

**Magnetic Mod jack Supports POE****1. SCOPE**

1.1. Content

This specification covers performance, tests, and quality requirements for RJ45 Jacks with integrated Magnetics (TE part# list see Figure 1) for Ethernet applications.

TE Part#	Description	Material	Current Rating	POE / non POE	Temperature Rating
2496556-X	RJ45 W/MAGNET 1X1 1G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2496558-X	RJ45 W/MAGNET 1X1 10G POE 90W LED	PA46	1.0A	90W	-40°C to +85°C
2496686-X	RJ45 W/MAGNET 2X1 1G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2496687-X	RJ45 W/MAGNET 2X2 1G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2496688-X	RJ45 W/MAGNET 2X4 1G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2497310-X	RJ45 W/MAGNET 2X6 1G POE 60W LED	PA6T	0.72A	60W	-40°C to +85°C
2496689-X	RJ45 W/MAGNET 2X8 1G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2497272-X	RJ45 W/MAGNET 2X1 2.5G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2496691-X	RJ45 W/MAGNET 2X2 2.5G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2497273-X	RJ45 W/MAGNET 2X4 2.5G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2497271-X	RJ45 W/MAGNET 2X6 2.5G POE 60W LED	PA6T	0.72A	60W	-40°C to +85°C
2497274-X	RJ45 W/MAGNET 2X8 2.5G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2496721-X	RJ45 W/MAGNET 1X4 1G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2496722-X	RJ45 W/MAGNET 1X4 2.5G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2496723-X	RJ45 W/MAGNET 1X4 5G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2496724-X	RJ45 W/MAGNET 1X4 10G POE 60W LED	PA46	0.72A	60W	-40°C to +85°C
2496733-X	RJ45 W/MAGNET 2X1 5G POE 60W LIGHT PIPE	PA6T	0.72A	60W	-40°C to +85°C

2496734-X	RJ45 W/MAGNET 2X2 5G POE 60W LIGHT PIPE	PA6T	0.72A	60W	-40°C to +85°C
2496735-X	RJ45 W/MAGNET 2X4 5G POE 60W LIGHT PIPE	PA6T	0.72A	60W	-40°C to +85°C
2497277-X	RJ45 W/MAGNET 2X6 5G POE 60W LIGHT PIPE	PA6T	0.72A	60W	-40°C to +85°C
2496736-X	RJ45 W/MAGNET 2X8 5G POE 60W LIGHT PIPE	PA6T	0.72A	60W	-40°C to +85°C
2496737-X	RJ45 W/MAGNET 2X1 10G POE 60W LIGHT PIPE	PA6T	0.72A	60W	-40°C to +85°C
2496738-X	RJ45 W/MAGNET 2X2 10G POE 60W LIGHT PIPE	PA6T	0.72A	60W	-40°C to +85°C
2496739-X	RJ45 W/MAGNET 2X4 10G POE 60W LIGHT PIPE	PA6T	0.72A	60W	-40°C to +85°C
2497278-X	RJ45 W/MAGNET 2X6 10G POE 60W LIGHT PIPE	PA6T	0.72A	60W	-40°C to +85°C
2496740-X	RJ45 W/MAGNET 2X8 10G POE 60W LIGHT PIPE	PA6T	0.72A	60W	-40°C to +85°C

Figure 1

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 2 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed. The Qualification Test Report number for this testing is 501-161671.

1.4. Revision Summary

Revisions to this specification include:

- Initial release of specification.

2. APPLICABLE DOCUMENTS AND FORMS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. TE Connectivity Specifications

- 114-161219 Application Specification
- 501-161671 Qualification Test Report

2.2. Commercial Standards and Specifications

- EIA-364 International Standard – Electrical Connector Test Procedures Including Environmental Classifications
- EIA-364-81 International Standard – Fire Hazard Testing
- UL 1977 Safety Standards – Component Connectors for Use in Data, Signal, Control, and Power Applications

2.3. Reference Documents

- 109-1 General Requirements for Testing
- 102-950 Qualification of Separable Interface Connectors

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable TE drawing.

