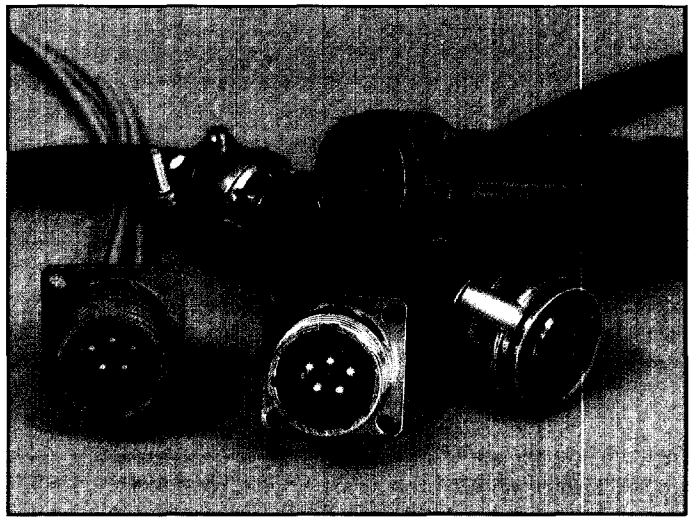
Multi-Channel Fiber to Fiber System
features and benefits

Amphenol® multi-channel fiber optic connectors offer a precision optic interconnect system within the high performance MIL-C-38999 Series III connector. The metal to metal mating feature of the Tri-Start™ connector provides protection from damage in severe physical and environmental conditions. The Amphenol® Fiber Optic Series III Tri-Start* offers high performance in either standard metal shells or in composite shells which are qualified to MIL-C-38999, Rev. J. Special features in either the metal (stainless steel and aluminum) or composite design include "scoop-proof" recessed pin contacts, quick coupling, moisture resistance and operation under high temperature vibration through 200°C. Mismating conditions are eliminated with the 5 key/keyway polarization feature of the Fiber Optic Tri-Start connector. Optical performance of the fiber to fiber system within the Tri-Start connector does not degrade with high level vibration.

The fiber to fiber termini design when utilized in a MIL-C-38999 connector has the capability for operation from temperatures of –55°C to +200°C. Care should be taken to select fiber, cable, epoxy and connector finishes that also meet temperature requirements

Amphenol® fiber optic termination types offer low loss characteristics, with high reliability and repeatability. Optical performance is maximized utilizing the unique alignment methods employed in these termination systems.

Amphenol® multi-mode fiber optic termini have been designed to operate in the size 16 and size 20 contact cavities of MIL-C-38999 Series III connectors, and are available from 2 (pattern 11-2) through 37 (pattern 25-37) channels. Single mode, size 16 and 20 termini are also available in special inserts, and fiber optic/electrical hybrid combinations can be accommodated in certain patterns. Size 20 single mode fiber optic arrangements may require special tooling; consult Amphenol, Sidney NY for further information. For insert availability for multi-channel fiber optic connectors see pages 4 - 6**.



Multi-Channel Connectors

OPTICAL PERFORMANCE OF MULTI-CHANNEL FIBER OPTIC CONNECTORS

- **Insertion Loss at 820 nm, 100/140, .2 NA fiber, room ambient (typical .5dB – 1.0dB)**

FEATURES/BENEFITS

- **Ceramic alignment ferrule**
- **Stainless steel alignment (sleeve)**
  Note: ceramic alignment sleeves are optional on proprietary designs.
- **Size 16 (MIL-C-38999, multi-mode and single mode)**
- **Size 20 (MIL-C-38999, multi-mode and single mode)*****
- **Stainless steel body**
- **Proven epoxy/polish terminations**
- **Air gap or physical contact termination options**
- **Size 16 multi-mode qualified to MIL-T-29504/4 and /5 requirements**
- **Hybrid design available**
- **Optional fiber cleaning feature**

ENVIRONMENTAL CAPABILITIES

- **Temperature –** –55°C to +200°C
- **Durability –** 500 cycles
- **Random Vibration –** per EIA/TIA 455-11, Condition 7, Letter J.
- **Shock –** per EIA/TIA 455-14, Condition D
- **Temperature Life –** per MIL-STD-1344, Method 1005, Condition D
- **Thermal Shock –** per MIL-STD-1344, Method 1003, Condition A

* The MIL-T-29504/4 and /5 were designed for operation in Amphenol® MIL-C-38999 Fiber Optic Series III Tri-Start connectors. Amphenol is not responsible for the proper function of these termini in other connectors.

