

# CONTACT INSERTION AND REMOVAL TOOLS

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## INSERTION AND REMOVAL TOOLS ARE ASTRO'S HERITAGE...

Astro is dedicated to serving the connector tooling needs of the electronics industry. We, therefore, top off our product package with a wide variety of contact insertion and removal tools.

Although we supply both plastic and metal tools, we recommend the use of the metal tools because of their durability. When used properly, they are more cost effective because they withstand thousands of contact insertion and removal cycles. The trend toward metal tools is actively encouraged by most departments of the government.

Astro insertion and removal tools are of proven high quality and reliability. In addition to the tools listed in the reference table, we have many more for other connector applications. Consult our factory for details.

Illustrated on the following page are typical rear and front release retention methods found in today's connectors.

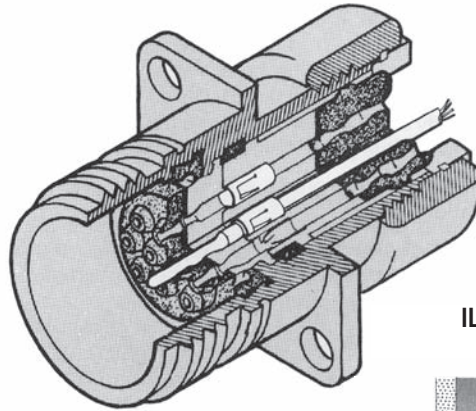
# Pin Locking and Releasing Methods

## ILL A

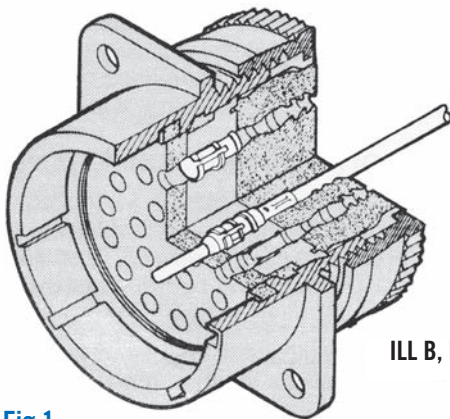
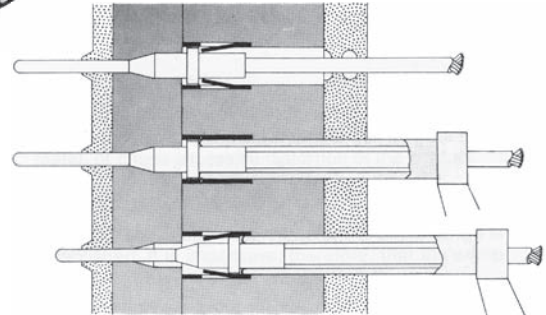
### REAR RELEASE NAS 1599, MIL-C-38999 RETENTION METHOD

These clips are one-piece, stamped metal parts, rolled into a tubular shape with large tines deflected inwardly. These tines lock securely behind the shoulder of the contact, assuring positive contact retention. To remove, insert removal tool, firmly seat on shoulder of contact pushing locking tines back, and then pull on wire and tool together. This will pull the contact and tool out as a unit.

See Illustrations 2, 10, & 17 for service tools on pages 80, 81, & 83.



ILL A, FIG 1



ILL B, FIG 1

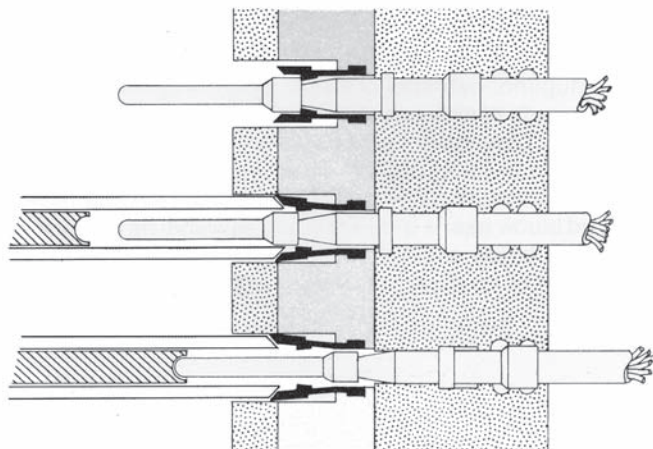
## ILL B

Front release used in MIL-C-5015, MIL-C-26482, 26500 and 26636 type connectors for service tools.

See illustrations: 5 & 6 for removal and 2, 26, & 27 for installation of contacts on pages 80 & 86.

## ILL B, Fig 1

MIL-C-26482, 26500, 26636 & 5015 cutaway front release.



A. Contact in "locked" position.

B. Tool probe shown opening retaining clip.

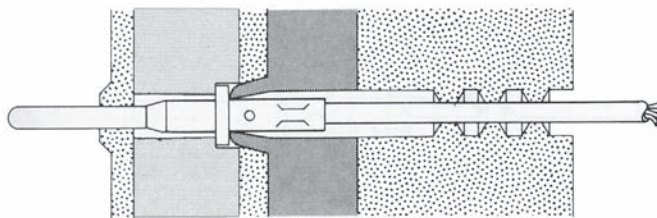
C. While clip is open, plunger moves contact out of the rear of connector.

**ILL C**

**GANG RETENTION MIL-C-81511, SERIES 1 & 2**

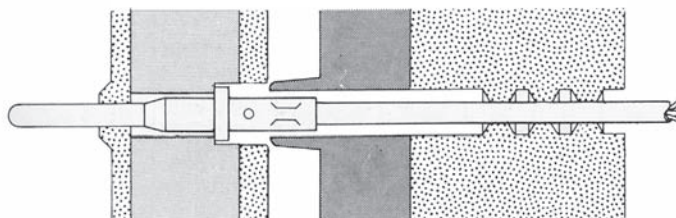
Using a rear locking screw, the retention plate may be “locked” by compressing it to the dielectric, (fig. 1) or “unlocked” by backing the nut out, releasing the locking plate. In an unlocked position (fig. 2), contacts may be inserted or removed with proper tooling.

See tooling illustrations 3 & 7 for removal and illustration 4 for insertion on pages 80 & 81.

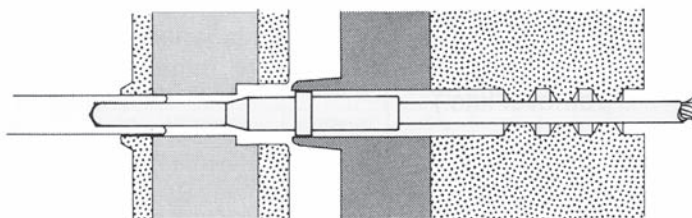


**ILL C, FIG 1** Locked

LOCKING PLATE



**ILL C, FIG 2** Unlocked

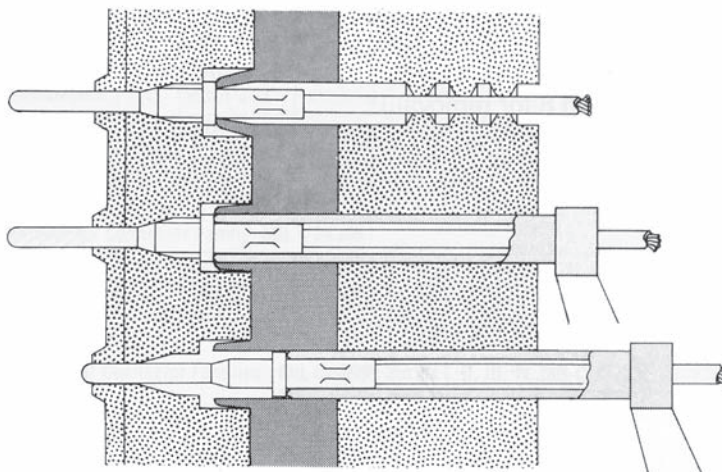


**ILL C, FIG 3** Contact being removed.

**ILL D**

**MIL-C-81511, SERIES 3 & 4**

Rear release connectors using molded dielectric locking clips. These contacts are removed by using a rear removal tool. See tool illustrations 10 & 30 for removal and illustrations 2 & 30 for insertion. See pages 80, 81, & 86.

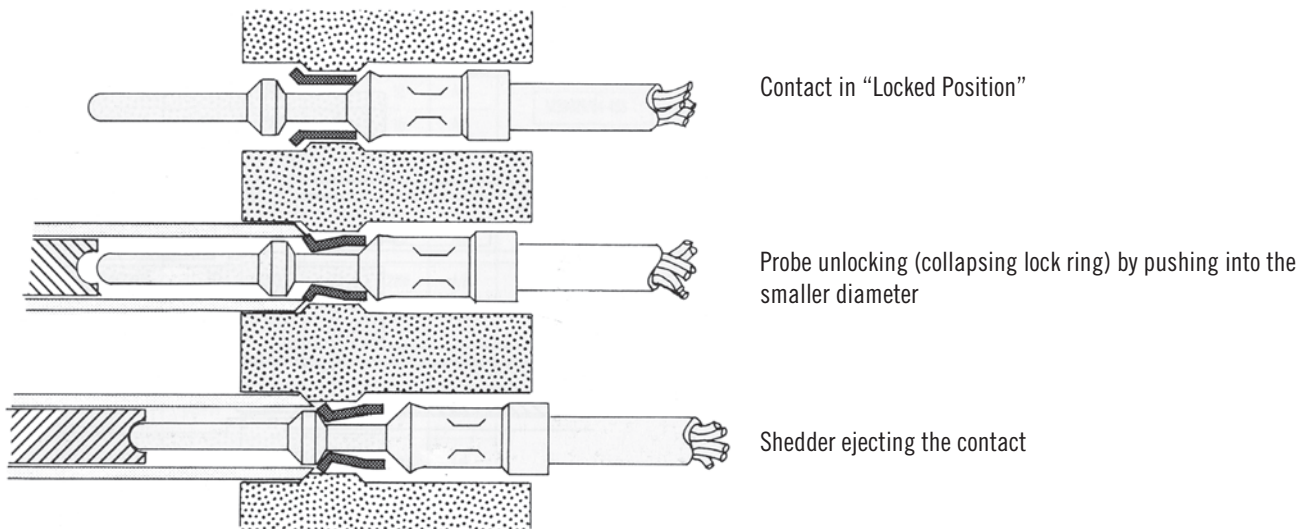


# Pin Locking and Releasing Methods

## ILL E

### FRONT RELEASE

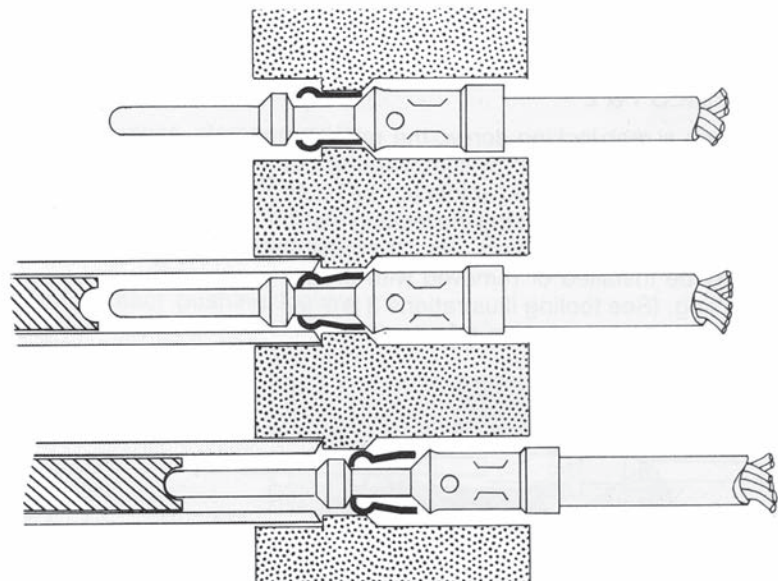
This locking mechanism is carried on the contact. It is pushed into the small diameter of the dielectric, collapsing the locking clip and permitting the contact to be removed. See tool illustration 8 on page 81. This locking method is common with Hughes Aircraft in sizes 22, 20, & 16.



## ILL F

### FRONT RELEASE CONNECTORS

Similar to Hughes locking clips, these are found in some Winchester connectors. The clip is expanded in a "locked" position. To remove contact, insert tool, probe will collapse the clip and unlock the contact. The shedder (plunger) will follow through ejecting the contact. For contact insertion see tool illustrations 1 & 2 on page 80, and illustration 8 for removal on page 81.

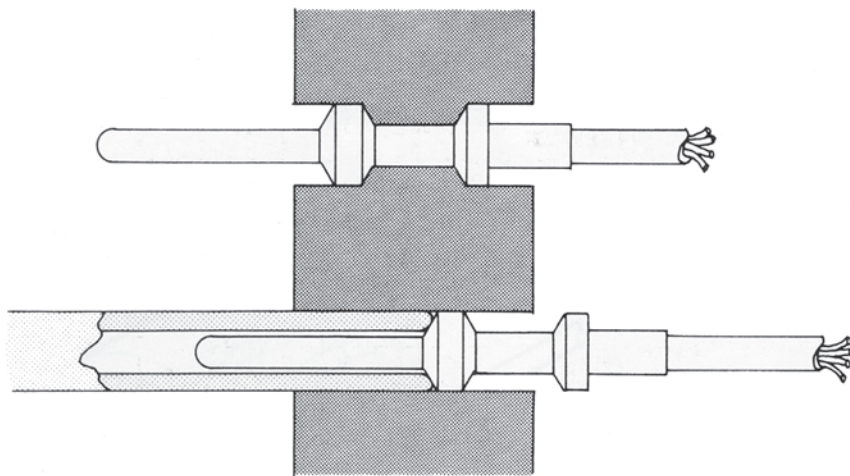


## ILL G

**INTERFERENCE LOCK CONNECTORS**

Used by Cannon, Bendix, and Amphenol, the contacts are inserted and removed by force using the proper tooling.

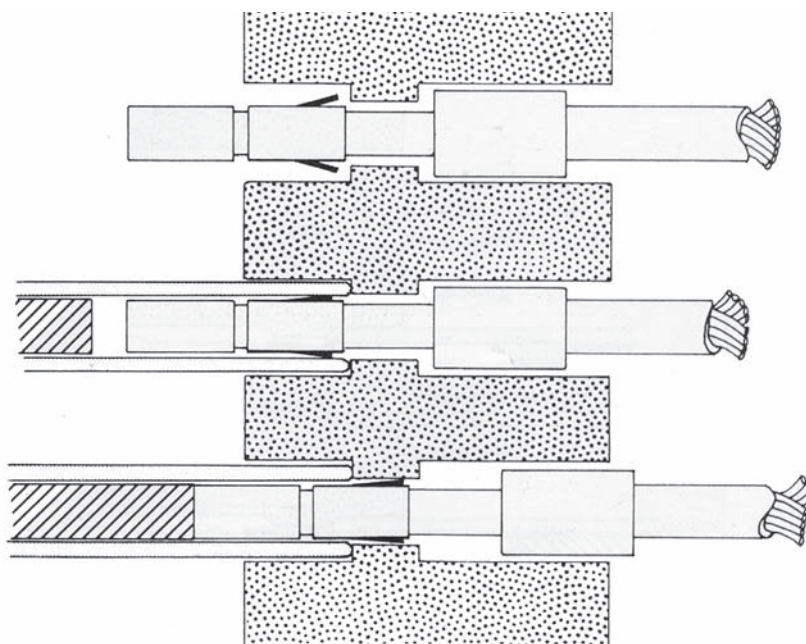
See tool illustrations 12 and 13 for insertion tools and illustrations 14 & 15 for insertion/removal kits on page 82.



## ILL H

**FRONT RELEASE—  
WINCHESTER, AMP  
AND ELCO CONNECTORS**

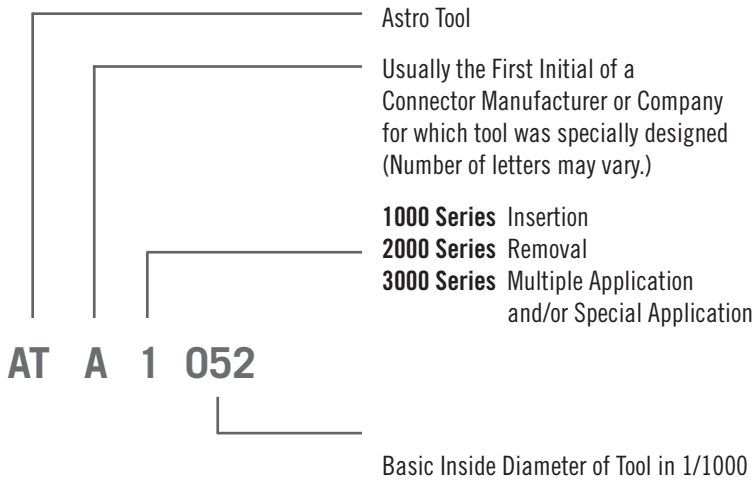
The contacts may be held in by a locking clip or spear action. Some contacts of this nature are machined with a locking clip attached, while others are stamped with the spur-lock made into them.



