
DEK WORKMANSHIP STANDARDS MANUAL

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CHAPTER 1 INTRODUCTION

ACKNOWLEDGEMENT AND ACCEPTANCE

The users of this manual acknowledge and accept the quality standards as defined within this manual - DEK Standards and Workmanship Manual (Part Number 115929).

Position	Print Name	Sign Name	Date

Foreword

Methods and techniques described in the pages of this manual are to be used as an aid to loom construction and constitute good working practice.

WHERE SPECIFIC INSTRUCTIONS ARE GIVEN IN A LOOM DRAWING, THESE TAKE PRECEDENCE OVER ANY GUIDELINES SET OUT IN THIS DOCUMENT.

Cross Reference

The following references may be consulted before carrying out any operation specified in this manual:

QP15-18 Health and Safety at Work
Production Local Procedure Sheet (PLP)

Amendment History

Issue 01	Oct 96
Issue 02	Dec 96 - Manual Re-write
Issue 03	Sep 97 - Health and Safety Information added
Issue 04	Jun 98 - Crimp Tools added
Issue 05	Apr 00 - Manual Re-write (with DEK Part Number)
Issue 06	Oct 00 - Miscellaneous Connectors chapter added. General manual update

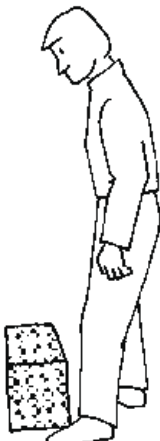
CHAPTER 2 HEALTH AND SAFETY INFORMATION

LOAD LIFTING

When carrying out any manual lifting operation, observe the following points:

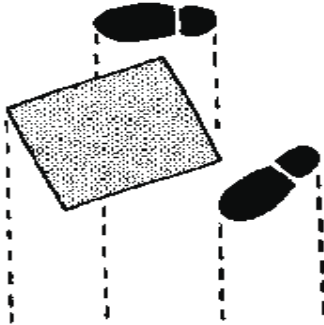
- Care should always be taken when lifting and carrying to avoid injury to yourself and others.
- Know your own limitations and never lift more than you are capable of.
- Employees most at risk are those who are pregnant or have a health problem or disability.
- If in doubt, get help or use the correct type of lifting equipment.
- Be aware of variations in floor levels, landings and staircases, slippery and uneven floors.
- Make sure your vision is not impaired when lifting and carrying.
- Make sure there is sufficient lighting and take into account the local adverse conditions.

Good Handling Technique



STOP and THINK

- Plan the lift
- Where is the load to be placed?
- Use appropriate handling aids if possible
- Do you need help with the load?
- Obstructions such as discarded wrapping materials
- For a long lift, such as floor to shoulder height, consider resting the load mid-way on a table or bench in order to change grip

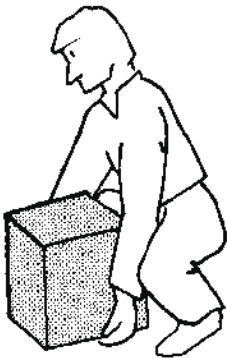


POSITION THE FEET

- Feet apart, giving a balanced and stable base for lifting. (Tight skirts and unsuitable footwear makes this difficult)
- Leading leg as far forward as is comfortable

Adopt a Good Posture

- When lifting from a low level, bend the knees.
- But do not kneel or over-flex the knees.
- Keep the back straight (tucking in the chin helps).
- Lean forward a little over the load if necessary to get a good grip.
- Keep the shoulders level and facing in the same direction as the hips.

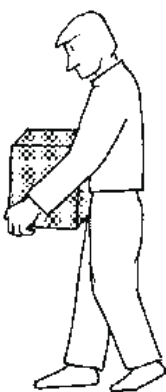
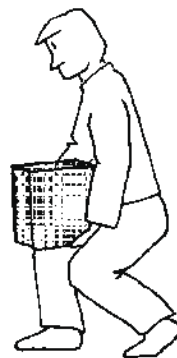


GET A FIRM GRIP

- Try to keep the arms within the boundary formed by the legs.
- Best position and type of grip depends on circumstances and individual preferences, but it must be secure.
- A hook grip is less tiring than keeping the fingers straight.
- If you need to vary the grip as the lift proceeds, do it as smoothly as possible.

KEEP CLOSE TO THE LOAD

- Keep the load close to the trunk for as long as possible.
- Keep the heaviest side of the load next to the trunk.
- If a close approach to the load is not possible, slide it towards you before trying to lift.



DON'T JERK

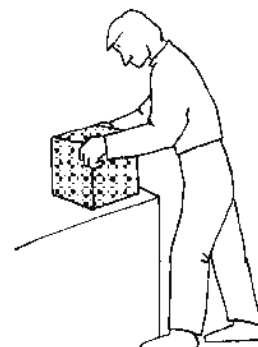
- Lift smoothly, keeping control of the load.

MOVE THE FEET

- Don't twist the trunk when turning to the side.

PUT DOWN, THEN ADJUST

- If precise positioning of the load is necessary, put it down first, then slide it into the desired position.



WORKSTATION AREA - SETTING UP

Workstations

Ensure that the following guidelines are observed:

- Workstations are arranged so that each task can be carried out safely and comfortably.
- Work materials and frequently used equipment should be within easy reach, without undue bending or stretching.
- When making Looms the work surface can be angled to reduce excessive reaching.
- Be aware of your posture (static and awkward posture at the workstation, the use of undesirable force and an uncomfortable hand grip, often coupled with continuous repetitive work without sufficient rest and recovery, may lead to chronic injury).

Seating

Ensure that the following guidelines are observed:

- Seat height must be adjusted for your requirements at the workstation.
- No excess pressure on underside of thighs and backs of knees. Use footrest if you cannot comfortably place your feet flat on the floor.
- Space for postural change, no obstacles under workstation.
- Forearms approximately horizontal.
- For close work adjust seat height to maintain a straight back and neck and not stooped with excessive tilting of the head.

WORK-RELATED UPPER LIMB DISORDERS

Upper Limb Disorders (ULDs) encompass a range of conditions affecting the soft tissues of the hand, wrist, arm and shoulder. Typically, tissues connecting muscles to bone, muscles themselves and other soft tissues are affected. Other conditions are prolonged fatigue, cramp, or loss of ability to use the affected part.

Where problems of ULDs are known or thought to exist, working arrangements are being examined to eliminate or control the risks.

Although many symptoms are associated with ULDs, the most notable are pain, restriction of joint movement and soft tissue swelling; in the early stages there may be little or no visible sign of swollen joint. For temporary fatigue, stiffness or soreness, full recovery occurs after appropriate rest.

Associated Factors

The following factors are associated with the increased risk of Upper Limb Disorders (ULDS):

- **FORCE** - the application of undesirable manual force.
- **FREQUENCY and Duration** of movement - including unsuitable rates of working or repetition of a single element.
- **AWKWARD posture** of the hand, wrist, arm or shoulder.

ULDs can occur from tasks that involve a lot of:

- **FORCEFUL** - Gripping (a tool or work piece)
- Squeezing (e.g. tool handles) or
- **FREQUENT** - Twisting
- Reaching or
- **AWKWARD** - Moving things (pushing, pulling, lifting)
- Finger/hand movement (e.g. keyboard work, indenting)

WARNING AND CAUTION NOTICES

WARNING notices draw the attention of the operator to possible 'general' or 'functional' hazards which may cause loss of life, serious injury or ill health. these hazards arise during the operation/implementation of a procedure.

CAUTION notices alert personnel to the possibility of damage occurring to equipment and material which is likely to arise following the departure from laid-down procedures. Caution notices do not imply danger to personnel.

The following warning notices are applicable to operations contained within this manual.

Warning	Definition
	WARNING: EXCLAMATION MARK GENERAL WARNING TO ALL HAZARDS NOT COVERED BY A SPECIFIC WARNING.
	WARNING: SEVER RISK OF INJURY DUE TO SHARP EDGE BEING PRESENT, IE WIRE CUTTERS, SCALPELS, KNIVES AND CRIMPING TOOLS. CARE SHOULD BE TAKEN WHEN USING TOOLS WITH SHARP EDGES.
	WARNING: IRRITANT SUBSTANCES ARE PRESENT WHICH CAN CAUSE INFLAMMATION ON IMMEDIATE, REPEATED OR PROLONGED CONTACT WITH MUCUS MEMBRANES OR SKIN.
	WARNING: FLAMMABLE MATERIAL FLAMMABLE SUBSTANCES ARE PRESENT. NO SMOKING OR NAKED FLAMES. KEEP AWAY FROM ALL SOURCES OF IGNITION. AVOID STATIC DISCHARGES.
	WARNING: ELECTRICAL HAZARD HIGH ELECTRICAL VOLTAGE IS PRESENT WITHIN CERTAIN TOOLS THAT MAY CAUSE INJURY OR DEATH. DO NOT USE ELECTRICAL TOOLS THAT ARE DEFECTIVE OR DAMAGED. DO NOT REMOVE PROTECTIVE COVERS FROM TOOLS.
	WARNING: HOT SURFACE INDICATES THAT CERTAIN OPERATIONS INVOLVE THE USE OF SOLDERING IRONS. WORK AREAS MAY BECOME HOT AND SHOULD NOT BE TOUCHED WITHOUT TAKING CARE

C.O.S.S.H.

COSHH is the abbreviation for Control Of Substances Hazardous to Health. The following are key points and precautions - for further information Safety Data Sheets are available upon request.

Soldering



WARNING
HIGH OPERATING TEMPERATURE. ALLOW TIME FOR THE COMPONENTS TO COOL BEFORE HANDLING.

1. Use Tip Extraction provided.
2. Wear Safety Glasses.
3. Wear Gloves or Use Barrier Cream (every 4 hours).

NOTE

Barrier cream must not be used when skin is broken, bruised or scabbed - in this case gloves must be worn.

4. Wash Hands before Eating and Drinking.
5. Beware Hot Metal Tip.

IPA



WARNING
FLAMMABLE. FLAMMABLE SUBSTANCES ARE PRESENT. KEEP AWAY FROM HEAT, SOURCES OF IGNITION AND STATIC DISCHARGES. USE IN A WELL VENTILATED AREA.

1. Highly Flammable. Keep away from Heat and other sources of Ignition i.e. Static, Discharge, Cleaning interfaces before power up and testing.
2. Wear Gloves or use Barrier Cream (every 4 hours).

NOTE

Barrier cream must not be used when skin is broken, bruised or scabbed - in this case gloves must be worn.

3. Wash hands after use and before Eating and Drinking.

Loctite 222



WARNING
IRRITANT. WHEN USING OR HANDLING ANY SOLVENT FORMULATION THE MANUFACTURER'S RECOMMENDED SAFETY PRECAUTIONS MUST BE STRICTLY ADHERED TO.

1. Wash hands if contact with skin.
2. Use applicator to minimise skin contact.

Loctite 7400



WARNING
FLAMMABLE. FLAMMABLE SUBSTANCES ARE PRESENT. KEEP AWAY FROM HEAT, SOURCES OF IGNITION AND STATIC DISCHARGES. USE IN A WELL VENTILATED AREA.



WARNING
IRRITANT. WHEN USING OR HANDLING ANY SOLVENT FORMULATION THE MANUFACTURER'S RECOMMENDED SAFETY PRECAUTIONS MUST BE STRICTLY ADHERED TO.

1. Highly Flammable.
2. Avoid Sources of Ignition and Static Discharge.
3. Do not inhale vapours.

Hellerine Lubricant



WARNING
SKIN CONTACT. IF EXCESSIVE SKIN CONTACT OCCURS, WASH WITH SOAP AND WATER.

Permabond Blue Threadlock



WARNING
SKIN CONTACT. IF EXCESSIVE SKIN CONTACT OCCURS, WASH WITH SOAP AND WATER.

1. Use Barrier Cream or gloves (if contact with skin wash with soap and water).

NOTE

Barrier cream must not be used when skin is broken, bruised or scabbed - in this case gloves must be worn.

Dow Corning Heat-Sink Compound



WARNING
SKIN CONTACT. IF EXCESSIVE SKIN CONTACT OCCURS, WASH WITH SOAP AND WATER.

1. Wash hands after handling, especially before eating and drinking.

Solvents and Adhesives

Always follow the instructions from your supervisor, manufacturing instructions and quality procedures i.e. regarding the need for local exhaust ventilation, PPE (Personal Protective Equipment), fire hazards, chemical hazards etc.

Always wash your hands prior to eating and drinking because of contamination from fumes etc.

Report any ill effects immediately to your Supervisor, Personnel Officer and your Doctor so that any necessary action can be taken for your own, and your colleagues health and safety.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment or PPE is used as a last resort when all other measures are taken to eliminate or reduce the risk of being harmed by a hazard.

"Risk" is the chance, great or small, that someone may be harmed by the hazard; "Hazard" means anything that can cause harm e.g. chemicals, electricity, machine, methods of work and other aspects of work organisation.

1. PPE must be used when instructed to. i.e. company, department and manufacturing instructions
2. PPE is not a matter for individual choice or decision - its use is a condition of employment!
3. Wearing safety glasses is mandatory during hazardous operations e.g. drilling, soldering, cutting soldered joints/wires, using solvents and solder pastes, and within three feet of any operation likely to cause harm to observers or passers by.
4. When the lenses show signs of becoming dirty they may be cleaned with soapy water or an optical cleaning tissue (provided).
5. After regular inspections pitting, scratched or damaged lenses should be replaced. (see your supervisor).
6. If your frame is damaged, replace the glasses (see your Supervisor).
7. Great care must be taken with PPE in general, they are provided free of charge only if used and stored in a safe manner.
8. When not in use store in protective bag provided.
9. Glasses left lying on the workbench may have contact with fumes (solvent, adhesive, solder fumes). When you put the glasses back on, the contamination would be passed directly on to your skin. This is also the case if gloves are left inside out.

SOLDERING

Hot Solder	Solder melts at 183° C. Excess solder should not be 'flicked' or shaken off the iron, nor should the iron be used in a manner which might cause molten solder to spatter.
Fume Hazards and Precautions	Suitable fume extraction equipment is provided and must be used at all times to extract flux fumes away from operators and the surrounding areas. Respiratory effects:- • Inhalation of the resin based solder flux fumes given off during soldering can irritate the nose and throat. • Also the fumes can lead to occupational asthma or make existing asthmatic conditions worse. • When the asthmatic effects are fully developed they are permanent and irreversible. • Continued exposure may cause asthma attacks and the person affected may be unable to do any soldering with resin based fluxes again. • Typical early symptoms are watery and prickly eyes, runny or blocked nose, a sore throat, coughing, wheezing or breathing difficulties. These may start within minutes of exposure or be delayed for several hours so that their link to work may not be immediately recognised. However, improvement at weekends and holidays often point to the symptoms being job related.
Skin Effects	On contact with the skin, resin based solder flux and its fumes can cause dermatitis. Both skin irritants and sensitisers are present in solder fluxes and their fumes. • Hands and forearms are mainly affected, possibly from contaminated workbenches or other surfaces. Fumes may also affect the face and neck.
How Exposure Occurs	Without effective control, solder fumes rise vertically and for manual operations is likely to enter the breathing zone of the operator. • For solder wire, commonly used in hand soldering, the flux is often contained in a central core and is released on heating. In other cases, the flux may be within a solder paste applied by syringe or by stencil and screen printing.
Protection and Hygiene	Solder alloys containing lead give off negligible lead fumes at normal soldering temperatures and at temperatures up to 500° C. • Lead is harmful if absorbed into the body through the digestive system or skin. • Eating, drinking should not be permitted in the working areas. • Hands should be washed with soap and warm water after handling solder, especially before eating. A simple skin conditioning cream may be used after washing and drying. • All female operators should notify managers and personnel officer as soon as possible if they become pregnant as lead absorbed into the body can cause birth defects and other reproductive harm.

- Report symptoms of respiratory or skin complaints to your doctor and tell them what you do.
- Inform your supervisor or line manager as well.
- If you have any concerns about working with resin-based solder fluxes inform your Health and Safety Representative, supervisor, line manager or personnel so that your concerns may be taken up with management and the Health and Safety Committee.

Before Starting

Ensure that the following checks are carried out:

- Ensure electrical appliance test written on the soldering iron plug is within the expiry date.
- Briefly inspect the soldering iron and its associated control box, ensuring there are no obvious signs of damaged cables.
- Report your or other operators (they may not be aware) defects on any extraction equipment, protective equipment or other control measures provided, to your supervisor or line manager.

Hot Metal

Never attempt to touch the tip of the soldering iron with your fingers, unless the iron has been switched off and allowed to cool for no less than 5 minutes.

Extraction Tip

Maintenance of the extraction tip is carried out in accordance with the following procedure:

1. Insert the brush provided into the front tapered end of the steel tube.
2. Push the brush the full length of the steel tube in a back and forward motion two or three times.
3. Extract the brush.
4. With forefinger and thumb, roll the first 6" to 9" inches of silicone tube immediately after the steel tube. This rolling process breaks away all particles built up by the solder fume. On breaking away, the particles are sucked down the tube, and eventually collect in the main filter unit.
5. Make sure the silicon tube is free from kinks, knots or being trapped. The white 'E' clips that attach the silicon tube to the power cord should be evenly spaced allowing the silicon tube to run parallel down the power cord.
6. Normal periods of cleaning are once or twice daily.
7. When the steel tube starts to become blocked or restricted, the operator may hear a hissing noise coming from the extractor tube. Under no circumstances allow this tube to become totally blocked.

HAND TOOLS	All tools are to be used in the manner for which they were designed. Inspect tools prior to use for damage and defects, if any damage or defects found, DO NOT USE , and report it to your supervisor.
Wire Cutters	Wire snippings or 'slugs' leave the cutters at high velocity so safety glasses are to be worn. Use wire cutters in a manner that ensures there is less risk to you or others, i.e. "aim" the slug in a safe direction.
Scalpels	All scalpels are must be stored with the blade retracted. All scalpel blades must be disposed of in the "Sharps Bin", only and NOT in any other waste bin!
Crimp Tool	Refer to the Risk of Work-Related Upper Limb Disorders section of this chapter.

E.S.D. PROTECTION

What is E.S.D?

Many semi conductor devices and integrated circuits are physically robust but electrically fragile. They are especially susceptible to static electricity, correctly called **Electro Static Discharge (E.S.D.)** such devices, and any assembly containing them, are described as **Electro Static Discharge Sensitive Devices (E.S.D.S.)**

The damage that **E.S.D.S.** suffer from **ESD** may be catastrophic. More often, and potentially even worse, the damage caused may be partial and latent and such damage is often undetectable by any practical means. The device is more susceptible to further damage and its reliability seriously impaired. **ESD** also has the ability to damage data. There are many instances of a discharge into the keyboard of a P.C. causing software damage. To a greater or lesser extent, all contact between objects, every separation of one item from another, each sliding of one object upon another, causes a disturbance of electrical charge. When charge disturbances take place faster than charge re-distribution, static charge accumulates.

Amongst the greatest generators of static electricity are people. It can readily be shown, how in ordinary ambient conditions, a persons electrical charge, measured in volts, is constantly changing; swinging up or down at every step, or as they sit or rise, when they touch things, or as another person passes nearby. Consequently, if people handle Static Sensitive Devices (**E.S.D.S**) without taking the appropriate precautions, there is a real risk that damage may occur.

E.S.D.S. Protection To protect E.S.D.S. from the unwanted effect of E.S.D. two key measures must be taken and applied at all times:

- **E.S.D.S.** must be handled exclusively in an E.S.D. protected area (E.P.A.)
- **E.S.D.S.** must be transported from one E.P.A. to another only in an E.S.D. shielding package.

In essence an **E.P.A.** is a defined space within which all surfaces, objects and people (and **E.S.D.S.**) are kept at the same electrical potential. This is achieved simply by using only “Groundable” materials ie materials with an electrical resistance, usually less than $10^{10}\Omega$ for the covering of surfaces and for the making of containers and tools, then electrically all the surfaces, people and objects together and to ground. Bonding means linking, usually through a resistance of between 1 and 100M Ω . Movables, such as containers and tools, are bonded by virtue of standing on a bonded surface or of being held by a bonded person. Everything that does not readily dissipate charge must be excluded from the **E.P.A.**

Summary

A summary of the basic rules are follows:

Static Sensitive Devices always remain susceptible to damage. The risk of damage is reduced by:

- Containing them at all times in an environment designed to minimise charge generation and to ensure that dissipation is at least twice as fast.
- Handling them as little as possible.
- Shielding them from electro static fields.
- Using warning labels (shown below) to prevent accidental contact with people and to indicate that packaging may only be removed in an EPA environment.



- Training of all personnel.
- Testing and auditing the protective measures taken.

CHAPTER 3 BRAIDING

BRAIDING A LOOM

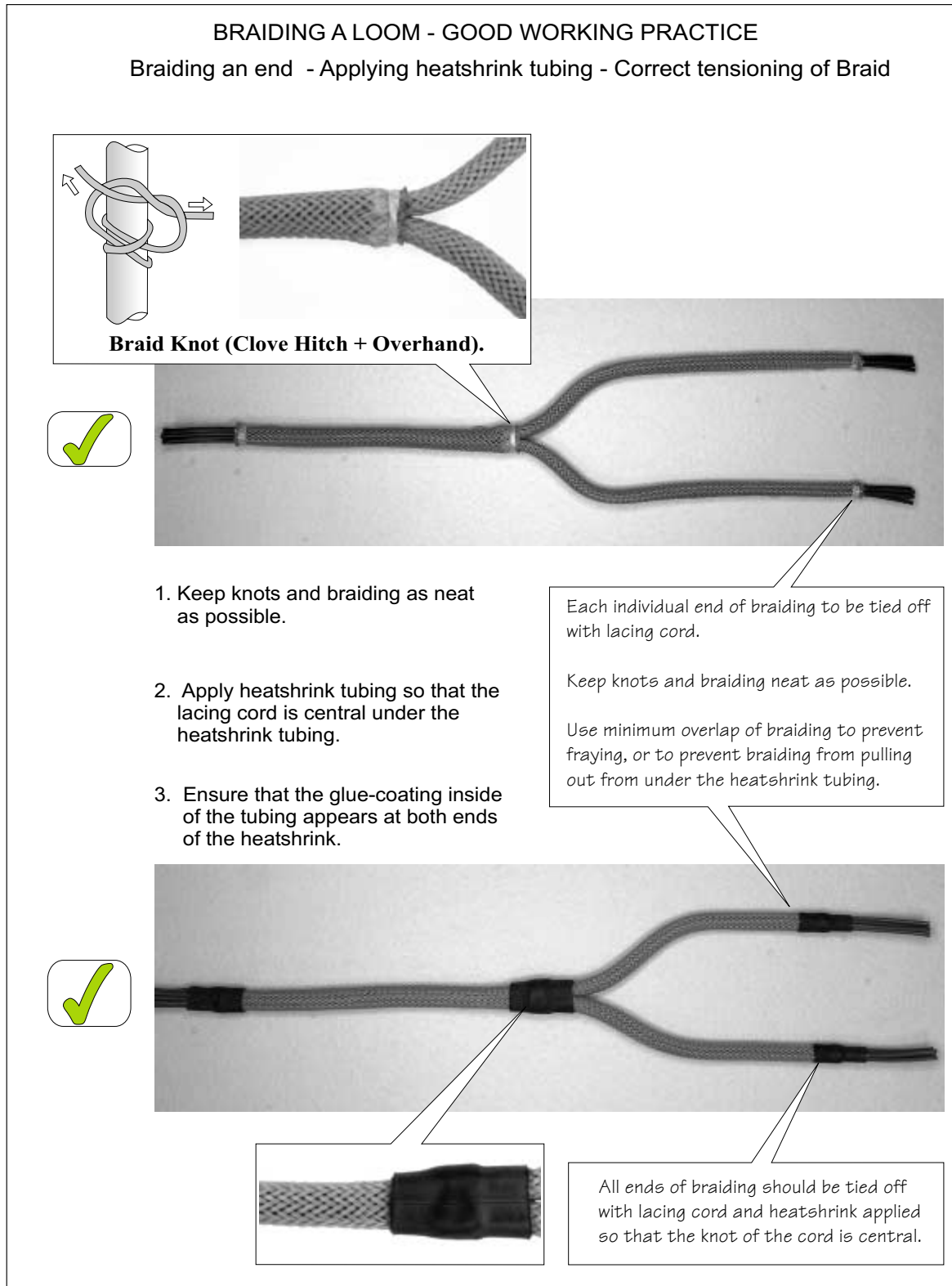


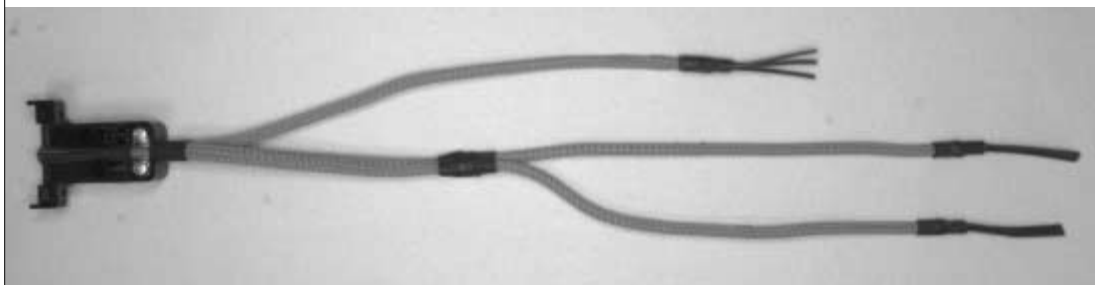
Figure 3-1

BRAIDING A LOOM - WORKING PRACTICE

Correct tensioning of braid - Trident connector

All Braided Wires:

1. Should feel supple and flexible. No twists inside braiding. This is possible when the correct tension is applied to the braid.



Example of Two Wires into 9-way 'D' Hood Connector

Trident Connectors

1. For Trident Connectors ensure that the end of the braiding is just inside the hood.
2. Tie the braid with lacing cord and overlap the heatshrink by approximately 2mm.
3. Secure the hood using a cable-tie, ensuring that halves of the hood locate together correctly.

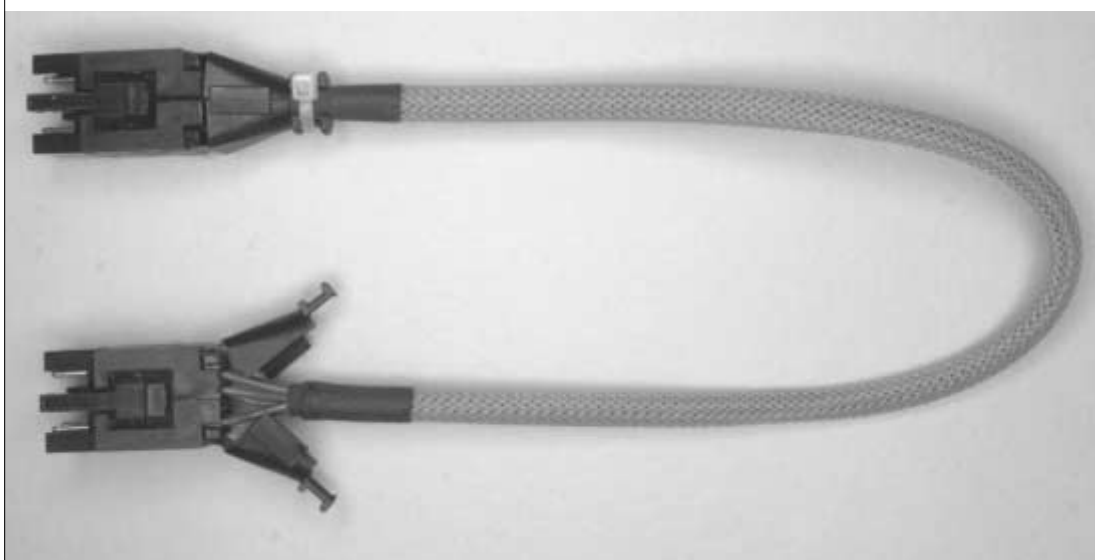


Figure 3-2

SPLIT CABLES

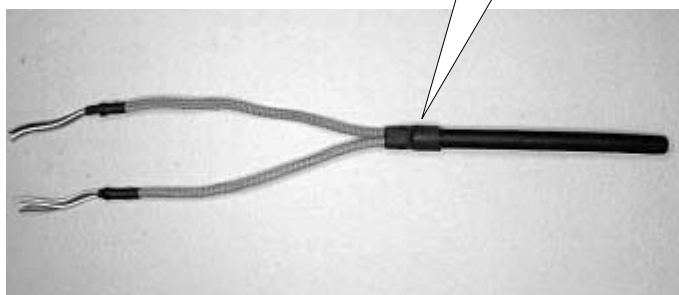
BRAIDING - WORKING PRACTICE

Split Cables - Mini Plug - Binder Connector Assembly

Where cables are required to be split, wires must be braided:

1. Trim back insulation. If cable is screened, but the screen is not required, fold a little of it back over the insulation.
2. Braid appropriate wires, securing braid with lacing cord as close as possible to the cable insulation.
3. Fit heatshrink, placed 50/50 onto braid and insulation.

Ensure lacing cord is not visible inside of heatshrink when braided wires are parted.



Braiding a cable for fitting to a mini plug:

1. Ensure knot of lacing cord is tied inside of hood, not outside, and that the rubber sleeve overlaps the wire by **1-2 mm**.
Fitting is correct when the sleeve is visible from the back of the housing.



