

IO-Link

Product Quality Policy

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This document has been prepared, approved, and released by the IO-Link Steering Committee.

Important notes:

NOTE 1 The IO-Link Community Rules shall be observed prior to the development and marketing of IO-Link products. The document can be downloaded from the www.io-link.com portal.

NOTE 2 Any IO-Link Device shall provide an associated IODD file. Easy access to the file and potential updates shall be possible. It is the responsibility of the IO-Link Device manufacturer to test the IODD file with the help of the IODD-Checker tool available per download from www.io-link.com.

NOTE 3 Any IO-Link devices shall provide an associated manufacturer declaration on the conformity of the device. A corresponding form with references to relevant documents is available per download from www.io-link.com.


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Conventions: In this specification the following key words (in **bold** text) will be used:

may:	indicates flexibility of choice with no implied preference.
should:	indicates flexibility of choice with a strongly preferred implementation.
shall:	indicates a mandatory requirement. Designers shall implement such mandatory requirements to ensure interoperability and to claim conformity with this specification.
highly recommended:	indicates that a feature shall be implemented except for well-founded cases. Vendor shall document the deviation within the user manual and within the test report.

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IO-Link Product Quality Policy – Organization and procedures

Management summary – scope of this document

This policy describes the necessary procedures on how to attain a manufacturer declaration for an IO-Link Master or Device and shall ensure the product quality.

Furthermore, in clauses 4 and 5 it gives hints

- for the successful preparation of testing,
- steps to create a manufacturer declaration,
- for brand labelling.

Overview of related documents

The IO-Link Community uses a set of policies to organize work of its members, providers, and test centers and to maintain quality assurance (mainly interoperability) of member products as shown in Figure 1. The technical specifications ([2], [3], and [4]) are building a technical platform for a certain generation of Devices and Masters. Consistent versions of the specifications are bundled to a Package and supposed to stay stable for several years.

The quality of products is stated only by a Manufacturer Declaration based on tests and referenced test reports.

All IO-Link implementations shall use valid specifications at that time. All valid specifications and documents are available on IO-Link.com and listed in [10]

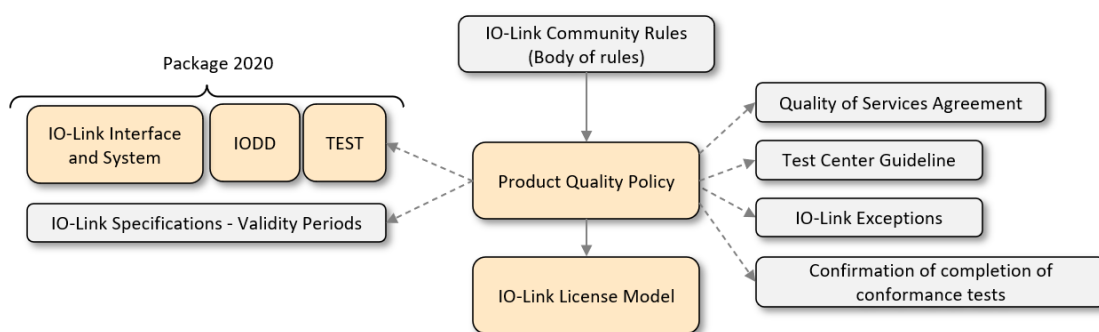


Figure 1 – Related documents

Table 1 provides information on IO-Link's technical and policy documents.

