

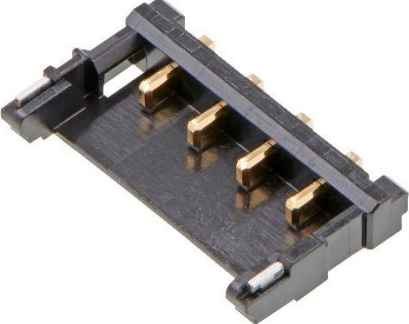


Pico-EZmate HC 1.8

Wire to Board CONNECTOR SYSTEM

Receptacle Terminal	Receptacle Housing
	
Series: 208299	Series: 208298

Plug Assembly

Series: 208294

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



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REVISION DESCRIPTION				PICO-EZMATE HC 1.8 WTB			
CHANGE NO.	810114			DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REVISED BY	PRAMOD	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
REV APPR BY	ISHWARG	DATE	2025/01/20	DOCUMENT NUMBER		REVISION	SHEET
INITIAL RELEASE			CUSTOMER		2082980000-PS		D1
INITIAL DRWN	PRAMOD	DATE	2024/11/05	2082980000-PS		D1	1 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

TABLE OF CONTENTS
Table of Contents

<u>ITEMS</u>		<u>PAGE</u>
1.	SCOPE:	3
2.	PRODUCTS DESCRIPTION:	3
2.1	SDESCRIPTIONS, SERIES NUMBER, AND LINKS:	3
2.2	DIMENSIONS, MATERIALS, PLATINGS	3
2.3	ENVIRONMENTAL CONFORMANCE:	3
2.4	SAFETY AGENCY LISTINGS	3
3.	REFERENCE DOCUMENTS:	3
3.1	MOLEX DOCUMENTS	3
3.2	INDUSTRY DOCUMENTS	3
4.	ELECTRICAL PERFORMANCE RATINGS	4
4.1	VOLTAGE:	4
4.2	RATED CURRENT AND APPLICABLE WIRES	4
4.3	TEMPERATURE	5
4.4	DURABILITY:	5
5.	QUALIFICATION:	5
6.	PERFORMANCE:	6
6.1	ELECTRICAL PERFORMANCE	6
6.2	MECHANICAL PERFORMANCE	7
6.3	ENVIRONMENTAL PERFORMANCE	9
7.	INSERTION / WITHDRAWAL FORC	11
8.	CONTACT RESISTANCE MEASURING POINT	11
9.	SOLDER INFORMATION	12
9.1	SOLDER PROCESS TEMPERATURES	12
9.2	SOLDERING PROFILE	12
10.	PACKAGING	13
11.	CABLE TIE AND / OR TWIST TIE LOCATION	13
12.	NOTE	14

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
CHANGE NO.	810114						
REVISED BY	PRAMOD	DATE	2025/01/20	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	2 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

1. SCOPE:

This product specification covers the performance requirements for Pico-EZmate HC 1.8 Wire to Board CONNECTOR SYSTEM series.

2. PRODUCTS DESCRIPTION:

2.1 DESCRIPTIONS, SERIES NUMBER, AND LINKS:

DESCRIPTIONS	PART NUMBER	DRAWING NUMBER
Receptacle Terminal	2082995001	2082995001-SD PSD 000
Receptacle Housing	20829820*1	2082982000-SD PSD 000
Embossed tape packaging of Plug Assembly	20829400*0	2082941000-SD PSD 000

2.2 DIMENSIONS, MATERIALS, PLATINGS

See sales drawings for details on dimensions, materials, and platings.

2.3 ENVIRONMENTAL CONFORMANCE:

- Go to molex.com
- Enter the part number in the search field.
- At the bottom of the page go to “Environmental” to see compliance status.

