

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS**

NORTHWESTERN UNIVERSITY,

Plaintiff,

vs.

mitsubishi electric corp. and
mitsubishi electric automation,
inc.,

Defendants.

Case No. 1:21-cv-00607

JURY TRIAL DEMANDED

ANSWER TO COMPLAINT, DEFENSES, AND COUNTERCLAIMS

Defendants Mitsubishi Electric Corporation and Mitsubishi Electric Automation, Inc. (collectively “Mitsubishi Defendants”), hereby respond to the Complaint as follows:

1. The Mitsubishi Defendants admit that the Complaint of Northwestern University (“Northwestern”) purports to bring an action for infringement of U.S. Patent Nos. 6,928,336; 6,907,317; and 7,120,508 but deny the remainder of Paragraph 1.

THE PARTIES

2. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 2, and on that basis deny the allegations therein.

3. The Mitsubishi Defendants admit that Mitsubishi Electric Corporation is a Japanese corporation and that it maintains a place of business at Tokyo Building, 2-7-3, Marunouchi, Chiyoda-ku, Tokyo 100-8310, Japan, but otherwise deny the allegations in Paragraph 3.

4. The Mitsubishi Defendants admit that Mitsubishi Electric Automation, Inc. is a Delaware corporation and that it maintains a place of business at 500 Corporate Woods Parkway, Vernon Hills, Illinois, 60061, but otherwise deny the allegations in Paragraph 4.

JURISDICTION AND VENUE

5. The Mitsubishi Defendants admit that the complaint purports to state an action for alleged patent infringement under the patent laws of the United States. Except as expressly admitted, the Mitsubishi Defendants deny all remaining allegations in Paragraph 5 and specifically deny that they have infringed or are infringing, directly, indirectly, or willfully, any valid claim of any asserted patent.

6. The Mitsubishi Defendants admit that this Court has subject matter jurisdiction over Plaintiff's claims under 28 U.S.C. § 1331 and 1338. Except as expressly admitted, the Mitsubishi Defendants deny all remaining allegations in Paragraph 6 and specifically deny that they have infringed or are infringing, directly, indirectly, or willfully, any valid claim of any asserted patent.

7. The Mitsubishi Defendants admit that Mitsubishi Electric Corporation is subject to jurisdiction for this particular matter in this judicial district, but otherwise deny the allegations in Paragraph 7.

8. The Mitsubishi Defendants admit that Mitsubishi Electric Automation, Inc. is subject to personal jurisdiction for this particular matter in this judicial district, but otherwise deny the allegations in Paragraph 8.

9. The Mitsubishi Defendants admit that they are subject to personal jurisdiction for this particular matter in this judicial district, but otherwise deny the allegations in Paragraph 9 and specifically deny that they have infringed or are infringing, directly, indirectly, or willfully, any valid claim of any asserted patent.

10. The Mitsubishi Defendants admit that Mitsubishi Electric Automation, Inc. offers for sale, sells, and/or advertises its products in Illinois, but otherwise deny the allegations in Paragraph 10.

11. The Mitsubishi Defendants admit that Mitsubishi Electric Automation, Inc. products are sold in this District, but otherwise deny the allegations in Paragraph 11 and specifically deny that they have infringed or are infringing, directly, indirectly, or willfully, any valid claim of any asserted patent.

12. The Mitsubishi Defendants deny the allegations in Paragraph 12.

13. The Mitsubishi Defendants admit that Mitsubishi Electric Automation, Inc. advertises, markets, offers for sale, and/or sells devices and provides instructions, user manuals, advertising, and or/marketing, but the Mitsubishi Defendants otherwise deny the allegations in Paragraph 13 and specifically deny that they have infringed or are infringing, directly, indirectly, or willfully, any valid claim of any asserted patent.

14. The Mitsubishi Defendants deny the allegations in Paragraph 14 and specifically deny that they have infringed or are infringing, directly, indirectly, or willfully, any valid claim of any asserted patent.

15. The Mitsubishi Defendants admit that venue is proper for this particular matter in this judicial district, that Mitsubishi Electric Automation, Inc. has a place of business in the District, and that Mitsubishi Electric Corporation is a foreign corporation. The Mitsubishi Defendants otherwise deny the allegations in Paragraph 15.

16. The Mitsubishi Defendants admit that venue is proper over Mitsubishi Electric Corporation in the Northern District of Illinois under 28 U.S.C. §§ 1391 and 1400(b) for this particular matter in this judicial district and that Mitsubishi Electric Corporation does not reside in the United States. The Mitsubishi Defendants otherwise deny the allegations in Paragraph 16.

17. The Mitsubishi Defendants admit that venue is proper over Mitsubishi Electronic Automation in the Northern District of Illinois under 28 U.S.C. §§ 1391 and 1400(b) for this

particular matter in this judicial district and that Mitsubishi Electronic Automation has a place of business in the District. The Mitsubishi Defendants otherwise deny the allegations in Paragraph 17.

BACKGROUND

I. Northwestern University¹

18. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 18, and on that basis deny the allegations therein.

19. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 19, and on that basis deny the allegations therein.

20. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 20, and on that basis deny the allegations therein.

21. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 21, and on that basis deny the allegations therein.

22. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 22, and on that basis deny the allegations therein.

¹ The headings used throughout this Answer mirror those used by the Complaint for convenience only, and no admissions or inferences shall be drawn therefrom.

23. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 23, and on that basis deny the allegations therein.

24. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 24, and on that basis deny the allegations therein.

25. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 25, and on that basis deny the allegations therein.

26. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 26, and on that basis deny the allegations therein.

II. Cobots

27. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 27 related to the award, and on that basis deny the allegations therein. The Mitsubishi Defendants deny the remaining allegations in Paragraph 27.

28. The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the allegations in Paragraph 28, and on that basis deny the allegations therein.

29. The Mitsubishi Defendants deny the allegations in Paragraph 29.

30. The Mitsubishi Defendants deny the allegations in Paragraph 30.

31. The Mitsubishi Defendants deny the allegations in Paragraph 31.

32. The Mitsubishi Defendants deny the allegations in Paragraph 32.

33. The Mitsubishi Defendants deny the allegations in Paragraph 33.

III. The Mitsubishi Defendants' Allegedly Infringing Products

34. The Mitsubishi Defendants admit the allegations in Paragraph 34.

35. The Mitsubishi Defendants admit that Mitsubishi Electric Automation, Inc. is an indirect subsidiary of Mitsubishi Electric Corporation through another entity. The Mitsubishi Defendants deny the remaining allegations in Paragraph 35.

36. The Mitsubishi Defendants admit that Mitsubishi Electric Corporation manufactures industrial robots outside of the United States. The Mitsubishi Defendants deny the remaining allegations in Paragraph 36.

37. To the extent the allegations in Paragraph 37 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 37.

38. The Mitsubishi Defendants deny the allegations in Paragraph 38.

39. The Mitsubishi Defendants deny the allegations in Paragraph 39.

40. The Mitsubishi Defendants deny the allegations in Paragraph 40.

41. The Mitsubishi Defendants deny the allegations in Paragraph 41.

FIRST CAUSE OF ACTION (Infringement of the '336 Patent)

42. The Mitsubishi Defendants re-allege and incorporate by reference each and every response above as if fully set forth herein.

43. The Mitsubishi Defendants admit that the cover page of U.S. Patent No. 6,928,336 states that it issued on August 9, 2005, and that its title is "System and Architecture for Providing a Modular Intelligent Assist System." The Mitsubishi Defendants are without knowledge or

information sufficient to form a belief as to the truth of the remaining allegations in Paragraph 43, and on that basis deny the allegations therein.

