



LIGO Laboratory / LIGO Scientific Collaboration

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Bill Of Materials for the production of the HAM optical
bench Seismic Attenuation System prototype

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1 List of drawings for the HAM-OPTICAL BENCH LIGO-D051100-01-D to D051165-01

HAM Seismic attenuator Assembly

Drawing LIGO number	Drawing Type	Drawing sub-Title	Part # shown or drawn (in drawing sheet or assembly) [D051 dropped]
D051100-01	Assembly	Section D-D	1-1.1(114)-2(127)-3-3.1(117-206)-64-64.1-64.2-75(113)-gr.1(106)-gr.2(107)-gr.3-(105)gr.4(109)-gr.5(108)-gr.8(166)
D051101-00	Assembly	Section A-A	
D051102-00	Assembly	Section C-C	4(128)-gr.1(106)-gr.2(107)-gr.3(105)-gr.4(109)-gr.6(110)-gr.8(166)
D051103-00	Assembly	Section E-E	7-8-8.1-8.2-73-74(142)-gr.1(106)-gr.2(107)-gr.3(105)-gr.4(109)-gr.5(108)-gr.6(110)
D051104-00	Assembly	Section B-B	gr.2(107)-gr.3(105)-gr.5(108)
D051105-00	Assembly	LVDT-actuator gr.3	5-5.1-6(130)-65-68(129)-72(123)-gr.3.1(112)-gr.3.2(111)
D051106-00	Assembly	Filter gr.1	9-77(121)-10(168)-11-12-19-20(124)-13-23-23.1-23.2(122)-22(168)14-15-18(125)-16-17(126)-21-24-26-27-28-72(123)-25(120)-77(121)-gr.9(167)
D051107-00	Assembly	Inverted pendulum gr.2	29-30-66-67(135)-31-35-62-63(136)-32-33-71(138)-34-36-37-38-39-40-41(137)-94-95(154)
D051108-00	Assembly	Slide gr.5	42-43-45-46-47-50-51(143)-44-48-49-52-76(139)
D051109-01	Assembly	Motorized vertical spring gr.4	53-54-55-56-60-61(140)57-59-69-70(141)-76(139)
D051111-00	Assembly	Actuator gr.3.2	124-129(134)-125-126-127-128(133)
D051112-00	Assembly	LVDT gr.3.1	130-131-138-139-134-136(132)-132-133-135-137(131)
D051113-00	Details	Tube suspension	64-64.1-64.2-75(100)
D051114-01	Details	Base	1-1.1(100)
D051115-00	Details	Base	1.2-1.3(114)
D051116-00	Details	Base	1.4-1.5-1.6(114)
D051117-01	Details	Table	3-3.1(100)
D051118-00	Details	Table	3.2-3.5(117)
D051119-00	Details	Table	3.3-3.4(117)