2.4 SAFETY AGENCY LISTINGS

UL / cUL File Number: E29179

3. REFERENCE DOCUMENTS:

3.1 MOLEX DOCUMENTS

A Pico-EZmate HC 1.8 Wire to Board CONNECTOR SYSTEM Application Specification 2166940000-AS PS 000
 ATS – Application Tooling Specification*

**Application Tooling Specification for terminals is not provided in this document. ATS for terminals can be available from respective terminal part number page in Molex.com*

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
CHANGE NO.	810114						
REVISED BY	PRAMOD	DATE	2025/01/20	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	3 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

4. ELECTRICAL PERFORMANCE RATINGS

4.1 VOLTAGE

250 V AC rms / DC

4.2 RATED CURRENT AND APPLICABLE WIRES

Wire Size	Rated Current (Max.)				Insulation O.D.
	2-circuits	3-circuits	4-circuits	5-circuits	
AWG #22	5.0 A	4.0 A	3.5 A	3.0 A	φ 1.11~ φ 1.26mm
AWG #24	4.0 A	3.0 A	2.5 A	2.0 A	

1. Current deratings are based on not exceeding 30 °C Temperature Rise
2. Temperature Rise is measured in tail of plug terminal.
3. PCB trace design can greatly affect temperature rise results.
4. Data is for all circuits powered.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
CHANGE NO.	810114						
REVISED BY	PRAMOD	DATE	2025/01/20	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	4 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

4.3 TEMPERATURE

Ambient Temperature Range*1*2*3

:- 40 °C ~ + 105 °C
Not freeze to low temperature

NOTE:

- *1. Non-operating connectors after reflow must follow the operating temperature range condition.
- *2. Including terminal temperature rise.
- *3. Applicable wires must also meet the specified temperature range.

4.4 DURABILITY:

Plating Type	Number of Cycles
Gold Plated	10 cycles

5. QUALIFICATION:

Sample selection is in accordance with EIA-364-1000.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
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REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	5 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

6. PERFORMANCE:

6.1 ELECTRICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
6.1.1	Contact Resistance	Mate connectors and measured by dry circuit, 20mV MAX., 10 mA MAX. and subtract wire conductor resistance. Refer to paragraph 8 Contact resistance measuring point. (JIS C5402-2-1)	20 milliohms MAX.	
6.1.2	Insulation Resistance	Mate connectors and apply 500 V DC between adjacent terminals or between terminal and ground. (JIS C5402-3-1 / MIL-STD-202 Method 302)	1000 Megohms MIN.	
6.1.3	Dielectric Strength	Mate connectors, apply 750V AC rms for 1 minute between adjacent terminals or between terminal and ground. (JIS C5402-4-1/MIL-STD-202 Method 301)	No Damage on function	
6.1.4	Contact Resistance on crimped portion	Crimp the applicable wire to the terminal, measured by dry circuit, 20 mV MAX., 10 mA. MAX.	5 milliohms MAX.	
6.1.5	Temperature Rise	Mate connectors and all crimp terminals shall be connected in a direct series. The temperature rise shall be measured when maximum rated current is flowed and thermal equilibrium reaches. (UL498)	Temperature Rise:	30 °C MAX.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
CHANGE NO.	810114						
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REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	6 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

6.2 MECHANICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.2.1	Insertion and Withdrawal Force	Insert and withdraw connectors at the speed rate of 25±3 mm/minute. The data is measured based on the NOTE 12, "18" and Fig.31 of "20".	Refer to paragraph 7
6.2.2	Crimping Pull out Force	Fix the crimped terminal to the jig, apply axial pull out force on the wire at the speed rate of 25±3 mm/minute. (JIS C5402-16-4)	AWG #22 39.2 N {4.0 kgf} MIN.
			AWG #24 29.4 N {3.0 kgf} MIN.
6.2.3	Crimp Terminal Insertion Force	Insert a crimped terminal into the housing	14.7 N {1.5 kgf} MAX.
6.2.4	Crimp Terminal Retention Force	Apply axial pull out force at the speed rate of 25±3 mm/minute on a crimped terminal assembled in the housing.	3.5 N {0.36 kgf} MIN.
6.2.5	Header Terminal Retention Force	Apply axial pull out force at the speed rate of 25±3 mm/minute on a header pin assembled in the header housing.	0.5 N {0.05 kgf} MIN.
6.2.6	Housing Lock Strength	Mate connectors and apply axial pull out force at the speed rate of 25 ± 3 mm/minute.	10 N {1.0 kgf} MIN.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
CHANGE NO.	810114						
REVISED BY	PRAMOD	DATE	2025/01/20	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	7 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