44. The Mitsubishi Defendants deny the allegations in Paragraph 44.

45. The Mitsubishi Defendants deny the allegations in Paragraph 45.

46. The Mitsubishi Defendants deny the allegations in Paragraph 46.

47. The Mitsubishi Defendants admit the allegations in Paragraph 47.

48. To the extent the allegations in Paragraph 48 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants admit that the screenshot included in Paragraph 48 purports to be an excerpt from a Mitsubishi Defendant website but deny that the screenshot included in Paragraph 48 is an accurate excerpt from a Mitsubishi Defendant website. Except as expressly admitted, the Mitsubishi Defendants deny all remaining allegations in Paragraph 48 and specifically deny that they have infringed or are infringing any valid and enforceable claim of any asserted patent.

49. To the extent the allegations in Paragraph 49 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants admit that the screenshot included in Paragraph 49 purports to be an excerpt from a Mitsubishi Defendant website but deny that the screenshot included in Paragraph 49 is an accurate excerpt from a Mitsubishi Defendant website. Except as expressly admitted, the Mitsubishi Defendants deny all remaining allegations in Paragraph 49 and specifically deny that they have infringed or are infringing any valid and enforceable claim of any asserted patent.

50. To the extent the allegations in Paragraph 50 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants admit that the screenshots included in Paragraph 50 purport to be excerpts from a Mitsubishi Defendant website but deny that the

screenshots included in Paragraph 50 are accurate excerpts from a Mitsubishi Defendant website. Except as expressly admitted, the Mitsubishi Defendants deny all remaining allegations in Paragraph 50 and specifically deny that they have infringed or are infringing any valid and enforceable claim of any asserted patent.

51. To the extent the allegations in Paragraph 51 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants admit that the screenshot included in Paragraph 51 purports to be an excerpt from a Mitsubishi Defendant website but deny that the screenshot included in Paragraph 51 is an accurate excerpt from a Mitsubishi Defendant website. Except as expressly admitted, the Mitsubishi Defendants deny all remaining allegations in Paragraph 51 and specifically deny that they have infringed or are infringing any valid and enforceable claim of any asserted patent.

52. To the extent the allegations in Paragraph 52 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 52.

53. To the extent the allegations in Paragraph 53 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 53.

54. To the extent the allegations in Paragraph 54 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants admit that the screenshot included in Paragraph 54 purports to be an excerpt from a Mitsubishi Defendant website but deny that the screenshot included in Paragraph 54 is an accurate excerpt from a Mitsubishi Defendant website. Except as expressly admitted, the Mitsubishi Defendants deny all remaining allegations in

Paragraph 54 and specifically deny that they have infringed or are infringing any valid and enforceable claim of any asserted patent.

55. To the extent the allegations in Paragraph 55 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 55.

56. The Mitsubishi Defendants deny the allegations in Paragraph 56.

57. The Mitsubishi Defendants deny the allegations in Paragraph 57.

58. The Mitsubishi Defendants deny the allegations in Paragraph 58.

59. The Mitsubishi Defendants deny the allegations in Paragraph 59.

60. The Mitsubishi Defendants deny the allegations in Paragraph 60.

61. The Mitsubishi Defendants deny the allegations in Paragraph 61.

62. The Mitsubishi Defendants admit that they received a letter dated May 5, 2020, that mentions one or more of the asserted patents, but otherwise deny the allegations in Paragraph 62.

63. The Mitsubishi Defendants deny the allegations in Paragraph 63.

**SECOND CAUSE OF ACTION
(Infringement of the '317 Patent)**

64. The Mitsubishi Defendants re-allege and incorporate by reference each and every response above as if fully set forth herein.

65. The Mitsubishi Defendants admit that the cover page of U.S. Patent No. 6,907,317 states that it issued on June 14, 2005, and that its title is “Hub for a Modular Intelligent Assist System.” The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations in Paragraph 65, and on that basis deny the allegations therein.

66. The Mitsubishi Defendants deny the allegations in Paragraph 66.

67. The Mitsubishi Defendants deny the allegations in Paragraph 67.

68. The Mitsubishi Defendants deny the allegations in Paragraph 68.

69. The Mitsubishi Defendants deny the allegations in Paragraph 69.

70. To the extent the allegations in Paragraph 70 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants admit that the screenshots included in Paragraph 70 purport to be excerpts from a Mitsubishi Defendant website but deny that the screenshots included in Paragraph 70 are accurate excerpts from a Mitsubishi Defendant website. Except as expressly admitted, the Mitsubishi Defendants deny all remaining allegations in Paragraph 70 and specifically deny that they have infringed or are infringing any valid and enforceable claim of any asserted patent.

71. To the extent the allegations in Paragraph 71 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 71.

72. To the extent the allegations in Paragraph 72 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 72.

73. To the extent the allegations in Paragraph 73 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 73.

74. To the extent the allegations in Paragraph 74 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 74.

75. To the extent the allegations in Paragraph 75 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 75.

76. To the extent the allegations in Paragraph 76 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 76.

77. The Mitsubishi Defendants deny the allegations in Paragraph 77.

78. The Mitsubishi Defendants deny the allegations in Paragraph 78.

79. The Mitsubishi Defendants deny the allegations in Paragraph 79.

80. The Mitsubishi Defendants deny the allegations in Paragraph 80.

81. The Mitsubishi Defendants deny the allegations in Paragraph 81.

82. The Mitsubishi Defendants deny the allegations in Paragraph 82.

83. The Mitsubishi Defendants admit that they received a letter dated May 5, 2020, that mentions one or more of the asserted patents, but otherwise deny the allegations in Paragraph 83.

84. The Mitsubishi Defendants deny the allegations in Paragraph 84.

**THIRD CAUSE OF ACTION
(Infringement of the '508 Patent)**

85. The Mitsubishi Defendants re-allege and incorporate by reference each and every response above as if fully set forth herein.

86. The Mitsubishi Defendants admit that the cover page of U.S. Patent No. 7,120,508 states that it issued on October 10, 2006, and that its title is "System and Architecture for Providing a Modular Intelligent Assist System." The Mitsubishi Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations in Paragraph 86, and on that basis deny the allegations therein.

87. The Mitsubishi Defendants deny the allegations in Paragraph 87.

88. The Mitsubishi Defendants deny the allegations in Paragraph 88.

89. The Mitsubishi Defendants deny the allegations in Paragraph 89.

90. The Mitsubishi Defendants admit the allegations in Paragraph 90.

91. To the extent the allegations in Paragraph 91 state a legal conclusion or question of law, no response is required. To the extent the allegations in Paragraph 91 refer or relate to a document, the document speaks for itself. The Mitsubishi Defendants deny the remaining allegations in Paragraph 91.

92. To the extent the allegations in Paragraph 92 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 92.

93. To the extent the allegations in Paragraph 93 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 93.

94. To the extent the allegations in Paragraph 94 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 94.

95. To the extent the allegations in Paragraph 95 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 95.

96. To the extent the allegations in Paragraph 96 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 96.

97. To the extent the allegations in Paragraph 97 state a legal conclusion or question of law, no response is required. The Mitsubishi Defendants deny the remaining allegations in Paragraph 97.

98. The Mitsubishi Defendants deny the allegations in Paragraph 98.

99. The Mitsubishi Defendants deny the allegations in Paragraph 99.

100. The Mitsubishi Defendants deny the allegations in Paragraph 100.

101. The Mitsubishi Defendants deny the allegations in Paragraph 101.

102. The Mitsubishi Defendants deny the allegations in Paragraph 102.

103. The Mitsubishi Defendants deny the allegations in Paragraph 103.

104. The Mitsubishi Defendants admit that they received a letter dated May 5, 2020, that mentions one or more of the asserted patents, but otherwise deny the allegations in Paragraph 104. In particular, the Mitsubishi Defendants deny the allegation that “[a]s of the filing of this complaint, Northwestern has not received a response”; the Mitsubishi Defendants responded to Northwestern’s May 5, 2020 letter on June 15, 2020, and June 24, 2020.

