



Model     CC-Link Ver1.10

Title     CC-Link Conformance Test Specification (Slip Ring)

**CC-Link Partner Association**

January 26<sup>th</sup>, 2005

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## Overview

This specification document refers to the test items regarding the connectivity (conformance) of slip ring compatible with CC-Link.

A slip ring shall be judged connectable to the CC-Link after passing all of the test specified in this specification document.

The test items are as follows:

- Noise tests
  - Combination test
  - Aging test
  - Other test
- 
- The specified configuration, communication speed and station-to-station distance shall be used for test.
  - The communication data between the master station and slave station is changed each time so that no identical data is transmitted successively.
  - Communication is considered to be normal if no count is added to the SW00C0 to SW00C8 registers (the number of retries executed) in the master station.

Master module Link special registers (SW00C0 to SW00C8 )

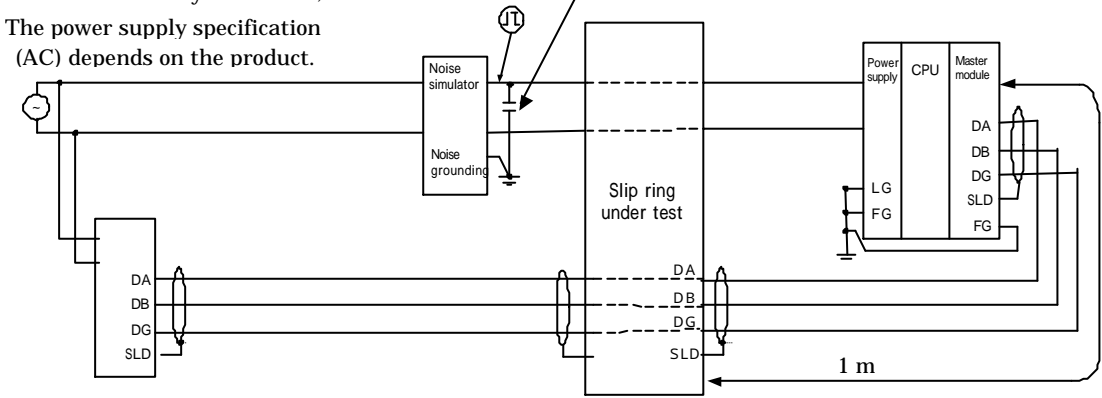
Number (buffer memory address)	Name	Content	Details
SW00C0 (6C0 <sup>H</sup> )	Number of retries	Number of retries executed	<p>??During 1 link scan, if communication is established normally within the set number of retries, or if the number of retries is exceeded (data link error), "1" is added to the count (+1). (Example) When the retry setting is the default of 1 to 3 times, and if normal communication is established at the third retry, only "1" is added to the count (+1). ??Accumulated number of retries ??Cleared when the SB0010 is turned on or at power-off.</p> <p>??Retry processing is performed for the set number of times, and the station with which data link could not be established is detected as a data link faulty station. ??The accumulated number of errors occurred is input for each error content. ??Cleared when the SB0011 is turned on or at power-off.</p>
SW00C1 (6C1 <sup>H</sup> )	TIME error	Number of timeout errors detected	
SW00C2 (6C2 <sup>H</sup> )	CRC error	Number of CRC errors detected	
SW00C3 (6C3 <sup>H</sup> )	Abort error	Number of abort errors detected	
SW00C4 (6C4 <sup>H</sup> )	Hardware error	Number of hardware errors detected	
SW00C5 (6C5 <sup>H</sup> )	Line error	Number of line errors detected	
SW00C6 (6C6 <sup>H</sup> )	Software error	Number of software monitoring timeouts	
SW00C7 (6C7 <sup>H</sup> )	Invalid XCD	Number of invalid XCDs detected	
SW00C8 (6C8 <sup>H</sup> )	Overflow	Number of receive buffer overflows occurred	

Master module Link special relays (SB0010 to SB0011 )

Number (buffer memory address)	Name	Content	Details
SB0010 (5E1 <sup>H</sup> bit 0)	Number clear	Number of retries clear	The number of retries is cleared OFF: no clear instruction ON: clear instruction issued (Cleared during ON)
SB0011 (5E1 <sup>H</sup> bit 1)	Transmission path clear	Number of line transmission errors clear	The number of line transmission errors is cleared OFF: no clear instruction ON: clear instruction issued (Cleared during ON)

Notice: The buffer memory addresses above shall be disclosed only to CLPA partner who uses this specification document. Do NOT disclose to your customers.