Table 1 – Subject of IO-Link's technical and policy documents

Title of document	Subject	Ref
IO-Link Interface and System	Specification of IO-Link interface, communication, and engineering technology	[1], [2]

Title of document	Subject	Ref
IO-Link IO Device Description	Specification of IO-Link Device parameters in a formal language (XML)	[3]
IO-Link Test	Specification of TestCases for physical tests and behavioral tests for Devices and Master	[4]
IO-Link Community Rules (Body of rules between IO-Link members and the PNO)	This document governs the cooperation between IO-Link members or licensees and the PNO and describes the rights and obligations of the partners.	[5]
IO-Link License Model	This document describes the license model for non-IO-Link members.	[6]
Quality of Services Agreement	This document is an agreement between IO-Link Community and the IOL-Competence Centers (IOLCC) for the technologies of IO-Link to assure quality of services.	[7]
Test Center Guideline	This document describes the preconditions for becoming a test laboratory accredited by IO-Link community. It additionally describes the rules for the performance of such an IOL Test Center (IOLTC).	[8]
IO-Link Exceptions	This document describes the change and exception management in case of implementation or test deviations.	[9]
IOL SpecificationValidity	This document contains a list of all valid specifications and their validity phase out with transition periods	[10]
Confirmation of completion of conformance tests	This document is the test confirmation of an IOL Test Center (IOLTC) or a brand label provider.	[11]

29

30 Terms, definitions, and abbreviated terms

31 3.1 Terms and definitions

32 For the purposes of this document, the terms and definitions given in [2], [3], and [4], as well
33 as the following apply.

34 3.1.1

35 IO-Link specifications

36 This are system specification, system extensions, profile specifications, IODD specification and
37 related test specifications

38 3.1.2

39 IO-Link Service Center

40 Central office of the IO-Link community, see publisher

41 3.1.3

42 Approved component list

43 The Approved component list comprises all devices with available IODDs by publishing the MD
44 on the community hosted IODDfinder

45 3.1.4

46 Master Tester

47 Tool, intended to perform test cases for IO-Link Master according to the IO-Link test specifica-
48 tion, approved by IO-Link quality authorities

49 3.1.5

50 Device Tester

51 Tool, intended to perform test cases for IO-Link Devices according to the IO-Link test specifi-
52 cation, approved by IO-Link quality authorities

53 3.1.6

54 IODD

55 electronic I/O and parameter description in XML of an IO-Link Device for its configuration and
56 parameterization to match certain application requirements

57 **3.1.7**
58 **DeviceID**
59 unique IO-Link Device identification allocated by a vendor

60 **3.1.8**
61 **VendorID**
62 unique vendor identification assigned by the IO-Link Community

63 **3.1.9**
64 **MasterID**
65 unique IO-Link Master identification allocated by a vendor

66 **3.2 Symbols and abbreviated terms**

IOLCC	IO-Link Competence Center
IOLTC	IO-Link Test Center
DUT	Device under test
MD	Manufacturer declaration

67 **Manufacturer declaration**

68 **4.1 General rules**

- 69 • The Manufacturer Declaration states compliance to the IO-Link specifications and shall be
70 signed by vendors and made available to customers.
- 71 • For the reason of functionality and interoperability, the implementation of the common profile
72 (part identification and diagnosis) is highly recommended.
- 73 • Profiles shall be implemented and tested according to the profile specifications.
- 74 • Brand labeled products require the Vendor ID (VID) of the branding company.

75
76 Important note:

77 Exceptions for not implemented "highly recommended" features specified in [2] or profiles shall
78 be documented within the user manual and the manufacturer declaration.

- 79 • Exceptions against the IO-Link specifications shall be handled according the rules defined
80 in [9].
- 81 • Members are entitled to perform the required tests under their own responsibility. The Man-
82 ufacturer Declaration has no expiring date.
- 83 • Non-members are obliged to provide a signed document "Confirmation of completion of con-
84 formance tests" [11] to the IO-Link Service Center to get an IO-Link licence. See IO-Link
85 License Model [6].
- 86 • For extensions like IO-Link Safety or IO-Link Wireless different MDs may be required.

87 88 **4.2 The way to manufacturer declaration (MD)**

89 The preconditions for an MD are:

- 90 • Each family of Devices or Masters shall be well defined to be listed later in the MD,
- 91 • Prerequisites for Devices are VendorID, DeviceID and IODD,
- 92 • Prerequisite for Master are VendorID and MasterID

93 94 **4.2.1 Steps for IO-Link members**

- 95 1) Execute IO-Link conformance tests successfully and completely.