105. The Mitsubishi Defendants deny the allegations in Paragraph 105.

PRAYER FOR RELIEF

106. Northwestern’s prayer for relief contains no allegations and therefore the Mitsubishi Defendants are not required to respond. To the extent a response is deemed necessary, the Mitsubishi Defendants deny all allegations in Northwestern’s prayer for relief and deny that Northwestern is entitled to any of the relief requested in its prayer for relief against them.

GENERAL DENIAL

The Mitsubishi Defendants deny each and every allegation contained in the Complaint to which the Mitsubishi Defendants have not specifically admitted, denied, or otherwise responded.

DEFENSES TO THE COMPLAINT

Subject to the responses earlier in this pleading, the Mitsubishi Defendants allege and assert the following defenses in response to the allegations in the Complaint. By virtue of listing the following defenses, the Mitsubishi Defendants do not assume any legal or factual burden of proof not otherwise assigned to them under the law, regardless of how such defenses are denominated herein. In addition to the defenses described below, the Mitsubishi Defendants specifically reserve all rights to allege additional defenses that become known through the course of discovery.

FIRST DEFENSE (Failure to State a Claim)

1. The Complaint fails to state sufficient facts to constitute a claim upon which relief may be granted, pursuant to Federal Rule of Civil Procedure 12(b)(6).

SECOND DEFENSE (Invalidity of the Asserted Patents)

2. One or more claims of the '336 patent, '317 patent, and '508 patent (collectively the "Asserted Patents") are invalid for failure to meet the "conditions of patentability" or otherwise to comply with the requirements set forth in U.S. Patent Laws, 35 U.S.C. §§ 100 *et seq.*, including but not limited to 35 U.S.C. §§ 101, 102, 103, and/or 112. The following exemplary bases of invalidity are not exhaustive, and the Mitsubishi Defendants reserve the right to provide additional bases of invalidity as the case proceeds and fact discovery begins.

3. For example, as to the '336 patent, the combination of WO 2000/047512 ("Gerd") and U.S. Patent no. 6,084,373 ("Goldenberg") renders the '336 patent invalid under 35 U.S.C. § 103. It would have been obvious to combine the motion module of Gerd with the more comprehensive computational strength of Goldenberg to provide a more highly customizable motion module. For example, Gerd specifically states that a person of skill in the art has "many

possibilities for further refinement of the invention.” Gerd at 22:878-79. Further, Goldenberg specifically relates to the same general field of invention as Gerd, relating to a reconfigurable modular robotic joint. Goldenberg at 1:5-10. Goldenberg seeks to improve the configuration ability of a robotic system like Gerd to provide an advantageously reconfigurable modular joint that can be used for various applications. *Id.* at 2:8-15.

4. Gerd and Goldenberg are analogous art to the Asserted Patents. Both references are in the same field of endeavor as the Asserted Patents and would have been reasonably pertinent to the problems the inventors set out to solve, as described herein and in the references themselves.

5. Gerd and Goldenberg both disclose an intelligent assist system as defined by Northwestern. For example, Gerd discloses a device that “can be manually operated by an operator” (Gerd at 13:531-33) and comprises an “adjusting element” (*id.* at 5:188-90) to allow a user to interact with the device. Gerd highlights several “safety functions” that permit operators to work alongside the robots, including “a safety control ... for a clamping or gripping mechanism.” *Id.* at 11:448-56. Goldenberg also describes an intelligent assist system, disclosing a system “that allows for direct interaction of a human operator with the LCS [local control subsystem].” Goldenberg at 9:32-46. Goldenberg further describes its modular joints as being “intelligent,” with each joint having “its own control and communication software.” *Id.* at 2:39-48.

6. Gerd and Goldenberg further disclose a modular architecture, with Gerd disclosing a “load-bearing device” connected to a “support element” (Gerd at 7:286-87) and Goldenberg disclosing several “modular reconfigurable joints” (Goldenberg at 9:12-17) that allow for “the addition, removal and rapid integration of the reconfigurable modular joints to suit different applications” (*id.* at 2:8-15).

7. Gerd discloses a motion module that contains an actuator and can support and move a payload. Specifically, Gerd discloses a “load lifting device, with a controllable drive, with a support element connected to the drive” (Gerd at 1:13-16), and “an actuator for the drive” (*id.* at 8:304-10).

8. Gerd in combination with Goldenberg discloses a motion module with multiple computational nodes, with one of the nodes configured to control the motion module. As stated previously, Gerd discloses a motion module. Goldenberg discloses a system with multiple nodes, specifically disclosing “an interconnected network of individual nodes, with each node comprising a single reconfigurable modular joint.” *Id.* at 2:8-15; *see also* FIG. 11 below. Each modular joint of Goldenberg comprises a “local control subsystem (LCS) ... comprising a microprocessor and the associated electronics for performing dedicated servo-control of position of each module in real time.” *Id.* at 9:39-42.

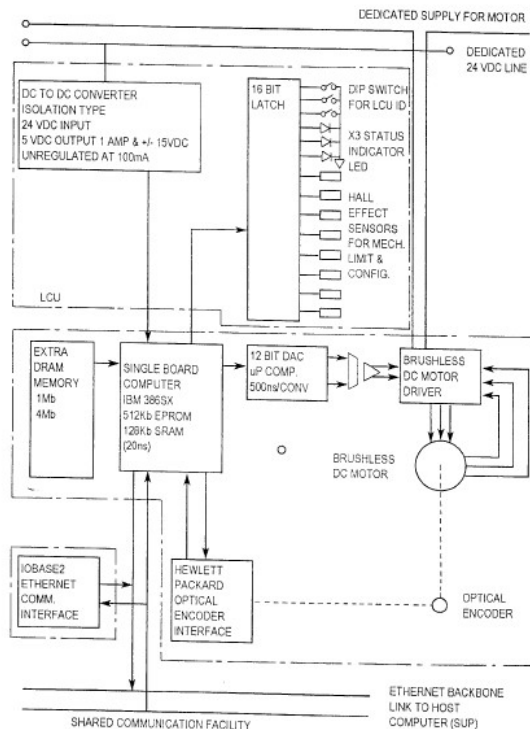


FIG. 11

Goldenberg at FIG. 11.

9. Goldenberg further discloses a node configured to control the motion module. For example, each modular joint of Goldenberg includes “its own built-in control system and electronics,” and “a motor and associated sensors,” further comprising “an embedded control system including a power amplifier for the motor, a sensor interface, microprocessor, and communication circuitry.” *Id.* at 2:26-34. Goldenberg states its distributed control system provides a system with “motion control about multiple axes.” *Id.* at 2:49-54.

10. Goldenberg also discloses a plurality of communication links. Specifically, Goldenberg describes a “shared communication facility ... that allows for the transfer of data and control information to and from a local control subsystem (LCS) that is resident on every individual module.” *Id.* at 9:32-38.

11. Goldenberg discloses that these communication links also exist between the computational nodes, stating that the modules “share a common communication bus between themselves.” *Id.* at 9:19-21.

12. Goldenberg also discloses that the communications links carry information between the nodes to actuate the motion module. For example, Goldenberg states that the modules share a “host computer which allows a user to enter motion and task commands.” *Id.* The local control subsystem that transmits data and control information as mentioned above comprises a “drive amplifier/motion controller for the actuator.” *Id.* at 10:21:30.

13. As for the '317 patent, the combination of Gerd and Goldenberg render the '317 patent invalid under 35 U.S.C. § 103. It would have been obvious to combine the motion module of Gerd with the more comprehensive computational strength of Goldenberg to provide a more highly customizable automated system controlled by a host computer.