** For further insert availability for Tri-Start connectors - those in addition to the contact size 16 and 20 patterns which accommodate fiber optics, consult Amphenol catalog 12-092.

***For availability of size 20 fiber types consult Amphenol, Sidney, NY.

Multi-Channel Fiber Optic Cylindrical Connectors Tri-Start (MIL-C-38999, III) shell styles

TRI-START COMPOSITE† CONNECTORS

Wall Mount Receptacle

Shell Size	MS Shell Size Code	B Thread	L Max	M +.000 −.005	R¹	R²	S Max	T +.008 −.006	V Thread Metric	Z Max	TT +.008 −.006
9	A	.6250	.514	.775	.719	.594	.948	.128	M12X1-6g	.198	.216
11	B	.7500	.514	.775	.812	.719	1.043	.128	M15X1-6g	.198	.194
13	C	.8750	.514	.775	.906	.812	1.137	.128	M18X1-6g	.198	.194
15	D	1.0000	.514	.775	.969	.906	1.232	.128	M22X1-6g	.198	.173
17	E	1.1875	.514	.775	1.062	.969	1.323	.128	M25X1-6g	.198	.194
19	F	1.2500	.514	.775	1.156	1.062	1.449	.128	M28X1-6g	.198	.194
21	G	1.3750	.545	.745	1.250	1.156	1.575	.128	M31X1-6g	.228	.194
23	H	1.5000	.545	.745	1.375	1.250	1.701	.154	M34X1-6g	.228	.242
25	J	1.6250	.545	.745	1.500	1.375	1.823	.154	M37X1-6g	.228	.242

Jam Nut Receptacle

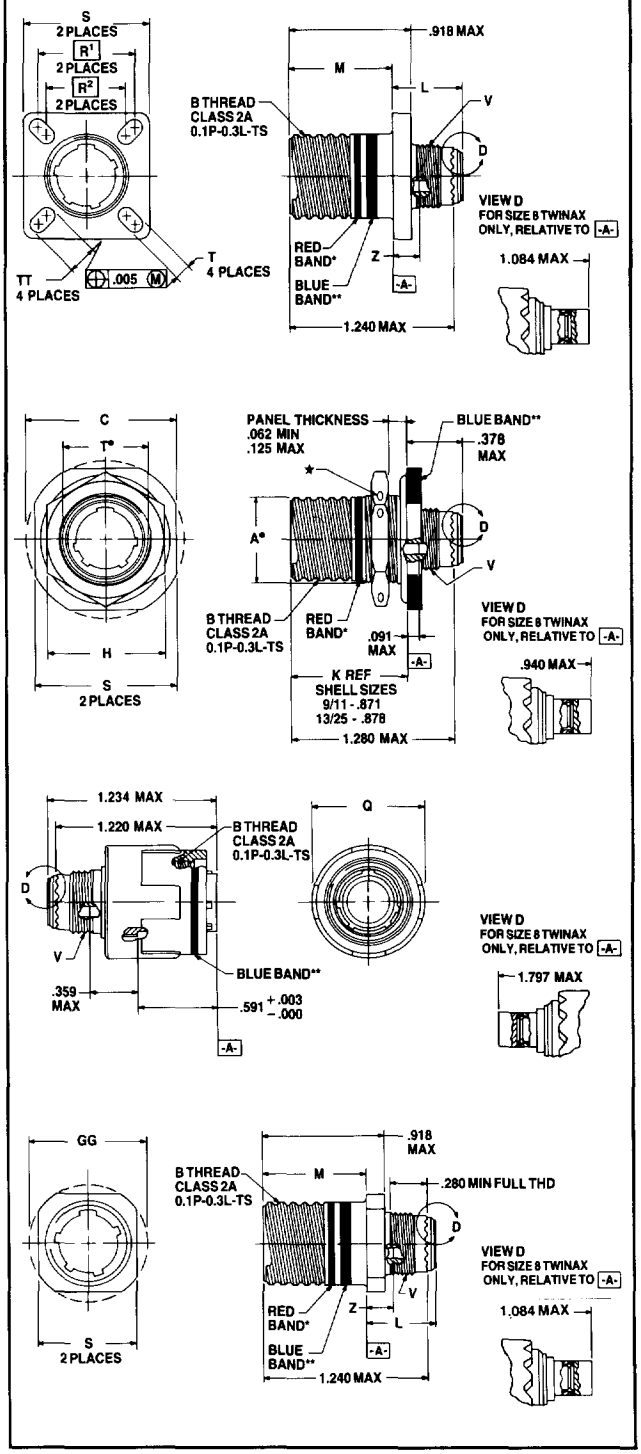
Shell Size	MS Shell Size Code	A● +.000 −.010	B Thread	C Max	H Hex +.017 −.016	S ±.010	T● +.010 −.000	V Thread Metric
9	A	.669	.6250	1.199	.875	1.062	.697	M12X1-6g
11	B	.769	.7500	1.386	1.000	1.250	.822	M15X1-6g
13	C	.955	.8750	1.511	1.188	1.375	1.007	M18X1-6g
15	D	1.084	1.0000	1.636	1.312	1.500	1.134	M22X1-6g
17	E	1.208	1.1875	1.761	1.438	1.625	1.259	M25X1-6g
19	F	1.333	1.2500	1.949	1.562	1.812	1.384	M28X1-6g
21	G	1.459	1.3750	2.073	1.688	1.938	1.507	M31X1-6g
23	H	1.575	1.5000	2.199	1.812	2.062	1.634	M34X1-6g
25	J	1.709	1.6250	2.323	2.000	2.188	1.759	M37X1-6g