Drawing LIGO number	Drawing Type	Drawing sub-Title	Part # shown or drawn (in drawing sheet or assembly) [D051 dropped]
D051120-00	Details	Blade	25-25.1-25.2-25.3(106)
D051121-00	Details	Platform	9-77(106)
D051122-01	Details	Filter	13-23-23.1-23.2(106)
D051123-00	Details	Filter	21-24-26-27-28-72(105-106)
D051124-00	Details	Filter	11-12-19-20(106)
D051125-00	Details	Filter	14-15-18(106)
D051126-00	Details	Filter	16-17(106)
D051127-01	Details	Suspension filter	2(100)
D051128-00	Details	Filter's plate	4(102)
D051129-00	Details	LVDT actuator	65-68(105)
D051130-00	Details	LVDT actuator	5-5.1-6(105)
D051131-00	Details	LVDT	132-133-135-137(112)
D051132-00	Details	LVDT	130-131-134-136-136.1-138-139(112)
H-OPT-133-00	Details	Actuator	125-126-127-128(111)
D051134-00	Details	Actuator	124-129(111)
D051135-00	Details	Inverted pendulum	29-30-66-67(107)
D051136-00	Details	Inverted pendulum	31-35-62-63(107)
D051137-00	Details	Inverted pendulum	34-36-37-38-39-40-41(107)
D051138-00	Details	Inverted pendulum	32-33-71(107)
D051139-00	Details	Slide	44-48-49-52-76(108-109)
D051140-01	Details	Motorized vertical spring	53-54-55-56-60-61(109)
D051141-02	Details	Motorized vertical spring	57-59-69-70(109)
D051142-00	Details	Mounting tools	7-8-8.1-8.2-73-73.1-74(103)
D051143-01	Details	Slide	42-43-45-46-47-50-51(108)
D051144-00	Assembly	Mounting blade tool	78-80-81(145)-79-82-83-84-85-86(146)-87-88-89-90-91-92(147)
D051145-00	Details	Mounting blade tool	78-80-81(144)
D051146-00	Details	Mounting blade tool	79-82-83-84-85-86(144)
D051147-00	Details	Mounting blade tool	87-88-89-90-91-92(144)
D051148-00	Details	Mounting top plate tool	93-93.1
D051149-00	Assembly	Horizontal calibrator	96-96.1-97-98-99(152)-100-101-102(153)
D051150-00	Assembly	Horizontal calibrator	
D051151-00	Assembly	Horizontal calibrator	
D051152-00	Details	Horizontal calibrator	96-96.1-97-99(149)
D051153-00	Details	Assembly	100-101-102(149-157)
D051154-00	Details	Inverted pendulum	94-95(107)
D051155-00	Details	Horizontal calibrator	98(149)
D051156-00	Assembly	Vertical calibrator	gr.7 (157)

Drawing LIGO number	Drawing Type	Drawing sub-Title	Part # shown or drawn (in drawing sheet or assembly) [D051 dropped]
D051157-01	Assembly	Large filter gr.7	102(153)-103(158)-104-109-111-112-114-117-120(160)-105-110-113-116(161)-106-107-115(163)-108-118(162)-119(159)
D051158-01	Details	Large filter	103(157)
D051159-00	Details	Large filter	119(157)
D051160-01	Details	Large filter	104-109-111-112-114-117-120(157)
D051161-00	Details	Large filter	105-110-113-116(157)
D051162-00	Details	Large filter	108-118(157)
D051163-00	Details	Large filter	106-107-115(157)
D051164-00	Assembly	Filter's test	121-122-123(165)
D051165-00	Details	Filter's test	121-122-123(164-176)
D051166-01	Assembly	Magnetic damper gr.8	140-141-144-145(171)-142-143-146(172)-159-160-161-162(173)
D051167-00	Assembly	Balance gr.9	10(168)-147-148-149-150-152-156-157-158(169)-151-153-154-155(170)
D051168-01	Details	Blade central support	10(106-167)
D051169-01	Details	Balance	147-148-149-150-152-156-157-158(167)
D051170-00	Details	Balance	151-153-154-155(167-183)
D051171-01	Details	Magnetic damper	140-141-144-145(166)
D051172-01	Details	Magnetic damper	142-143-146(166)
D051173-00	Details	Magnetic damper	159-160-161-162 (166)
D051174-00	Details	Balance tool	163-164-165(183)
D051175-00	Details	Ballast	166-167-168(176)
D051176-00	Assembly	Filter's test	102(153)-121-122(165)-166(175)-169-171-173-186(177)-170(178)-172-174(179)-191(185)
D051177-00	Details	Filter's test	169-171-173-186 (176)
D051178-00	Assembly	Structure	170.1-170.2-170.3-170.4(184)
D051179-00	Details	Flats	172-174 (176)
D051180-00	Assembly	Large blade tool	175-177-178-179(181)-176-180-182-189(185)-181-183-184-185-187-188-190(182)
D051181-00	Details	Large blade tool	175-177-178-179 (180)
D051182-00	Details	Large blade tool	181-183-184-185-187-188-190 (180)
D051183-00	Assembly	Assembly drawing	147-158(169)-154(170)-163-164-165(174)
D051184-00	Details	Structure	170.1-170.2-170.3-170.4(178)

