ass'y

Top Bellow Cap
D020291 Part 2
(1) required per ass'y

Chamfer 3/32 x 45 deg.
For a 1/4-20 tapped hole typ (6) plcs

Bottom tap for 1/4-20 x .340 dp. typ (3) plcs.

Required for each actuator
Bellow Cap
D020293 Part 2
(1) required per ass'y

Bellow Slug
D020293 Part 1
(1) required per ass'y

NOTE: CHECK FIT WITH BOTTOM PLATE
(Should not fit in top plate)
SECTION CV-CV
SCALE 1 : 1.5
Drill and tap for a 1/4-20 screw x .50 deep

SECTION O-O
SCALE 1 : 1.5

SECTION P-P
SCALE 1 : 1.5

DETAIL S
SCALE 4 : 1
2 Required for each actuator

S.H.C.S. 4-40 x 0.750
(2) Required per Shield

ITEM NO. QTY. PART NO. DESCRIPTION MATERIAL / VENDOR

1 2 D020302-B BELLOWS SHIELD ASSEMBLY 23
2 2 D020295-A AMERIFLEX BELLOWS RING 221
1 D020294-A AMERIFLEX BELLOWS 21, 22
HEPI Bellows Assembly

D020294-A
AMERIFLEX BELLOWS RING

D020294-A
AMERIFLEX BELLOWS

ITEM NO. QTY. PART NO. DESCRIPTION MATERIAL / VENDOR SHT. NO.

NOTES: (UNLESS OTHERWISE SPECIFIED)

FILE NAME/LOCATION:

CALIFORNIA INSTITUTE OF TECHNOLOGY

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DIMENSIONS ARE IN INCHES

TOLERANCES:

.020" 0.02"

.001" 0.001"

ANGULAR 30'

FINISH

SCALE:

A

NAME DATE UNLESS OTHERWISE SPECIFIED:

MATERIAL DWG. NO.

SYSTEM SUB-SYSTEM

HEPI NEXT ASSY

PART NAME

2 Required for each actuator

REDRAWN 5/23/02 Kern

REDRAWN 7/16/03 Spjeld

9/16/03 E030373-00-E

Sht. No. 21 / 43

CALIFORNIA INSTITUTE OF TECHNOLOGY

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Fall'02A

REV. DCN # REV. DATEDRAWING TREE # NOTES: (UNLESS OTHERWISE SPECIFIED)

FILE NAME/LOCATION:

CALIFORNIA INSTITUTE OF TECHNOLOGY

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DIMENSIONS ARE IN INCHES

TOLERANCES:

.020" 0.02"

.001" 0.001"

ANGULAR 30'

FINISH

SCALE:

A

NAME DATE UNLESS OTHERWISE SPECIFIED:

MATERIAL DWG. NO.

SYSTEM SUB-SYSTEM

HEPI NEXT ASSY

PART NAME

DRAWN 4/02 Hardham

CHECKED 2/9/03 Kern

Refer to LIGO-E030066-A-E for design calculations of these bellows.

**SECTION B-B**

- **Bellows**
- D020295-A-E Part 1
- Mat'l: 17-7 ph
- (2) required per ass'y

**SECTION D-D**

- **Bellows Weld Shield Ring**
- D020295-A-E Part 2
- Mat'l: 304 L
- (4) required per ass'y

NOTES: (UNLESS OTHERWISE SPECIFIED)

- FILE NAME/LOCATION:
  - CALIFORNIA INSTITUTE OF TECHNOLOGY
  - MASSACHUSETTS INSTITUTE OF TECHNOLOGY
- DIMENSIONS ARE IN INCHES
- TOLERANCES:
  - .XX     0.02"
  - .XXX   0.001"
  - ANGULAR  30'
- FINISH
- SCALE:
  - C
- SIZE COMMENTS:
- NAME DATE UNLESS OTHERWISE SPECIFIED:
- MATERIAL
- DWG. NO.
- SYSTEM
- SUB-SYSTEM
- HEPI
- NEXT ASSY
- PART NAME
- REDRAWN
- Fall' 02
- Hammond
- 1:1 unless noted

CHECKED             2/9/03              Kern
DRAWN                 4/02          Hardham

AFall'02

120 RMS
unless noted
1:1 unless noted

Sht. No. 22 / 43
Silt approx. 0.015" by wire EDM, slitting saw or best shop practice. Silt extends 0.60" away from bottom. Typ (2) places. Near side shown. Far side equal and opposite.

Drill and tap thru for a 4-40 thread typ (2) plcs. .063 X 45.00°

C'Bore and drill thru for 4-40 SHCS TYP (2) PLCS.

