

TECHNICAL REPORT

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1990-11-15

Information technology — Communication interface connectors used in local area networks

*Technologies de l'information — Connecteurs d'interface de communication utilisés
dans les réseaux locaux*



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) together form a system for worldwide standardization as a whole. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The main task of a technical committee is to prepare International Standards but in exceptional circumstances, the publication of a technical report of one of the following types may be proposed:

- type 1, when the necessary support within the technical committee cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development requiring wider exposure;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical reports of type 3 do not necessarily have to be reviewed until data they provide are considered to be no longer valid or useful.

ISO/IEC TR 9578, which is a technical report of type 3, was prepared by ISO/IEC JTC 1, Information technology.

Introduction

This Technical Report deals with connectors for communication systems.

For a number of years, communications interfaces defined by ISO have used interface connectors which had been or are being standardized by IEC.

This Technical Report briefly defines connectors that are primarily used in International Standards for local area networks, which may also be used in wide area networks and municipal area networks. It should be clearly understood that the data on connectors given in the International Standards merely provides reference information for particular applications. The final responsibility for connector standards lies with IEC.

This subject of connector standards has caused some misunderstanding in the past and it is hoped that this Technical Report will minimize the confusion as work proceeds on new open system interconnects related to local area networks. It should assist those not fully conversant with electrical connector technology to use the correct components in their systems.

The connectors described in this Technical Report are divided into three groups, according to the three transmission media currently defined for local area networks, that is to say copper wire/twisted pair, coaxial and fibre optic media, where the standards are available and appropriate.

Information technology — Communication interface connectors used in local area networks

1 Scope

This Technical Report describes the physical layer connection device for local area networks. This device is sometimes referred to as the medium interface connector and is used between the terminal equipment and the trunk coupling unit for the trunk cable. The connectors described in this document were proposed by ISO/IEC JTC 1 SC 6, SC 13, SC 83, IEC TC 46, IEC TC 48, and IEC TC 86. This document focuses the work of all of these groups into one compendium which describes the physical devices which are currently available in the standards world.

Data transmission techniques can be divided into two basic classifications: baseband and broadband. They can be further defined by the speeds of the data transmission across the interface. To avoid undue complexity, no attempt is made to describe the cable or wire used in conjunction with the connectors that are described.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Technical Report. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Technical Report are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4903: 1980, Data communications - 15-pin DTE/DCE interface connector and pin assignments. First edition amendment slip 1981.

ISO 8802-3: 1989: Information processing systems - Local area networks - Part 3: Carrier sense multiple access with collision detection.

ISO 8802-4: - ¹⁾, Information processing systems - Local area networks - Part 4: Token-passing bus access method and physical layer specification.

ISO 8802-5: - ¹⁾, Information processing systems - Local area networks - Part 5: Token ring access method and physical layer specification.

ISO 8802-7: - ¹⁾, Information processing systems - Local area networks - Part 7: Slotted ring access method and physical layer specification.

ISO 8877: 1987: Information processing systems - Interface connector and contact assignments for ISDN - Basic access interface located at reference points S and T.

ISO 9314-1: - ¹⁾, Information processing systems - Fibre distributed data interface (FDDI) - Part 1: Physical layer protocol (PHY).

ISO 9314-2: - ¹⁾, Information processing systems - Fibre distributed data interface (FDDI) - Part 2: Media access control (MAC).

ISO 9314-3: - ¹⁾, Information processing systems - Fibre distributed data interface (FDDI) - Part 3: Physical layer medium dependent (PMD).

IEC 48B(CO)189: - ¹⁾, Detail specification for connectors four signal and earthing contacts for cable screen.

IEC 83(Sec.)54: - ¹⁾, Medium attachment unit and baseband medium specification for a vendor independent fibre optic layer repeater link.

IEC 169-8: 1978, Part 8: R.F. coaxial connectors with inner diameter of outer conductor 6,5 mm (0,256 in) with bayonet lock - Characteristic impedance 50 ohms (Type BNC).

¹⁾ To be published.

IEC 169-16: 1982, Part 16: R.F. coaxial connectors with inner diameter of outer conductor 7 mm (0,276 in) with screw coupling - Characteristic impedance 50 ohms (75 ohms) (Type N).

IEC 169-17: 1980, Part 17: R.F. coaxial connectors with inner diameter of outer conductor 6,5 mm (0,256 in) with screw coupling - Characteristic impedance 50 ohms (Type TNC).

IEC 169-24: - ¹⁾, Part 24: Radio-frequency connectors - Radio-frequency coaxial connectors with screw coupling, typically for use in 75 ohms cable distribution systems (Type F).