- 96 2) Fill out and sign the MD.
 97 3) Add the MD to the Approved component list.

98
 99 **4.2.2 Steps for non IO-Link members (licensee)**

- 100 1) Contact an IO-Link Test Center or the brand label provider to get the "Conformance test
 101 commitment for licences" to apply for a VendorID (see [6]).
 102 2) Apply for a VendorID at the IO-Link Service Center.
 103 3) Ask IO-Link Test Center or the brand label provider for the "Confirmation of completion
 104 of conformance tests" (see [11]).
 105 4) Fill out and sign the MD.
 106 5) Provide the MD and the "Confirmation of completion of conformance tests" (see [11]) to
 107 the IO-Link Service Center to get the licence.
 108 6) Add the MD to the Approved component list.

109
 110 **4.3 Additional procedures regarding re-testing**

111 **4.3.1 General approach**

112 This clause describes the recommendations for re-testing whenever changes have been made
 113 at an already tested Device or Master. Either a full test or a partial test shall be performed. This
 114 leads to a new test report and a corresponding MD.

115 Due to the increasing complexity of Device variants, the following clause can only cope with
 116 fundamental deviations of the IO-Link interface (communication and/or timing). Other deviations
 117 should be negotiated between manufacturer and an IOLTC.

118 **4.3.2 Devices**

119 Table 2 shows the consequences of fundamental changes/deviations in a Device.

120 **Table 2 – Consequences of changes to the Device interface**

Changes/deviations	New DeviceID	Physical layer test	EMC test	Protocol test	New MD
Software changes in application new functions / parameters	X			X	X
Software changes influencing communication / timing	X	X		X	X
Hardware changes influencing communication		X	X		X
NOTE Communication software is part of the Device software, which represents the implementation of the protocol layers, data objects, methods and interfaces as defined in [2].					

121
 122 **4.3.3 Masters**

123 Table 3 shows the consequences of fundamental changes/deviations in a Master.

124 **Table 3 – Consequences of changes to the Master interface**

Changes/deviations	New MasterID	Physical layer test	EMC test	Protocol test	New MD
Software changes influencing communication / timing	X	X		X	X

Hardware changes influencing communication		X	X	X	X
NOTE Communication software is part of the Master software, which represents the implementation of the protocol layers, data objects, methods and interfaces as defined in [2].					

125

126 **Testing and test tools**127 **5.1 Prerequisites for type testing**

128 Table 4 shows the prerequisites for type testing of Device and Master.

129

Table 4 – Prerequisites for type testing

Type	Final product before release	IODD (checked, stamped)	VendorID	DeviceID	MasterID
Device	X	X	X	X	–
Master	X	–	X	–	X

130

131 **5.2 Test of an IODD (only for Devices)**

132 Every Device manufacturer shall provide an IODD file for the DUT. The IODD describes the
 133 features of a Device (I/O data structures and parameters), which are also used by Device test-
 134 ers for protocol tests.

135 The correctness of the IODD file shall be tested with the help of the actual version of the IODD
 136 checker.

137 **5.3 Test of the physical layer (PL) and EMC**

138 The PL and EMC tests shall be performed according to [2] and [4].

139 **5.4 Test of the Protocol**

140 The protocol test shall be performed according to [4]. In case of Devices a checked IODD shall
 141 be used for the test.

142 **5.5 Tools for testing**

143 There are several test systems on the market supporting tests and generating test reports,
 144 which are approved by the IO-Link quality authority.

145 These test systems comprise

- 146 • Physical layer tester
- 147 • EMC tester
- 148 • Device tester (protocol)
- 149 • IODD checker
- 150 • Master tester

151

152 **Quality center**

153 The IO-Link community is operating a Quality Center for the clearing of MD relevant quality
154 complaints.

155 Complaints shall be reported in english language via e-mail to quality@io-link.com.

156

157

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160

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