Binder Connector Hood Assembly:

1. Place backnut, cable clamp, grommet and backshell onto cable before soldering wires to socket.

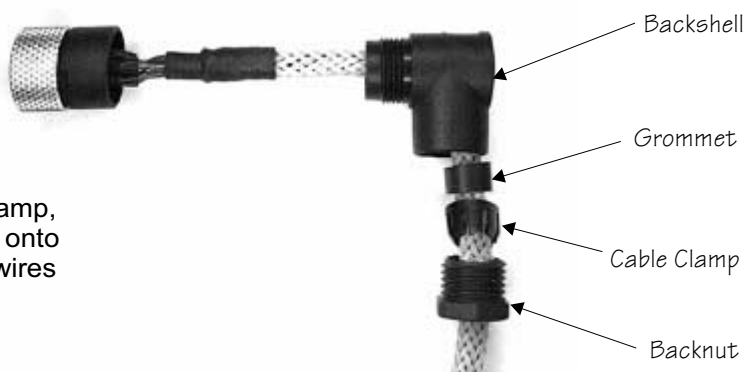


Figure 3-3

UNACCEPTABLE PRACTICE

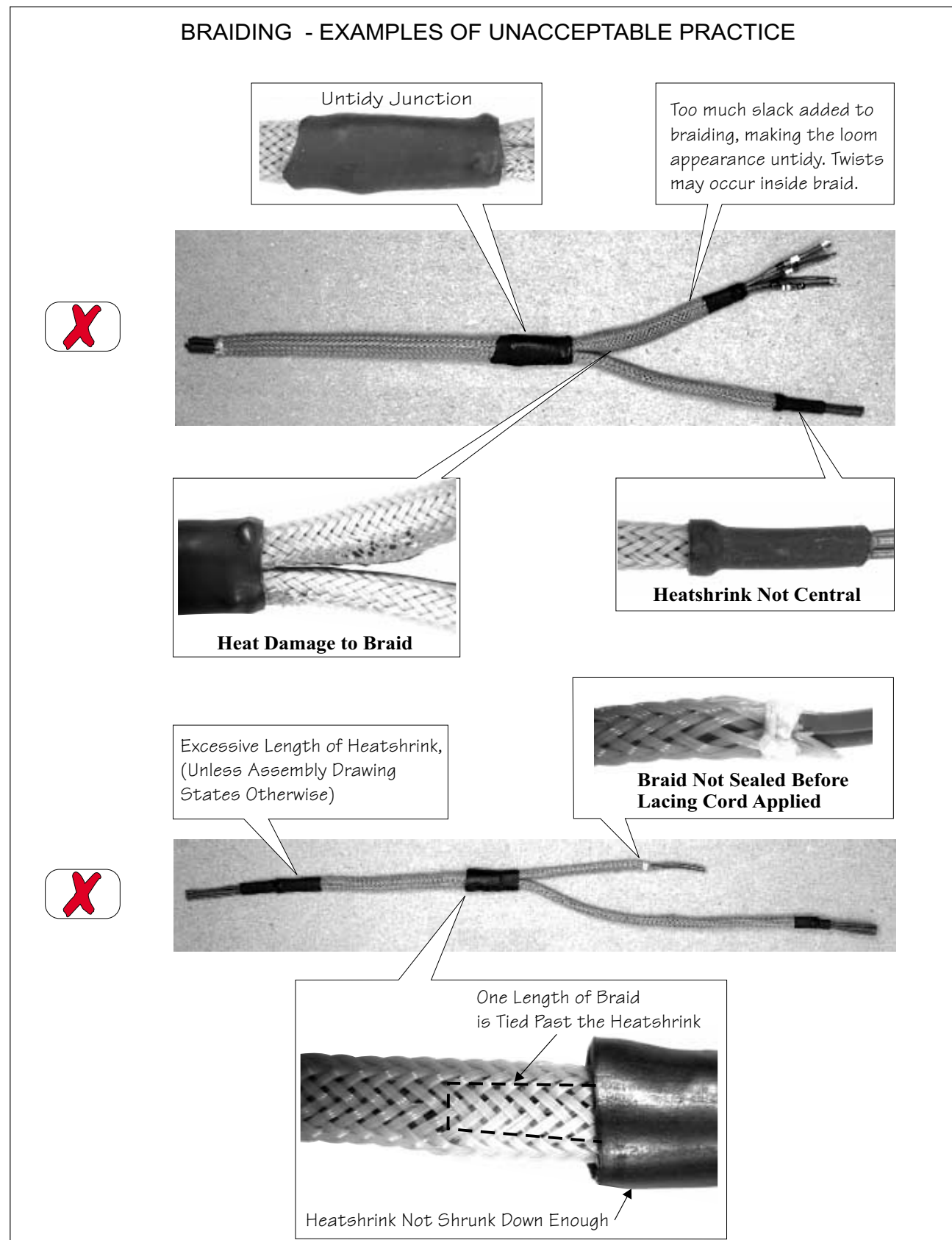
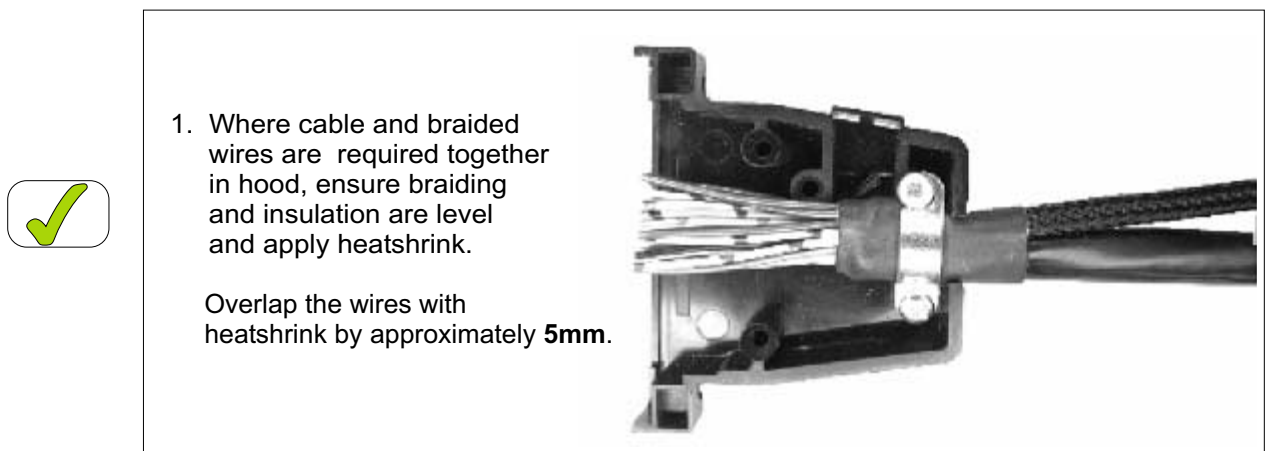
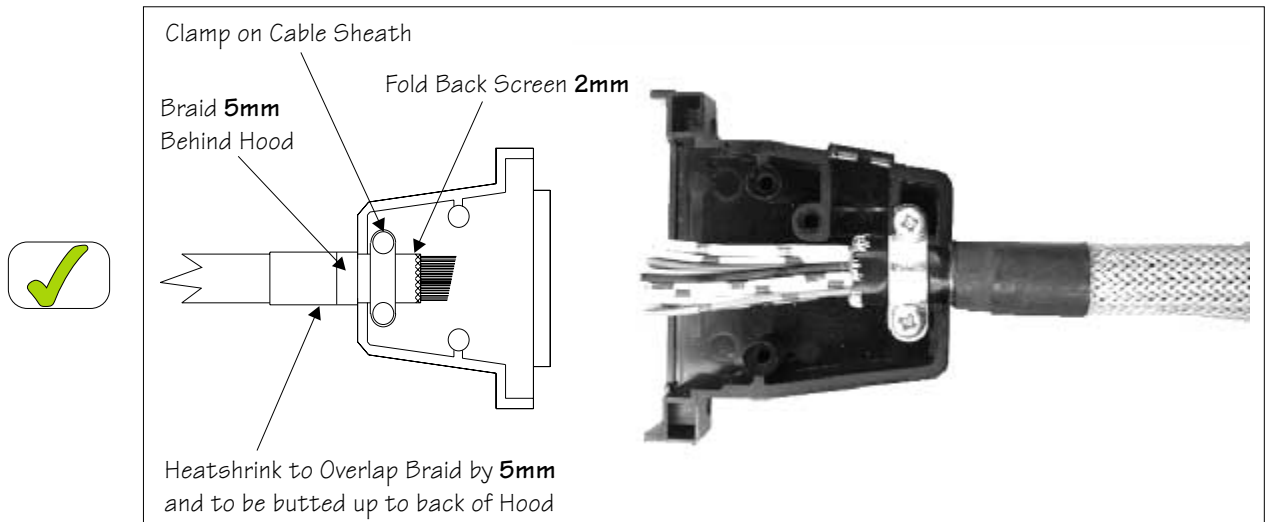


Figure 3-4

GOOD PRACTICE

BRAIDING - EXAMPLES OF GOOD PRACTICE

This procedure applies to many looms where the braided cable is too large for the connector hood.



4 way Plug E0338

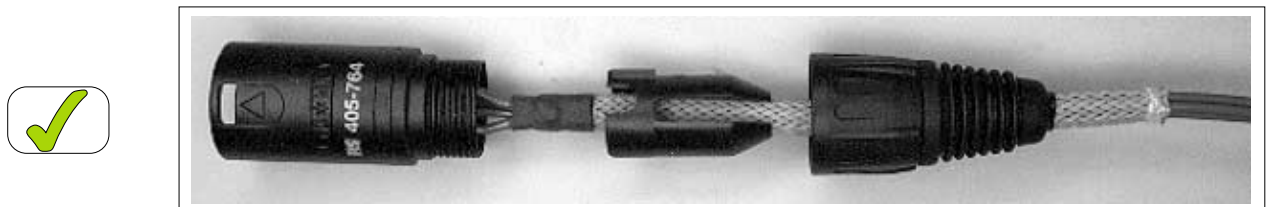


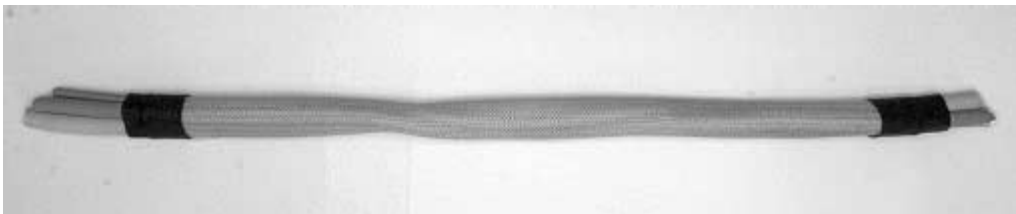
Figure 3-5

BRAIDED CABLES

BRAIDED CABLES



When braiding cables, arrange them in a neat and tidy order to avoid twists appearing within the braid.



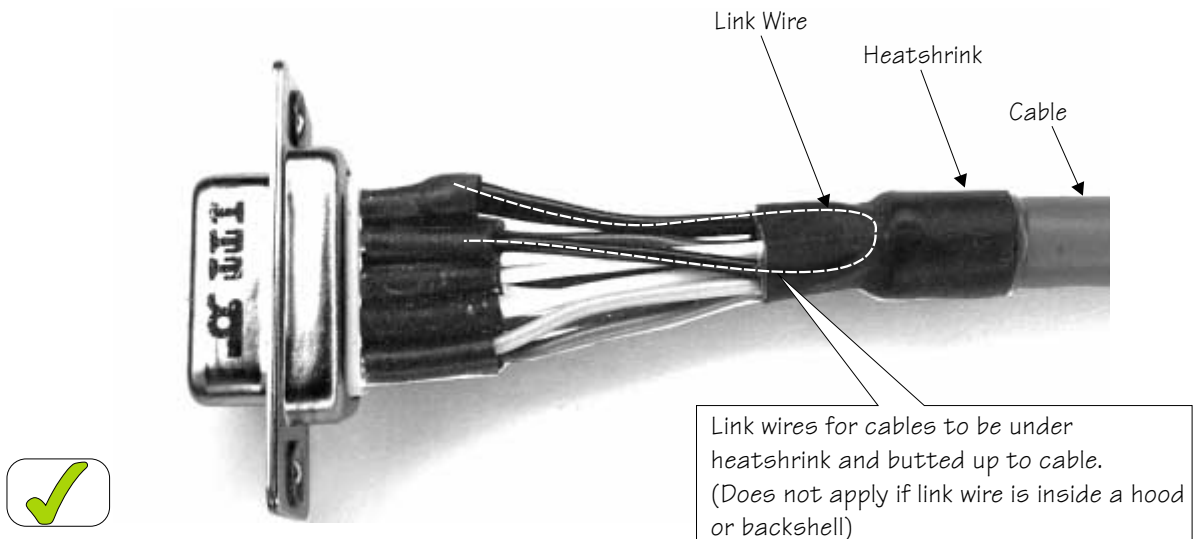
Shows twisted cables - Braiding too tight

Figure 3-6

CABLE LINKS

LINKS FOR CABLES AND BRAIDED WIRES - WORKING PRACTICE

Wire Links for Cables



Wire Links for Braiding

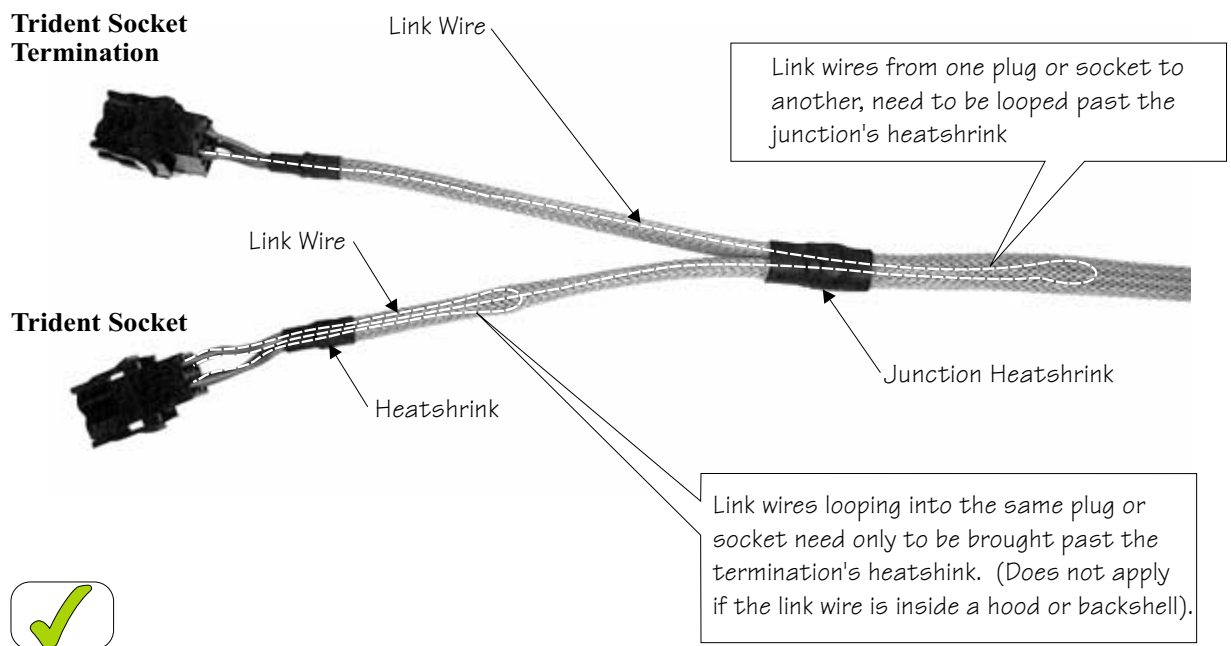


Figure 3-7

CHAPTER 4 SPIROWRAP BRAIDING

WORKING PRACTICE

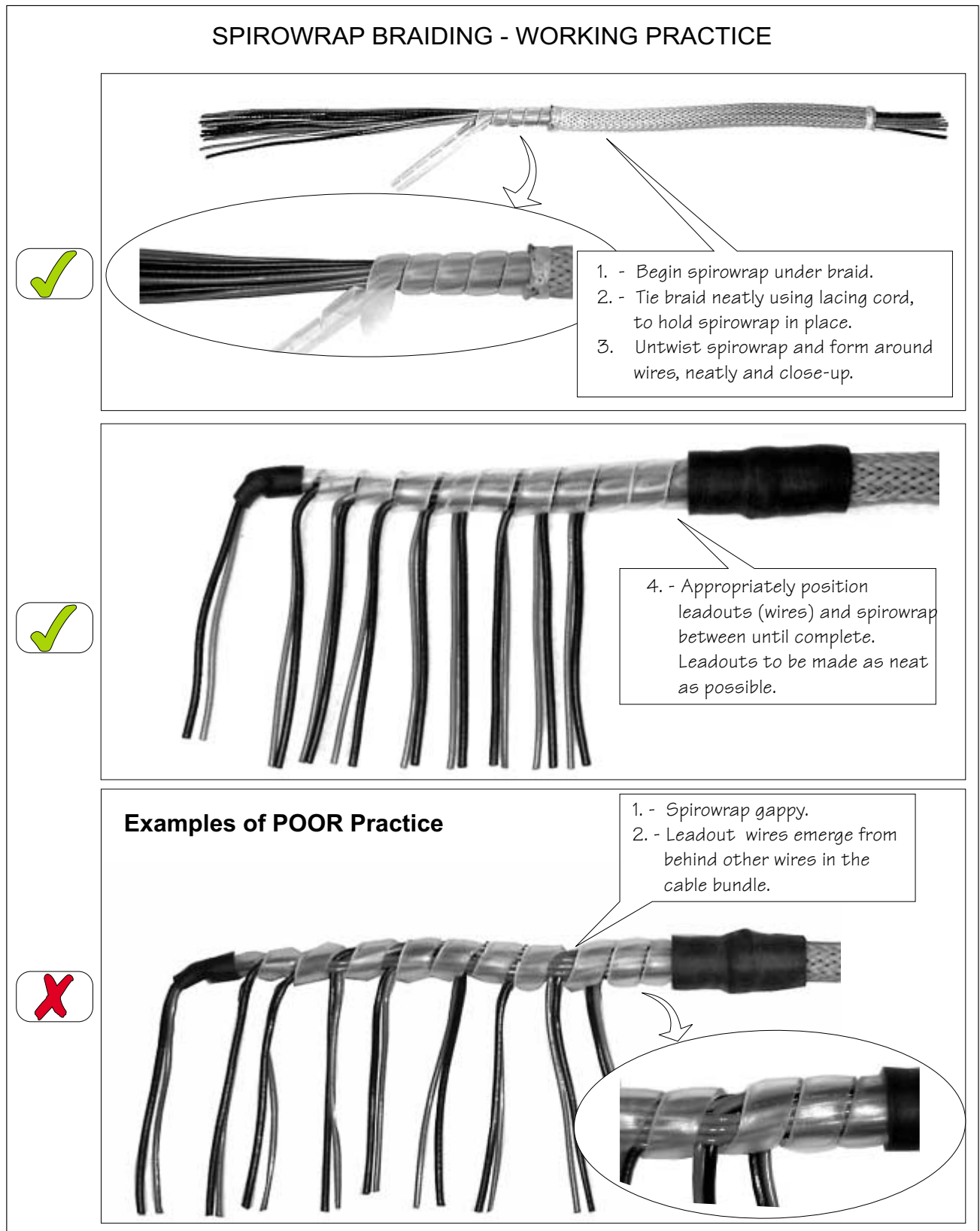


Figure 4-1

CABLE WITH SCREEN

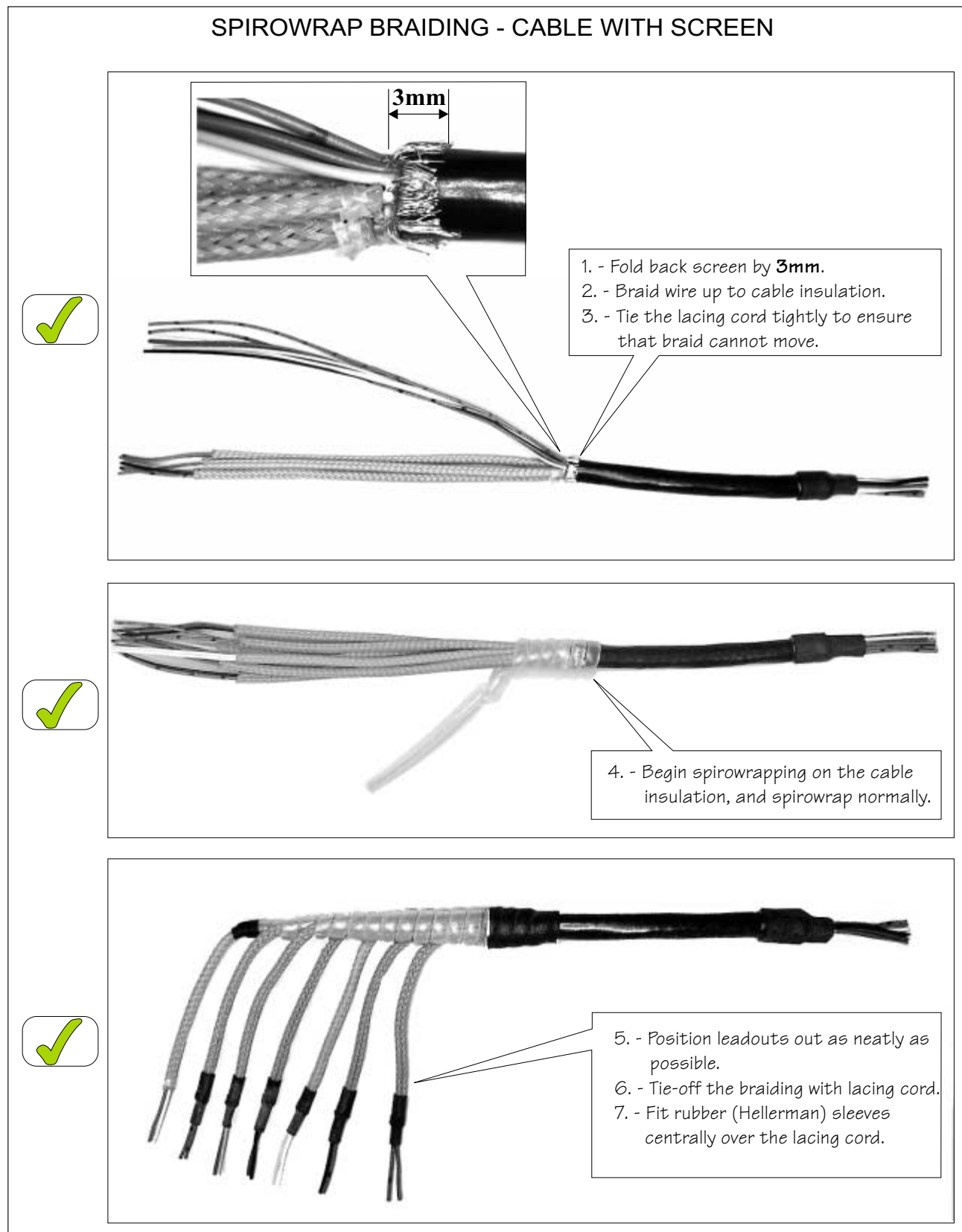


Figure 4-2

CHAPTER 5 RINGLOCK CONNECTORS

WORKING PRACTICES

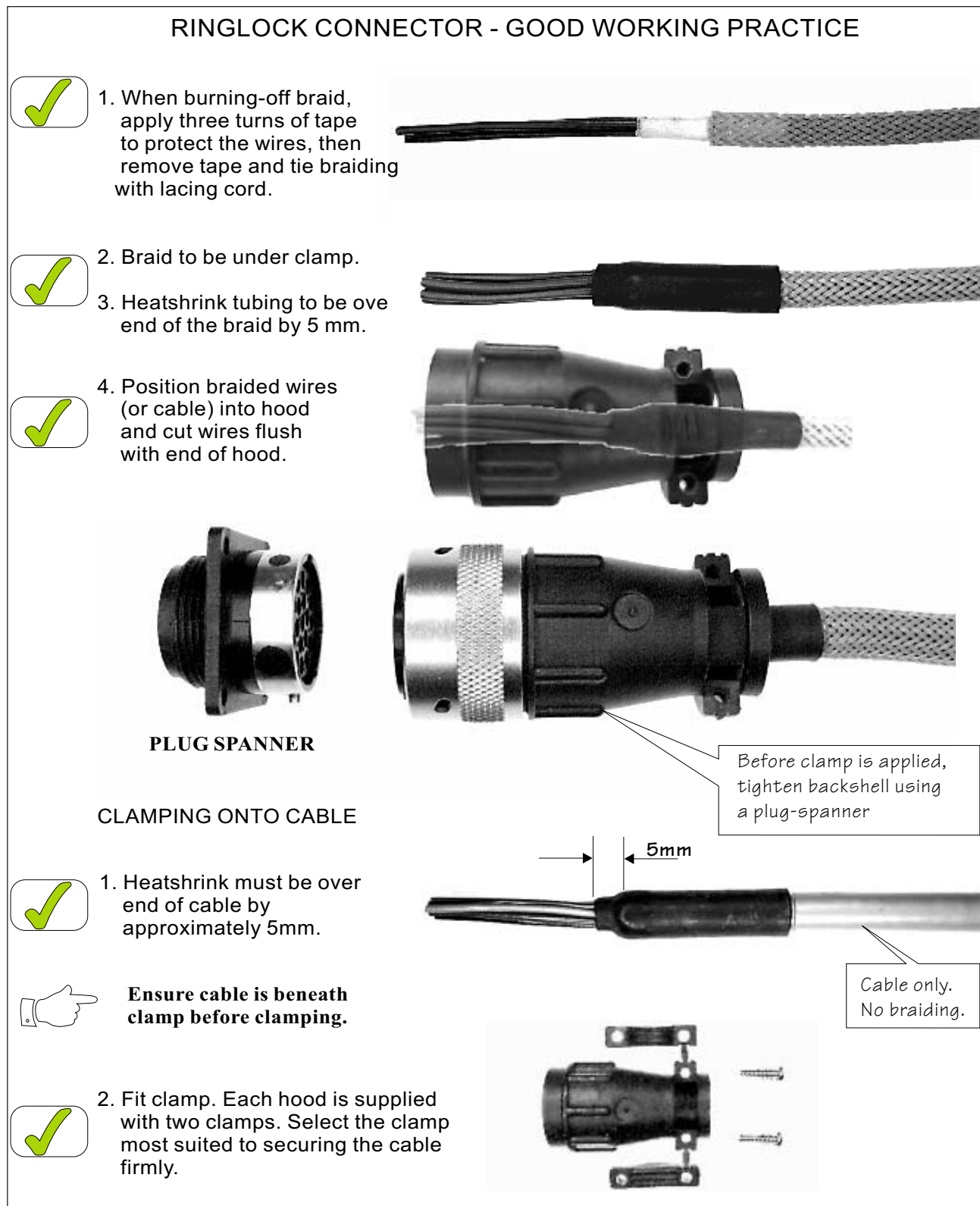


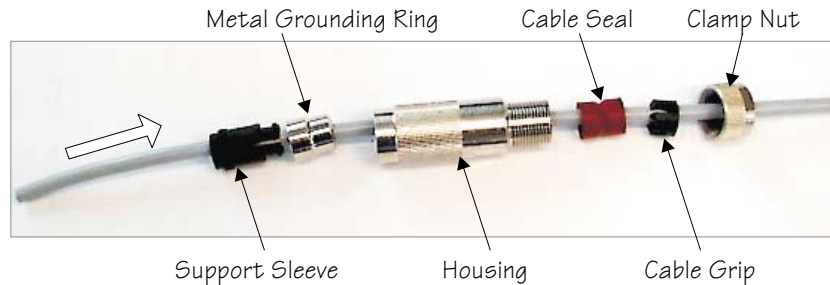
Figure 5-1

TNM ASSEMBLY

TNM RINGLOCK CONNECTOR - ASSEMBLY

1. Slide the six Ringlock components along the cable in the correct sequence as shown.

Note:
 Rubber 'O' ring supplied with kit not required.

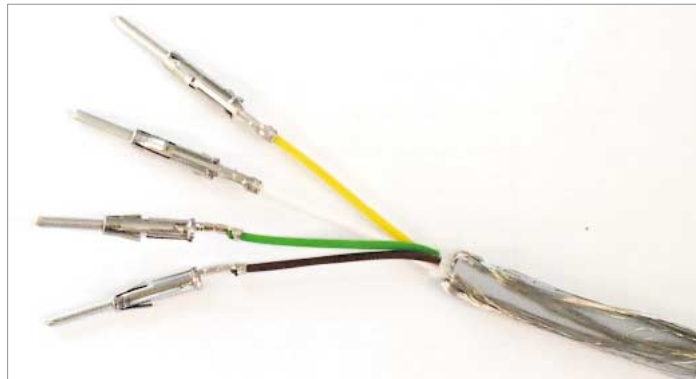


2. Cut cable sleeving back **50mm**, fold back screen over the cable (as shown).
3. Cut off excess paper insulation.



4. Snip wires to **25mm - 30mm** in length.
5. Set the wire strippers to **4mm - 5mm** and cut back the insulation of each wire.
6. Using a Trident Crimp. Crimp E0421 pins to the end of each wire, ensure that the insulation is inside the crimped pin. (Ensure that bare copper wire can be observed in the crimp window.)

(Refer to Crimp Section 14 of this manual for detailed instructions.)



7. In accordance with the assembly drawing, position the colour coded pins into the rear of the connector by push fitting.

Tip:
 secure the screen ends to the cable using a small piece of masking tape before sliding the support sleeve up to the connector.

8. Carefully slide the support sleeve over the cable screen and insert into the rear of the connector (as shown).

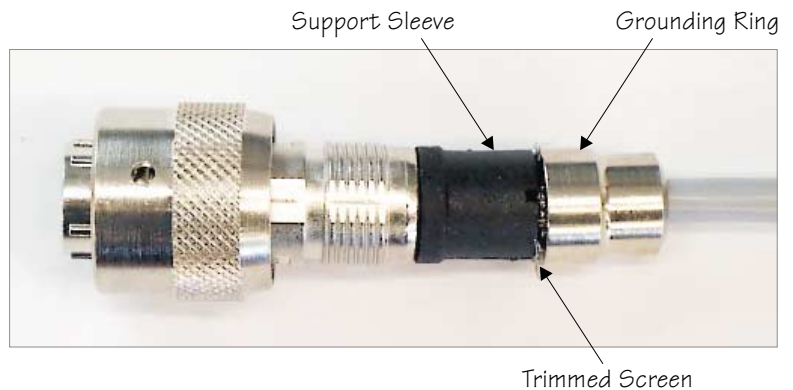
(remove masking tape from screen if fitted).