IEC 169-25: - ¹⁾, Part 25: Radio-frequency connectors - Two-pole screw (3/4-20 UNEF) coupled connectors for use with shield balanced cables having twin inner conductors with inner diameter of outer conductor: 13,56 mm (0,534 in).

IEC 607-3: 1990, Part 7: Detail specification for connectors, 8 way, including fixed and free connectors with common mating features.

IEC 807-2: 1985, Part 2: Detail specification for a range of connectors with round contacts. Fixed solder contact types.

IEC 807-3: 1990, Part 3: Detail specification for a range of connectors with trapezoidal shaped metal shells and round contacts, removable crimp contact types with closed crimp barrels, rear insertion/rear release.

IEC 874-2: - ¹⁾, Connector for optical fibers and cables. Part 2: Fibre optic connector type F-SMA.

CCITT Recommendation I.430: 1984, Basic user network interface - Layer 1 specification.

CCITT Recommendation I.431: 1984, Primary rate user network interface - Layer 1 specification.

¹⁾ To be published.

3 Reference interface details

3.1 *Copper wire/twisted pair media*

3.1.1 *D subminiature connectors*

D subminiature connectors for use in local area network systems shall conform to the requirements of IEC 807-2 and/or 807-3. The mating face drawings and contact arrangements are included here for information.

Performance

Working voltage: 25 V d.c. or a.c. peak

Insulation resistance: 5 G Ω min.

Contact resistance: 10 m Ω max.

