

INCH-POUND

MIL-STD-3067
19 November 2021

DEPARTMENT OF DEFENSE INTERFACE STANDARD

INSERT ARRANGEMENTS FOR MIL-DTL-32689 CIRCULAR
ELECTRICAL CONNECTORS



MIL-STD-3067

FOREWORD

Insert Arrangements for MIL-DTL-32689 Circular Electrical Connectors.

1. This standard is approved for use by all Departments and Agencies of the Department of Defense.
2. Comments, suggestions, or questions on this document should be addressed to: Commander, DLA Land and Maritime, ATTN: VAI, P.O. Box 3990, Columbus, Ohio, 43218-3990, or emailed to CircularConnector@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.
3. Listing of all insert arrangements can be found in [table I](#).

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1. SCOPE

1.1 Scope. This standard covers insert arrangements for use with MIL-DTL-32689 environment resisting, circular, lightweight electrical connectors.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 4 and 5 of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 4 and 5 of this standard, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-DTL-32689 - Connectors, Electrical, Micro-Circular, Quick Disconnect, Environment Resisting, Receptacles and Plugs, General Specification for

(Copies these documents are available online at <https://quicksearch.dla.mil>.)

2.2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASME INTERNATIONAL

ASME Y14.5 - Dimensioning and Tolerancing

(Copies of these documents are available online at <https://www.asme.org>.)

2.3 Order of precedence. Unless otherwise noted herein or in the contract, the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

3.1 Definitions. The terms used in this standard are generally accepted by the electrical and electronics industries and commonly used in electrical connector engineering practice.

Contact	Individual electrical connection terminating a wire within a connector and interfacing with a corresponding contact in another connector when mated.
Contact cavity	A generally cylindrical hole in the insert which the contact and retention clip are inserted.
Contact density	The density of the contacts in an insert arrangement. See maximum contact density.

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Contact size	Assigned numbers denoting the size of the contact mating end and the size of the contact wire barrel end.
Crimp contacts	A contact where a stripped wire is insert into the contact's barrel and the barrel is crimped (mechanically deformed) to mechanically and electrically join the wire and contact
Insert	A piece which mechanically positions the contacts (and retention clips) into an arrangement pattern. With the retention clips, the insert holds the contacts in the axial direction. Insert provide electrical insulation to prevent electrical arcing between pins and from pins to the shell. Inserts are generally a cylinder (O.D. to fit in the shell) with a pattern of holes to hold the contacts. Inserts are inserted and fixed or retained in the shell body of the connector during assembly.
Insert arrangement	A specific, standardized arrangement (pattern) of contacts for different shell sizes. The same insert arrangement in connectors allow them to be used with each other. Different insert arrangements can't be used with each but design flexibility with factors such as number of contacts, contact sizes, ampacity, voltages, contact spacing (density), and shell sizes.
Key	Protrusion ("male") which aligns with corresponding keyway for keying.
Keying	One or more sets of key and matching keyway which rotationally orientate two connectors during mating and prevents connectors with different keying from mating. Rotational orientation correctly positions pins and sockets engagement.
Keyway	Recessed slot ("female") which aligns with corresponding key for keying.
Maximum contact density	The insert arrangement with the highest density of contacts. Typically for a given connector shell size. Density is difficult to define in particular when more irregular patterns or insert arrangements with multiple sizes of contacts. For purposes of defining the parameter, the maximum contact density is taken as an insert arrangement with shortest distance (least dielectric) between any two electrically conductive elements (contact, another contact, connector shell, retaining clip, etc.).
Pin (contact)	A contact having a mating end that enters the socket contact.
Socket (contact)	A contact having a mating end that will accept entry of a pin contact.

4. GENERAL REQUIREMENTS

4.1 Recycled, recovered, or environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economical advantageous life cycle costs.

5. DETAILED REQUIREMENTS

5.1 Dimensions. Dimensions shall be in accordance with the applicable section of this standard and the following dimensional data:

- Dimensioning and tolerancing in accordance with ASME Y14.5. Dimensions are true position (TP) and are in inches.
- Dimensions and markings shown are for engaging face of pin insert; socket insert is opposite.
- The following tolerances apply to an insert installed in the shell:

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1. Center of each hole in the insert shall be located at TP within .015 in diameter.
2. Center of engaging end of each contact shall be located at TP within .024 in diameter.

d. Unless otherwise indicated, dimensions are symmetrical about centerline.

e. ↓ indicates CL (centerline) of insert arrangement.

5.2 Contact cavity. Socket contact cavity and pin contact cavity dimensions in accordance with MIL-DTL-32689.

5.3 Contacts. Crimp contacts shall be in accordance MIL-DTL-32689.

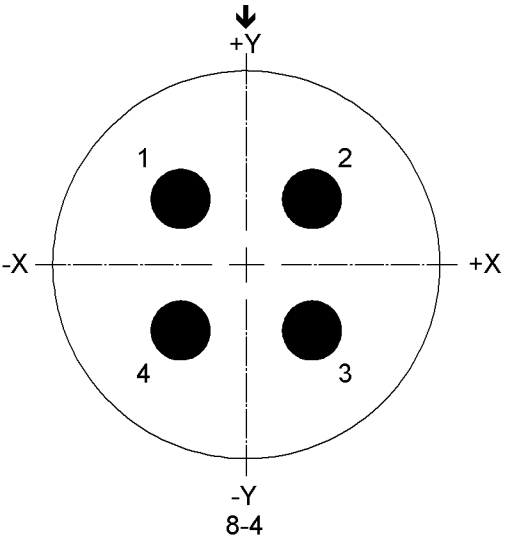
5.4 Marking. Marking shall be in accordance with MIL-DTL-32689 and as shown in the applicable sections of this standard.

5.5 Insert Arrangements. Requirements of insert arrangement are provided. A cross reference is provided in [table I](#) for navigation. Insert arrangements are organized by shell size first and an arrangement number second. Arrangement number may but does not always indicate the total contacts in the arrangement (more likely to match for lower numbered arrangements).

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TABLE I. Cross-reference of insert arrangement by shell size.

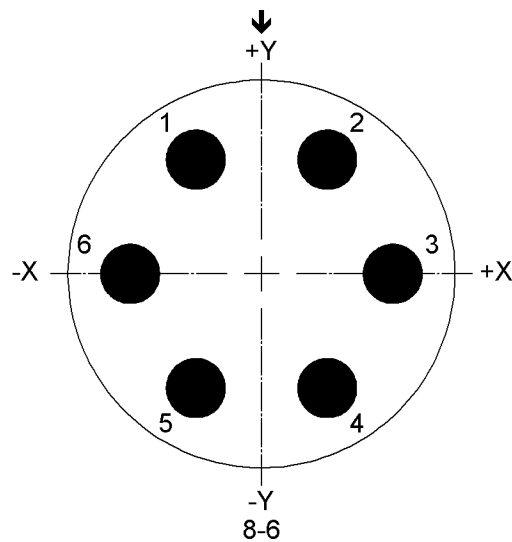
Shell size	Insert arrangement	Figure	Page
8	Insert arrangement 8-4.	FIGURE 1	5
	Insert arrangement 8-6.	FIGURE 2	6
	8-7 socket arrangement will mate (mis-mating) to an 8-6 pin arrangement (with identical keying). This fact must be taken into account in the design and use of this insert arrangement		
	Insert arrangement 8-7.	FIGURE 3	7
	Insert arrangement 8-23.	FIGURE 4	8
9	Insert arrangement 9-1.	FIGURE 5	9
	Insert arrangement 9-10.	FIGURE 6	10
10	Insert arrangement 10-2.	FIGURE 7	11
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11	Insert arrangement 11-4.	FIGURE 11	15
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12	Insert arrangement 12-2.	FIGURE 13	17
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	Insert arrangement 12-26.	FIGURE 15	19
13	Insert arrangement 13-31.	FIGURE 16	20
15	Insert arrangement 15-2.	FIGURE 17	21
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18	Insert arrangement 18-12.	FIGURE 21	26
	Insert arrangement 18-55.	FIGURE 22	27
	Insert arrangement 18-204.	FIGURE 23	29
	Insert arrangement 18-205.	FIGURE 24	33
	Insert arrangement 18-235.	FIGURE 25	34
19	Insert arrangement 19-7.	FIGURE 26	38
	Insert arrangement 19-14.	FIGURE 27	35
	Insert arrangement 19-85.	FIGURE 28	36
	Insert arrangement 19-204.	FIGURE 29	38
21	Insert arrangement 21-100.	FIGURE 30	39
23	Insert arrangement 23-12.	FIGURE 31	41
	Insert arrangement 23-130.	FIGURE 32	42



CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	- .038	+ .038
2	+ .038	+ .038
3	+ .038	- .038
4	- .038	- .038

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
8	4	4	23	All

FIGURE 1. Insert arrangement 8-4.