(Cont'd)

Figure 5-2

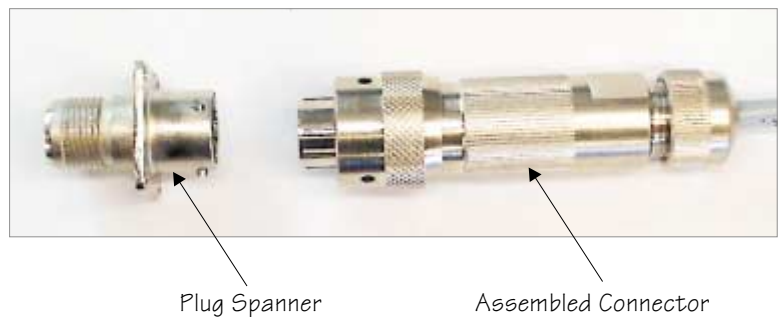
9. Slide the metal grounding ring up to the support sleeve, trapping the screen. Trim the excess screen around the edge of the support sleeve, (as shown).



10. Fit the plug spanner (bayonet connection) to the connector.
11. Screw the housing unit onto the connector and tighten using a 17mm spanner (**do not over tighten**).

Note:

To enable a firm grip when tightening the connector to the housing, secure the square flange of the plug spanner into a vice.



12. Slide the cable seal and cable grip into the back of the housing.
13. Screw the clamp nut onto the housing thread, (**do not over tighten**).

Figure 5-3

CHAPTER 6 D TYPE HOOD CONNECTORS

CUTTING CABLE TO LENGTH

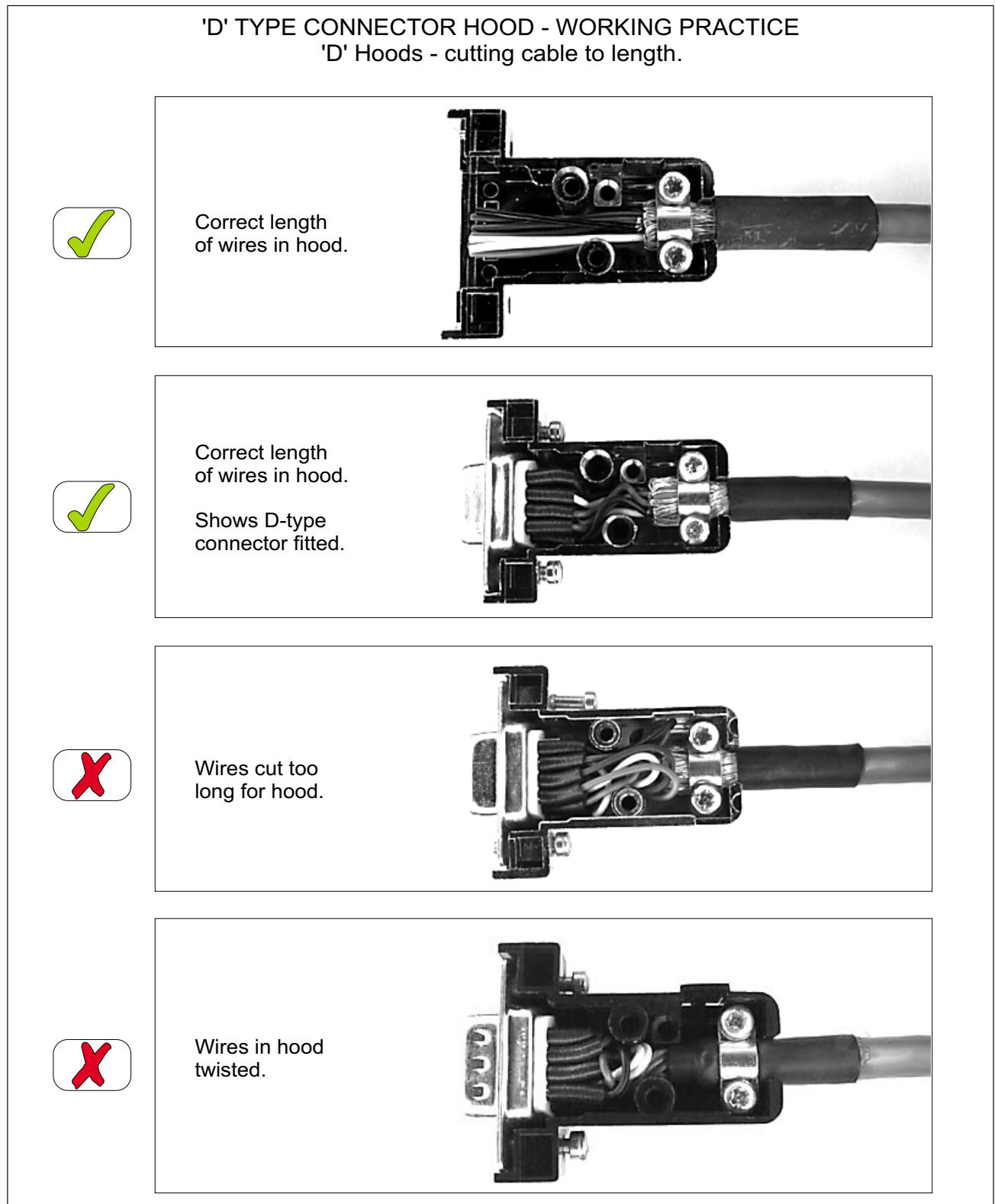


Figure 6-1

USING BRAIDED WIRES

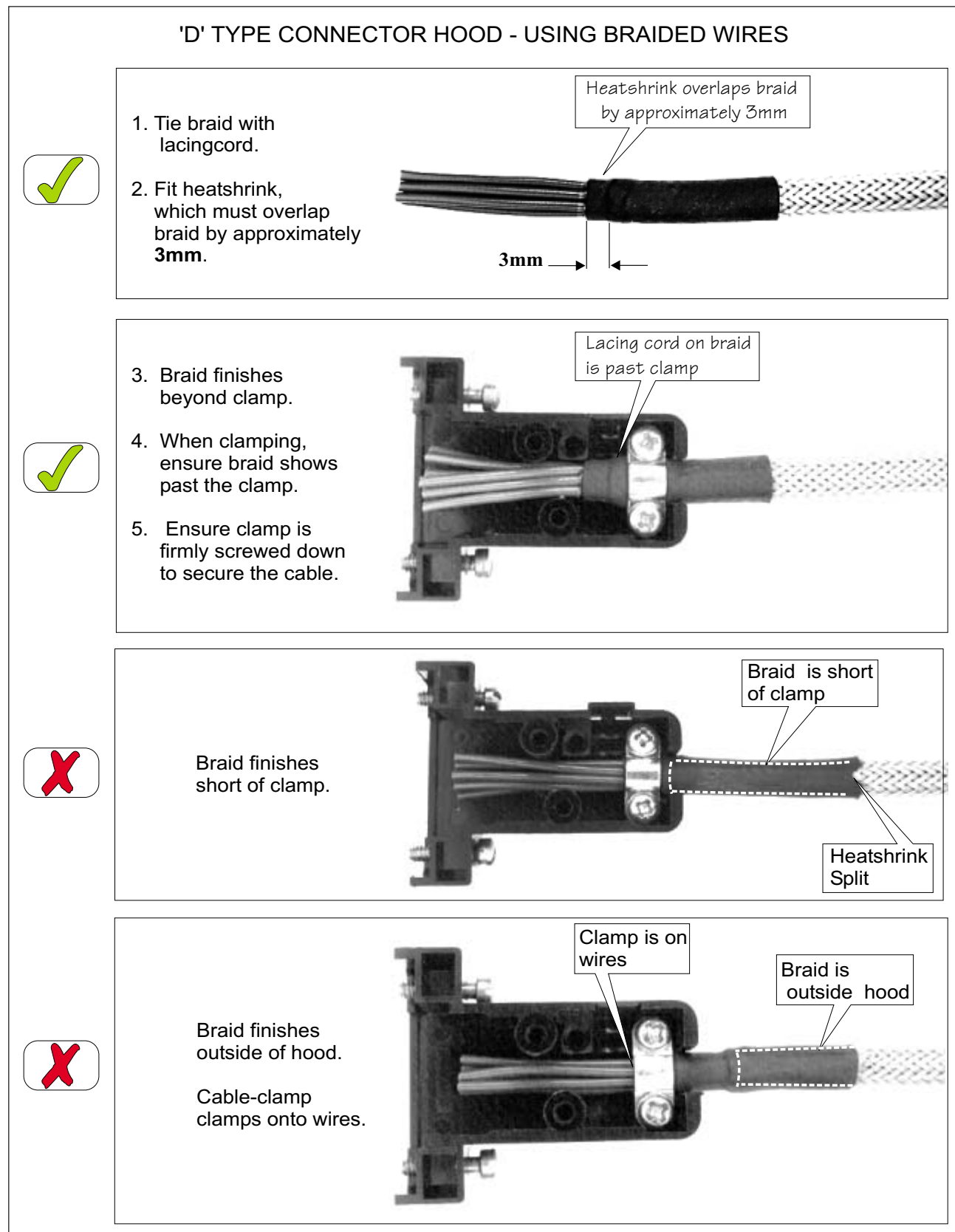


Figure 6-2

CABLE SCREEN - NOT CONNECTED

'D' TYPE CONNECTOR HOOD - CABLE SCREEN NOT TO BE CONNECTED

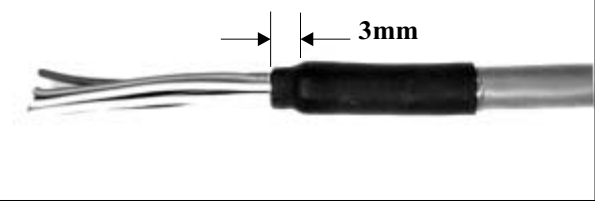
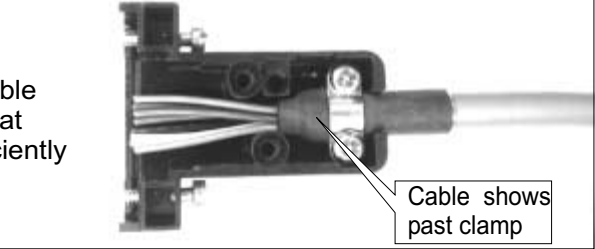
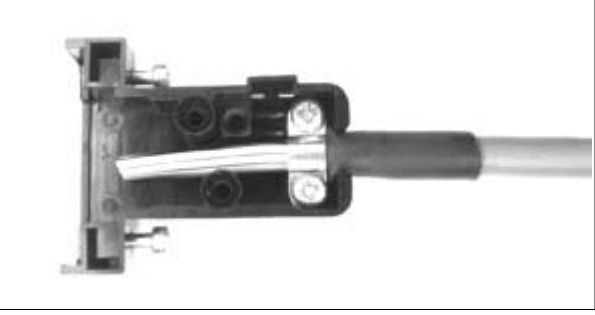
	1. Cut back insulation. Bring screen back over approximately 3 mm. 
	2. Heatshrink must overlap end of cable by approximately 3 mm, covering screen. 
	3. Clamp cable. When clamping cable ensure cable is showing past the clamp and that the clamp is screwed down sufficiently to firmly secure the cable. 
	TAKE CARE! Do not cut screen off flush, (unless the assembly drawing states otherwise). 
	Cable insulation outside of hood, thereby clamping is onto heatshrink and wires, unless specified otherwise for thicker cables in D-Hoods. 
	Cable not far enough under clamp to hold cable firmly. Causes wires to be too short. 

Figure 6-3

SCREENED

'D' TYPE CONNECTOR HOOD
'D' Hoods - Screened, (screen clamped to hood).

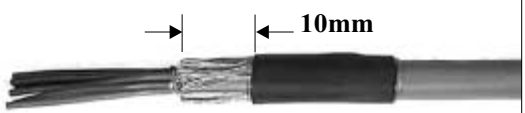
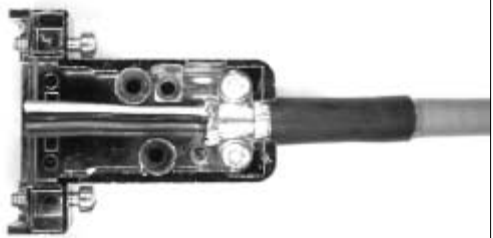
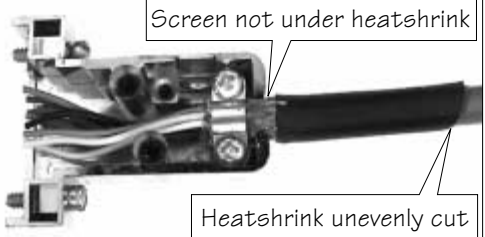
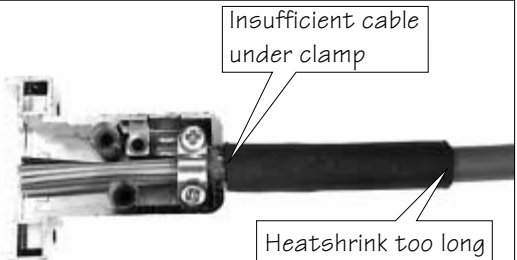
	1. Cut off cable insulation.	
	2. Fold screen back over cable neatly and evenly, approx. 25 mm length.	
	3. Use approximately 25 mm of heatshrink over the screen, (leaving approx. 10mm for clamping on).	
	4. Ensure screen is showing past the clamp, and the clamp is screwed down enough to secure the cable firmly. Trim wires to end of hood.. Caution If longer screws are used for clamping, ensure tips of the screws do not penetrate through to the back of the hood.	
	Screen clamped to hood incorrectly. Not enough screen under heatshrink. Heatshrink unevenly cut and not close enough to 'D' Hood.	
	Insufficient cable under clamp, may cause cable to come away from hood. Heatshrink too long. No more than 25mm of heatshrink is required.	

Figure 6-4

CABLE 111468 - CLAMPING

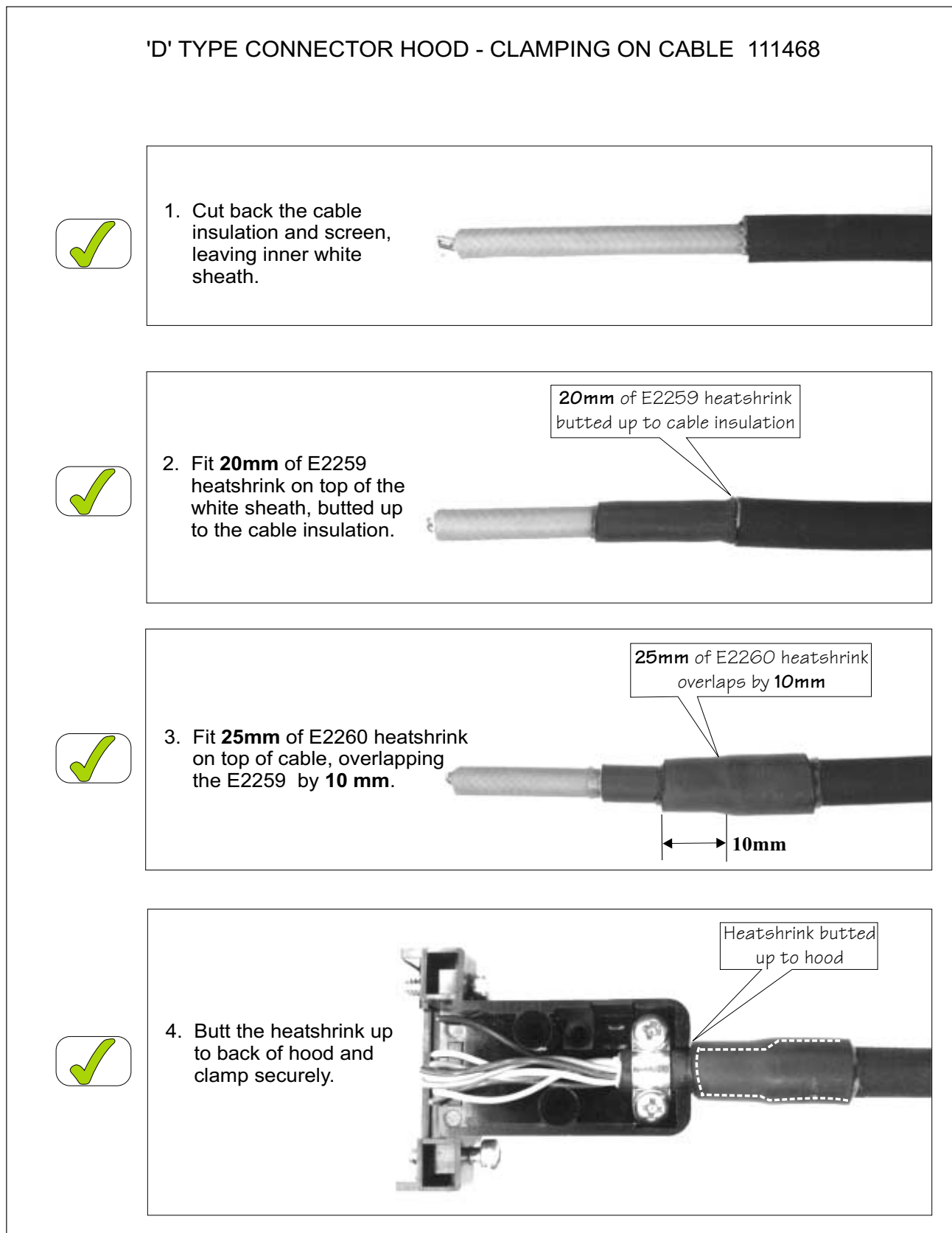


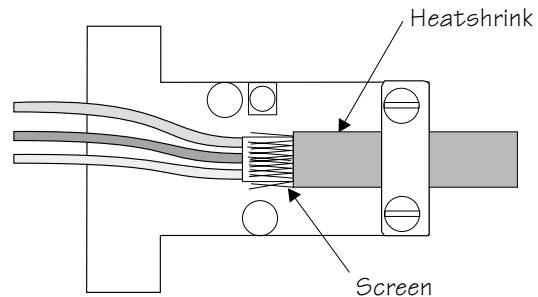
Figure 6-5

CABLE SCREEN - NOT CONNECTED

'D' TYPE CONNECTOR HOOD - CABLE SCREEN NOT TO BE CONNECTED

Summary

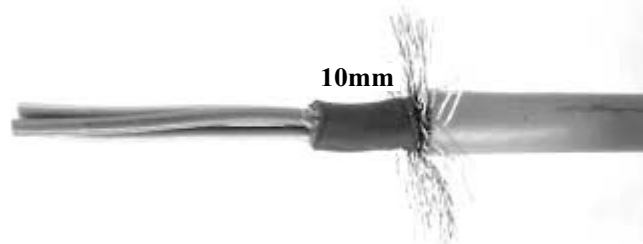
Cut back the insulation, sleeve heatshrink over the wires, pull screen down over the heatshrink, then put a second layer over the screen.



1. Cut back insulation. Position the 2nd layer of heatshrink onto the cable now. (cut back any unwanted wires now)



2. Fray out screen wires and position **10mm** of E2259 heatshrink onto wires, (until sleeving butts against the screen and cable insulation).



3. Bring screen forward to lay on top of 10mm heatshrink. Slide the second layer of heatshrink over the screening.



4. Butt the insulation up to the hood and secure hood clamp to the heatshrink.



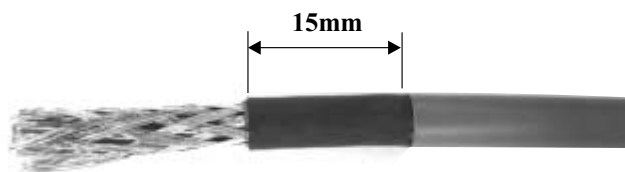
Figure 6-6

CABLE 128711 - PREPARATION

CABLE PREPARATION 128711 - WORKING PRACTICE

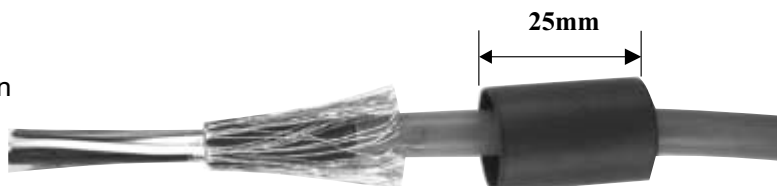
128711 LOOM

1. Cut back insulation to **5mm** behind hood.
2. Sleeve **15mm** of E2259 heatshrink over screen and butt up to insulation.

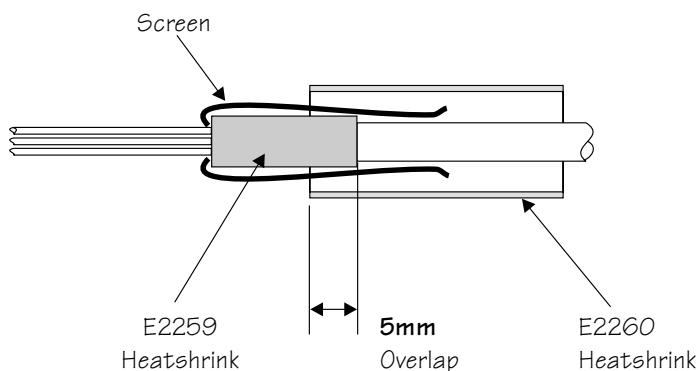


3. Fold screen back over the heatshrink and secure the screen using **25mm** of E2260 heatshrink.

Overlap the E2259 heatshrink by **5mm**.



4. Overlap the E2259 heatshrink by **5mm**.



5. Butt the heatshrink up to the back of the hood and clamp securely onto screen.

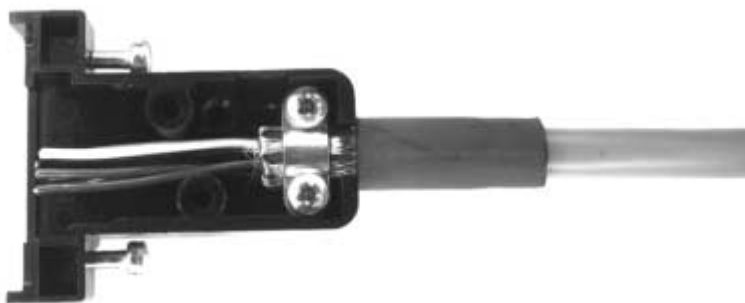


Figure 6-7

SCREEN TO PIN CONNECTION

CONNECTING SCREEN TO PIN (PLASTIC HOOD) - WORKING PRACTICE

Connecting Screen to Pin (Plastic Hood)

1. Prepare the screened cable and solder tag by the usual method.

Ensure that the solder tag is clamped between screw and clamp.

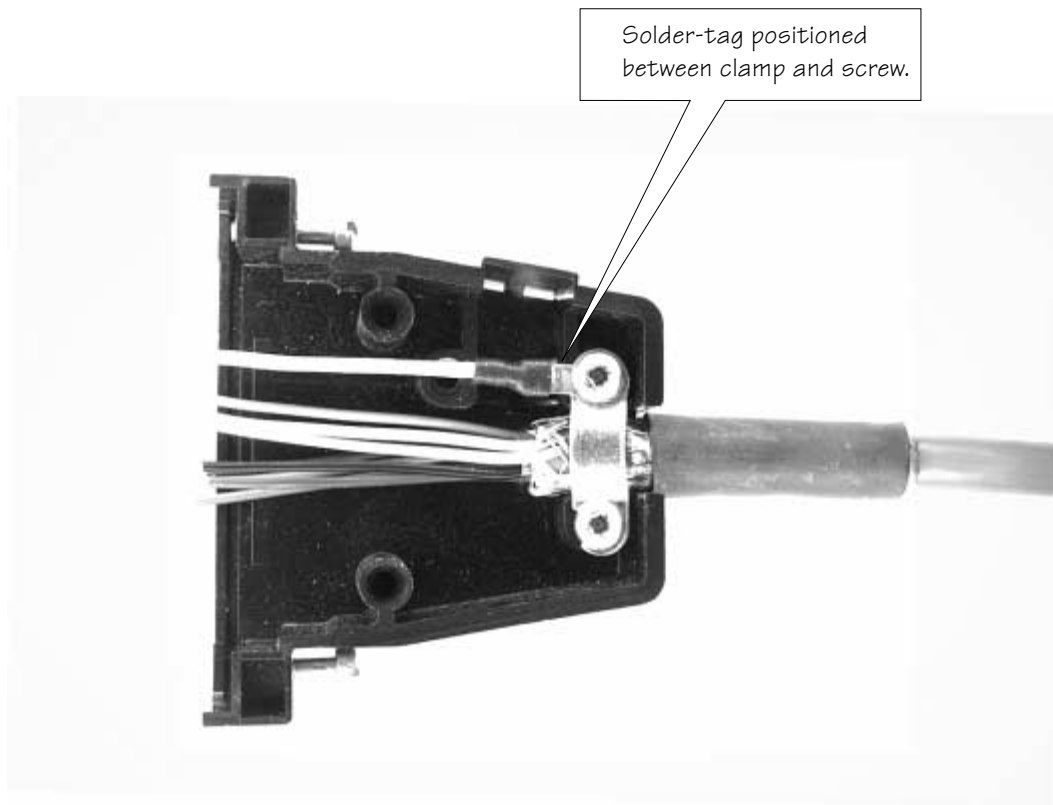


Figure 6-8

HOOD TYPE 126160

'D' TYPE CONNECTOR HOOD 126160
'D' Hoods - Screened, Unscreened

✓

1. Fit tightest grommet to insulation. If still loose, fit heatshrink tube underneath - at this stage.



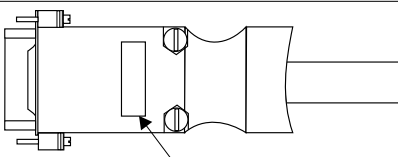
Heatshrink should not extend beyond the back of grommet, unless drawing specifies otherwise.



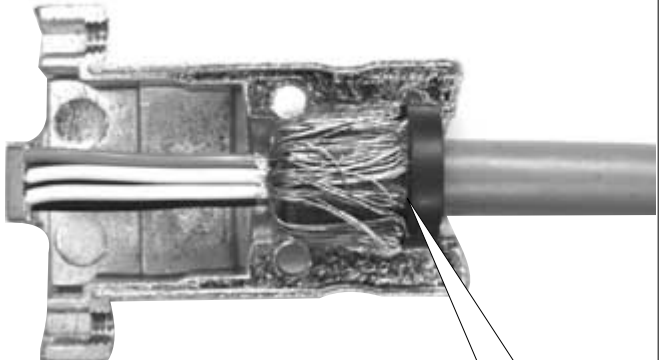
✓

2. Fold screen back over grommet and trim flush with base of grommet.

3. When used, 'D' Hoods to be fitted such that the cover screws are adjacent to higher pin numbers (shorter row of pins), unless drawing specifies otherwise.



Square indicates top of hood



Screen is in line with base of grommet

✗

Do not use lacing cord to secure screen.

This is not acceptable.



✓

4. If screen connection is not required, fold a little of the screen back over the insulation and apply heatshrink before fitting grommet.



Figure 6-9

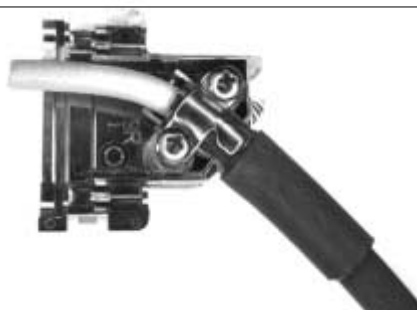
ANGLED HOOD TYPE - SCREENED

'D' TYPE CONNECTOR HOOD - WORKING PRACTICE

'D' Hoods - Angled Hood type - Screened Cable

1. Prepare Screened Cable in usual manner.

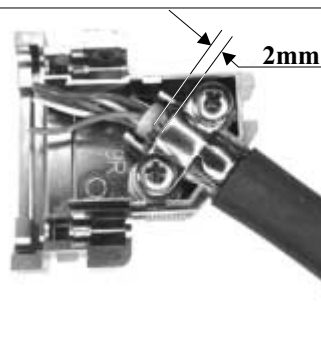
- a. Lay cable into connector hood and mark correct length.
- b. Remove and trim back inner sheath.



2. Ensure that approximately **2mm** of inner sheath remains visible.

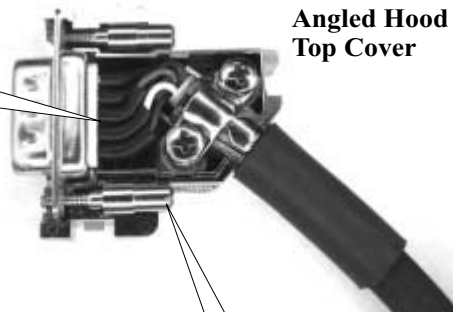


Now check wires for any damage.



When fitting wires into hood, ensure wires are within shell to prevent shorting to case during assembly.

Angled Hood Top Cover



Fit locking posts before assembling hood

Note:
Wires are assembled into the top cover of the hood.



Angled Hood Bottom Cover

Figure 6-10

ANGLED HOOD TYPE - UN-SCREENED

'D' TYPE CONNECTOR HOOD - WORKING PRACTICE

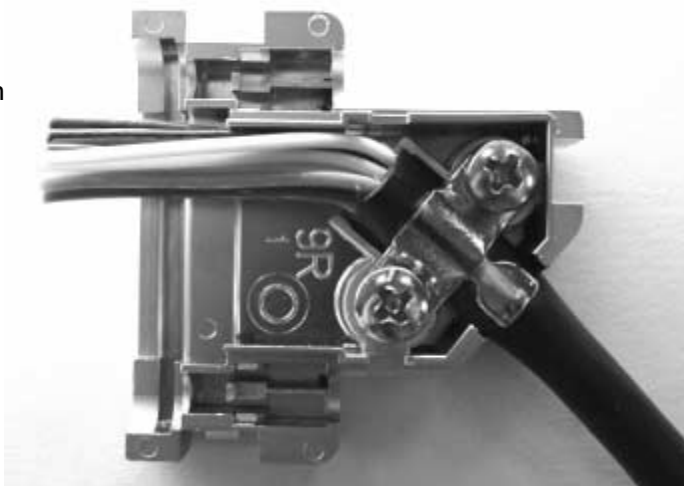
'D' Hoods - Angled Hood type - Unscreened Cable



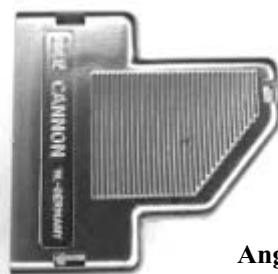
1. Lay cable into connector hood and mark correct length
2. Remove cable outer sheath to correct length, ie the outer sheath protects the cable when hood clamp is fitted (Figure refers).