Drawing LIGO number	Drawing Type	Drawing sub-Title	Part # shown or drawn (in drawing sheet or assembly) [D051 dropped]
D051185-00	Details	Structure	176-180-182-189(180)-191(176)
D051186-00	Assembly	Front insertion filters	
D051187-00	Assembly	Lateral insertion filters	192(200)
D051188-00	Assembly	Front insertion bench	193(200)-194-194.1(199)-216(205)
D051189-00	Assembly	Lateral insertion bench	
D051190-00	Assembly	Filter's complex on trolley	195(197)-196-198-(196)-197(195)-199(191)
D051191-00	Assembly	Mounting support	199-199.2(198)-199.1(197)
D051192-00	Assembly	Elevator	200(204)-201-202(202)-203-205(203)-204-215(205)
D051193-00	Assembly	Elevator	206-207-208-209-210-211(202)
D051194-00	Assembly	Elevator	212(201)-213-214(203)
D051195-00	Details	Trolley base	197-197.1-197.2-197.3(190)
D051196-00	Details	Trolley-vertical part	196-198(190)
D051197-00	Details	Mounting supports	199.1(191)-195(190)
D051198-00	Details	Mounting supports	199-192.2(191)
D051199-00	Details	Mounting supports	194-194.1-194.2(188)
D051200-00	Details	Guide beam	192-192.1(187)-193(188)
D051201-00	Details	Elevator	212-212.1(194)
D051202-00	Details	Elevator	201-202(192)-206-207-208-209-210-211(193)
D051203-00	Details	Elevator	203-205(192)-213-214(194)
D051204-00	Details	Body elevator	200(192)
D051205-00	Details	Elevator	204-215(192)-216(188))
D051206-00	Details	Old table	
D051207-00	Details	Connection to table	22.1-22.2-22.3-22.4(106)-217(208)
D051208-00	Assembly	Motorized vertical spring	57(141)-217(207)
D051209-00	Details	Jig to drill old table	218-219

2 List of Production parts

For the LASTI HAM-SAS unit Assembly

Note The complete part number of a component has the format D0511xx-Rxx-Pxx-SNxx (example D051114-R01-P01-SN01) where D0511xx is the Drawing number in column 2 below, Rxx is the Revision number, Pxx is the part number of column 1 and SNxx is a serial number assigned to each produced part..

In the right column, the number of parts foreseen in original bid appears in parenthesis when changed.

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
1	D051114	Base structure ass'y	D051100	0 (1)
1.1	D051114	Base structure bottom plate	D051114	0(1)
1.2	D051115	Base structure side	D051114	0(2)
1.3	D051115	Base structure side	D051114	0(2)
1.4	D051116	Base structure rib	D051114	0(2)
1.5	D051116	Base structure rib	D051114	0(4)
1.6	D051116	Base structure rib	D051114	0(4)
2	D051127	Filter's top plate	D051100	1
3	D051117	Optical table ass'y	D051100	0(1)
3.1	D051117	Optical table bottom plate	D051100	1
3.2	D051118	Optical table side	D051117	2
3.3	D051119	Optical table rib	D051117	6
3.4	D051119	Optical table rib	D051117	6
3.5	D051118	Optical table side	D051117	2
4	D051128	Filter's bottom plate	D051102	1
5	D051130	Sensor/actuator plate	D051105	4
5.1	D051130	Sensor/actuator bar	D051130	8
6	D051130	Sensor/actuator base	D051105	4

