Product Specification.
Modular Terminal Block

This specification may change without notice, as a result of product performance evaluation testing and design changes.

1. Scope:

This product specification covers product performance requirements and test method of Modular Terminal Block and 6-Position Positive Lock Connector as a mating counterpart of Modular Terminal Block.

1.1 Product Part Numbers and Descriptions:

The products of the following part numbers shall be governed under this specification.

Part Number		Descriptions
171846-1	Modular Terminal Block	6-Pos. Unit Block Assembly
-2		" " " "
171847-1		6-Pos. Extension Block Assembly
-2		
170233-2	Mating Counterpart	Positive Lock Receptacle Contact
170234-2		" " " "
171848-1		6-Pos. Positive Lock Plug Housing

2. Applicable Documents:

The following specification form part of this specification to the extent specified herein.

JEM 1103: Clearance and Creepage Distances for Controlgear

MIL-STD-202 Test Methods for Electronic and Electric Component Parts

NK, Nippon Kaiji Kyokai:

Rules and Regulations for the Constructions and Classification of Ships, 1979

BV, Bureau Veritas:

Rules and Regulation for the Construction and Classification of Steel Ships

NV, Det Norske Veritas:

Rules for the Construction and Classification of Steel Ships

3. Definitions of Terms:

For the purpose of this specification, the following terms shall apply.

3.1 Contact:

Electrically conductive metallic component members of connector.

3.2 Housing:

Electrically insulating plastic member that encapsulates contacts in its cavities.

3.3 Connector:

An assembly of a housing and contacts arranged properly for the designated purposes.

4. Material:

4.1 Contact:

Contacts are made from brass strip, conforming to Copper Alloy No. 260 of ASTM B36.

4.2 Screws and Washers:

Cross-recessed pan head machine screw M4, is made of free-cutting brass conforming to JIS H 3422, flat washer is made of brass conforming to JIS H 3201 and spring washer is made of phosphor bronze conforming to JIS H 3751. These three parts are pre-assembled and used on connector block assembly.

4.3 Housing:

Housing is made of molded Nylon resin conforming to UL 94V-O.

4.4 End Plate:

End plates that cover sides of connector housing,are made of glass-filled polybuthylene terephthalate resin conforming to UL 94V-O.

5. Appearance, Markings, Finish and Color:

5.1 Appearance :

Product connector assembly shall be free from abnormal defects such as cracks, damages,blister, dirt and burrs that are detrimental to connector functions.

5.2 Markings:

Markings on the connector shall be legible after testing conforming to the requirements specified in applicable product drawing(s).

5.3 Finish:

Finish shall be conforming to applicable product drawing(s).

5.4 Color:

Housing and End plates are of black material.

6. Product Feature, Construction and Dimensions:

6.1 Block Assembly:

Product design feature, construction and dimensions shall be conforming to applicable product drawing(s). Housing block assembly comprises of two end plates and tab housing. Each end plate provides mounting ear for securing connector assembly on panel in either vertical or horizontal disposition. In tab housing block, a four-way tab contact is press-fit in so designated groove. Tab contact is designed to mate with positive lock receptacle contact assembled in housing.
The basic 6-position connector block can be extended by adding extension block which has an end plate on one side only, side by side to the basic block. And extension block cannot be used itself only without exsitence of basic block assembly.

6.2 Receptacle Contact:

Product design feature, construction and dimensions shall be conforming to the applicable product drawing(s). Positive Lock recptacle contact is a female contact which is encapsulated in a 6-position plug housing after crimped on wire. Positive lock contact has a mechanism to lock on counterpart tab contact when mated. This locking condition can be released automatically only if the inserted plug housing is pull-off by holding on its body. This locking mechanism works when the connector is pulled by crimped wires.