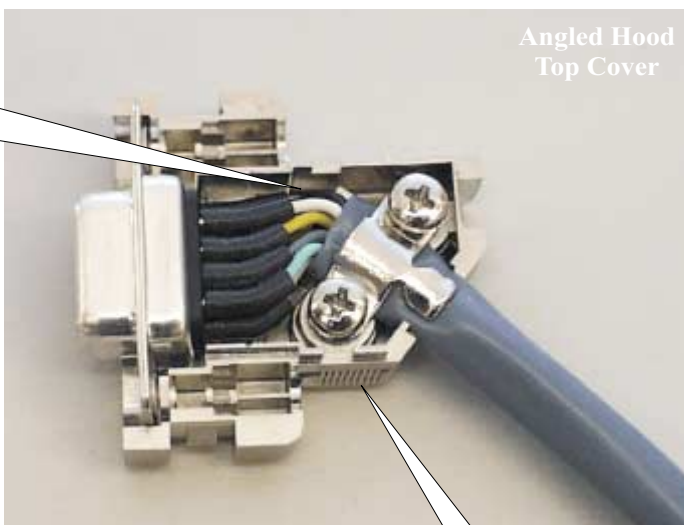
Now check wires for any damage.



When fitting wires into hood, ensure wires are within shell to prevent shorting to case during assembly.



**Angled Hood
Bottom Cover**



Note:
Wires are assembled into the top cover of the hood.

Figure 6-11

POWER D TYPE

Power 'D' Type Connection

NOTE
 Heatshrink must be fitted over all power crimp types.

Insulation cut to correct length. Good solder joint



Insulation too short. Bad solder joint



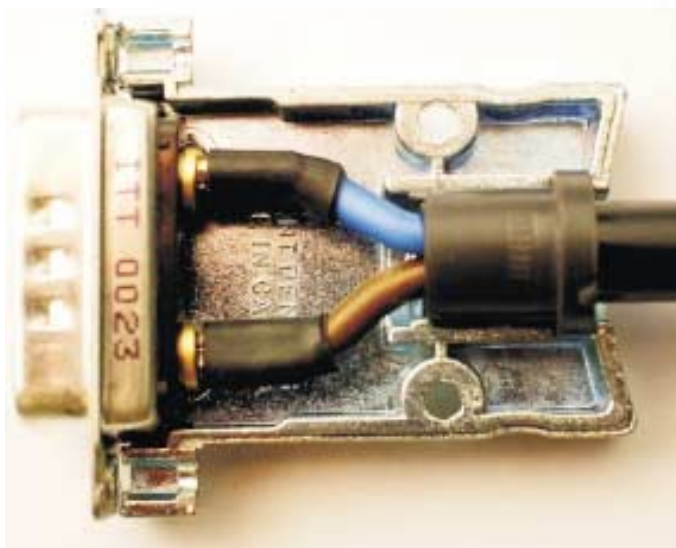
Heatshrink incorrectly fitted.



Heatshrink correctly fitted..



Cable wires clear of hood cover metal flanges.



Cable wires resting upon hoods metal flanges.



Keep Wires
 Clear of Raised
 Flanges

Figure 6-12

JST 'D' TYPE HOOD FITTING

JST 'D' TYPE CONNECTOR HOOD - WORKING PRACTICE



Correct length
of wires in hood.



Fold screen back over the
insulation sheath and wrap
with copper tape.

Wires in hood twisted.

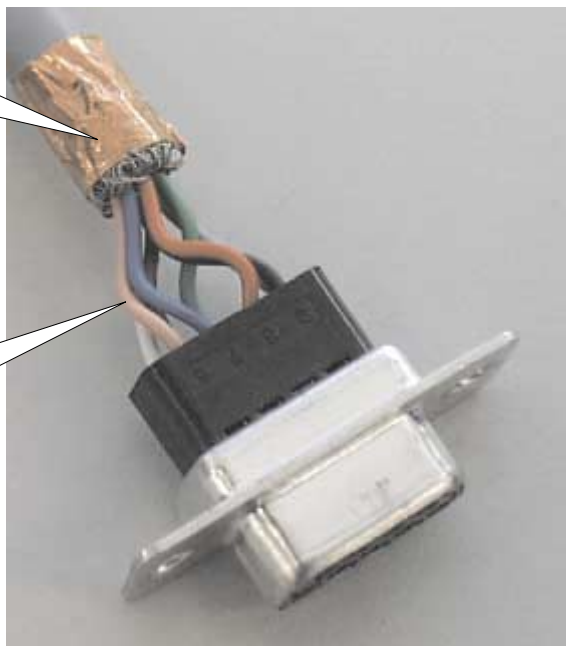


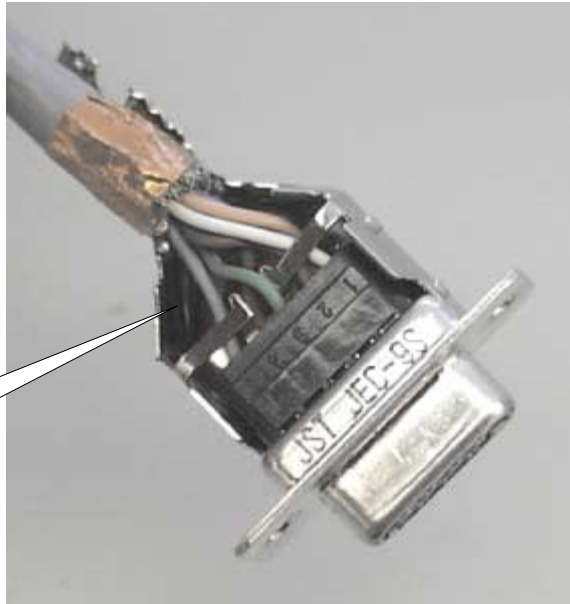
Figure 6-13

JST 'D' TYPE CONNECTOR HOOD - WORKING PRACTICE



Hood clamps folded over to hold wires in place.

Ensure all wires are fitted into the hood and are not trapped during assembly.



Screw type securing fitting.

Locking posts fitted.



Figure 6-14

CHAPTER 7 TRIDENT CONNECTORS

WORKING PRACTICES

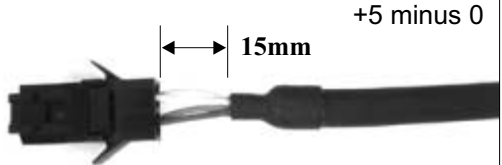
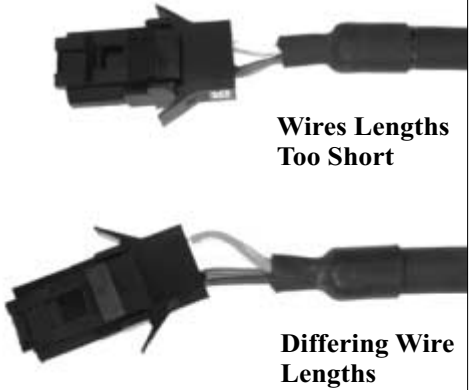
TRIDENT CONNECTORS - WORKING PRACTICE	
Braided Wires and Multi-core cables into Trident connectors	
	1. Single wires in braid can be kept tidy provided crimps are inserted into socket or plug before the braid is tied and heatshrink tubing applied. 
	Example showing untidy wires due to braid and heatshrink being applied before wires are inserted in plug or socket. 
	2. Wires in multi-core cable should be as neat as possible and all wires cut to the same length. 
	3. Length of wires between heatshrink and connector should be 15mm unless stated otherwise. 
	Wire lengths <u>too</u> short. Wire lengths different. Both examples shown are unacceptable. 

Figure 7-1

CHAPTER 8 TRIAD CONNECTORS

WORKING PRACTICES

TRIAD CONNECTORS - WORKING PRACTICE
Cables into Triad Connectors - Braided and Unbraided

	BRAIDED AND SCREENED 1. Cut off cable insulation and bring back screen over cable 25mm and tie with lacing cord.	Lacing Cord
	2. Bring braid over screen by 5mm and tie with lacing cord.	
	3. Apply approximately 25mm heatshrink. Overlap braid by 5mm. Ensure enough screen cable is showing for clamping.	5mm
	4. Butt heatshrink up to back of clamp. Do not allow heatshrink to go under clamp.	
	5. When a screened cable is not braided, pull the screen back over the insulation and apply heatshrink. 6. Select suitable cable clamp.	Two clamps are supplied with the backshell. Select the clamp most suitable for securing cable firmly. Cable only (not braided) Heatshrink not butted up to clamp Screen not secured under heatshrink
	Screen not under heatshrink and heatshrink not butted up to clamp.	

Figure 8-1

BACKSHELL TIGHTENING

TRIAD CONNECTORS - WORKING PRACTICE
Tightening the Backshells

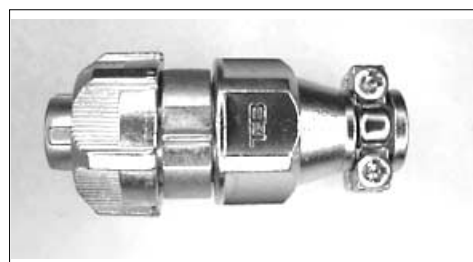
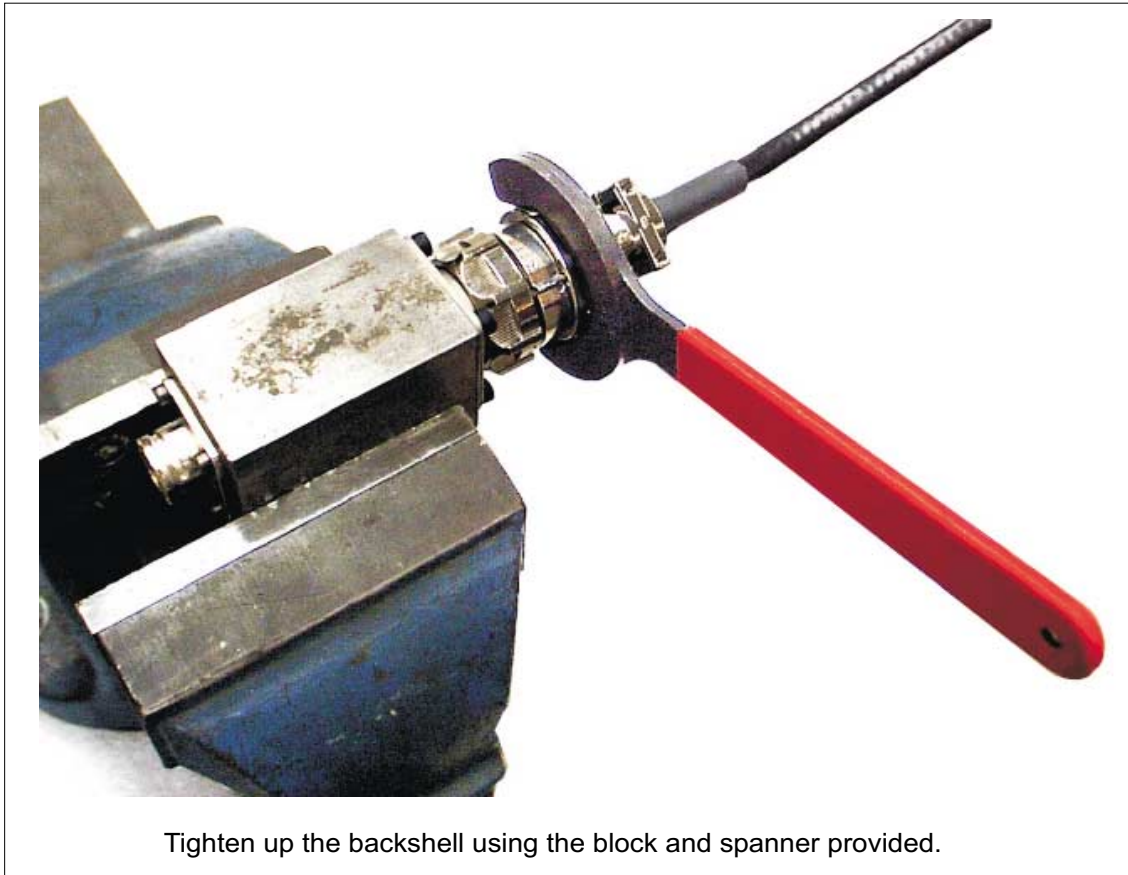


Figure 8-2

POLARISING THE INSERT

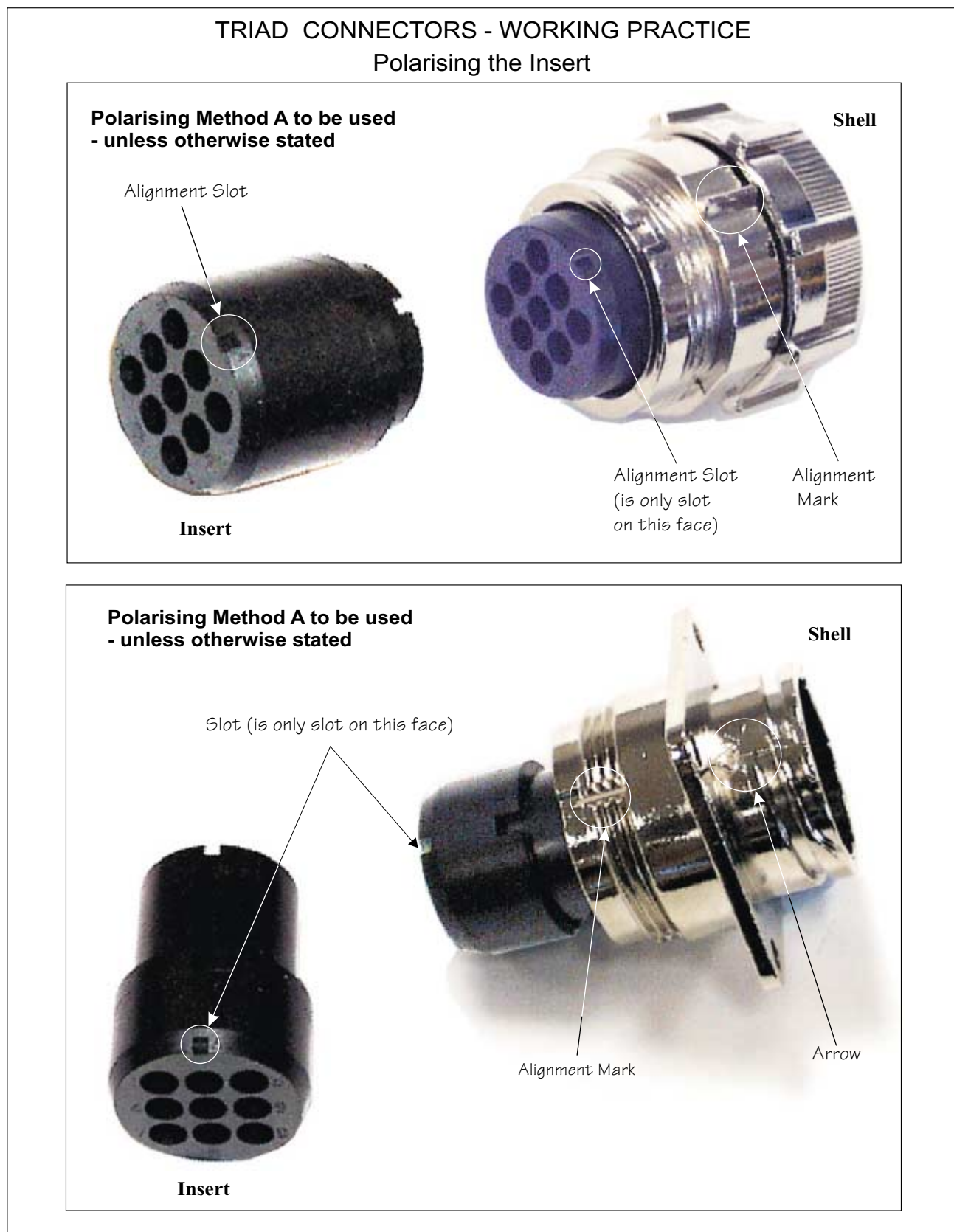


Figure 8-3

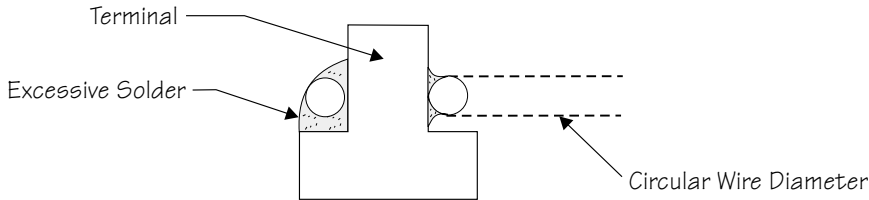
CHAPTER 9 SOLDERED CONNECTIONS

CIRCULAR WIRE JOINTS

SOLDER FORM (CIRCULAR WIRE JOINT)

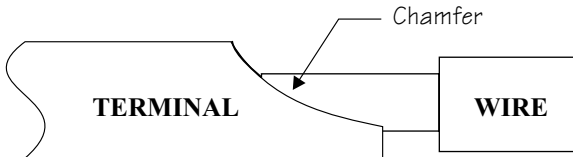
On a circular wire the solder shall not be less than the diameter of the wire on it's arrival at the terminal face. This is shown by the dotted line.



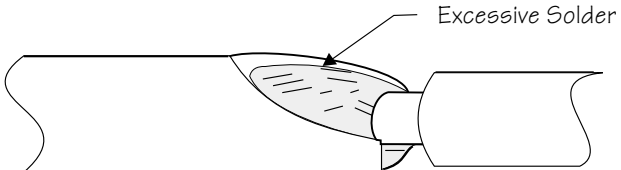


On a cup or bucket type joint, there shall be no depression evident below the chamfered face of the terminal.









Dry Joints



When soldering, the greatest care must be taken to avoid dry joints. It is important that there is no movement at the joint either when soldering or whilst the solder is solidifying. Solder must run smoothly onto both items being joined. Bead formation usually indicates a dry joint.

Inspection

Operators are responsible for inspecting their own work, before requesting a solder check by the team-leader.

Appearance of Finished Joint



Solder in a joint must present a bright finish, smoothly and evenly coated over the entire area.



The outer edges of the jointing solder must blend in with the tinning on the surface of the components in a smooth curve and not cease abruptly to form a ragged outline or convex 'blob'. The junction between the jointing solder and the component tinning should be hardly discernible.



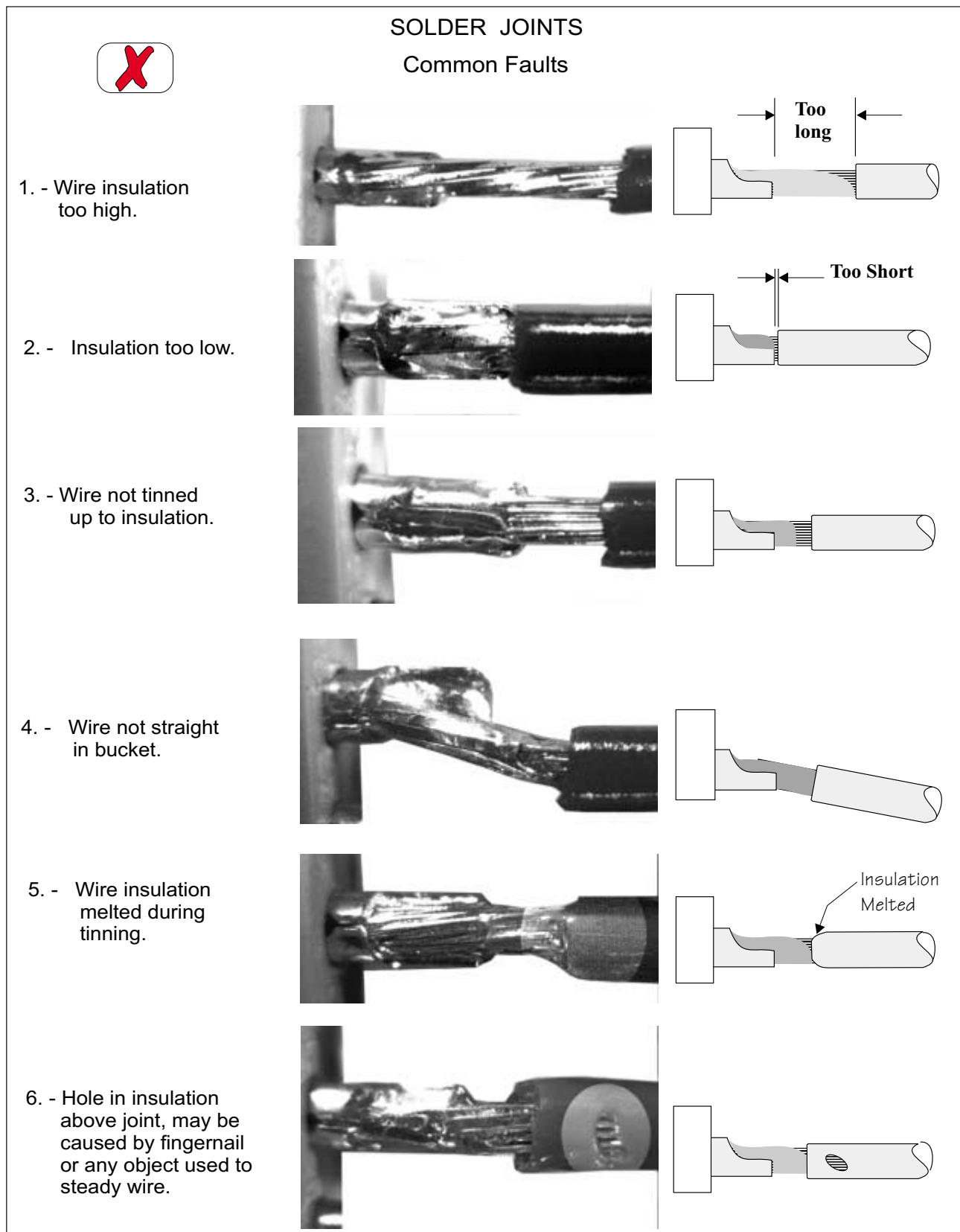
A dull matt or crystalline appearance to the solder surface usually indicates that the components of the joint have moved in relation to each other after the solder has cooled below the liquid point and the solder is no longer solid throughout.



NOT ACCEPTABLE - The base metal of the joint components (ie bare copper etc) must not be visible in any part of the joint.

Figure 9-1

COMMON FAULTS



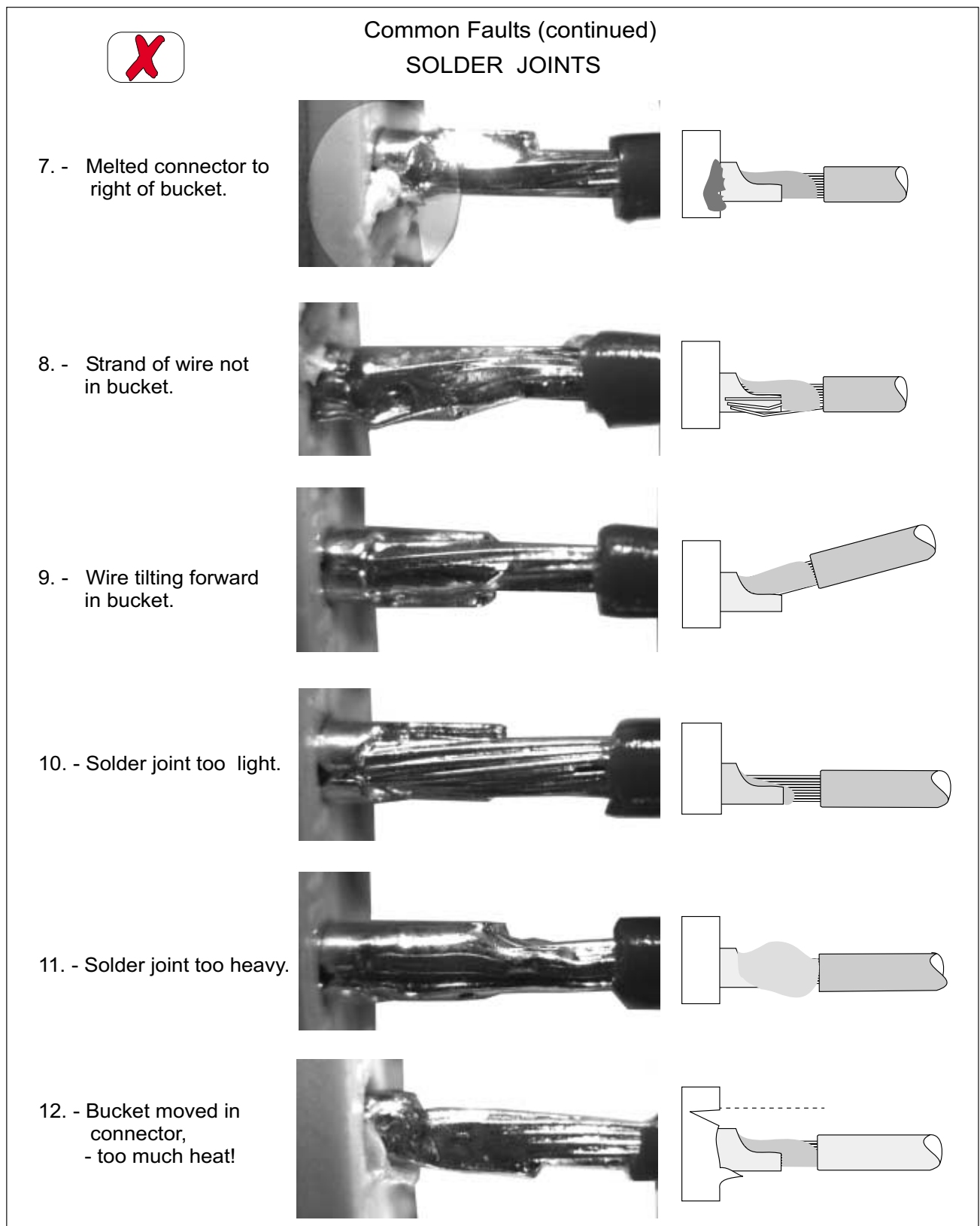


Figure 9-3

AMPHENOL CONNECTORS

SOLDER JOINTS
Amphenol Connectors

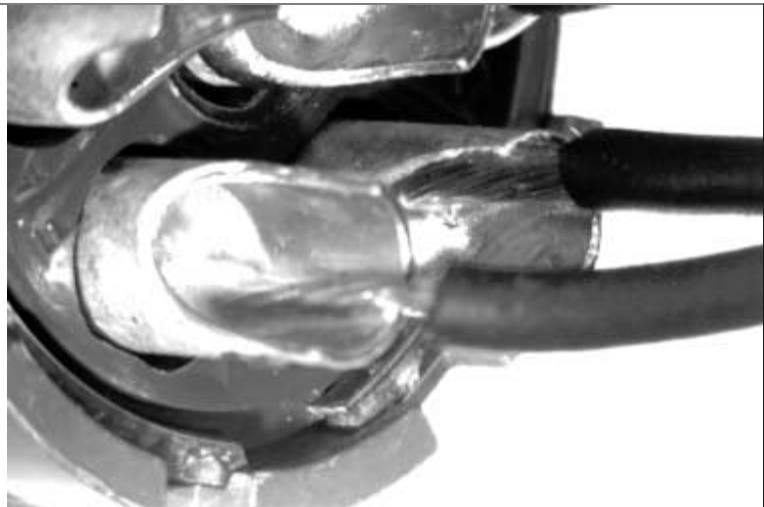
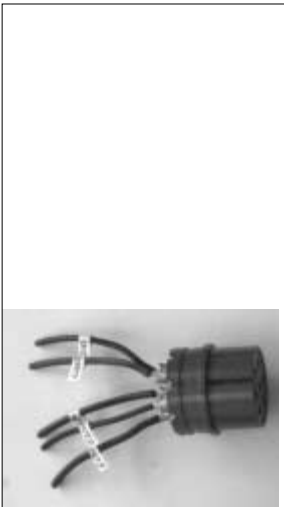
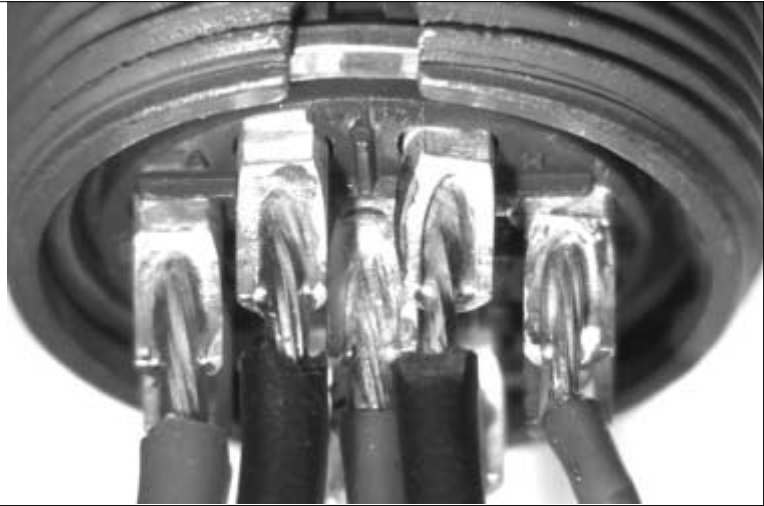
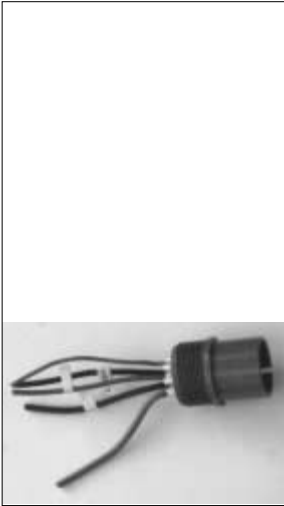