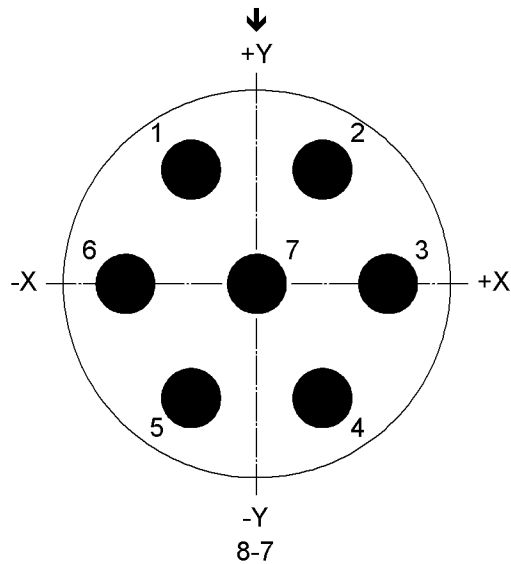


8-7 socket arrangement will mate (mis-mating) to an 8-6 pin arrangement (with identical keying). This fact must be taken into account in the design and use of this insert arrangement.

CONTACTS (INSERT ARRANGEMENT 8-6)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	- .038	+ .066
2	+ .038	+ .066
3	+ .076	.000
4	+ .038	- .066
5	- .038	- .066
6	- .076	.000

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
8	6	6	23	All

FIGURE 2. Insert arrangement 8-6.

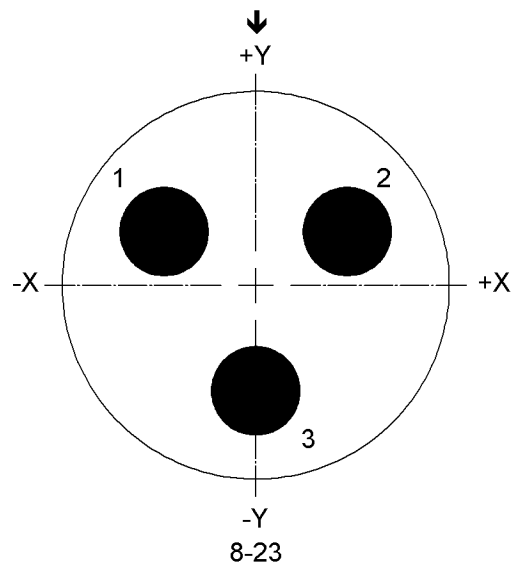


8-7 socket arrangement will mate (mis-mating) to an 8-6 pin arrangement (with identical keying). This fact must be taken into account in the design and use of this insert arrangement.

CONTACTS (INSERT ARRANGEMENT 8-7)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	- .038	+ .066
2	+ .038	+ .066
3	+ .076	.000
4	+ .038	- .066
5	- .038	- .066
6	- .076	.000
7	.000	.000

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
8	7	7	23	All

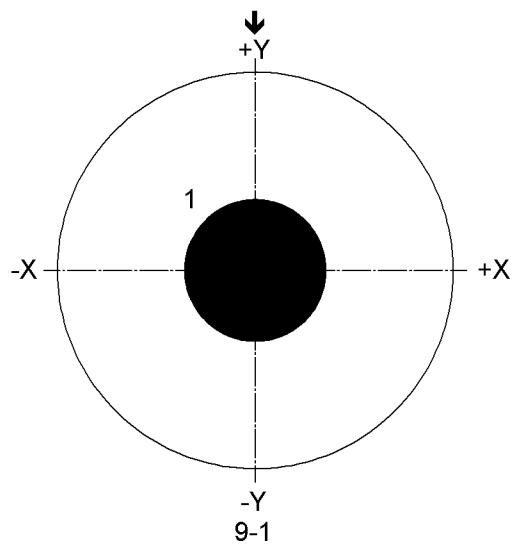
FIGURE 3. Insert arrangement 8-7.



CONTACTS (INSERT ARRANGEMENT 8-23)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	- .053	+ .031
2	+ .053	+ .031
3	.000	- .061

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
8	23	3	20HD	All

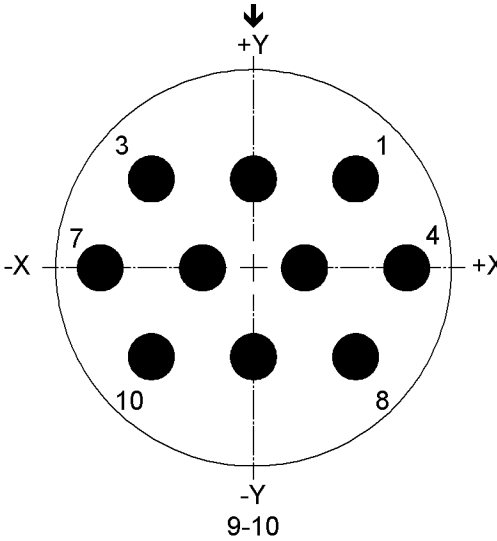
FIGURE 4. Insert arrangement 8-23.



CONTACTS (INSERT ARRANGEMENT 9-1)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	.000	.000

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
9	-1	1	12	All

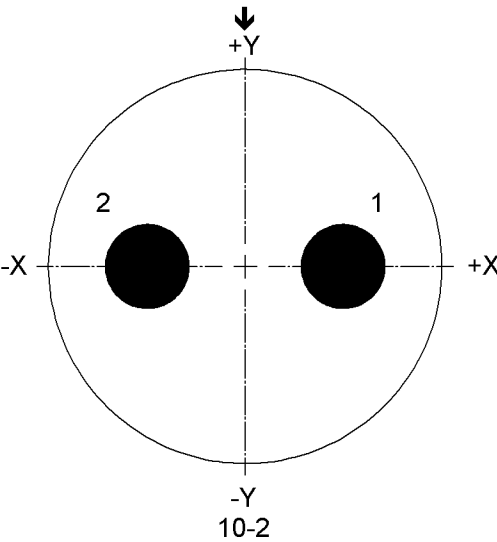
FIGURE 5. Insert arrangement 9-1.



CONTACTS (INSERT ARRANGEMENT 9-10)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	+ .076	+ .066
2	.000	+ .066
3	- .076	+ .066
4	+ .114	.000
5	+ .038	.000
6	- .038	.000
7	- .114	.000
8	+ .076	- .066
9	.000	- .066
10	- .076	- .066

Shell size	Arrangement No.	Number of contacts	Size contacts	Contact location
9	10	10	23	All

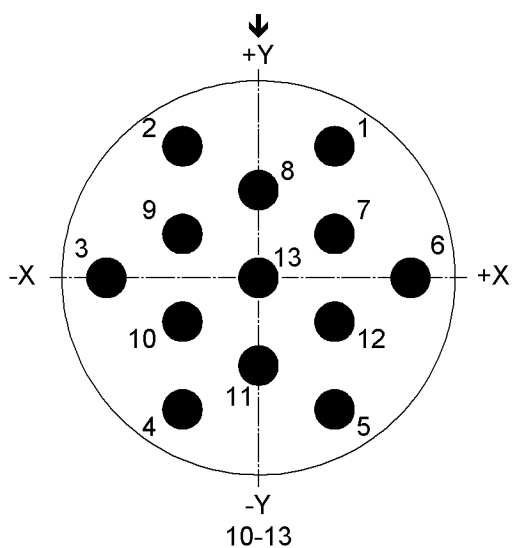
FIGURE 6. Insert arrangement 9-10.



