

NUMBER <b>GS-12-1702</b>	TYPE <b>GENERAL PRODUCT SPECIFICATION</b>	<b>Amphenol ICC</b>	
TITLE <b>COMBO LOCK WTB</b>		PAGE <b>1 of 11</b>	REVISION <b>C</b>
		AUTHORIZED BY <b>Arthur Zhao</b>	DATE <b>2022.01.07</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

## 1.0 Objective

This specification defines the performance, test, quality and reliability requirements of the COMBO LOCK WTB Series Connector product.

## 2.0 Scope

This specification is applicable to the termination characteristics of the COMBO LOCK WTB Series Connector family of products which provides electrical connectors between parallel mounted boards.

## 3.0 Ratings

3.1 Operating Voltage Rating =  $50 V_{DC} / V_{AC}$ ;

3.2 Operating Current Rating :

Pin NO. Awg	2 Pins	4 Pins	6 Pins
Power Pin: 18 Awg	13A/Pin	12A/Pin	11A/Pin
Signal Pin: 24Awg	1.5A for all signal contact		

TBD: Power Pin NO. 8

Note: Connectors are applied to test boards with 2 layers X 2 ounce copper power plane.

3.3 Operating Temperature Range =  $-40 \sim +105^{\circ}\text{C}$ ;

3.4 Applicable wire insulation O.D = AWG#18 for power pin, Insulation O.D. 2.4 mm (Max.). ;  
AWG#24 for signal pin, Insulation O.D. 1.2 mm (Max.).

## 4.0 Applicable Documents

4.1 AFCI Specifications

4.1.1 Engineering drawings: 10162688 & 10152695 & 10162696 & 10162697.

4.1.2 Material specification(s): Meets the European Union directives and other country regulation as described in GS-22-008

4.2 Industry or Trade Association standards: N/A

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#### 4.3 National or International Standards

4.3.1 Flammability: UL94V-0 or similar applicable specification

4.3.2 EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.

4.3.3 IEC 60512: Connectors for Electronic Equipment – Tests and Measurement

### 5.0 Requirements

#### 5.1 Qualification

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.

#### 5.2 Material

The material for each component shall be as specified herein or equivalent.

Refer to the drawing (Drawing No.: 10162688 & 10152695 & 10162696 & 10162697.)

#### 5.3 Finish

The finish for applicable components shall be as specified herein or equivalent.

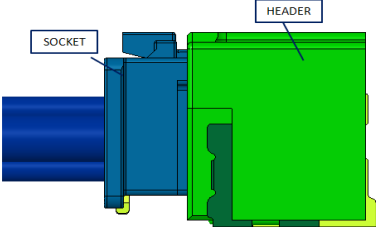
Refer to the drawing (Drawing No.: 10162688 & 10162696 & 10162697.)

#### 5.4 Design and Construction

Connectors shall be of the design, construction, and physical dimensions specified on the applicable product drawing. There shall be no cracks, burrs, or other physical defects that may impair performance.

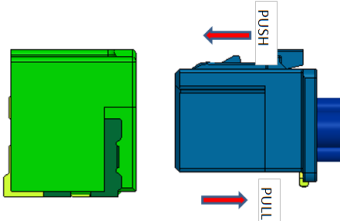
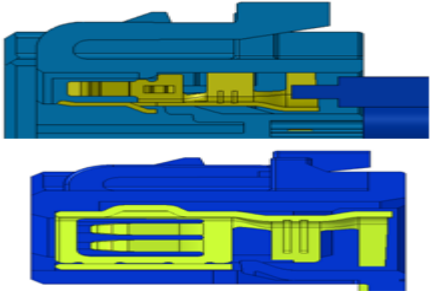
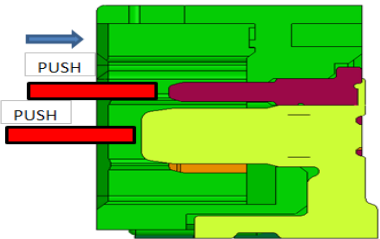
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## 6.0 Electrical Characteristics

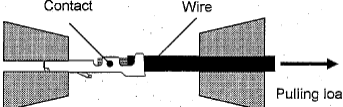
Item		Test Condition	Requirement
6-1	Contact Resistance	Mate connectors, measure by dry circuit, 20mV MAX, 10mA. (Based upon EIA-364-23).	Initial: 20 milliohms Max. After Test: 40 milliohms Max.
			
6-2	Insulation Resistance	Mate connectors, apply 250V DC between adjacent terminal or ground for 1 minute. (Based upon EIA-364-21 / MIL-STD-202 Method 302 Cond.)	100 megohm Min.
6-3	Dielectric Strength	Mate connectors, apply 500V AC for 1 minute between adjacent terminal or ground. (Based upon EIA-364-20 / MIL-STD-202 Method 301)	No Breakdown and Flashover
6-4	Contact resistance on crimped portion	Crimp the applicable wire on to the terminal measure by dry circuit 20mV MAX, 10mA.	10 milliohms Max.