6.3 Plug Housing:

Product design feature, construction and dimensions shall be conforming to the applicable product drawing(s). Plug housing has loacking detents, one in each housing cavity that hooks on in the slot of receptacle contact to lock in housing. To remove receptacle contact from housing cavity, use tip end of a thin tool like a screw driver to bend lower wall of cavity outward to release detent from catching. This will release locking of inserted receptacle contact, and the contact can be easily removed.

7. Applicable Rating:

7.1 Temperature Rating:

Temperature rating shall be within the range of -55 thru 85°C.
This temperature includes ambient temperature and temperature rising resulted from energized current during operation.

7.2 Applicable Panel Thickness:

Connector block can be mounted on panel having thickness of 1 - 3.5mm.

7.3 Applicable Wire Range:

Part Number	Wire Size mm^2 (AWG)	Insulation Diameter (mm)
170233-2	0.5-2.27 (#20-14)	2.2 - 3.4
170234-2	3.08-5.63(#12-10)	3.8 - 5.1

8. Performance Requirements and Test Methods:

8.1 Performance:

When tested in accordance with the test methods specified in Para. 8.2, in test sequence specified in Para. 8.3, product performance shall meet the requirements specified in Table 1.

Test Item (Paragraph No.)	Performance Requirements Contact (Initial)	Performance Requirements of Connector (Final) (Initial)	After Environmental Conditioning
Confirmation of Product (Para. 8.2.1)	Product shall be conforming to applicable product drawing(s), being free from abnormalities and defects such as cracks, breakage, damages, rattling and loose od parts, rust, fusion that are detrimental to connector functions.		
Termination Resistance (Para. 8.2.2)		3mV/A Max.	10mV/A Max.
Insulation Resistance (Para. 8.2.3)		100 MΩ Min.	
Dielectric Strength (Para. 8.2.4)		Connector shall withstand test potential of 2,500V AC for 1 minute, without showing abnormalities.	
Temperature Rising (Para. 8.2.5)		Wire Size mm² / (AWG) / Test Current (A) / Temperature Rising (°C)	
		0.5 / (#20) / 10 / 40 Max.	
		0.75 / (#18) / 12	
		1.25 / (#16) / 15	
		2.0 / (#14) / 20 / 40 Max.	
		3.5 / (#12) / 25	
		5.5 / (#10)	
Crimp Tensile Strength (Para. 8.2.6) (Applicator Crimped)	Wire Size mm² / (AWG) / Tensile(Min.) kg (lbs.)	//	
	0.5 / (#20) / 9.0(19.8)		
	0.75 / (#18) / 13.0(28.7)		
	1.25 / (#16) / 17.0(37.5)		
	2.0 / (#14) / 25.0(55.1)		
	3.5 / (#12) / 35.0(77.2)		
	5.5 / (#10) / 35.0(77.2)		
Insertion Force Connector (Para. 8.2.7)	//	19.0 kg Max.	
Extraction Force Connector (Para. 8.2.8)	//	3.0 - 19.0 kg	2.0 kg Min. After 50 cycles of insertion/extraction

Table 1 (to be continued)

8.1 Performance Requirements (continued):

Test Item (Paragraph No.)	Performance Requirements Contact (Initial)	Performance Requirements of Connector (Initial)	(Final) After Environmental Conditioning
"Kojiri" Resistibility (Para. 8.2.9)	//		Connector Extraction Force: 2.0 kg Min.
Retention Force, Receptacle Contact (Para. 8.2.10)	//	4.0 kg Min.	
Contact Locking Retention Force (Para. 8.2.11)	//	10.0 kg Min.	
Tab Contact Retention Force (Para. 8.2.12)	//	30.0 kg Min.	
Panel Mounting Retention Force (Para. 8.2.13)	//	30.0 kg Min.	
Vibration, Low Frequency (Para. 8.2.14)	//		No electrical discontinuity greater than 1 microsecond shall occur during test. Product shall not show abnormalities and loose of parts after test conditioning.
Physical Shock (Para. 8.2.15)	//		
Humidity Cycling (Para. 8.2.16)	//		When tested in accordance with test sequence specified in Table 3, performance requirements shall be met.
Thermal Shock (Para. 8.2.17)	//		
Salt Spray (para. 8.2.18)	//		
Sulphurous Acid Gas (Para. 8.2.19)	//		

Table 1 (End)

8.2 Test Methods:

8.2.1 Appearance:

Visually and tactically inspect appearance of product to see if abnormalities such as cracks, breakage, damages, rattling and loose of parts, rust, fusion and deformation which are detrimental to connector functions, are evident.