- A. Housing: Refer to Figure 1.
- B. Contacts: Phosphor Bronze, overall nickel plating with selective gold plating in the contact area and tin plating on the soldertails.
- C. Shield: Copper Alloy, overall Nickel plating.
- D. LED: Epoxy encapsulated diode lens, iron lead frame with Nickel and Tin.
- E. Magnetics: Epoxy encapsulated wound cores. Printed circuit board assembly contains Common mode choke cores, isolation transformer cores, resistors, and capacitors surface-mounted. Wound cores consist of magnet wire winding on a manganese-zinc ferrite toroid.

3.3. Ratings

- A. Voltage Rating: 48V/DC
- B. Current Rating: Refer to Figure 1
- C. Temperature Rating: Refer to Figure 1

3.4. Performance Requirements and Test Description

3.5. The product should meet the electrical, mechanical and environmental performance requirements specified in

3.6.

3.7. TRANSMISSION PERFORMANCE

Insertion Loss	-1.2dB MAX from 0.3 MHz to 100 MHz	In accordance with EIA-568-A For specific application
Return Loss	-18dB MIN from 1 MHz to 30 MHz -16dB MIN from 30 MHz to 60 MHz -12dB MIN from 60 MHz to 80 MHz -10dB MIN from 80 MHz to 100 MHz	In accordance with EIA-568-A For specific application,
Near-End Cross-Talk (NEXT)	-30dB MIN from 1 MHz to 100 MHz	In accordance with EIA-568-A For specific application
Common- to-Common Mode Attenuation	-30dB MIN from 1 MHz to 100 MHz	In accordance with EIA-568-A For specific application

DC Resistance	PHY:1.0Ω max CABLE: 0.8Ωmax	
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Part# 2496556-X / 2496721-X / 2496686-X / 2496687-X / 2496688-X / 2497310-X / 2496689-X (1X1/1X4/2X1/2X2/2X4/2X6/2X8 1G POE) TRANSMISSION PERFORMANCE

TRANSMISSION PERFORMANCE

Insertion Loss	-1.0dB MAX@1MHz-100MHz -1.5dB MAX@100MHz-125MHz	In accordance with IEC EIA-568-A For specific application
Return Loss	-18dB MIN@1MHz-40MHz; -18+15LOG (f/40MHz)dB MIN@40MHz-200MHz	In accordance with IEC EIA-568-A For specific application
Near-End Cross-Talk (NEXT)	-35dB MIN@1MHz-40MHz; -35+15LOG (f/40MHz)dB MIN@40MHz-125MHz	In accordance with IEC EIA-568-A For specific application
Common- to-Common Mode Attenuation	-30dB MIN from 1 MHz to 200 MHz	In accordance with IEC EIA-568-A For specific application
DC Resistance	PHY:1.0 Ω max CABLE: 0.8Ωmax	

Part# 2496722-X / 2497272-X / 2496691-X / 2497273-X / 2497271-X / 2497274-X (1X4/2X1/2X2/2X4/2X6/2X8 2.5G POE) TRANSMISSION PERFORMANCE

TRANSMISSION PERFORMANCE

Insertion Loss	-0.5dB MAX@1MHz-50MHz -1.0dB MAX@50MHz-125MHz -2.0dB MAX@125MHz-200MHz -2.5dB MAX@200MHz-250MHz	In accordance with EIA-568-A For specific application
Return Loss	-20dB MIN@1MHz-50MHz; -20+15LOG (f/40MHz)dB MIN@50MHz-250MHz	In accordance with EIA-568-A For specific application
Near-End Cross-Talk (NEXT)	-25dB MIN@1MHz-125MHz; -20dB MIN@125MHz-250MHz	In accordance with EIA-568-A For specific application
Common- to-Common Mode Attenuation	-23dB MIN@1MHz-250MHz	In accordance with EIA-568-A For specific application
DC Resistance	PHY:1.0 Ω max CABLE: 0.8Ωmax	