Application

ISO 8802-3

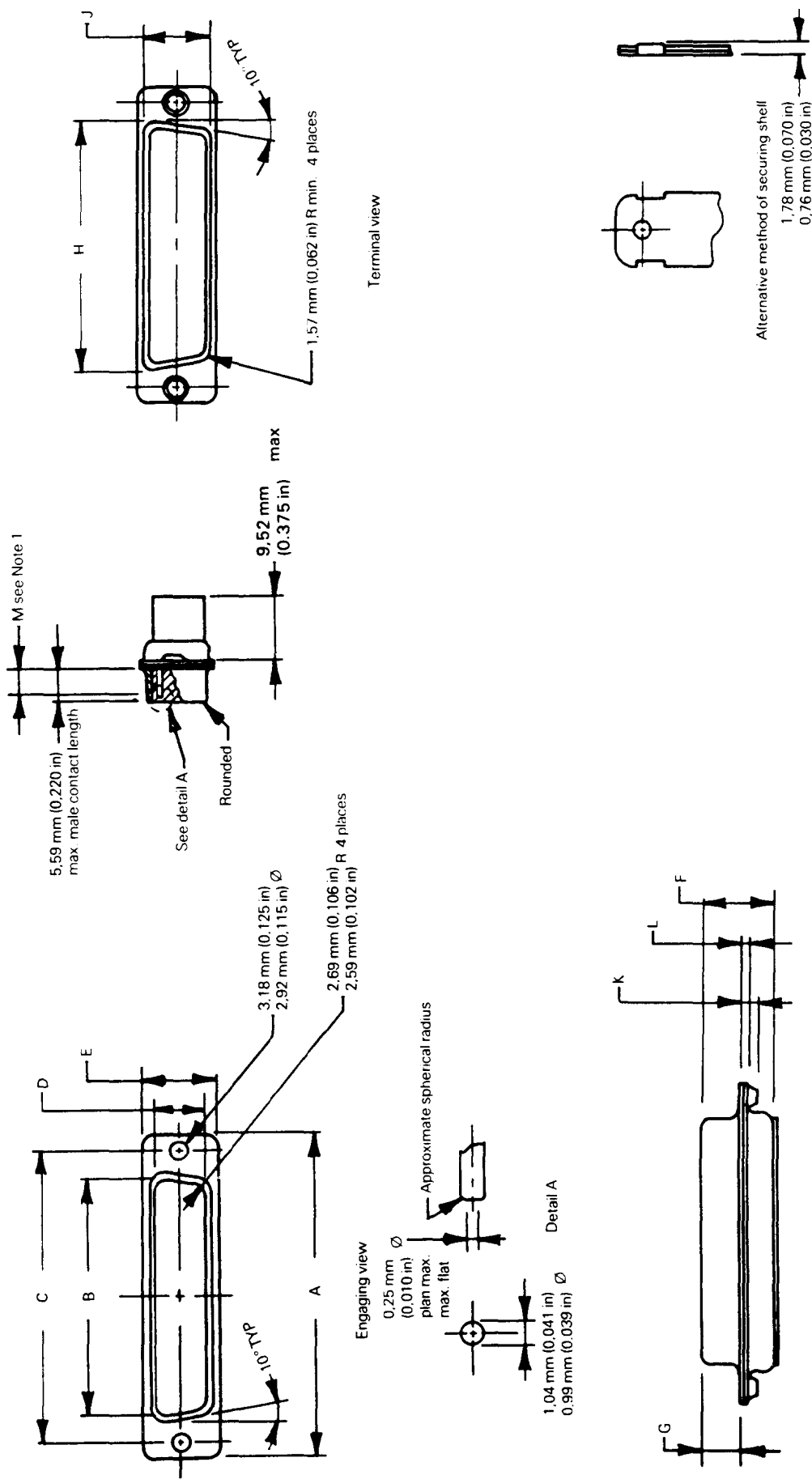
ISO 8802-7

Mating face dimensions and contact arrangements

3.1.1.1 *Contact arrangements, face view of connector with male contacts or rear view of connector with female contacts. (For complete details see IEC 807-2 and/or IEC 807-3.)*

Shell size	Number of contacts	Connector with male contacts
1	9	1 2 3 4 5 ++ ++ ++ ++ 6 7 8 9
2	15	1 2 3 4 5 6 7 8 ++ ++ ++ ++ ++ ++ ++ ++ 9 10 11 12 13 14 15
3	25	1 2 3 4 5 6 7 8 9 10 11 12 13 ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ 14 15 16 17 18 19 20 21 22 23 24 25
4	37	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37
5	50	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++

3.1.1.2 Outline dimensions of connector with male contacts.



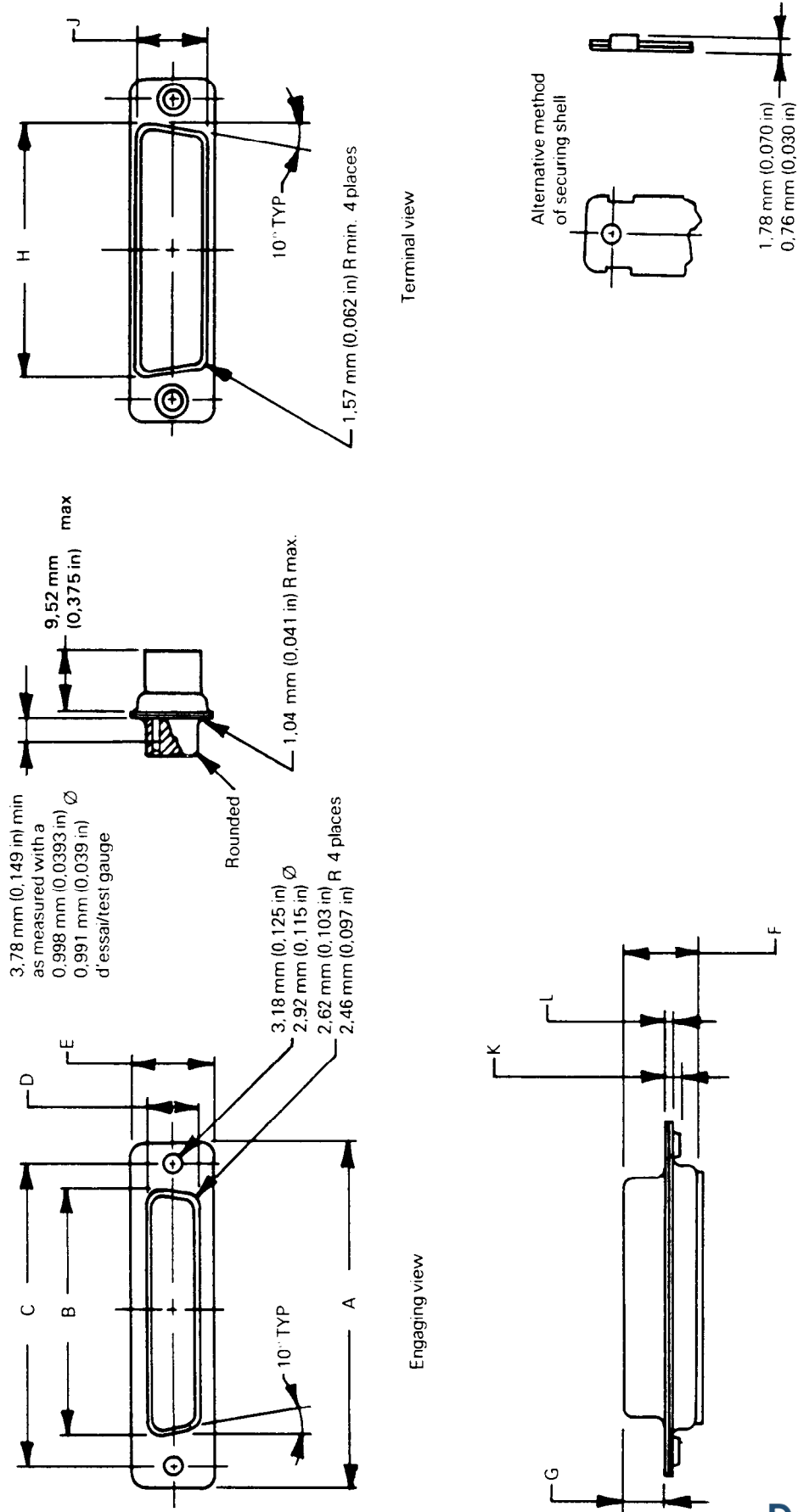
Note 1. - The male contact shall have a circular cross-section concentric within 0.051 mm (0.002 in) Total Indicator Reading, the full length of the M dimension.