8.2.2 Termination Resistance:

Termination resistance across a mated pair of tab and receptacle contacts is measured by applying test current of specified intensity shown in Table 1 after temperature of circuit becomes stabilized at the probing points 75mm apart from terminated area as shown in Fig. 1. Termination resistance is calculated after deducting resistance of a 150mm long wire used for termination from the measured millivolt drop value. Measurement shall be done at the positions one after one.

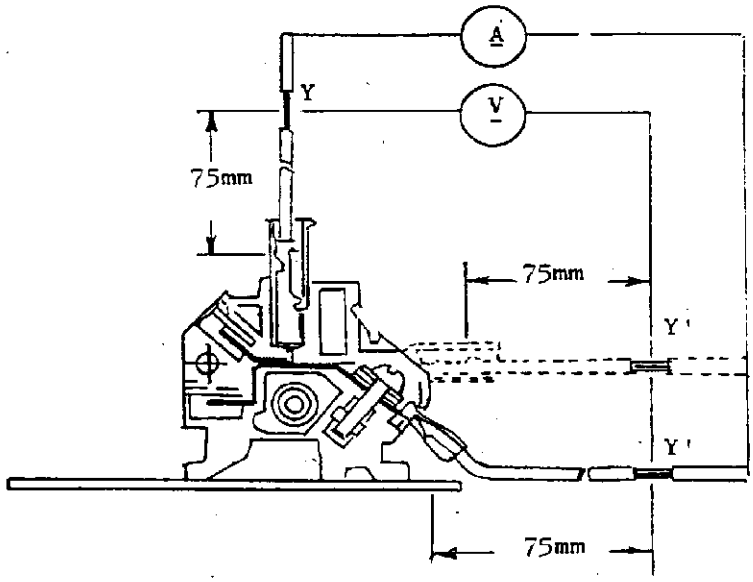


Fig. 1

8.2.3 Insulation Resistance:

Mated pair of connector assemblies shall be tested by applying test potential between the adjacent contacts and between the contacts and the ground. Measurement shall be done by using 500 V DC megohmmeter.

8.2.4 Dielectric Strength:

Mated pair of connector assemblies shall be tested by applying test potential of 2,500V AC between the adjacent contacts and between the contacts and the ground in accordance with Test Method 301 of MIL-STD-202. Test potential is increased at a specified rate, and after the specified potential is reached, it shall be held for 1 minute.

8.2.5 Temperature Risisng:

Contact-loaded and mated pair of connector assemblies shall be tested by applying test current of specified intensity as shown in Table 1. Measurement shall be done by probing with thermocouple on wire crimp after temperature of circuit becomes stabilized. Crimped wire shall be long enough (900mm minimum) to dissipate heat which is generated by the effect of loaded current.

8.2.6 Crimp Tensile Strength:

Securely fasten a wire-crimped contact on the head of tensile testing machine, and apply an axial load to pull off the wire by ope ating the head to travel w9th the speed at a rate of 100mm a minute. Crimp tensile strength is determined, when the wire is broken or is pulled off from the wire crimp.

8.2.7 Insertion Force of Contact:

Contact-loaded plug housing and block assembly shall be secu ed properly on the tensile testing machine in the manner that they are to mate as the machine head is operated. C onnector insertion force is measured by applying an axial load to insert by operating the head to travel with the speed at a rate of 100mm a minute. Initial insertion force shall be measured and recorded.