14. For example, Gerd specifically states that a person of skill in the art has “many possibilities for further refinement of the invention.” Gerd at 22:878-79. Further, Goldenberg specifically relates to the same general field of invention as Gerd, relating to a reconfigurable modular robotic joint. Goldenberg at 1:5-10. Goldenberg seeks to improve the configuration ability of a robotic system like Gerd to provide an advantageously reconfigurable modular joint that can be used for various applications. *Id.* at 2:8-15.

15. Gerd and Goldenberg both disclose an intelligent assist system as defined by Northwestern. For example, Gerd discloses a device that “can be manually operated by an operator” (Gerd at 13:531-33) and comprises an “adjusting element” (*id.* at 5:188-90) to allow a user to interact with the device. Gerd highlights several “safety functions” that permit operators to work alongside the robots, including “a safety control ... for a clamping or gripping mechanism.” *Id.* at 11:448-56. Goldenberg also discloses an intelligent assist system, disclosing a system “that allows for direct interaction of a human operator with the LCS [local control subsystem].” Goldenberg at 9:32-46. Goldenberg further describes its modular joints as being “intelligent,” with each joint having “its own control and communication software.” *Id.* at 2:39-48.

16. Goldenberg further describes a reconfigurable modular joint that can be used for building and configuring robotic and automated systems as an interconnected network of individual nodes which are controlled by a host computer. Goldenberg at Abstract. Goldenberg discloses a multi-function hub that is configured to be a central interface point. *Id.* at 9:46-53.

17. Goldenberg also describes a distributed control system for operating simultaneously one or more modular reconfigurable joints using multiple processors under different operations systems and controlled by a host computer. *Id.* at 9:12-17. Goldenberg further discloses an I/O interface on the host computer for communication with the computational node.

Id. at 10:23-30. Goldenberg also discloses digital communication protocol to communicate with the modules. *Id.* at 10:11-19.

18. As for the '508 patent, the combination of Gerd and Goldenberg renders the '508 patent invalid under 35 U.S.C. § 103. It would have been obvious to combine the motion module of Gerd with the more comprehensive computational strength of Goldenberg to provide a more highly customizable automated system controlled by a host computer. For example, Gerd specifically states that a person of skill in the art has “many possibilities for further refinement of the invention.” Gerd at 22:878-79. Further, Goldenberg specifically relates to the same general field of invention as Gerd, relating to a reconfigurable modular robotic joint. Goldenberg at 1:5-10. Goldenberg seeks to improve the configuration ability of a robotic system like Gerd to provide an advantageously reconfigurable modular joint that can be used for various applications. *Id.* at 2:8-15.

19. Gerd and Goldenberg both disclose an intelligent assist system as defined by Northwestern. For example, Gerd discloses a device that “can be manually operated by an operator” (Gerd at 13:531-33) and comprises an “adjusting element” (*id.* at 5:188-90) to allow a user to interact with the device. Gerd highlights several “safety functions” that permit operators to work alongside the robots, including “a safety control ... for a clamping or gripping mechanism.” *Id.* at 11:448-56. Goldenberg also discloses an intelligent assist system, disclosing a system “that allows for direct interaction of a human operator with the LCS [local control subsystem].” Goldenberg at 9:32-46. Goldenberg further describes its modular joints as being “intelligent,” with each joint having “its own control and communication software.” *Id.* at 2:39-48.

20. Goldenberg further describes a reconfigurable modular joint that can be used for building and configuring robotic and automated systems as an interconnected network of individual nodes controlled by a host computer. Goldenberg at Abstract.

21. Specifically, Goldenberg discloses a computational node on each module that is capable of communicating with a host computer. *Id.* at 9:46-53. The “supervisor controller” acts as the master controller and provides high-level user interface, generates control set-points for the “local control subsystem,” and constantly receives information/data from the “local control subsystem.” *Id.*

22. Goldenberg further discloses a graphical user interface (GUI) for “monitoring” and “performing standard initialization” of the system. *Id.* at 11:11-28. The GUI also provides visual indicators that indicate the status of the module. *Id.*

23. The preceding grounds of invalidity are exemplary, not exhaustive, and the Mitsubishi Defendants reserve all rights to provide additional grounds of invalidity as the case proceeds.

THIRD DEFENSE (Non-infringement of the Asserted Patents)

24. The Mitsubishi Defendants do not and have not infringed directly or indirectly either literally or under the doctrine of equivalents and are not liable for infringement of any valid and enforceable claim of the Asserted Patents. The Mitsubishi Defendants hereby provide the following exemplary reasons why they do not infringe, while reserving all rights to provide additional bases for non-infringement as the case proceeds.

25. The Mitsubishi Defendants do not infringe any valid claim of the ’336 patent, directly or indirectly, contributorily or otherwise in conjunction with any accused product or service because the accused products do not practice the elements of the claims of the ’336 patent.

26. The Mitsubishi Defendants' accused products do not comprise an "intelligent assist system." As defined by Northwestern during prosecution of the '336 patent, an "intelligent assist system" excludes a "human/machine interface." *See* '336 prosecution history at 643 ("Engdahl does not disclose or suggest an IAD, or an intelligent assist system, **but instead** discloses a human/machine interface for programming and monitoring of control programs used for the control of factories.") (emphasis added).

27. According to Northwestern's complaint, the accused products allegedly comprise a "human-machine interface." *See, e.g.*, Compl. at ¶¶ 37, 52, 53, 70. Hence, the accused products are not specifically designed for operation in an intelligent assist system.

28. Further, the accused products do not comprise a plurality of "communication links." As defined by Northwestern, "communication links" prevent self-discovery of physical location. *See* '336 patent at 15:38-53 ("Because the modules are connected via communication links in this embodiment, they do not self-discover their physical location, e.g. which one is on which rail."). The accused products, however, include a process of "automatic detection of connected devices" using a "device map area" function. *See, e.g.*, MELSEC iQ-F FX5 User's Manual (Ethernet Communication) at p. 22.

29. The accused products further do not include a "motion module for supporting" humans in lifting and moving payloads. The '336 patent defines a motion module in the context of an intelligent assist device where human and machine interaction is present. However, as the accused products do not constitute an intelligent assist system, they do not provide a motion module for supporting. For example, a robotic arm as seen in the accused products does not support humans; it is instead a preprogrammed automated machine.

30. The accused products also do not include computational nodes “being configured,” as the accused products are not programmed for an intelligent assist system. The Mitsubishi Defendants at best provide general purpose software for their products, which are not “configured” for use with intelligent assist systems, as required by the claims. Further, the accused products are not configured as required by the claims by the Mitsubishi Defendants.

31. The Mitsubishi Defendants also do not infringe the ’336 patent because all asserted claims of the ’336 patent are invalid, as specified elsewhere in this pleading.

32. The Mitsubishi Defendants do not infringe any valid claim of the ’317 patent, directly or indirectly, contributorily or otherwise in conjunction with any accused product or service because the accused products do not practice the elements of the claims of the ’317 patent.

33. The Mitsubishi Defendants’ accused products do not comprise an “intelligent assist system.” As defined by Northwestern during prosecution of the ’336 patent, an “intelligent assist system” excludes a “human/machine interface.” *See* ’336 prosecution history at 643 (“Engdahl does not disclose or suggest an IAD, or an intelligent assist system, **but instead** discloses a human/machine interface for programming and monitoring of control programs used for the control of factories.”) (emphasis added).

34. By Northwestern’s own admission, the accused products comprise a “human-machine interface.” *See, e.g.*, Compl. at ¶¶ 37, 50, 52, 53, 70. Hence, the accused products are not specifically designed for operation in an intelligent assist system.

35. The accused products also do not satisfy the ’317 patent’s requirement for “a physical interface configured and arranged to be a central interface point for an operator,” at least because they comprise merely long-known human-machine interfaces, not a “physical” interface as in an intelligent assist device/system.

36. Further, the accused products do not comprise a “common data link.” Instead, the accused products provide a communication interface for network connection. The data link between different modules depend upon each system’s configuration and architecture.