6.2 MECHANICAL PERFORMANCE continued

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
6.2.8	Repeated Insertion / Withdrawal	Insert and withdraw connectors up to 10 cycles repeatedly at speed rate of 10 cycles per minute maximum.	Contact Resistance	40 milliohms MAX.
6.2.9	Vibration	Mate connectors and conduct test subject to the following vibration conditions, for a period of 2 hours in each of 3 mutually perpendicular axes, passing DC 1mA during the test. Cables should be fixed during the test. Amplitude : 1.5mm P-P Frequency : 10~55~10 Hz in 1 minute. Duration : 2 hours in each X.Y.Z.axes. (JIS C 60068-2-6/ MIL-STD-202 Method 201)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
			Discontinuity	1.0 microsecond MAX.
6.2.10	Mechanical Shock	Mate connectors and conduct test subject to the following shock conditions. 3 shocks shall be applied 6 directions along 3 mutually perpendicular axes [$\pm x$, $\pm y$, $\pm z$, each], passing DC 1 mA current during the test. [Total of 18 shocks] Test pulse : Half Sine Peak value : 490 m/s ² {50 G} Duration : 11 ms (JIS C60068-2-27/ MIL-STD-202 Method 213)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
			Discontinuity	1.0 microsecond MAX.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



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REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
CHANGE NO.	810114						
REVISED BY	PRAMOD	DATE	2025/01/20	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	8 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

6.3 ENVIRONMENTAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
6.3.1	Temperature Cycling	Mate connectors and conduct test subject to the following conditions for 5 cycles. Upon completion of the exposure period, the test specimens shall be left at ambient room temperature for 1 to 2 hours. After that, the measurements shall be performed. 5 cycles of : a) - 40±3 °C 30 minutes b) + 105±2 °C 30 minutes Shifting time: within 5 minutes (JIS C60068-2-14)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
6.3.2	Heat Resistance	Mate connectors and expose to 105±2 °C for 96 hours. Upon completion of the exposure period, the test specimens shall be left at ambient room temperature for 1 to 2 hours. After that, the measurements shall be performed. (JIS C60068-2-2/ MIL-STD-202 Method 108)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
6.3.3	Cold Resistance	Mate connectors and expose to -40±3 °C for 96 hours. Upon completion of the exposure period, the test specimens shall be left at ambient room temperature for 1 to 2 hours. After that, the measurements shall be performed. (JIS C60068-2-1)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
6.3.4	Humidity	Mate connectors and expose to 60±2 °C, relative humidity 90 to 95 % for 96 hours. Upon completion of the exposure period, the test specimens shall be left at ambient room temperature for 1 to 2 hours. After that, the measurements shall be performed. (JIS C60068-2-78/ MIL-STD-202 Method 103)	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
			Insulation Resistance	100 Megohms MIN.
			Dielectric Strength	Must meet 6.1.3

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
CHANGE NO.	810114						
REVISED BY	PRAMOD	DATE	2025/01/20	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE			CUSTOMER		DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05	2082980000-PS		D1	9 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

ENVIRONMENTAL PERFORMANCE continued

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
6.3.5	Salt Spray	Mate connectors and expose to the following salt mist conditions. Upon completion of the exposure period, salt deposits shall be removed by a gentle water wash or dip in running water. After that, the measurements shall be performed. NaCl solution Concentration: 5±1 % Spray time: 48±4 hours Ambient temperature: 35±2 °C (JIS 60068-2-11/ MIL-STD-202 Method 101)	Appearance	No Damage
			Contact Resistance	40 milliohms MAX.
6.3.6	SO ₂ Gas	Mate connectors and expose to the conditions of 50±5 ppm SO ₂ gas at ambient temperature 40±2 °C for 24 hours.	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
6.3.7	NH ₃ Gas	Mate connectors and expose to the conditions of 28 % concentration NH ₃ solution for 40 minutes. [The ratio is 25 ml per 1L]	Appearance	No Damage on function
			Contact Resistance	40 milliohms MAX.
6.3.8	Solderability	Dip terminal or pin into flux, and immerse the area up to 0.2 mm from the product mounted surface on PCB into molten solder pot at 245±3 °C for 3±0.5 sec.	Solder Wetting	95% MIN. of immersed area and there are no pin holes and no gap.
6.3.9	Resistance to Soldering Heat	<u>Soldered by IR Reflow Machine</u> Using the reflow profile condition below paragraph 9, the product shall be reflowed.	Appearance	No Damage
		<u>Soldered by Manual Soldering iron</u> Using a manual soldering iron [350±5 °C for 5 seconds MAX.], the product shall be heated up. However, do not apply excessive pressure to either the terminals or fitting nails.		