CONTACTS (INSERT ARRANGEMENT 10-2)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	+ .085	.000
2	- .085	.000

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
10	-2	2	16	All

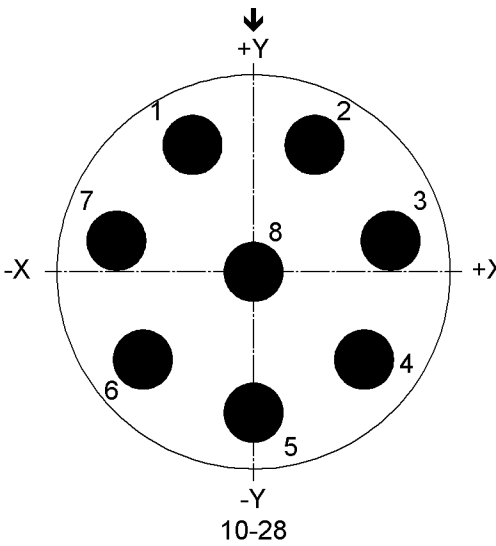
FIGURE 7. Insert arrangement 10-2.



CONTACTS (INSERT ARRANGEMENT 10-13)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	+ .066	+ .114
2	- .066	+ .114
3	- .132	.000
4	- .066	- .114
5	+ .066	- .114
6	+ .132	.000
7	+ .066	+ .038
8	.000	+ .076
9	- .066	+ .038
10	- .066	- .038
11	.000	- .076
12	+ .066	- .038
13	.000	.000

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
10	-13	13	23	All

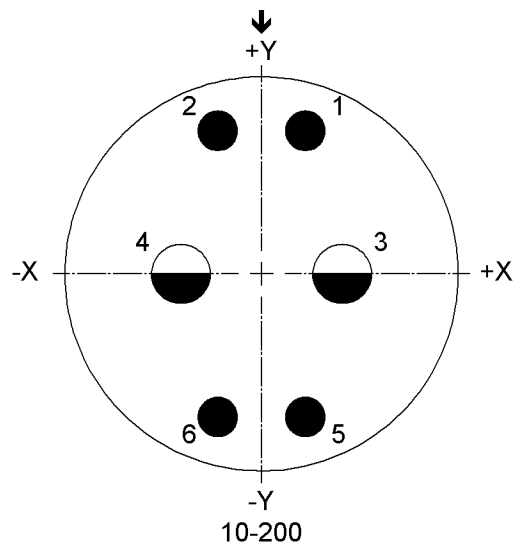
FIGURE 8. Insert arrangement 10-13.



CONTACTS (INSERT ARRANGEMENT 10-28)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	- .053	+ .110
2	+ .053	+ .110
3	+ .119	+ .027
4	+ .096	- .076
5	.000	- .122
6	- .096	- .076
7	- .119	+ .027
8	.000	.000

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
10	28	28	20HD	All

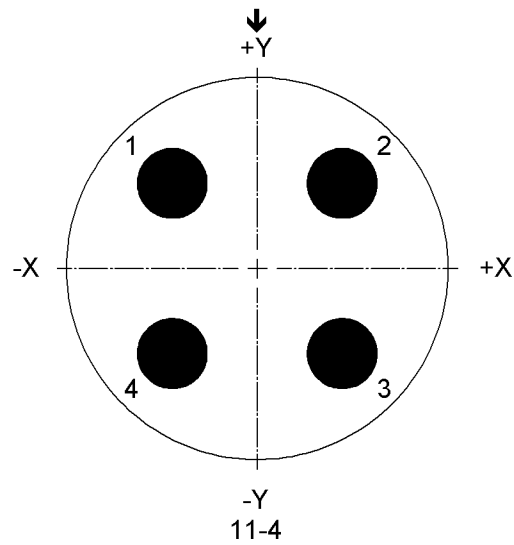
FIGURE 9. Insert arrangement 10-28.



CONTACTS (INSERT ARRANGEMENT 10-200)			
CONTACT POSITION ID	CONTACT LOCATION		
	Contact Size	X	Y
1	23	+ .038	+ .124
2	23	- .038	+ .124
3	20	+ .070	.000
4	20	- .070	.000
5	23	+ .038	- .124
6	23	- .038	- .124

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
10	-200	2	20	3, 4
		4	23	1, 2, 5, 6

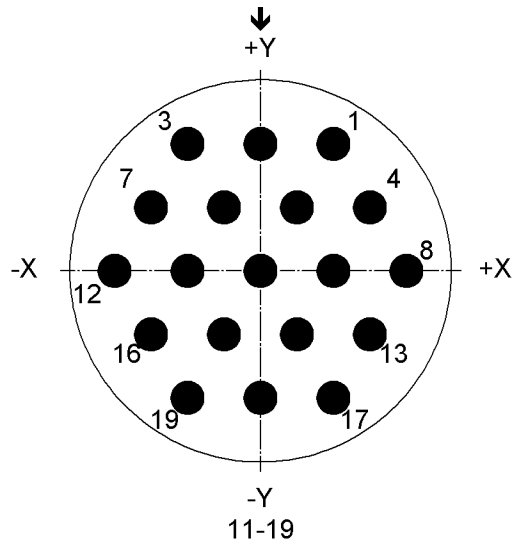
FIGURE 10. Insert arrangement 10-200.



CONTACTS (INSERT ARRANGEMENT 11-4)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	- .0885	+ .0885
2	+ .0885	+ .0885
3	+ .0885	- .0885
4	- .0885	- .0885

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
11	4	4	16	All

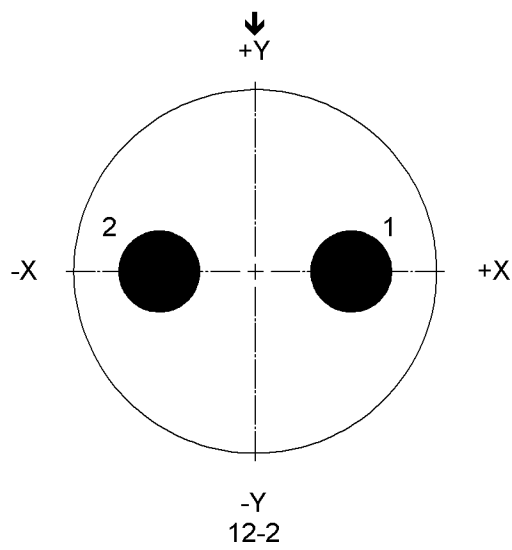
FIGURE 11. Insert arrangement 11-4.



CONTACTS (INSERT ARRANGEMENT 11-19)						
CONTACT POSITION ID	CONTACT LOCATION			CONTACT POSITION ID	CONTACT LOCATION	
	X	Y			X	Y
1	+ .076	+ .132		11	- .076	.000
2	.000	+ .132		12	- .152	.000
3	- .076	+ .132		13	+ .114	- .066
4	+ .114	+ .066		14	+ .038	- .066
5	+ .038	+ .066		15	- .038	- .066
6	- .038	+ .066		16	+ .114	- .066
7	- .114	+ .066		17	+ .076	- .132
8	+ .152	.000		18	.000	- .132
9	+ .076	.000		19	- .076	- .132
10	.000	.000				

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
11	19	19	23	All

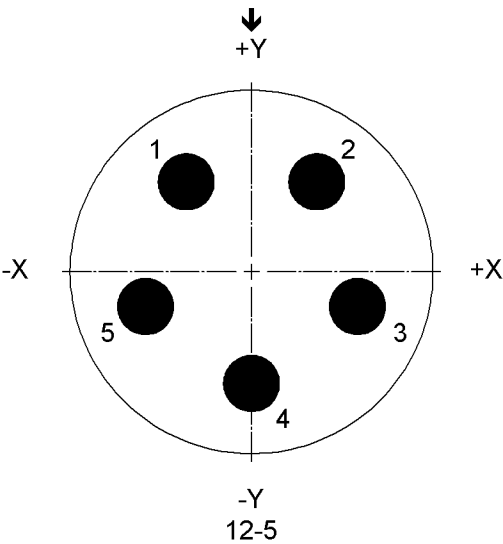
FIGURE 12. Insert arrangement 11-19.