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## 7.0 Mechanical Characteristics

Item		Test Condition	Requirement
7-1	Insertion & withdraw Force	Insert and withdraw Connectors 30 cycles at the speed rate of 25.4±3mm/minute.;	See table 1
			
7-2	Terminal/Housing Retention Force	Apply axial pull out force at the speed rate of 25.4±3mm/minute on the terminal assembled in the housing. Record the force pulled the terminal out of Housing. If the housing or the cable is broken before the terminal is pulled out, the data of damage force should be recorded and the failure mode should be described in the test report.	Signal pin: 6.9 N Min.; Power pin: 13 N Min.;
			
7-3	Terminal Insertion Force	Insert the crimped terminal into the housing.	Signal pin: 3 N Max.; Power pin: 6 N Max.;
7-4	Pin Retention Force	Apply axial push force at the speed rate of 25.4±3mm/minute.	Power Pin: 8 N Min.; Signal Pin: 5 N Min.;
			

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Item		Test Condition	Requirement			
7-5	Housing retention force (Positive Lock )	Apply axial push force at the speed rate of 25.4±3mm/minute.	25N Min.			
7-6	Crimped connections	Fix the crimped terminal, apply axial pull out force on the wire. (Do not crimp insulation part), record the minimum separation force of the cable and terminal	AWG	18	24	26
			Spec. N Min.	89	22.3	13.4
			Note> As for unspecified wire sizes in this specification define values with clients			

## 8.0 Environmental Conditions

Item		Test Condition	Requirement	
8-1	Repeated Insertion/ Withdrawal	When mated up to 30 cycles repeatedly by the rate of 10 cycles per minute.	Contact Resistance	40 milliohms Max.
8-2	Temperature Rise	Mated the connectors, the initial ambient temperature 55°C maximum, after the current is loaded until the temperature is stable, the temperature should be 85°C maximum. Reference: EIA-364-70 Method 1.	Temperature rise	Refer to P1 /Power Pin; 1.5A/Signal Pin; Δ30°C Max.
		Mated the connectors, energize connectors with a test current to produce approximately 5°C to 10°C temperature(stabilized condition). Repeat above step at a minimum of 4 consecutively increasing current levels with each additional level generating an additional temperature rise (minimum) of 10°C above that previously recorded still reaching the stated approximately maximum operating temperature of the connectors. Reference: EIA-364-70 Method 2		Create Derating curve

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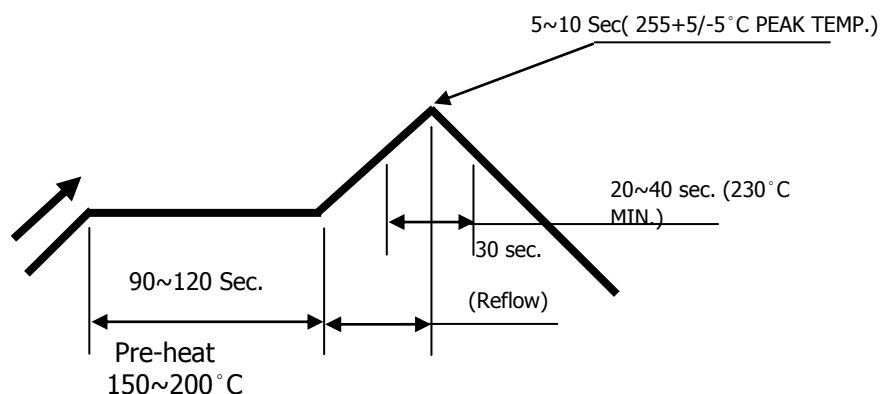
8-3	Vibration test	Amplitude: 1.5mm P-P Sweep time: 10~55~10 HZ in 1 minute Duration: 2 hours in each X.Y.Z axial. (Based upon EIA-364-28/MIL-STD-202 Method 213B Cond.A)	Appearance	No Damage
			Contact Resistance	40 milliohms Max.
			Discontinuity	1 micro-second Max.
8-4	Shock test	490m/s <sup>2</sup> {50G}, 3 strokes in each X.Y.Z. axes. (Based upon EIA-364-27/MIL-STD-202 Method 213B Cond.A)	Appearance	No Damage
			Contact Resistance	40 milliohms Max.
			Discontinuity	1 micro-second Max.