Part# 2496723-X (1X4 5G POE) TRANSMISSION PERFORMANCE

TRANSMISSION PERFORMANCE

Insertion Loss	-0.5dB MAX@1MHz-50MHz -1.0dB MAX@50MHz-125MHz -2.0dB MAX@125MHz-200MHz -2.5dB MAX@200MHz-250MHz	In accordance with EIA-568-A For specific application
Return Loss	-20dB MIN@1MHz-50MHz; -20+15LOG (f/40MHz)dB MIN@50MHz-250MHz	In accordance with EIA-568-A For specific application

Near-End Cross-Talk (NEXT)	-25dB MIN@1MHz-125MHz; -20dB MIN@125MHz-250MHz	In accordance with EIA-568-A For specific application
Common- to-Common Mode Attenuation	-20dB MIN@1MHz-250MHz	In accordance with EIA-568-A For specific application
DC Resistance	PHY:1.0 Ω max CABLE: 0.8Ωmax	

Part# 2496733-X / 2496734-X / 2496735-X / 2497277-X / 2496736-X (2X1/2X2/2X4/2X6/2X8 5G POE) TRANSMISSION PERFORMANCE

TRANSMISSION PERFORMANCE

Insertion Loss	-3.0dB Max from 1MHz to 500 MHz	In accordance with EIA-568-A For specific application
Return Loss	-22dB MIN@1MHz-100MHz; -22+20.75LOG(f/100)dB MIN@100MHz-500MHz	In accordance with EIA-568-A For specific application
Near-End Cross-Talk (NEXT)	-28 dB MIN from 1 MHz to 100 MHz -19 dB MIN from 100 MHz to 500 MHz	In accordance with EIA-568-A For specific application
Common- to-Common Mode Attenuation	-30dB MIN from 1 MHz to 100 MHz -20dB MIN from 100 MHz to 500 MHz	In accordance with EIA-568-A For specific application
DC Resistance	PHY:1.0Ω max CABLE: 0.8Ωmax	

Part# 2496558-X / 2496724-X / 2496737-X / 2496738-X / 2496739-X / 2497278-X / 2496740-X (1X1/1X4/2X1/2X2/2X4/2X6/2X8 10G POE)
TRANSMISSION PERFORMANCE

ENVIRONMENTAL

Thermal shock	No physical evidence of damage	EIA-364-32. Subject unmated to 10 cycles between -40°C for 30 minutes and 85°C for 30 minutes
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SOLDERABILITY

Solderability (DIP)	Appearance of the specimen shall be inspected with a magnifier of min 10x. The soldered surface shall be covered with a smooth solder coating with no more than small amounts of scattering imperfections such as pin-holes, un-wet or de-wet areas.	EIA-364-52, Test Ta Test connector on PCB Solder Temperature: 245+/-5° Immersion Duration: 5+/-0.5sec
Resistance to Soldering Heat (DIP)	No physical evidence of damage.	EIA-364-56, Test Tb, 260 +0/-5 °C /30sec

. All tests shall be performed at ambient environmental conditions otherwise specified.