Straight Plug

Shell Size	MS Shell Size Code	B Thread	Q Max.	V Thread Metric
9	A	.6250	.859	M12X1-6g
11	B	.7500	.969	M15X1-6g
13	C	.8750	1.141	M18X1-6g
15	D	1.0000	1.266	M22X1-6g
17	E	1.1875	1.391	M25X1-6g
19	F	1.2500	1.500	M28X1-6g
21	G	1.3750	1.625	M31X1-6g
23	H	1.5000	1.750	M34X1-6g
25	J	1.6250	1.875	M37X1-6g

Line Receptacle (Consult Amphenol Aerospace for availability)

Shell Size	MS Shell Size Code	B Thread	L Max	M +.000 −.005	S ±.010	V Thread Metric	Z Max	GG Dia ±.010
9	A	.6250	.514	.775	.635	M12X1-6g	.198	.699
11	B	.7500	.514	.775	.765	M15X1-6g	.198	.875
13	C	.8750	.514	.775	.885	M18X1-6g	.198	1.007
15	D	1.0000	.514	.775	1.100	M22X1-6g	.198	1.140
17	E	1.1875	.514	.775	1.197	M25X1-6g	.198	1.229
19	F	1.2500	.514	.775	1.260	M28X1-6g	.198	1.380
21	G	1.3750	.545	.745	1.385	M31X1-6g	.228	1.493
23	H	1.5000	.545	.745	1.510	M34X1-6g	.228	1.626
25	J	1.6250	.545	.745	1.635	M37X1-6g	.228	1.777



All dimensions for reference only. ☐ Designates true position dimensioning

† Drawings and dimensions are for Tri-Start, MIL-C-38999 Series III connectors with composite shells. For standard metal Tri-Start Connectors consult Tri-Start Catalog, 12-092 (-6 version or higher).
Some dimensions do vary from composite to metal.

See how to order Fiber Optic MIL-C-38999 Series III connectors on page 7.

● D shaped mounting hole dimensions.

* Red band indicates fully mated.

** Blue band indicates rear release contact retention system.

★.059 dia. min., 3 lockwire holes.

Multi-Channel Fiber Optic Cylindrical Connectors Tri-Start (MIL-C-38999, III) insert availability

Fiber optic termini can be accommodated in any size 16 or size 20 contact cavity of MIL-C-38999 Series III connector insert patterns, as listed in the following chart. For availability of fiber type, either multi-mode or single mode, see note at bottom of chart.