() : Reference Standard
 { } : Reference Unit

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



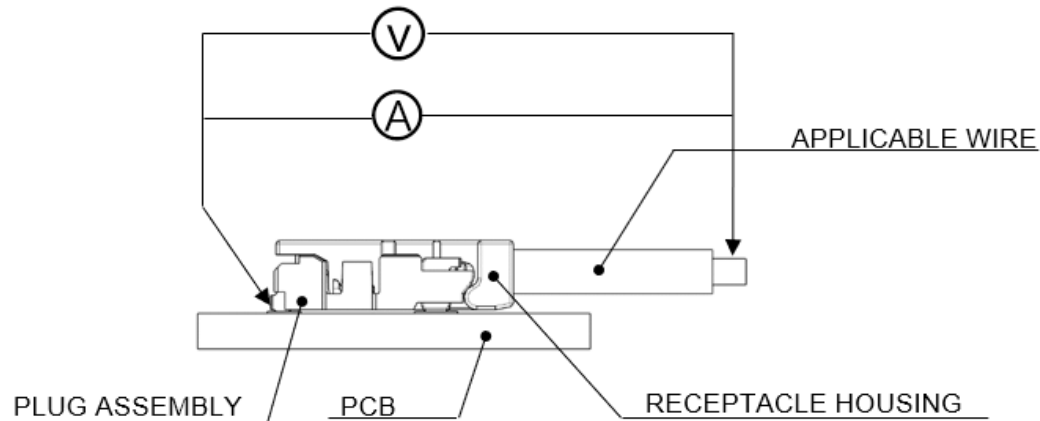
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CHANGE NO.	810114						
REVISED BY	PRAMOD	DATE	2025/01/20	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE			CUSTOMER		DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05	2082980000-PS		D1	10 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

7. INSERTION / WITHDRAWAL FORCE

No. of CKT	UNIT	Insertion (MAX.)			Withdrawal (MIN.)		
		1st	3th	10th	1st	3th	10th
2	N {kgf}	18 { 1.8 }	18 { 1.8 }	18 { 1.8 }	3.5 { 0.36 }	1.8 { 0.18 }	1.5 { 0.15 }
3	N {kgf}	24 { 2.4 }	24 { 2.4 }	24 { 2.4 }	3.5 { 0.36 }	1.8 { 0.18 }	1.5 { 0.15 }
4	N {kgf}	30 { 3.1 }	30 { 3.1 }	30 { 3.1 }	3.5 { 0.36 }	1.8 { 0.18 }	1.5 { 0.15 }
5	N {kgf}	35 { 3.5 }	35 { 3.5 }	35 { 3.5 }	3.5 { 0.36 }	1.8 { 0.18 }	1.5 { 0.15 }

8. CONTACT RESISTANCE MEASURING POINT



Contact Resistance: $m\Omega = V/A$

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
CHANGE NO.	810114						
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REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE			CUSTOMER		DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05	2082980000-PS		D1	11 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