CONTACTS (INSERT ARRANGEMENT 12-2)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	+ .125	.000
2	- .125	.000

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
12	2	2	12	All

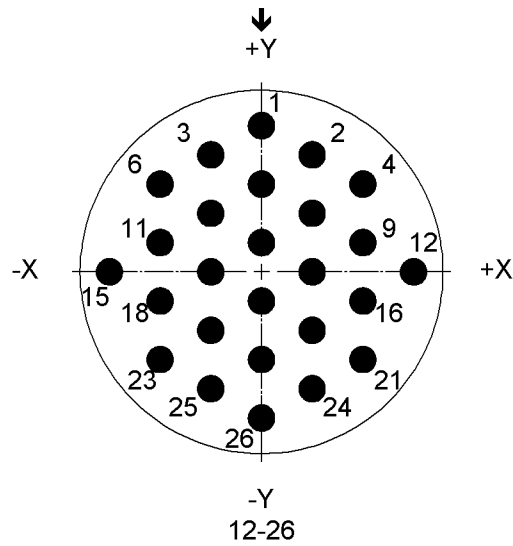
FIGURE 13. Insert arrangement 12-2.



CONTACTS (INSERT ARRANGEMENT 12-5)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	- .085	+ .117
2	+ .085	+ .117
3	+ .138	- .045
4	.000	- .145
5	- .138	- .045

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
12	5	5	16	All

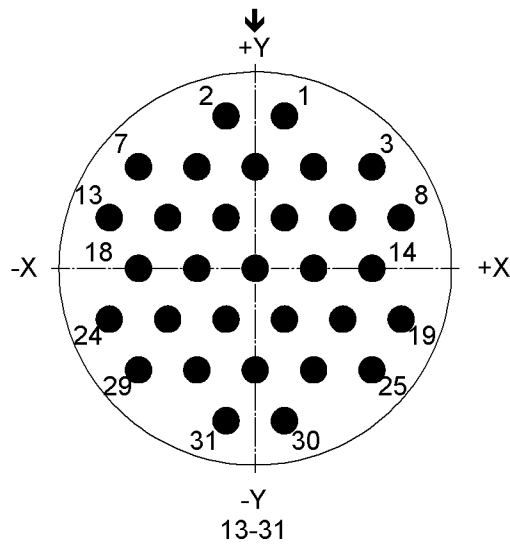
FIGURE 14. Insert arrangement 12-5.



CONTACTS (INSERT ARRANGEMENT 12-26)								
CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION	
	X	Y		X	Y		X	Y
1	.000	+ .190	10	.000	+ .038	19	+ .066	- .076
2	+ .066	+ .152	11	- .132	+ .038	20	- .066	- .076
3	- .066	+ .152	12	+ .198	.000	21	+ .132	- .114
4	+ .132	+ .114	13	+ .066	.000	22	.000	- .114
5	.000	+ .114	14	- .066	.000	23	- .132	- .114
6	- .132	+ .114	15	- .198	.000	24	+ .066	- .152
7	+ .066	+ .076	16	+ .132	- .038	25	- .066	- .152
8	- .066	+ .076	17	.000	- .038	26	.000	- .190
9	+ .132	+ .038	18	- .132	- .038			

Shell size	Arrangement No.	Number of contacts	Size contacts	Contact location
12	26	26	23	All

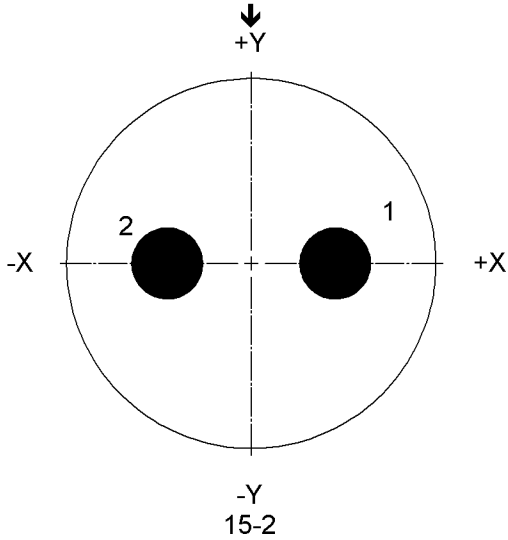
FIGURE 15. Insert arrangement 12-26.



CONTACTS (INSERT ARRANGEMENT 13-31)								
CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION	
	X	Y		X	Y		X	Y
1	- .038	+ .198	12	+ .114	+ .066	23	.114	- .066
2	+ .038	+ .198	13	+ .190	+ .066	24	+ .190	- .066
3	- .152	+ .132	14	- .152	.000	25	- .152	- .132
4	- .076	+ .132	15	- .076	.000	26	- .076	- .132
5	.000	+ .132	16	.000	.000	27	.000	- .132
6	+ .076	+ .132	17	+ .076	.000	28	+ .076	- .132
7	+ .152	+ .132	18	+ .152	.000	29	+ .152	- .132
8	- .190	+ .066	19	- .190	- .066	30	- .038	- .198
9	- .114	+ .066	20	- .114	- .066	31	+ .038	- .198
10	- .038	+ .066	21	- .038	- .066	---	---	---
11	+ .038	+ .066	22	+ .038	- .066	---	---	---

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
13	31	31	23	All

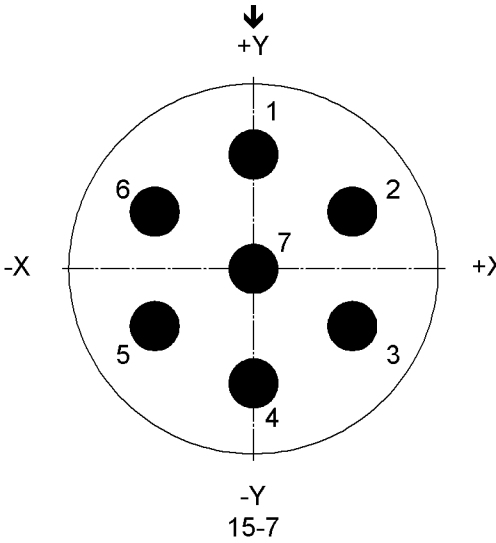
FIGURE 16. Insert arrangement 13-31.



CONTACTS (INSERT ARRANGEMENT 15-2)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	+ .125	.000
2	- .125	.000

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
15	2	2	12	All

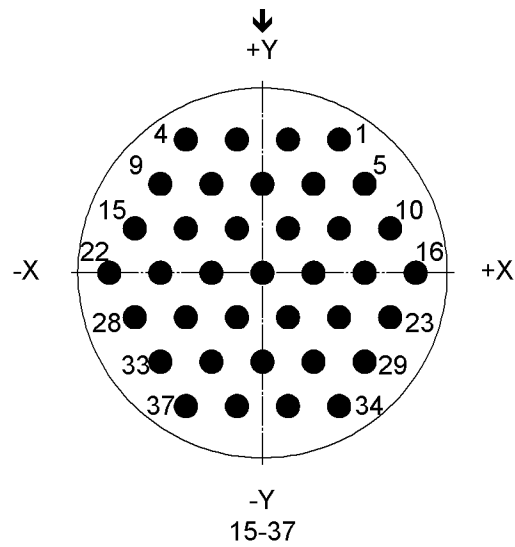
FIGURE 17. Insert arrangement 15-2.



CONTACTS (INSERT ARRANGEMENT 15-7)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	.000	+ .170
2	+ .147	+ .085
3	+ .147	- .085
4	.000	- .170
5	- .147	- .085
6	- .147	+ .085
7	.000	.000

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
15	7	7	16	All

FIGURE 18. Insert arrangement 15-7.

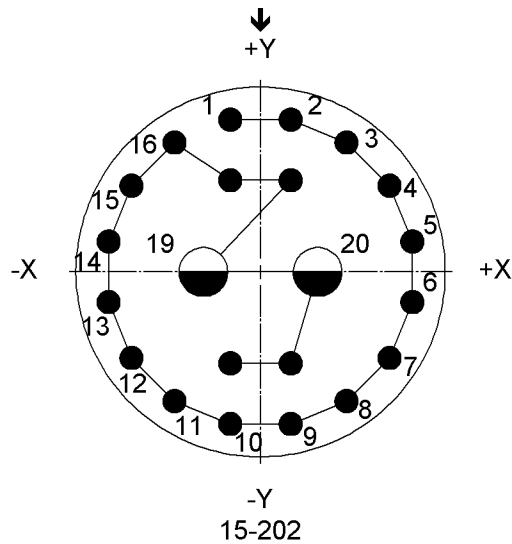


Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
15	37	37	23	All

FIGURE 19. Insert arrangement 15-37.