Figure 9-4

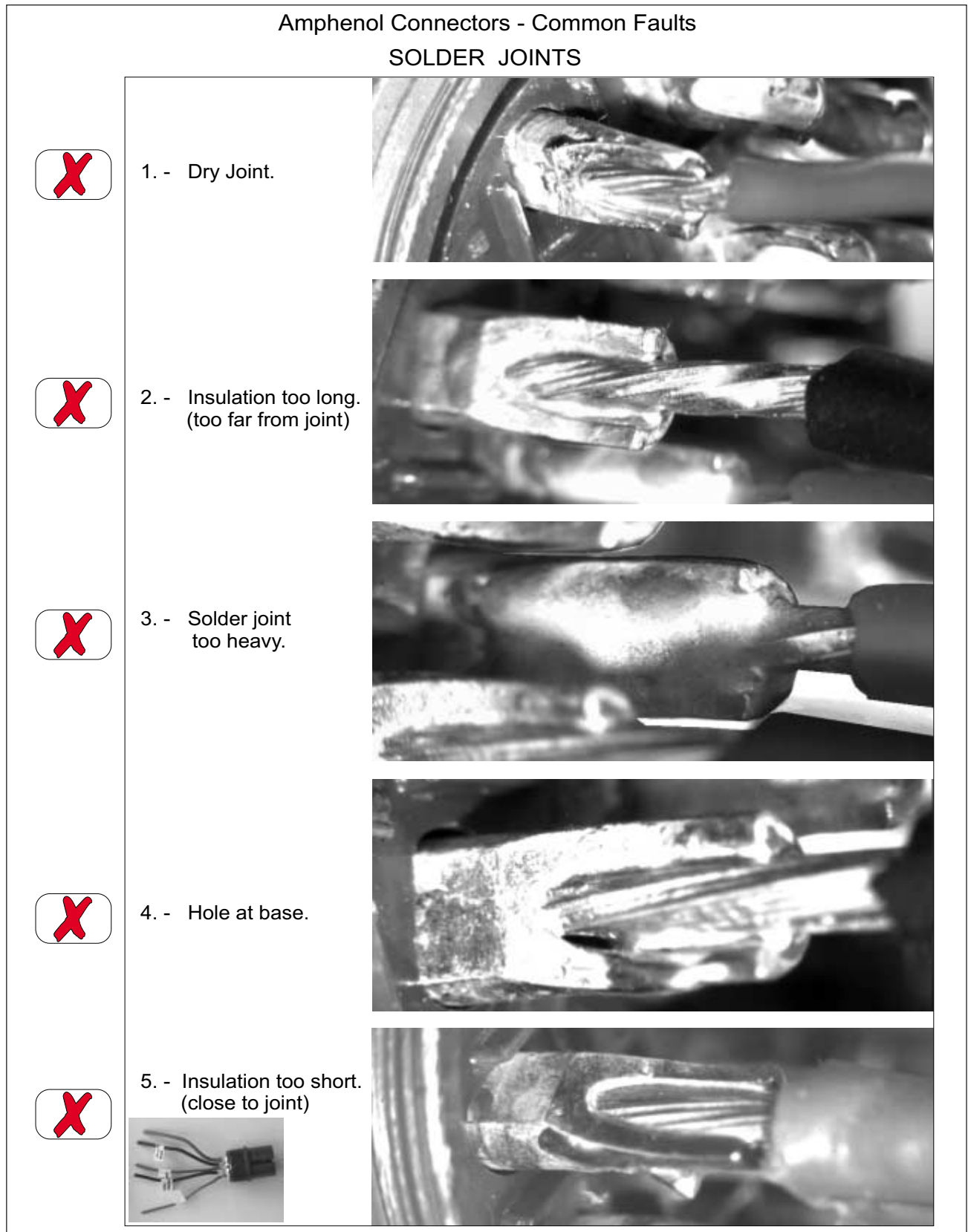
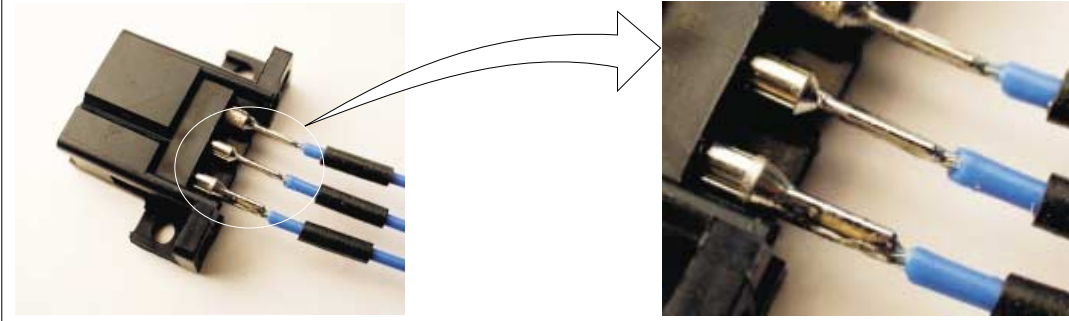


Figure 9-5

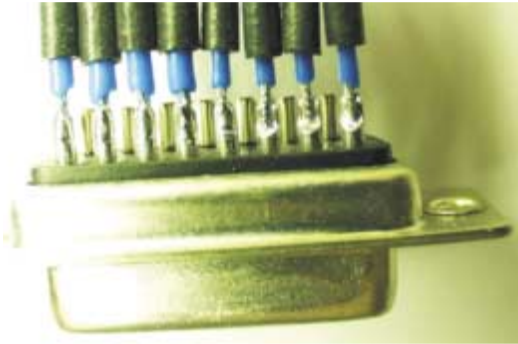
EXAMPLES - GOOD PRACTICE

SOLDER JOINTS
Examples of good practice









Wire Insulation close to solder joints.

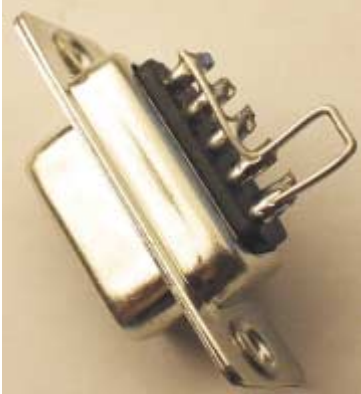


Sleeving fitted to overlap solder bucket and insulation of the wire. Sleeving abuts to the back of connector shell.

Tinned-copper Link Across Pins



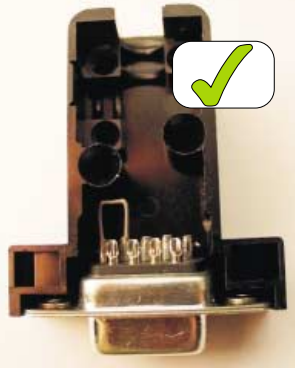
1. Begin the link at the first pin.
2. Form the end of the link into the last bucket and make a good contact with solder to all of the buckets across the link.











3. Ensure that the link is not too long thus preventing the hood cover from being assembled correctly.

Figure 9-6

CHAPTER 10 AMPHENOL CONNECTORS

BRAIDED WIRE

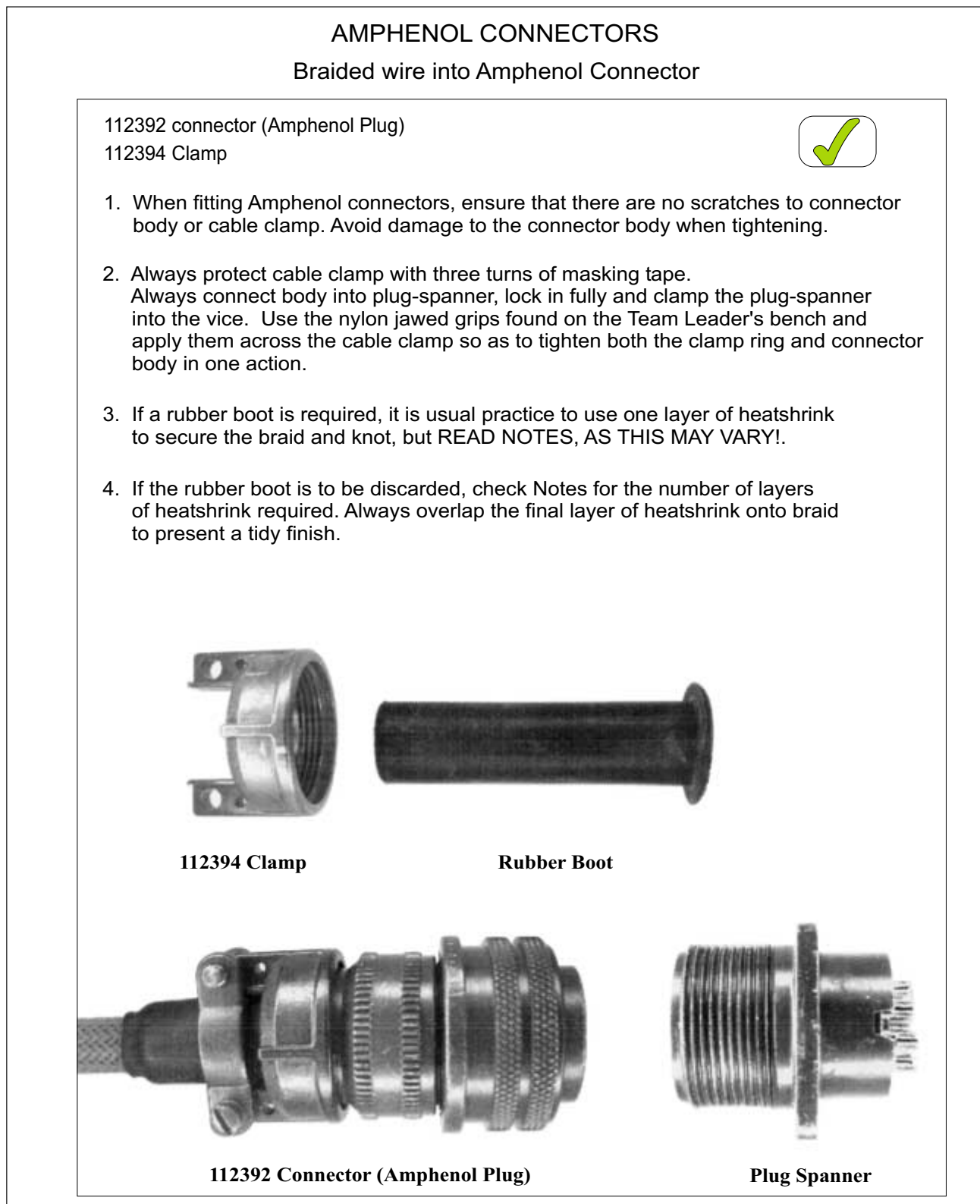


Figure 10-1

CHAPTER 11 RIBBON CONNECTORS

GENERAL

RIBBON CONNECTORS	
Socket Longest row of pins Red wire to pin 1 1 → 10	Plug Red wire to pin 1 10 → 1 ✓
Black ribbon cable connected to a 9way D-type connector. 1. Use ribbon cutters to ensure a neat and tidy finish when cutting ribbon to length. 2. Trim approximately 15 mm from the tenth wire. 3. The ribbon must enter at the longest row of pins for correct location. 4. When correctly located put connector squarely into a vice and carefully close. 5. Note that on a ribbon cable, one is indicated by either a red or a white strip at the side.	
✗ Sample of a 9-way ribbon connector. Assembly is incorrect. Ribbon enters from side that has the short row of pins	Short row of pins
On a multi-coloured ribbon, Pin 1 is indicated by the brown wire (as in the standard colour code). ✓ Ribbon should finish flush to the end of the connector	
✓ When ribbon is correctly located, position connector squarely in the vise and carefully close. On an IDC type connector Pin 1 is indicated by an arrow.	Write identification eg 1SK01 onto the body of connector. When using black ribbon cable, ident tag is not required. ✓

Figure 11-1

FLAT RIBBON - FITTING

RIBBON CONNECTORS - FITTING (Flat Ribbon)



Ensure ribbon cable wires are positioned correctly so that the wires are in line with the grooves on the backing plate. Pin 1 of the connector is aligned with the red wire of the ribbon cable.



Ribbon Press machine with correct backplane socket plate fitted.

Clamp Adjustment Knob

Backplane Socket Plate Recess

Backplane Socket Plate



Position the ribbon and plug (backing plate first) into the backplane socket plate recess, (as shown).

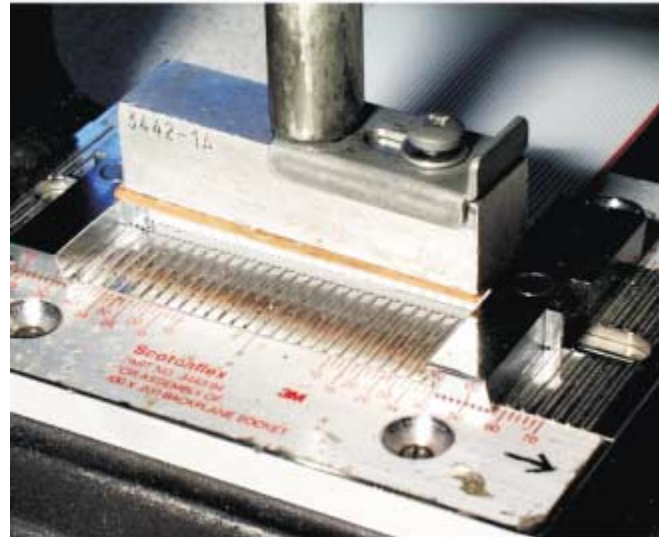


Figure 11-2

RIBBON CONNECTORS - FITTING (Flat Ribbon)
(Continued)



Clamp the backing plate / ribbon and connector together.
(To ensure a positive connection, adjust the clamp adjustment knob on the ribbon press as necessary.)



Carefully fold the ribbon cable over the back of the backing plate and fit and secure the strain relief clip.
(Completed connector as shown.)

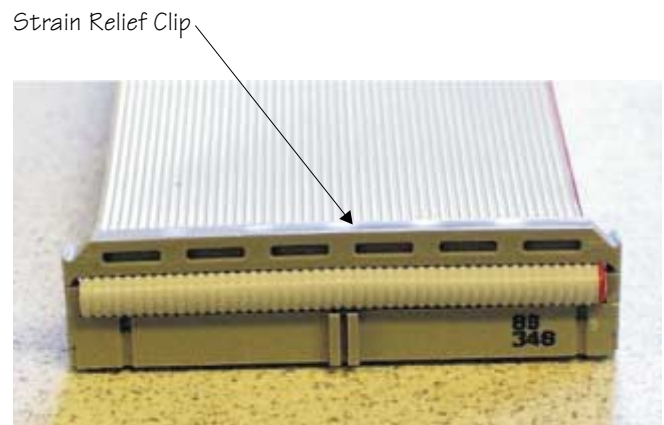


Figure 11-3

CONNECTORS - ROUND AND FLAT TYPE

Ribbon Connectors (Round and Flat Cable Type)



Round cable ribbon connection is carried out by the same method as flat ribbon cable with the following notes:

- Perform the cable connection at a solid section area of the cable.
- Adjust the cable wires in a 'fan' shape to the cable sleeving.
- Ensure screening is folded back over the end of the cable sleeving.



Figure 11-4

CHAPTER 12 BNC CONNECTORS

2.5MM CABLE - 117352

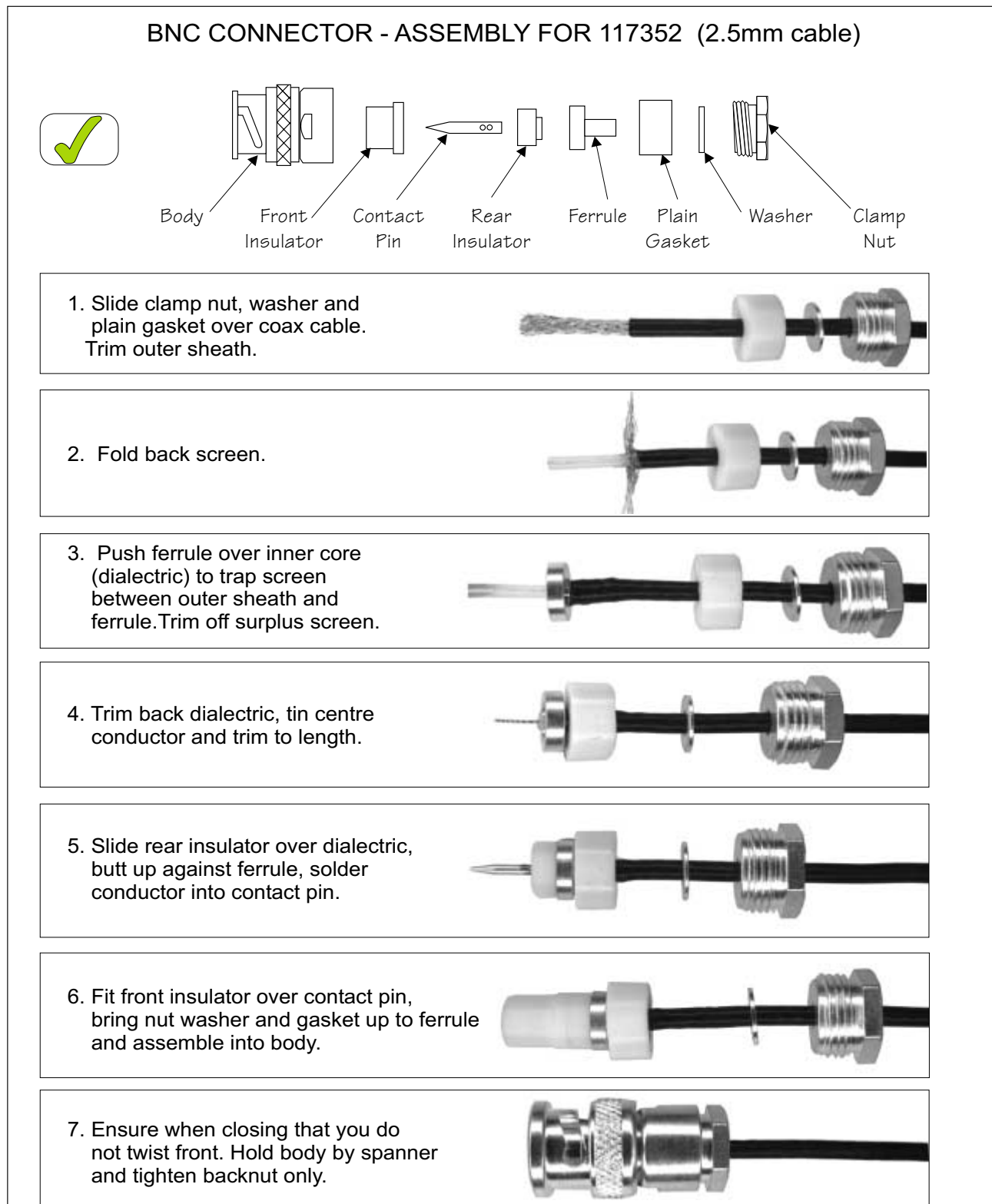


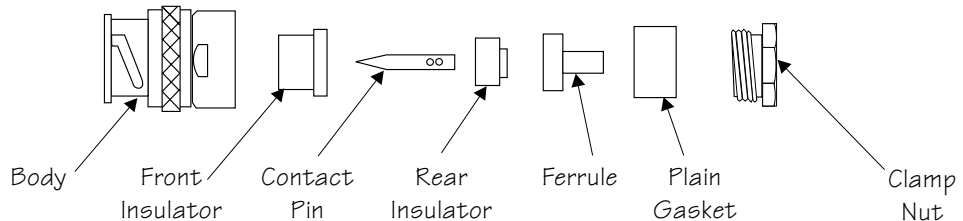
Figure 12-1

5.8MM CABLE - 117957

BNC CONNECTOR - ASSEMBLY FOR 117957



NOTE:
 There is **NO** washer
 with this BNC
 Connector



1. Slide clamp nut, and plain gasket over coax cable. Trim outer sheath.



2. Fold back screen.



3. Push ferrule over inner core (dielectric) to trap screen between outer sheath and ferrule. Trim off surplus screen.



4. Trim back dielectric, tin centre conductor and trim to length.



5. Slide rear insulator over dielectric, butt up against ferrule, solder conductor into contact pin.



6. Fit front insulator over contact pin, bring nut and gasket up to ferrule and assemble into body.



7. Ensure when closing that you do not twist front. Hold body by spanner and tighten backnut only.



Figure 12-2

2.5MM CABLE - 119508

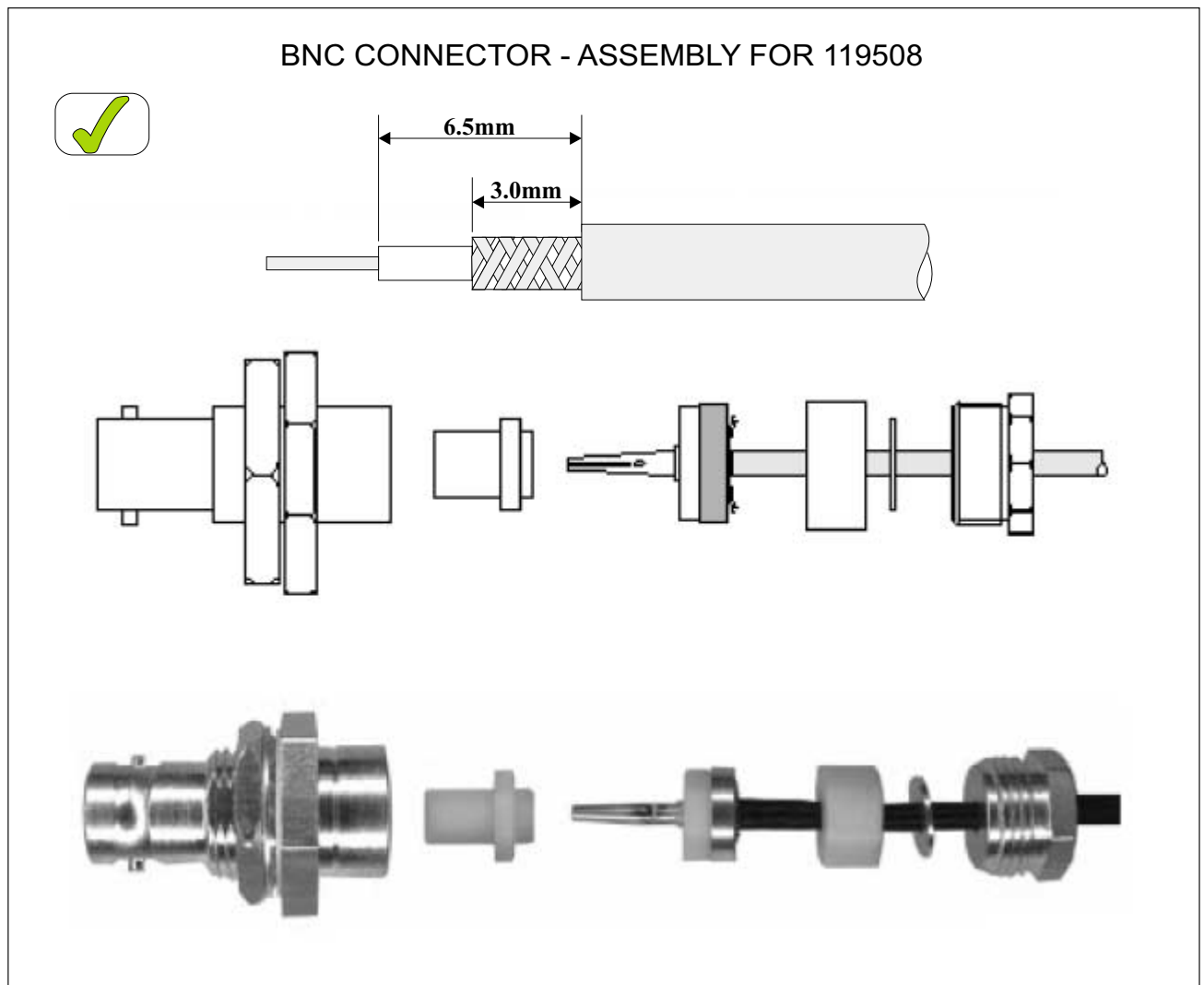


Figure 12-3

CHAPTER 13 MISCELLANEOUS CONNECTORS

SOLENOID CONNECTOR

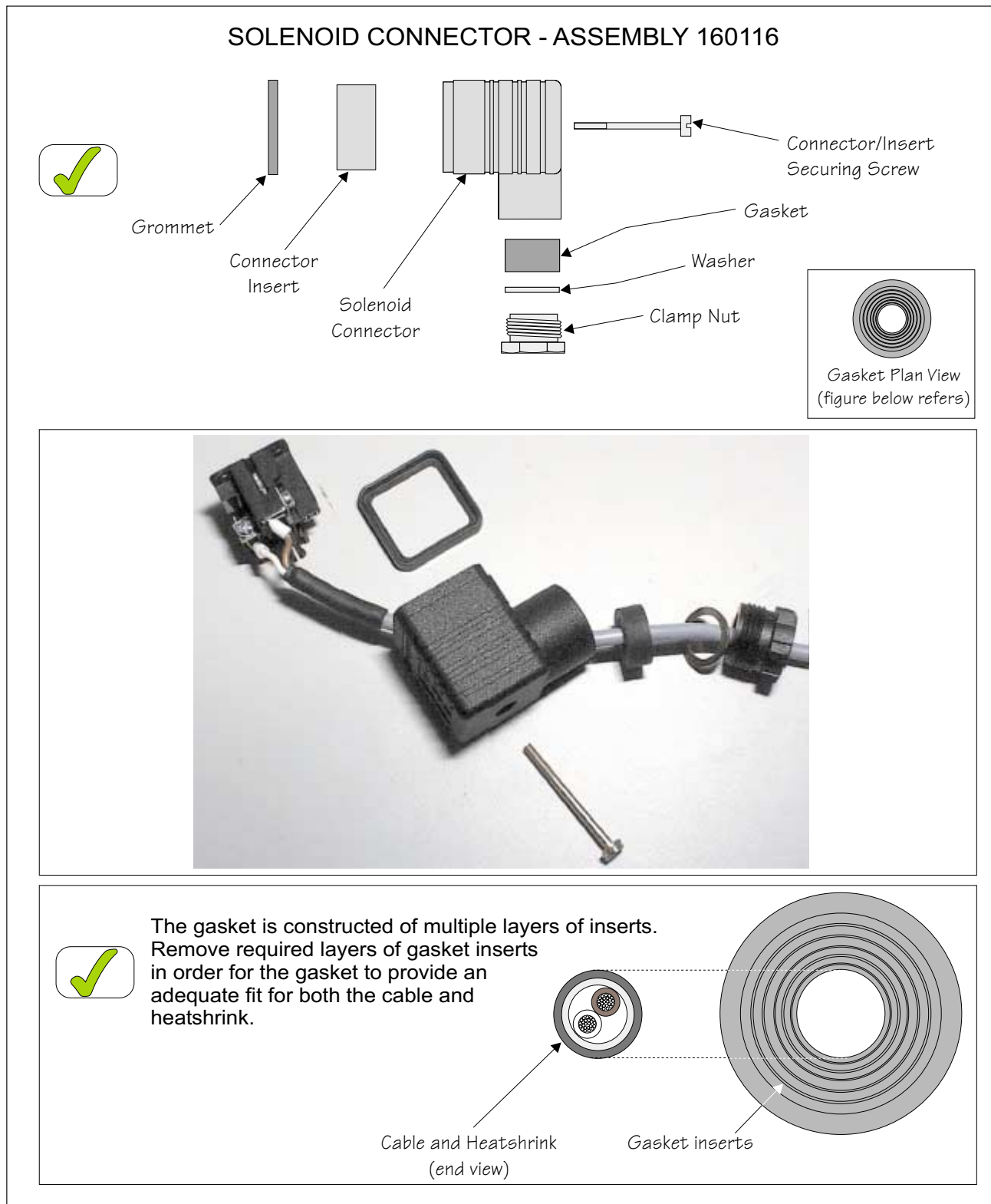
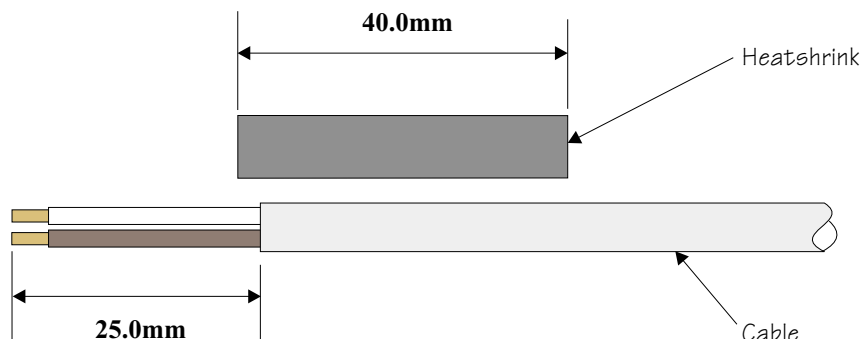


Figure 13-1

SOLENOID CONNECTOR - ASSEMBLY 160116



NOTE

1. Ensure heatshrink overlaps the end of the cable
2. Wire end connectors - Orange Bootlace Ferrules (Crimps Chapter Fig 4 refers)



Figure 13-2

CHAPTER 14 ENCLOSURES

CABLE TIES

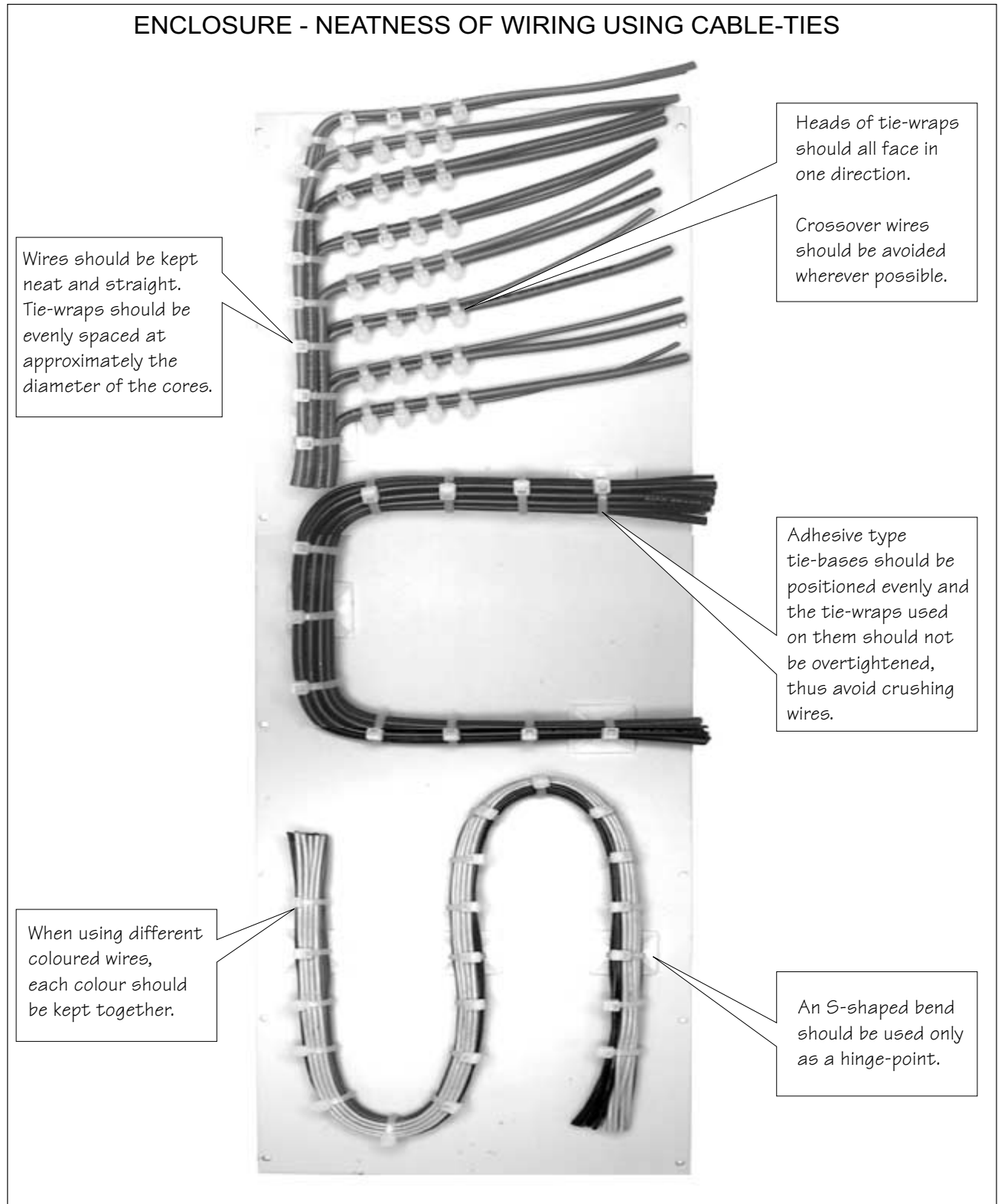


Figure 14-1

M23/M24 CLIP TERMINALS

M23/M24 Clip Terminals - Orientation

M24 Clip Terminals

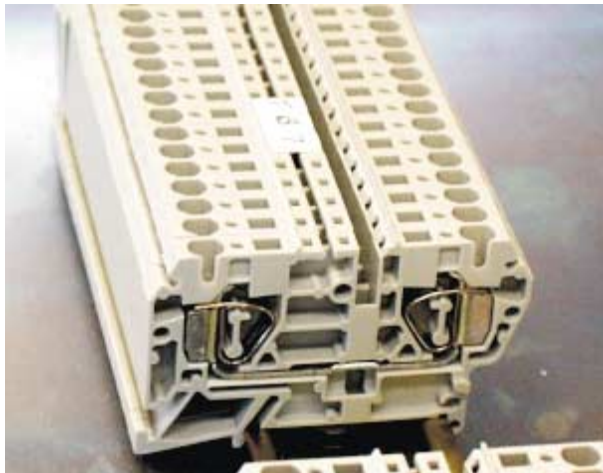


When assembling the clip terminals to create terminal blocks. Ensure that each clip face is assembled in the correct sequence as shown.