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
7	D051142	Wedge	D051103	8
8	D051142	Stiffener fastening	D051103	8
8.1	D051142	Fastening	D051103	8
8.2	D051142	Fastening	D051103	8
9	D051121	Filter main platform	D051106	4
10	D051168	Blade central support	D051106	4
11	D051124	Central screw	D051106	4
12	D051124	End-stop blade	D051106	4
13	D051122	End-stop column	D051106	16
14	D051125	LVDT coil	D051106	4[+1]
15	D051125	Magnet yoke front	D051106	4
16	D051126	Magnet yoke back	D051106	4
17	D051126	LVDT/actuator coils	D051106	4[+1]
18	D051125	Coil adjustment plate	D051106	4
19	D051124	Washer	D051106	4
20	D051124	Filter's structural column	D051106	64(32)
21	D051123	Blade clamp plate	D051106	32
22.1	D051207	Connection (new) table	D051106	0(2)
22.2	D051207	Connection (new) table	D051106	0(2)
22.3	D051207	Connection (exist.) table	D051106	2(0)
22.4	D051207	Connection (exist.) table	D051106	2(0)
23	D051122	Connection, nose (point)	D051106	1
23.1	D051122	Connection nose (flat)	D051106	2
23.2	D051122	Connection nose (line)	D051106	1
24	D051123	Tuning pusher	D051106	32

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
25	D051120	GAS blade (80 mm base)	D051106	32
25.1	D051120	GAS blade $\frac{3}{4}$ width	D051106	0(8)
25.2	D051120	GAS blade $\frac{1}{2}$ width	D051106	0(8)
25.3	D051120	GAS blade $\frac{1}{4}$ width	D051106	0(8)
26	D051123	Blade clamp	D051106	32
27	D051123	Guide left	D051106	32
28	D051123	Guide right	D051106	32
29	D051135	LIGO-I flex joint base	D051107	2
30	D051135	Main flex joint	D051107	4
31	D051136	LIGO-I safety tube extension	D051107	4
32	D051138	Safety tube	D051107	4
33	D051138	Maintenance locking screw	D051107	4
34	D051137	Flex joint connector	D051107	4
35	D051136	IP leg	D051107	4
36	D051137	Small flex joint	D051107	4 [+4 spares]
37	D051137	Top leg disk	D051107	4
38	D051137	1/2 cup retainer	D051107	4
39	D051137	Small flex joint base plate	D051107	4
40	D051137	1/2 cups	D051107	8 pairs [+ 8 spares]
41	D051137	Disk	D051107	4
42	D051143	Support	D051108	4
43	D051143	Hor. movement screw	D051108	4
44	D051139	Sled	D051108	4
45	D051143	Rod	D051108	8
46	D051143	Motor flange	D051108	4
47	D051143	Hor. movement nut	D051108	4

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
48	D051139	Spring clamp	D051108	8
49	D051139	Spring support	D051108	8
50	D051143	Central spring clamp	D051108	4
51	D051143	Central spring support	D051108	4
52	D051139	Bushing	D051108	8
53	D051140	Vert. movement screw	D051109	4
54	D051140	Vert. movement nut	D051109	4
55	D051140	Rod	D051109	4
56	D051140	Counter rotation	D051109	4
57	D051141	Spring clamp support	D051109	4
58		(Suppressed)		
59	D051141	Spring clamp	D051109	4
60	D051140	Joint	D051109	4
61	D051140	Support plate	D051109	4
62	D051136	C. weight bell	D051107	2
63	D051136	C. weight	D051107	8
64	D051113	Support tube ass'y	D051100	0(2)
64.1	D051113	Support tube endcap	D051100	0(4)
64.2	D051113	Support bushing tube spools	D051100	0(22)
65	D051129	LVDT/actuator LIGO-I spacer	D051105	4
66	D051135	Adv-LIGO extension spool	D051107	2
67	D051135	Flex joint base	D051107	2
68	D051129	LVDT/act. transport plate	D051105	8
69	D051141	Vert. spring clamp support	D051109	4
70	D051141	Spacer	D051109	8
71	D051138	Adv-LIGO flex joint base	D051107	2

