
KPSE

C O N N E C T O R S

A S S E M B L Y

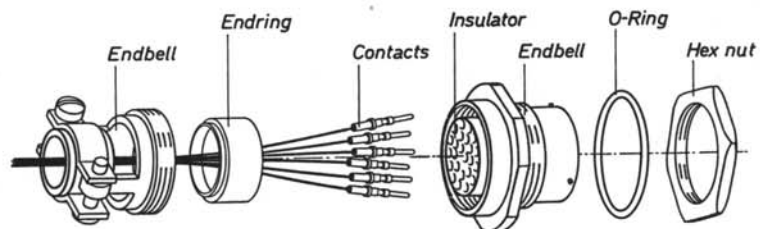
I N S T R U C T I O N S



Contents

| | |
|--|----|
| Connector design | 3 |
| Connector assembly | 3 |
| Stripping of cable | 3 |
| Manual crimping of contacts | 4 |
| Crimp testing | 5 |
| Pneumatic crimping of contacts | 5 |
| Crimp testing | 6 |
| Crimping of contacts by HACS | 6 |
| Insertion tools | 7 |
| Insertion of contacts | 7 |
| Wire hole fillers | 8 |
| Extraction tools | 9 |
| Extraction of contacts | 9 |
| Extraction tool for coax contacts | 10 |
| Connectors with solder contacts | 10 |
| Mounting data/Termination data/dimension | 11 |
| Mounting holes | 12 |
| Mounting of shielded braid | 13 |
| Mounting aids | 14 |

Connector design (e.g. KPSE 07E)



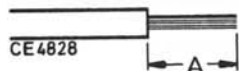
Connector assembly

- Strip cable according to instruction (see table)
- Crimp contacts according to instruction (KPT: solder cable according to instruction, see page 10)
- Remove hardware from plug or receptacle and push over wire bundle in the correct order
- Load contacts into insulator according to instruction (use wire hole fillers for empty contact cavities)
- Assemble connector in correct sequence
- Depending on connector type secure shielding braid and shrink heat shrink boot according to instruction (see page 13)

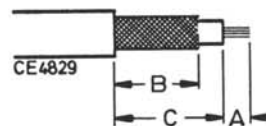
Note:

Prepare cable for 90° cable bundle as follows: Cable bundle to be in 90° position before cutting

Strip cable



Strip coax cable (solder version) only for 14A4 layout

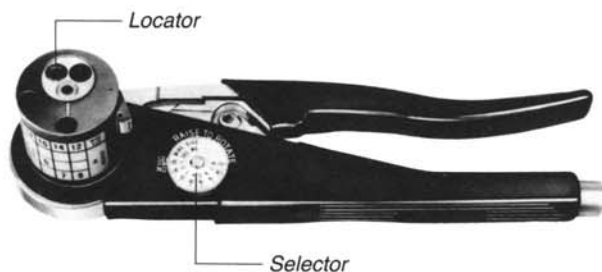


| Contact size | AWG | A mm | Insulation outer Ø |
|--------------|-------|------|--------------------|
| 20 | 20–24 | 5,0 | 1,3–2,1 |
| 16 | 16–20 | 6,5 | 1,8–2,7 |
| 12 | 12–14 | 6,5 | 2,5–3,4 |

| Order references Contact | Dimensions | | |
|-----------------------------|------------|------|------|
| | A | B | C |
| DM 53742-5001 | 1,98 | 6,35 | 7,92 |
| DM 53740-5001 | 1,98 | 6,35 | 7,92 |