(The clip side showing the exposed metal terminals and springs must fit against the blank side of the adjacent clip.)



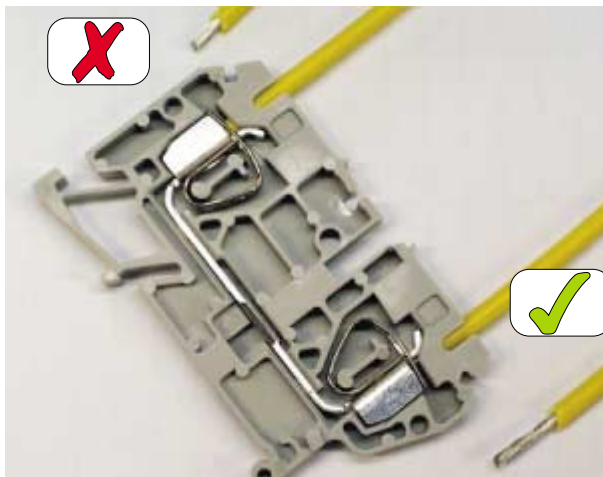
If a clip is inadvertently fitted in the wrong configuration, ie metal terminals facing each other, any electrical terminations may short together.



Wire Fitting to Terminal Blocks

Ensure that the correct amount of insulation is stripped from wires to be inserted in terminal blocks.

The photograph shows that if the exposed wire is too short, when inserting into the block, there is a danger of the spring connector gripping only insulation.

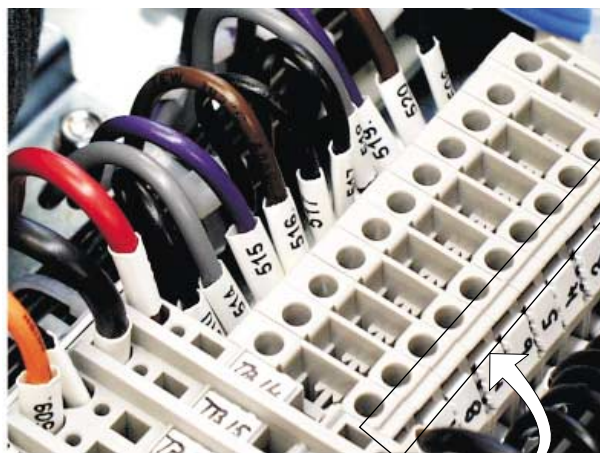


M23 Clip Terminals



When assembling the clip terminals, ensure that the correct sequence is adopted.

Terminal block has a ridge on one side only (as shown).

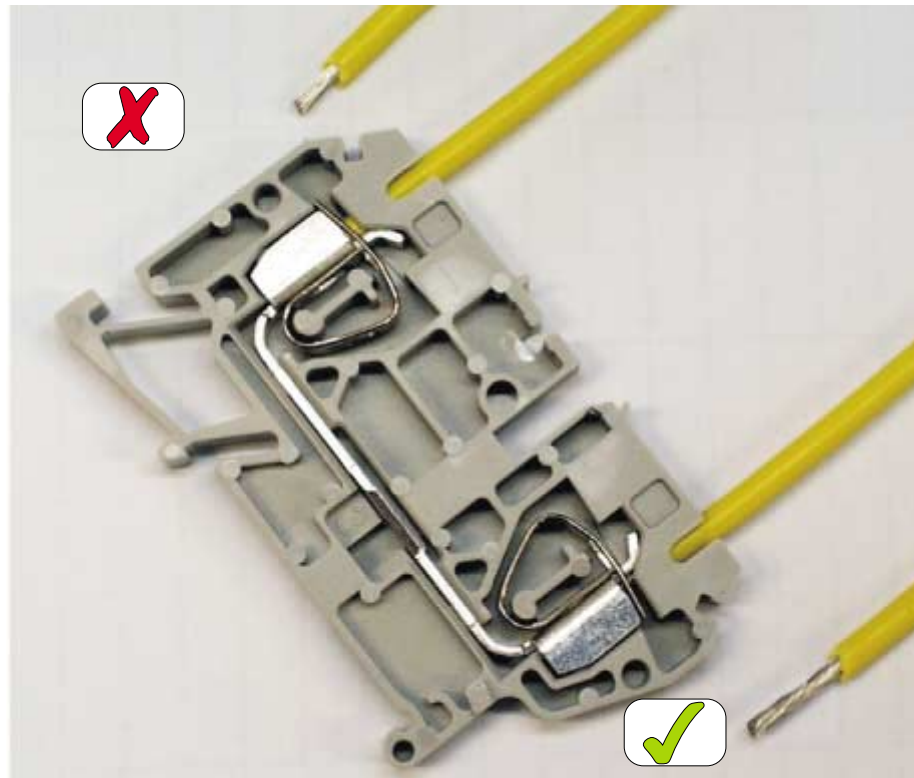


Ridge on One Side of Terminal Block

Figure 14-2

M23/M24 TERMINAL BLOCKS

Terminal Blocks - Fitting Wires



Ensure that the correct amount of insulation is stripped from wires to be inserted in terminal blocks. The photograph shows that if the exposed wire is too short, when inserting into the block, there is a danger of the spring connector gripping only insulation.



Using a screwdriver to open the terminal block spring connector carefully insert the wire into the terminal block connector.

NOTE

Ensure that when releasing the spring connector, (by removing the screwdriver), the jaws of the spring connector snatches the bare wire.

Ensure that no bare wire is evident above the terminal block.

Figure 14-3

JOG/SYSTEM BUTTON WIRING

Typical Installation



The correct configuration for jog button wiring layout is shown in the photograph above, where a rubber insulating sleeve is fitted over the barrel of the switch and cable connections.

Figure 14-4

M23 - FITTING METALCLAD RESISTORS

M23 Enclosure - Typical Fit



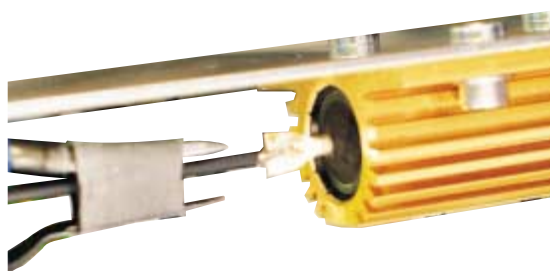
Before fitting the surge suppressor to the enclosure, smear the flat surface of the suppressor with heatsink compound, (used to dissipate heat from the heatsink to the metal framed enclosure).



Secure the suppressor to the enclosure frame.



Position the rubber insulation sleeving over the soldered joint using Hellerman pliers.



Ensure that the single ident sleeves are positioned correctly, (ident number starts nearest to the joint).



Figure 14-5

CHAPTER 15 CABLE IDENTS AND MARKERS

CABLE IDENTS

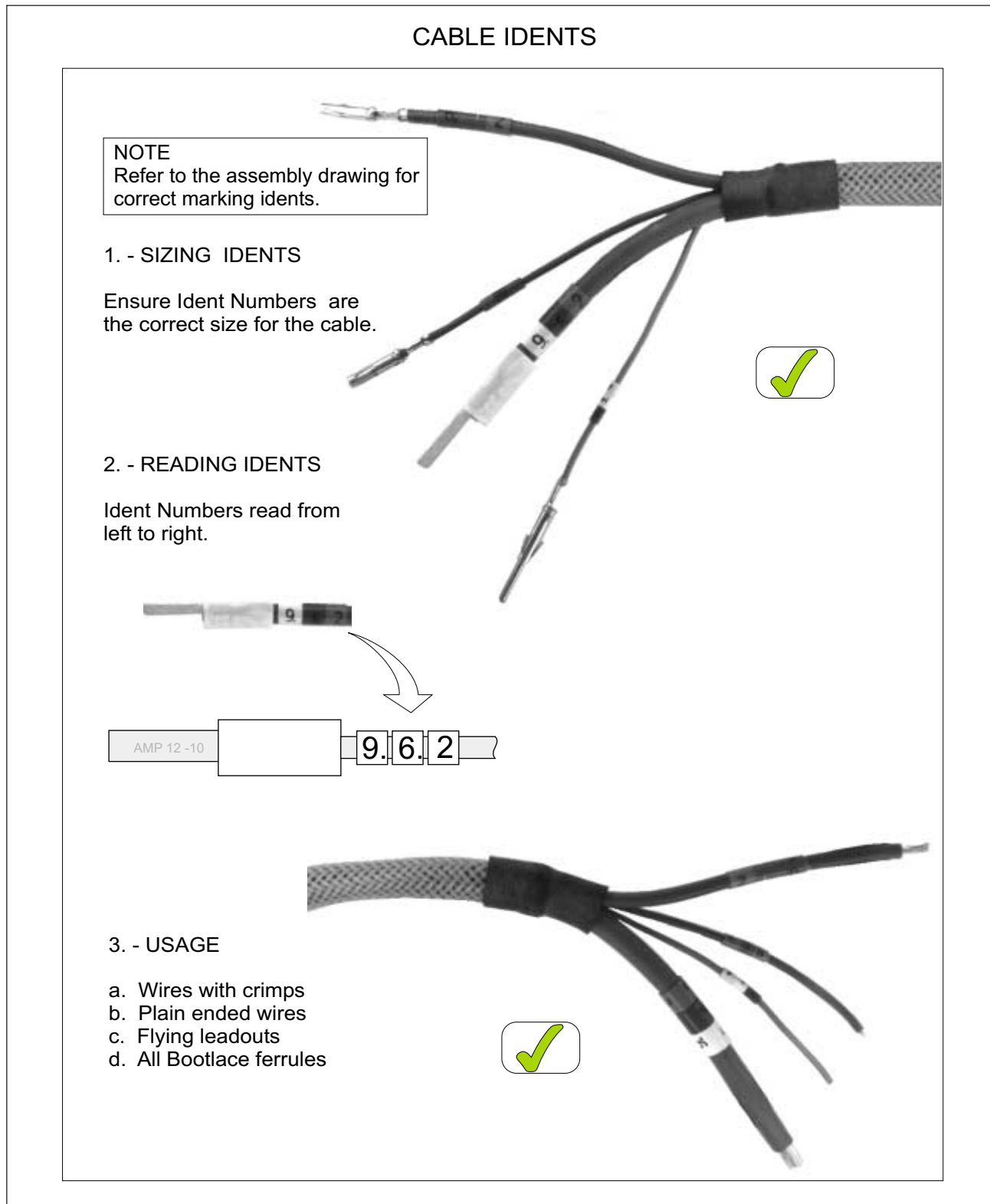


Figure 15-1

CABLE IDENTS (continued)

4. - Mounting screw terminals,
Ferrule crimps.



Note: Ident Ties

When an Ident Tie is fitted. It should be able to slide along the loom, so that if it coincides with a Tie Base, it can be moved.

EXAMPLES of UNACCEPTABLE PRACTICE

No 9 - One side folded under.

No 2 - Upside down.

No 6 - Split

No 031 - Too large for wire size

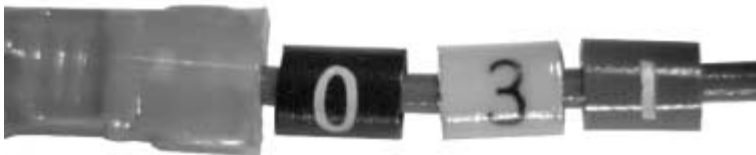


Figure 15-2

IDENTS AND MARKERS

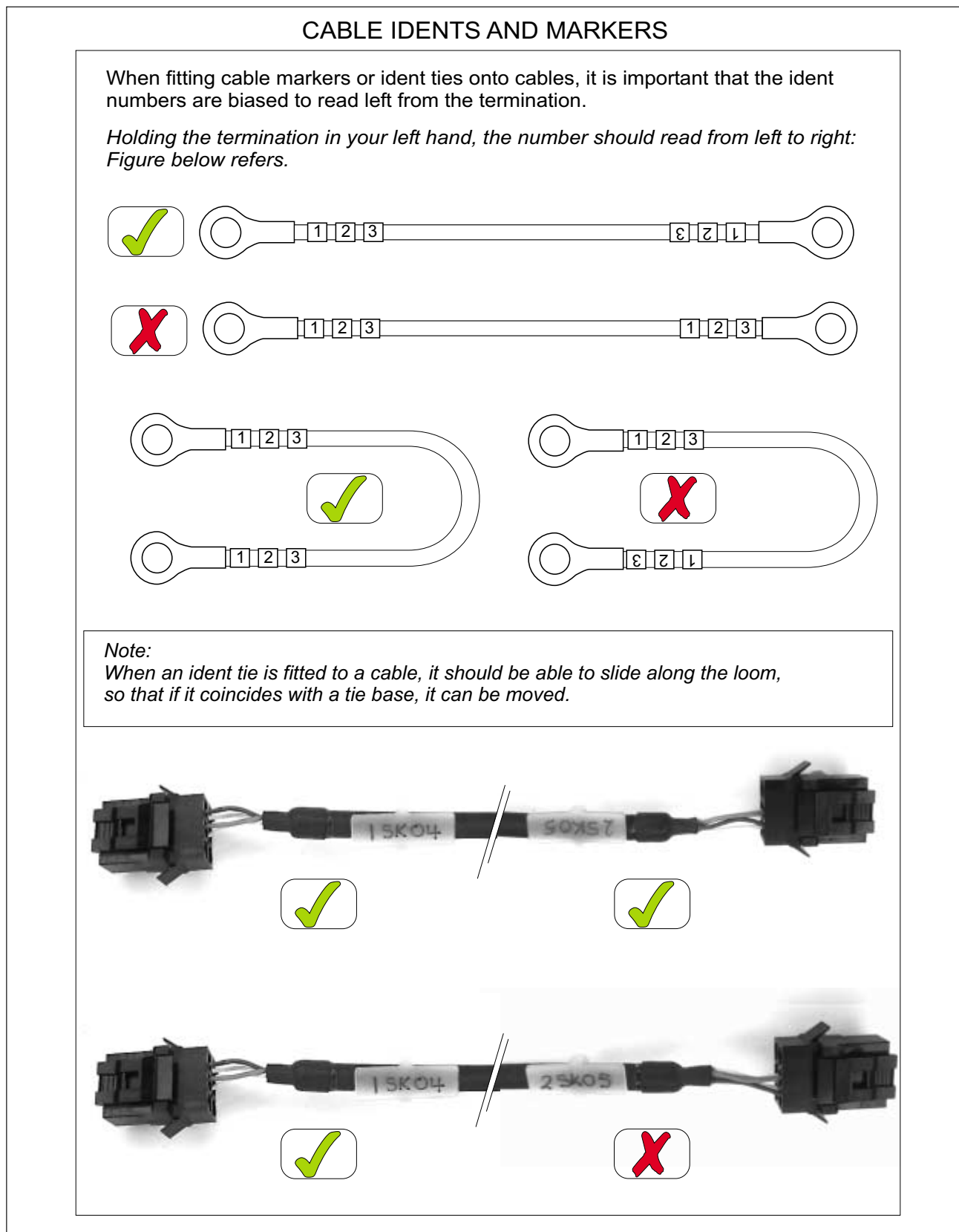


Figure 15-3

LOOM IDENT

CABLE IDENTS AND MARKERS - Loom Ident

Loom ident labels are to be movable and positioned as detailed in the applicable Assembly Drawing. Idents are to be greater than 90mm and no less than 110mm from the indicated connector.

Note:

When an ident tie is fitted to a cable it should be able to slide along the loom, so that if it coincides with a tie base it can be moved.

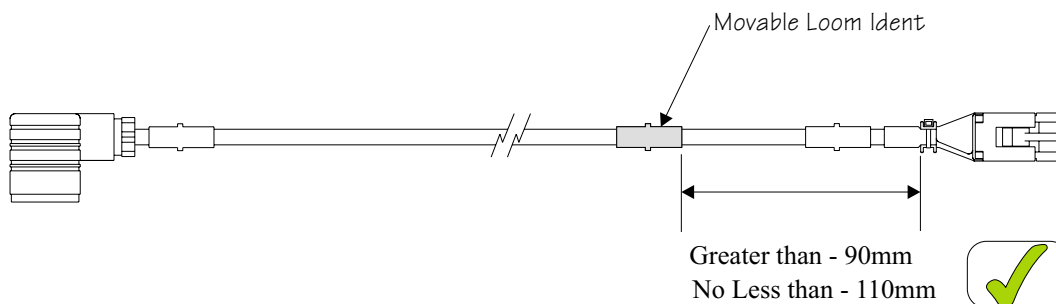
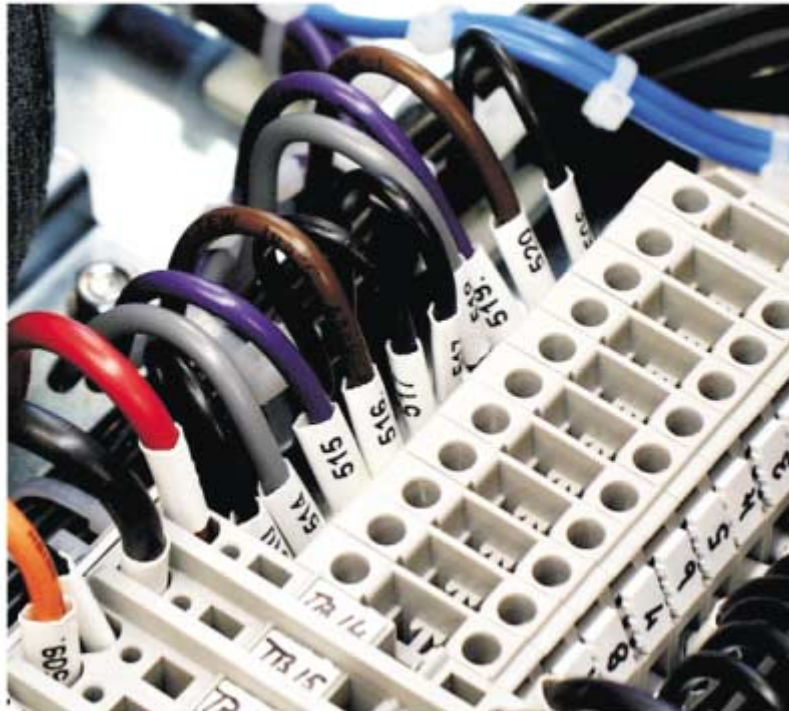


Figure 15-4

SINGLE SLEEVE IDENT

Single Sleeve Idents



Single sleeve idents are fitted to cables within crates, ie M23 /M24. The sleeves are positioned on the cables in the same configuration as set out previously in this section.

The main points to remember are:

- Holding the termination in your left hand, the number should read from left to right.
- The ident should be loose enough to slide along the cable.