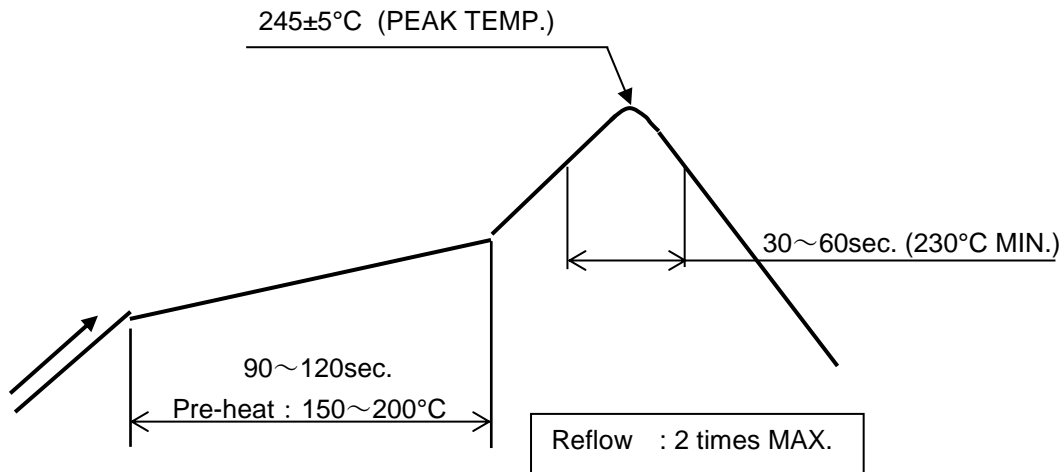
9. SOLDER INFORMATION

These specifications establish standard solderability test methods used to evaluate a products ability to accept molten solder. Solder Process Temperatures and Reflow Solder Profiles will vary based on application, equipment, solder paste, PCB thickness, **ETC.**

9.1 SOLDER PROCESS TEMPERATURES

Reflow Solder Temperature: 245 °C MAX.

9.2 SOLDERING PROFILE



TEMPERATURE CONDITION GRAPH

(Temperature is measured at the soldering area on the surface of PCB)

NOTE : Please check the mount condition (reflow soldering condition) by your own devices beforehand, because each condition varies by the reflow machine, printed circuit boards (PCB), and so on. Although tail of terminal and nail might be discolored, it does not affect solderability.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

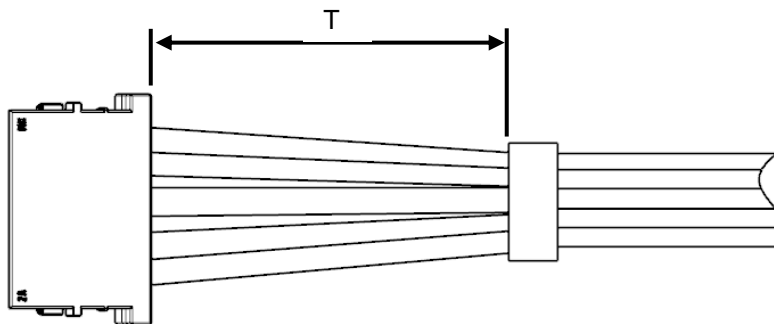
REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
CHANGE NO.	810114						
REVISED BY	PRAMOD	DATE	2025/01/20	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	12 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

10. PACKAGING

Parts shall be packaging to protect the parts from damage during standard shipping, storage, and handling. Refer Molex.com specific part number webpage to get the exact packaging document for that item.

11. CABLE TIE AND / OR TWIST TIE LOCATION

CKT Size	Dim T Min.
2-5 ckt	20 mm



The “T” dimension defines a “free” length of wire, or a length of wire that is not subject to significant bias by external factors such as a wire tie, wire twisting, or other means of bending or deforming of the wires that repositions them from their natural relaxed state or location where they enter the housing. Wires are to be dressed in such a manner to allow the terminals to float freely in the pocket. This dimension is general recommendation and may need to be adjusted for different wire gauges and wire type and insulation thickness and insulation material.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
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REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05	2082980000-PS		D1	13 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

