REDEL

# Plastic connectors
# REDEL P Series

LEUIS00025

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# REDEL P Series

**A new step**
**in the connection world !**

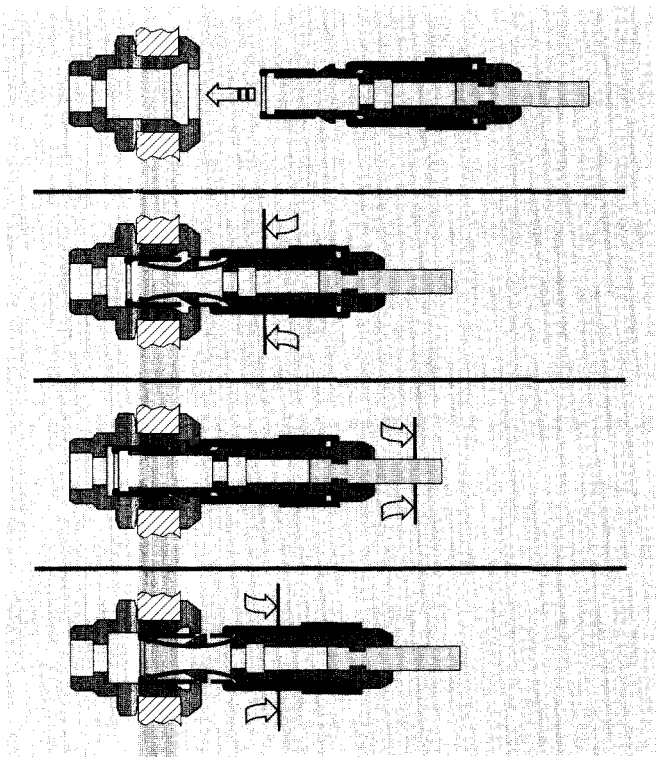
A very easy to use and reliable self-latching system which ensures a perfect connection as soon as mated, an accidental pull on the cable cannot break it.

Only a deliberate manual pull on the plug outer shell will release these connectors.
Top quality lightweight but rugged materials have been chosen to optimize most applications. Polysulfone (PSU), UL certified as autoextinguishable, can be sterilized by gas or by steam up to 20 cycles (as per IEC 601-1 standard).
For extensive steam sterilization (over 100 cycles) we propose Polyetherimide ULTEM® (PEI).
The contacts are gold-plated over copper and nickel to ensure at least 1000 mating/unmating cycles without significantly affecting the electrical characteristics.
A keying system combined with color coding can be incorporated on all connector types to assist in the prevention of mismating.
One or two keys on the plug nose will only allow it to be mated with a receptacle having the same keying configuration.
Color coding of the plug collet nut and receptacle flange will give an instant visual indication as to whether connectors are compatible or not.

*Ultem is a registered trademark of GE*

## REDEL's Self-Latching Push-Pull system

This self-latching system is renowned worldwide for its easy and quick mating and unmating features. It provides absolute security against vibrations, shock or pull on the cable, and facilitates operations in a very limited space.

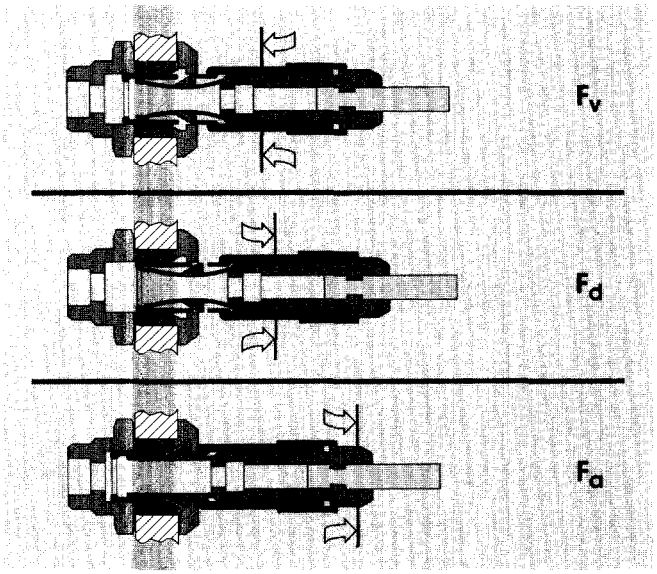


The REDEL self-latching system allows the connector to be mated by simply pushing the plug axially into the receptacle.

Once firmly latched, connection cannot be broken by pulling on the cable or any other component part other than the outer release sleeve.

When required, the connector is disengaged by a single straight axial pull on the outer release sleeve. This first disengages the latches and then withdraws the plug from the receptacle.