Figure 15-5

CHAPTER 16 CRIMPS

STRIPPING WIRE

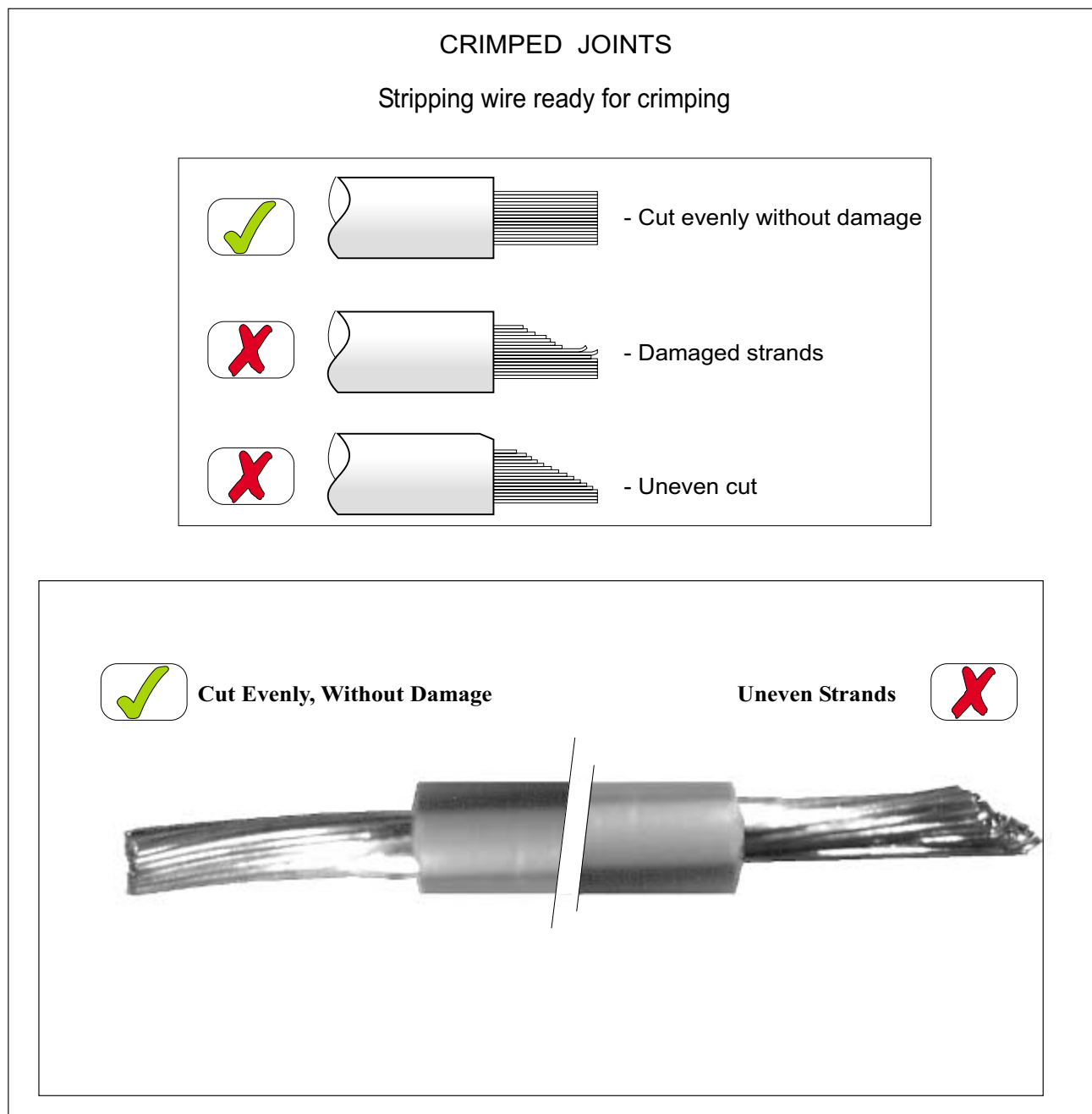


Figure 16-1

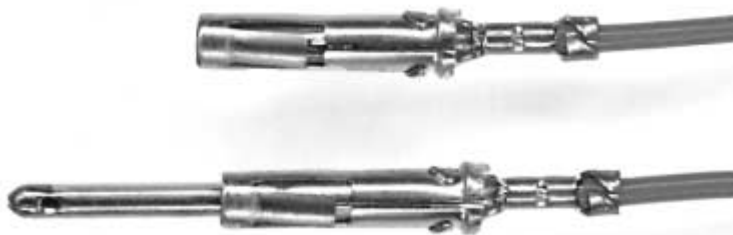
TRIDENT CONNECTOR

CRIMPED JOINTS

Trident Connector



E0421 / E0422
Connector Pin and Socket
7/0.2 wires



E0423 / E0424
Connector Pin and Socket
16/0.2 wire



Insulation not under clamp



Bent crimp



Insulation crimped too far into conductor



Figure 16-2

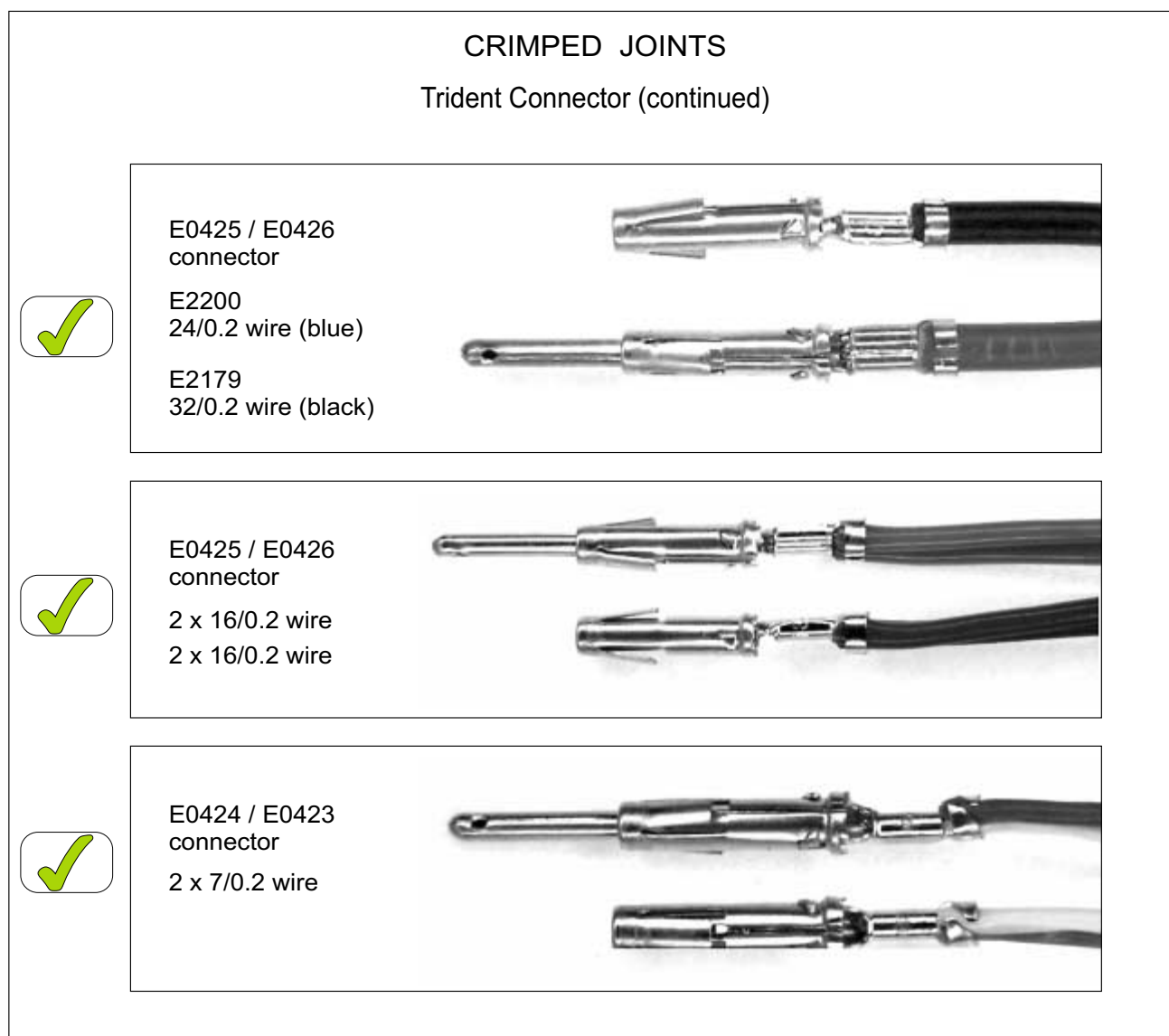


Figure 16-3

BOOTLACE CONNECTOR

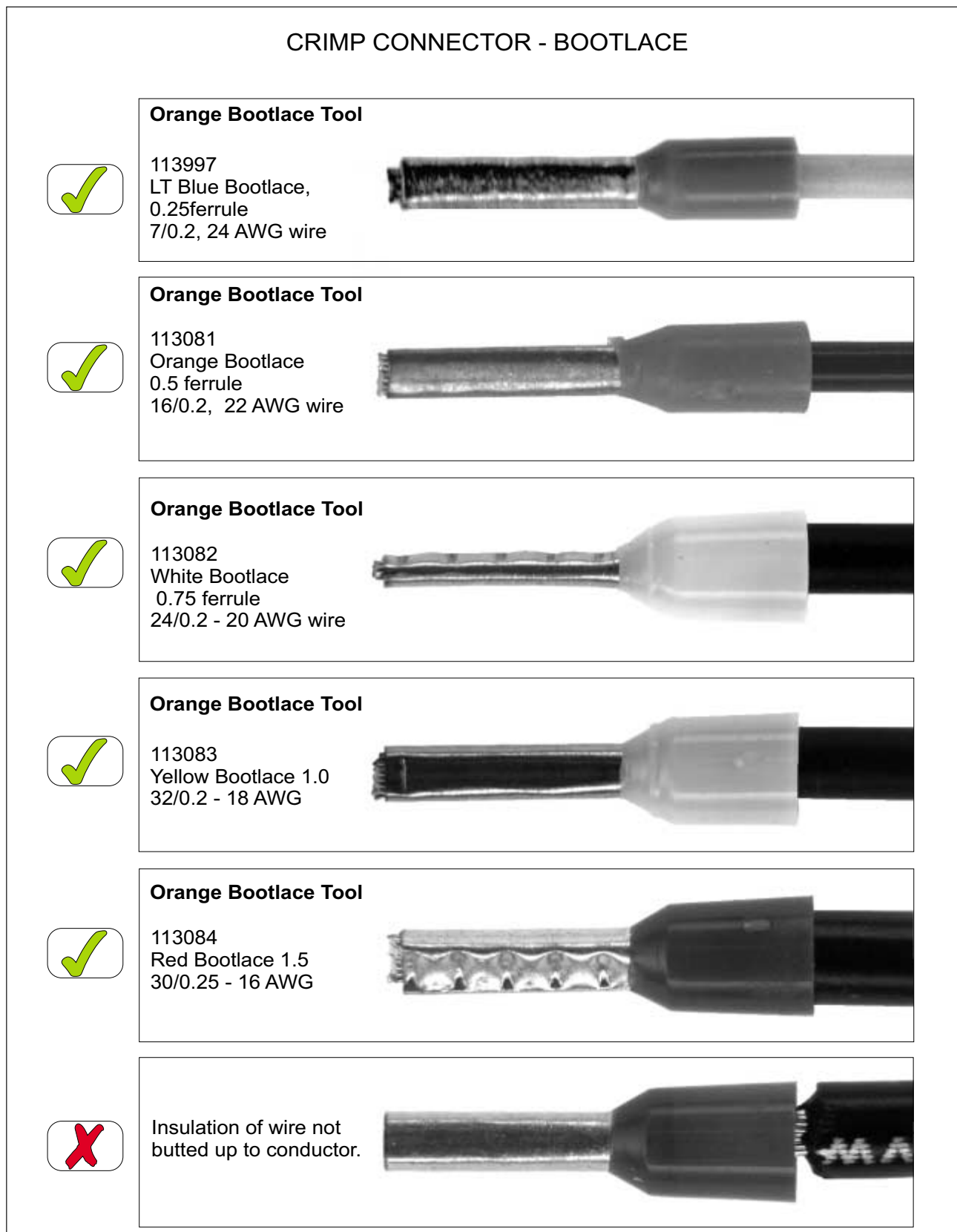


Figure 16-4

CRIMP CONNECTOR - BOOTLACE



Orange Bootlace Tool

133913
White Double Bootlace
16/0.2 Tri



Orange Bootlace Tool

113085
Blue Bootlace 2.5
50/0.25 - 14 AWG



Green/Black Handled Bootlace Tool

(Jaw Size 5 - Size Gauge
See Section 15, Table 13)
or use
Orange Bootlace Tool

117885
Orange Bootlace 4.0
56/0.3 - 12 AWG



Green/Black Handled Bootlace Tool

(Jaw Size 5 - Size Gauge
See Section 15, Table 13)
or use
Orange Bootlace Tool

114188
Bootlace 6.0
- 10 AWG



Green/Black Handled Bootlace Tool

(Jaw Size 5 - Size Gauge
See Section 15, Table 13)
or use
Orange Bootlace Tool

113086
Slate Bootlace 4.0
56/0.3 - 12 AWG



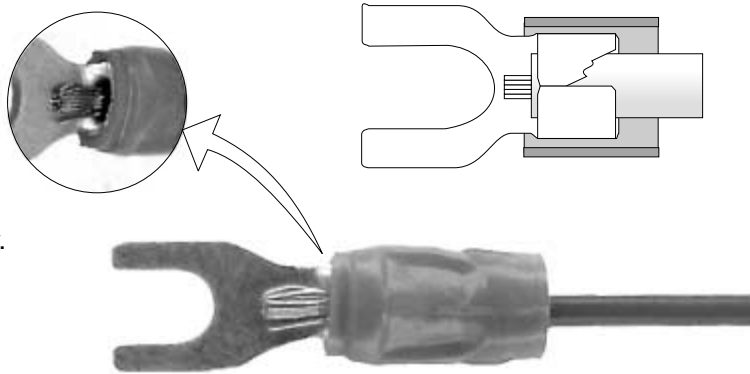
Figure 16-5

AMP CONNECTOR

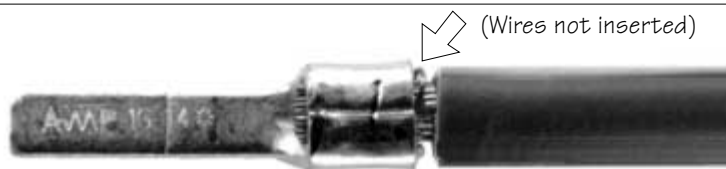
CRIMP CONNECTOR - AMP



1. Insulation inside conductor barrel.
2. Crimp located in crimp tool incorrectly.



Take care to insert all of the strands of the wire fully.



E0445



Earth cable - blue crimp



E2123 wire
7/0.2 wire doubled over into red amp crimp.



Figure 16-6

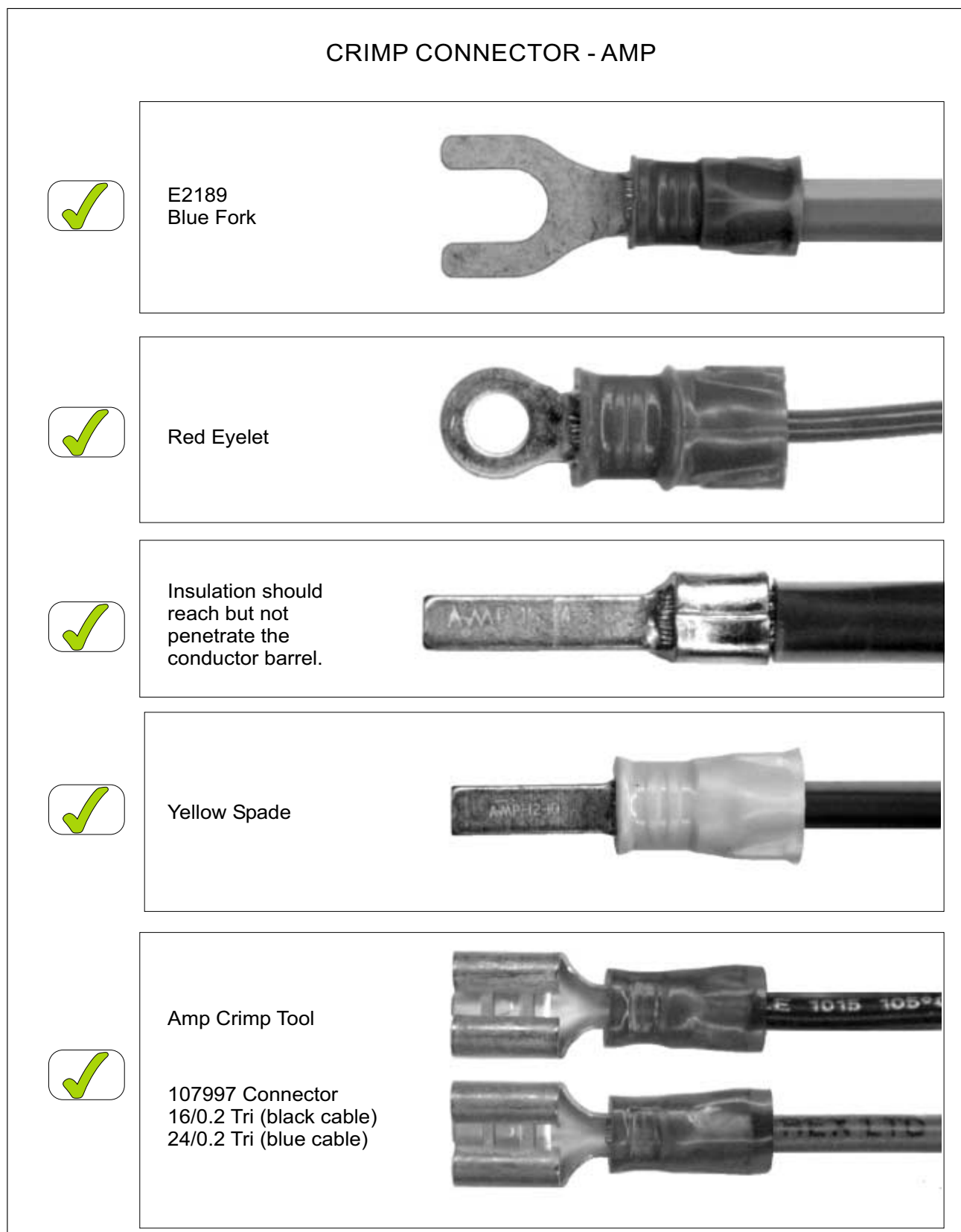


Figure 16-7

SHROUDED AMP CONNECTOR

CRIMP CONNECTOR - AMP SHROUDED



Crimp placed
sideways in
crimp tool

E2170



Shrouded Insulation

E2177



Figure 16-8

CRIMP CONNECTOR - AMP SHROUDED CRIMP TOOL



E2170

Crimp correctly
placed in crimp
tool, from rear



Crimp placed
in crimp tool
from front!



E2177

Two wires



Insulation of wire
not butted up
to conductor.
Wire strands untidy



Figure 16-9

CRIMP CONNECTOR - AMP SHROUDED



Brown cable
- Yellow shrouded crimp,

Shown correctly formed
by crimp tool.



Incorrect crimp formation.

Crimp incorrectly located
sideways into crimp tool.



Incorrect crimp formation.

Crimp incorrectly located
into crimp tool back to front.



Figure 16-10

TRIAD CONNECTOR

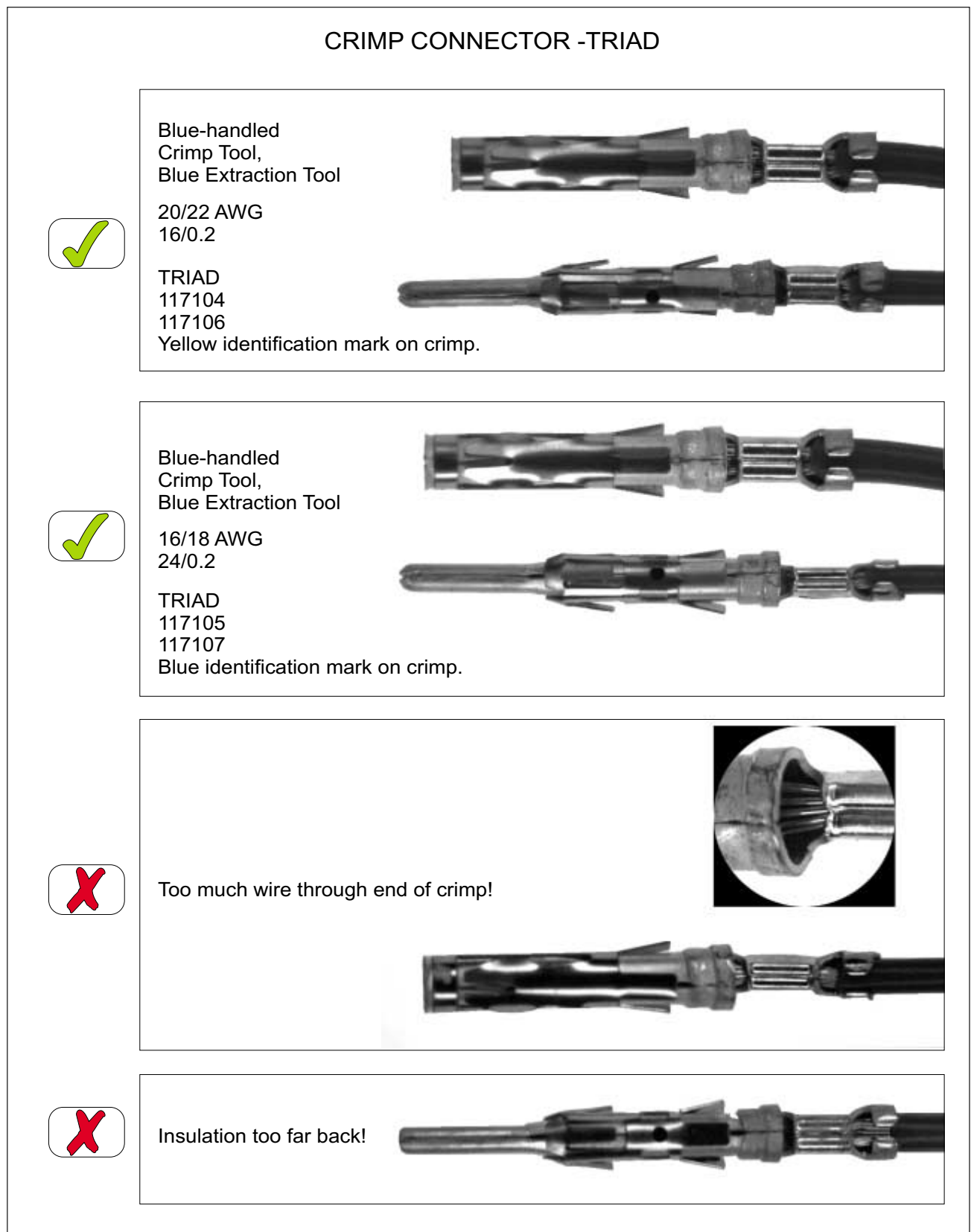


Figure 16-11

VARIOUS CONNECTOR TYPES

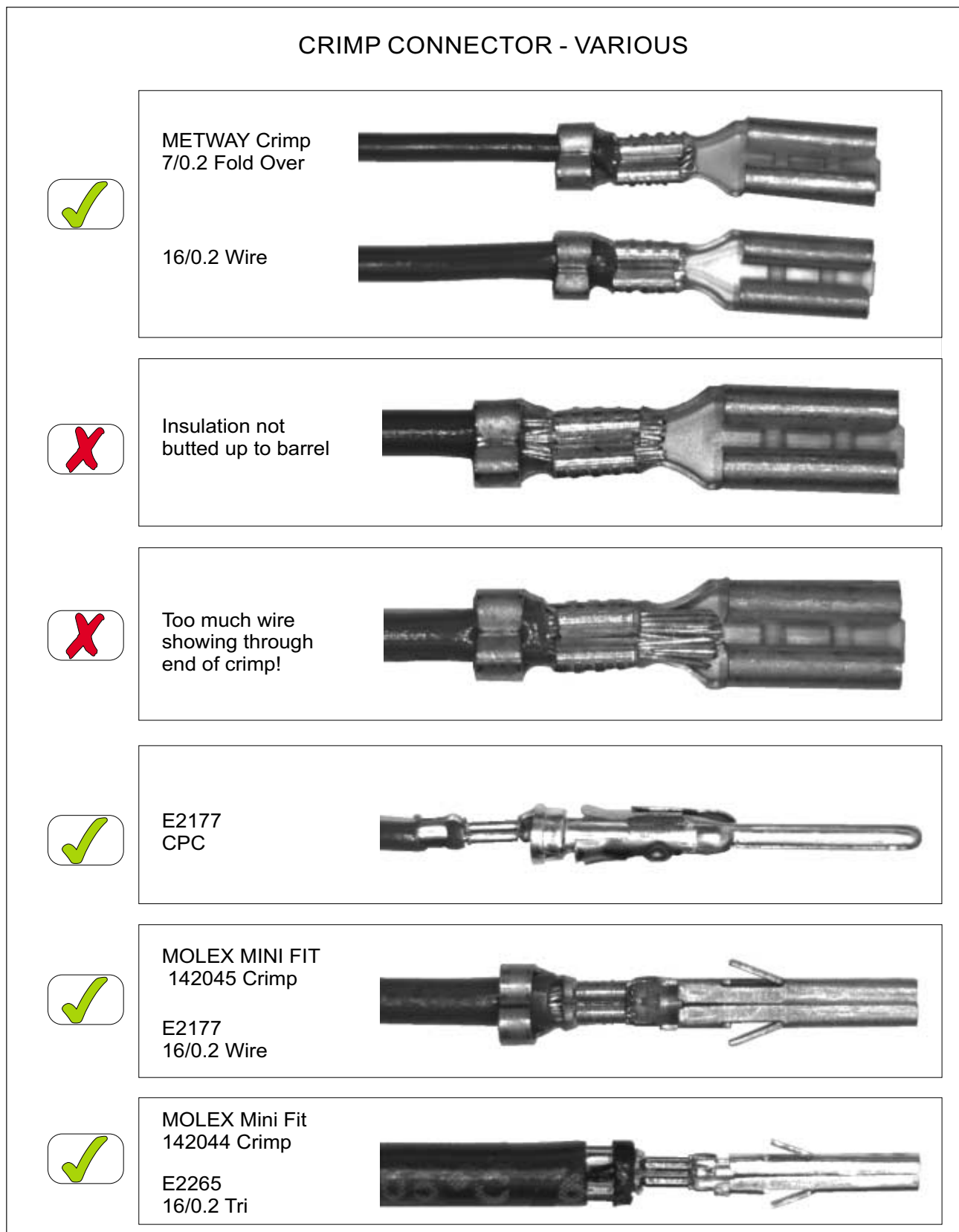


Figure 16-12

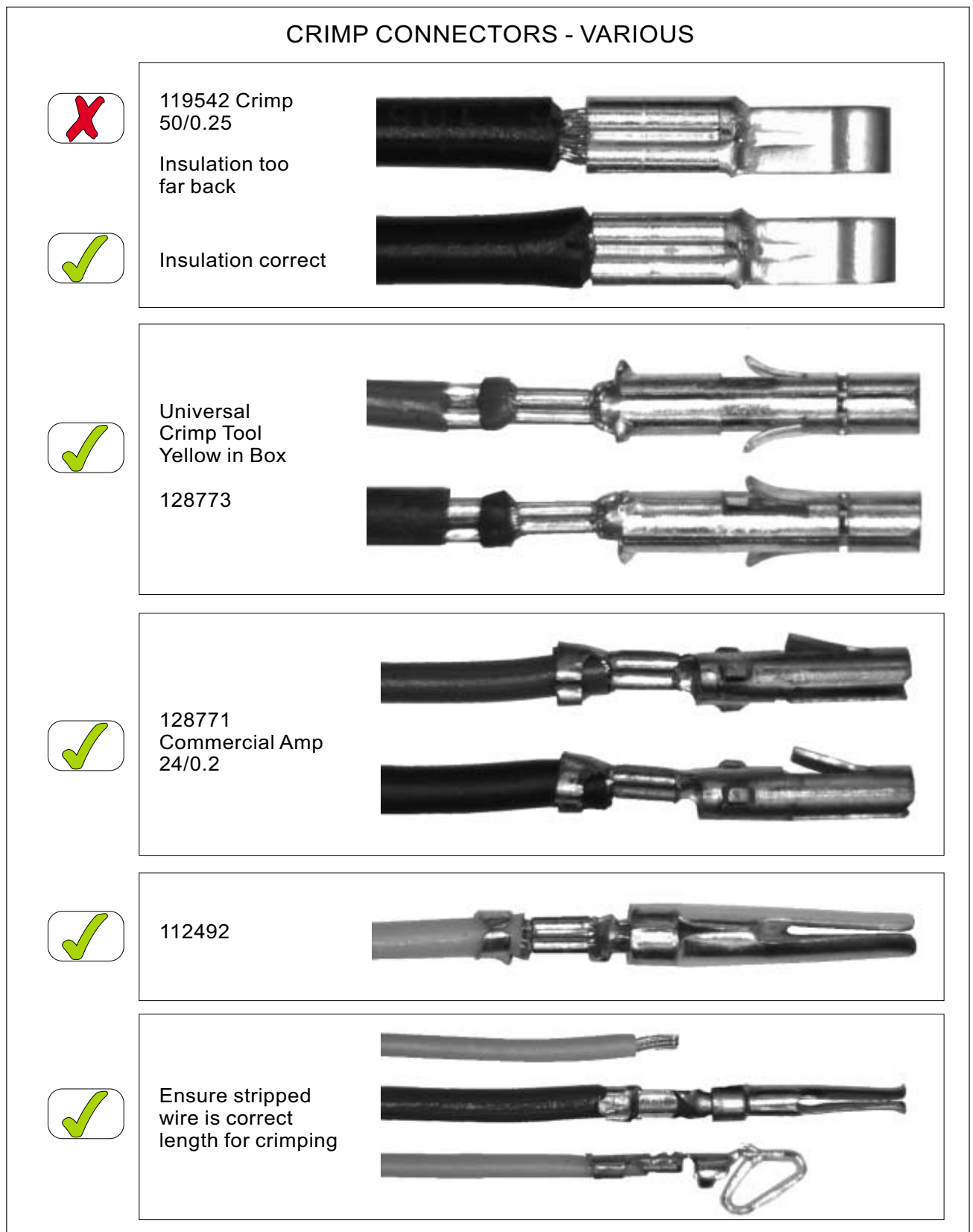


Figure 16-13

CRIMP CONNECTOR - VARIOUS



JST Type 167082

Insulation too far back /
 Wires pushed back



Insulation correct
 (held within the crimp area)



Power 'D' Type

Insulation too far back from crimp



Insulation correct (abuts directly
 up to crimp joint)



Norgren Crimp

Insulation on each
 wire is taken inside
 the crimp area.

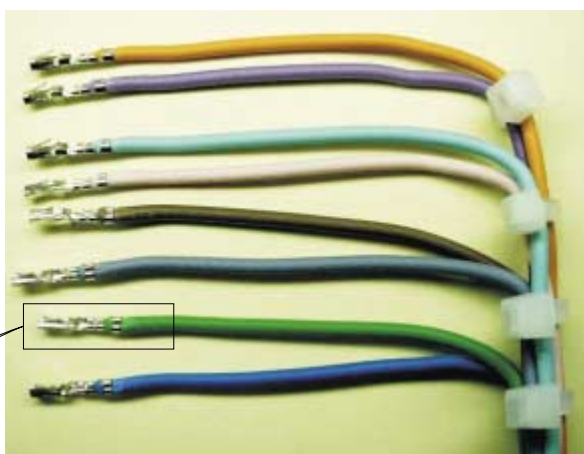


Figure 16-14

CHAPTER 17 CRIMP TOOL SELECTION

TOOL SELECTION GUIDE

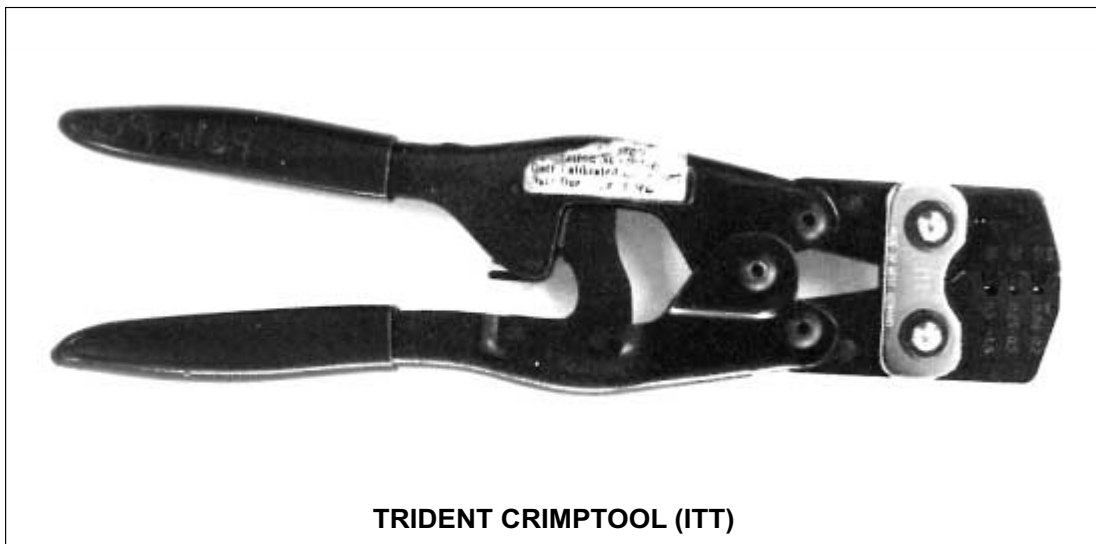
CRIMP	Table Number		CRIMP	Table Number	
	Preferred	Alternative		Preferred	Alternative
E0322	06	07	107996	02	
E0416	02		107997	02	
E0417	02		109110	06	07
E0421	01		112491	05	
E0422	01		112492	05	
E0423	01		112732	04	
E0424	01		112765	02	
E0425	01		112901	02	
E0426	01		113034	02	
E0432	03		113081	12	13
E0434	02	03	113082	12	13
E0439	10		113083	12	13
E0440	02		113084	12	13
E0445	02		113085	12	13
E0446	02		113086	12	13
E0478	03		113220	02	
E0479	02		113221	02	
E0500	02		113222	02	
E0529	02		113604	19	
E9320	02		113996	12	13
E9321	03		113997	12	13
E9328	04		114188	13	
E9330	04		117104	09	
E9355	02		117105	09	
E9356	02		117106	09	
E9383	02		117107	09	
E9392	03		117885	12	13
E9399	02		119110	06	07
E9400	02		119515	06	07
E9407	02		119542	08	
E9423	02		121257	02	
101089	02		121258	02	
123040	17	18			

CRIMP TOOL SELECTION
TOOL SELECTION GUIDE

CRIMP	Table Number		CRIMP	Table Number	
	Preferred	Alternative		Preferred	Alternative
128771	01				
128773	11				
131165	14				
131166	14				
133913	12				
137108	02				
140045	16				
140072	06				
140529	11				
140710	15				
142044	16				
160182	20				
160183	20				
167082	10				

TABLE 01 - TRIDENT CRIMPTOOL (ITT)

TABLE 01 - TRIDENT CRIMPTOOL (ITT)



TOOL	CRIMP	TYPE	REMARKS
Blue handles	E0421	PIN	COMMERCIAL AMP
	E0422	SOCKET	
	E0423	PIN	
	E0424	SOCKET	
	E0425	PIN	
	E0426	SOCKET	
	128771	SOCKET	
Tool Location: One tool per bench			

TABLE 02 - AMP 169403

TABLE 02 - AMP CRIMP TOOL (169403)

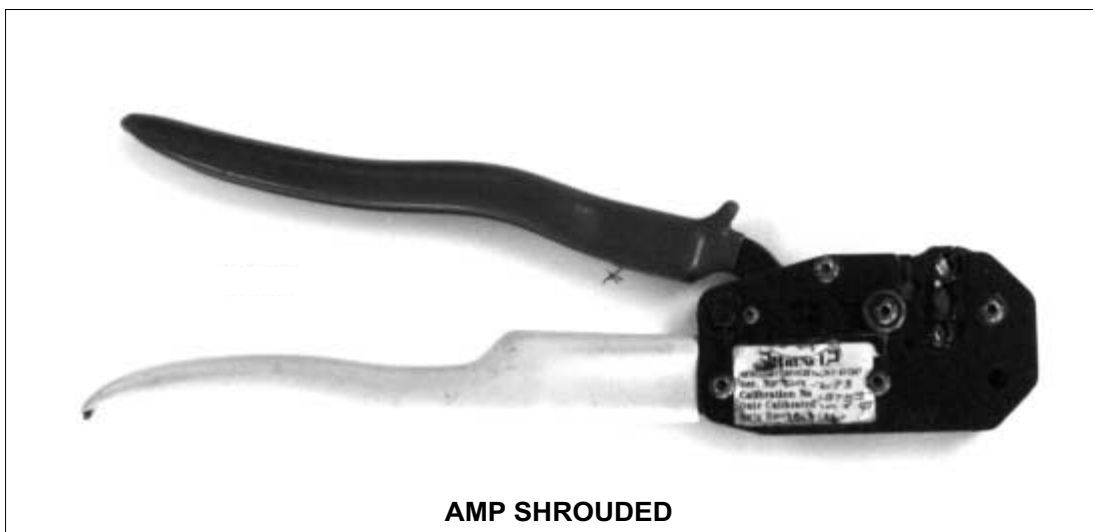


AMP CRIMP TOOL 169403

TOOL	CRIMP	TYPE	REMARKS
AMP CRIMP TOOL 169403 One green handle and one yellow handle	E0440	RED EYELET	
	E0417	RED EYELET	
	113220	RED EYELET	
	E0434	RED EYELET	
	E0445	RED FORK	
	E9355	RED FORK	
	121257	RED FORK	
	107997	RED SEMI-SHROUDED	
	112901	RED PIN	
	E0416	RED FLAT CRIMP	
	E9399	RED PIGGY BACK	
	E9423	BLUE EYELET	
	E0500	BLUE EYELET	
	113221	BLUE EYELET	
	E0479	BLUE EYELET	
	113034	BLUE EYELET	
	E0446	BLUE FORK	
	E9356	BLUE FORK	
	121258	BLUE FORK	
	107996	BLUE CRIMP RECEPTACLE	
	E9400	BLUE PIGGY BACK	
	E0529	BLUE FLAT PIN	
	113222	YELLOW EYELET	
	E9407	YELLOW EYELET	
	E9383	YELLOW EYELET	
	112765	YELLOW EYELET	
	E9320	YELLOW FORK	
	101089	YELLOW FLAT PIN	
	137108	YELLOW PIN CRIMP	