12. NOTE

1. When connectors are unmated, positive locks shall certainly be released.
2. There is no influence in the product performance in the case that the black spot or bubble might be appeared on the plastic part of this product and the color shade might be different (including discoloration by aging etc.).
3. A few scratches may be seen on the surface of the housing and the plating of this product, however, there is no issue in the product performance.
4. Discoloration of the plastic part of this product can be appeared by the exposure to ultraviolet light, however, there is no issue in the product performance.
5. When this product is used at a place where the water exposure could be expected, please provide the appropriate care to avoid the damage from water. There is a possibility of causing insulated malfunction between the circuits by condensation and water leakage.
6. Please do not conduct any washing process on the connectors because it may damage the functionality.
7. Please avoid the situation which the contact area of connector always moves around. For example, the contact area is experiencing a constant movement by the sympathetic vibration of wires and PCB, rotating construction of devices, and action of moveable area. This may cause a defect in the conductivity due to the contact area being worn down. Therefore, please fix wires and PCB on the chassis, and reduces sympathetic vibration.
8. Please do not apply the extra pressure on the connector. For example, do not carry around the substrate which has mated hanging connector on board. There is a case where it causes the damage of connector.
9. After mating the connectors, please do not apply the pressure on the connectors in either the pitch direction, the span direction or rotational direction. It may cause the damage of connector and may crack the soldering.
10. Please ensure to prevent from applying any external forces or shock to the connector when connector or the cable assembly in process or cable assembly is under being packaged, or under transportation. This may cause deformation and damage to the connector and may cause a defect in product performance.
11. When using this product, please ensure to follow within its rated current per circuit. Please ensure not to apply the sum of the rated current separated in several circuits to exceed the maximum allowable rated current.
12. This product is not designed for mating and un-mating of the connector under the condition of an active electrical circuit. It may cause a risk of electric spark and the defect in product performance. Please do not conduct the hot plug and hot unplug.
13. The applicable wire for this connector, in principle, is tin-plated copper stranded wire. Please contact molex in advance when using other kind of wires.
14. Please ensure to keep enough clearance between the connector and chassis of your device in order not to apply pressure on the connector.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

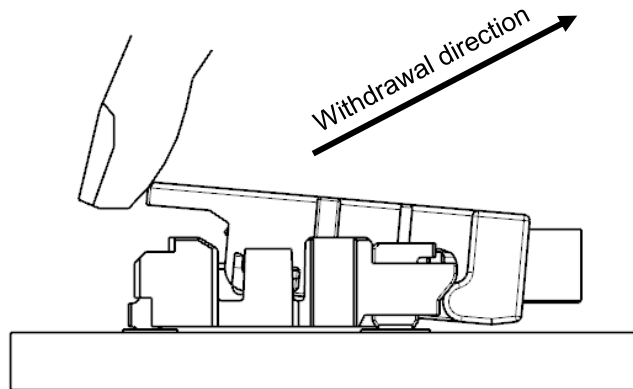
[TABLE OF CONTENT](#)



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REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
CHANGE NO.	810114						
REVISED BY	PRAMOD	DATE	2025/01/20	DOC TYPE	DOC TYPE DESCRIPTION	DOC PART	SERIES
REV APPR BY	ISHWARG	DATE	2025/01/20	PS	PRODUCT SPECIFICATION WORD	001	208298
INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	14 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

- 15. Please tie the cables at least 20 mm away from the edge of the connector housing and ensure that the forces on all of the wires are applied evenly.
- 16. When extracting a crimp terminal from the housing by using a jig, it may deform the housing lance, and it causes to reduce the terminal retention force enormously after re-inserting the terminal. Therefore, please ensure to use a new housing after repairing the crimp terminals.
- 17. When positioning cable assembly and cable assembly after mating connectors in the device, it should not have a constant stress or a pulling force applied on it. This phenomenon may damage the contact area, crimping area, or terminal lock area, and it causes the defect in conductivity. Therefore, when designing the wire positioning in the device, please ensure that there is enough wire length not to stress on the connector.
- 18. When un-mating connector, please place fingers on the locking tab of the receptacle housing and, using the flat of fingers, push the locking tab upward at an angle to fully release the lock, then please withdraw the receptacle housing slowly and diagonally. Please avoid withdrawing strongly. This may cause the damage of the connector.