3.8. Test Requirements and Procedure Summary

Test Description	Requirement	Procedure
Visual examination	Meet requirements of product drawing. There shall be no cracks or burrs	Comply with EIA-364-18
Electrical		
LED Test	Meet LED requirements of product drawing.	If applicable: Test all LEDs in both directions
Contact Resistance	8 contacts/specimen, $\leq 30\text{m}\Omega$.	EIA-364-23
Insulation Resistance	8 contacts/specimen, DC 500V, Insulation Resistance $\geq 500\text{M}\Omega$	EIA-364-21
HI Pot (Isolation voltage)	2250 VDC for 60 s applied as specified in 5.3.2 of IEC 60950-1:1991	Between all contacts on the PHY side to the contacts on the plug side and the contacts of the PHY side to the shield. Comply with IEEE802.3 isolation requirements: EIA-364-20
Turn ratio (Chip: cable)	TX = 1:1; RX = 1:1 @ 100kHz, 100mV	
Mechanical		
Insertion and withdrawal forces	Speed: $25\pm 3\text{mm/min}$ maximum Insertion and withdrawal: 30 N maximum All types.	EIA-364-13 Number of cycles:10
Effectiveness of connector locking device	Tensile force: 50 N for 60 s \pm 5 s All types.	EIA-364-04.
TRANSMISSION PERFORMANCE		
Insertion Loss	-1.2dB MAX from 0.3 MHz to 100 MHz	In accordance with EIA-568-A For specific application
Return Loss	-18dB MIN from 1 MHz to 30 MHz -16dB MIN from 30 MHz to 60 MHz -12dB MIN from 60 MHz to 80 MHz -10dB MIN from 80 MHz to 100 MHz	In accordance with EIA-568-A For specific application,
Near-End Cross-Talk (NEXT)	-30dB MIN from 1 MHz to 100 MHz	In accordance with EIA-568-A For specific application
Common- to-Common Mode Attenuation	-30dB MIN from 1 MHz to 100 MHz	In accordance with EIA-568-A For specific application
DC Resistance	PHY: 1.0Ω max CABLE: 0.8Ω max	

Part# 2496556-X / 2496721-X / 2496686-X / 2496687-X / 2496688-X / 2497310-X / 2496689-X (1X1/1X4/2X1/2X2/2X4/2X6/2X8 1G POE) TRANSMISSION PERFORMANCE

TRANSMISSION PERFORMANCE

Insertion Loss	-1.0dB MAX@1MHz-100MHz -1.5dB MAX@100MHz-125MHz	In accordance with IEC EIA-568-A For specific application
Return Loss	-18dB MIN@1MHz-40MHz; -18+15LOG (f/40MHz)dB MIN@40MHz-200MHz	In accordance with IEC EIA-568-A For specific application
Near-End Cross-Talk (NEXT)	-35dB MIN@1MHz-40MHz; -35+15LOG (f/40MHz)dB MIN@40MHz-125MHz	In accordance with IEC EIA-568-A For specific application
Common- to-Common Mode Attenuation	-30dB MIN from 1 MHz to 200 MHz	In accordance with IEC EIA-568-A For specific application
DC Resistance	PHY:1.0 Ω max CABLE: 0.8Ωmax	

Part# 2496722-X / 2497272-X / 2496691-X / 2497273-X / 2497271-X / 2497274-X (1X4/2X1/2X2/2X4/2X6/2X8 2.5G POE) TRANSMISSION PERFORMANCE

TRANSMISSION PERFORMANCE

Insertion Loss	-0.5dB MAX@1MHz-50MHz -1.0dB MAX@50MHz-125MHz -2.0dB MAX@125MHz-200MHz -2.5dB MAX@200MHz-250MHz	In accordance with EIA-568-A For specific application
Return Loss	-20dB MIN@1MHz-50MHz; -20+15LOG (f/40MHz)dB MIN@50MHz-250MHz	In accordance with EIA-568-A For specific application
Near-End Cross-Talk (NEXT)	-25dB MIN@1MHz-125MHz; -20dB MIN@125MHz-250MHz	In accordance with EIA-568-A For specific application
Common- to-Common Mode Attenuation	-23dB MIN@1MHz-250MHz	In accordance with EIA-568-A For specific application
DC Resistance	PHY:1.0 Ω max CABLE: 0.8Ωmax	

Part# 2496723-X (1X4 5G POE) TRANSMISSION PERFORMANCE

TRANSMISSION PERFORMANCE

Insertion Loss	-0.5dB MAX@1MHz-50MHz -1.0dB MAX@50MHz-125MHz -2.0dB MAX@125MHz-200MHz -2.5dB MAX@200MHz-250MHz	In accordance with EIA-568-A For specific application
Return Loss	-20dB MIN@1MHz-50MHz; -20+15LOG (f/40MHz)dB MIN@50MHz-250MHz	In accordance with EIA-568-A For specific application
Near-End Cross-Talk (NEXT)	-25dB MIN@1MHz-125MHz; -20dB MIN@125MHz-250MHz	In accordance with EIA-568-A For specific application