37. The Mitsubishi Defendants also do not infringe the ’317 patent because all asserted claims of the ’317 patent are invalid, as specified elsewhere in this pleading.

38. The Mitsubishi Defendants do not infringe any valid claim of the ’508 patent, directly or indirectly, contributorily or otherwise in conjunction with any accused product or service because the accused products do not practice the elements of the claims of the ’508 patent.

39. For example, the Mitsubishi Defendants’ accused products do not comprise an “intelligent assist system.” As defined by Northwestern during prosecution of the ’336 patent, an “intelligent assist system” excludes a “human/machine interface.” *See* ’336 prosecution history at 643 (“Engdahl **does not disclose or suggest an IAD**, or an intelligent assist system, **but instead** discloses a human/machine interface for programming and monitoring of control programs used for the control of factories.”) (emphasis added).

40. By Northwestern’s own admission, the Mitsubishi Defendants’ products comprise a “human-machine interface.” *See, e.g.*, Compl. at ¶¶ 37, 50, 52, 53, 70. Hence, the accused products are not specifically designed for operation in an intelligent assist system.

41. Further, the Mitsubishi Defendants’ accused products do not provide a graphical user interface to “manipulate objects related to the module or the computational node.” Instead, the accused products monitor through an automated sequence program without any human intervention. *See, e.g.*, GOT 2000 Series/Simple Series at pp. 25, 29, 33.

42. The Mitsubishi Defendants also do not infringe the ’508 patent because all asserted claims of the ’508 patent are invalid, as specified elsewhere in this pleading.

43. The preceding grounds of non-infringement are exemplary, not exhaustive, and the Mitsubishi Defendants reserve the right to claim additional bases of non-infringement as the case proceeds.

**FOURTH DEFENSE
(Prosecution History Estoppel)**

44. Northwestern is estopped from construing the claims of one or more of the Asserted Patents, even if this were otherwise possible, to cover and include any of the Mitsubishi Defendants' products and/or services that Northwestern alleges infringes any claim of the Asserted Patents because of actions taken and/or statements made during prosecution of the applications that resulted in the Asserted Patents.

**FIFTH DEFENSE
(Limitation on Patent Damages—Marking)**

45. Northwestern's claims for damages, if any, against the Mitsubishi Defendants for alleged infringement of the Asserted Patents are limited by 35 U.S.C. §§ 286, 287, and/or 288.

46. Specifically, upon information and belief, Northwestern has failed to properly, consistently, and continuously mark its products with any patent numbers prior to filing the Complaint in this action pursuant to 35 U.S.C. § 287.

47. On information and belief, one or more of the current or prior owners of the Asserted Patents produced products and/or prototypes that should have been marked with the patent numbers but were not so marked.

48. Northwestern also failed to allege any such proper marking in the Complaint.

**SIXTH DEFENSE
(Limitation on Patent Damages—Statute of Limitations/Laches)**

49. Northwestern's claims for damages, if any, against the Mitsubishi Defendants for alleged infringement of the Asserted Patents are limited by 35 U.S.C. § 286 and Northwestern's

own unreasonable delay in bringing suit. Northwestern has inexcusably and unreasonably delayed bringing a patent infringement action against the Mitsubishi Defendants, and this delay has resulted in material prejudice to the Mitsubishi Defendants.

**SEVENTH DEFENSE
(Unenforceability)**

50. Northwestern, by its conduct, representation, and/or omissions misled the U.S. Patent and Trademark Office and/or misused the Asserted Patents and rendered the patents unenforceable, and is thus barred from recovery.

51. For example, on information and belief, one or more prior art references that were material to patentability were withheld from the USPTO during prosecution of the Asserted Patents with the intent to deceive or mislead. For example, one or more of the inventors of the Asserted Patents (including Dr. Colgate and Dr. Peshkin) published articles related to cobots and systems for controlling them more than one year before the earliest effective filing date of the Asserted Patents. As the author of these references, at least Drs. Peshkin and/or Colgate committed inequitable conduct by failing to disclose these references to the USPTO during prosecution.

52. In addition, the Mitsubishi Defendants reserve the right to allege that one or more individuals (including the '317 patent's prosecuting attorneys) committed inequitable conduct by falsely certifying on February 28, 2011, that the delay in paying the first maintenance fee for the '317 patent was "unintentional" when it in fact was not. The '317 patent expired on July 13, 2009, for failure to pay maintenance fees, but was not revived until more than 19 months later, and there are no facts known to the Mitsubishi Defendants evidencing that this entire period of delay was unintentional.

53. Likewise, the Mitsubishi Defendants reserve the right to allege that one or more individuals (including the '508 patent's prosecuting attorneys) committed inequitable conduct by

falsely certifying on April 10, 2020, that the delay in paying the third maintenance fee for the '508 patent was "unintentional" when it in fact was not. The '508 patent expired on November 12, 2018, for failure to pay maintenance fees, but was not revived until nearly 17 months later, and there are no facts known to the Mitsubishi Defendants evidencing that this entire period of delay was unintentional.

**EIGHTH DEFENSE
(Standing)**

54. Northwestern lacks standing to pursue some or all of its claims against the Mitsubishi Defendants. For example, according to the USPTO assignment database, at least the '508 patent has a break in its chain of title, apparently passing from the inventors to Cobotics, Inc. and then from Stanley Black & Decker, Inc. to Northwestern, without any recorded conveyance from Cobotics to Stanley Black & Decker.

55. In addition, upon information and belief, Northwestern assigned one or more of the Asserted Patents to Stanley Black & Decker, Inc. On information and belief, subject to further discovery, Stanley Black & Decker, Inc. owns some or all rights in the Asserted Patents. As a result, Northwestern does not own all of the rights in the Asserted Patents and therefor lacks standing to pursue its claims for infringement of those patents.

**NINTH DEFENSE
(Failure to Join a Required Party)**

56. The Complaint fails to join a party required by Fed. R. Civ. P. 19(b). Upon information and belief, Stanley Black & Decker, Inc., maintains an interest in one or more of the Asserted Patents and is a required party in this action pursuant to Fed. R. Civ. P. 19(b). As a result, Northwestern's claims are barred in whole or in part because it has failed to name all necessary parties to this action.

RESERVATION OF RIGHTS

57. In addition to the defenses set forth here, the Mitsubishi Defendants reserve their right to allege any additional defenses or counterclaims that become known through the course of discovery.

THE MITSUBISHI DEFENDANTS' COUNTERCLAIMS

Without admitting any of the allegations of Northwestern's Complaint, and without prejudice to the Mitsubishi Defendants' right to plead additional counterclaims as the facts of the matter warrant, the Mitsubishi Defendants hereby asserts the following counterclaims against Northwestern and respectfully states the following.

THE PARTIES

1. Mitsubishi Electric Corporation is a Japanese corporation existing under the laws of Japan, with its principal place of business in Tokyo, Japan. Mitsubishi Electric Automation, Inc. is a company existing under the laws of Delaware, with its principal place of business in Vernon Hills, Illinois. Mitsubishi Electric Corporation and Mitsubishi Electric Automation, Inc. are collectively referred to herein as "the Mitsubishi Defendants."

2. Upon information and belief, Northwestern University ("Northwestern") is an institution of higher education existing under the laws of Illinois with its principal place of business at 633 Clark Street, Evanston, Illinois, 60208.

JURISDICTION AND VENUE

3. Subject to the defenses and denials set forth herein, this Court has subject matter jurisdiction over the Mitsubishi Defendants' declaratory claims related to patent invalidity and non-infringement under 28 U.S.C. §§ 1331, 1338(a), 2201, and 2202.

4. This Court has personal jurisdiction over Northwestern by reason of Northwestern existing under the laws of Illinois and having its principal place of business at 633 Clark Street, Evanston, Illinois, 60208.