TABLE 03 - AMP SHROUDED

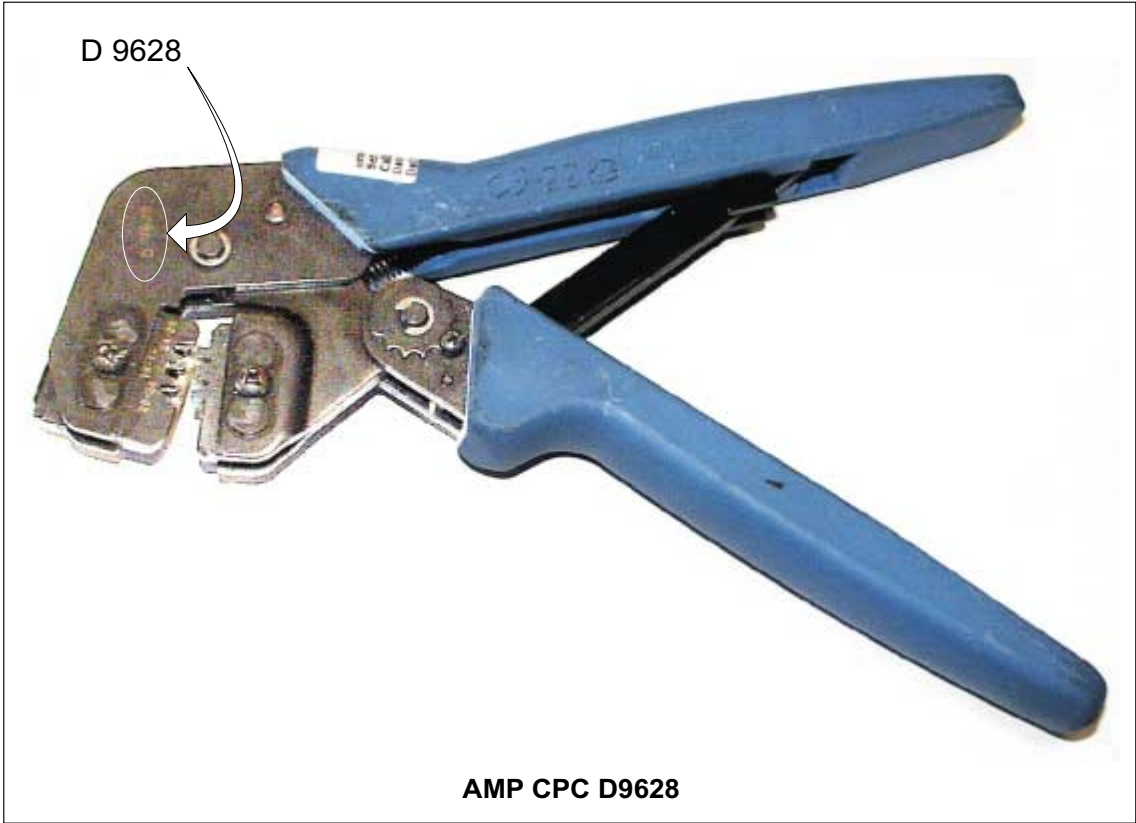
TABLE 03 - AMP SHROUDED



TOOL	CRIMP	TYPE	REMARKS
One green handle and one yellow handle "shrouded" written on handles	E9392 E0432 E0434 E0478 E9321	RED SHROUDED RED SHROUDED RED SHROUDED BLUE SHROUDED YELLOW SHROUDED	

TABLE 04 - AMP CPC D9628

TABLE 04 - AMP CPC D9628



TOOL	CRIMP	TYPE	REMARKS
AMP CPC D9628 Pale blue handles	112732 E9328 E9330	PIN SOCKET PIN	

TABLE 05 - AMP 655044-1

TABLE 05 - AMP 655044-1



TOOL	CRIMP	TYPE	REMARKS
AMP 655044-1 Two yellow handles	112491 112492	PIN SOCKET	

TABLE 06 - MOLEX

TABLE 06 - MOLEX



TOOL	CRIMP	TYPE	REMARKS
MOLEX 69008 - 0713 Red handled crimp tool with gate	E0322 119515 140072	SOCKET SOCKET SOCKET	

TABLE 07 - MOLEX 69008-0956

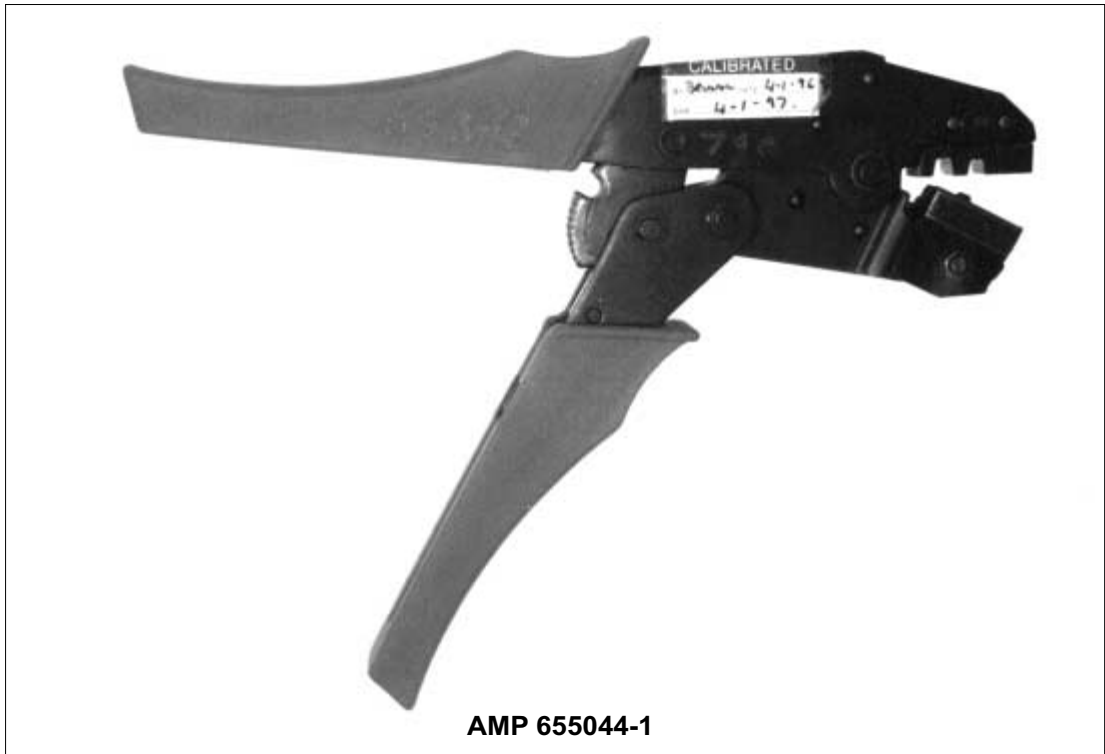
TABLE 07 - MOLEX 69008 - 0956



TOOL	CRIMP	TYPE	REMARKS
MOLEX 69008 - 0956 Black handled crimptool	E0322 119515 140072	SOCKET SOCKET SOCKET	

TABLE 08 - RS MODULAR 531-009

TABLE 08 - RS MODULAR 531- 009



TOOL	CRIMP	TYPE	REMARKS
AMP 655044-1 Red handled crimptool	119542	SOCKET	

TABLE 09 - TRIAD

TABLE 09 - TRIAD



TRIAD 69008 - 0713

TOOL	CRIMP	TYPE	REMARKS
TRIAD 69008 - 0713 Blue handled crimp tool	117104 117105 117106 117107	PIN PIN SOCKET SOCKET	

TABLE 10 - ELPRESS DRB 0015

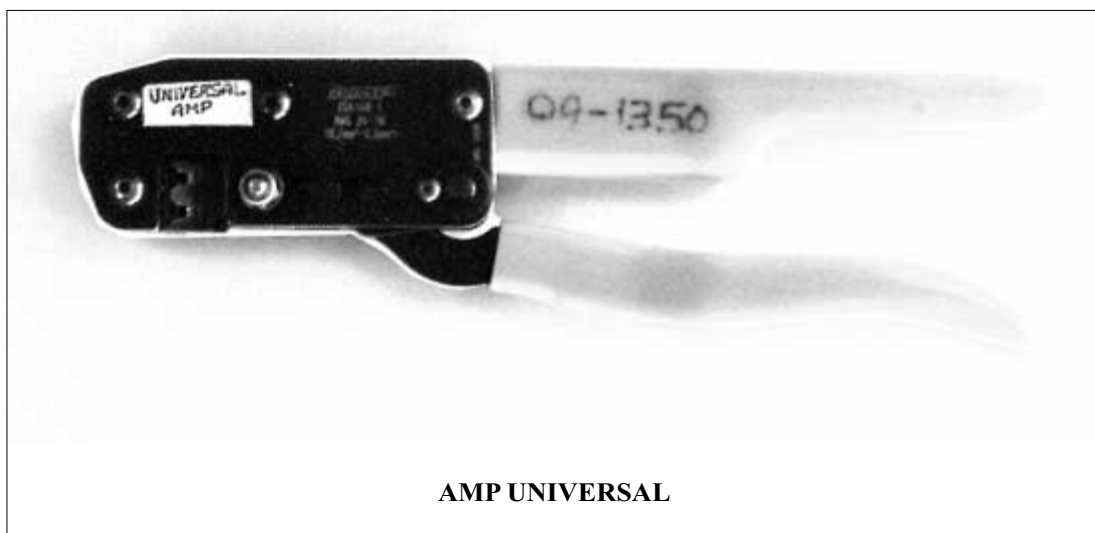
TABLE 10 - ELPRESS DRB 0015



TOOL	CRIMP	TYPE	REMARKS
ELPRESS DRB 0015 Green handled crimp tool	E0439	SOCKET METWAY	
	167082	JST TYPE	

TABLE 11 - AMP UNIVERSAL

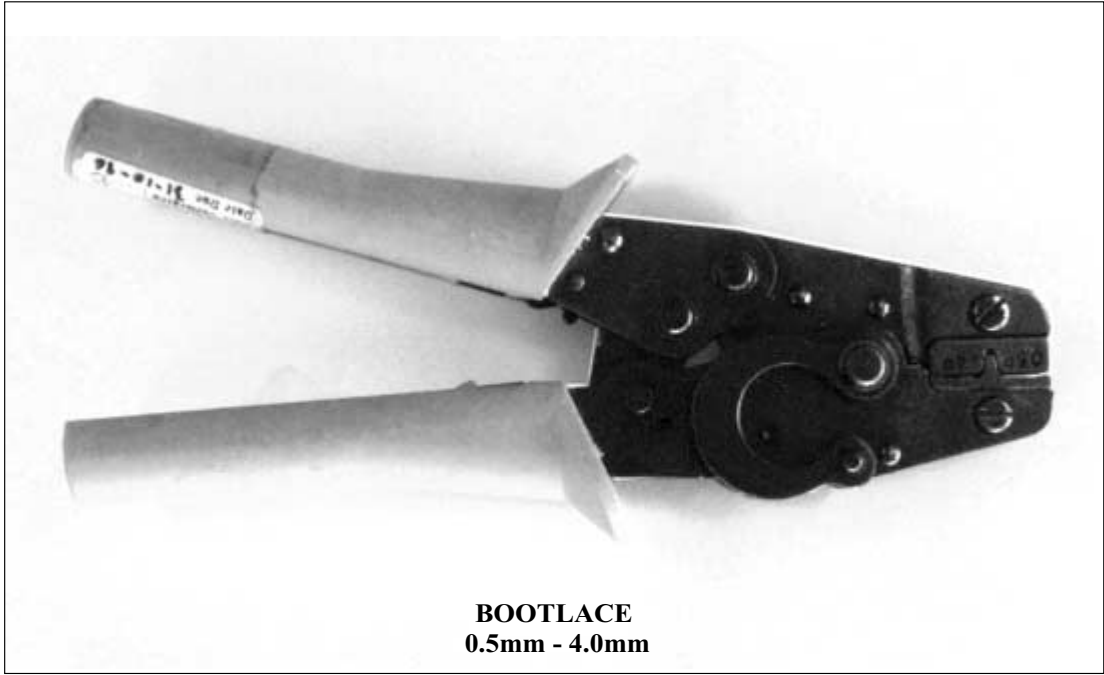
TABLE 11 - AMP UNIVERSAL



TOOL	CRIMP	TYPE	REMARKS
AMP UNIVERSAL Yellow handled crimptool	128773 140529		

TABLE 12 - BOOTLACE

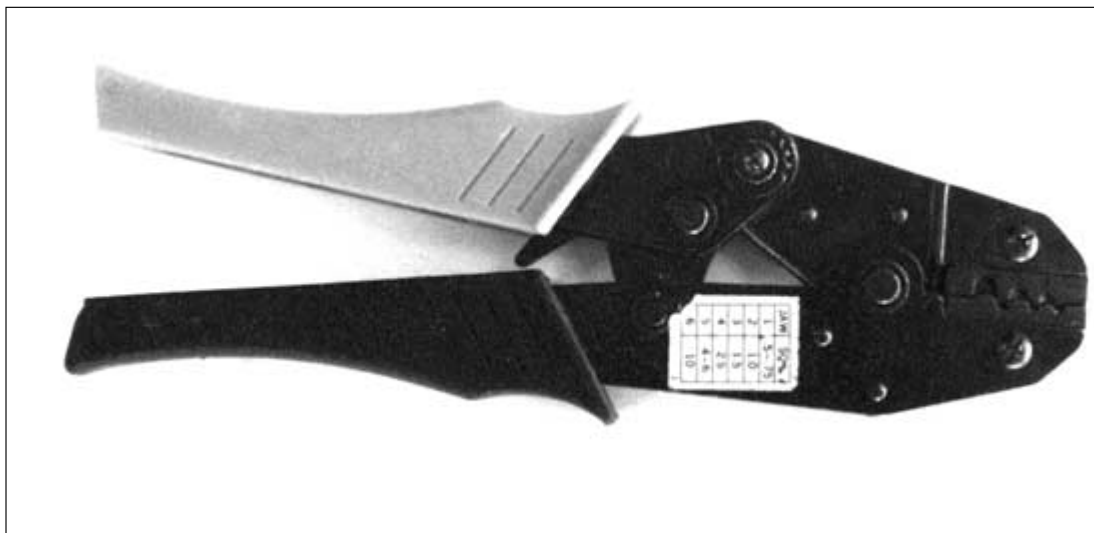
TABLE 12 - BOOTLACE



TOOL	CRIMP	TYPE		REMARKS
BOOTLACE 0.5mm - 4.0mm Orange handled crimp tool	113081	ORANGE	0.5	Some of these crimps may also be used in black-and-green handled bootlace crimptool - see size gauge (Table 13)
	113082	WHITE	0.75	
	113083	YELLOW	0.75	
	113084	RED	1.5	
	113085	BLUE	2.5	
	113086	GREY	4.0	
	113996	TURQUOISE	0.34	
	113997	LIGHT BLUE	0.25	
	117885	ORANGE	4.0	
	133913	DOUBLE WHITE		
		BOOTLACE		

TABLE 13 - BOOTLACE DEER 510

TABLE 13 - BOOTLACE DEER 510 0.5mm - 10mm



TOOL	CRIMP	TYPE		REMARKS	
One black handle One green handle	114188	GREEN	6.0	JAW	SQ mm
	113081	ORANGE	0.5		
	113082	WHITE	0.75	1	0.5 - 0.75
	113083	YELLOW	0.75	2	1.0
	113084	RED	1.5	3	1.5
	113085	BLUE	2.5	4	2.5
	113086	GREY	4.0	5	4 - 6
	113996	TURQUOISE	0.34	6	10
	113997	LIGHT BLUE	0.25	SIZE GAUGE	
	117885	ORANGE	4.0		
	133913	DOUBLE WHITE BOOTLACE			

TABLE 14 - MP-600 HD TOOL FOR 'D'

TABLE 14 - MP-600 - HD CRIMP TOOL FOR 'D'



TOOL	CRIMP	TYPE	REMARKS
Blue handles (kept in box)	131165 131166	PIN SOCKET	

TABLE 15 - HARTING

TABLE 15 - HARTING



HARTING

TOOL	CRIMP	TYPE	REMARKS
HARTING Blue handled tool	140710	Socket	

TABLE 16 - MOLEX MINIFIT

TABLE 16 - MOLEX MINIFIT



TOOL	CRIMP	TYPE	REMARKS
MOLEX MINIFIT	142044 142045	Skt Skt	16 AWG 18-24 AWG

TABLE 17 - FCC-68 (BT) TYPE

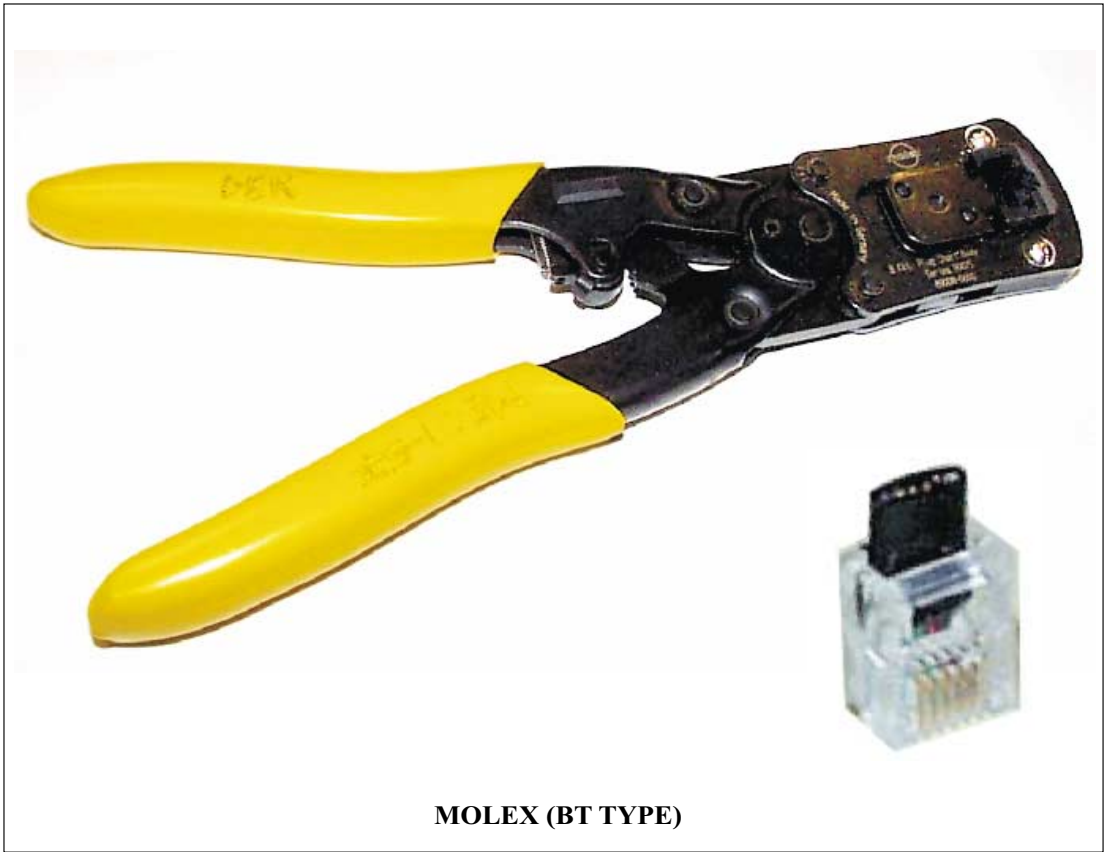
TABLE 17 - FCC-68 (BT) TYPE



TOOL	CRIMP	TYPE	REMARKS
FCC68	123040	IN-LINE PLUG	BT CONNECTOR

TABLE 18 - MOLEX (BT) TYPE

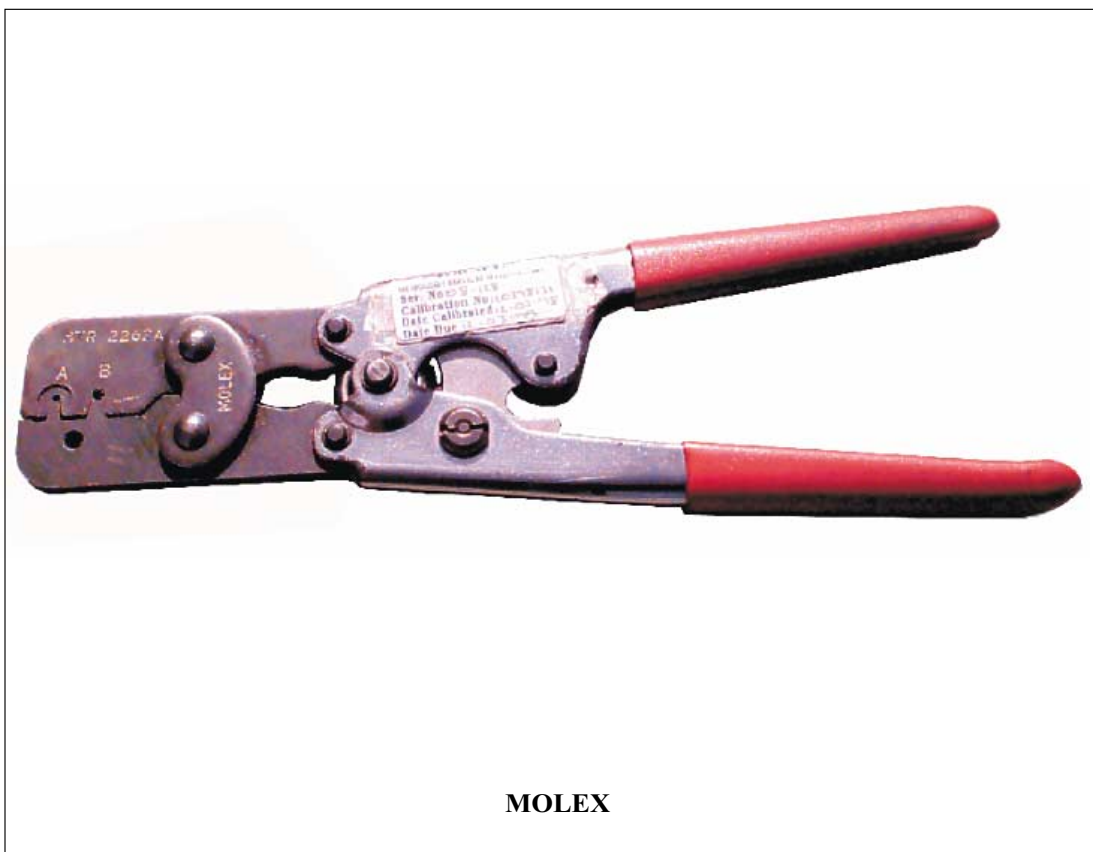
TABLE 18 - MOLEX (BT TYPE)



TOOL	CRIMP	TYPE	REMARKS
MOLEX (BT TYPE)	123040	IN-LINE PLUG	BT CONNECTOR

TABLE 19 - MOLEX

TABLE 19 - MOLEX



TOOL	CRIMP	TYPE	REMARKS
MOLEX Reddish-Brown coloured handles	113604	PIN	MOLEX 0.093" PIN

TABLE 20 - RS MODULAR 531-009 (GATE REMOVED)

TABLE 20 - RS MODULAR 531-009
(WITH GATE REMOVED)



TOOL	CRIMP	TYPE	REMARKS
AMP 655044-1 Red handled crimptool (with gate removed)	160182 160183	PLUG SOCKET	

CHAPTER 18 COMPONENT FITTING

AUXILIARY BLOCK TO CONTACTOR

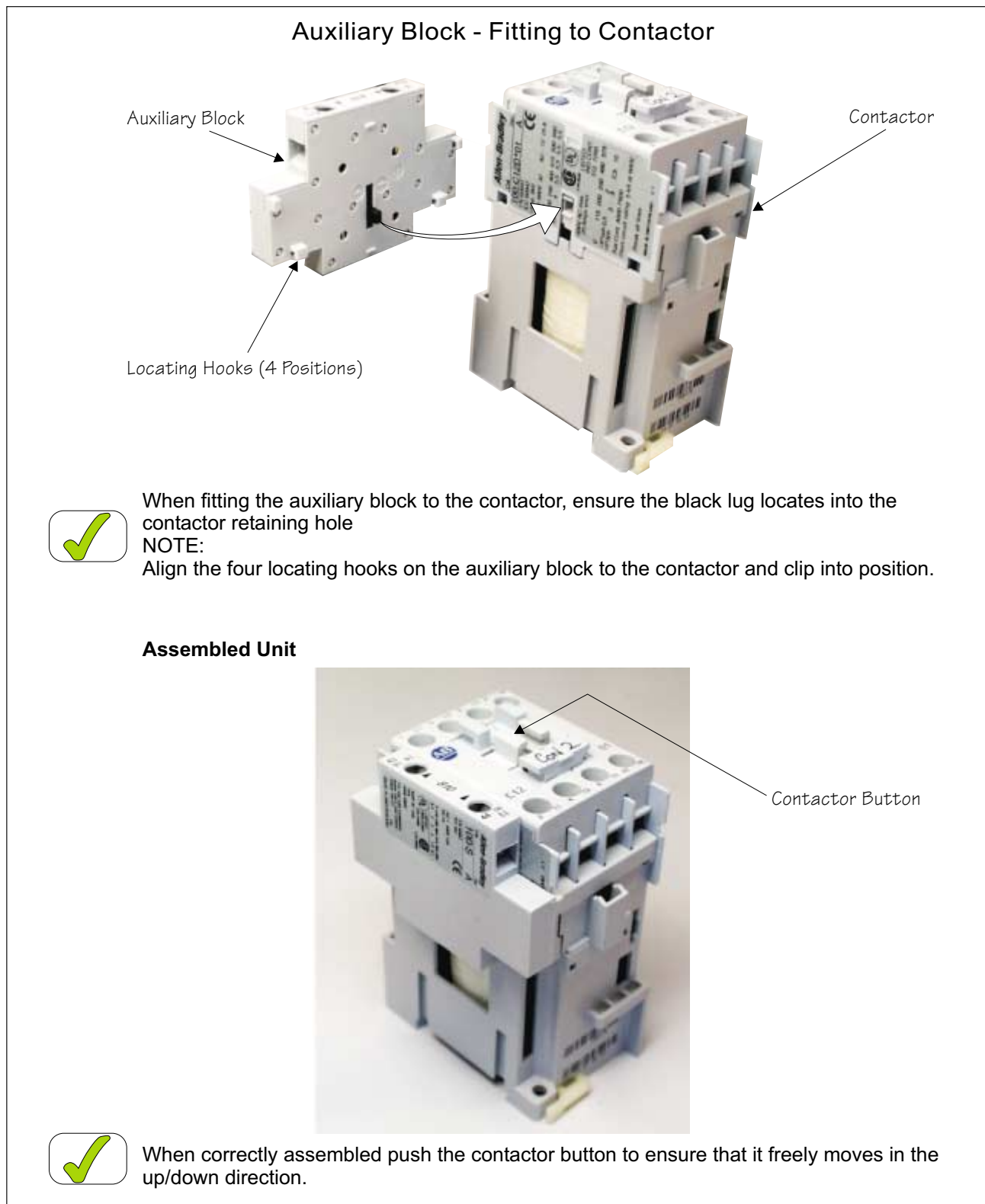


Figure 18-1

PASTE DISPENSER TILT MOTOR

Maxon DC Motor - Capacitor Fit



The capacitor is fitted and soldered to the motor terminal first (positioned as shown in photograph). Loom wires are fitted and soldered. Heatshrink is fitted to terminals (slit the heatshrink to accommodate the capacitor wire).

Figure 18-2

USC MOTOR AND GEARBOX

USC MOTOR AND GEARBOX - FITTING CAPACITOR AND THERMISTOR



Position the capacitor centrally between the motor terminals and loop the wires around the bottom of the terminal pillars. Solder both joints.



Position the thermistor centrally between the motor terminals.

NOTE
The thermistor should stand at least **10mm** clear of the motor - photograph refers. (The thermistor gets **VERY HOT** during operation).

Solder into position.



Attach and solder loom cables to each terminal.
Snip off surplus terminal tabs - photograph refers.

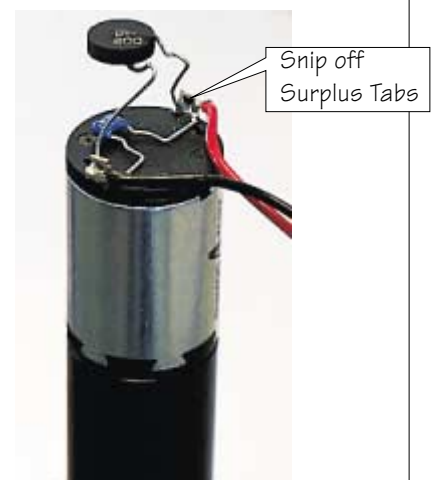


Figure 18-3

**USC MOTOR AND GEARBOX -
FITTING CAPACITOR AND THERMISTOR (Continued)**



Figure 18-4