# Insertion and Removal Tool Selection Charts

## How to Read Selection Charts

For ATA 1052



## CHART ABBREVIATIONS

- I/R** Insertion or Removal designation column
- I** Insertion Tool
- R** Removal Tool
- I & R** Insertion & Removal Tool
- R/F** Rear or Front Release designation column
- R** Rear Release
- F** Front Release
- R & F** Rear and Front Release
- ILL** Illustration reference number
- GA** Gage designation
- NAATT** Not Available At This Time

**ASTRO WILL DESIGN CUSTOM INSERTION AND REMOVAL TOOLS TO FIT YOUR NEEDS.**

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
AIRBORN	ASTRO TOOL #						
TIR 1610	ATIR 1610	I & R	R	Metal Tool, Tweezer	10	22	WTK
	ATIR 1610-L	I & R	R	Modified version of ATIR 1610 .62 tips	10	22	WTK
TR 1883	ATR 1883	I & R	R	Metal Tool, Tweezer-Straight	10	22	WTK
TR 1886	ATR 1886	I & R	R	Metal Tool, Tweezer-.455 ext.	10	22	WTK482
2597	See ATIR 1610	I & R	R	TIR 1610 (Same as TIR1610)	10	22	WTK
2598	See ATIR 1883	I & R	R	TR 1883 (Same as TR1883)	10	22	WTK
	AT 4000	I	R	Pins & Sockets	2	22	TW
	AT 4001	I	R	Pins & Sockets	2	20	TW
	AT 4002	I	R	Comparable to ATH 1094	2	16	TM
	AT 4003	I	R	Deep Insertion	2	20	W
	AT 4004	I	R	Deep Insertion MRS, MRE, MRA, Joggled	2	16	C, M, R
	AT 5000	R	F	Pins & Sockets, Metal Spring-Loaded Probe Tool	8	22	TW
	AT 5001	R	F	Pins & Sockets, Metal Spring-Loaded Probe Tool	8	20	TW
	AT 5001-S	R	F	Pins Only, Metal Spring-Loaded Probe Tool	8	20	TW
	AT 5002	R	F	Comparable to ATH 2102, Metal Spring-Loaded Probe Tool	8	16	TM



TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
AMPHENOL	ASTRO TOOL #						
294-27	ATA 1079 or	I	R	Pins & Sockets	2	20	348
	ATA 1080	I	R	Pins & Sockets	4	20	348
294-28	ATA 2042 or	R	F	Pins Only	3	20	348
	ATA 2348-20	R	F	Pins & Sockets	9	20	348
294-29	ATA 2038 or	R	F	Sockets Only	7	20	348
	ATA 2048 or	R	F	Pins & Sockets	9	20	348
294-30	ATA 1102 or	I	R	Pins & Sockets	2	16	348
	ATA 1104	I	R	Pins & Sockets	4	16	348
294-31	ATA 2065 or	R	F	Pins Only	3	16	348
	ATA 2348-16	R	F	Pins & Sockets	9	16	348
294-32	ATA 2060 or	R	F	Sockets Only	7	16	348
	ATA 2348-16	R	F	Pins & Sockets	9	16	348
294-33	ATA 1159 or	I	R	Pins & Sockets	2	12	348
	ATA 1158 or	I	R	Pins & Sockets	4	12	348
	ATA1159-S	I	R	Modified version of ATA 1159, Straight	1	12	348
294-34	ATA 2120 or	R	F	Pins Only	3	12	348
	ATA 2348-12	R	F	Pins & Sockets	9	12	348
294-35	ATA 2093 or	R	F	Sockets Only	7	12	348
	ATA2348-12	R	F	Pins & Sockets	9	12	348
294-39	ATA 3069	I & R	F & R	Tool Kit	15	16	69
294-40	ATA 3095	I & R	F & R	Tool Kit	15	12	69
294-48	ATA 2125	R	R	Metal Tool, Rear Release, Plunger	6	16	84, 94
294-58	ATA 2085	R	F	Short Metal Tool, Front Release, Plunger	6	20	84, 94
294-66	ATA 3050	I	R	Tool, Double-Ended Tip, Dual Purpose	9	16, 20	84
294-72	AT 1000-12 or	I	R	Metal Tool, Joggled	2	12	48, 217
	ATA 1144	I	R	Metal Interchangeable Probe Tool	26	12	48, 217
294-73	AT 2012	R	F	Metal Tool, Front Release, Plunger	6	12	48, 217
294-88	AT 1000-20 or	I	R	Metal Tool, Joggled	2	20	48, 217
	ATA 1086	I	R	Metal Interchangeable Probe Tool	26	20	48, 217
294-89	AT 2020	R	F	Metal Tool, Front Release, Plunger	6	20	48, 217
294-96	AT 1000-16 or	I	R	Metal Tool, Joggled	2	16	48, 217
	ATA 1101	I	R	Metal Interchangeable Probe Tool	26	16	48, 217
294-97	AT 2016	R	F	Metal Tool, Front Release, Plunger	6	16	48, 217
294-108	ATA 1080 and	I	R	Metal Joggled Tool	2	20	M83723
	ATA 2080	R	R	Metal Tool, Tweezer Tool	10	20	M83723
294-109	ATA 1107 and	I	R	Metal Joggled Tool	2	16	M83723
	ATA 2112	R	R	Metal Tool, Tweezer Tool	10	16	M83723
294-110	ATA 1160 and	I	R	Metal Joggled Tool	2	12	M83723
	ATA 2160	R	R	Metal Tool, Tweezer Tool	10	12	M83723

# Insertion and Removal Tool Selection Charts

LISTED BY CONTACT MANUFACTURER

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
AMPHENOL	ASTRO TOOL #						
294-123	ATD 1035	I	R	Metal Tool, Joggled	2	22	
294-127	ATA 2255	R	F	#2 Sheilded Contacts	6	Coax	48
294-128	ATA 1189	I	R	#2 Sheilded Contacts	4	8	94
294-152	ATC 2040 and	R	F	Pins & Sockets	9	20	67, 906
	ATA 1075	I	R	Insertion tool for above	1	20	67, 906
294-155	ATA 2040 and	R	F	Pins & Sockets	9	22	17
	ATA 1040	I	R	Insertion tool for above	1	22	17
294-189	ATA 2185	R	F	#10 Contacts	6	10	213
294-190	ATA 1175	I	R	#10 Contacts	4	10	213
294-192	ATF 1101 or	I	R	Metal Long-Slot Tool	27	16	246
	ATF 1105	I	R	Comparable	2	16	246
294-219	ATF 2115	R	F	Metal Tool, Front Release, Plunger	5	16	246
294-229	ATF 1144 or	I	R	Metal Long-Slot Tool	27	12	246
	ATF 1160	I	R	Comparable	2	12	246
294-230	ATF 2162	R	F	Metal Tool, Front Release, Plunger	5	12	246
294-235	ATF 1558 or	I	R	Metal Long-Slot Tool	27	0	246
	ATF 1554	I	R	Comparable	2	0	246
294-236	ATF 1378 or	I	R	Metal Long-Slot Tool	27	4	246
	ATF 1359	I	R	Comparable	2	4	246
294-237	ATF 1260 or	I	R	Metal Long-Slot Tool	27	8	246
	ATF 1256	I	R	Comparable	2	8	246
294-238	ATA 2254	R	F	Coaxial 94-621	6	Coax	94
294-239	ATF 2336	R	F	Metal Tool, Front Release, Plunger	5	4	246
294-240	ATF 2252	R	F	Metal Tool, Front Release, Plunger	5	8	246
294-241	ATF 2518	R	F	Metal Tool, Front Release, Plunger	5	0	246
294-278	ATA 1052 or	I	R	Pins & Sockets	2	22	348
	ATA 1051 or	I	R	Pins & Sockets	4	22	348
	ATA 1052-S	I	R	Modified Version of ATA 1052, straight	1	22	348
294-280	ATA 2079	R	F	Metal Tool, Front Release, Plunger	6	20	213
294-286	ATA 2030 or	R	F	Pins Only	3	23	348
	ATA2348-22	R	F	Pins & Sockets	9	23	348
294-287	ATA 2026 or	R	F	Sockets Only	7	23	348
	ATA 2348-22	R	F	Pins & Sockets	9	23	348
294-296	ATSE 2070	R	F	MIL-C-28840	5	20	213
294-465	ATA 1114	I	R	Tip for ATA 3069 Kit (16-A)	15	16	69
356-400-1, 3	ATA 1040	I	R	Pins & Sockets Min-Rac, Relia-Tac	1	22	17
356-400-5,6, 7, 8	ATA 2040	R	F	Pins & Sockets Min-Rac	9	22	17
356-400-11	ATA 1033	I	R	Pins & Sockets Min-Rac, Wire Form	1	22	17





TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
AMPHENOL	ASTRO TOOL #						
356-400-1, 3	ATA 1040	I	R	Pins & Sockets Min-Rac, Relia-Tac	1	22	17
356-400-5,6, 7, 8	ATA 2040	R	F	Pins & Sockets Min-Rac	9	22	17
356-400-11	ATA 1033	I	R	Pins & Sockets Min-Rac, Wire Form	1	22	17
356-400-12	ATA 2029	R	F	Sockets, Min-Rac, 220-501	1	22	17
356-400-13	ATA 2033	R	F	Pins Minc-Rac, Wire Form	1	22	17
	ATA 2033-L	R	F	Pins-Librascope, Long Tip	1	22	17
356-400-2	ATA 1109	I	R	Pins & Sockets Mini-Rac, Wire Form	9	22	
356-400-15, 14	ATA 2032	R	F	Pins & Sockets Min-Rac, Wire Form	9	22	17
356-400-11, 12, 13	ATA 3032	I & R	R & F	Tool Kit, Min-Rac, 220-501	15	22	17
494-1 Handles	ATA 3482	I & R	R & F	Tool, Double-Ended Tip-Filter Pins	9	20	482
494-1-2 Insertion Tip	ATA 1186	I	R	Straight Coaxial	1	Coax	
494-1-3 Removal Tip	ATA 2073	R	F	Stamped Contacts	6	20	M
	ATA 2112	R	F	Pins & Sockets	6	16	M
	ATA 3035	I & R	R & F	Tool Kit, Pins & Sockets, Min-Rac, Wire Form	15	22	17
200-4000-240-20	ATA 3120	I & R	R & F	Contact Clip Removal & Replacement	--	16	5015
11-3695	ATBX 2-3695	R	F	Tool Kit	14	12, 16	AN/MS
11-3696	ATBX 2-3696	R	F	Tip Only	25	12	AN/MS
11-3697	ATBX 2-3697	R	F	Tip Only, Pins	25	16	AN/MS
11-3698	ATBX 2-3698	R	F	Tip Only, Sockets	25	12, 16	AN/MS
11-6147-1	ATBX 3-6147-1	--	--	Connector Plier	--	--	
11-6781	ATBX 1-6781	I	R	Plier for Pygmy CE Connector	12	16	CE
11-6782	ATBX 1-6782	I	R	Plier for Pygmy CE Connector	12	20	CE
11-6783	ATBX 2-6783	R	F	Tip, CE Pygmy Pins	25	20	CE
11-6784	ATBX 2-6784	R	F	Tip, CE Pygmy Sockets	25	20	CE
11-6900	ATBX 2-6900	R	F	Tool Kit, CE Pygmy	14	16, 20	CE
11-6911	0148-0141			Handle & Cap Only	14	--	
11-7082	ATBX 1-7082	I	R	Solderless Contacts	12	12	AN/MS
11-7260	ATBX 2-7260	R	F	Tool Kit, CE Contacts incl.	14	12, 16, 20	AN/MS & CE
11-7345	ATBX 1-7345	I	R	Plier for 75, 81 & 85 Connector	12	16	AN/MS
11-7401-12	ATA 1144 or	I	R	MS24254 & MS24255 CONTACTS, Metal Interchangeable Probe Tool	26	12	AN/MS
	AT 1000-12	I	R	Metal Tool Joggled	2	12	AN/MS
11-7401-16	ATA 1101 or	I	R	MS24254 & MS24255 CONTACTS, Metal Interchangeable Probe Tool	26	16	AN/MS
	AT 1000-16	I	R	Metal Tool Joggled	2	16	AN/MS
11-7401-20	ATA 1086 or	I	R	MS24254 & MS24255 CONTACTS, Metal Interchangeable Probe Tool	26	20	AN/MS
	AT 1000-20	I	R	Metal Tool Joggled	2	20	AN/MS
11-7736	ATBX 1-7736	I	R	Angled Pliers (214000 Series)	13	16	AN/MS
11-7763	ATBX 1-7763	I	R	Angled Pliers (214000 Series)	13	12	AN/MS
11-7837	ATBX 2-8250	R	F	Tool Kit	14	8, 12, 16	AN/MS

# Insertion and Removal Tool Selection Charts

LISTED BY CONTACT MANUFACTURER

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
AMPHENOL/BENDIX	ASTRO TOOL #						
11-7880-8	ATBX 2291	R	F	Coaxial	6	8	SE/MS
11-7880-12	AT 2012	R	F	MS24254 & MS24255 CONTACTS	6	12	SE/MS
11-7880-16	AT 2016	R	F	MS24254 & MS24255 CONTACTS	6	16	SE/MS
11-7880-20	AT 2020	R	F	MS24254 & MS24255 CONTACTS	6	20	SE/MS
11-8107-16	ATBX 1-8107-16	I	R	Pliers, SE Contacts	12	16	SE
11-8107-20	ATBX 1-8107-20	I	R	Pliers, SE Contacts	12	20	SE
11-8154-1	ATBX 2288	R	F	Coaxial Contacts	6	8	SE
11-8220	ATBX 1-8220	I	R	Coaxial		8	AN/MS
11-8250	ATBX 2-8250	R	F	Tool Kit	14	8, 12, 16	AN/MS
11-8251	ATBX 2-8251	R	F	Tip Only, Sockets	14	8	AN/MS
11-8252	ATBX 2-8252	R	F	Tip Only, Pins	14	8	AN/MS
11-8475	ATBX 2-8475	R	F	Tool Kit	14	12, 16	AN/MS
11-8860-1	ATBX 1133	I	R	Coaxial contacts 10 PT-CE	2	Coax	CE
11-8860-2	ATBX 1160	I	R	Coaxial contacts 10 PT-CE	2	Coax	CE
11-8860-3	ATBX 1203	I	R	Coaxial contacts 10 PT-CE	2	Coax	CE
11-8860-4	ATBX 1231	I	R	Coaxial contacts 10 PT-CE	2	Coax	CE
11-8860-5	ATBX 1253	I	R	Coaxial contacts 10 PT-CE	2	Coax	CE
11-8369-4	ATBX 1231	I	R	Coaxial contacts 10 PT-CE	2	Coax	CE
11-8674-12	ATBX 1154	I	R	Metal Tool, Joggled	2	12	JT
	ATBX 1154-90	I	R	Metal Tool, 90 Degree Angle	1	12	JT
	ATBX 1157	I	R	Metal Tool, Tweezer Tool	10	12	JT
11-8674-16	ATBX 1103	I	R	Metal Tool, Pencil Style	24	16	JT
	ATR 1107	I	R	Metal Tool, Joggled	2	16	JT
	ATBX 1108	I	R	Metal Tool, Tweezer Tool	10	16	JT
11-8674-20	ATBX 1070	I	R	Metal Tool, Pencil Style	24	20	JT
	ATBX 1071	I	R	Metal Tool, Straight Style	1	20	JT
	ATBX 1073	I	R	Metal Tool, Offset	2	20	JT
	ATBX 1072	I	R	Metal Tool, Tweezer Tool	10	20	JT
	ATBX 1075	I	R	Metal Tool, Tweezer Tool, .75 tip length	10	20	JT
11-8674-22	ATBX 1057	I	R	Metal Tool, Pencil Style	24	22	JT
	ATBX 1055	I	R	Metal Tool, Offset	2	22	JT
	ATBX 1055-S	I	R	Metal Tool, Special	1	22	JT
	ATBX 1058	I	R	Metal Tool, Tweezer Tool	10	22	JT
	ATBX 1059	I	R	Metal Tool, Tweezer Tool, .260 of Straight	10	22	JT



TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
AMPHENOL/BENDIX	ASTRO TOOL #						
11-8674-24	ATBX 1046	I	R	Metal Tool, Pencil Style	24	22M/D	JT
	ATBX 1046-90	I	R	Metal Tool, 90 Degree Angle	24	22M/D	JT
	ATBX 1046-135	I	R	Metal Tool, 45 Degree Angle	24	22M/D	JT
	ATBX 1049	I	R	Metal Tool, Offset	2	22M/D	JT
	ATBX 1049-S	I	R	Metal Tool, Special	2	22M/D	JT
	ATBX 1052	I	R	Metal Tool for .052 dia. wire	2	22D	JT
	ATBX 1048	I	R	Metal Tool, Tweezer Tool	10	22M/D	JT
	ATBX 1051	I	R	Metal Tool, Tweezer Tool, .055 dia. wire	10	22M/D	JT
11-8675-12	ATBX 2155	R	R	Metal Tool, Tweezer Tool	10	12	JT
11-8675-16	ATBX 2103	R	R	Metal Tool, Tweezer Tool	10	16	JT
11-8675-20	ATBX 2070	R	R	Metal Tool, Tweezer Tool	10	20	JT
	ATBX 2075	R	R	Metal Tool, Tweezer Tool, .75 Tip Length	10	20	JT
11-8675-22	ATBX 2057	R	R	Metal Tool, Tweezer Tool	10	22	JT
	ATBX 2058	R	R	Metal Tool, Tweezer Tool, Long Tip	10	22	JT
11-8675-24	ATBX 2046	R	R	Metal Tool, Tweezer Tool	10	22M/D	JT
	ATBX 2048	R	R	Metal Tool, Tweezer Tool, .560 Tip Length	10	22M/D	JT
11-8794-12	ATBX 1159	I	R	Metal Tool, Tweezer Tool, Straight	10	12	JT
11-8794-16	ATBX 1109	I	R	Metal Tool, Tweezer Tool, Straight	10	16	JT
11-8794-20	ATBX 1078	I	R	Metal Tool, Tweezer Tool, Straight	10	20	JT
11-8794-22	ATBX 1060	I	R	Metal Tool, Tweezer Tool, Straight	10	22	JT
11-8794-24	ATBX 1054	I	R	Metal Tool, Tweezer Tool, Straight	10	22M/D	JT
11-8795-12	ATBX 2160	R	R	Metal Tool, Tweezer Tool, Straight	10	12	JT
11-8795-16	ATBX 2109	R	R	Metal Tool, Tweezer Tool, Straight	10	16	JT
11-8795-20	ATBX 2073	R	R	Metal Tool, Tweezer Tool, Straight	10	20	JT
11-8795-22	ATBX 2059	R	R	Metal Tool, Tweezer Tool, Straight	10	22	JT
11-8795-24	ATBX 2050	R	R	Metal Tool, Tweezer Tool, Straight	10	22M/D	JT
	ATBX 2047	R	R	Metal Tool, Tweezer Tool, Modified Version of ATBX 2050	10	22M/D	JT
11-8952	ATBX 2052	R	R	Metal Tool, Tweezer Tool, Oversize Wire, Min.	10	22M/D	JT
11-8953-1	ATBX 1053	I	R	Modified version of ATBX 1048, .375 Long Straight Section	10	22M/D	JT
11-10050-1	ATX 2014	R	R	Unwired Contacts	16	22D	JT
11-10050-2	ATX 2004	R	R	Unwired Contacts	16	22	JT
11-10050-3	ATX 2003	R	R	Unwired Contacts	16	20	JT
11-10050-4	ATX 2002	R	R	Unwired Contacts	16	16	JT

# Insertion and Removal Tool Selection Charts

LISTED BY CONTACT MANUFACTURER

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
AMPHENOL/MATRIX	ASTRO TOOL #						
90-0001-022	ATM 1046	I	R	Mini-Mate	23	22	
	ATM 1046-135	I	R	Modified version of ATM 1046, 45 degree angle	23	22	
90-0002-022	ATM 2052	R	F	Mini-Mate, Metal Spring-Loaded Probe Tool	8	22	
258-6018-16	ATR 2112	R	R	Metal Tool, Tweezer	10	16	
258-6019-16	ATR 1107	I	R	Metal Tool, Joggled	2	16	
259-6002-20	ATR 2080	R	R	Metal Tool, Tweezer	10	20	
5000-026-22	ATRX 2052	R	R	Metal Tool, Tweezer	10	22	
6500-001-20	ATR 1080 and	I	R	Metal Tool, Joggled	2	20	
	ATR 2080	R	R	Metal Tool, Tweezer	10	20	
6500-001-16	ATR 1107 and	I	R	Metal Tool, Joggled	2	16	
	ATR 2112	R	R	Metal Tool, Tweezer	10	16	
6500-001-12	ATR 1160 and	I	R	Metal Tool, Joggled	2	12	
	ATR 2160	R	R	Metal Tool, Tweezer	10	12	
6500-018-0	ATC 2565	R	R	5015 Connector, Rear Release	19	0	
6500-018-4	ATC 2426	R	R	5015 Connector, Rear Release	19	4	
6500-018-8	ATC 2281	R	R	5015 Connector, Rear Release	19	8	
6500-028-12	ATC 2157	R	R	Modified version of ATR 2160, straight	10	12	
6500-028-16	ATC 2106	R	R	Modified version of ATR 2112, straight	10	16	
6500-028-20	ATC 2079	R	R	Modified version of ATR 2080, straight	10	20	
6500-029-12	ATR 2160	R	R	PLASTIC Tweezer, 70 degree angle	10	12	
6500-029-16	ATR 2112-L	R	R	PLASTIC Tweezer, 70 degree angle	10	16	
6500-029-20	ATR 2080	R	R	PLASTIC Tweezer, 70 degree angle	10	20	
6500-030-12	ATGH 1160	I	R	Straight In-Line, PLASTIC	1	12	
6500-030-16	ATGH 1112	I	R	Straight In-Line, PLASTIC	23	16	
6500-030-20	ATGH 1079	I	R	Straight In-Line, PLASTIC	23	20	
6500-045-20	ATC 1071 and	I	R	Metal Comparable for Hydraulic Research	23	20	
	ATC 2076	R	R	Metal Comparable for Hydraulic Research	10	20	
	ATM 1050	I	R	Special Close 90 degree Bend	23	22	



TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
BOEING	ASTRO TOOL #						
	ATBO 1053	I	R	Special Plier Repair Tool for m39029/11-22 & 12-22	13	22	
	ATBO 1054	I	R	Modified version of ATC 1054, 1.1 Long Tip (CIT DPXMA22-1)	2	22	
	ATBO 1070	I	R	Contact BACC47DT&S	-	20	
	ATBO 1075	I	R	NAS 1599 Connector	-	20	
	ATBO 1075-L	I	R	Modified version of ATBO 1075, Longer Tip	-	20	
	ATBO 1081	I	R	Contact BACC47DT&S	-	16	
	ATBO 1081-L	I	R	Modified version of ATBO 1081, Longer Tip	-	16	
	ATBO 1082	I	R	NAS 1599 Connector	2	20	
	ATBO 1105	I	R	Metal Tool, Tweezer Tool	10	16	
ST 2342A-T1	ATBO 1107	I	R	Metal Tool, Joggled "Horses Head"	2	16	
	ATBO 1108	I	R	Arbor Press	2	16	
	ATBO 1108-90	I	R	Modified version of ATBO 1108, 90 Degree Angle	1	16	
ST 2342A-T5	ATBO 1154	I	R	Metal Tool, Joggled "Horses Head"	2	12	
	ATBO 2054	R	R	Special Boeing Tool (CET DPXMA22)	2	22	
	ATBO 2073	R	R	Hypertronics Connector, Metal Spring-Loaded Probe Tool	8	20	K65
	ATBO 2082	R	R	NAS 1599 -- Oversize Wire	2	20	
ST 2342PB	ATBO 2342-PB	I	R	Handle inserts wire wrap contacts	-	-	
	ATBO 2342-PB			(Replaceable tips for basic tool listed below)			
	/1	I	R	Original Tip	-	22	
	/2	I	R	Modified .050 I.D.	-	22	
	/3	I	R	Modified ATC 1054 Tip	-	22	
	/4	I	R	Modified to .062 I.D.	-	22	

## CHART ABBREVIATIONS

**I/R** Insertion or Removal designation column  
**I** Insertion Tool  
**R** Removal Tool  
**I & R** Insertion & Removal Tool  
**R/F** Rear or Front Release designation column

**R** Rear Release  
**F** Front Release  
**R & F** Rear and Front Release  
**ILL** Illustration reference number  
**GA** Gage designation  
**NAATT** Not Available At This Time

# Insertion and Removal Tool Selection Charts

LISTED BY CONTACT MANUFACTURER

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
BURNDY/FCI	ASTRO TOOL #						
J-1276-1		I & R	R	YHMM-22-1 Pins, plastic tip, recommended ATB 3062-2	-	2	YHMM
J-1276-3	ATB 3062-2	I & R	R	YHMM-22-1 Pins, plastic tip	29	2	YHMM
J-1276-4	ATB 3062-4	I & R	R	YHMM-22-1 Pins, plastic tip (Longer Handle)	29	2	YHMM
RTM-12-5	ATA 1144 or	I	R	MIL-C-26500, Metal Interchangeable Probe Tool	26	12	HYFEN
	AT 1000-12	I	R	MIL-C-26500, Metal Tool, Joggled	2	12	HYFEN
RTM-12-8	ATBX 1157	I	R	MIL-C-38999, Metal Tool, Joggled	10	12	JT
RTM-16-2V	ATA 1101	I	R	MIL-C-26482, Metal Interchangeable Probe Tool	26	16	HYFEN
RTM-16-4	ATBX 1108	I	R	MIL-C-38999, Metal Tool, Tweezer	10	16	JT
RTM-20-5	ATB 1064 or	I	R	MIL-C-26482, 26500, 26636, Metal Interchangeable Probe Tool	26	20	HYFEN
	ATB 1067 or	I	R	Modified version of ATB 1064, Long Tip, Metal Interchangeable Probe Tool	26	20	HYFEN
	ATB 1068	I	R	Modified version of ATB 1067, Joggled	2	20	HYFEN
RTM-20-5PI	ATB 1067-R	I	R	Tip to fit Burndy RTM-20-5	25	20	HYFEN
RTM-20-17	ATBX 1072	I	R	MIL-C-38999, Metal Tool, Tweezer	10	20	JT
RTM-22-1	ATBX 1058	I	R	MIL-C-38999, Metal Tool, Tweezer	10	22	JT
RTM-24-3	ATBX 1053	I	R	MIL-C-38999, Metal Tool, Tweezer	10	24	JT
RTM-20-16	AT1000-20	I	R	Metal Tool, Joggled	2	20	
RX-8-1	ATH 2202	R	F	Metal Tool, Coaxial	6	8	
RX-12-7	AT 2012	R	F	MIL-C-26636, 26482	6	12	HYFEN
RX-12-9	ATBX 2155	R	R	MIL-C-38999	10	12	JT
RX-16-7-V1	ATB 2114	R	F	Modified MS24256R-16, Revision E	6	16	HYFEN
RX-16-7-V2	ATB 2114	R	F	Modified MS24256R-16, Revision E	6	16	HYFEN
RX-16-8	AT 2016	R	F	MIL-C-26482	6	16	HYFEN
RX-16-9	ATBX 2103	R	R	MIL-C-38999	10	16	JT
RX-20-10	ATB 2088	R	F	MIL-C-26500, 26636, Metal Spring-Loaded Probe Tool	8	20	HYFEN
RX-20-24	AT 2020	R	F	MIL-C-26482	6	20	HYFEN
RX-20-24V3	ATB 2080	R	F	MIL-C-26482 (MS24256R-20, Revision E) Modified	6	20	HYFEN
RX-20-24V5	ATB 2080	R	F	MIL-C-26482 (MS24256R-20, Revision E) Modified	6	20	HYFEN
RX-20-36	ATBX 2070	R	R	MIL-C-38999	10	20	JT
RX-22-1	ATBX 2057	R	R	MIL-C-38999	10	22	JT
RX-24-3	ATBX 2046	R	R	MIL-C-38999	10	22D	JT
	ATB 1035	I	R	Unwired Contact 28-91-S-9000	1	22	
	ATB 1043	I	R	Unwired Contact 39029/18-20-20	1	20	
	ATB 1044	I	R	Unwired Contact 2749420	1	20	
	ATB 1066	I	R	Unwired Contact 0641-1-1631	1	16	

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
COLLINS RADIO	ASTRO TOOL #						
372-8091-010	ATC 2026	R	F	Tuning Fork Contacts	11	--	
372-8091-060	ATC 1032	I	R	Tweezer, Filter Pins	30	--	



TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
CONTINENTAL	ASTRO TOOL #						
2512	AT 5002	R	F	Metal Spring-Loaded Probe Tool	8	16	25
2534	AT 4002	I	R	Metal Tool, Joggled	2	16	25
2558	ATBX 1057	I	R	Metal Tool, Pencil Style	24	22	25
2559	ATCL 2061	R	F	Metal Spring-Loaded Probe Tool	8	22	25

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
DELPHI/HUGHES	ASTRO TOOL #						
TD-202-IT-000	AT 4003	I	R	Deep Insertions G. D. Pomona	2	20	W
TE-022-RT-001	ATH 2027	R	F	PC Connector Jack Pins, Metal Spring-Loaded Probe Tool	8	22	EMS
TG-22-IT	ATH 1053	I	R	Metal Tool, Tweezer	10	22D	W
TG-22-RT	ATH 2053	R	R	Metal Tool, Tweezer	10	22D	W
THM-22-B000	ATBX 2046	R	R	Metal Tool, Tweezer	10	22M	W
TM-016-IT-001	AT 4002 or 4004	I	R	Joggled Push-In Style	2	16	C-M-R
TM-016-IT-003	AT 4004	I	R	Deep Insertion-MRS-MRE-MRA	2	16	MR
TM-016-RT-001	AT 5002	R	F	MRP Connector, Pins & Sockets, Metal Spring-Loaded Probe Tool	8	16	MR
TM-016-RT-006	ATH 2103	R	F	Pins & Sockets	6	16	M
TR-22D-IT	ATH 1050	I	R	Metal Tool, Tweezer #1035415	10	22D	W
TR-22D-RT	ATH 2050	R	R	Metal Tool, Tweezer #1035416A	10	22D	W
TU-016-IT-002	ATH 1102	I	R	Contacts UP 16Y16C000	2	16	U
TU-016-RT-000	ATH 2120	R	F	Universal Contacts, Metal Spring-Loaded Probe Tool	8	16	U
TU-016-RT-006	ATH 2121	R	F	Pins & Sockets	6	16	U
TU-020-IT-002	ATH 1067	I	R	UR-UTE-UTS	1	20	U
TU-020-RT-002	AT 5001-S	R	F	URS-UTE-UTS, Metal Spring-Loaded Probe Tool	8	20	U
TU-020-RT-006	ATH 2088	R	F	Pins & Sockets	6	20	U
TU-180-RT-000	ATH 2221	R	F	Co-ax RG 180/U	6	8	U
TU-195-RT-000	ATH 2206	R	F	Co-ax RG 195/U	6	8	U
TW-020-IT-000	AT 4001	I	R	Pins & Sockets	2	20	W
TW-020-RT-002	AT 5001	R	F	WMS-WMW-O-Line, Metal Spring-Loaded Probe Tool	8	20	W
TW-020-RT-006	ATH 2088	R	F	Pins & Sockets	6	20	W
TW-022-IT-000	ATH 1046	I				22	W
TW-022-IT-001	AT 4000	I	R	Pins & Sockets	2	22	W
TW-022-IT-007	ATH 1052	I	R	Pins & Sockets	23	22	W
TW-022-RT-001	AT 5000	R	F	WSS 0244 P08-RN-549, Metal Spring-Loaded Probe Tool	8	22	W
TW-022-RT-006	ATH 2052	R	F	Pins & Sockets, Metal Spring-Loaded Probe Tool	8	22	W
652636	AT 5000	R	F	WSS 0244P08 -Airborn, Metal Spring-Loaded Probe Tool	8	22	W
722698-328	AT 5002	R	F	Pins & Sockets -Documented, Metal Spring-Loaded Probe Tool	8	16	MR
722698-329	ATAMP 3070			Transfer Tool Termpoint Clib	21		
722699-224	ATH 3260			Forming Tool Microelectronic Leads	20		
722699-224-1	ATH 3261			Forming Pliers-To form leads before Insertion on circuit board	20		
722699-224-2	ATH 3262			Forming Pliers-To form leads before Insertion on circuit board	20		
722699-224-3	ATH 3263			Forming Pliers-To form leads before Insertion on circuit board	20		

# Insertion and Removal Tool Selection Charts

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TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
DELPHI/HUGHES	ASTRO TOOL #						
	ATH 1031	I	R	Special for General Dynamics	1	22	
	ATH 1033	I	R	Special for General Dynamics	2	22	
	ATH 1054	I	R	Metal Tool	23	22	
	ATH 1094	I	R	MIL-C-22857	1	16	
	ATH 2089	R	F	URS-UTE-UTS-Deep, Metal Spring-Loaded Probe Tool	8	20	U
	ATH 2102	R	F	MIL-C-22857, Metal Spring-Loaded Probe Tool	8	16	
	ATH 3037-12			Contact Guide 12" Long used on rear insert 22 GA contacts	22		
	ATH 3037-18			Contact Guide 18" Long used on rear insert 22 GA contacts	22		

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
DEUTSCH	ASTRO TOOL #						
15513-12	ATA 1144	I	R	MIL-C-26636, Metal Interchangeable Probe Tool	26	12	DD, DTK, DPK
15513-16	ATA 1101	I	R	MIL-C-26636, Metal Interchangeable Probe Tool	26	16	DD, DTK, DPK
15513-20	ATA 1086	I	R	MIL-C-26636, Metal Interchangeable Probe Tool	26	20	DD, DTK, DPK
81515-20	ATD 1061 and	I	R	MIL-C-81511, Series III & IV	2	20	
	ATD 2062	R	F	MIL-C-81511, Series III & IV	10	20	
81515-16	ATD 1094 and	I	R	MIL-C-81511, Series III & IV	2	16	
	ATD 2094	R	F	MIL-C-81511, Series III & IV	10	16	
81517-23	ATD 2044	R	R	Metal Tool	17	22	
81517-20	ATD 2058	R	R	Metal Tool	17	20	
81517-16	ATD 2090	R	R	Metal Tool	17	16	
81517-12	ATD 2150	R	R	Metal Tool	17	12	
M-15513-12	ATA 1159	I	R	800 Series	2	12	DS, MDR, DA
M-15513-16	ATR 1107	I	R	800 Series	2	16	DS, MDR, DA
M-15513-20	ATD 1081 or	I	R	800 Series	2	20	DS, MDR, DA
	ATD 1081-S	I	R	Modified version of ATD 1081 Straight	1	20	
M-15513-25	ATD 1206	I	R	Coaxial & 8 GA, Metal Long-Slot Tool	27	8	
M-15514-12	AT 2012	R	F	MIL-C-26636	6	12	DD, DTK, DPK
M-15514-16	AT 2016	R	F	MIL-C-26636	6	16	DD, DTK, DPK
M-15514-20	AT 2020	R	F	MIL-C-26636	6	20	DD, DTK, DPK
M-15514-25	ATA 2254	R	F	800 Series	6	Coax	DD, DTK, DPK
M-15515-12	ATD 2191 or	R	F	Pins & Sockets	17	12	DS
	ATD 2190	R	F	Pins & Sockets	6	12	DS
M-15515-16	ATD 2127 or	R	F	Connector #6820	17	16	DS
	ATD 2128	R	F	Connector #6820	6	16	DS
M-15515-20	ATD 2097 or	R	F	Pins & Sockets	17	20	DS
	ATD 2095	R	F	Pins & Sockets, Spring Loaded	6	20	DS
M-15515-22P/S	ATD 2040	R	F	Metal Tool	23	22	DS





TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
DEUTSCH	ASTRO TOOL #						
M-15513-12	ATA 1159	I	R	800 Series	2	12	DS, MDR, DA
M-15513-16	ATR 1107	I	R	800 Series	2	16	DS, MDR, DA
M-15513-20	ATD 1081 or ATD 1081-S	I	R	800 Series Modified version of ATD 1081 Straight	2 1	20 20	DS, MDR, DA
M-15513-25	ATD 1206	I	R	Coaxial & 8 GA, Metal Long-Slot Tool	27	8	
M-15514-12	AT 2012	R	F	MIL-C-26636	6	12	DD, DTK, DPK
M-15514-16	AT 2016	R	F	MIL-C-26636	6	16	DD, DTK, DPK
M-15514-20	AT 2020	R	F	MIL-C-26636	6	20	DD, DTK, DPK
M-15514-25	ATA 2254	R	F	800 Series	6	Coax	DD, DTK, DPK
M-15515-12	ATD 2191 or ATD 2190	R	F	Pins & Sockets Pins & Sockets	17 6	12 12	DS DS
M-15515-16	ATD 2127 or ATD 2128	R	F	Connector #6820 Connector #6820	17 6	16 16	DS DS
M-15515-20	ATD 2097 or ATD 2095	R	F	Pins & Sockets Pins & Sockets, Spring Loaded	17 6	20 20	DS DS
M-15515-22P/S	ATD 2040	R	F	Metal Tool	23	22	DS
M-15515-25	ATD 2250	R	F	Coaxial, Metal Spring-Loaded Probe Tool	6	8	DSM
M-15570-12	ATR 1160 and ATR 2160	I R	R R	Metal Tool, Joggled Metal Tool, Tweezer	2 10	12 12	JTA JTA
M-15570-16	ATR 1107 and ATR 2112	I R	R R	Metal Tool, Joggled Metal Tool, Tweezer	2 10	16 16	JTA JTA
M-15570-20	ATR 1080 and ATR 2080	I R	R R	Metal Tool, Joggled Metal Tool, Tweezer	2 10	20 20	JTA JTA
M-15570-22	ATD 2048	R	R	Metal Tool	23	22	RSM-RTK
M-15570-22-1	ATD 1035 and ATD 2047	I R	R R	Metal Tool, Joggled Metal Tool, Tweezer	2 10	22 22	RSM-RTK RSM-RTK
	ATD 1035-135	I	R	Joggled version of ATD 1035, 45 degree angle	2	22	RSM-RTK
M-15571	ATK 2115	R	R	NAS 1599, Unwired Contacts	17	12, 16, 20	JTA
M83723-31-12, 16 & 20	SEE THE NATIONAL AEROSPACE STANDARD SECTION						
	ATD 1020	I	R	RTK Connector Twist Pin	1	22	RTK
	ATD 3312			Wire comb, 6" taper flap, modified version of ATWC 3312	--	--	
	ATDL 2050	R	R	MIL-C-38999, tweezers	10	22D	

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
ELCO	ASTRO TOOL #						
061742-04	ATD 1081	I	R	Metal Tool, Joggled	2	20	
T-06-1877-02	ATE 2057	R	R	D11890977 Connector, Metal Spring-Loaded Probe Tool	8	20	



# Insertion and Removal Tool Selection Charts

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TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
FLIGHT CONN.	ASTRO TOOL #						
	ATF 1101	I	R	Metal Long-Slot Tool	27	16	
716-1227-000	ATF 1105	I	R	Joggled version of ATF 1101	2	16	
	ATF 1144	I	R	Metal Long-Slot Tool	27	12	
712-1229-000	ATF 1160	I	R	Joggled version of ATF 1144	2	12	
708-1258-000	ATF 1256	I	R	Version of ATF 1260	2	8	
	ATF 1260	I	R	Metal Long-Slot Tool	27	8	
704-1260-000	ATF 1359	I	R	Joggled version of ATF 1378	2	4	
	ATF 1378	I	R	Metal Long-Slot Tool	27	4	
700-1262-000	ATF 1554	I	R	Joggled version of ATF 1558	2	0	
	ATF 1558	I	R	Metal Tool	27	0	
716-1168-000	ATF 2115	R	F	Front Release	5	16	
712-1172-000	ATF 2162	R	F	Front Release	5	12	
708-1138-000	ATF 2255	R	F	Front Release	5	8	
704-1134-000	ATF 2336	R	F	Front Release	5	4	
700-1130-000	ATF 2518	R	F	Front Release	5	0	



TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
G & H TECHNOLOGY	ASTRO TOOL #						
847-101-COTO-1 &-2	ATGH 1055	I & R	R	Single Tip, No Wire Slot	23	22	847/848
847-101-COTO-3 &-4	ATGH 1081	I & R	R	Single Tip, No Wire Slot	23	20	847/848
847-101-COTO-5 &-6	ATGH 1104	I & R	R	Single Tip , No Wire Slot	23	16	847/848
847-101-COTO-7 &-10	ATGH 2057	I & R	R	Single Tip	23	22	847/848
847-101-COTO-8 &-11	ATGH 2081	I & R	R	Single Tip	23	20	847/848
847-101-COTO-9 & -12	ATGH 2105	I & R	R	Single Tip	23	16	847/848
866-1078-COTO-3	ATGH 2048	I & R	R	Single Tip , Straight with Slot	23	22	866
866 -1078-COTO-4	ATGH 1070	I & R	R	Single Tip, Straight	23	20	866
882-94	ATGH 2110	R	R	Metal Tool, Tweezer	10	16	
885-277-COTO-001	ATGH 2051	R	R	MIL-C-38999, Breech Lok	10	22D	
885-277-COTO-002	ATGH 2078	R	R	MIL-C-38999, Breech Lok	10	20	
885-277-COTO-003	ATGH 2109	R	R	MIL-C-38999 , Breech Lok	10	16	
998-062	ATGH 1079	I	R	NAS 1599 Connectors	23	20	843
998-063	ATGH 2079	R	R	NAS 1599 Connectors	23	20	843
998-102	ATGH 1112	I	R	NA S 1599 Connectors	23	16	843
998-103	ATGH 1160	I & R	R	NAS 1599 Connectors	1	12	843
998-104	ATGH 1190	I & R	R	NAS 1599 Connectors	1	8	843
998105	ATGH 1079	I & R	R	NAS 1599 Connectors	23	20	843
998-142-001	ATGH 2330	R	R	Coaxial, Metal Long-Slot Tool	27	Coax	
998-145-001	ATGH 1050	I	R	Metal Tool, Tweezer	10	22	847/848
998-145-002	ATGH 2052	R	R	Metal Tool, Tweezer	10	22	847/848
998-145-003	ATGH 1076	I	R	Metal Tool, Tweezer	10	20	847/848
998-145-004	ATGH 2076	R	R	Metal Tool, Tweezer	10	20	847/848
998-145-005	ATGH 1101	I	R	Metal Tool, Tweezer	10	16	847/848
998-145-006	ATGH 2101	R	R	Metal Tool, Tweezer	10	16	847/848
	ATGH 1071	I & R	R	Modified for Lockheed S-2406-30	23	20	
	ATGH 1077	I	R	Modified version of ATBX 1072 .66 tip length , MIL-C-38999	10	20	
	ATGH 1109	I	R	Modified version of ATBX 1108 .66 tip length , MIL-C-38999	10	16	
	ATGH 2049	R	R	Metal Tool, Tweezer	10	22	847/848
	ATGH 2054	R	R	Metal Tool, Tweezer	10	22	847/848
	ATGH 2075	R	R	Metal Tool, Tweezer	10	20	847/848
	ATGH 2077	R	R	Metal Tool, Tweezer	10	20	847/848
	ATGH 2080	R	R	Modified version of ATBX 2070 .66 tip length, MIL-C-38999	10	20	
	ATGH 2103	R	R	Metal Tool, Tweezer	10	16	
	ATGH 2104	R	R	NAS1599, 15° tip angle	10	16	
	ATGH 2108	R	R	Modified version of ATBX 2103 .66 tip length, MIL-C-38999	10	16	
	ATGH 2160	R	R	Metal Tool, Tweezer	10	12	



# Insertion and Removal Tool Selection Charts

LISTED BY CONTACT MANUFACTURER

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
ITT/CANNON	ASTRO TOOL #						
CET 4	ATC 2234	R	F	Push out, Pins & Sockets	9	4	RX
CET 8	ATC 2150	R	F	Push out, Pins & Sockets	9	8	RX
CET 8-2	ATC 2281	R	R	MS3483-1 (Ref. 5015)	19	8	5015
CET 12	ATC 2092	R	F	Impact Tool, Ring-Lok Connector	22	12	KMBA
CET 12-1A	ATC 2105	R	F	Push out, Pins & Sockets	9	12	CA/RX
CET 12-2	ATC 2105	R	F	Push out, Pins & Sockets	9	12	MS-E, EX-G
CET 12-4	ATR 2160	R	R	Metal Tool, Tweezer, NAS 1599	10	12	
CET 12-16	0159-0051			Tip Only, Delrin			
CET 16	ATC 2062	R	F	Impact Tool, Ring-Lok DPGM	22	16	KMBA
CET 16-3A	ATC 2070	R	F	Push out, Pins & Sockets	9	16	CA/RX
CET 16-4	ATC 2070	R	F	Push out, Pins & Sockets	9	16	MS-E, EX-G
CET 16-9	ATR 2212	R	R	MIL-C-83723	10	16	
CET 16-21	ATML 3006			Tip Only, Delrin			
CET 16KJ	ATBX 2103	R	R	MIL-C-38999	10	16	KJ
CET 20-3	ATC 2040-L	R	F	Push out, Pins & Sockets (Long Tip)	9	20	RX
CET 20-4	ATC 2040	R	F	Push out, Pins & Sockets	9	20	KPTM
CET 20-5A	ATC2046	R	F	Impact Tool DDSMF Ring-Lok	22	20	D*SM
CET 20-8	ATR 2080	R	R	Metal Tool, Tweezer, NAS 1664	10	20	
CET 20-11	ATC 2071	R	R	Metal Tool, Tweezer	10	20	D*C
CET 20-11, 20HD	ATC 2076	R	R	Metal Tool, Tweezer, DCB-DPX-DDCE	10	20	DD
CET 20-24	ATML 3005			Tip Only, Delrin			
CET 20-A	ATC 2046-L	R	F	Impact Tool Ring-Lok, Long Tip	22	20	DPGM
CET 20-D	ATC 2071	R	R	Metal Tool, Tweezer	10	20	D*C
CET 20-D-1	ATC 2073	R	R	Metal Tool, Tweezer (Dwg. #995-0001-768)	10	20	
CET 20KJ	ATBX 2070	R	R	MIL-C-38999	10	20	KJ
CET 22KJ	ATBX 2057	R	R	MIL-C-38999	10	22	KJ
CET 22M-KJ	ATBX 2046	R	R	MIL-C-38999	10	22M	KJ
CET C1	ATC 2170	R	F	Impact Tool	22	20	
CET C4	ATC 2200	R	F	Impact Tool	22	Coax	DPXMS
CET C6B	ATC 2188	R	F	D Miniature Coax	6	Coax	DPXA26
CET C11	ATC 2276	R	F	D Sub-Miniature	6	Coax	
CET DPKB 22	ATC 2053	R	R	Metal Tool, Tweezer	10	22	DPK
CET DPKB 22	ATC 2054	R	R	Metal Tool, Tweezer	10	22	DPK
Revision C							
CET FRF-0	ATF 2518	R	F	MIL-C-5015, Front Release	5	0	
CET FRF-4	ATF 2336	R	F	MIL-C-5015, Front Release	5	4	
CET FRF-8	ATF 2252	R	F	MIL-C-5015, Front Release	5	8	
CET FRF-12	ATF 2162	R	F	MIL-C-5015, Front Release	5	12	
CET FRF-16	ATF 2115	R	F	MIL-C-5015, Front Release	5	16	
CET KPSE 20A	AT 2020	R	F	MIL-C-26500, 26482, 26636	6	20	



TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
ITT/CANNON	ASTRO TOOL #						
CET P-CTA	ATC 2035	R	F	Centi Lok 2DD Pins	1	22	DD
CET S-CTA	ATC 2036	R	F	Centi Lok 2DD Sockets	1	22	DD
CET TF	ATC 2026	R	F	Tuning Fork Contacts	11	--	
CET VE-0	ATC 2565	R	R	MIL-C-5015, Rear Release	19	0	
CET VE-4	ATC 2426	R	R	MIL-C-5015, Rear Release	19	4	
CET VE-8	ATC 2281	R	R	MIL-C-5015, Rear Release	19	8	
CET VE-12	ATC 2184	R	R	MIL-C-5015, Rear Release	10	12	
CET VE-16	ATC 2136	R	R	MIL-C-5015, Rear Release	10	16	
CIET 12	ATR 1160	I	R	Metal Tool, NAS 1664 for NAS 1599	2	12	KV/PV/DPK
	ATR 2160	R	R	Metal Tool, NAS 1664 for NAS 1599	10	12	KV/DPK/PV
CIET 16	ATR 1107	I	R	Metal Tool, NAS 1664 for NAS 1599	2	16	DPXME
	ATR 2112	R	R	Metal Tool, NAS 1664 for NAS 1599	10	16	DPXME
CIET 20	ATR 1080	I	R	Metal Tool, NAS 1664 for NAS 1599	2	20	DPXME
	ATR 2080	R	R	Metal Tool, NAS 1664 for NAS 1599	10	20	DPXME
CIET 20-18	ATC 1081	I	R	Metal Tool, Joggled	2	20	D*C
	ATC 2076	R	R	Metal Tool, Tweezer	10	20	D*C
CIET 20HD	ATC 1076	I	R	Metal Tool, Tweezer	10	20	D*RA
	ATC 2076	R	R	Metal Tool, Tweezer	10	20	D*RA
CIET 20HDL	ATC 2076-L	R	R	Metal Tool, Tweezer, Long Tip	10	20	DPXME
CIET CK-1	ATC 3050	R	R	Metal Tool	3	22	DPX
CIET 22	ATC 1054	I	R	Metal Tool, Joggled	2	22	DPX2MA
	ATC 2053	R	R	Metal Tool, Tweezer (ref. ATC 2054)	10	22	CENTI-K
	ATC 2053-70	R	R	Modified version of ATC 2053 (70 degree angle)	10	22	
	ATC 1054-S	I	R	Modified version of ATC 1054 (straight)	1	22	
CIT 4	ATC 1377	I	R	Metal Tool, Straight	1	4	RX
CIT 8	ATC 1265	I	R	Metal Tool, Straight	1	8	RX
CIT 12	ATC 1160	I	R	DP*M, DPS, MS-E, KMBA Connector	2	12	RX
CIT 12-1	ATC 1160	I	R	RX Contacts	2	12	RX
CIT 12-2	ATC 1160	I	R	RX Contacts	2	12	RX
CIT 16	ATC 1111	I	R	Ring-Lok DP*M, KMB, SRC	2	16	RX
CIT 16-1	ATC 1111	I	R	Ring-Lok DP*M, KMB, SRC	2	16	RX
CIT 16-2	ATC 1111-1	I	R	Ring-Lok DP*M, KMB, SRC, Long Tip	2	16	RX
CIT 16-9	ATC 1112	I	R	Ring-Lok DP*M, KMB, SRC	2	16	RX
CIT 16KJ	ATBX 1108	I	R	MIL-C-38999	10	16	KJ
CIT 20	ATA 1086	I	R	DP*M, KQ, KR, KTM, MIL-C-26636, Metal Interchangeable Probe Tool	26	20	SRC
CIT 20-2	ATC 1079	I	R	DSM	2	20	BFRX
CIT 20-5A	ATC 1084	I	R	KPTM	2	20	KPTM
CIT 20-18	ATC 1081	I	R	038894-0018	2	20	KPTM
CIT 20A	ATC 1055	I	R	DDSMI	2	20	D
CIT 20D	ATC 1072	I	R	DPXME-20 H.D.	2	20	D



# Insertion and Removal Tool Selection Charts

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TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
ITT/CANNON	ASTRO TOOL #						
CIT 20KJ	ATBX 1072	I	R	MIL-C-38999	10	20	KJ
CIT 22KJ	ATBX 1058	I	R	MIL-C-38999	10	22	KJ
CIT 22M-KJ	ATBX 1048	I	R	MIL-C-38999	10	22M/D	KJ
CIT C2	ATC 1156	I	R	DP*M	2	COAX	DP
CIT CTA-1	ATC 1046	I	R	Metal Tool, Tweezer	10	22	CTA
CIT DPKB	ATC 1053	I	R	DPKB	2	22	DPKB
CIT DPX2MA22	ATC 1054	I	R	DPX	2	22	DPX
CIT DPXMA22-1	ATC 1052	I	R	DPXMA	2	22	DPXMA
CIT PS-CTA-22	ATC 1046	I	R	Tweezer, Pins & Sockets	10	22	D
CIT SS-14	ATCS 1105	I	R	Super Seal Connector	1	20	SS
CIT TF/FP	ATC 1032	I	R	Metal Tool, Tweezer, Filter Pins	30	--	--
	ATC 1071	I	R	D*C Connectors	23	20	D*
	ATC 1080	I	R	Equivalent NSN 5120-00-409-5217	1	20	
CET-CTA-2	ATC 3035	I & R	F & R	Tool Kit, Centi Lok Pins & Sockets	15	22	DD

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
KLIXON	ASTRO TOOL #						
	ATK 1052	I	R	Klixon circuit breaker contacts	1		
	ATK 1130	I	R	Insertion Kit - MIL-C-26482, 26500, 26636 connectors, Metal Interchangeable Probe Tool	26	12,16,20	
	ATK 2115	R	R	Removal Kit for unwired contacts, NAS 1599	17	12,16,20	
	ATK 2120	R	F	Removal Kit-MIL-C-26482, 26500, 26636 connectors, Metal Interchangeable Probe Tool	26	12,16,20	

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
LOCKHEED	ASTRO TOOL #						
L525C19-24	ATL 1112	I	R	Tip used with L525C19-44 Handle	25	16	
L525C19-28	ATL 2097	R	F	Tip used with L525C19-44 Handle	25	12	
L525C19-32	ATL 2095	R	F	Tip used with L525C19-44 Handle	25	12	69
L525C19-40	ATL 1108	I	R	Tip used with L525C19-44 Handle	25	20	
L525C19-42	ATL 1105	I	R	Tip used with L525C19-44 Handle	25	20	
L525C19-58	ATL 2040	R	F	Tip used with L525C19-44 Handle	25	20	69
L525C19-59	ATL 2064	R	F	Tip used with L525C19-44 Handle	25	16	69
L525C19-68	ATL 2044	R	F	Tip used with L525C19-44 Handle	25	20	
L525C19-69	ATL 2062	R	F	Tip used with L525C19-44 Handle	25	16	
L525C19-86	ATL 1154	I	R	Tip used with L525C19-44 Handle	25	12	
LITTON	ATL 2048	R	R	MIL-C-38999 with wire wrap pins for wrapped contacts (Developed for Litton).	-	22M	



TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
MASTER SPEC..	ASTRO TOOL #						
	ATMS 2050	R	R	Modified version of ATBX 2046, Tip .8	10	22M	
800-P2	ATMS 2062	R	R	Indicator light case contacts	-	22	
	ATMS 2073	R	R	Unwired contacts NAS 1599	17	20	
	ATMS 2101	R	R	Unwired contacts NAS 1599	17	16	
	ATMS 2148	R	R	Unwired contacts NAS 1599	17	12	
	ATMS 90562-1	R	F	MIL-C-22992, Class L Connector	-	4/0	
	ATMS 90562-2	R	F	MIL-C-22992, Class L Connector	-	2/0	
	ATMS 90562-3	R	F	MIL-C-22992, Class L Connector	-	1/0	
	ATMS 90562-4	R	F	MIL-C-22992, Class L Connector	-	2	
	ATMS 90562-5	R	F	MIL-C-22992, Class L Connector	-	4	
	ATMS 90562-6	R	F	MIL-C-22992, Class L Connector	-	6	
	ATMS 3115	R	F	MIL-C-38300 Ultra-mate Connector	-	16	
	ATMS 3080	R	F	MIL-C-38300 Ultra-mate Connector	-	20	

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
MOLEX	ASTRO TOOL #						
HT 2285	ATMO 2081	R	F	20 GA rolled contacts	6	20	
HT 2038	ATMO 2124	R	F	16 GA rolled contacts	6	16	

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
NAT'L. AERO	ASTRO TOOL #						
NAS 1664-12	ATR 1160 and	I	R	Single Tip Tool	2	12	
	ATR 2160	R	R	Metal Tool, Tweezer	10	12	
	ATR 1160-135	I	R	Modified Version of ATR 1160, 45 degree angle	2	12	
	ATR 1153	I	R	Metal Tool, Tweezer	10	12	
	ATR 2160-S	R	R	Modified Version of ATR 2160, straight	10	12	
NAS 1664-16	ATR 1107 and	I	R	Single Tip Tool	2	16	
	ATR 2112	R	R	Metal Tool, Tweezer	10	16	
	ATR 1107-135	I	R	Modified Version of ATR 1107, 45 degree angle	2	16	
	ATR 1105	I	R	Metal Tool, Tweezer	10	16	
	ATR 2112-L	R	R	Same as ATR 2112	10	16	
	ATR 2112-LS	R	R	Modified Version of ATR 2112, long tip-straight	10	16	
NAS 1664-20	ATR 1080 and	I	R	Single Tip Tool	2	20	
	ATR 2080	R	R	Metal Tool, Tweezer	10	20	
	ATR 1080-135	I	R	Modified Version of ATR 1080, 45 degree angle	2	20	
	ATR 1078	I	R	Metal Tool, Tweezer	10	20	
	ATR 2080-S	R	R	Modified Version of ATR 2080, straight	10	20	
	ATR 2109	R	R	MS3162 contacts, tip extension to one inch	10	16	

# Insertion and Removal Tool Selection Charts

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TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
POSITRONICS	ASTRO TOOL #						
9081	ATG 2103	R	F	Metal Spring-Loaded Probe Tool	8	16	
9099	AT 4004	I	R	Metal Tool, Joggled	2	16	

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
S.A.E.	ASTRO TOOL #						
M81969/33-01	ATSE 1077	I	R	MIL-C-28840	2	20	
M81969/33-02	ATSE 1078	I	R	MIL-C-28840	1	20	
M81969/34-01	ATSE 2071	R	F	MIL-C-28840	5	20	
	ATSE 2070	R	F	MIL-C-28840	5	20	
T10149-0	ATC 2565	R	R	MIL-C-5015, Rear Release	19	0	
T10149-4	ATC 2426	R	R	MIL-C-5015, Rear Release	19	4	
T10149-8	ATC 2281	R	R	MIL-C-5015, Rear Release	19	8	
T10149-12	ATSE 2166	R	R	MIL-C-5015, Rear Release	10	12	
T10149-16	ATSE 2109	R	R	MIL-C-5015, Rear Release	10	16	
T10150-0	ATF 1554	I	R	MIL-C-5015, Rear Release	2	0	
T10150-4	ATF 1359	I	R	MIL-C-5015, Rear Release	2	4	
T10150-8	ATF 1256	I	R	MIL-C-5015, Rear Release	2	8	
T10150-12	ATSE 1158-B	I	R	MIL-C-5015, Rear Release	2	12	
T10150-16	ATSE 1108	I	R	MIL-C-5015, Rear Release	2	16	
T10438	ATSE 1077	I	R	MIL-C-28840	1	20	
	ATSE 1080	I	R	Metal Tool, Joggled	2	20	
	ATSE 2049	R	R	Metal Tool, Tweezer	10	22	
	ATSE 2112	R	R	5015 connector, Tweezer	10	16	

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
TRANSITRON	ASTRO TOOL #						
PCD 91-023	ATT 1059	I	R	Metal Tool, Straight	1	22	
	ATT 1060-B	I	R	Metal Tool, Straight	1	22	
	ATT 1060-SGA	I	R	Metal Tool, Tweezer			
PCD 91-021	ATT 2059	R	R	Metal Tool, Tweezer	10	22	
	ATT 2059-S	R	R	Modified version of ATT 2059, straight	10	22	
	ATT 2060-S	R	R	Metal Tool, Tweezer, Straight	10	22	





TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
TYCO/AMP	ASTRO TOOL #						
20823-2	AT 2016	R	F	Metal Tool, Front Release, Plunger	6	16	2017
20823-3	AT 2020	R	F	Metal Tool, Front Release, Plunger	6	20	2017
200826-1	AT 1000-20	I	R	Metal Tool, Joggled	2	20	2017
200826-2	AT 1000-16	I	R	Metal Tool, Joggled	2	16	2017
305141-1	ATAMP 2302	R	F	Coaxial	6	Coax	
305183-0	A 305183	R	F	AMP 16, 20	17	16, 20	M, W
305183-2	ATAMP 2103	R	F	Metal Spring-Loaded Probe Tool	8	20	
91002-1	ATAMP 1085	I	R	Series M, Type 3	1	20, 16	M
91039-1	ATSE 1078	I	R	MIL-C-28840	1	20	Sub 20
91040-1	ATSE 2070	R	F	MIL-C-28840	5	20	Sub 20
91040-7	ATF 2518	R	F	MIL-C-5015	5	0	
91066-1	ATC 1054 and	I	R	Metal Tool, Joggled	2	22	RME
	ATC 2053	R	R	Metal Tool, Tweezer Tool	10	22	RME
91066-2, 4	ATC 1071 and	I	R	Metal Straight Probe Tool	23	20	RME
	ATC 2071	R	R	Metal Tool, Tweezer Tool	10	20	RME
91066-3	ATR 1107 and	I	R	Metal Tool, Joggled	2	16	RME
	ATR 2112	R	R	Metal Tool, Tweezer Tool	10	16	RME
91067-1	ATBX 1048 and	I	R	Metal Tool, Tweezer Tool	10	22D	
	ATBX 2046	R	R	Metal Tool, Tweezer Tool	10	22D	
91067-2	ATBX 1055 and	I	R	Metal Tool, Tweezer Tool	10	22	
	ATBX 2057	R	R	Metal Tool, Tweezer Tool	10	22	
91067-3	ATC 1076-L and	I	R		10	20	
	ATC 2076-L	R	R		10	20	
91074-1	ATAMP 2250	R	R	Metal Tool, Tweezer Tool	10	Coax	RM #5
	ATA 2073	R	F	Metal Tool, Front Release, Plunger	6	20	M
	ATA 2112	R	F	Metal Tool, Front Release, Plunger	6	16	M
202476-6	ATAMP 1231	I	R	Connector #202476-6	1		
	ATAMP 3040			Miniclip Transfer Tool for .025 Square Pins	21		
	ATAMP 3070			Transfer Tool Kit-transfers AMP terminal clips from gun to terminal's single wires.	21		

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
U.S. COMPONENTS	ASTRO TOOL #						
R.T.2260	ATBX 2046	R	R	Metal Tool, Tweezer	10	22D	
	ATUS 1050	I	R	#2260 contacts	23	22	
	ATUS 2052	R	F	Pins & Sockets, Metal Spring-Loaded Probe Tool	8	22	



# Insertion and Removal Tool Selection Charts

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TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
VEAM/WINCHESTER	ASTRO TOOL #						
107-1001	ATW 2104	R	F	Metal Spring-Loaded Probe Tool	8	16	MRAC
107-1005	AT 5002	R	F	Comparable to ATH 2102, Metal Spring-Loaded Probe Tool	8	16	MRAC
107-1007	ATW 2055	R		Flat contacts 8617	11	--	
107-1011	ATW 1055	I	R	Proto at Litton	1	22	SREC
107-1012	ATCL 2061	R	F	Winchester 4040-4024, Metal Spring-Loaded Probe Tool	8	22D	SREC
107-1015	ATH 1094	I	R	MIL-C-22857	1	16	MRAC
107-1026	ATS 2133	R	F	Submarine Connector	6	16	
	ATWC 3032	--	--	Wire comb, 8" long, hook on one end, blade on other	--	--	
	ATWC 3312	--	--	12" long phenolic 5/16" dia., point on one end, blade on other	--	--	

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
VIKING	ASTRO TOOL #						
000407-0003	ATV 1086	I	R	Metal Tool, Straight	1	20	
000407-0004	ATV 2073	R	F	Metal Spring-Loaded Probe Tool	8	20	
000407-0006	AT 2016	R	F	Miniature relay sockets	6	16	
000407-0027	ATA 1101 or	I	R	MIL-R-6106, Metal Long-Slot Tool	27	16	
	AT 1000-16	I	R	MIL-R-6106	2	16	
000407-0031	ATV 2052	R	F	Metal Spring-Loaded Probe Tool	8	22	
000407-0603	ATV 2073	R	F	Revision B, Metal Spring-Loaded Probe Tool	8	20	
980-0007-002	ATR 1107 and	I	R	NAS 1599 metal tools	2	16	
	ATR 2112	R	R	NAS 1599 metal tools	10	16	
	ATV 2075	R	F	Modified version of ATV 2073 I.D. .075, Metal Spring-Loaded Probe Tool	8	20	
	ATV3125	R	F	Impact Tool	22	20	

TOOL IDENTIFICATION NUMBERS		I/R	R/F	USAGE/ DESCRIPTION	ILL.	GAGE	CONNECTOR SERIES
VIRGINIA PANEL	ASTRO TOOL #						
166223	ATVP 2101	R	F	Locktite Extraction	--	20	
223848	ATVP 1120-2	I	R	Locktite 12	1	20	
223849	ATVP 1120-1	I	R	Locktite 14-20 AWG	1	20	
223850	ATVP 1120-3	I	R	Locktite 22-24 AWG	1	20	



# Insertion and Removal Tool Selection Charts

## Insertion and Removal Tool Selection Charts listed by Military Standard

LISTED BY MILITARY STANDARD

TOOL IDENTIFICATION NUMBERS					I/R	COMMENTS	
MILITARY STANDARD	ILL.	ASTRO TOOL #	ASTRO FUNCTIONAL ALTERNATIVE	ILL.			
MS3156-16	28	SEE M81969/1	ATR 1107 and	2	I	Used on MIL-C-81659 Series II	
			ATR 2112	10	R		
MS3156-20	28	SEE M81969/1	ATC 1072 and	2	I		
			ATC 2076	10	R		
MS3156-22	28	SEE M81969/1	ATC 1054 and	2	I		
			ATC 2053	10	R		
MS3159-12	17	ATD 2150		17	R		MIL-C-81511 Series III & IV, Unwired contacts
MS3159-16	17	ATD 2090		17	R		
MS3159-20	17	ATD 2058		17	R		
MS3159-22	17	ATD 2044		17	R		
MS3159-12A	17	0214-1251		17	R	Tip Only	
MS3159-16A	17	0214-1641		17	R	Tip Only	
MS3159-20A	17	0214-2031		17	R	Tip Only	
MS3159-22A	17	0214-2251		17	R	Tip Only	
MS3165-16	28	SEE M81969/29	ATC 2136				
MS3165-8	28	SEE M81969/29	ATC 2281	19	R	MIL-C-5015 Rear Release Contacts	
MS3165-4	28	SEE M81969/29	ATC 2426	19	R		
MS3165-0	28	SEE M81969/29	ATC 2565	19	R		
MS3323-12	4	ATA 1158	ATA 1159	2	I	MIL-C-81511 Series I & II Pins & Contacts	
MS3323-16	4	ATA 1104	ATA 1102	2	I		
MS3323-20	4	ATA 1080	ATA 1079	2	I		
MS3323-22	4	ATA 1051	ATA 1052	2	I		
MS3342-12	3	ATA 2120	ATA 2348-12*	9	R	MIL-C-81511 Series I & II Pins	
MS3342-16	3	ATA 2065	ATA 2348-16*	9	R		
MS3342-20	3	ATA 2042	ATA 2348-20*	9	R		
MS3342-23	3	ATA 2030	ATA 2348-22*	9	R		
MS3344-12	7	ATA 2093	ATA 2348-12*	9	R	MIL-C-81511 Series I & II Sockets	
MS3344-16	7	ATA 2060	ATA 2348-16*	9	R		
MS3344-20	7	ATA 2038	ATA 2348-20*	9	R		
MS3344-23	7	ATA 2026	ATA 2348-22*	9	R		
			* ATA 2348XX tool removes both pins and sockets				
MS3347-12	28	SEE M81969/14	ATR 1160 and	2	I	NAS 1599 Connector Series	
			ATR 2160	10	R		
MS3347-16	28	SEE M81969/14	ATR 1107 and	2	I		
			ATR 2112	10	R		
MS3347-20	28	SEE M81969/14	ATR 1080 and	2	I		
			ATR 2080	10	R		

Verify QPL status (if required) at time of purchase.



# Insertion and Removal Tool Selection Charts

LISTED BY MILITARY STANDARD

## CHART ABBREVIATIONS

**I/R** Insertion or Removal designation column  
**I** Insertion Tool  
**R** Removal Tool

**I & R** Insertion & Removal Tool designation column  
**R/F** Rear or Front Release designation column  
**R** Rear Release

**F** Front Release  
**R & F** Rear and Front Release  
**ILL** Illustration reference number  
**GA** Gage designation  
**NAATT** Not Available At This Time

TOOL IDENTIFICATION NUMBERS					I/R	COMMENTS
MILITARY STANDARD	ILL.	ASTRO TOOL #	ASTRO FUNCTIONAL ALTERNATIVE	ILL.		
MS3448-001	17	ATK 2115		17	R	NAS 1599 Unwired contacts
MS3448-001A	17	0161-0031		17	R	Tip Only
	17	ATMS 2073		17	R	Single Tip Tool
MS3448-001B	17	0160-0041		17	R	Tip Only
	17	ATMS 2101		17	R	Single Tip Tool
MS3448-001C	17	0159-0051		17	R	Tip Only
	17	ATMS 2148		17	R	Single Tip Tool
MS3483-1 (or size 8)	19	ATC 2281		19	R	MIL-C-5015 Rear Release Contacts
MS3483-2 (or size 4)	19	ATC 2426		19	R	
MS3483-3 (or size 0)	19	ATC 2565		19	R	
MS17805	1	ATH 1094	AT 4002	2	I	MIL-C-22857 Connector Series
MS17806	7	ATH 2102	AT 5002	8	R	
MS18278-1	19	NONE	ATC 1072 and	2	I	MIL-C-24308 Connector Series
			ATC 2076	10	R	
MS24256A-12	27	ATA 1144	AT 1000-12	2	I	MIL-C-26482, 265000 & 26636 Connectors
MS24256A-16	27	ATA 1101	AT 1000-16	2	I	
MS24256A-20	27	ATA 1086	AT 1000-20	2	I	
MS24256B-20	27	ATB 1064	ATB 1067 or	1	I	
			ATB 1068	1	I	
MS24256K	26	ATK 1130			I	
MS24256R-12	6	AT 2012			R	
MS24256R-16	6	AT 2016			R	
MS24256R-20	6	AT 2020			R	
MS24256RH-16	--	ATMS 3115		--	R	
MS24256RH-20	--	ATMS 3080		--	R	
MS27495A-12	10	ATBX 1157	ATBX 1154	2	I	MIL-C-38999 Connectors -"S" designates straight in-line version
MS27495A-16	10	ATBX 1108	ATR 1107	2	I	
MS27495A-20	10	ATBX 1072	ATBX 1073	2	I	
MS27495A-22	10	ATBX 1058	ATBX 1055	2	I	
MS27495A-22D	10	ATBX 1048	ATBX 1049	2	I	
MS27495A-22M	10	ATBX 1048	ATBX 1049	2	I	
MS27495A-12-S	10	ATBX 1159			I	
MS27495A-16-S	10	ATBX 1109			I	
MS27495A-20-S	10	ATBX 1078			I	
MS27495A-22-S	10	ATBX 1060			I	
MS27495A-22D-S	10	ATBX 1054			I	
MS27495A-22M-S	10	ATBX 1054			I	

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TOOL IDENTIFICATION NUMBERS					I/R	COMMENTS
MILITARY STANDARD	ILL.	ASTRO TOOL #	ASTRO FUNCTIONAL ALTERNATIVE	ILL.		
MS27495R-12	10	ATBX 2155			R	MIL-C-38999 Connectors - "S" designates straight in-line version
MS27495R-16	10	ATBX 2103			R	
MS27495R-20	10	ATBX 2070			R	
MS27495R-22	10	ATBX 2057			R	
MS27495R-22D	10	ATBX 2046			R	
MS27495R-22M	10	ATBX 2046			R	
MS27495R-12-S	10	ATBX 2160			R	
MS27495R-16-S	10	ATBX 2109			R	
MS27495R-20-S	10	ATBX 2073			R	
MS27495R-22-S	10	ATBX 2059			R	
MS27495R-22D-S	10	ATBX 2050			R	
MS27495R-22M-S	10	ATBX 2050			R	
MS27509	28	NONE	Use MS27495 series tools	10	I & R	MIL-C-38999 Connectors - plastic double-ended tool
MS27534	28	SEE M81969/14	Use MS27495 series tools	10	I & R	MIL-C-38999 Connectors - plastic double-ended tool
M83723-12	28	SEE M81969/14	ATR 1160 and	2	I	Astro Metal Equivalents for Plastic Tools
			ATR 2160	10	R	
M83723-16	28	SEE M81969/14	ATR 1107 and	2	I	
			ATR 2112	10	R	
M83723-20	28	SEE M81969/14	ATR 1080 and	2	I	
			ATR2080	10	R	
MS90455-0	27	ATF 1558	ATF 1554	2	I	MIL-C-005015 Connectors
MS90455-4	27	ATF 1378	ATF 1359	2	I	
MS90455-8	27	ATF 1260	ATF 1256	2	I	
MS90455-12	27	ATF 1144	ATF 1160	2	I	
MS90455-16	27	ATF 1101	ATF 1105	2	I	
MS90456-0	5	ATF 2518		5	R	MIL-C-005015 Series 3400 & MIL-C-81659 (16 GA only) front release contacts
MS90456-4	5	ATF 2336		5	R	
MS90456-8	5	ATF 2252		5	R	
MS90456-12	5	ATF 2162		5	R	
MS90456-16	5	ATF 2115		5	R	
MS90562-1	--	ATMS 90532-1		--	R	MIL-C-22992, Class I Connector, MS90566, MS90559 & MS90560
MS90562-2	--	ATMS 90532-2		--	R	
MS90562-3	--	ATMS 90532-3		--	R	
MS90562-4	--	ATMS 90532-4		--	R	
MS90562-5	--	ATMS 90532-5		--	R	
MS90562-6	--	ATMS 90532-6		--	R	

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# Plastic Insertion & Removal Tool Selection Charts

LISTED BY MIL #

## Plastic Insertion and Removal Tool Selection Charts listed by MIL#

### CHART ABBREVIATIONS

**I/R** Insertion or Removal designation column  
**I** Insertion Tool  
**R** Removal Tool

**I & R** Insertion & Removal Tool designation column  
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**R** Rear Release

**F** Front Release  
**R & F** Rear and Front Release  
**ILL** Illustration reference number  
**GA** Gage designation  
**NAATT** Not Available At This Time

MIL #	MANUFACTURERS P/N	COLOR CODE	SIZE	APPLICATION REFERENCE	ASTRO TOOL METAL EQUIVALENT	
MIL-C-83723	83723/31-12	Yellow - Ins.		83723	ATML 08209B	
		White - Rem.		83723	ATML 08210B	
	83723/31-16	Blue - Ins.		83723	ATML 08207B	
		White - Rem.		83723	ATML 08208B	
	83723/31-20	Red - Ins.		83723	ATML 08205B	
		White - Rem.		83723	ATML 08206B	
	83723/31-22	Brown - Ins.		83723	ATBX 1058	
		White - Rem.		83723	ATBX 2057	
	83723/31-22D	Black - Ins.		83723	ATBX 1048	
		White - Rem.		83723	ATBX 2046	
MIL-I-81969	M81969/1-01*	Green - Ins.	22	MIL-C-24308	ATC 1054	
		White - Rem.		MIL-C-81659 Series II	ATC 2053	
	M81969/1-02*	Red - Ins.	20	MIL-C-24308	ATC 1076-L	
		White - Rem.		MIL-C-81659 Series II	ATC 2076-L	
	M81969/1-03*	Blue - Ins.	16	MIL-C-81659 Series II	ATR 1105	
		White - Rem.			ATR 2112	
	M81969/1-04*	Green - Ins.	22D	MIL-C-24308	--	
		White - Rem.				
	* Plastic body with metal tips					
	M81969/14-01	Green - Ins.	22D	MIL-C-38999	ATML 0801B (Ins.)	
				MIL-C-24308	ATML 0802B (Rem.)	
				MIL-C-83733		
				MIL-T-81714		
				MIL-C-55302/68/69		
	M81969/14-02	Red - Ins.	20	MIL-C-38999	ATML 0805B (Ins.)	
		White - Rem.			ATML 0806B (Rem.)	
				ATR 1078 (Ins.)		
			MIL-C-26482 Series II	ATR 2080 (Rem.)		
			MIL-C-81703 Series III	ATML 08205B (Ins.)		

MIL #	MANUFACTURERS P/N	COLOR CODE	SIZE	APPLICATION REFERENCE	ASTRO TOOL METAL EQUIVALENT
MIL-I-81969	M81969/14-02			MIL-C-83723 Series I & III	ATML 08206B (Rem.)
				MIL-C-83733	
				MIL-T-81714 (Size 20 & 22)	
	M81969/14-03	Blue - Ins.	16	MIL-C-38999	ATML 0807B (Ins.)
				White - Rem.	ATML 0808B (Rem.)
				MIL-C-5015 (MS3450 Series)	ATR 1105 (Ins.)
				MIL-C-26482 Series II	ATR 2112 (Rem.)
				MIL-C-81703 Series III	ATML 08207B (Ins.)
				MIL-C-83723	ATML 08208B (Rem.)
				MIL-T-81714	
				MIL-C-83733	
	M81969/14-04	Yellow - Ins.	12	MIL-C-38999	ATML 0809B (Ins.)
				White - Rem.	ATML 0810B (Rem.)
				MIL-C-5015 (MS3450 Series)	ATR 1153 (Ins.)
				MIL-C-81703 Series III	ATR 2160 (Rem.)
				MIL-T-81714 Series III	ATML 08209B (Ins.)
				MIL-C-83723	ATML 08210B (Ins.)
				MIL-C-83723	
				MIL-C-26482 Series II	
			MIL-C-81659		
M81969/14-05		Gray - Ins.	10	MIL-C-38999	ATML 0811B (Ins.)
		White - Rem.		ATML 0812B (Rem.)	