Shell Size/ Arrangement	Total Contacts	Contact Size					
		22D	Optic Termini Availability*		12	10 (Power)	8 Coax
			20	16			
9-94	2		2				
9-98	3		3				
11-2	2			2			
11-5	5		5				
11-98	6		6				
13-4	4			4			
13-8	8		8				
13-98	10		10				
15-5	5			5			
15-15	15		14	1			
15-18	18		18				
15-19	19		19				
15-97	12		8	4			
17-8	8			8			
17-26	26		26				
17-99	23		21	2			
19-11	11			11			
19-32	32		32				
21-16	16			16			
21-39	39		37	2			

Shell Size/ Arrangement	Total Contacts	Contact Size					
		22D	Optic Termini Availability*		12	10 (Power)	8 Coax
			20	16			
21-41	41		41				
23-21	21			21			
23-53	53		53				
23-54	53	40		9	4		
23-55	55		55				
25-4	56		48	8			
25-11***	11		2			9	
25-20***	30		10	13	4†		3††
25-24	24			12	12		
25-26	25		16		5		4
25-29	29			29			
25-37	37			37			
25-43	43		23	20			
25-46	46		40	4			2**
25-61	61		61				

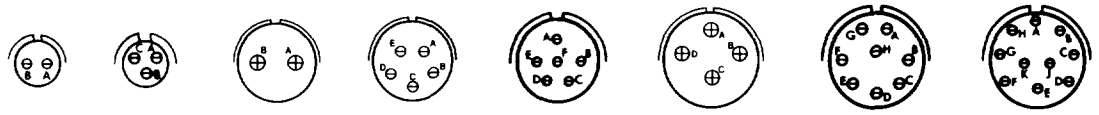
* Size 16 multi-mode and single mode fiber optic termini are readily available. For size 20 multi-mode and single mode termini - please consult Amphenol, Sidney, NY for current availability.

† Coax †† Concentric Twinax

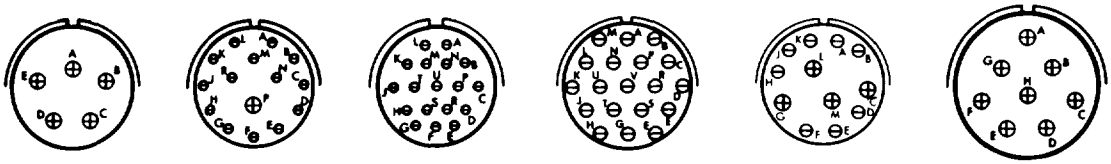
** For RG180/U and RG195/U cables only. Contact Sidney, NY for other cable applications.

*** For use in MIL-STD-1760 applications. See Tri-Start Catalog, 12-092.

front face of pin inserts illustrated



Insert Arrangement	9-94	9-98	11-2	11-5	11-98	13-4	13-8	13-98
Service Rating	M	I	I	I	I	I	I	I
Number of Contacts	2	3	2	5	6	4	8	10
Contact Size	20	20	16	20	20	16	20	20

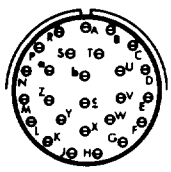


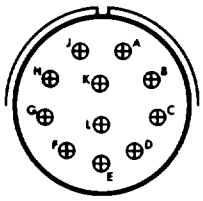
Insert Arrangement	15-5	15-15	15-18	15-19	15-97	17-8
Service Rating	II	I	I	I	I	II
Number of Contacts	5	14 1	18	19	8 4	8
Contact Size	16	20 16	20	20	20 16	16

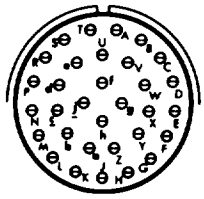
CONTACT LEGEND 8 10 12 16 20 22D

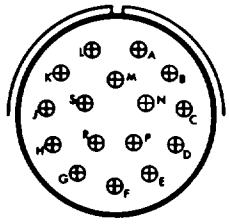
Multi-Channel Fiber Optic Cylindrical Connectors Tri-Start (MIL-C-38999, III) insert availability, cont.