Crimping of Contacts

Manual crimping



Order reference

Hand crimp tool **M 22520/1-01***

Crimp profile 8 crimp indents
Contact size 12, 16 and 20

Parts subject to wear **7011707**
Spare crimp stamp

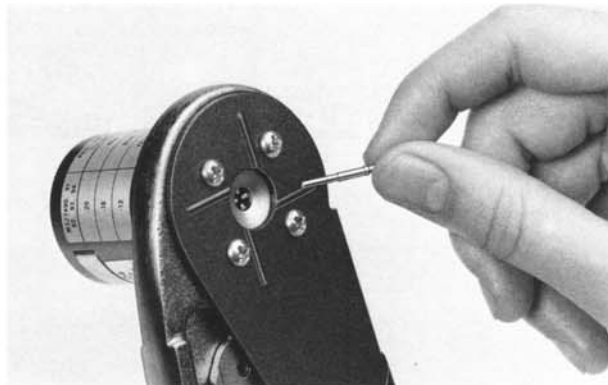
Order references

Crimp locators*

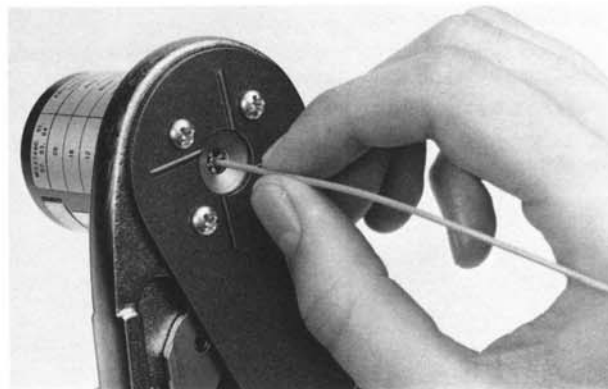
| Contact size | Crimp locator for Pin contact and socket contact | Colour coding | Wire size AWG | Crimp locator (Selector No) |
|--------------|--|---------------|---------------|-----------------------------|
| 12 | M 22520/1-02 | yellow | 12 | 8 |
| | | | 14 | 7 |
| 16 | M 22520/1-02 | blue | 16 | 6 |
| | | | 20 | 4 |
| 20 | M 22520/1-02 | red | 20 | 4 |
| | | | 22 | 3 |
| | | | 24 | 2 |

* Attention
Crimp locators to be ordered separately.

Terminate contacts only with the correct tools. Manual wiring is done with the hand crimp tool and the correct locator for each contact size. Prior to crimping close tool completely in order to check that the crimp indentors are in correct position for crimping. Insert the contact into the tool with its crimp pot on top.



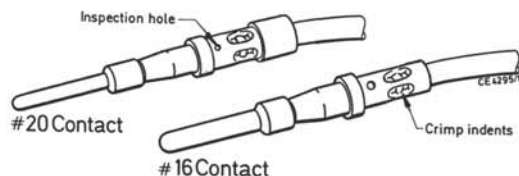
Close the tool partially until the indentors hold the contact in firm position. Insert stripped wire into contact crimp pot as deep as possible. Apply slight axial pressure onto the contact. When inserting a stranded conductor note that all strands are inserted into the crimp pot and that they are not excessively twisted. Now close tool completely, the locking mechanism will only release the fully crimped contact. Extract contact from tool and check through inspection hole that stranded wires are visible.



After crimping please check that

- wire has to be visible through inspection hole
- the contacts are not bent or damaged
- no strand is outside the crimp pot
- a proper crimp termination with eight indents has been performed.

During the crimping cycle the contact must not be bent or damaged in any way. The wire must not be cut, pulled out of the contact or deformed as it will fail before reaching the required tensile strength. Broken wires which appear at a lower tensile strength, but not due to the crimping operation, are no faults.



Crimping of contacts

Testing the crimp depth (hand tool)

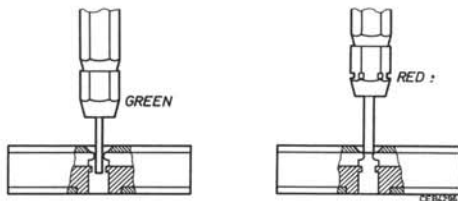


Order reference
Reference gauge

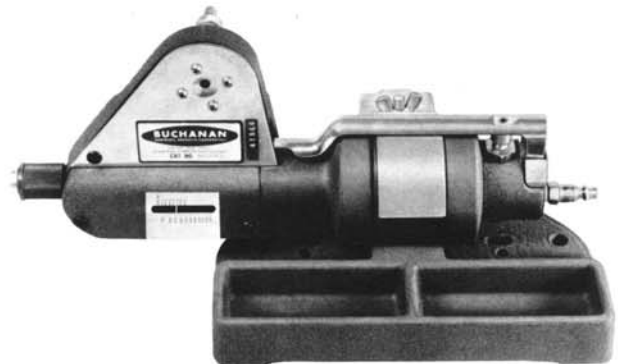
M 22520/3-1

Usage

- Adjust position 4 at locator
- Close indentors
- Insert "GO" end (green) of reference gauge into crimp tool
- Afterwards check with "NO" end (red)
- When "NO" end cannot be inserted the crimp depth is correctly adjusted. If "NO" end can be inserted the crimp tool must be checked.



Pneumatic crimping



Order reference
Pneumatic crimp tool

612141

Crimp profile

8 crimp indents

Contact size

12, 16 and 20

Attention
Work tray with foot pedal and crimp locator inserts to be ordered separately.