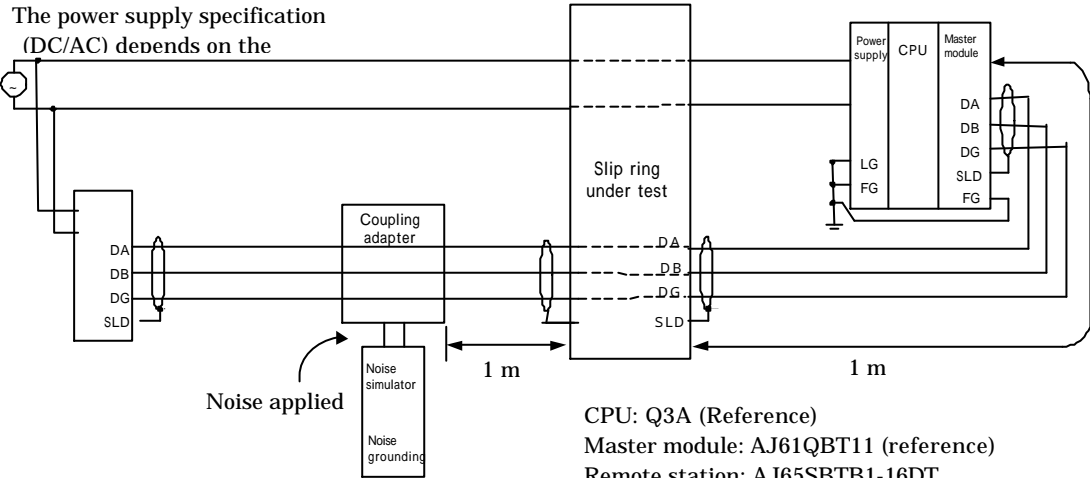
Classification	Function	Prepared by	Tested by	Operation confirmation	OK	Page
	2. Noise tests 2.1 Simulator noise test (AC-system test)					

No.	Test item	Test method	Judgment criteria	Result		Remarks
				Manuf acturer	CLPA	
1	Common mode	<p>Simulator set conditions (Square-wave) Pulse width ----- 1 <math>\mu</math> sec Rise ----- 1 nsec Frequency ----- 45 Hz Polarity ----- +, -</p> <p>The power supply specification (AC) depends on the product.</p> <p>Power cable length: 70 cm (27.55 in.) Grounding connection Wiring length: 50cm (19.68 in.) Cable: 2 mm<sup>2</sup> Ground at one point</p> <p>3KV 1500PF to 3500PF (*1)</p>  <p>Communication speed: 10Mbps Communication cable length: 5m (16.40 ft.)</p> <p><b>Remarks</b> We use the equipments below. • Noise simulators Manufacturer: NOISE LABORATORY CO., LTD. Model name: INS-4001 • Isolating transformer Manufacturer: NOISE LABORATORY CO., LTD. Model name: NCT-160</p>	Must communicate and function normally at $\pm 2000V$ for two hours or more	-		<p>For the capacitor indicated by *1, select the smallest value at which overshooting of simulator output waveform will not occur.</p> <p>Note: When the capacitor is placed with a large value, output value must not be smaller than the value that indicated by the simulator.</p> <p>Connect slip ring 1 meter away from the master module.</p>

Classification	Function	Prepared by	Tested by	Operation confirmation	OK	Page
	2.2 Simulator noise test (DC-system test )					

No.	Test item	Test method	Judgment criteria	Result		Remarks
				Manuf acturer	CLPA	
1	Common mode	<p>Simulator set conditions (Square-wave) Pulse width ----- 1 μ sec Rise ----- 1 nsec Frequency -----45 Hz Polarity ----- +, -</p> <p>The power supply specification (DC) depends on the product.</p> <p>Power cable length: 70 cm (27.55 in.) Grounding connection Wiring length: 50cm (19.68 in.) Cable: 2 mm<sup>2</sup> Ground at one point</p> <p>1.5KV 1500PF to 3500PF</p> <p>Communication speed: 10Mbps Communication cable length: 5m (16.40 ft.)</p> <div> <p><b>Remarks</b> We use the equipments below • Noise simulator See "2.1 simulator noise test" • Isolating transformer See "2.1 simulator noise test"</p> </div>	Must communicate and function normally at ±900V for two hours or more	-		<p>For the capacitor indicated by *1, select the smallest value at which overshooting of simulator output waveform will not occur.</p> <p>Note: When the capacitor is placed with a large value, output value must not be smaller than the value that indicated by the simulator.</p> <p>Connect slip ring 1 meter away from the master module.</p>