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
72	D051123	Electrical connection bar	D051105	8
73	D051142	LIGO_I transport column	D051103	4
73.1	D051142	Adv. LIGO transport column	D051103	4
74	D051142	Transport bracket	D051103	4
75	D051113	Support tube	D051100	0(4)
76	D051139	Hor/Vert.-vert. spring	D051108/9	12 [+88 spares]
77	D051121	GAS F. Mounting tool	D051106	4
78	D051145	Support base	D051144	2
79	D051146	Tie rod	D051144	8
80	D051145	Curve-gauge	D051144	8 (4)
81	D051145	Curve-gauge	D051144	4 (2)
82	D051146	Spacer	D051144	16 (8)
83	D051146	Clamp spacer	D051144	4 (2)
84	D051146	Fork stop block	D051144	4 (2)
85	D051146	Clamp blade	D051144	4 (2)
86	D051146	Clamp blade	D051144	4 (2)
87	D051147	Clamp blade tip	D051144	2 (1)
88	D051147	Axis of rotation	D051144	4 (2)
89	D051147	Rotary jar	D051144	2 (1)
90	D051147	Rotary jar	D051144	2 (1)
91	D051147	Tie rod	D051144	2 (1)
92	D051147	Handle	D051144	2 (1)
93	D051148	Alignment part 2 and 4 (LIGO)	D051148	4
93.1	D051148	Alignment part 2 and 4 (AdLIGO)	D051148	4

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
94	D051154	Magnets separator 35.5 mm	D051107	16 [+14 spares]
94	D051154	Magnets separator 51 mm	D051107	32 [+18 spares]
95	D051154	Magnets support	D051107	8
96	D051152	Clamping cups	D051149	0 (4)
96.1	D051152	Clamping cups	D051149	0 (4)
96.1	D051152	Clamping cups	D051149	0 (4)
97	D051152	Support ring ass'y	D051149	0 (4)
98	D051155	Main support tube	D051149	0 (4)
99	D051152	Top plate	D051149	0 (4)
100	D051153	wire	D051149	0 (4)
101	D051153	Adjustment screw	D051149	9 (4)
102	D051153	½ cups	D051149-157	10 pairs (9)
103	D051158	Filter main platform	D051157	1 (4)
104	D051160	Tuning pusher	D051157	8 (32)
105	D051161	Magnet yoke back	D051157	1 (4)
106	D051163	Coil adjust. plate	D051157	1 (4)
107	D051163	LVDT coil	D051157	2 (4)
108	D051162	Blade central support	D051157	1 (4)
109	D051160	End-stop plate	D051157	1 (4)
110	D051161	Electrical conn. bar	D051157	1 (4)
111	D051160	End-stop column	D051157	4 (16)
112	D051160	End-stop column	D051157	4 (16)
113	D051161	Blade clamp plate	D051157	8 (32)
114	D051160	Blade clamp	D051157	8 (32)
115	D051163	LVDT/act.coils	D051157	2 (4)
116	D051161	Magnet yoke front	D051157	1 (4)

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
117	D051160	Guide right	D051157	8 (32)
118	D051162	End-stop plate	D051157	1 (4)
119	D051159	GAS blade	D051157	8 (X)
120	D051160	Guide left	D051157	8 (32)
121	D051165	½ cup	D051164	4 pairs (+6 spares) (0)
122	D051165	Nut	D051164	4 (8)
123	D051165	wire	D051164	0 (6)
124	D051134	Coil spool base	D051111	4
125	D051133	Coil tray	D051111	8
126	D051133	Flux guides	D051111	8
127	D051133	Central flux guide	D051111	4
128	D051133	Coil1/2 spools	D051111	8
129	D051134	Magnet base	D051111	4
130	D051132	Insulator washer	D051112	32 [+28 spares]
131	D051132	Insulator bushing	D051112	32 [+28 spares]
132	D051131	Lateral plate	D051112	16
133	D051131	Lateral plate	D051112	8
134	D051132	Top plate	D051112	8
135	D051131	Bottom support	D051112	4
136	D051132	Small coil support	D051112	4
136.1	D051132	Small coil cabling connector	D051112	4
137	D051131	Large coil	D051112	8 [+1 spare]
138	D051132	Small coil	D051112	4 [+1 spare]
139	D051132	Holder small coil	D051112	8
140	D051171	Magnetic damper	D051166	4 (on request)
141	D051171	Magnetic damper	D051166	4 (on request)