Order references
Work tray with foot pedal

611380

Crimp locators

| Contact-size | Crimp locator for Pin and Socket contact | Colour coding | Wire size AWG | Crimp position (Selector No) |
|--------------|--|---------------|---------------|------------------------------|
| 12 | M 22520/1-02 | yellow | 12 | 8 |
| | | | 14 | 7 |
| | | | 16 | 6 |
| 16 | M 22520/1-02 | blue | 18 | 5 |
| | | | 20 | 4 |
| | | | 22 | 3 |
| 20 | M 22520/1-02 | red | 24 | 2 |

Parts subject to wear

Order reference
Crimp stamp

7008317

Crimping of contacts

Pneumatic tool (working tray)

612141

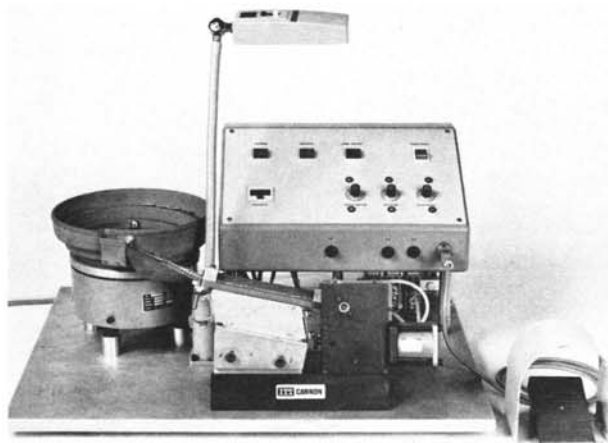
The pneumatic crimp tool has to be adjusted to correct crimp depth with the appropriate gauge:

| Contact size | Wire size AWG | Test pin \varnothing min. | max. |
|--------------|------------------|--------------------------------|------|
| 12 | 12 | 1,73 | 1,85 |
| | 14 | 1,50 | 1,62 |
| 16 | 16 | 1,32 | 1,44 |
| | 18 | 1,14 | 1,27 |
| | 20 | 0,99 | 1,11 |
| 20 | 20 | 0,99 | 1,11 |
| | 22 | 0,91 | 1,04 |
| | 24 | 0,81 | 0,94 |

Testing the crimp depth

- Use gauge according to contact size or wire size
- Close crimp area
- Insert gauge with min. dimension
- Gauge with max. dimension must not be inserted.

Semi-automatic crimp tool



Order references according to contact size

HACS-KPSE-12
HACS-KPSE-16
HACS-KPSE-20

Crimp profile

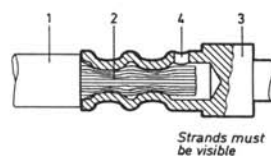
8 crimp indents

| Crimp machine | Contact size | Wire size AWG |
|---------------|--------------|---------------|
| HACS-KPSE-12 | 12 | 12 |
| | | 14 |
| HACS-KPSE-16 | 16 | 16 |
| | | 18 |
| | | 20 |
| HACS-KPSE-20 | 20 | 20 |
| | | 22 |
| | | 24 |

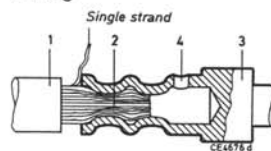
Crimp Testing

Visual

Correct



Wrong



- 1 Insulation
- 2 Strands
- 3 Contact
- 4 Inspection hole

Mechanical

Tensile strength test according to IEC 352-2

| AWG | Tensile strenght of conductors N (torque values) | Extraction force N |
|-----|---|-----------------------|
| 28 | 18 | 14 |
| 26 | 29 | 22 |
| 24 | 47 | 36 |
| 22 | 74 | 49 |
| 20 | 117 | 76 |
| 18 | 186 | 112 |
| 16 | 295 | 177 |
| 14 | 468 | 258 |
| 12 | 745 | 410 |

Micro sections

Enlargement of micro section allows the final judgment of crimp quality. We recommend this test whenever new tools or new types of wires are used.

Insertion of contacts

Insertion tool



Order reference according to contact size

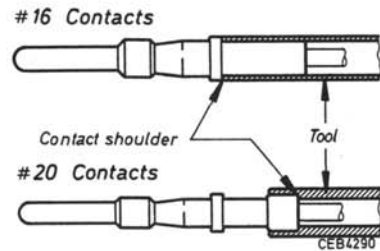
| | |
|---------|---------------------|
| Size 20 | MS 24256-A20 |
| Size 16 | MS 24256-A16 |
| Size 12 | MS 24256-A12 |

Coaxial contacts can be inserted without tool.