CONTACTS (INSERT ARRANGEMENT 15-37)								
CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION	
	X	Y		X	Y		X	Y
1	+ .114	+ .198	14	- .114	+ .066	27	- .114	- .066
2	+ .038	+ .198	15	- .190	+ .066	28	- .190	- .066
3	- .038	+ .198	16	+ .228	.000	29	+ .152	- .132
4	- .114	+ .198	17	+ .152	.000	30	+ .076	- .132
5	+ .152	+ .132	18	+ .076	.000	31	.000	- .132
6	+ .076	+ .132	19	.000	.000	32	- .076	- .132
7	.000	+ .132	20	- .076	.000	33	- .152	- .132
8	- .076	+ .132	21	- .152	.000	34	+ .114	- .198
9	- .152	+ .132	22	- .228	.000	35	+ .038	- .198
10	+ .190	+ .066	23	+ .190	- .066	36	- .038	- .198
11	+ .114	+ .066	24	+ .114	- .066	37	- .114	- .198
12	+ .038	+ .066	25	+ .038	- .066			
13	- .038	+ .066	26	- .038	- .066			

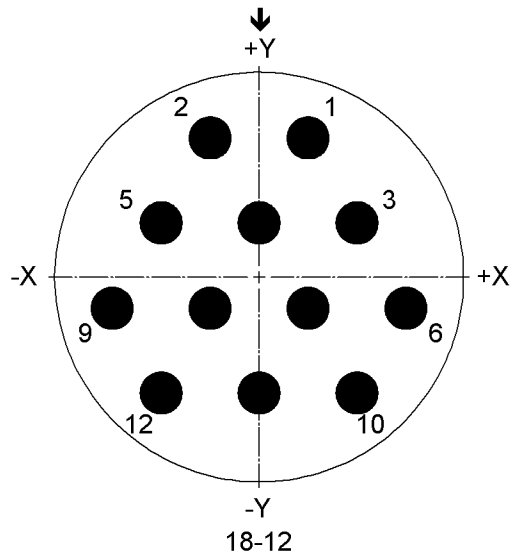
FIGURE 19. Insert arrangement 15-37. – Continued.



CONTACTS (INSERT ARRANGEMENT 15-202)								
CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION	
	X	Y		X	Y		X	Y
1	- .045	+ .226	9	+ .045	- .226	17	- .045	+ .136
2	+ .045	+ .226	10	- .045	- .226	18	+ .045	+ .136
3	+ .128	+ .192	11	- .128	- .192	19	- .085	.000
4	+ .192	+ .128	12	- .192	- .128	20	+ .085	.000
5	+ .226	+ .045	13	- .226	- .045	21	- .045	- .136
6	+ .226	- .045	14	- .226	+ .045	22	+ .045	- .136
7	+ .192	- .128	15	- .192	+ .128			
8	+ .128	- .192	16	- .128	+ .192			

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
15	202	20	23	1 thru 18, 21-22
		2	16	19, 20

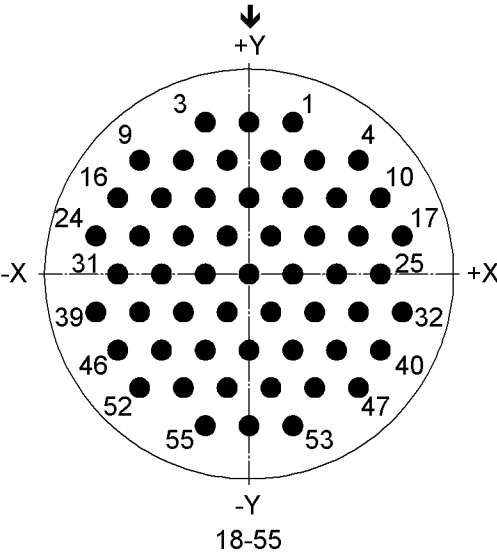
FIGURE 20. Insert arrangement 15-202.



CONTACTS (INSERT ARRANGEMENT 18-12)						
CONTACT POSITION ID	CONTACT LOCATION			CONTACT POSITION ID	CONTACT LOCATION	
	X	Y			X	Y
1	+ .085	+ .241		7	+ .085	- .054
2	- .085	+ .241		8	- .085	- .054
3	+ .170	+ .094		9	- .255	- .054
4	.000	+ .094		10	+ .170	- .201
5	- .170	+ .094		11	.000	- .201
6	+ .255	- .054		12	- .170	- .201

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
18	12	12	16	All

FIGURE 21. Insert arrangement 18-12.



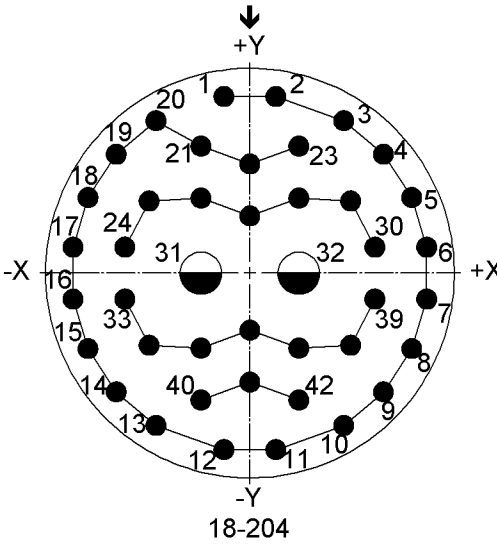
Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
18	55	55	23	All

FIGURE 22. Insert arrangement 18-55.

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CONTACTS (INSERT ARRANGEMENT 18-55)								
CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION	
	X	Y		X	Y		X	Y
1	+ .076	+ .263	20	+ .038	+ .066	39	- .266	- .066
2	.000	+ .263	21	- .038	+ .066	40	+ .228	- .132
3	- .076	+ .263	22	- .114	+ .066	41	+ .152	- .132
4	+ .190	+ .197	23	- .190	+ .066	42	+ .076	- .132
5	+ .114	+ .197	24	- .266	+ .066	43	.000	- .132
6	+ .038	+ .197	25	+ .228	.000	44	- .076	- .132
7	- .038	+ .197	26	+ .152	.000	45	- .152	- .132
8	- .114	+ .197	27	+ .076	.000	46	- .228	- .132
9	- .190	+ .197	28	.000	.000	47	+ .190	- .197
10	+ .228	+ .132	29	- .076	.000	48	+ .114	- .197
11	+ .152	+ .132	30	- .152	.000	49	+ .038	- .197
12	+ .076	+ .132	31	- .228	.000	50	- .038	- .197
13	.000	+ .132	32	+ .266	- .066	51	- .114	- .197
14	- .076	+ .132	33	+ .190	- .066	52	- .190	- .197
15	- .152	+ .132	34	+ .114	- .066	53	+ .076	- .263
16	- .228	+ .132	35	+ .038	- .066	54	.000	- .263
17	+ .266	+ .066	36	- .038	- .066	55	- .076	- .263
18	+ .190	+ .066	37	- .114	- .066			
19	+ .114	+ .066	38	- .190	- .066			

. Insert arrangement 18-55.- Continued.

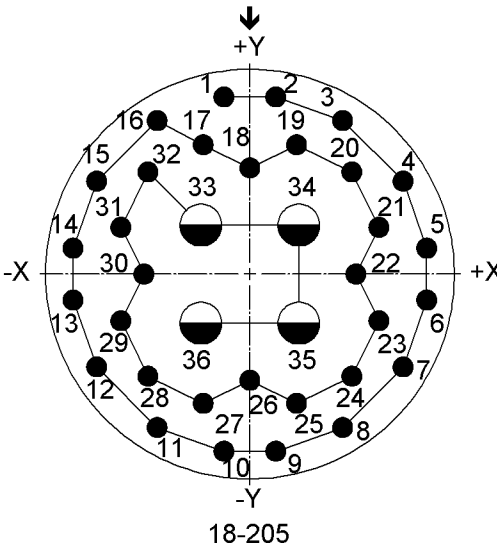


Shell size	Arrangement No.	Number of contacts	Size contacts	Contact location
18	204	40	23	All
		2	16	

FIGURE 23. Insert arrangement 18-204.