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LISTED BY MIL #

MIL #	MANUFACTURERS P/N	COLOR CODE	SIZE	APPLICATION REFERENCE	ASTRO TOOL METAL EQUIVALENT	
MIL-I-81969	M81969/14-06	Red - Rem.	8	MIL-C-83723	ATML 0813B (Ins.)	
				MIL-C-5015	ATML 0814B (Rem.)	
				Suggested Application	Suggested ATML 1501	
	M81969/14-07	Blue - Rem.	4	MIL-C-83723	Suggested ATML 1502	
				MIL-C-5015		
	M81969/14-08	Yellow - Rem.	0	MIL-C-83723	Suggested ATML 1503	
				MIL-C-5015		
	M81969/14-09	Brown - Ins.	22	MIL-C-55302/169, MIL-C-55302/171 only	ATML 0803B (Ins.)	
		White - Rem.			ATML 0804B (Rem.)	
	M81969/14-10	Red - Ins.	20	MIL-C-38999	ATML 0805B (Ins.)	
				Orange-Rem.		ATML 0806B (Rem.)
	M81969/14-11	Red - Ins.	20	MIL-C-26482 Series II	ATML 08205B (Ins.)	
				White - Rem.	MIL-C-81703 Series III	ATML 08206B (Rem.)
					MIL-C-83723 Series I & III	
					MIL-C-83733	
					MIL-T-81714 (Size 20 & 22)	
	M81969/14-12	Green - Rem.	8	MIL-C-38999	ATML 0813B (Ins.)	
					ATML 0814B (Rem.)	
	M81969/29-01	Blue - Rem.	16	MIL-C-5015	Suggest ATC 2136	
	M81969/29-02	Red - Rem.	8	MIL-C-5015	ATC 2281	
	M81969/29-03	Blue - Rem.	4	MIL-C-5015	ATC 2426	
	M81969/29-04	Yellow - Rem.	0	MIL-C-5015	ATC 2565	
	M81969/39	Green - Ins.		MIL-C-24308	Suggest ATC 1072	
White - Rem.			(Size 20)	Suggest ATC 2076		

MIL #	MANUFACTURERS P/N	COLOR CODE	SIZE	APPLICATION REFERENCE	ASTRO TOOL METAL EQUIVALENT	
M81969/29	MS3165-0			MIL-C-5015	ATC 2565	
	MS3165-4			MIL-C-5015	ATC 2426	
	MS3165-8			MIL-C-5015	ATC 2281	
M81969/14	MS27534-12	White - Rem.		MIL-C-38999	ATBX 2155	
		Yellow - Ins.		MIL-C-38999	ATBX 1157	
	MS27534-16	White - Rem.		MIL-C-38999	ATBX 2103	
		Blue - Ins.		MIL-C-38999	ATBX 1108	
	MS27534-20	White - Rem.		MIL-C-38999	ATBX 2070	
		Red - Ins.		MIL-C-38999	ATBX 1072	
	MS27534-22	White - Rem.		MIL-C-38999	ATBX 2057	
		Brown - Ins.		MIL-C-38999	ATBX 1058	
	MS27534-22D	White - Rem.		MIL-C-38999	ATBX 2046	
		Black - Ins.		MIL-C-38999	ATBX 1048	
	MS27534-22M	White - Rem.				
		Black - Ins.		MIL-C-38999	ATBX 1048	
	NAS 1664-12	Yellow - Ins.			NAS 1599 Connector	ATR 1160
		White - Rem.			NAS 1599 Connector	ATR 2160
	NAS 1664-16	Blue - Ins.			NAS 1599 Connector	ATR 1107
White - Rem.				NAS 1599 Connector	ATR 2112	
NAS 1664-20	Red - Ins.			NAS 1599 Connector	ATR 1080	
	White - Rem.			NAS 1599 Connector	ATR 2080	

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# Plastic Insertion & Removal Tool Selection Charts

LISTED BY MANUFACTURER

## Plastic Insertion and Removal Tool Selection Charts listed by Manufacturer

MANUFACTURER	MANUFACTURERS P/N	COLOR CODE	APPLICATION REFERENCE	ASTRO TOOL METAL EQUIVALENT	
<b>AMPHENOL</b>	294-108	Red - Ins.	NAS 1664-20	ATR 1080	
		White - Rem.	NAS 1664-20	ATR 2080	
	294-109	Blue - Ins.	NAS 1664-16	ATR 1107	
		White - Rem.	NAS 1664-16	ATR 2112	
	294-110	Yellow - Ins.	NAS 1664-12	ATR 1160	
		White - Rem.	NAS 1664-12	ATR 2160	
<b>AMPHENOL / BENDIX</b>	MS27534-22D	Black - Ins.	JT/LJT, MIL-C-38999	ATBX 1048	
		White - Rem.	JT/LJT, MIL-C-38999	ATBX 2046	
	MS27534-22	Brown - Ins.	JT/LJT, MIL-C-38999	ATBX 1058	
		White - Rem.	JT/LJT, MIL-C-38999	ATBX 2057	
	MS27534-20	Red - Ins.	JT/LJT, MIL-C-38999	ATBX 1072	
		White - Rem.	JT/LJT, MIL-C-38999	ATBX 2070	
	MS27534-16	Blue - Ins.	JT/LJT, MIL-C-38999	ATBX 1108	
		White - Rem.	JT/LJT, MIL-C-38999	ATBX 2103	
	MS27534-12	Yellow - Ins.	JT/LJT, MIL-C-38999	ATBX 1157	
		White - Rem.	JT/LJT, MIL-C-38999	ATBX 2155	
	<b>AMPHENOL / MATRIX</b>	6500-001-12	Yellow - Ins.		ATR 1160
			White - Rem.		ATR 2160
6500-018-0		Yellow-Rem.	MS3165-0	ATC 2565	
6500-018-4		Blue - Rem.	MS3165-0	ATC 2426	
6500-018-4		Red - Rem.	MS3165-0	ATC 2281	
6500-028-12		White - Rem.	NAS 1599 Connector	ATR 2157	
6500-029-12		White - Rem.	NAS 1599 Connector	ATR 2160	
6500-030-12		Yellow - Ins.	NAS 1599 Connector	ATGH 1160	
6500-028-16		White - Rem.	NAS 1599 Connector	ATR 2106	
6500-029-16		White - Rem.	NAS 1599 Connector	ATR 2112	
6500-030-16		Blue - Ins.	NAS 1599 Connector	ATGH 1112	
6500-028-20		White - Rem.	NAS 1599 Connector	ATR 2080	
6500-029-20		White - Rem.	NAS 1599 Connector	ATR 2080	
6500-030-20		Red - Ins.	NAS 1599 Connector	ATGH 1079	
6500-045-20		Green - Ins.		ATC 1071	
		White - Rem.		ATC 2076	
<b>BURNDY/FCI</b>		RXT 22-10	Red - Ins.		ATR 1080
			White - Rem.		ATR 2080
	RXT 16-1	Blue - Ins.		ATR 1107	
		White - Rem.		ATR 2112	
	RXT 12-1	Yellow - Ins.		ATR 1160	
		White - Rem.		ATR 2160	
<b>DEUTSCH</b>	81515-23	Yellow - Ins.	81511 3 & 4	ATD 1049	
		White - Rem.	81511 3 & 4	ATD 2047	
	81515-20	Red - Ins.	81511 3 & 4	ATD 1061	
		White - Rem.	81511 3 & 4	ATD 2062	
	81515-16	Blue - Ins.	81511 3 & 4	ATD 1094	
		White - Rem.	81511 3 & 4	ATD 2094	
	M15570-12	Yellow - Ins.	83723	ATR 1160	
		White - Rem.	83723	ATR 2160	
	M15570-16	Blue - Ins.	83723	ATR 1107	
		White - Rem.	83723	ATR 2112	

MANUFACTURER	MANUFACTURERS P/N	COLOR CODE	APPLICATION REFERENCE	ASTRO TOOL METAL EQUIVALENT
<b>DEUTSCH (con't)</b>	M15570-20	Red - Ins.	83723	ATR 1080
		White - Rem.	83723	ATR 2080
	M15570-22	Green - Ins.	83723	ATC 1054
		White - Rem.	83723	ATD 2048
	M15570-22-1	Yellow - Ins.	83723	ATD 1035
		White - Rem.	83723	ATD 2047
<b>ITT/CANNON</b>	CET-0-1		MIL-C005015 Series	ATC 2565
	CET-4-8		MIL-C005015 Series	ATC 2526
	CET-8-2		MIL-C005015 Series	ATC 2281
	CET-12-4		DPD	ATR 2160
	CET-16-9		DPJ	ATR 2112
	CET-20-8	Red - Rem.	83723-20	ATR 2080
	CET-20-11	Green - Rem.	D*MA	ATC 2071
	CET-20-11HD	Green - Rem.	D*MA	ATC 2076
	CET-20-14		DF D*MA	ATR 2080
	CET-C8		MIL-C005015 Series	ATC 2281
	CIET 12	Yellow - Ins.	NAS 1664-12	ATR 1160
		White - Rem.	NAS 1664-12	ATR 2160
	CIET 16	Blue - Ins.	NAS 1664-16	ATR 1107
		White - Rem.	NAS 1664-16	ATR 2112
	CIET 20	Red - Ins.	NAS 1664-20	ATR 1080
		White - Rem.	NAS 1664-20	ATR 2080
	CIET 20-18	- Ins.	D*C	ATC 1081
		White - Rem.	D*C	ATC 2076
	CIET 20HD	- Ins.	D*C	ATC 1076
		White - Rem.	D*C	ATC 2076
	CIET 20HDL	- Ins.	D*C	ATC 1076-L
		White - Rem.	D*C	ATC 2076-L
CIET 22	Yellow - Ins.	DPX*MA	ATC 1054	
	White - Rem.	DPX*MA	ATC 2053	
CIET 22D		38999		
		38999		
<b>TRANSITRON</b>	91-021	White - Rem.		ATT 2059
	91-023	Green - Ins.		ATT 1059
<b>TYCO/AMP</b>	91066-1	Black - Ins.	MS3156-22	ATC 1054
		White - Rem.	MS3156-22	ATC 2053
	91066-4	Red - Ins.	MS3156-20	ATC 1071
		White - Rem.	MS3156-20	ATC 2071
	91066-3	Blue - Ins.	MS3156-16	ATR 1107
		White - Rem.	MS3156-16	ATR 2112
	91067-1	Black - Ins.	MS27534-22M	ATBX 1048
		White - Rem.	MS27534-22M	ATBX 2046
91067-2	Yellow - Ins.	MS27534-22	ATBX 1055	
	White - Rem.	MS27534-22	ATBX 2057	

Verify QPL status (if required) at time of purchase.





## Special Service Tools for Connectors

LISTED BY ASTRO TOOL #

VARIOUS SPECIAL TOOLS FOR CONNECTORS		
ASTRO TOOL #	NOMENCLATURE	USAGE
ATA 3120	Wire Contact Clip	Insertion & removal clip for 16 GA.
ATAMP 3040	Miniclip Transfer Tool	Transfers terminal clips for .025 square pins.
ATAMP 3070	Transfer Tool Kit HAC #722698-329	Transfers AMP terminal clips from gun to terminal's single wires.
ATBX 3050	Special Removal Tool	Special rear release tool for 22M/D contact using .060 dia. wire.
ATBX 3-6147-1	Special Connector Plier	Assembly & disassembly of connectors.
ATC 2046-100	Compliant Pin Tool	Insertion/removal of compliant pins
ATD 3312	Wire Comb	Six inch long phenolic 5/16" diameter with a point on one end and a blade on the other end.
ATH 3037-12	Contact Guide	Twelve inch long guide used on rear insert 22 GA contacts.
ATH 3037-18	Contact Guide	Eighteen inch long guide used on rear insert 22 GA contacts.
ATH 3260, 3261, 3262, & 3263	Forming Plier	Forms joggled leads for flatpack circuits while removing from carrier - HAC P/N 772699-224, -1, -2, & -3.
ATWC 3032	Wire Comb	Eight inch long metal comb with a hook on one end and a blade on the other end.
ATWC 3312	Wire Comb	Twelve inch long phenolic 5/16" diameter with a point on one end and a blade on the other end.

METAL UNWIRED CONTACT TOOL		
ASTRO TOOL #	NOMENCLATURE	USAGE
ATX 2001	Metal Unwired Contact Tool	MIL-C-38999 Uncrimped Contacts
ATX 2002	Metal Unwired Contact Tool	MIL-C-38999 Uncrimped Contacts
ATX 2003	Metal Unwired Contact Tool	MIL-C-38999 Uncrimped Contacts
ATX 2004	Metal Unwired Contact Tool	MIL-C-38999 Uncrimped Contacts
ATX 2005	Metal Unwired Contact Tool	MIL-C-38999 Uncrimped Contacts
ATX 2006	Metal Unwired Contact Tool	NAS-1599 Uncrimped Contacts
ATX 2007	Metal Unwired Contact Tool	NAS-1599 Uncrimped Contacts
ATX 2008	Metal Unwired Contact Tool	NAS-1599 Uncrimped Contacts
ATX 2009	Metal Unwired Contact Tool	Deutsch RSM & RTK Uncrimped Contacts
ATX 2010	Metal Unwired Contact Tool	Cannon D*C Uncrimped Contacts
ATX 2011	Metal Unwired Contact Tool	Cannon CK, DPX2MA, DPKB Uncrimped Contacts
ATX 2012	Metal Unwired Contact Tool	Douglas 2022B Uncrimped Contacts
ATX 2013	Metal Unwired Contact Tool	G & H Tech. Uncrimped Contacts (ATGH 2054)
ATX 2014	Metal Unwired Contact Tool	MIL-C-38999 Uncrimped Contacts

RETENTION TEST TOOLS		
ASTRO TOOL #	NOMENCLATURE	USAGE
ATC 3074	Retention Test Tool	Tests contact retention in 22 GA Connector.
ATC 3075	Retention Test Tool	Tests contact retention in 20 GA Connector.
ATC 3076	Retention Test Tool	Tests contact retention in 16 GA Connector.
ATC 3077	Retention Test Tool	Tests contact retention in 12 GA Connector.
The above Retention Test Tool are designed to universally cover MIL-C-5015, MIL-C-26482, MIL-C-26500, MIL-C-38999, MIL-C-81511, MIL-C-83723, MIL-C-81703. Consult the factory for special applications.		
ATC 3078	Retention Test Tool	Tests pin and socket contact retention in co-axial connector.



# Mil-I-81969 Cross Reference Chart

LISTED BY MIL DOCUMENT

## MIL-I-81969 Cross Reference Chart

### CHART ABBREVIATIONS

**I/R** Insertion or Removal designation column  
**I** Insertion Tool  
**R** Removal Tool

**I & R** Insertion & Removal Tool  
**R/F** Rear or Front Release designation column  
**R** Rear Release

**F** Front Release  
**R & F** Rear and Front Release  
**ILL** Illustration reference number  
**GA** Gage designation  
**NAATT** Not Available At This Time

CURRENT DOCUMENT	ASTRO TOOL #	I/R	ILL.	GAGE	SUPERSEDED DOCUMENT
MIL-I-81969/1-01	M81969/1-01	I & R	28	22	MS3156-22
MIL-I-81969/1-02	M81969/1-02	I & R	28	20	MS3156-20, MS24308/18-2
MIL-I-81969/1-03	M81969/1-03	I & R	28	16	MS3156-16, MS24308/18-3
MIL-I-81969/1-04	M81969/1-04	I & R	28	22D	MS24308/18-1
<b>FOR ASTRO'S METAL EQUIVALENTS OF /1 TOOLS SEE PAGE 73.</b>					
MIL-I-81969/2-01	ATML 0201	I	4	23	MS3323-22
MIL-I-81969/2-02	ATML 0202	I	4	20	MS3323-20
MIL-I-81969/2-03	ATML 0203	I	4	16	MS3323-16
MIL-I-81969/2-04	ATML 0204	I	4	12	MS3323-12
MIL-I-81969/3-01	ATML 0301	R	7	23	MS3344-23
MIL-I-81969/3-02	ATML 0302	R	7	20	MS3344-20
MIL-I-81969/3-03	ATML 0303	R	7	16	MS3344-16
MIL-I-81969/3-04	ATML 0304	R	7	12	MS3344-12
MIL-I-81969/3-05	ATML 0305	R	3	23	MS3344-23
MIL-I-81969/3-06	ATML 0306	R	3	20	MS3344-20
MIL-I-81969/3-07	ATML 0307	R	3	16	MS3344-16
MIL-I-81969/3-08	ATML 0308	R	3	12	MS3344-12
MIL-I-81969/4-01		R			MIL-C-55302/106
MIL-I-81969/4-02		R			
MIL-I-81969/5-01		I			MIL-C-55302/105
MIL-I-81969/6-01		R			MIL-C-21097/18C
MIL-I-81969/7-01		I & R			MIL-C-21097/12B
MIL-I-81969/8-01	ATML 0801B	I	10	22M	MS27495A22M, M55302/79-01
MIL-I-81969/8-02	ATML 0802B	R	10	22M	MS27495R22M, M55302/79-02
MIL-I-81969/8-03	ATML 0803B	I	10	22	MS27495A22
MIL-I-81969/8-04	ATML 0804B	R	10	22	MS27495R22
MIL-I-81969/8-05	ATML 0805B	I	10	20	MS27495A20
MIL-I-81969/8-06	ATML 0806B	R	10	20	MS27495R20
MIL-I-81969/8-07	ATML 0807B	I	10	16	MS27495A16
MIL-I-81969/8-08	ATML 0808B	R	10	16	MS27495R16
MIL-I-81969/8-09	ATML 0809B	I	10	12	MS27495A12
MIL-I-81969/8-10	ATML 0810B	R	10	12	MS27495R12
MIL-I-81969/8-11	ATML 0811B	I	10	10	
MIL-I-81969/8-12	ATML 0812B	R	10	10	

CURRENT DOCUMENT	ASTRO TOOL #	I/R	ILL.	GAGE	SUPERSEDED DOCUMENT
MIL-I-81969/8-13	ATML 0813B	I	10	8	
MIL-I-81969/8-14	ATML 0814B	R	10	8	
MIL-I-81969/8-205	ATML 08205B	I	10	20	
MIL-I-81969/8-206	ATML 08206B	R	10	20	
MIL-I-81969/8-207	ATML 08207B	I	10	16	
MIL-I-81969/8-208	ATML 08208B	R	10	16	
MIL-I-81969/8-209	ATML 08209B	I	10	12	
MIL-I-81969/8-210	ATML 08210B	R	10	12	
MIL-I-81969/9-01		R			MIL-C-55302/28-01
MIL-I-81969/10-01		I			MIL-C-55302/86
MIL-I-81969/10-02		R			
MIL-I-81969/11-01		R			MIL-C-28731/22
MIL-I-81969/12-01	ATML 1201	I & R	10	22	--
MIL-I-81969/11-01		R			MIL-C-28731/22
MIL-I-81969/12-01	ATML 1201	I & R	10	22	--
MIL-I-81969/12-02	ATML 1202	I & R	10	22	--
MIL-I-81969/13-01	ATML 1301	I			MIL-C-28731/21
MIL-I-81969/14-01	M81969/14-01	I & R	28	22D	MS27534-22D
MIL-I-81969/14-02	M81969/14-02	I & R	28	20	NAS 1664-20, MS3447-20, M83723/31-20, MS27534-20
MIL-I-81969/14-03	M81969/14-03	I & R	28	16	NAS 1664-16, MS3447-16, M83723/31-16, MS27534-16
MIL-I-81969/14-04	M81969/14-04	I & R	28	12	NAS 1664-12, MS3447-12, M83723/31-12
MIL-I-81969/14-05	M81969/14-05	I & R	28	10	
MIL-I-81969/14-06	M81969/14-06	R	28	8	
MIL-I-81969/14-07	M81969/14-07	R	28	4	
MIL-I-81969/14-08	M81969/14-08	R	28	0	
MIL-I-81969/14-09	M81969/14-09	I & R	28	22	
MIL-I-81969/14-10	M81969/14-10	I & R	28	20	
MIL-I-81969/14-11	M81969/14-11	I & R	28	20	
MIL-I-81969/14-12	M81969/14-12	R	28	8	
<b>FOR ASTRO'S METAL EQUIVALENTS OF /14 TOOLS SEE PAGE 73 &amp; 74.</b>					