Insertion of contacts

Push tool over termination end of contact. Contacts sizes 12 and 16 lay in the tool.

The tool tip butts against the contact shoulder. The rear part of the contact or the insulation support size 20 butts against the shoulder of the tool tip. Use Isopropyl-alcohol on the contacts to insert wire more easily.



Straight cable insertion

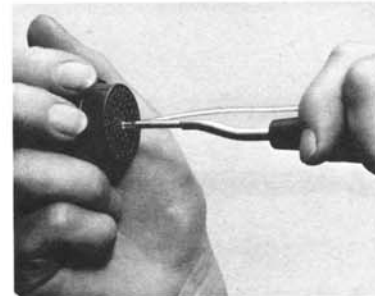
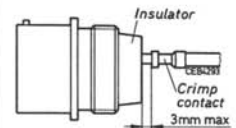
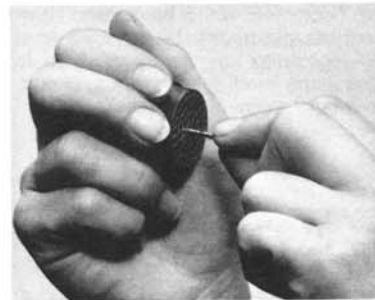
Start inserting contacts from the centre and continue in a spiral towards outer marking

90° cable insertion

Start inserting contacts in the lowest row and continue upwards.

Insert terminated contacts into connector rear until contact shoulder is nearly next to (about 3 mm) the insulator. This ensures the correct positioning of the contact in the contact cavity.

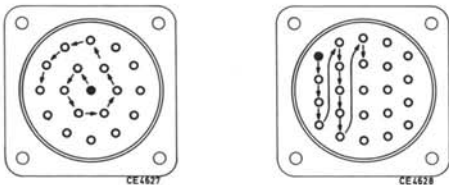
The insertion tool has to be in an axial position to the insulator face area. Insert contact slowly into connector until it snaps in audibly. Slightly pull cable and check the correct position of contact.



Insertion of contacts

Insert contacts according to marking on the insulator (Same applies to system cable).

Here are two typical examples:



Attention

Insertion tool can damage insulator and contact clip when it is not used according to instructions, when twisted or is itself damaged

Check face of connector for correct contact insertion

Using a dummy connector with integral contacts, both connector halves can be mated.

Push cone over insulator as far as possible. Push endbell over cone and fix carefully. If necessary loosen endbell a bit and fix again according to torque given.

Attention

Do not insert damaged or bent contacts.

If a contact is damaged during the insertion it has to be removed from the front side and a new contact installed. If the insulator is damaged it must be replaced. Damaged insulators do not meet specified test voltage rating. Grommets which have been damaged during insertion of a contacts also have to be replaced. After insertion of contacts, check connector on the mating side to ensure all contacts are at the same level. After insertion of contacts remove tool carefully without turning.



Correctly crimped contact



Incorrectly crimped contact

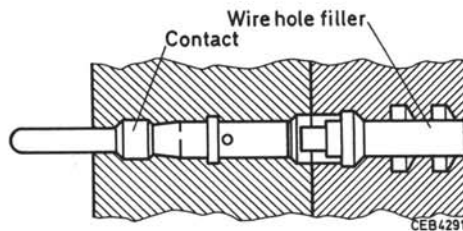
Wire hole fillers

We recommend filling empty contact cavities with wire hole fillers at the rear of the insulator.

Wire hole fillers are colour coded

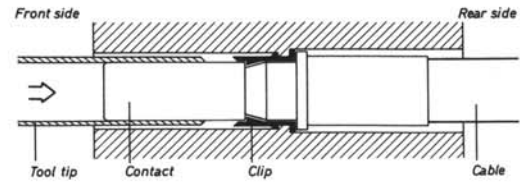
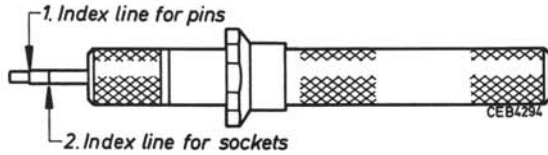
| Size | Order no | Colour |
|--------------|--------------|--------|
| 20 | 225-1012-000 | red |
| 16 | 225-1011-000 | blue |
| 12 | 225-1010-000 | yellow |
| Coaxial 14A4 | 225-1018-000 | yellow |

Fill empty contact cavities with an unwired contact and a wire hole filler as shown below.