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
142	D051172	Magnetic damper	D051166	32 (on request)
143	D051172	Magnetic damper	D051166	32 (on request)
144	D051171	Magnetic damper	D051166	4 (on request)
145	D051171	Magnetic damper	D051166	4 (on request)
146	D051172	Magnetic damper	D051166	4 (on request)
147	D051169	Balance	D051167	8 (0)
148	D051169	Balance	D051167	8 (0)
149	D051169	Balance	D051167	8 (0)
150	D051169	Balance	D051167	8 (0)
151	D051170	Balance	D051167	8 (0)
152	D051169	Balance	D051167	16 (+14 spares) (0)
153	D051170	Balance	D051167	8 (0)
154	D051170	Balance	D051167	8 (0)
155	D051170	Balance	D051167	8 (0)
156	D051169	Balance	D051167	8 (+12 spares) (0)
157	D051169	Balance	D051167	16 (0)
158	D051169	Balance	D051167	8 (0)
159	D051173	Magnetic damper	D051166	16 (on request)
160	D051173	Magnetic damper	D051166	16 (on request)
161	D051173	Magnetic damper	D051166	32 (+18 spares) (on request)
162	D051173	Magnetic damper	D051166	64 (on request)
163	D051174	Balance tool	D051183	1 (0)
164	D051174	Balance tool	D051183	1 (0)
165	D051174	Balance tool	D051183	1 (0)

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
166	D051175	Ballast filter tuning	D051176	2x~30kg, 2x~20kg, 2x~10kg, 2x~5kg (0)
167	D051175	Ballast optical bench	D051176	(0) 16
168	D051175	Ballast optical bench	D051176	(0) 17
169	D051177	Filter's test	D051176	1 (0)
170.1	D051184	Structure	D051178	3 (0)
170.2	D051184	Structure	D051178	3 (0)
170.3	D051184	Structure	D051178	3 (0)
170.4	D051184	Structure	D051178	3 (0)
171	D051177	Filter's test	D051178	16 (0)
172	D051179	Flats	D051176	1 (0)
173	D051177	Filter's test	D051176	1 (0)
174	D051179	Flats	D051176	1 (0)
175	D051181	Large blade tool	D051180	1 (0)
176	D051185	Structure	D051180	4 (0)
177	D051181	Large blade tool	D051180	1 (0)
178	D051181	Large blade tool	D051180	1 (0)
179	D051181	Large blade tool	D051180	1 (0)
180	D051185	Large blade tool	D051180	1 (0)
181	D051182	Large blade tool	D051180	2 (0)
182	D051185	Large blade tool	D051180	1 (0)
183	D051182	Large blade tool	D051180	1 (0)
184	D051182	Large blade tool	D051180	2 (0)
185	D051182	Large blade tool	D051180	2 (0)
186	D051177	Filter's test	D051176	2 (+2 spares) (0)
187	D051182	Large blade tool	D051180	2 (0)