8.2.8 Extraction Force of Connector:

Contact-loaded plug housing and block assembly shall be secured properly on the tensile testing machine in the manner that they are to be unmated as the machine head is operated. Connector extraction force is measured by applying the head to travel with the speed at a rate of 100mm a minute. The force required to unmate the connectors shall be measured and recorded.

8.2.9 "Kojiri" Resistibility:

Tightly secure a block assembly on a sturdy test bench as shown in Fig. 2, and mate a contact-loaded plug housing.
"Kojiri" testing is performed by applying torque force of 20kg. cm(T) to plug housing in reciprocated cycles to force in right-left direction at every depth of 1 mm graduation along the extraction stroke, until the connector halves are completely separated. Making one separation a cycle, repeat 10 cycles of "Kojiri" twisting and bending motion to the sample connectors.

Note: "Kojiri" is a Japanese term, meaning the motions to give forcing stress to a set of assembled parts as connectors or contacts in mated condition with the manner of twisting, bending and rolling, forcing in the direction amiss to working axis, resulting detrimental affections to the parts involved, especially deformation, breakage and damages as usually seen in contact/connector applications.

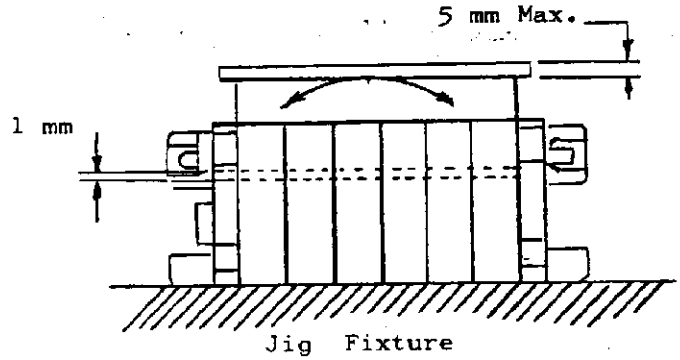


Fig. 2

8.2.10 Retention Force of Receptacle Contact:

Insert a receptacle contact which is crimped on an approximately 100mm long, 0.75mm^2 or thicker wire, into plug housing, and secure the housng on the head of tensile testing machine. An axial pull-off load is applied to crimped wire by operating the head to travel with the speed at a rate of 100mm a minute. Measure and record the force required to dislodge the receptacle contact from the housing position.

8.2.11 Mated Contact Retention Force:

Insert approximately 100mm long, 1.25mm^2 or greater wire-crimped contact into block housing assembly, and mate with tab contact in block housing with locking mechanism set in effect, and after securing the housing on the head of tensile tessting machine, apply an axial load to unmate the connectors by operating the head to travel with the speed at a rate of 100mm a minute. Measure and record the force required to separate the mated housings, by unlocking the locking mechanism or breakage of the device.

8.2.12 Retention Force of Tab Contact:

Terminate a GP terminal which is crimped on 2mm^2 or greater wire on a 4mm stud screw tap of block assembly (P/N 171846-2), and secure the housing on the head of tensile testing machine and apply an axial load to pull off the scewed-on terminal, by operating the head to travel with the speed at a rate of 100mm a minute, until the force reaches 30 kg. (Shown in Fig. 3)