Extraction of contacts

Extraction tool



Tip of removal tool is inserted into contact cavity

Order references

| Contact size | Complete tool | Spare insertion tip |
|--------------|---------------|---------------------|
| 20 | MS 24256-R20 | CT 317-7130-000 |
| 16 | MS 24256-R16 | CT 317-7129-000 |
| 12 | MS 24256-R12 | CT 317-7131-000 |

Usage of tool

The two index lines on the sleeve are important for the extraction process.

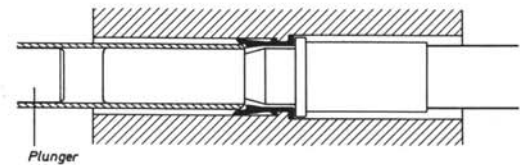
The first index line indicates the extraction of pin, the second one the extraction of socket contacts.

While pushing the tool into the insulator, make sure that the appropriate index line is flush with the face of the insulator.

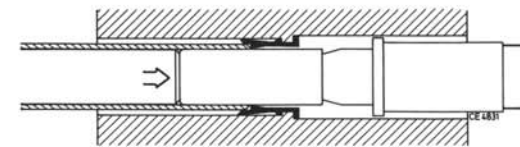
Carefully push the tool tip over the contact until the tool tip is flush with the face of the insulator. Apply smooth and constant pressure to the tool until clip opens. Pushing the plunger forward while holding it between thumb and index finger pushes the contact out of the insulator. Remove contact from connector by pulling at the cable.

Attention

Tool can damage insulator and contact clip when it is not used according to instructions, when twisted or itself is damaged.



Tip of removal tool opens retaining clip



Plunger of removal tool pushes contact backwards out of cavity

Extraction of coax contacts

Extraction tool for coax contacts (layout 14A4)



Order reference

Tool
Spare tip

CET-C6B
CET-C6B-TIP

Extraction of coax contacts

To extract the coax contact, hold the tool by the body and insert the tip into the front of the contact cavity until it bottoms and opens the coax retaining clip. Holding the body in this position securely enough to keep coax retaining clip open, push the plunger. Contact will be pushed out of the rear of the assembly.

Soldering of contacts

Connectors of series KPT with solder contacts

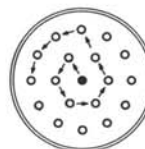
Connectors of this series already have fixed contacts and solder pots aligned.



Soldering of wires

Pull wire through insulator, ferrule, grommet and all used accessories such as endbell and cable clamp. Make sure that wire is inserted through the appropriate cavity of the insulator. Use Isopropyl-alcohol for easier wire insertion. Finally solder conductors to the contacts by using appropriate solder tin and flux.

Preferably start soldering at center contact and continue in a spiral to the outer contacts as shown below.



Make sure that soldering is performed as quickly as possible in order to prevent the insulator from damage. Fill empty cavities with wire hole fillers.

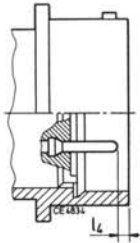
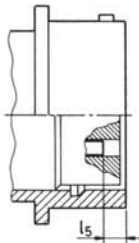
Assemble accessories

After soldering cables the grommet has to be pushed over the wires in an axial direction until it is flush with the insulator. The ferrule is then moved over the grommet and both parts are fastened and tightened by the endbell. Use Isopropyl-alcohol for easier assembly of wire, grommet, insulator and ferrule.

Termination dimensions

Connector types A, B, C, D, E, H, P, R, S and T
with socket contacts

Shell styles 00, 01, 02, 07
with pin contacts

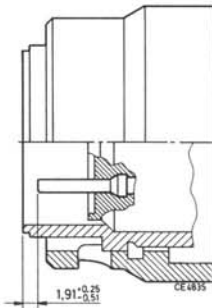
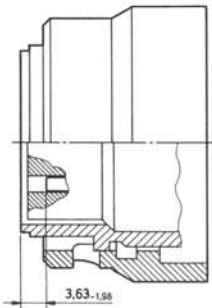


| Gehäusegröße | l_4 +0,25 -0,5 | $l_5^{*)}$ 0 -1,78 |
|--------------|------------------------|--------------------------|
| 8 | 2,16 | 3,89 |
| 10 | 2,16 | 3,89 |
| 12 | 2,16 | 3,89 |
| 14 | 2,16 | 3,89 |
| 16 | 2,16 | 3,89 |
| 18 | 2,16 | 3,89 |
| 20 | 3,73 | 5,5 |
| 22 | 3,73 | 5,5 |
| 24 | 3,73 | 5,5 |

* Distance between end of shell and the point at which a gauge pin having the same basic diameter as the mating contact and a square face first engages socket contact spring.