CONTACTS (INSERT ARRANGEMENT 18-204)								
CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION	
	X	Y		X	Y		X	Y
1	- .045	+ .306	15	- .281	- .131	29	+ .175	+ .125
2	+ .045	+ .306	16	- .307	- .045	30	+ .217	+ .045
3	+ .163	+ .264	17	- .307	+ .045	31	- .085	.000
4	+ .232	+ .206	18	- .281	+ .131	32	+ .085	.000
5	+ .281	+ .131	19	- .232	+ .206	33	- .217	- .045
6	+ .307	+ .045	20	- .163	+ .264	34	- .175	- .125
7	+ .307	- .045	21	- .085	+ .220	35	- .085	- .130
8	+ .281	- .131	22	.000	+ .189	36	.000	- .099
9	+ .232	- .206	23	+ .085	+ .220	37	+ .085	- .130
10	+ .163	- .264	24	- .217	+ .045	38	+ .175	- .125
11	+ .045	- .306	25	- .175	+ .125	39	+ .217	- .045
12	- .045	- .306	26	- .085	+ .130	40	- .085	- .220
13	- .163	- .264	27	.000	+ .099	41	.000	- .189
14	- .232	- .206	28	+ .085	+ .130	42	+ .085	- .220

FIGURE 23. Insert arrangement 18-204.- Continued.

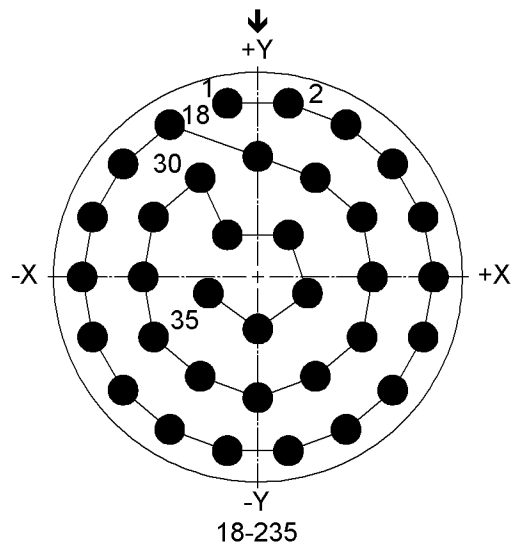


Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
18	205	32	23	1 thru 32
		4	16	33 thru 36

FIGURE 24. Insert arrangement 18-205.

CONTACTS (INSERT ARRANGEMENT 18-205)								
CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION	
	X	Y		X	Y		X	Y
1	- .045	+ .307	13	- .307	- .045	25	+ .081	- .224
2	+ .045	+ .307	14	- .307	+ .045	26	.000	- .184
3	+ .161	+ .266	15	- .266	+ .161	27	- .081	- .224
4	+ .266	+ .161	16	- .161	+ .266	28	- .177	- .177
5	+ .307	+ .045	17	- .081	+ .224	29	- .224	- .081
6	+ .307	- .045	18	.000	+ .184	30	- .184	.000
7	+ .266	- .161	19	+ .081	+ .224	31	- .224	+ .081
8	+ .161	- .266	20	+ .177	.177	32	- .177	+ .177
9	+ .045	- .307	21	+ .224	+ .081	33	- .085	+ .085
10	- .045	- .307	22	+ .184	.000	34	+ .085	+ .085
11	- .161	- .266	23	+ .224	- .081	35	+ .085	- .085
12	- .266	- .161	24	+ .177	- .177	36	- .085	- .085

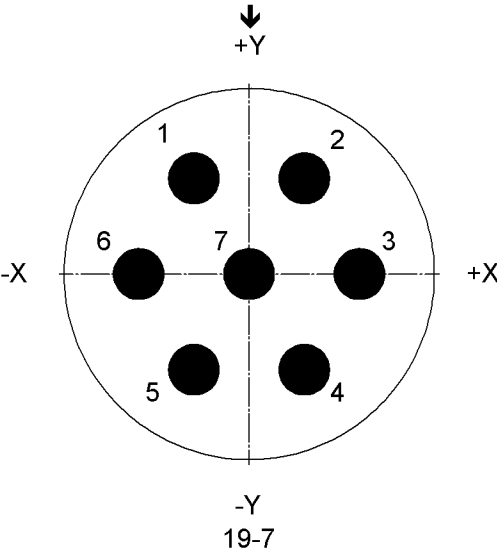
FIGURE 24. Insert arrangement 18-205.- Continued.



CONTACTS (INSERT ARRANGEMENT 18-235)								
CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION	
	X	Y		X	Y		X	Y
1	-.053	+.301	13	-.234	-.196	25	.000	-.209
2	+.053	+.301	14	-.287	-.104	26	-.100	-.172
3	+.153	+.264	15	-.305	.000	27	-.181	-.104
4	+.234	+.196	16	-.287	+.104	28	-.199	.000
5	+.287	+.104	17	-.234	+.196	29	-.181	+.104
6	+.305	.000	18	-.153	+.264	30	-.100	+.172
7	+.287	-.104	19	.000	+.209	31	-.053	+.073
8	+.234	-.196	20	+.100	+.172	32	+.053	+.073
9	+.153	-.264	21	+.181	+.104	33	+.086	-.028
10	+.053	-.301	22	+.199	.000	34	.000	-.090
11	-.053	-.301	23	+.181	-.104	35	-.086	-.028
12	-.153	-.264	24	+.100	-.172			

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
18	235	35	20HD	All

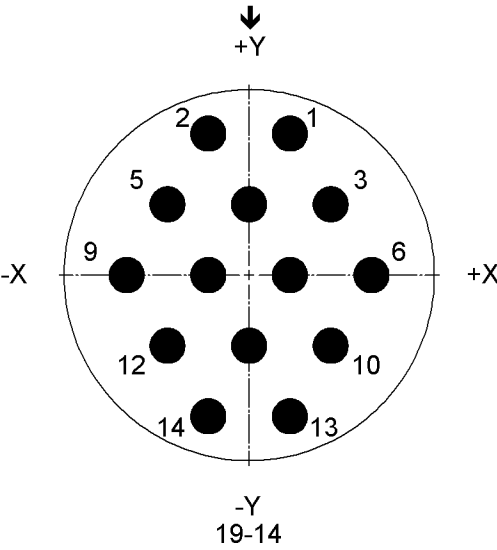
FIGURE 25. Insert arrangement 18-235.



CONTACTS (INSERT ARRANGEMENT 19-7)		
CONTACT POSITION ID	CONTACT LOCATION	
	X	Y
1	- .115	+ .199
2	+ .115	+ .199
3	+ .230	.000
4	+ .115	- .199
5	- .115	- .199
6	- .230	.000
7	.000	.000

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
19	7	7	12	All

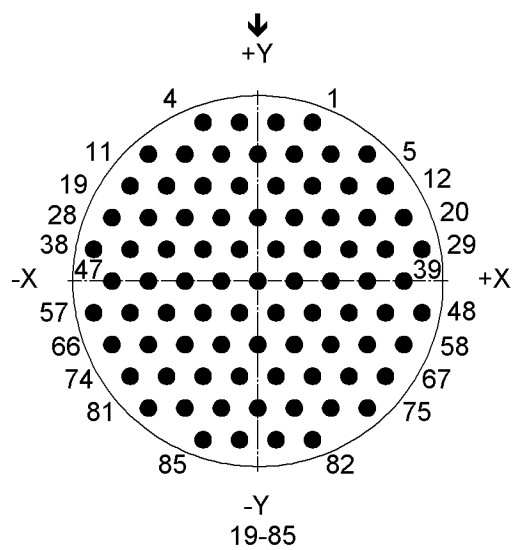
FIGURE 26. Insert arrangement 19-7.