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
188	D051182	Large blade tool	D051180	10 (0)
189	D051185	Large blade tool	D051180	2 (0)
190	D051182	Large blade tool	D051180	12 (0)
191	D051185	Accelerometer holder	D051176	1 (0)
192	D051200	Guide beam	D051187	2 (0)
192.1	D051200	Guide beam	D051187	4 (0)
193	D051200	Supp. thrust bearing	D051188	4 (0)
194	D051199	Mounting support	D051188	2 (0)
194.1	D051199	Fixing support	D051188	2 (0)
194.1	D051199	Fixing support	D051188	2 (0)
195	D051197	Supp. thrust bearing	D051190	4 (0)
196	D051196	Trolley-vertical part	D051190	4 (0)
197	D051195	Trolley base	D051190	2 (0)
197.1	D051195	Trolley base	D051190	8 (0)
197.2	D051195	Trolley base	D051190	8 (0)
197.3	D051195	Trolley base	D051190	40 (0)
198	D051196	Joint load cell	D051190	4 (0)
199	D051198	Mounting support	D051191	2 (0)
199.1	D051197	Fixing plate	D051191	4 (0)
199.2	D051198	Rod support	D051191	2 (0)
200	D051204	Elevator Body	D051192	2 (0)
201	D051202	Screw	D051192	2 (0)
202	D051202	Foot	D051192	2 (0)
203	D051203	Bracket	D051192	4 (0)
204	D051205	Horizontal cover	D051192	2 (0)
205	D051203	Surface bearing	D051192	4 (0)

Part number	Detailed in drawing	Description	Shown in assembly number	Production pieces per unit
206	D051202	Belt pulley	D051193	8 (0)
207	D051202	Axle	D051193	4 (0)
208	D051202	Jockey pulley	D051193	8 (0)
209	D051202	Space	D051193	8 (0)
210	D051202	Pulley axle	D051193	8 (0)
211	D051202	Axle	D051193	4 (0)
212	D051201	Support guide beam	D051194	2 (0)
212.1	D051201	Support guide beam	D051194	2 (0)
213	D051203	Bottom space	D051194	4 (0)
214	D051203	End spacer	D051194	4 (0)
215	D051205	Vertical cover	D051192	4 (0)
216	D051205	Brace	D051188	1 (0)
217	D051207	Spring support	D051208	1 (0)
218	D051209	Drilling Jig for old optical bench	D051209	1 (0)
219	D051209	Bracket	D051209	4 (0)

Commercial supplies

Manuf acture r/code	Sho wn in Asse mbly #
	D051 -
Ring seeger J 19x1 V	108
Oriental Motor flexible coupling type MC12 0505C	108
Stepping motor AML type B17.2- R	108- 109
Newport fine adjuster	110

ment screws type AJS- 05H	
Buntin g magnet s type NEB35 90	106
Buntin g magnet s type NEB35 54NP/ N35P5 00500	107
Buntin g magnet s type NEB35 86NP/ N35P5 00500	111
Buntin g magnet s type NEB35 86NP/ N35P5 00500	157
Thrust bearing Rollon type CSW6 3-235- 2ZR	186

Guide Rollon type TLV63 length 4300 mm	187
Foot ROBO cod. 132/60 611	190
Wheel Tellure -Rota cod. 656602	190
Support series ATI SILVER R STAIN LESS type MUP0 06	190
National Instruments compression load cell type LPU- 2K	190
Hand wheel ELES A	192

VD:30 0FP+I +CM	
Worm gear reducer Bonfig lioli VF/W 44/75, I=120	192
Wheel Tellure -Rota cod. 658604	192
Handle ELES A cod. 67901	192
Guide Rollon type TLV63 length 960 mm	192
Thrust bearing Rollon type CSW6 3-235- 2ZR	192
Handle ELES A cod. 222661	192
Belt pulley	193

AT10 Z36 width 56 mm	
ATI SIT_L OCK 1300.0 20x47	193
Bearin g housin g ATI type BPF4	193
Bushin g bearing SKF 6202	193
Open belt ATI CDS/A T10/50 /A length 2.9 m	193
Drive extensi ble type S- 3A ATI length closed 669.5 mm	193
Plug-in output shaft	193

W 75-
D28

Clamp
belt

194

3 Bolt and screw list

To be updated

List of Stainless Steel screws and bolts needed to assemble one unit of HAM-SAS (S) stands for silver plated for mating with Stainless Steel parts.

Of each kind provide at least 10% spares (when plating, process screws in units of full boxes).

All screws should be of high standard with strength certification.