Common- to-Common Mode Attenuation	-20dB MIN@1MHz-250MHz	In accordance with EIA-568-A For specific application
DC Resistance	PHY:1.0 Ω max CABLE: 0.8Ωmax	

Part# 2496733-X / 2496734-X / 2496735-X / 2497277-X / 2496736-X (2X1/2X2/2X4/2X6/2X8 5G POE) TRANSMISSION PERFORMANCE

TRANSMISSION PERFORMANCE

Insertion Loss	-3.0dB Max from 1MHz to 500 MHz	In accordance with EIA-568-A For specific application
Return Loss	-22dB MIN@1MHz-100MHz; -22+20.75LOG(f/100)dB MIN@100MHz-500MHz	In accordance with EIA-568-A For specific application
Near-End Cross-Talk (NEXT)	-28 dB MIN from 1 MHz to 100 MHz -19 dB MIN from 100 MHz to 500 MHz	In accordance with EIA-568-A For specific application
Common- to-Common Mode Attenuation	-30dB MIN from 1 MHz to 100 MHz -20dB MIN from 100 MHz to 500 MHz	In accordance with EIA-568-A For specific application
DC Resistance	PHY:1.0Ω max CABLE: 0.8Ωmax	

Part# 2496558-X / 2496724-X / 2496737-X / 2496738-X / 2496739-X / 2497278-X / 2496740-X (1X1/1X4/2X1/2X2/2X4/2X6/2X8 10G POE) TRANSMISSION PERFORMANCE

ENVIRONMENTAL

Thermal shock	No physical evidence of damage	EIA-364-32. Subject unmated to 10 cycles between -40°C for 30 minutes and 85°C for 30 minutes
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SOLDERABILITY

Solderability (DIP)	Appearance of the specimen shall be inspected with a magnifier of min 10x. The soldered surface shall be covered with a smooth solder coating with no more than small amounts of scattering imperfections such as pin-holes, un-wet or de-wet areas.	EIA-364-52, Test Ta Test connector on PCB Solder Temperature: 245+/-5° Immersion Duration: 5+-0.5sec
Resistance to Soldering Heat (DIP)	No physical evidence of damage.	EIA-364-56, Test Tb, 260 +0/-5 °C /30sec

Figure 2



Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 3

3.9. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)				
	1 Mechanical	2 Electrical transmission	3 (Solder) Heat resistance	4 Electrical	5 Solderability
	TEST SEQUENCE (b)				
Visual examination	1,4,8	1,8	1,7	1,10	1,7
LED test			2,6	2,9	2,4
Contact Resistance				3,6	5
Insulation Resistance				4,7	6
HI Pot (Isolation voltage)	3,5		5	5,8	
Turn ratio (Chip: cable)		2			
Insertion and withdrawal forces	2,6				
Effectiveness of connector locking device	7				
Thermal shock			3		
Insertion Loss		3			
Return Loss		4			
Near-End Cross-Talk (NEXT)		5			
Common-to-Common Mode Attenuation		6			
DC Resistance		7			
Resistance to Soldering Heat (DIP)			4		
Solderability test (DIP)					3
Sample Quantity(pcs)	Single port Connector 5pcs/Test Group; Multi port connector 3pcs/Test Group				

Figure 4



NOTE

(a) See paragraph 4.2.

(b) Numbers indicate sequence in which tests are performed.

4. QUALITY ASSURANCE PROVISIONS

4.1. Test Conditions

Unless otherwise specified, all the tests shall be performed in any combination of the following test conditions shown in Figure 5

Temperature	15°C – 35°C
Relative Humidity	45% – 75%
Atmospheric Pressure	86.6 – 106.6 kPa

Figure 6

4.2. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 7

4.3. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.4. Acceptance

Acceptance is based on verification that the product meets the requirements in Figure 2. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.5. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.