8-5	Heat Resistance	105±2°C ,96 hours. (Based upon MIL-STD-202 Method 108A Cond.A)	Appearance	No Damage
			Contact Resistance	40 milliohms Max.
8-6	Cold Resistance	Temperature: -40±2°C Duration: 96 hours ( Based upon EIA-364-59)	Appearance	No Damage
			Contact Resistance	40 milliohms Max.
8-7	Humidity	Temperature: 40±2°C Relative Humidity: 90~95% Duration: 96 hours (Based upon EIA-364-31/MIL-STD-202 Method 103B Cond.B)	Appearance	No Damage
			Contact Resistance	40 milliohms Max.
			Dielectric Strength	Must meet 6-3
			Insulation Resistance	100 Megohms Min.
8-8	Temperature Cycling	5 cycles of: a) -40°C 30 minutes. b) +105°C 30 minutes. (Based upon EIA-364-32)	Appearance	No Damage
			Contact Resistance	40 milliohms Max.

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8-9	Salt Spray	24±1 hours exposure to a salt spray from the 5±1% solution at 35±2°C. (Based upon EIA-364-26/MIL-STD-202 Method 101D Cond.B).	Appearance	No Damage
			Contact Resistance	40 milliohms Max.
8-10	Solder-ability	Soldering Time: 3±5second. Solder Temperature: 245±5°C. (Based upon EIA-364-52)	Solder Wetting	95% of immersed area must show no voids, pin holes.
8-11	Solder-Resistance	Soldering time:5~10 sec solder. Temperature:255+5/-5°C. (Based upon EIA-364-56)	Appearance	No Damage

#### SMT REFLOW CONDITION



#### TEMPERATURE CONDITION GRAPH/ (TEMPERATURE ON BOARD PATTERN SIDE)

Notes: Please check the reflow soldering condition by your own devices beforehand. Because the condition changes by the soldering devices, P.C. boards, and so on.

Table 1

P/N	Mating Force/N Max.	Un mating Force/N Min.
05Signal+02Power	17	6
15Signal+02Power	34	14
07Signal+06Power	43	15

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## 9.0 QUALITY ASSURANCE PROVISIONS

### 9.1 Equipment Calibration

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with ANSI Z-540 and ISO 9000.

### 9.2 Inspection Conditions

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

- Temperature: 25 +/- 5 deg C
- Relative Humidity: 30% to 60%
- Barometric Pressure: Local ambient

### 9.3 Sample Quantity And Description

Connector shall be prepared according to applicable instruction sheets. Samples shall be selected at random from current production.

### 9.4 Acceptance

9.4.1 Electrical and mechanical requirements placed on test samples as indicated in paragraphs 6.0 and 7.0 shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the stated requirements.

9.4.2 Failures attributed to equipment, test setup, or operator error shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

### 9.5 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures normally used in production. The test sequences shall be as shown in the qualification test table. Data shall be provided with the samples noting production history: production lot codes for components and assemblies, components and assemblies produced to print revision \_\_\_, verification of plating composition and thickness, etc.

### 9.6 Re-Qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate requalification testing consisting of all applicable parts of the qualification test matrix.



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- a. A significant design change is made to the existing product which impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating material composition or thickness, contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.
- b. A significant change is made to the manufacturing process which impacts the product form, fit or function.
- c. A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

#### 9.7 Qualification Test Table

Test Table

Item	DESCRIPTION	SEQUENCE															
		A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q
1	Examination of product	1,3	1,6	1	1	1	1	1	1,6	1,9	1,9	1,9	1,9	1,5	1,2	1,3	1,3
2	Contact resistance		2,5						2,5	2,6	2,6	2,6	2,6	2,4			
3	Insulation resistance									3,7	3,7	3,7	3,7				
4	Dielectric withstanding Voltage									4,8	4,8	4,8	4,8				
5	Contact resistance on crimped portion														3		
6	Insertion Force								3								
7	Withdraw Force								4								
8	Terminal/Housing Retention Force			2													
9	Terminal Insertion Force				2												
10	Pin Retention Force					2											

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Test Table (continued)

Item	DESCRIPTION	SEQUENCE															
		A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q
11	Lock Retention Force						2										
12	Crimped connections							2									
13	Repeated Insertion/Withdrawal																
14	Temperature rising	2															
15	Vibration		3														
16	Shock test		4														
17	Heat Resistance									5							
18	Cold Resistance										5						
19	Humidity											5					
20	Temperature Cycling												5				
21	Salt spray													3			
22	Solderability															2	
23	Solder-Resistance																2
Sample Quantity(pcs)		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

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**REVISION RECORD**

<b>Rev</b>	<b>Page</b>	<b>Description</b>	<b>EC#</b>	<b>Date</b>
A	All	New Release	-	20210927
B	All	Modify Operating Current Rating	ELX-N-43509	20220107
C	All	Correct version number	ELX-N-43794	20220217