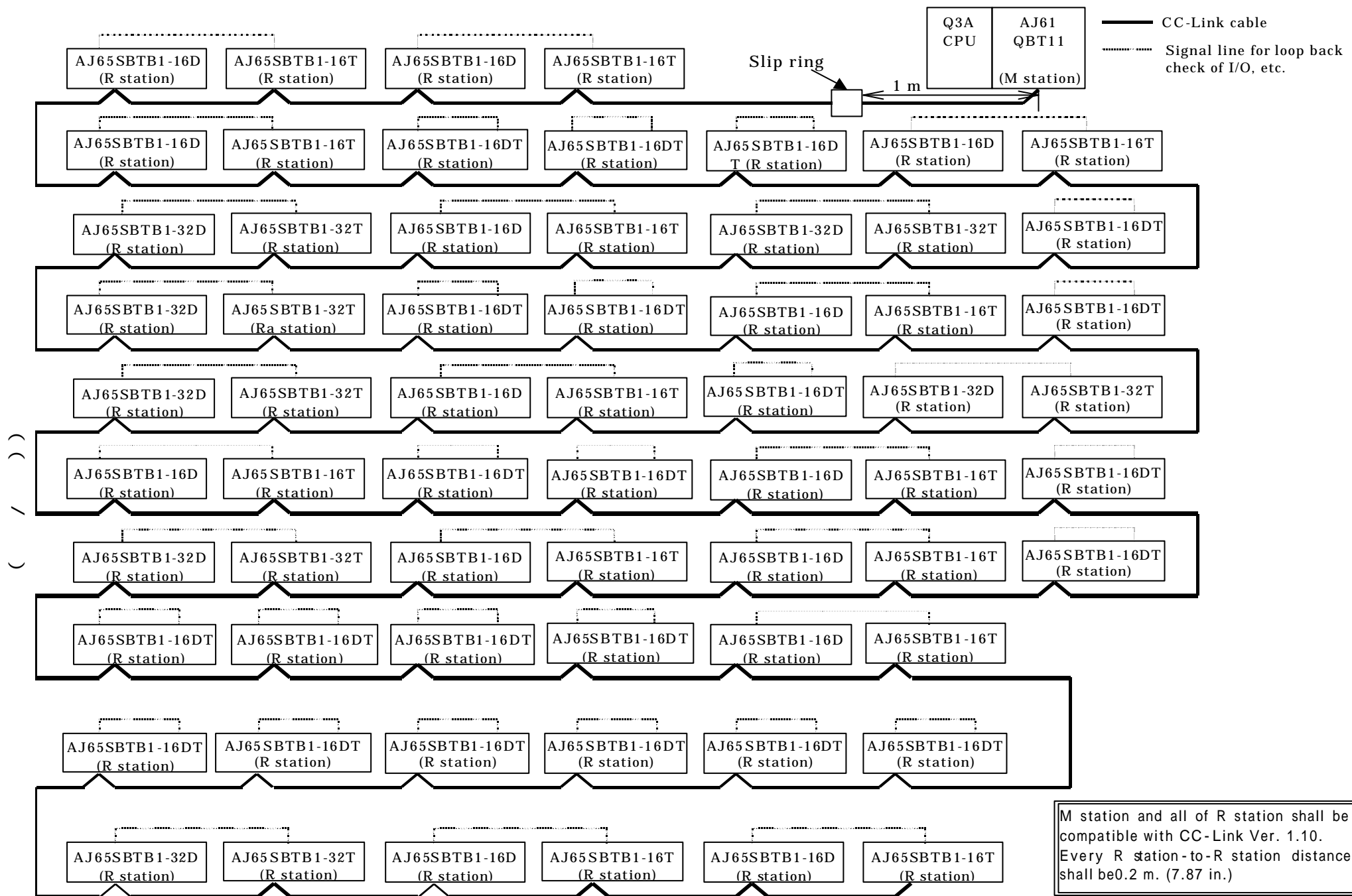
Classification	Function	Prepared by	Tested by	Operation confirmation	OK	Page
	2.3 Cable (bundle) noise test					