5. To the extent this Court has determined venue is proper in this Court, venue is proper in this judicial district under 28 U.S.C. §§ 1391, 1400, and by reason of Northwestern's choice of forum.

BACKGROUND

6. On February 2, 2021, Northwestern filed its Complaint, alleging that the Mitsubishi Defendants infringe U.S. Patent Nos. 6,928,336; 6,907,317; and 7,129,508 (collectively the "Asserted Patents") in connection with the Mitsubishi Defendants' activities related to sales of its industrial robots. Northwestern purported to be the owner of all right, title, and interest in the Asserted Patents. Northwestern also claims that the Asserted Patents are valid and enforceable.

7. The Mitsubishi Defendants deny that any of their products infringe any claims of the Asserted Patents, directly or indirectly, contributorily or otherwise. The Mitsubishi Defendants also contend the Asserted Patents are invalid.

8. An actual and justiciable controversy exists between the Mitsubishi Defendants and Northwestern with respect to the Asserted Patents.

9. Northwestern's infringement allegations and related actions threaten actual and imminent injury to the Mitsubishi Defendants that can be addressed by judicial relief and warrants the issuance of a declaratory judgment.

FIRST COUNTERCLAIM FOR DECLARATORY RELIEF (Non-infringement of the '336 Patent)

10. The allegations of Paragraphs 1–9 are incorporated by reference as though fully set forth herein.

11. The Mitsubishi Defendants do not infringe any valid claim of the '336 patent, directly or indirectly, contributorily or otherwise in conjunction with any accused product or service because the accused products do not practice the elements of the claims of the '336 patent.

The following bases for non-infringement are exemplary, not exhaustive, and the Mitsubishi Defendants reserve the right to advance additional non-infringement arguments as the case proceeds.

12. The Mitsubishi Defendants' accused products do not comprise an "intelligent assist system." As defined by Northwestern during prosecution of the '336 patent, an "intelligent assist system" excludes a "human/machine interface." *See* '336 prosecution history at 643 ("Engdahl **does not disclose or suggest an IAD**, or an intelligent assist system, **but instead** discloses a human/machine interface for programming and monitoring of control programs used for the control of factories.") (emphasis added).

13. According to Northwestern's complaint, the accused products allegedly comprise a "human-machine interface." *See, e.g.*, Compl. at ¶¶ 37, 52, 53, 70. Hence, the accused products are not specifically designed for operation in an intelligent assist system.

14. Furthermore, the accused products do not comprise a plurality of "communication links." As defined by Northwestern, "communication links" prevent self-discovery of physical location. *See* '336 patent at 15:38-53 ("Because the modules are connected via communication links in this embodiment, they do not self-discover their physical location, e.g. which one is on which rail.").

15. The accused products, however, include a process of "automatic detection of connected devices" using a "device map area" function. *See, e.g.*, MELSEC iQ-F FX5 User's Manual (Ethernet Communication) at p. 22.

16. The accused products further do not include a "motion module for supporting" humans in lifting and moving payloads. The '336 patent defines a motion module in the context of an intelligent assist device where human and machine interaction is present. However, as the

accused products do not constitute an intelligent assist system, they do not provide a motion module for supporting. For example, a robotic arm as seen in the accused products does not support humans; it is instead a preprogrammed automated machine.

17. The accused products also do not include computational nodes “being configured,” as the accused products are not programmed for an intelligent assist system. The Mitsubishi Defendants at best provide general purpose software for their products, which are not “configured” for use with intelligent assist systems, as required by the claims. Further, the accused products are not configured as required by the claims by the Mitsubishi Defendants.

18. The Mitsubishi Defendants also do not infringe because all asserted claims of the ’336 patent are invalid, as specified elsewhere in this pleading.

19. As set forth here, an actual and justiciable controversy exists between the Mitsubishi Defendants and Northwestern as to the Mitsubishi Defendants’ non-infringement of the ’336 patent.

20. A judicial declaration is necessary and appropriate so that the Mitsubishi Defendants may ascertain their rights regarding the ’336 patent.

21. Under the Federal Declaratory Judgment Act, 28 U.S.C. §§ 2201 *et seq.*, the Mitsubishi Defendants request that this Court enter a judgment that they do not infringe, under any infringement theory, any valid claim of the ’336 patent.

**SECOND COUNTERCLAIM FOR DECLARATORY RELIEF
(Invalidity of the ’336 Patent)**

22. The allegations of Paragraphs 1–9 are incorporated by reference as though fully set forth herein.

23. The claims of the ’336 patent are invalid for failure to comply with one or more of the conditions for patentability set forth in Title 35 of the United States Code, including without

limitation 35 U.S.C. §§ 101, 102, 103, and/or 112. The following bases for invalidity are exemplary, not exhaustive, and the Mitsubishi Defendants reserve the right to advance additional grounds of invalidity as the case proceeds.

24. For example, the combination of WO 2000/047512 (“Gerd”) and U.S. Patent no. 6,084,373 (“Goldenberg”) renders the ’336 patent invalid.

25. Gerd and Goldenberg are analogous art to the ’336 patent. Both references are in the same field of endeavor as the patent and would have been reasonably pertinent to the problems the inventors set out to solve, as described herein and in the references themselves.

26. It would have been obvious to combine the motion module of Gerd with the more comprehensive computational strength of Goldenberg to provide a more highly customizable motion module. For example, Gerd specifically states that a person of skill in the art has “many possibilities for further refinement of the invention.” Gerd at 22:878-79.

27. Further, Goldenberg specifically relates to the same general field of invention as Gerd, relating to a reconfigurable modular robotic joint. Goldenberg at 1:5-10. Goldenberg seeks to improve the configuration ability of a robotic system like Gerd to provide an advantageously reconfigurable modular joint that can be used for various applications. *Id.* at 2:8-15.

28. Gerd and Goldenberg both disclose an intelligent assist system as defined by Northwestern. For example, Gerd discloses a device that “can be manually operated by an operator” (Gerd at 13:531-33) and comprises an “adjusting element” (*id.* at 5:188-90) to allow a user to interact with the device. Gerd highlights several “safety functions” that permit operators to work alongside the robots, including “a safety control ... for a clamping or gripping mechanism.” *Id.* at 11:448-56.

29. Goldenberg also describes an intelligent assist system, disclosing a system “that allows for direct interaction of a human operator with the LCS [local control subsystem].” Goldenberg at 9:32-46. Goldenberg further describes its modular joints as being “intelligent,” with each joint having “its own control and communication software.” *Id.* at 2:39-48.

30. Gerd and Goldenberg further disclose a modular architecture, with Gerd disclosing a “load-bearing device” connected to a “support element” (Gerd at 7:286-87) and Goldenberg disclosing several “modular reconfigurable joints” (Goldenberg at 9:12-17) that allow for “the addition, removal and rapid integration of the reconfigurable modular joints to suit different applications” (*id.* at 2:8-15).

31. Gerd discloses a motion module that contains an actuator and can support and move a payload. Specifically, Gerd discloses a “load lifting device, with a controllable drive, with a support element connected to the drive” (Gerd at 1:13-16), and “an actuator for the drive” (*id.* at 8:304-10).

32. Gerd in combination with Goldenberg discloses a motion module with multiple computational nodes, with one of the nodes configured to control the motion module. As stated previously, Gerd discloses a motion module. Goldenberg discloses a system with multiple nodes, specifically disclosing “an interconnected network of individual nodes, with each node comprising a single reconfigurable modular joint.” *Id.* at 2:8-15; *see also* FIG. 11 below. Each modular joint of Goldenberg comprises a “local control subsystem (LCS) ... comprising a microprocessor and the associated electronics for performing dedicated servo-control of position of each module in real time.” *Id.* at 9:39-42.