Large screws (M12 and above) to be shipped separately packages to avoid thread damage.

Wash, degrease and bake-out clean assembly screws according to UHV specifications.

All clean assembly screws to be stored in clean plastic boxes and/or sealable bags.

Black steel screws should be used in the dirty assembly instead of the silver plated stainless steel screws.

Screw type	Thread type and length (mm)	Number needed	Detailed in Drawing number
Tommy head (socket cap)	M12x35	64	D051100
Tommy head (socket cap)	M10x20	64	D051103
Tommy head (socket cap)	M10x50	16	D051103
Tommy head (socket cap)	M12x30	16	D051103
Tommy head (socket cap)	M16x35	8	D051103
Tommy head (socket cap)	M10x25 (S)	80	D051106
Tommy head (socket cap)	M10x35 (S)	128	D051106
Tommy head (socket cap)	M10x40 (S)	96	D051106
Tommy head (socket cap)	M12x40 (S)	64	D051106
Tommy head (socket cap)	M8x20 (S)	76	D051106
Tommy head (socket cap)	M5x30 (S)	N°24	D051106
Tommy head (socket cap)	M4x12 (S)	N°32	D051106
Tommy head (socket cap)	M4x12	N°12	D051106
Flat head	M3x8 (S)	N°12	D051106
Tommy head (socket cap)	M10x30	32	D051107

Screw type	Thread type and length (mm)	Number needed	Detailed in Drawing number
Tommy head (socket cap)	M10x25 (S)	16	D051107
Tommy head (socket cap)	M10x35	8	D051107
Tommy head (socket cap)	M4x12	8	D051107
Tommy head (socket cap)	M4x12 (S)	8	D051107
Flat head	M10x25 (S)	8	D051108
Tommy head (socket cap)	M6x60 (S)	8	D051108
Tommy head (socket cap)	M6x50 (S)	8	D051108
Tommy head (socket cap)	M5x16	16	D051108
Tommy head (socket cap)	M4x16 (S)	24	D051108
Nut	M3	16	D051108
Grub	M5x8	16	D051108
Tommy head (socket cap)	M10x30	8	D051109
Tommy head (socket cap)	M10x70	8	D051109
Tommy head (socket cap)	M5x12	8	D051109
Tommy head (socket cap)	M5x20	8	D051109
Tommy head (socket cap)	M3x12	8	D051109
Nut	M6	4	D051109
Nut	M3	16	D051109
Grub	M4x5	4	D051109
Tommy head (socket cap)	M5x12 (S)	24	D051111
Tommy head (socket cap)	M5x12	24	D051111
Flat head	M2.5x6 (S)	48	D051111
Tommy head (socket cap)	M5x12	32	D051112
Tommy head (socket cap)	M3x8	64	D051112
Flat head	M3x5	4	D051112
Flat head	M4x16 (S)	16	D051112
Flat head	M2.5x5	8	D051112
Tommy head (socket cap)	M10x100	2	D051144
Tommy head (socket cap)	M6x35	2	D051144
Tommy head (socket cap)	M6x20	4	D051144

Tommy head (socket cap)	M12x35	8	D051149
Hexagonal head	M12x40	32	D051149
Screw type	Thread type and length (mm)	Number needed	Detailed in Drawing number
Nut	M18	8	D051149
Grub	M10x15	4	D051149
Hexagonal head	M12x40	32	D051156
Tommy head (socket cap)	M10x25	64	D051157
Tommy head (socket cap)	M12x55	96	D051157
Tommy head (socket cap)	M12x45	128	D051157
Tommy head (socket cap)	M12x30	16	D051157
Tommy head (socket cap)	M8x25	64	D051157
Tommy head (socket cap)	M6x55	16	D051157
Tommy head (socket cap)	M5x45	32	D051157
Tommy head (socket cap)	M5x16	32	D051157
Tommy head (socket cap)	M4x12	16	D051157
Tommy head (socket cap)	M3x10	32	D051157