front face of pin inserts illustrated

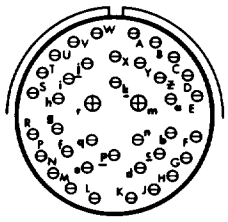


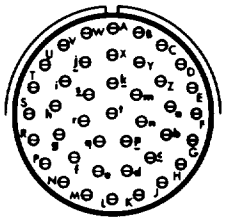


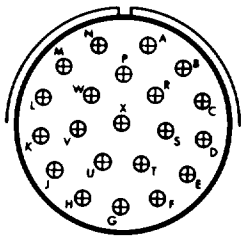


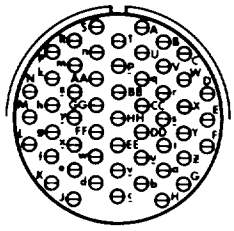


Insert Arrangement	**17-26**	**17-99**	**19-11**	**19-32**	**21-16**
Service Rating	**I**	**I**	**II**	**I**	**II**
Number of Contacts	**26**	**21 2**	**11**	**32**	**16**
Contact Size	**20**	**20 16**	**16**	**20**	**16**

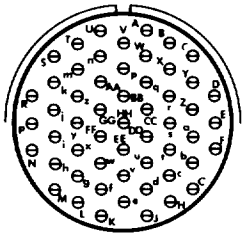


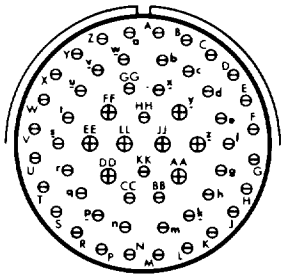


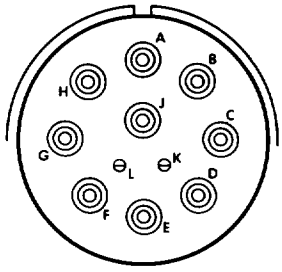




Insert Arrangement	**21-39**	**21-41**	**23-21**	**23-53**
Service Rating	**I**	**I**	**II**	**I**
Number of Contacts	**37 2**	**41**	**21**	**53**
Contact Size	**20 16**	**20**	**16**	**20**







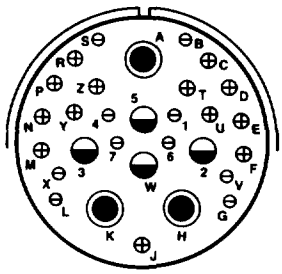
Insert Arrangement	**23-55**	**25-4**	**25-11*** **
Service Rating	**I**	**I**	**N**
Number of Contacts	**55**	**48 8**	**2 9**
Contact Size	**20**	**20 16**	**20 10 Power**

*** For use in MIL-STD-1760 applications. See Tri-Start Catalog, 12-092.

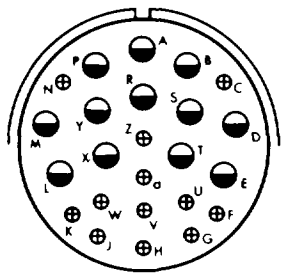
CONTACT LEGEND **8** **10** **12** **16** **20** **22D**

Multi-Channel Fiber Optic Cylindrical Connectors Tri-Start (MIL-C-38999, III) insert availability, cont.

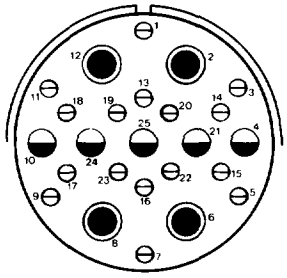
front face of pin inserts illustrated



Insert Arrangement	**25-20*** **
Service Rating	**N**
Number of Contacts	**10 13 3 4**
Contact Size	**20 16 8 Twinax 12 Coax**

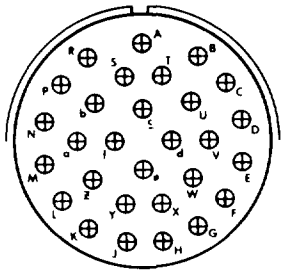


Insert Arrangement	**25-24**
Service Rating	**I**
Number of Contacts	**12 12**
Contact Size	**16 12**

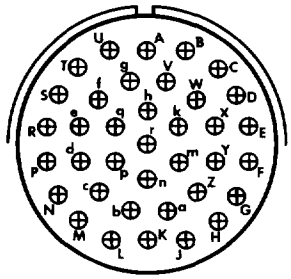


Insert Arrangement	**25-26**
Service Rating	**I**
Number of Contacts	**16 5 4**
Contact Size	**20 12 8 Coax**