Detail: .350 typ of (2) slit details (see detail CADD)

Anodize: COLOR: CLEAR
Side Foundation Assembly view with Flexure

1 Required for each actuator

DIMENSIONS ARE IN INCHES
TOLERANCES:

- .XX     0.020"
- .XXX   0.005"
- ANGULAR  30'

SCALE: 1:1 unless noted
#10-32 Tapped Hole x .375 dp.
typ (5) pcs

1/2-20 UNF Thru
4 typ

.257 Thru
.406 - .250
4 Typ (other side)

.093 X 45.00°
TYP 2 EDGES

.035 X 45.00°
TYP 4 EDGES

1:1 unless noted

DETAIL F
SCALE 3 : 1
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>QTY.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>MATERIAL / VENDOR</th>
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<tr>
<td>3</td>
<td>1</td>
<td>D020299-A</td>
<td>PARALLEL MOTION FLEXURE</td>
<td></td>
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<tr>
<td>2</td>
<td>1</td>
<td>D020299-A</td>
<td>PARALLEL FLEXURE HOLDER</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>D020298-A</td>
<td>BACK FOUNDATION PLATE</td>
<td></td>
</tr>
</tbody>
</table>

**TOLERANCES:**
- .XX    0.020"  
- .XXX 0.005"  
- ANGULAR 30’

**FINISH**

**SCALE:**
1:1 unless noted

---

1 Required for each actuator

**FILE NAME/LOCATION:**
- CALIFORNIA INSTITUTE OF TECHNOLOGY
- MASSACHUSETTS INSTITUTE OF TECHNOLOGY

**DIMENSIONS ARE IN INCHES**

**COMMENTS:**
- 120 RMS unless noted
Manifold
Large Pin Valve
D020367-1
Mat'#: 17-4PH
Heat Treat
H-900
(1) required
NOTE: WELD CAPS MUST BE CLEARLY NUMBERED
Manifold Large Plug
D020367-B-E
Mat'l: 304 L
(1) required

O-ring: #2-016

Broach for Standard 5/16 Allen Wrench Hex .250 deep

5/8-18 thread w/ full thread relief

§ 3/8 thru

Manifold Large Plug
D020367-B-E Part 2A
Mat'l: 6061-T6
Anodize
Color: Clear
(1) required

1.083

5/8-18 thread w/ full thread relief

Scallop for thumb screws approx. as shown with best shop practice typ for details D020367-2 and D020367-2A

0.031 X 45.00°
NOTES: (UNLESS OTHERWISE SPECIFIED)

1. Required for each actuator

DIMENSIONS ARE IN INCHES

TOLERANCES:

.02"  ± .005"

ANGULAR  30'

FINISH C

SIZE COMMENTS:

CHECKED 2/9/03 Kern

DRAWN 4/02 Hardham

REDRAWN 5/23/02 Kern

REDRAWN 6/11/03 Spjeld

ATTACHMENTS:

ALUM 6061-T6 Anodized Clear

120 RMS unless noted

FILE NAME/LOCATION:

CALIFORNIA INSTITUTE OF TECHNOLOGY

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SYSTEM

SUB-SYSTEM

PART NAME

HEPI Oil Catch Horiz & Vert

DWG. NO.

E030373-00-E

REV.

DCN # REV.DATEDRAWING TREE # NOTES: (UNLESS OTHERWISE SPECIFIED)
NOTE:
ASSEMBLE IN FIXTURE, TACK WELD 6 SPOTS AND VACUUM BRAZE TRIPOD BARS TO ATTACHMENT PLATE AND TRIPOD BASE.

ITEM NO. QTY. PART NO. DESCRIPTION MATERIAL / VENDOR SHT. NO.
1 2 D020370-A Quarter Round Displacement Sensor Flag 41
5 4 D020368-B TRIPOD DISPLACEMENT ASSEMBLY 374
3 3 D020371-B TRIPOD VERTICAL POST 393
2 3 D020369-A TRIPOD BAR 38
1 1 D020369-A ATTACHMENT PLATE 38

NOTE:
2 Required for each actuator unless noted.
Attachment Plate
D020369-A-E Part 1
(1) required
Mat'l 304 L

3 holes equally spaced 120° apart on a 4.00" B.C.

3 holes equally spaced 120° apart (see View CE for detail)

Sensor Holster
D020369-A-E Part 2
(1) required
Mat'l 6061-T6
Anodize - Clear

Tripod Bar
D020369-A-E Part 3
(3) required
Mat'l 304 L
drill and tap for a 8-32 x .469 dp.

thru hole for a 8-32 screw

Tripod Sensor Post
DO20372-A-E Part 2
(1) required
use Thompson Rod
(hardened and ground)

Tripod Sensor Housing
DO20372-A-E Part 1
(1) required
mat'l: Al 6061-T6
Anodize - Clear
CADJ

O.D. = 0.125 in.
I.D. = 0.080 in.
STRAIGHT LENGTH = 8.155 in.

DETAIL CADJ
SCALE 6:1

SPOT SOLDER AND VACCUUM BRAZE

DIMENSIONS ARE IN INCHES
TOLERANCES:
.020"   .005"
ANGULAR  30'

COMMENTS:
One (1) bleed tube assembly required per actuator assembly unless noted

FILE NAME/LOCATION:
CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DRAWN                  6/25/03       Spjeld
NAME DATE UNLESS OTHERWISE SPECIFIED:

MATERIAL
DWG. NO.

SYSTEM                                   LASTI
SUB-SYSTEM                            HEPINEXT ASSY

PART NAME

REV. DATE     SCALE
6/11/03       D020373-00-E

DRAWING TREE #
Break All Sharp Corners Including I.D.

CHAMFER 3/64 X 60°

CHAMFER 3/64 X 60°

\( \phi.1270 \)

\( \phi.250 \)

\( .750 \)