- 19. Please do not deliberately deform the movable portion (the lock area and lance of plug housing) and terminals. It would lead to product failure.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

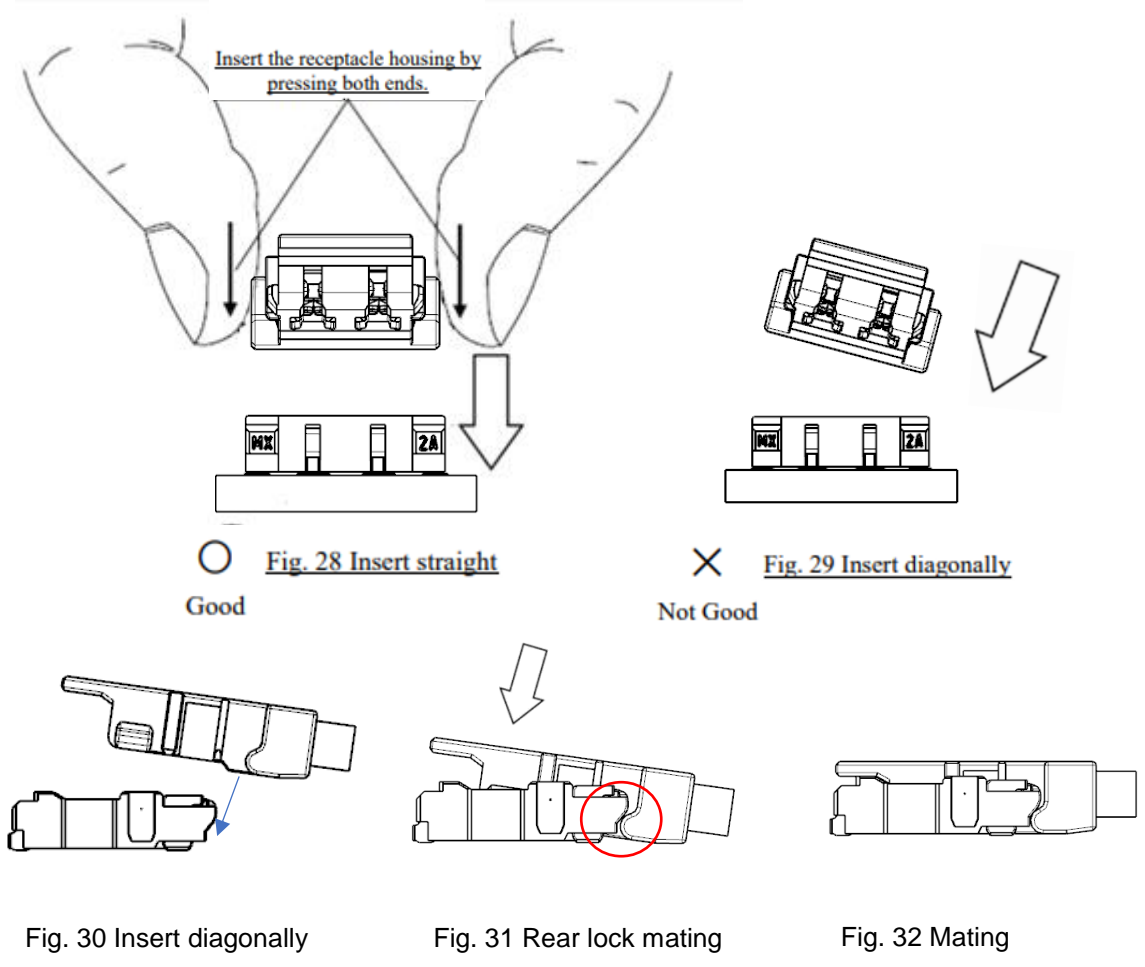
[TABLE OF CONTENT](#)



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INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	15 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

20. Please mate the connector in parallel with the mating axis as much as possible. At this time, after positioning and facing each rear lock (fig.31) of both receptacle and plug housing, push the arrow part of receptacle housing (fig.31) to mate until both plug and receptacle housings strike each other. When mating connector in the diagonal angle excessively, it may damage the connector.