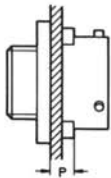
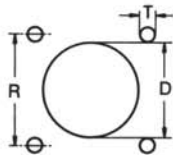
Connector types J, K, M, N, V2
with socket contacts

Shell styles 06, 08
with pin contacts

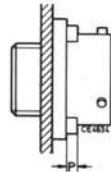


Mounting holes

KTP/KPSE Flange mounting receptacle



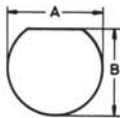
Rear mounting



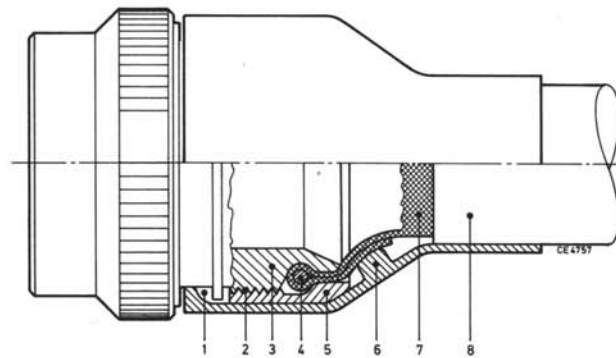
Front mounting

| Shell size | Rear mounting D +0,25 -0 | Front mounting D +0,25 -0 | R ±0,15 | T +0,3 | P max. Rear mounting incl. panel thickness |
|------------|--------------------------------|---------------------------------|------------|-----------|---|
| 8 | 14 | 12,7 | 15,1 | 3,1 | 2,20 |
| 10 | 17 | 16,0 | 18,3 | 3,1 | 2,20 |
| 12 | 22 | 19,0 | 20,6 | 3,1 | 2,20 |
| 14 | 25 | 22,2 | 23,0 | 3,1 | 2,20 |
| 16 | 28 | 25,5 | 24,6 | 3,1 | 2,20 |
| 18 | 31 | 28,5 | 27,0 | 3,1 | 2,20 |
| 20 | 34,5 | 31,7 | 29,4 | 3,1 | 5,40 |
| 22 | 37,5 | 35,0 | 31,8 | 3,1 | 5,40 |
| 24 | 41,0 | 38,0 | 34,9 | 3,6 | 5,40 |

KPSE7/KPT7 Jam nut receptacle



| Shell size | A +0,25 -0 | B +0 -0,12 |
|------------|------------------|------------------|
| 8 | 14,5 | 13,6 |
| 10 | 17,7 | 16,8 |
| 12 | 22,7 | 20,9 |
| 14 | 25,7 | 14,1 |
| 16 | 28,8 | 27,2 |
| 18 | 32,0 | 30,4 |
| 20 | 35,1 | 33,6 |
| 22 | 38,4 | 36,8 |
| 24 | 41,5 | 40,0 |



Fixing of shielding braid to connectors with DZ-adapter

- Loosen lock nut (5). Slide heat shrink component (6) and lock nut (5) over cable
- Push shielding braid (7) onto endbell (3) and over thread (2). Fasten shielding braid (7) into rounded groove by means of baling wire
- Fold back protruding shielding braid on cone.
- Slide lock nut (5) onto endbell (3). The folded back shielding braid protrudes under the tightened lock nut
- Shrink heat shrink component (6) according to manufacturers instructions (End of heat shrink component to be located in square groove (1))

Torque wrench system CTW 17

The torque wrench system CTW 17 consists of torque wrench incl. display, connector insert and backshell assembly wrench.

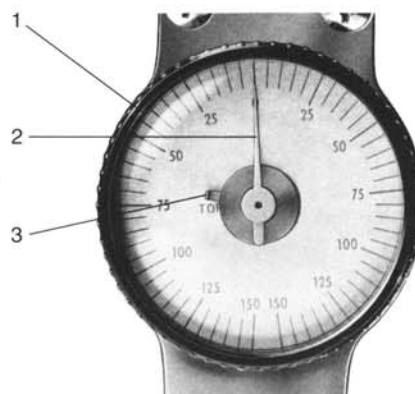
Operation instructions

Select proper connector holder and put it on torque wrench, set desired torque as follows

- turn bezel (1) clockwise until light signal is on
- continue until main pointer (2) together with memory pointer (3) is at desired torque level
- turn bezel (1) now counter clockwise until the main pointer (2) is aligned with "0" on scale.