CURRENT DOCUMENT	ASTRO TOOL #	I/R	ILL.	GAGE	SUPERSEDED DOCUMENT
MIL-I-81969/15-01	ATML 1501	R	19	8	MS3483-1
MIL-I-81969/15-02	ATML 1502	R	19	4	MS3483-2
MIL-I-81969/15-03	ATML 1503	R	19	0	MS3483-3
MIL-I-81969/16-01	M81969/16-01	I & R	28	20	MS3160-20
MIL-I-81969/16-02	M81969/16-02	I & R	28	16	MS3160-16
MIL-I-81969/16-03	M81969/16-03	I & R	28	12	MS3160-12
MIL-I-81969/16-04	M81969/16-04	I & R	28	22	MS3160-22
MIL-I-81969/17-01	ATML 1701	I	27	16	MS90455-16
MIL-I-81969/17-02	ATML 1702	I	27	12	MS90455-12
MIL-I-81969/17-03	ATML 1703	I	27	20	MS90455-A20
MIL-I-81969/17-04	ATML 1704	I	27	16	MS90455-A16
MIL-I-81969/17-04	ATML 1704	I	27	16	MS90455-A16
MIL-I-81969/17-05	ATML 1705	I	27	12	MS90455-A12
MIL-I-81969/17-06	ATML 1706	I	27	8	MS90455-8
MIL-I-81969/17-07	ATML 1707	I	27	4	MS90455-4
MIL-I-81969/17-08	ATML 1708	I	27	0	MS90455-0
MIL-I-81969/17-09	ATML 1709	I	27	20	MS90455-B20
MIL-I-81969/18-01	ATML 1801	I	1	16, 20	MS17805
MIL-I-81969/18-02	ATML 1802	I	1	22	
MIL-I-81969/19-01	ATML 1901	R	5	16	MS90456-16
MIL-I-81969/19-02	ATML 1902	R	5	12	MS90456-12
MIL-I-81969/19-03	ATML 1903	R	5	8	MS90456-8
MIL-I-81969/19-04	ATML 1904	R	5	4	MS90456-4
MIL-I-81969/19-05	ATML 1905	R	5	0	MS90456-0
MIL-I-81969/19-06					
MIL-I-81969/19-07	ATML 1907	R	6	20	MS24256-R20
MIL-I-81969/10-01		I			MIL-C-55302/86
MIL-I-81969/10-02		R			
MIL-I-81969/11-01		R			MIL-C-28731/22
MIL-I-81969/12-01	ATML 1201	I & R	10	22	--
MIL-I-81969/19-08	ATML 1908	R	6	16	MS24256-R16
MIL-I-81969/19-09	ATML 1909	R	6	12	MS24256-R12
MIL-I-81969/19-10	ATML 1910	R	--	20	MS24256-RH20
MIL-I-81969/19-11	ATML 1911	R	--	16	MS24256-RH16

CURRENT DOCUMENT	ASTRO TOOL #	I/R	ILL.	GAGE	SUPERSEDED DOCUMENT
MIL-I-81969/20-01	ATML 2001	R	7	16, 20	MS17806
MIL-I-81969/20-02	ATML 2002	R	--	22	--
MIL-I-81969/21-01	ATML 2101	I & R	--	--	--
MIL-I-81969/22-01	ATML	R	--	16, 20	--
MIL-I-81969/23-01	ATML	I	--	16, 20	--
MIL-I-81969/23-02	ATML	I	--	16, 20	--
MIL-I-81969/23-03	ATML	I	--	16, 20	--
MIL-I-81969/23-04	ATML	I	--	16, 20	--
MIL-I-81969/24-01		R	--	--	--
MIL-I-81969/25-01		I & R		18	
MIL-I-81969/25-02		I & R		18	
MIL-I-81969/25-03		I & R		16	
MIL-I-81969/25-04		I & R		16	
MIL-I-81969/25-05		I & R		16	
MIL-I-81969/25-06		I & R		16	
MIL-I-81969/26-01		R		--	--
MIL-I-81969/27-01	ATML 2701	R	--	4/0	MS90562-1
MIL-I-81969/27-02	ATML 2702	R	--	2/0	MS90562-2
MIL-I-81969/27-03	ATML 2703	R	--	1/0	MS90562-3
MIL-I-81969/27-04	ATML 2704	R	--	2	MS90562-4
MIL-I-81969/27-05	ATML 2705	R	--	4	MS90562-5
MIL-I-81969/27-06	ATML 2706	R	--	6	MS90562-6
MIL-I-81969/28-01	ATML 2801	R	--	5, 9	MS3178-001
MIL-I-81969/28-02	ATML 2802	R	--	12	MS3178-002
MIL-I-81969/28-03	ATML 2803	R	--	8	--
MIL-I-81969/29-01	M81969/29-01	R	--	16	MS3165-16
MIL-I-81969/29-02	M81969/29-02	R	--	8	MS3165-8, M83723/32-08
MIL-I-81969/29-03	M81969/29-03	R	--	4	MS3165-4, M83723/32-04
MIL-I-81969/29-04	M81969/29-04	R	--	0	MS3165-0, M83723/32-00
<b>FOR ASTRO'S METAL EQUIVALENTS OF /29 TOOLS SEE PAGE 74.</b>					

Verify QPL status (if required) at time of purchase.



# Mil-I-81969 Cross Reference Chart

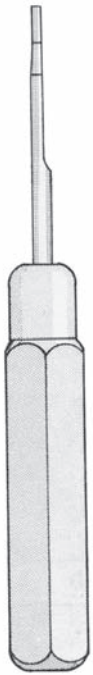
LISTED BY MIL DOCUMENT

CURRENT DOCUMENT	ASTRO TOOL #	I/R	ILL.	GAGE	SUPERSEDED DOCUMENT
MIL-I-81969/30B-01	ATML 3001B	R	17	22	MS3159-22
MIL-I-81969/30B-02	ATML 3002B	R	17	20	MS3159-20
MIL-I-81969/30B-03	ATML 3003B	R	17	16	MS3159-16
MIL-I-81969/30B-04	ATML 3004B	R	17	12	MS3159-12
MIL-I-81969/30B-05	ATML 3005B	R	17	20	MS3448-001A
MIL-I-81969/30B-06	ATML 3006B	R	17	16	MS3448-001B
MIL-I-81969/30B-07	ATML 3007B	R	17	12	MS3448-001C
MIL-I-81969/30B-08	ATML 3008B	R	17	22D	
MIL-I-81969/30B-09	ATML 3009B	R	17	22M	
MIL-I-81969/30B-10	ATML 3010B	R	17	22	
MIL-I-81969/30B-11	ATML 3011B	R	17	20	
MIL-I-81969/30B-12	ATML 3012B	R	17	16	
MIL-I-81969/30B-13	ATML 3013B	R	17	12	
MIL-I-81969/30B-19	ATML 3019B	R	17	22D-12	
MIL-I-81969/30B-20	ATML 3020B	R	17	--	
MIL-I-81969/30B-21	ATML 3021B	R	17	22	
MIL-I-81969/30B-22	ATML 3022B	R	17	20	
MIL-I-81969/30B-23	ATML 3023B	R	17	16	
MIL-I-81969/30B-24	ATML 3024B	R	17	12	
MIL-I-81969/30B-25	ATML 3025B	R	17	20	
MIL-I-81969/30B-26	ATML 3026B	R	17	16	
MIL-I-81969/30B-27	ATML 3027B	R	17	12	
MIL-I-81969/30B-28	ATML 3028B	R	17	22D	
MIL-I-81969/30B-29	ATML 3029B	R	17	22M	
MIL-I-81969/30B-30	ATML 3030B	R	17	22	
MIL-I-81969/30B-31	ATML 3031B	R	17	20	
MIL-I-81969/30B-32	ATML 3032B	R	17	16	
MIL-I-81969/30B-33	ATML 3033B	R	17	12	
MIL-I-81969/30B-34	ATML 3034B	R	17	22-12	
MIL-I-81969/30B-35	ATML 3035B	R	17	20-12	
MIL-I-81969/30B-36	ATML 3036B	R	17	22D-12	
NOTE: ATML 30567 is available as a set consisting of a handle and 1 each of ATML 3005, ATML 3006, ATML 3007					MS3448-001

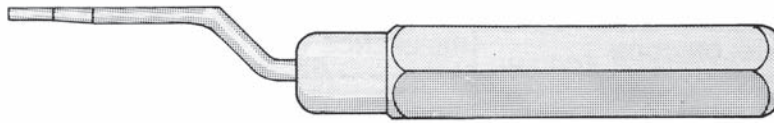
CURRENT DOCUMENT	ASTRO TOOL #	I/R	ILL.	GAGE	SUPERSEDED DOCUMENT
MIL-I-81969/31-01					MS3178-20-1
MIL-I-81969/31-02		I			MS3178-20-2
MIL-I-81969/31-03		R			MS3178-20-3
MIL-I-81969/31-04		R			MS3178-20-4
MIL-I-81969/31-05		I			MS14035-02
MIL-I-81969/31-06		I			MS14035-03
MIL-I-81969/31-07		R			MS14035-01
MIL-I-81969/31-08		I			MS14036-01
MIL-I-81969/31-09		I			MS14036-02
MIL-I-81969/21-10		I			MS14036-03
MIL-I-81969/32-01		R			
MIL-I-81969/33-01	ATML 3301	I			
MIL-I-81969/33-02	ATML 3302	I			
MIL-I-81969/34-01	ATML 3401	R			
MIL-I-81969/38-01					
MIL-I-81969/38-02					
MIL-I-81969/38-03					
MIL-I-81969/38-04					
MIL-I-81969/38-05					
MIL-I-81969/38-06					
MIL-I-81969/38-07					
MIL-I-81969/38-08					
MIL-I-81969/38-09					
MIL-I-81969/38-10					
MIL-I-81969/38-11					
MIL-I-81969/38-12					
MIL-I-81969/38-13					
MIL-I-81969/38-14					
MIL-I-81969/38-15					
MIL-I-81969/38-16					
MIL-I-81969/38-17					
MIL-I-81969/38-18					
MIL-I-81969/39-01	M81969/39-01	I & R	28	20	

Verify QPL status (if required) at time of purchase.





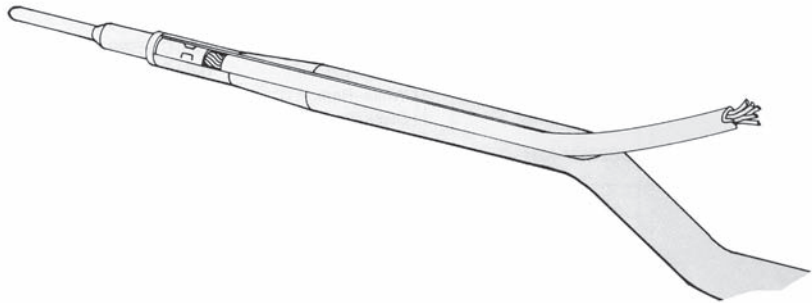
ILL 1



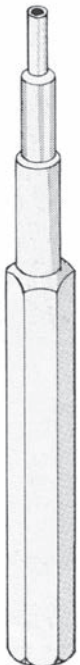
ILL 2

## INSERTION TOOLS

Straight (ILL. 1) and joggled tools (ILL. 2) hold contact and wire in line with center or side of the tool handle. Tool sizes are "0" to "24" gage. Handles are color coded aluminum. Tools range from 4 1/2" to 6" long with replaceable tips.

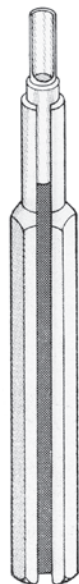


## FRONT REMOVAL, REAR INSERTION TOOLS



ILL 3

Both front removal (Ill. 3) and rear insertion (Ill. 4) Military Standard tools offer a convenient and practical approach to servicing the MIL-C-81511, Series 1 & 2 connectors. Tools are color coded for contact size with half-inch hex metal handles.



ILL 4

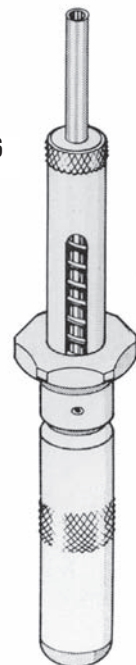


ILL 5

## FRONT RELEASE

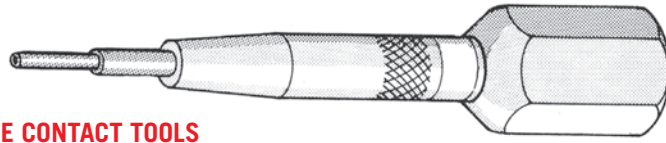
Front release connectors are easily serviced with these military spec removal tools. Handles are color coded for contact size. Replaceable tips are available.

REF: MIL-C-005015, MIL-C-26482, MIL-C-26500, and MIL-C-26636 Connectors.



ILL 6

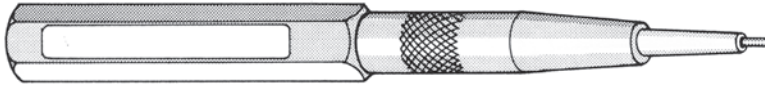
# Insertion & Removal Tool Illustrations



ILL 8

## FRONT REMOVAL SPRING-LOADED PROBE CONTACT TOOLS

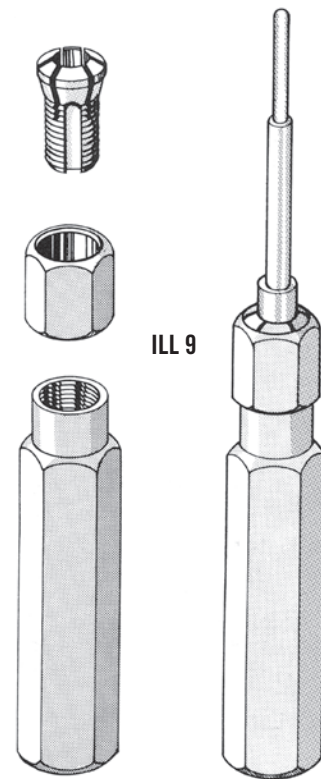
Employing the floating tip concept, these tools offer quality, as well as ease in operation. Body and handle are anodized aluminum alloy and color coded. Replaceable tips are available and require no special insertion tools.



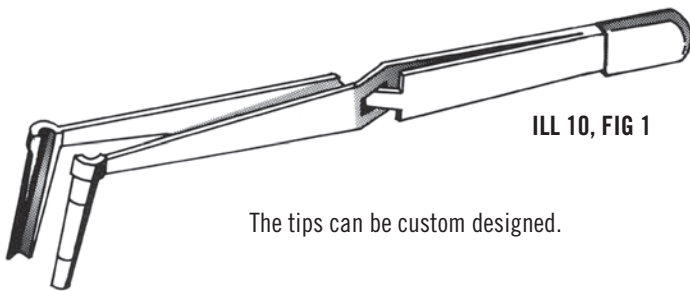
ILL 7

## INTERFERENCE FIT CONTACTS

A collect grip in the handle allows for a multi-purpose tool. The tips can be set to remove both pins and sockets or insert multi-sized contacts by reversing the replaceable tip. Handles are aluminum alloy and color coded. Sizes are from 1/8" diameter to 1/4" diameter.



ILL 9

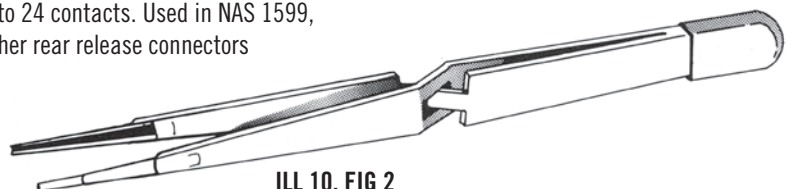


ILL 10, FIG 1

The tips can be custom designed.

## REAR REMOVAL AND INSERTION TWEEZERS

Tools are for sizes 8 to 24 contacts. Used in NAS 1599, MIL-C-38999 and other rear release connectors

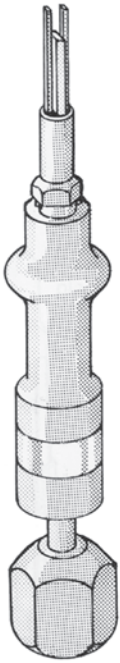


ILL 10, FIG 2

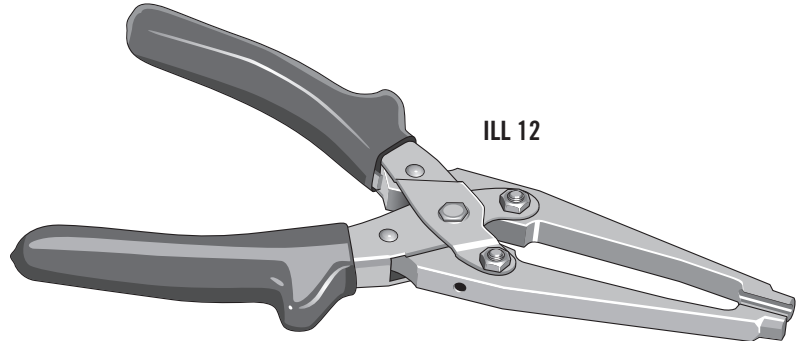
The tips can be custom designed.

**FLAT CONTACT REMOVAL TOOLS**

Tool is used in the Elco, Winchester, Tri-Star and Collins Radio connectors. Tool slides down both sides of contact from front and releases locking clip (spur). Shedder then ejects contact out of the rear.



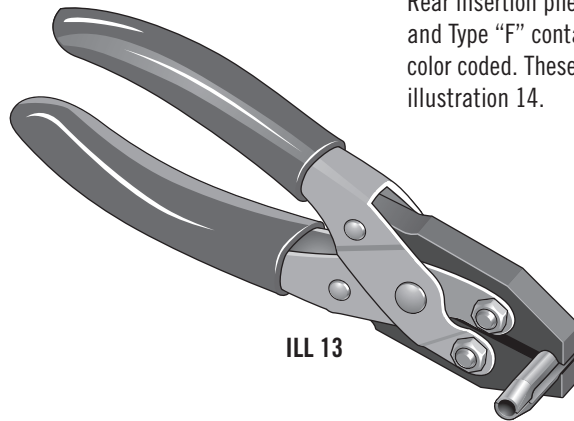
ILL 11



ILL 12

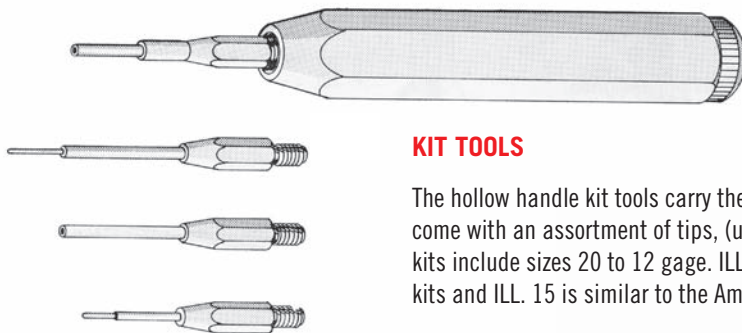
**INSERTION PLIERS**

Rear insertion pliers are for Amphenol/Bendix, CE, SE, AN/MS and Type "F" contacts in sizes 12, 16, & 20 gage. Handles are color coded. These pliers are used in conjunction with kits in illustration 14.