Outline dimensions of connectors with male contacts (for reference only).

Shell size	Number of contacts	A		B		C		D		E		F	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
1	9	31,19	1,228	17,04	0,671	25,12	0,989	8,48	0,334	12,93	0,509	10,97	0,432
		30,43	1,198	16,79	0,661	24,87	0,979	8,23	0,324	12,17	0,479	10,46	0,412
2	15	39,52	1,556	25,37	0,999	33,45	1,317	8,48	0,334	12,93	0,509	10,97	0,432
		38,76	1,526	25,12	0,989	33,20	1,307	8,23	0,324	12,17	0,479	10,46	0,412
3	25	53,42	2,103	39,09	1,539	47,17	1,857	8,48	0,334	12,93	0,509	11,07	0,435
		52,65	2,073	38,84	1,529	46,91	1,847	8,23	0,324	12,17	0,479	10,57	0,416
4	37	69,70	2,744	55,55	2,187	63,63	2,505	8,48	0,334	12,93	0,509	11,07	0,436
		68,94	2,714	55,30	2,177	63,37	2,495	8,23	0,324	12,17	0,479	10,57	0,416
5	50	67,31	2,650	52,93	2,084	61,24	2,411	11,33	0,446	15,75	0,620	11,07	0,436
		66,55	2,620	52,68	2,074	60,99	2,401	11,07	0,436	14,99	0,590	10,57	0,416

Shell size	Number of contacts	G		H		J		K		L		M	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
1	9	6,05	0,238	19,53	0,769	10,97	0,432	1,78	0,070	1,02	0,040	4,04	0,159
		5,82	0,229	19,02	0,749	10,46	0,412	max.	max.	0,51	0,020	min.	min.
2	15	6,05	0,238	27,76	1,093	10,97	0,432	1,78	0,070	1,02	0,040	4,04	0,159
		5,82	0,229	27,25	1,073	10,46	0,412	max.	max.	0,51	0,020	min.	min.
3	25	5,99	0,236	41,53	1,635	10,97	0,432	1,78	0,070	1,24	0,049	3,81	0,150
		5,69	0,224	41,02	1,615	10,46	0,412	max.	max.	0,74	0,029	min.	min.
4	37	5,99	0,236	57,96	2,282	10,97	0,432	1,78	0,070	1,24	0,049	3,81	0,150
		5,69	0,224	57,45	2,262	10,46	0,412	max.	max.	0,74	0,029	min.	min.
5	50	5,99	0,236	55,58	2,188	13,82	0,544	1,78	0,070	1,24	0,049	3,81	0,150
		5,69	0,224	55,07	2,168	13,31	0,524	max.	max.	0,74	0,029	min.	min.

3.1.1.3 Outline dimensions of connector with female contacts.



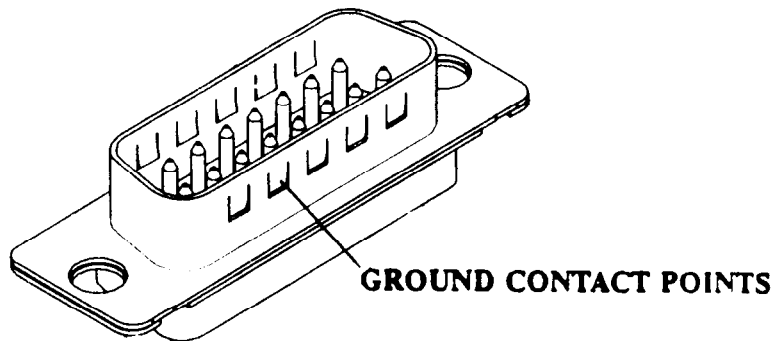
Outline dimensions of connectors with female contacts (for reference only).