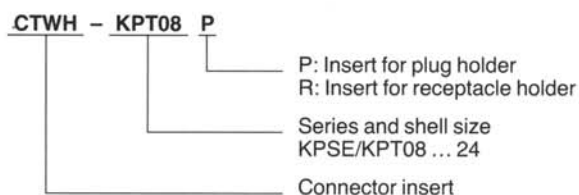
Torque wrench is now ready for operation.

Backshell assembly wrench to be used as shown; tighten backshell until set torque is rechecked and light signal is on.

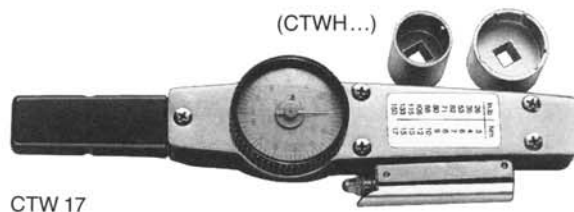


Order references

Torque key CTW 17
Connector insert



Caution:
Do not apply torque in excess of signal setting. Excess torque will cause signal pointer to reset and give erroneous reading.

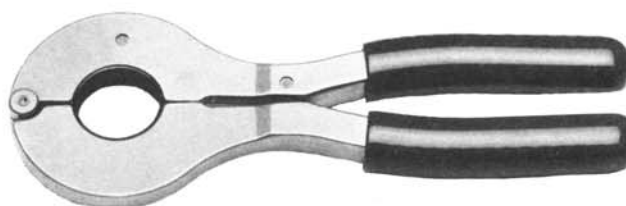


CTW 17

Torque key

CTWA 08
CTWA 10
CTWA 12
CTWA 14
CTWA 16

CTWA18
CTWA20
CTWA22
CTWA24



CTWA...

Spare parts

Insert pads
CTWA-PR 24

Admissible torque for endbells according to DIN 65180

| Shell size | Torque Nm | Tolerance |
|------------|-----------|-----------|
| 8 | 4 | +0,5 |
| 10 | 6 | +0,5 |
| 12 | 8 | ± 1 |
| 14,16 | 10 | ± 1 |
| 18,20 | 13 | ± 1 |
| 22,24 | 13 | ± 1 |

Max. admissible torque for hex nut KPT/KPSE VG 95328 Form D, E, F, S and T

| Shell size | Torque Nm |
|------------|-----------|
| 8 | 10 |
| 10 | 16 |
| 12 | 20 |
| 14 | 20 |
| 16 | 30 |
| 18 | 30 |
| 20 | 30 |
| 22 | 40 |
| 24 | 40 |

Torque wrench system CTW 17

Spare parts (continued)

Soft jaw adjustable pliers to fix endbells
CT 12830

Soft jaw inserts
CT 12830-5



Product Safety Information

This note should be read in conjunction with the Product Data Sheet/Catalogue. Failure to observe the advice in this information sheet and the operating conditions specified in the Product Data Sheet/Catalogue could result in hazardous situations.

1. MATERIAL CONTENT AND PHYSICAL FORM

Electrical connectors do not usually contain hazardous materials. They contain conducting and non-conducting materials and can be divided into two groups.

a) Printed circuit types and low cost audio types which employ all plastic insulators and casings.

b) Rugged, Fire Barrier and High Reliability types with metal casings and either natural rubber, synthetic rubber, plastic or glass insulating materials.

Contact materials vary with type of connector and also application and are usually manufactured from either:

Copper, copper alloys, nickel, alumel, chromel or steel. In special applications, other alloys may be specified.

2. FIRE CHARACTERISTICS AND ELECTRIC SHOCK HAZARD

There is no fire hazard when the connector is correctly wired and used within the specified parameters.

Incorrect wiring or assembly of the connector or careless use of metal tools or conductive fluids, or transit damage to any of the component parts may cause electric shock or burns. Live circuits must not be broken by separating mated connectors as this may cause arcing, ionisation and burning.

Heat dissipation is greater at maximum resistance in a circuit. Hot spots may occur when resistance is raised locally by damage, e.g. cracked or deformed contacts, broken strands of wire. Local overheating may also result from the use of the incorrect application tools or from poor quality soldering or slack screw terminals. Overheating may occur if the ratings in the Product Data Sheet/Catalogue are exceeded and can cause breakdown of insulation and hence electric shock.

If heating is allowed to continue it intensifies by further increasing the local resistance through loss of temper of spring contacts, formation of oxide film on contacts and wires, and leakage currents through carbonisation of insulation and tracking paths. Fire can then result in the presence of combustible materials and this may release noxious fumes. Overheating may not be visually apparent. Burns may result from touching overheated components.