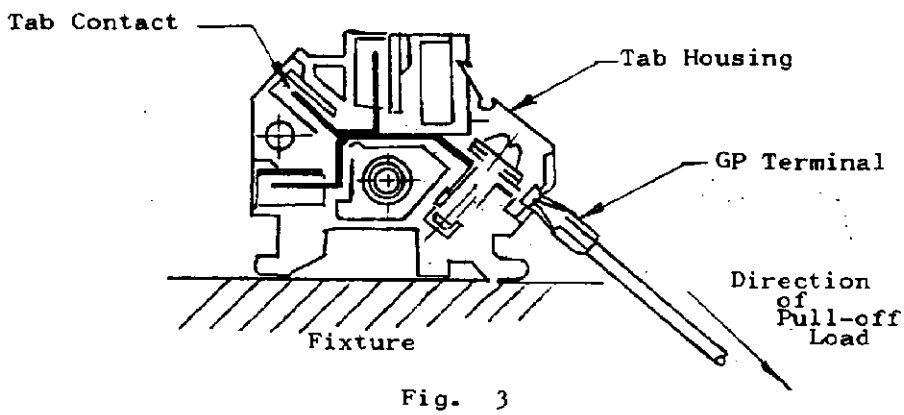
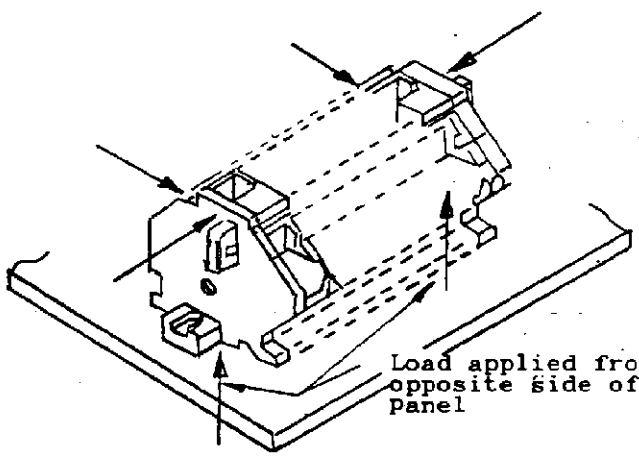


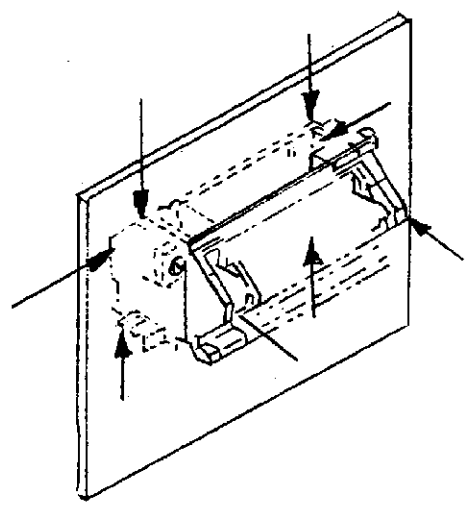
Fig. 3

8.2.13 Panel-Mount Retention Force:

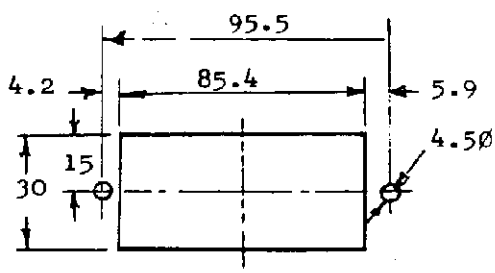
Mount block assembly on the panel as shown in Fig. 4, and apply load of 30 - 35 kg at 6 places on upper side of housing and 2 places on lower part of housing for 5 seconds each place.



Arrows denote direction of load applied for the test.



For vertical mounting application, recommended mounting dimensions must be strictly followed.



Recommended Panel Cut-out Dimension (REF.)

Fig. 4

8.2.14 Vibration, Low Frequency:

Secure mated connector assemblies on fixture plate of vibrating machine with the crimped wires of 75mm long approximately, freely extended without touching vibration testing equipment. Sample connector assemblies are subject to be vibrated with the maximum amplitude of 2mm both sides in the sweeping frequencies changing between 5 and 25 Hz. uniformly in simple harmonic oscillation reciprocating one cycle a minute. Vibration shall be applied to 2 hours each, totally 6 hours in three axial directions. During the vibration, all the contacts shall be series-wired, and applied with test current of 0.1A., and the circuit shall be monitored for electrical discontinuity greater than 1 microsecond taking place in the circuit.