Shell size	Number of contacts	A		B		C		D		E		F	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
1	9	31,19	1,228	16,46	0,648	25,12	0,989	8,03	0,316	12,93	0,509	11,15	0,439
		30,43	1,198	16,21	0,638	24,87	0,979	7,77	0,306	12,17	0,479	10,64	0,419
2	15	39,52	1,556	24,79	0,976	33,45	1,317	8,03	0,316	12,93	0,509	11,15	0,439
		38,76	1,526	24,54	0,966	33,20	1,307	7,77	0,306	12,17	0,479	10,64	0,419
3	25	53,42	2,103	38,51	1,516	47,17	1,857	8,03	0,316	12,93	0,509	11,15	0,439
		52,65	2,073	38,25	1,506	46,91	1,847	7,77	0,306	12,17	0,479	10,64	0,419
4	37	69,70	2,744	54,97	2,164	63,63	2,505	8,03	0,316	12,93	0,509	11,15	0,439
		68,94	2,714	54,71	2,154	63,37	2,495	7,77	0,306	12,17	0,479	10,64	0,419
5	50	67,31	2,650	52,55	2,069	61,24	2,411	10,87	0,428	15,75	0,620	11,15	0,439
		66,55	2,620	52,30	2,059	60,99	2,401	10,62	0,418	14,99	0,590	10,64	0,419

Shell size	Number of contacts	G		H		J		K		L	
		mm	in	mm	in	mm	in	mm	in	mm	in
1	9	6,30	0,248	19,53	0,769	10,97	0,432	1,78	0,070	1,02	0,040
		6,05	0,238	19,02	0,749	10,46	0,412	max.	max.	0,51	0,020
2	15	6,30	0,248	27,76	1,093	10,97	0,432	1,78	0,070	1,02	0,040
		6,05	0,238	27,25	1,073	10,46	0,412	max.	max.	0,51	0,020
3	25	6,30	0,248	41,53	1,635	10,97	0,432	1,78	0,070	1,02	0,040
		6,05	0,238	41,02	1,615	10,46	0,412	max.	max.	0,51	0,020
4	37	6,30	0,248	57,96	2,282	10,97	0,432	1,78	0,070	1,02	0,040
		6,05	0,238	57,45	2,262	10,46	0,412	max.	max.	0,51	0,020
5	50	6,30	0,248	55,58	2,188	13,82	0,544	1,78	0,070	1,02	0,040
		6,05	0,238	55,07	2,168	13,31	0,524	max.	max.	0,51	0,020

3.1.1.4 15-pole connectors for CSMA/CD systems.

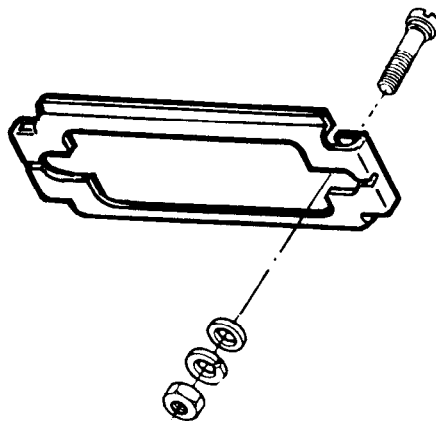
ISO 8802-3 specifies that there shall be multiple contact points around the sides of the male front shell to provide shield continuity not greater than 5 milliohms. All female connectors shall have the slide latch and all male connectors shall have the locking posts



3.1.1.5 Accessories - covers and locking devices.

a) Slide lock - as specified for CSMA/CD systems. This consists of two halves:

- 1) Sliding plate
- 2) Locking posts



b) Jack screws - It may not be possible to use jack screws with certain connector housing designs.

- c) **Connector housing** - A variety of connector housings are available to protect the wiring termination at the back of the free connector manufactured from sheet metal, die-cast alloy, or moulded plastic. Many designs offer electromagnetic interference shielding to enable equipment using them to comply with various specifications requiring immunity from interference.

A number of manufacturers supply ready-made cable assemblies which have the connectors moulded on to the cable. Such assemblies may also offer electromagnetic shielding.

The style of connector housing is dependent on the particular application and no attempt has been made to recommend a standard.

System designers may consult connector manufacturers for advice on suitable items.