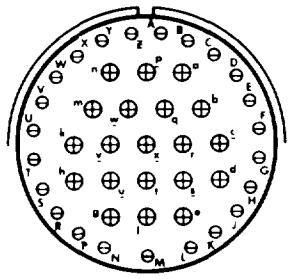
(Locations U and Y - Dedicated to Fiber Optics)



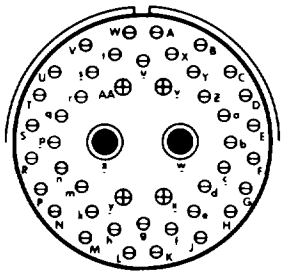
Insert Arrangement	**25-29**
Service Rating	**I**
Number of Contacts	**29**
Contact Size	**16**



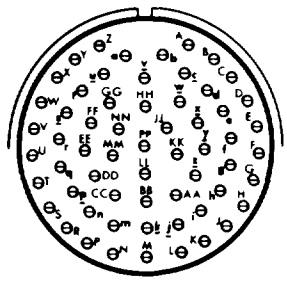
Insert Arrangement	**25-37**
Service Rating	**I**
Number of Contacts	**37**
Contact Size	**16**



Insert Arrangement	**25-43**
Service Rating	**I**
Number of Contacts	**23 20**
Contact Size	**20 16**



Insert Arrangement	**25-46**
Service Rating	**I**
Number of Contacts	**40 4 2**
Contact Size	**20 16 8 Coax†**



Insert Arrangement	**25-61**
Service Rating	**I**
Number of Contacts	**61**
Contact Size	**20**

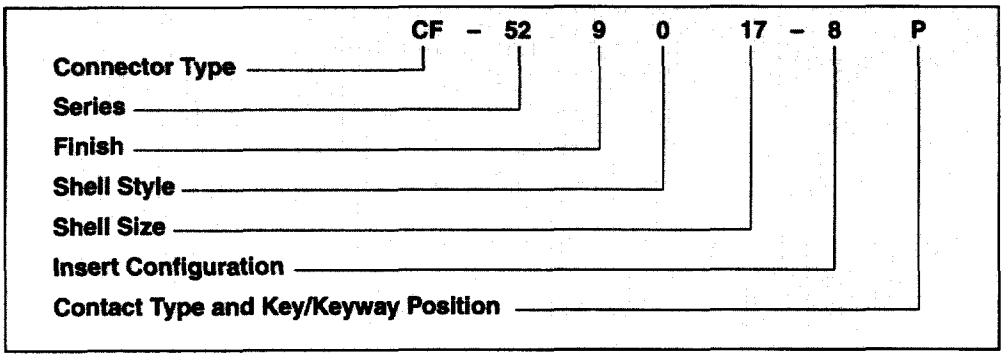
*** For use in MIL-STD-1760 applications (see page 18).

† Coax contacts for RG180 or RG195 cable.

CONTACT LEGEND **8 10 12 16 20 22D**

Multi-Channel Fiber Optic Cylindrical Connectors Tri-Start (MIL-C-38999, III) how to order

Amphenol® Fiber to Fiber Multi-Channel fiber optic connectors for use with multi-mode and single mode termini can be ordered by coded part number. Ordering procedure is illustrated by part number CF-529017-8P as shown below:



Connector Type
CF designates Multi-Channel Fiber Optic Connector
DF designates Multi-Channel Fiber Optic Connector supplied per D38999 with sealing plugs and insertion/removal tools

Series
52 designates aluminum shell
82 designates stainless steel shell
62 designates composite shell

Finish
4 designates electroless nickel
5 designates unplated composite
6 designates stainless steel
9 designates O.D. cadmium

Shell Style
0 designates wall mount receptacle
2 designates box mount receptacle
7 designates jam nut receptacle
6 designates straight plug

Shell Size
See Insert Availability (preceding pages)

Insert Configuration
See Insert Availability (preceding pages)

Contact Type and Key/Keyway Position
P designates pin contacts
S designates socket contacts
For key/keyway positioning, choose the alternate rotation suffix letter from the chart below.

ALTERNATE POSITION SUFFIX

Alternate Position	Suffix Letter	
	Pins	Sockets
Normal	P	S
A	G	H
B	I	J
C	K	L
D	M	N
E	R	T

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Amphenol:

CF-529615-97S CF-529015-97P