CONTACTS (INSERT ARRANGEMENT 19-14)						
CONTACT POSITION ID	CONTACT LOCATION			CONTACT POSITION ID	CONTACT LOCATION	
	X	Y			X	Y
1	+ .085	+ .294		8	- .085	.000
2	- .085	+ .294		9	- .255	.000
3	+ .170	+ .147		10	+ .170	- .147
4	.000	+ .147		11	.000	- .147
5	- .170	+ .147		12	- .170	- .147
6	+ .255	.000		13	+ .085	- .294
7	+ .085	.000		14	- .085	- .294

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
19	14	14	16	All

FIGURE 27. Insert arrangement 19-14.



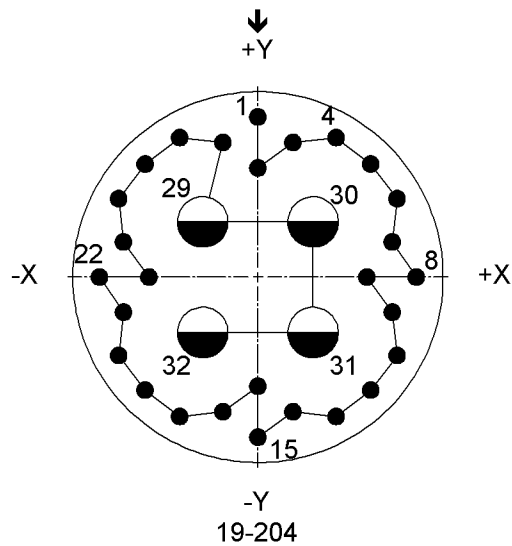
Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
19	85	85	23	All

FIGURE 28. Insert arrangement 19-85.

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CONTACTS -(INSERT ARRANGEMENT 19-85)								
Contact position ID	Location		Contact position ID	Location		Contact position ID	Location	
	X	Y		X	Y		X	Y
1	+ .114	+ .330	30	+ .266	+ .066	59	+ .228	- .132
2	+ .038	+ .330	31	+ .190	+ .066	60	+ .152	- .132
3	- .038	+ .330	32	+ .114	+ .066	61	+ .076	- .132
4	- .114	+ .330	33	+ .038	+ .066	62	.000	- .132
5	+ .228	+ .264	34	- .038	+ .066	63	- .076	- .132
6	+ .152	+ .264	35	- .114	+ .066	64	- .152	- .132
7	+ .076	+ .264	36	- .190	+ .066	65	- .228	- .132
8	.000	+ .264	37	- .266	+ .066	66	- .304	- .132
9	- .076	+ .264	38	- .342	+ .066	67	+ .266	- .198
10	- .152	+ .264	39	+ .304	.000	68	+ .190	- .198
11	- .228	+ .264	40	+ .228	.000	69	+ .114	- .198
12	+ .266	+ .198	41	+ .152	.000	70	+ .038	- .198
13	+ .190	+ .198	42	+ .076	.000	71	- .038	- .198
14	+ .114	+ .198	43	.000	.000	72	- .114	- .198
15	+ .038	+ .198	44	- .076	.000	73	- .190	- .198
16	- .038	+ .198	45	- .152	.000	74	- .266	- .198
17	- .114	+ .198	46	- .228	.000	75	+ .228	- .264
18	- .190	+ .198	47	- .304	.000	76	+ .152	- .264
19	- .266	+ .198	48	+ .342	- .066	77	+ .076	- .264
20	+ .304	+ .132	49	+ .266	- .066	78	.000	- .264
21	+ .228	+ .132	50	+ .190	- .066	79	- .076	- .264
22	+ .152	+ .132	51	+ .114	- .066	80	- .152	- .264
23	+ .076	+ .132	52	+ .038	- .066	81	- .228	- .264
24	.000	+ .132	53	- .038	- .066	82	+ .114	+ .330
25	- .076	+ .132	54	- .114	- .066	83	+ .038	+ .330
26	- .152	+ .132	55	- .190	- .066	84	- .038	+ .330
27	- .228	+ .132	56	- .266	- .066	85	- .114	+ .330
28	- .304	+ .132	57	- .342	- .066			
29	+ .342	+ .066	58	+ .304	- .132			

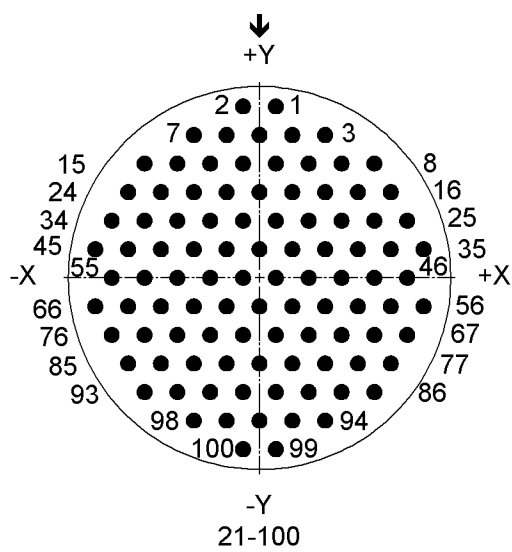
FIGURE 28. Insert arrangement 19-85. – Continued.



CONTACTS (INSERT ARRANGEMENT 19-204)								
CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION	
	X	Y		X	Y		X	Y
1	.000	+ .333	12	+ .235	- .235	23	- .227	.000
2	.000	+ .227	13	+ .163	- .290	24	- .280	+ .073
3	+ .073	+ .280	14	+ .073	- .280	25	- .290	+ .163
4	+ .163	+ .290	15	.000	- .333	26	- .235	+ .235
5	+ .235	+ .235	16	.000	- .227	27	- .163	+ .290
6	+ .290	+ .163	17	- .073	- .280	28	- .073	+ .280
7	+ .280	+ .073	18	- .163	- .290	29	- .115	+ .115
8	+ .333	.000	19	- .235	- .235	30	+ .115	+ .115
9	+ .227	.000	20	- .290	- .163	31	+ .115	- .115
10	+ .280	- .073	21	- .280	- .073	32	- .115	- .115
11	+ .290	- .163	22	- .333	.000			

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
19	204	28	23	1 thru 28
		4	12	29 thru 32

FIGURE 29. Insert arrangement 19-204.



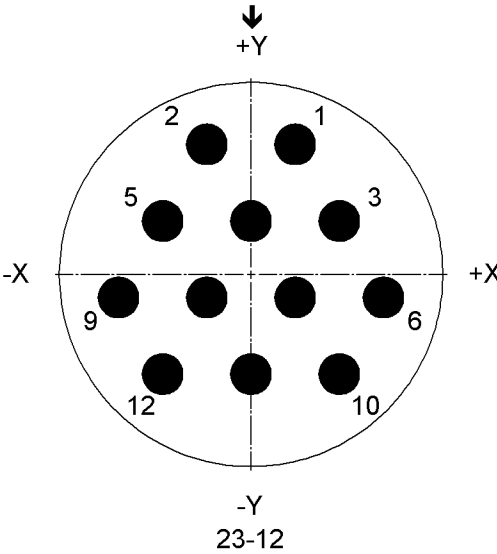
Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
21	100	100	23	All

FIGURE 30. Insert arrangement 21-100.