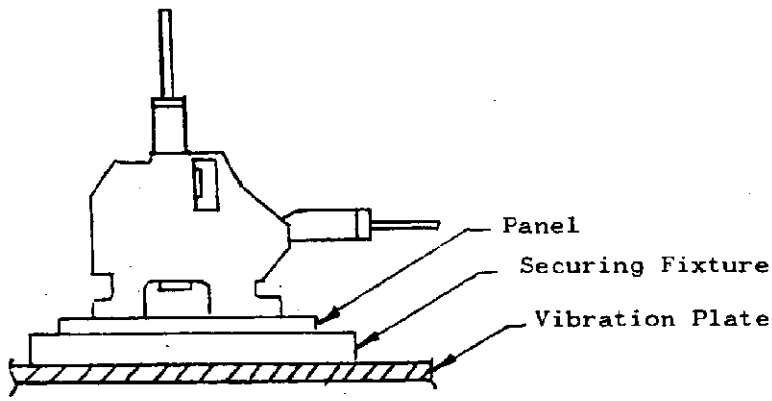


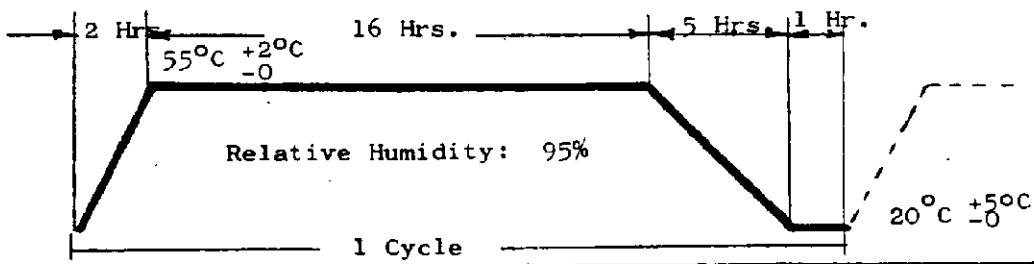
Fig. 5

8.2.15 Physical Shock:

Mated pair of connector assemblies shall be tested in accordance with the test method specified in Test Condition A, Test Method 203 of MIL-STD-202. During the test, connector contacts shall be series-wired, and energized with test current of 0.1A minimum.

8.2.17 Humidity:

Mated pair of connector assemblies shall be tested in accordance with the test method, specified in the following diagram for 2 cycles. After completion of test duration, the sample connector shall be removed from test chamber, and reconditioned in the room temperature without using power driven ventilation, for 4 hours.



8.2.17 Thermal Shock:

Mated pair of connector assemblies shall be tested in accordance with Test Condition A (Table 2), Test Method 107 of MIL-STD-202, by repeating the sequence for 10 cycles continuously.

Test Sequence, Condition A

Step	Temperature (°C)	Duration
1	$-55\ ^{+0}_{-3}$	60 minutes
2	$+25\ ^{+10}_{-5}$	5 minutes max.
3	$+85\ ^{+3}_{-0}$	60 minutes
4	$+25\ ^{+10}_{-5}$	5 minutes max.

Table 2

8.2.18 Salt Spray:

Mated pair of connector assemblies shall be tested in accordance with Test Condition B, Test Method 101 of MIL-STD-202. After test duration, connector assemblies shall be linsed in tap water and dried in the room temperature for 1 hour.

8.2.19 Industrial Gas Resistibility:

Mated pair of connector assemblies shall be exposed under sulphurous acid gas in the test chamber for 48 hours. The details of test gas condition shall be as follows.

Density of Gas	50 ppm ±3
Temperature	Room Temperature
Humidity	90% min.

8.3 Test Sequence:

All the tests shall be performed in accordance with the following sequence.