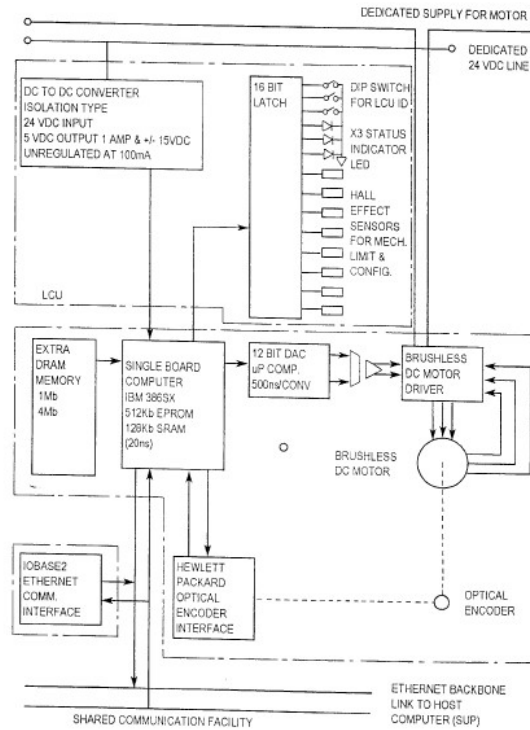


FIG. 11

Goldenberg at FIG. 11.

33. Goldenberg further discloses a node configured to control the motion module. For example, each modular joint of Goldenberg includes “its own built-in control system and electronics,” and “a motor and associated sensors,” further comprising “an embedded control system including a power amplifier for the motor, a sensor interface, microprocessor, and communication circuitry.” *Id.* at 2:26-34. Goldenberg states its distributed control system provides a system with “motion control about multiple axes.” *Id.* at 2:49-54.

34. Goldenberg also discloses a plurality of communication links. Specifically, Goldenberg describes a “shared communication facility ... that allows for the transfer of data and control information to and from a local control subsystem (LCS) that is resident on every individual module.” *Id.* at 9:32-38.

35. Goldenberg discloses that these communication links also exist between the computational nodes, stating that the modules “share a common communication bus between themselves.” *Id.* at 9:19-21.

36. Goldenberg also discloses that the communications links carry information between the nodes to actuate the motion module. For example, Goldenberg states that the modules share a “host computer which allows a user to enter motion and task commands.” *Id.* The local control subsystem that transmits data and control information as mentioned above comprises a “drive amplifier/motion controller for the actuator.” *Id.* at 10:21:30.

37. As set forth in the preceding descriptions, an actual and justiciable controversy exists between the Mitsubishi Defendants and Northwestern as to whether the claims of the ’336 patent are valid. The preceding example basis of invalidity is exemplary, not exhaustive, and the Mitsubishi Defendants reserve all rights to provide additional grounds of invalidity as the case proceeds and fact discovery begins.

38. Under the Federal Declaratory Judgment Act, 28 U.S.C. §§ 2201 *et seq.*, the Mitsubishi Defendants request that this Court enter a judgment that the claims of the ’336 patent are invalid under Title 35 of the United States Code, including without limitation 35 U.S.C. §§ 101, 102, 103, and/or 112.

THIRD COUNTERCLAIM FOR DECLARATORY RELIEF
(Non-infringement of the ’317 Patent)

39. The allegations of Paragraphs 1–9 are incorporated by reference as though fully set forth herein.

40. The Mitsubishi Defendants do not infringe any valid claim of the ’317 patent, directly or indirectly, contributorily or otherwise in conjunction with any accused product or service because the accused products do not practice the elements of the claims of the ’317 patent.

The following bases for non-infringement are exemplary, not exhaustive, and the Mitsubishi Defendants reserve the right to advance additional non-infringement arguments as the case proceeds.

41. The Mitsubishi Defendants' accused products do not comprise an "intelligent assist system." As defined by Northwestern during prosecution of the '336 patent, an "intelligent assist system" excludes a "human/machine interface." *See* '336 prosecution history at 643 ("Engdahl **does not disclose or suggest an IAD**, or an intelligent assist system, **but instead** discloses a human/machine interface for programming and monitoring of control programs used for the control of factories.") (emphasis added).

42. By Northwestern's own admission, the accused products comprise a "human-machine interface." *See, e.g.*, Compl. at ¶¶ 37, 50, 52, 53, 70. Hence, the accused products are not specifically designed for operation in an intelligent assist system.

43. The accused products also do not satisfy the '317 patent's requirement for "a physical interface configured and arranged to be a central interface point for an operator," at least because they comprise merely long-known human-machine interfaces, not a "physical" interface as in an intelligent assist device/system.

44. Further, the accused products do not comprise a "common data link." Instead, the accused products provide a communication interface for network connection. The data link between different modules depend upon each system's configuration and architecture.

45. The preceding grounds of no infringement are exemplary, not exhaustive, and the Mitsubishi Defendants reserve the right to claim additional bases of non-infringement as the case proceeds and fact discovery begins.

46. As set forth herein, an actual and justiciable controversy exists between the Mitsubishi Defendants and Northwestern as to the Mitsubishi Defendants' non-infringement of the '317 patent.

47. A judicial declaration is necessary and appropriate so that the Mitsubishi Defendants may ascertain their rights regarding the '317 patent.

48. Under the Federal Declaratory Judgment Act, 28 U.S.C. §§ 2201 *et seq.*, the Mitsubishi Defendants request that this Court enter a judgment that they do not infringe, under any infringement theory, any valid claim of the '317 patent.

**FOURTH COUNTERCLAIM FOR DECLARATORY RELIEF
(Invalidity of the '317 Patent)**

49. The allegations of Paragraphs 1–9 are incorporated by reference as though fully set forth herein.

50. The claims of the '317 patent are invalid for failure to comply with one or more of the conditions for patentability set forth in Title 35 of the United States Code, including without limitation 35 U.S.C. §§ 101, 102, 103, and/or 112. The following bases for invalidity are exemplary, not exhaustive, and the Mitsubishi Defendants reserve the right to advance additional grounds of invalidity as the case proceeds.

51. For example, the combination of Gerd and Goldenberg renders the '317 patent invalid under 35 U.S.C. § 103.

52. Gerd and Goldenberg are analogous art to the '317 patent. Both references are in the same field of endeavor as the patent and would have been reasonably pertinent to the problems the inventors set out to solve, as described herein and in the references themselves.

53. It would have been obvious to combine the motion module of Gerd with the more comprehensive computational strength of Goldenberg to provide a more highly customizable

automated system controlled by a host computer. For example, Gerd specifically states that a person of skill in the art has “many possibilities for further refinement of the invention.” Gerd at 22:878-79.

54. Further, Goldenberg specifically relates to the same general field of invention as Gerd, relating to a reconfigurable modular robotic joint. Goldenberg at 1:5-10. Goldenberg seeks to improve the configuration ability of a robotic system like Gerd to provide an advantageously reconfigurable modular joint that can be used for various applications. *Id.* at 2:8-15.

55. Gerd and Goldenberg both disclose an intelligent assist system as defined by Northwestern. For example, Gerd discloses a device that “can be manually operated by an operator” (Gerd at 13:531-33) and comprises an “adjusting element” (*id.* at 5:188-90) to allow a user to interact with the device. Gerd highlights several “safety functions” that permit operators to work alongside the robots, including “a safety control ... for a clamping or gripping mechanism.” *Id.* at 11:448-56.

56. Goldenberg also discloses an intelligent assist system, disclosing a system “that allows for direct interaction of a human operator with the LCS [local control subsystem].” Goldenberg at 9:32-46. Goldenberg further describes its modular joints as being “intelligent,” with each joint having “its own control and communication software.” *Id.* at 2:39-48.

57. Goldenberg further describes a reconfigurable modular joint that can be used for building and configuring robotic and automated systems as an interconnected network of individual nodes which are controlled by a host computer. Goldenberg at Abstract. Goldenberg discloses a multi-function hub that is configured to be a central interface point. *Id.* at 9:46-53.