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CONTACTS - (INSERT ARRANGEMENT 21-100)								
CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION		CONTACT POSITION ID	CONTACT LOCATION	
	X	Y		X	Y		X	Y
1	+ .038	+ .396	35	+ .380	+ .066	68	+ .266	- .132
2	- .038	+ .396	36	+ .304	+ .066	69	+ .190	- .132
3	+ .152	+ .330	37	+ .228	+ .066	70	+ .114	- .132
4	+ .076	+ .330	38	+ .152	+ .066	71	+ .038	- .132
5	.000	+ .330	39	+ .076	+ .066	72	- .038	- .132
6	- .076	+ .330	40	.000	+ .066	73	- .114	- .132
7	- .152	+ .330	41	- .076	+ .066	74	- .190	- .132
8	+ .266	+ .264	42	- .152	+ .066	75	- .266	- .132
9	+ .190	+ .264	43	- .228	+ .066	76	-.342	- .132
10	+ .114	+ .264	44	- .304	+ .066	77	+ .304	- .198
11	+ .038	+ .264	45	- .380	+ .066	78	+ .228	- .198
12	- .038	+ .264	46	+ .342	.000	79	+ .152	- .198
13	- .114	+ .264	47	+ .266	.000	80	+ .076	- .198
14	- .190	+ .264	48	+ .190	.000	81	.000	- .198
15	- .266	+ .264	49	+ .114	.000	82	- .076	- .198
16	+ .304	+ .198	50	+ .038	.000	83	- .152	- .198
17	+ .228	+ .198	51	- .038	.000	84	- .228	- .198
18	+ .152	+ .198	52	- .114	.000	85	- .304	- .198
19	+ .076	+ .198	53	- .190	.000	86	+ .266	- .264
20	.000	+ .198	54	- .266	.000	87	+ .190	- .264
21	- .076	+ .198	55	-.342	.000	88	+ .114	- .264
22	- .152	+ .198	56	+ .380	- .066	89	+ .038	- .264
23	- .228	+ .198	57	+ .304	- .066	90	- .038	- .264
24	- .304	+ .198	58	+ .228	- .066	91	- .114	- .264
25	+ .342	+ .132	59	+ .152	- .066	92	- .190	- .264
26	+ .266	+ .132	60	+ .076	- .066	93	- .266	- .264
27	+ .190	+ .132	61	.000	- .066	94	+ .152	- .330
28	+ .114	+ .132	62	- .076	- .066	95	+ .076	- .330
29	+ .038	+ .132	63	- .152	- .066	96	.000	- .330
30	- .038	+ .132	64	- .228	- .066	97	- .076	- .330
31	- .114	+ .132	65	- .304	- .066	98	- .152	- .330
32	- .190	+ .132	66	- .380	- .066	99	+ .038	- .396
33	- .266	+ .132	67	+ .342	- .132	100	- .038	- .396
34	-.342	+ .132						

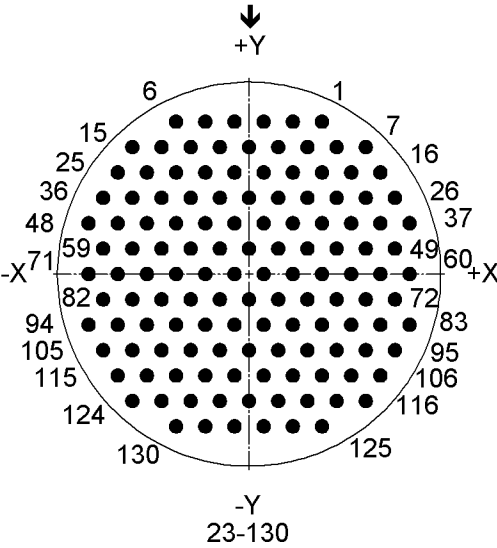
FIGURE 30. Insert arrangement 21-100. – Continued.



CONTACTS (INSERT ARRANGEMENT 23-12)						
Contact position ID	Location			Contact position ID	Location	
	X	Y			X	Y
1	+ .115	+ .338		7	+ .115	- .060
2	- .115	+ .338		8	- .115	- .060
3	+ .230	+ .139		9	- .345	- .060
4	.000	+ .139		10	+ .230	- .259
5	- .230	+ .139		11	.000	- .259
6	+ .345	- .060		12	- .230	- .259

Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
23	12	23	12	All

FIGURE 31. Insert arrangement 23-12.



Shell size	Arrangement number	Number of contacts	Size contacts	Contact location
23	130	130	23	All

FIGURE 32. Insert arrangement 23-130.

CONTACTS (INSERT ARRANGEMENT 23-130)										
Contact position ID	Location			Contact position ID	Location			Contact position ID	Location	
	X	Y			X	Y			X	Y
1	+ .190	+ .396		45	- .190	+ .132		89	- .038	- .132
2	+ .114	+ .396		46	- .266	+ .132		90	- .114	- .132
3	+ .038	+ .396		47	- .342	+ .132		91	- .190	- .132
4	- .038	+ .396		48	- .418	+ .132		92	- .266	- .132
5	- .114	+ .396		49	+ .380	+ .066		93	- .342	- .132
6	- .190	+ .396		50	+ .304	+ .066		94	- .418	- .132
7	+ .304	+ .330		51	+ .228	+ .066		95	+ .380	- .198
8	+ .228	+ .330		52	+ .152	+ .066		96	+ .304	- .198
9	+ .152	+ .330		53	+ .076	+ .066		97	+ .228	- .198
10	+ .076	+ .330		54	.000	+ .066		98	+ .152	- .198
11	.000	+ .330		55	- .076	+ .066		99	+ .076	- .198
12	- .076	+ .330		56	- .152	+ .066		100	.000	- .198
13	- .152	+ .330		57	- .228	+ .066		101	- .076	- .198
14	- .228	+ .330		58	- .304	+ .066		102	- .152	- .198
15	- .304	+ .330		59	- .380	+ .066		103	- .228	- .198
16	+ .342	+ .264		60	+ .418	.000		104	- .304	- .198
17	+ .266	+ .264		61	+ .342	.000		105	- .380	- .198
18	+ .190	+ .264		62	+ .266	.000		106	+ .342	- .264
19	+ .114	+ .264		63	+ .190	.000		107	+ .266	- .264
20	+ .038	+ .264		64	+ .114	.000		108	+ .190	- .264
21	- .038	+ .264		65	+ .038	.000		109	+ .114	- .264
22	- .114	+ .264		66	- .038	.000		110	+ .038	- .264

FIGURE 32. Insert arrangement 23-130. – Continued.

CONTACTS (INSERT ARRANGEMENT 23-130)										
Contact position ID	Location			Contact position ID	Location			Contact position ID	Location	
	X	Y			X	Y			X	Y
23	- .190	+ .264		67	- .114	.000		111	- .038	- .264
24	- .266	+ .264		68	- .190	.000		112	- .114	- .264
25	- .342	+ .264		69	- .266	.000		113	- .190	- .264
26	+ .380	+ .198		70	- .342	.000		114	- .266	- .264
27	+ .304	+ .198		71	- .418	.000		115	- .342	- .264
28	+ .228	+ .198		72	+ .380	- .066		116	+ .304	- .330
29	+ .152	+ .198		73	+ .304	- .066		117	+ .228	- .330
30	+ .076	+ .198		74	+ .228	- .066		118	+ .152	- .330
31	.000	+ .198		75	+ .152	- .066		119	+ .076	- .330
32	- .076	+ .198		76	+ .076	- .066		120	.000	- .330
33	- .152	+ .198		77	.000	- .066		121	- .076	- .330
34	- .228	+ .198		78	- .076	- .066		122	- .152	- .330
35	- .304	+ .198		79	- .152	- .066		123	- .228	- .330
36	- .380	+ .198		80	- .228	- .066		124	- .304	- .330
37	+ .418	+ .132		81	- .304	- .066		125	+ .190	- .396
38	+ .342	+ .132		82	- .380	- .066		126	+ .114	- .396
39	+ .266	+ .132		83	+ .418	- .132		127	+ .038	- .396
40	+ .190	+ .132		84	+ .342	- .132		128	- .038	- .396
41	+ .114	+ .132		85	+ .266	- .132		129	- .114	- .396
42	+ .038	+ .132		86	+ .190	- .132		130	- .190	- .396
43	- .038	+ .132		87	+ .114	- .132				
44	- .114	+ .132		88	+ .038	- .132				

FIGURE 32. Insert arrangement 23-130. – Continued.

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6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This standard covers insert arrangements for use with MIL-DTL-32689 environment resisting, micro-circular, electrical connectors. Inserts are used in the assembly of a connector. Inserts are installed into the shell of the connector and retaining clips and contacts put into the insert. Inserts are used in a variety of application such as military, industrial, and aerospace applications. Information pertaining to the shell size, arrangement number, number of contacts, contact location and superseding information is contained in this document.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this standard.

6.3 Subject term (key word) listing.

Shell size
Contacts
Socket
Pin

CONCLUDING MATERIAL

Custodians:

Army – CR
Navy – AS
Air Force – 85
DLA - CC

Preparing activity:

DLA - CC

(Project 5935-2021-093)

Review activities:

Navy – EC, SH

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.