No.	Test item	Test method	Judgment criteria	Result		Remarks
				Manuf acturer	CLPA	
1	Cable noise test	<p>Simulator set conditions (Square-wave) Pulse width ---- 1 μsec Rise ----- 1 nsec Frequency -----45 Hz Polarity ----- +, -</p> <p>Power cable length: 70 cm (27.55 in.) Grounding connection Wiring length: 50cm (19.68 in.) Cable: 2 mm<sup>2</sup> Ground at one point</p> <p>The power supply specification (DC/AC) depends on the</p>  <p>DA DB DG SLD</p> <p>Coupling adapter</p> <p>Noise simulator Noise grounding</p> <p>Slip ring under test</p> <p>1 m</p> <p>1 m</p> <p>Power supply</p> <p>CPU</p> <p>Master module</p> <p>DA DB DG SLD LG FG</p> <p>DA DB DG SLD LG FG</p> <p>DA DB DG SLD LG FG</p> <p>CPU: Q3A (Reference) Master module: AJ61QBT11 (reference) Remote station: AJ65SRTR1-16DT</p> <p>Communication speed: 10Mbps Communication cable length: 5m (16.40 ft.)</p> <p>Remarks CLPA used the equipments below • Noise simulator See "2.1 Noise simulator noise test" • Coupling adapter Manufacturer :NOISE LABORATORY CO., LTD. Model name: CA-805B</p>	Must communicate and function normally at ±1000V for 10 minutes or more	-		Connect slip ring 1 meter away from the master module.

Classification	Function	Prepared by	Tested by			Page
	3. Combination test 3.1 Maximum cable length test			Operation confirmation	OK	

No.	Test item	Test method	Judgment criteria	Result		Remarks						
				Manuf acturer	CLPA							
1	Maximum cable length test	<p>Test with the system configuration described in the next page.</p> <p>All of stations must operate normally with the conditions of the maximum communication distance below.</p> <p>Testing time: 6 hours (continuous)</p> <table><tr><td>Communic ation speed</td><td>Minimum station-to-sta tion distance</td><td>Maximum communicati on distance</td></tr><tr><td>10 Mbps</td><td>20cm</td><td>130 m</td></tr></table>	Communic ation speed	Minimum station-to-sta tion distance	Maximum communicati on distance	10 Mbps	20cm	130 m	<p>Confirm that normal communication can be established between remote station and the master station.</p> <p>No count should be added to the number of errors in SW00C0 to SW00C8.</p>	-		
Communic ation speed	Minimum station-to-sta tion distance	Maximum communicati on distance										
10 Mbps	20cm	130 m										





Classification	Function	Prepared by	Tested by			Page
	4. Aging test 4.1 Aging test			Operation confirmation	OK	

No.	Test item	Test method	Judgment criteria	Result		Remarks
				Manuf acturer	CLPA	
1	Aging test	<p>Perform continuous operation using the system configuration shown on previous page.</p> <p>However operate with the maximum communication distance and minimum station-to-station distance with the maximum communication speed described at the “ 3.1 Maximum cable length test.”</p> <p>Continuous operation time: 12 or more hours.</p> <p>Sequence program outline</p> <ol style="list-style-type: none"> <li>1. Perform loop back check for all I/O modules.</li> </ol> <p>* Program to change transmitted data each time.</p>	<p>Confirm that operation can be continued for the specified time.</p> <p>No count should be added to the number of errors in SW00C0 to SW00C8.</p>	-		

Classification	Function	Prepared by	Tested by			Page
	5. Other test 5.1 Measurement of transmission path waveform at rotation			Operation confirmation	OK	

No.	Test item	Test method	Judgment criteria	Result		Remarks						
				Manuf acturer	CLPA							
1	Measurement of transmission path waveform at rotation	<p>Perform using the system configuration shown on 2 pages ago. (64 Remote I/O stations) All of stations must operate normally with the conditions of the maximum transmission distance below.</p> <table><tr><td>Communic ation speed</td><td>Minimum station-to-stat ion distance</td><td>Maximum communication distance</td></tr><tr><td>10 Mbps</td><td>20 cm</td><td>130 m</td></tr></table>	Communic ation speed	Minimum station-to-stat ion distance	Maximum communication distance	10 Mbps	20 cm	130 m	<p>Confirm that normal communication can be established at the master station. No count should be added to the number of errors in SW00C0 to SW00C8. Transmission path waveform at resting condition of slip ring must be same as the one at rotation.</p>			
Communic ation speed	Minimum station-to-stat ion distance	Maximum communication distance										
10 Mbps	20 cm	130 m										