Pico-EZmate HC 1.8 Connector System Webpage				TABLE OF CONTENT					
THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION									
REVISION DESCRIPTION		PICO-EZMATE HC 1.8 WTB							
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INITIAL RELEASE				CUSTOMER		DOCUMENT NUMBER		REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05			2082980000-PS		D1	16 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13						

21. Please ensure to solder all the terminal tails and fitting nails on the PCB. When you leave any soldering area open, it may cause the short circuit between pins, terminal buckling or connector's coming off the PCB.
22. Please evaluate the connector on your mounter in advance. When the mounter applies the extra pressure on the connector, it may cause the deformation or damage of connector.
23. Please ensure to check appearance and solderability of connector when the recommended storage condition for package is not followed.
24. Please do not directly touch the terminal and fitting nail area before and after mounting the connector on the PCB.
25. Please do not stack the PCB directly after mounted the connectors on it.
26. Please ensure to conduct the manual soldering under the condition of the product specifications when repairing by manual soldering iron. In the case of practicing beyond the soldering condition, it may cause terminal fallout issue, the contact gap change issue, and the deformation/dissolution of the mold.
27. When conducting manual repairing by using a soldering iron, please do not use more solder and flux than needed. This may cause a solder wicking and flux wicking issues, and it will eventually lead to a contact defect and functional issues.
28. Please do not use the connector alone to provide mechanical support for the PCB. Please ensure that PCB is supported by a fixed structure on the chassis except the connector.
29. In the case of changing Molex recommended board layout pattern size on your PCB, please contact Molex in advance because it may cause a fatal defect.
30. Please contact Molex surely when using a special PCB or FPC (flexible printed circuit), because we evaluated connector by using Glass epoxy PCB based on our product specification.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION

REVISION DESCRIPTION	PICO-EZMATE HC 1.8 WTB						
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INITIAL RELEASE				CUSTOMER	DOCUMENT NUMBER	REVISION	SHEET
INITIAL DRWN	PRAMOD	DATE	2024/11/05		2082980000-PS	D1	17 OF 18
INITIAL APPR	ISHWARG	DATE	2025/01/13				

- 31. There is no influence in the product performance though the twist appearance in the terminal plating area might be generated by some reflow conditions.
- 32. There is no influence in the product performance though the discoloration in the resin area might be seen by some reflow conditions.
- 33. There is no influence in the product performance though the discoloration in the soldering area might be seen after reflow.
- 34. This product is designed for using IR (Infrared) reflow machine. When using Nitrogen reflow machine, it might generate the solder wicking issue. Please evaluate the mounting condition (reflow soldering condition) beforehand when using Nitrogen reflow machine. The mounting conditions may change due to the soldering temperature, soldering paste, IR reflow machine, Nitrogen reflow machine, and the type of PCB. The different mounting conditions may influence in the product performance.
- 35. The stencil (thickness 0.1 mm / aperture ratio 100 %) is used in this product specification evaluation.
- 36. The connector mounting specification for coplanarity does not include the influence of the PCB warpage. The warpage of the PCB should be a less than 0.02 mm at the center of connector when setting both edges of connector as the datum.
- 37. The coplanarity of this product is assured only before mounting/reflowing condition. There is no product guarantee in terms of coplanarity during and after mounting/reflowing.
- 38. The housing material of this product is made from a high heat resistant polyamide plastic material. The water absorption properties of the housing material and soldering condition may cause blistering on the housing surface after reflowing. Because the blister is not caused by property change of polyamide, it does not damage the product performance.
- 39. Because of the property of Housing resin, the blister might be generated during reflow heating process depending on the water absorption condition. When opening the humidity prevention package and passing the recommended storage condition time limit, the baking process is highly recommended with below condition.
Baking condition: 50 °C temperature chamber for 16±6 hours.
- 40. Because the receptacle housing material of this product is using polyamide, the water absorption status of the housing material might influence the insertion force / withdrawal force or feeling of insertion. Though its excessive water absorption status may cause to interfere with insertion a bit or to weaken the lock click feeling when mating, it does not damage the product's performance and functions.

[Pico-EZmate HC 1.8 Connector System Webpage](#)

[TABLE OF CONTENT](#)



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INITIAL APPR	ISHWARG	DATE	2025/01/13				