	Sample Group											
	A	B	C	D	E	F	G	H	I	J	K	L
Confirmation of Product	1								1	1	1,5	
Termination Resistance	3								4	2,4	2,4	1,3
Insulation Resistance									2,5			
Dielectric Strength									6			
Temperature Rising		1										
Crimp Tensile Strength			1									
Insertion Force, Connector	2			Repeat								
Extraction Force, Connector	4			1	2							
"Kojiri" Resistibility					1							
Contact Retention Force	5											
Contact Locking Strength	6											
Tab Contact Retention Force						1						
Panel Mounting Retention Force										5		
Vibration, Low Frequency							1					
Physical Shock								1				
Humidity Cycling									3			
Thermal Shock										3		
Salt Spray											3	
Industrial Gas Sulphurous Acid Gas												2

Table 3

9. Quality Assurance Provisions:

9.1 Test Conditions:

Unless otherwise specified, all the tests shall be conducted in any combination of the following test conditions.

Temperature	15	-	35°C
Relative Humidity	45	-	75%
Atmospheric Pressure	650	-	800mmHg

9.2 Test Specimens:

Test specimens to be employed for the tests shall be prepared in accordance with AMP specified crimping procedure with correct crimp height by using wires specified in Table 4.
Unless otherwise specified, no sample shall be reused.

9.3 Applicable Wires:

Wires used for terminating Modular Terminal Block shall be conforming to JIS C 3306 applicable to vinyl cord for appliance application in sizes over $0.5mm^2$, and JIS C 3316 applicable to vinyl-insulated wires KIV for electric equipment in sizes over $0.75mm^2$ as shown in Table 5.

Wire Size		Strand Composition		Insulation Diameter (mm)
mm^2	(AWG)	Diameter of A Strand(mm)	Number of Strands	
0.5	(#20)	0.18	20	2.6
0.75	(#18)	0.18	30	2.8
1.25	(#16)	0.18	50	3.1
2.0	(#14)	2.6	37	3.4
3.5	(#12)	0.32	45	4.1
5.5	(#10)	0.32	70	5.1

Table 5

9.4 Sample Group Composition:

Sample group composition in reference to product part numbers, is as follows.

	171846-1	171846-2	170233-2	170234-2	171848-1
A	X	X	X		X
B	X	X	X	X	X
C			X	X	
D	X		X		X
E	X			X	X
F		X			
G	X		X		X
H	X		X		X
I	X		X		X
J	X	X	X		X
K		X	X		X
L		X	X		X

Table 5

10. Additional Instructions at Assembly:

10.1 When to mate, receptacle contact loaded plug housing with block assembly, be sure to confirm the followings.

(1) Be sure to confirm clicking sound which is heard when receptacle contact fully accepts tab contact as is is sufficiently inserted.

(2) Visually inspect that shoulder of plug housing is bottomed in the recession of block housing as shown in Fig. 6.

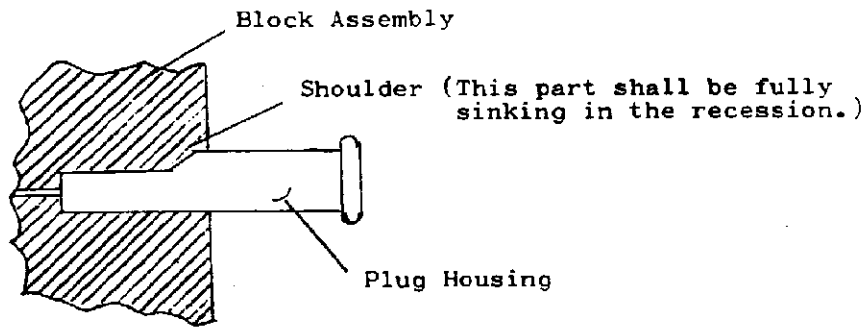


Fig. 6

单击下面可查看定价，库存，交付和生命周期等信息

>>TE Connectivity(泰科)