3. HANDLING

Care must be taken to avoid damage to any component parts of electrical connectors during installation and use. Although there are normally no sharp edges, care must be taken when handling certain components to avoid injury to fingers. Electrical connectors may be damaged in transit to the customers, and damage may result in creation of hazards.

Products should therefore be examined prior to installation/use and rejected if found to be damaged.

4. DISPOSAL

Incineration of certain materials may release noxious or even toxic fumes.

5. APPLICATION

Connectors with exposed contacts should not be selected for use on the current supply side of an electrical circuit, because an electric shock could result from touching exposed contacts on an unmated connector. Voltages in excess of 30 V ac or 42.5 V dc are potentially hazardous and care should be taken to ensure that such voltages can not be transmitted in any way to exposed metal parts of the connector body. The connector and wiring should be checked, before making live, to have no damage to metal parts or insulators, no solder blobs, loose strands, conducting lubricants, swarf, or any other undesired conducting particles. Insulation resistance should be checked to make certain that no low resistance joints or spurious conducting paths are existing between contacts and exposed metal parts of the connector body. Further the contact resistance of the connectors should be measured within the electrical circuit in order to identify high resistances which result in excessive connector heating. Always use the correct application tools as specified in the Data Sheet/Catalogue.

Do not permit untrained personnel to wire, assemble or tamper with connectors. For operation voltage please see appropriate national regulations.

IMPORTANT GENERAL INFORMATION.

1. Air and creepage paths/Operating voltage

The admissible operating voltages depend on the individual applications and the valid national and other applicable safety regulations.

For this reason the air and creepage path data are only reference values. Observe reduction of air and creepage paths due to PC board and/or harnessing.

2. Temperature

All information given are temperature limits. The operation temperature depends on the individual application.

3. Other important information

Cannon continuously endeavours to improve their products. Therefore, Cannon products may deviate from the description, technical data and shape as shown in this catalogue and data sheets.

4. Harnessing and Assembly Instructions

If applicable, our special harnessing and/or assembly instruction has to be adhered to. This is provided at request.

ITT Cannon Worldwide Facilities

Austria

Afrikanergasse 3
1020 Vienna
FAX: (1) 2160948 PH: (1) 2160947

Benelux

Rue Col. Bourg Str. 105A
1140 Brussels, Belgium
FAX: (02) 7269201 PH: (02) 726 75 94
NL
FAX: 31.35.691.8796 PH: 31.35.691.6855

China

No. 24, 2 Block
Taohuawu New District
Zhenjiang, Jiangsu
P.R.C.
FAX: 86 511 4428616 PH: 86 511 443 3399

Denmark

Park Allé 287 A
2605 Brøndby
FAX: 43 43 58 58 PH: 43 45 52 88

Finland

Virkatie 1
1510 Vantaa
FAX: +358 9 70039188 PH: +358 9 70039180

France

2, Ave Sablons Bouillants, B.P. 133
77109 Meaux
FAX: (1) 64 33 16 82 PH: (1) 60 24 51 51

Germany

Postfach 11 20, 71365 Weinstadt
Cannonstrasse 1, 71384 Weinstadt
FAX: (07151) 699217 PH: (07151) 699-0

Hong Kong

906 New World Office Building
West Wing, 20 Salisbury Road
Tsim Sha Tsui, Kowloon
FAX: (852) 2369-5651 PH: (852) 2732-2720

Italy

Via Panzeri 10
20123 Milano
FAX: (02) 8372036 PH: (02) 581801

Japan

5362-1, 5-chome, Hibarigaoka
Zama-shi, Kanagawa 228
FAX: 0462-57-1680 PH: 0462-57-2010

Korea

620, Changkang Bldg.
#22, Dohwa-dong, Mapo-ku
Seoul
FAX: (02) 717 7330 PH: (02) 702 7111

Spain

Parque Empresarial San Fernando
Edificio Italia 1ª Planta
28830 Madrid
FAX: (34) 1 656 15 83 PH: (34) 1 656 03 11

Sweden

Norr Mälarstrand 64
Jaktvarvet 1
11235 Stockholm
FAX: (46) 8 650 0072 PH: (46) 8 650 0071

Switzerland

Herzogenmühle 18
8304 Wallisellen
FAX: (01) 830-3104 PH: (01) 830-3888, 830-3613

United Kingdom

Jays Close, Viables Estate
Basingstoke Hampshire RG22 4BA
FAX: (01256) 323356 PH: (01256) 311200

United States

666 E. Dyer Road
Santa Ana, CA 92705-5612
FAX: 714.628.2142 PH: 714.557.4700

INTERNET

<http://www.ittcannon.com>