58. Goldenberg also describes a distributed control system for operating simultaneously one or more modular reconfigurable joints using multiple processors under

different operations systems and controlled by a host computer. *Id.* at 9:12-17. Goldenberg further discloses an I/O interface on the host computer for communication with the computational node. *Id.* at 10:23-30. Goldenberg also discloses digital communication protocol to communicate with the modules. *Id.* at 10:11-19.

59. As set forth here, an actual and justiciable controversy exists between the Mitsubishi Defendants and Northwestern as to whether the claims of the '317 patent are valid.

60. Under the Federal Declaratory Judgment Act, 28 U.S.C. §§ 2201 *et seq.*, the Mitsubishi Defendants requests that this Court enter a judgment that the claims of the '317 patent are invalid under Title 35 of the United States Code, including without limitation 35 U.S.C. §§ 101, 102, 103, and/or 112.

**FIFTH COUNTERCLAIM FOR DECLARATORY RELIEF
(Non-infringement of the '508 Patent)**

61. The allegations of Paragraphs 1–9 are incorporated by reference as though fully set forth herein.

62. The Mitsubishi Defendants do not infringe any valid claim of the '508 patent, directly or indirectly, contributorily or otherwise in conjunction with any accused product or service because the accused products do not practice the elements of the claims of the '508 patent. The following bases for non-infringement are exemplary, not exhaustive, and the Mitsubishi Defendants reserve the right to advance additional non-infringement arguments as the case proceeds.

63. The Mitsubishi Defendants' accused products do not comprise an "intelligent assist system."

64. As defined by Northwestern during prosecution of the '336 patent, an "intelligent assist system" excludes a "human/machine interface." *See* '336 prosecution history at 643

(“Engdahl **does not disclose or suggest an IAD**, or an intelligent assist system, **but instead** discloses a human/machine interface for programming and monitoring of control programs used for the control of factories.”) (emphasis added).

65. By Northwestern’s own admission, the Mitsubishi Defendants’ products comprise a “human-machine interface.” *See, e.g.*, Compl. at ¶¶ 37, 50, 52, 53, 70. Hence, the accused products are not specifically designed for operation in an intelligent assist system.

66. Further, the Mitsubishi Defendants’ accused products do not provide a graphical user interface to “manipulate objects related to the module or the computational node.” Instead, the accused products monitor through an automated sequence program without any human intervention. *See, e.g.*, GOT 2000 Series/Simple Series at pp. 25, 29, 33.

67. As set forth here, an actual and justiciable controversy exists between the Mitsubishi Defendants and Northwestern as to the Mitsubishi Defendants’ non-infringement of the ’508 patent.

68. A judicial declaration is necessary and appropriate so that the Mitsubishi Defendants may ascertain their rights regarding the ’508 patent.

69. Under the Federal Declaratory Judgment Act, 28 U.S.C. §§ 2201 *et seq.*, the Mitsubishi Defendants request that this Court enter a judgment that they do not infringe, under any infringement theory, any valid claim of the ’508 patent.

SIXTH COUNTERCLAIM FOR DECLARATORY RELIEF
(Invalidity of the ’508 Patent)

70. The allegations of Paragraphs 1–9 are incorporated by reference as though fully set forth herein.

71. The claims of the ’508 patent are invalid for failure to comply with one or more of the conditions for patentability set forth in Title 35 of the United States Code, including without

limitation 35 U.S.C. §§ 101, 102, 103, and/or 112. The following bases for invalidity are exemplary, not exhaustive, and the Mitsubishi Defendants reserve the right to advance additional grounds of invalidity as the case proceeds.

72. For example, the combination of Gerd and Goldenberg renders the '508 patent invalid under 35 U.S.C. § 103.

73. Gerd and Goldenberg are analogous art to the '508 patent. Both references are in the same field of endeavor as the patent and would have been reasonably pertinent to the problems the inventors set out to solve, as described herein and in the references themselves.

74. It would have been obvious to combine the motion module of Gerd with the more comprehensive computational strength of Goldenberg to provide a more highly customizable automated system controlled by a host computer. For example, Gerd specifically states that a person of skill in the art has “many possibilities for further refinement of the invention.” Gerd at 22:878-79.

75. Further, Goldenberg specifically relates to the same general field of invention as Gerd, relating to a reconfigurable modular robotic joint. Goldenberg at 1:5-10. Goldenberg seeks to improve the configuration ability of a robotic system like Gerd to provide an advantageously reconfigurable modular joint that can be used for various applications. *Id.* at 2:8-15.

76. Gerd and Goldenberg both disclose an intelligent assist system as defined by Northwestern. For example, Gerd discloses a device that “can be manually operated by an operator” (Gerd at 13:531-33) and comprises an “adjusting element” (*id.* at 5:188-90) to allow a user to interact with the device. Gerd highlights several “safety functions” that permit operators to work alongside the robots, including “a safety control ... for a clamping or gripping mechanism.” *Id.* at 11:448-56.

77. Goldenberg also discloses an intelligent assist system, disclosing a system “that allows for direct interaction of a human operator with the LCS [local control subsystem].” Goldenberg at 9:32-46. Goldenberg further describes its modular joints as being “intelligent,” with each joint having “its own control and communication software.” *Id.* at 2:39-48.

78. Goldenberg further describes a reconfigurable modular joint that can be used for building and configuring robotic and automated systems as an interconnected network of individual nodes controlled by a host computer. Goldenberg at Abstract.

79. Specifically, Goldenberg discloses a computational node on each module that is capable of communicating with a host computer. *Id.* at 9:46-53. The “supervisor controller” acts as the master controller and provides high-level user interface, generates control set-points for the “local control subsystem,” and constantly receives information/data from the “local control subsystem.” *Id.*

80. Goldenberg further discloses a graphical user interface (GUI) for “monitoring” and “performing standard initialization” of the system. *Id.* at 11:11-28. The GUI also provides visual indicators that indicate the status of the module. *Id.*

81. As set forth here, an actual and justiciable controversy exists between the Mitsubishi Defendants and Northwestern as to whether the claims of the ’508 patent are valid.

82. Under the Federal Declaratory Judgment Act, 28 U.S.C. §§ 2201 *et seq.*, the Mitsubishi Defendants request that this Court enter a judgment that the claims of the ’508 patent are invalid under Title 35 of the United States Code, including without limitation 35 U.S.C. §§ 101, 102, 103, and/or 112.

DEMAND FOR JURY TRIAL

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, the Mitsubishi Defendants demand a trial by jury of this action.

PRAYER FOR RELIEF

WHEREFORE, the Mitsubishi Defendants pray for the relief as follows:

- A. Dismiss the Complaint with prejudice and on the merits and deny Northwestern the relief it requests;
- B. Declare that the Mitsubishi Defendants have not and do not infringe any valid and enforceable claim of the '336 patent;
- C. Declare that the '336 patent is invalid and/or unenforceable;
- D. Declare that the Mitsubishi Defendants have not and do not infringe any valid and enforceable claim of the '317 patent;
- E. Declare that the '317 patent is invalid and/or unenforceable;
- F. Declare that the Mitsubishi Defendants have not and do not infringe any valid and enforceable claim of the '508 patent;
- G. Declare that the '508 patent is invalid and/or unenforceable;
- H. Declare that under 35 U.S.C. § 285 Northwestern's conduct in commencing and pursuing this action makes this an exceptional case;
- I. Award the Mitsubishi Defendants their costs and attorneys' fees incurred in this action under 35 U.S.C. § 285; and/or
- J. Award the Mitsubishi Defendants such other further relief as the Court deems just and proper.

Dated: May 31, 2021

Respectfully submitted,

MAYER BROWN LLP

By: /s/ Robert G. Pluta

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