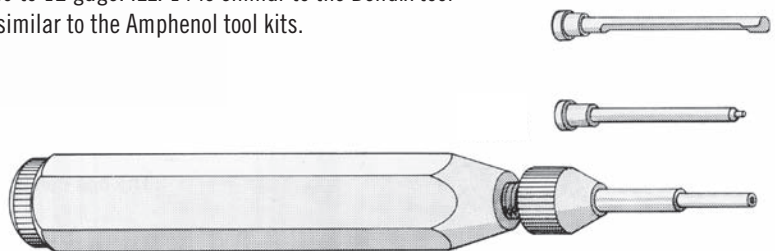
ILL 13

ILL 14



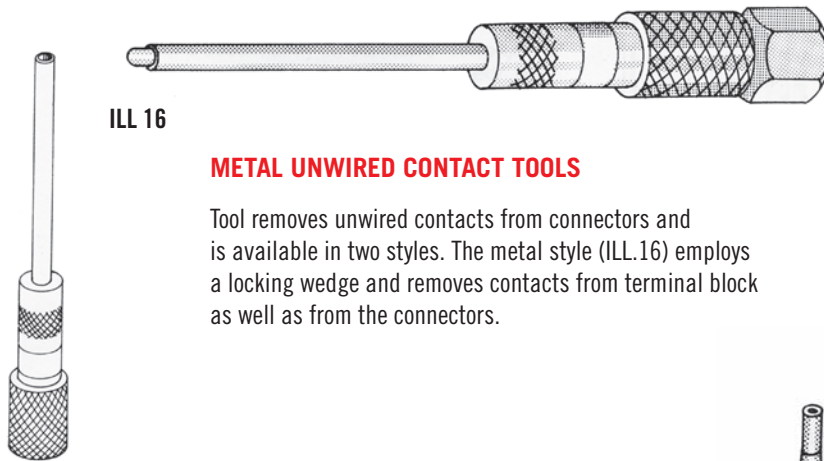
**KIT TOOLS**

The hollow handle kit tools carry the tips inside the handle and come with an assortment of tips, (usually 3 to 5 per kit). Various kits include sizes 20 to 12 gage. ILL. 14 is similar to the Bendix tool kits and ILL. 15 is similar to the Amphenol tool kits.



ILL 15

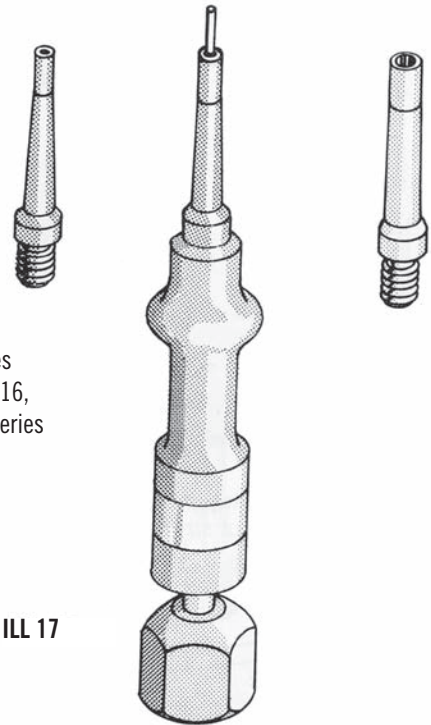
# Insertion & Removal Tool Illustrations



ILL 16

## METAL UNWIRED CONTACT TOOLS

Tool removes unwired contacts from connectors and is available in two styles. The metal style (ILL.16) employs a locking wedge and removes contacts from terminal block as well as from the connectors.



ILL 17

The Military Standard tools (ILL.17) use plastic probes which are interchangeable and available in sizes 12,16, 20 (MS3448-001 kit) and 12 through 22 (MS3159), series NAS 1599 and MIL-C-81511, Series 3 and 4.

## RETENTION TEST TOOL

This tool is designed to test contacts in connectors to verify a properly “locked in” condition after insertion. These tools impose a controlled spring pressure against pin or socket contacts and will displace when not properly locked.

Each tool has interchangeable probes for testing either pin or socket contacts and three sizes of compression springs (light, medium or heavy, covering from 1 ½ to 18 lbs). Tool is easily adjusted to any requirement. Design features a “visual check” with an indicator button showing when full compression is reached.



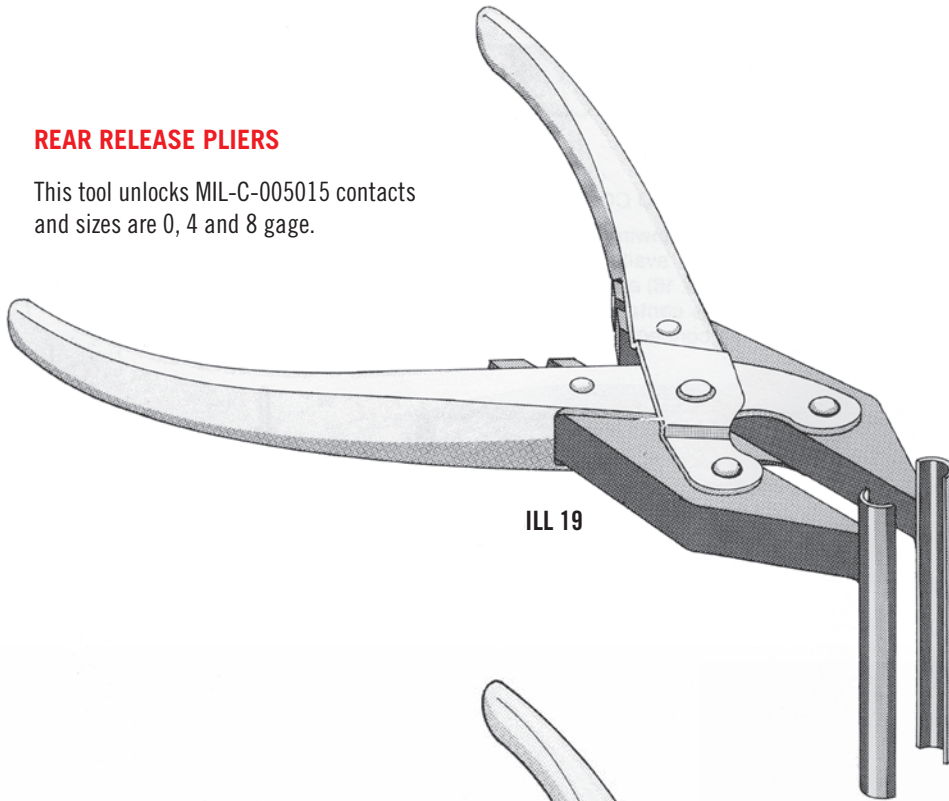
ILL 18





**REAR RELEASE PLIERS**

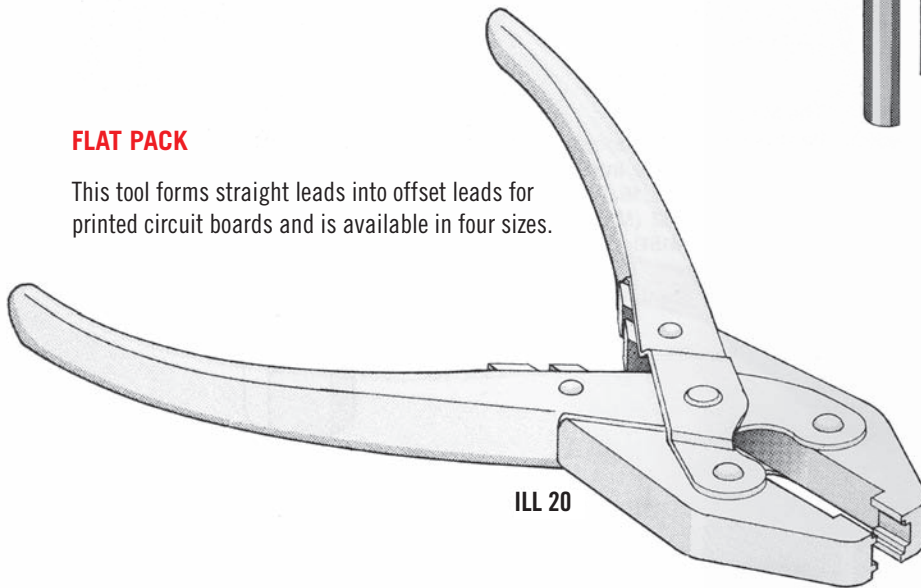
This tool unlocks MIL-C-005015 contacts and sizes are 0, 4 and 8 gage.



ILL 19

**FLAT PACK**

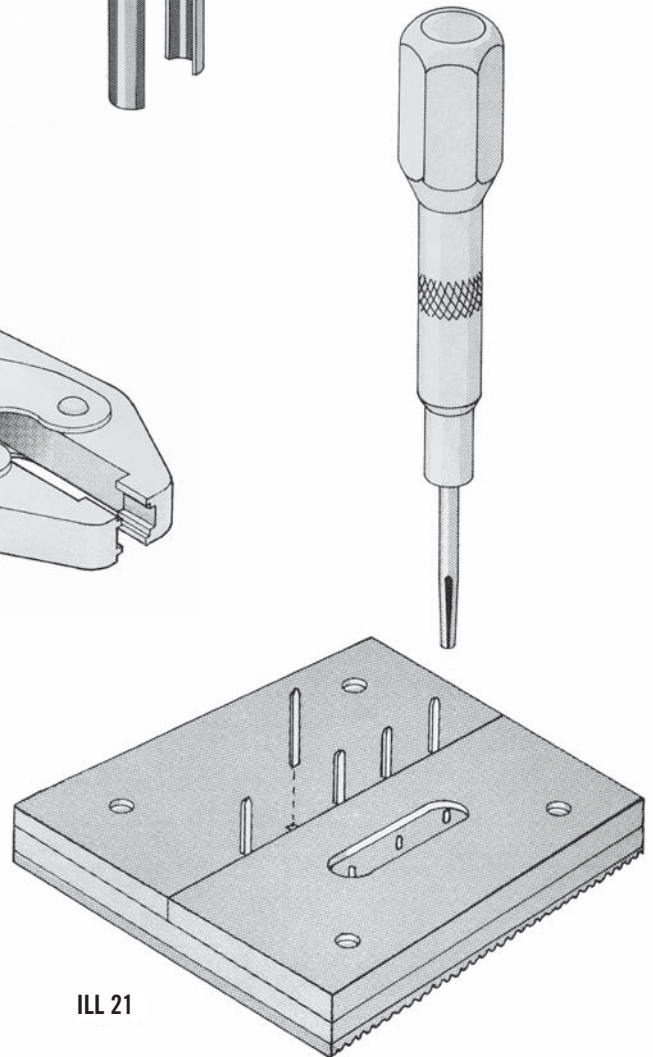
This tool forms straight leads into offset leads for printed circuit boards and is available in four sizes.



ILL 20

**TRANSFER KITS**

This tool is designed to move the wired clips from one pin to another with ease. Two sizes are available; .025 square and .058 x .028 pins kits.

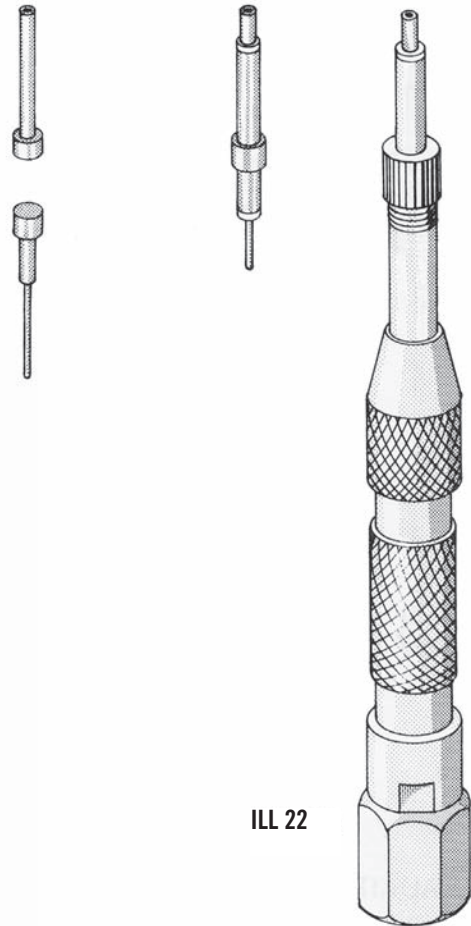


ILL 21

# Insertion & Removal Tool Illustrations

## IMPACT TOOLS

Tool is used mainly on Cannon's "Ring-Lok" contacts. The contacts are "snapped" out by the impact tool. Sizes are coax to 20 gage and remove both pin and socket contacts. The probes are replaceable and handles are color coded.

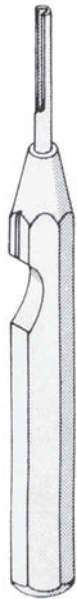


ILL 22

## INSERTION AND REMOVAL TOOLS

This tool uses 3/8" hex aluminum handle and is used in the smaller gage sizes. Tips are normally straight, from 1" to 4" long.

Delrin handles with 20° offset tips work well when inserting 16 to 22M contacts in the MIL-C-38999 connectors.



ILL 23



ILL 24

## TIPS

Replacement tips come in many shapes and sizes.

Lockheed (figure A)

Bendix (figure B)

Burdy (figure C)

ILL 25

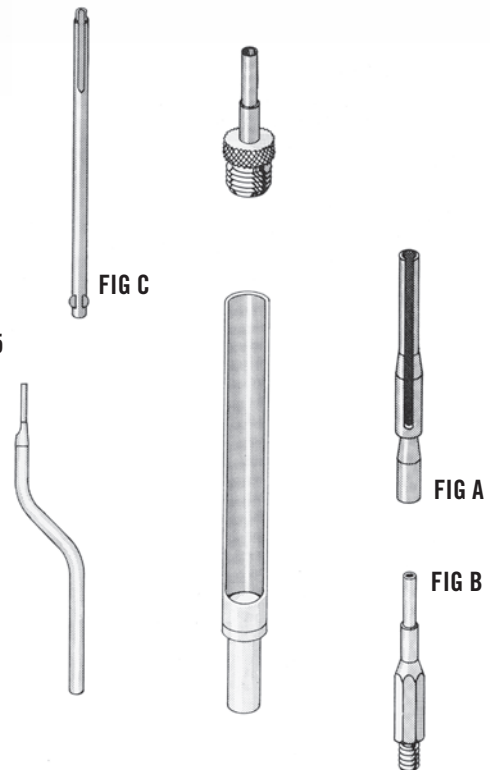
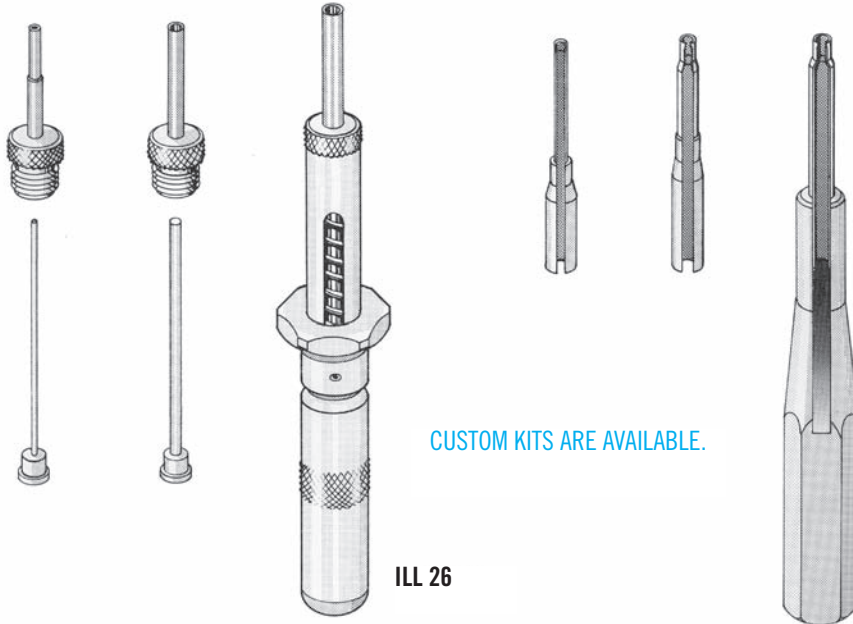


FIG A

FIG B



CUSTOM KITS ARE AVAILABLE.

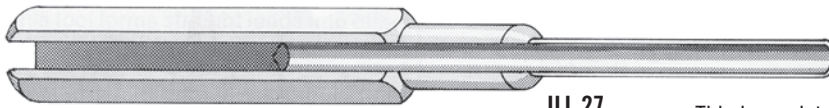
ILL 26

**INTERCHANGEABLE PROBE REMOVAL KIT**

Common handle and 3 tips for sizes 12, 16 and 20 gage contacts, with shedders for MIL-C-26482, 26500 and 26636 connectors.

**INTERCHANGEABLE PROBE INSERTION KIT**

Common handle and 3 tips for sizes 12, 16 and 20 gage contacts for MIL-C-26482, 26500 and 26636 connectors.



ILL 27

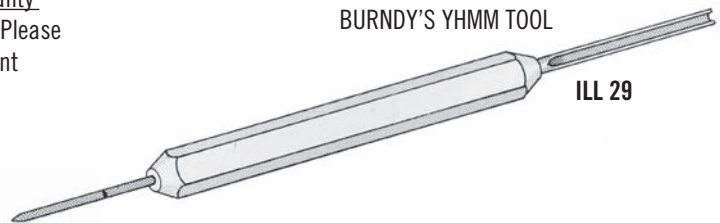
This long-slot tool illustrates the standard for MIL-C-005015 insertion tools. Modified versions are available on request.

**PLASTIC TOOLS vs. ASTRO METAL TOOLS**

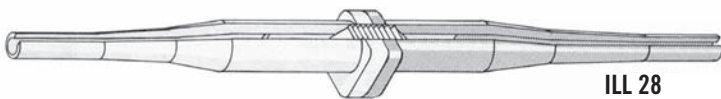
Plastic tools are used throughout the industry. Astro Tool Corp's policy is to give our customers the greatest savings for the best quality tools we can manufacture. Metal tools, although initially more costly, offer a quality product and a lower tooling cost in servicing electrical connectors. Please refer to our cross-reference lists for any plastic to metal replacement equivalents you may need.

The tools are available in two basic lengths with a metal or plastic insertion foot.

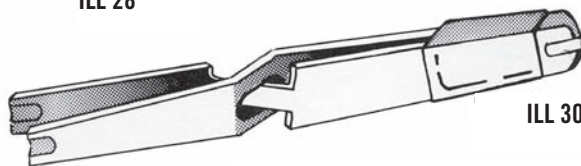
BURNDY'S YHMM TOOL



ILL 29



ILL 28



COLLIN'S RADIO FILTER PIN INSERTION TOOL

ILL 30