### Mechanical Connecting Characteristics




$F_v$: average latching force = 4N

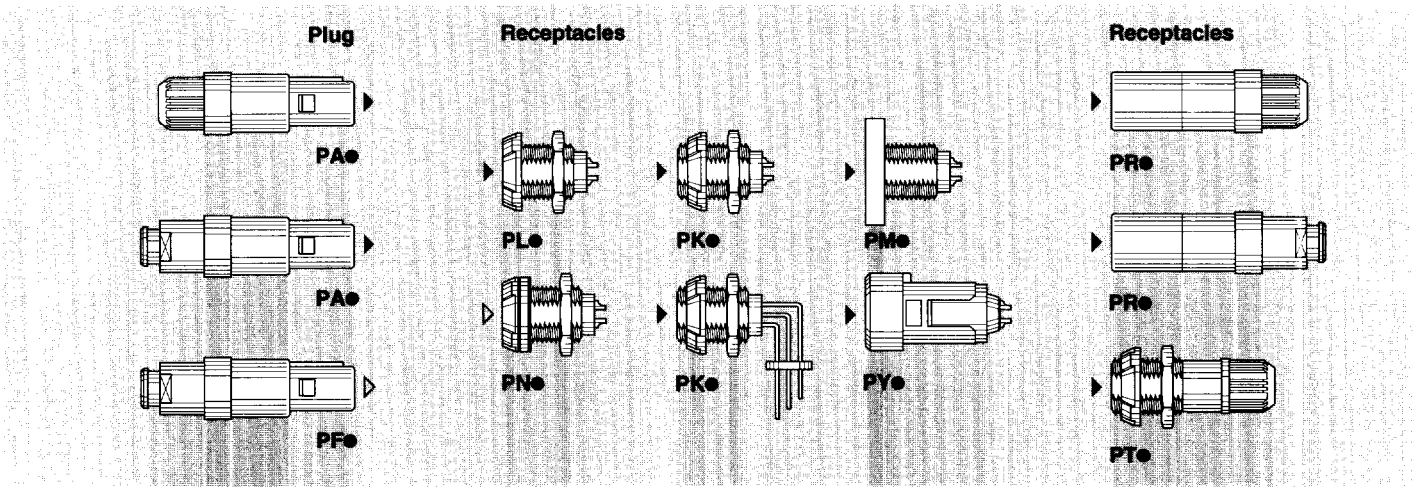
$F_d$: average unmating force with axial pull on the outer release sleeve = 6N

$F_a$: straight pull force with axial pull on the collet nut = 120 N

**Notes:** The forces were measured on PSU outer shells not fitted with contacts. The mechanical endurance represents the number of cycles after which the latching system is still effective (1 cycle = 1 latching/unlatching - 300 cycles per hour). The values were measured according to the standard MIL-STD-1344A method 2013.1.

1N = 0.102 kg. Mechanical endurance: 5000 cycles.

## INTERCONNECTION




## MODEL PA●

**PA●** Straight plug with cable collet

**PA●** Straight plug with cable collet and nut for fitting a strain relief

**PF●** Straight plug with cable collet and nut for fitting a strain relief, watertight (IP 64)

**PK●** Fixed receptacle with two nuts (back panel mounting)

**PK●** Fixed receptacle with two nuts, with 90° contacts for printed circuit

**PL●** Fixed receptacle, nut fixing

**PM●** Fixed receptacle with square flange

**PN●** Fixed receptacle, nut fixing, watertight (IP 64)

**PR●** Free receptacle with cable collet

**PR●** Free receptacle with cable collet and nut for fitting a strain relief

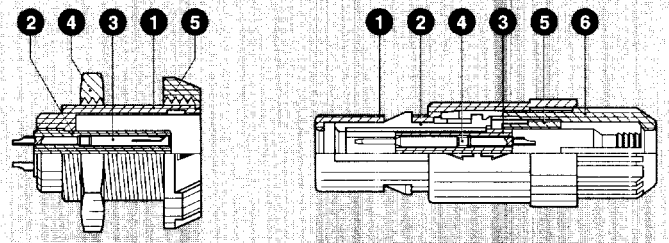
**PT●** Fixed receptacle with two nuts and cable collet (back panel mounting)

**PY●** Fixed receptacle, snap-on fixing

## PART SECTION OF THE INTERNAL COMPONENTS

**Fixed receptacle**

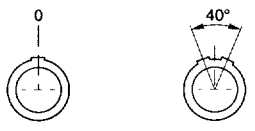
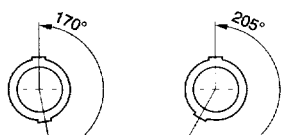
1 Outershell
2 Insulator
3 Female contact
4 Hexagonal nut
5 Front nut




**Straight plug**

1 Outershell
2 Latch sleeve
3 Insulator
4 Male contact
5 Collet
6 Collet nut

## ARRANGEMENT OF POLARIZATION SYSTEM

| Keying (plug front view) |  | | | |  | |
|---|---|---|---|---|---|---|
| | G | A | B | C | H | J |
| Contact type for plug | male | male | male | male | female | female |
| Contact type for receptacle | female | female | female | female | male | male |
| Number of contacts | 2 to 14 | | | | 10 or 14 | |



Data subject to change

## TECHNICAL CHARACTERISTICS

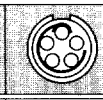
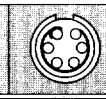
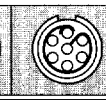
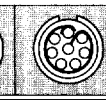
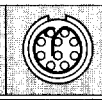
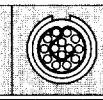
| Characteristics | Value | Standards |
|---|---|---|
| Average retention force when pulling on the cable | 120 N | - |
| Cable retention force (depends on cable construction) | 50 - 150 N | MIL-STD 1344A (2009.1) |
| Endurance | > 1000 cycles | MIL-STD 1344A (2016) |

1N = 0.102 kg

| Characteristics | Standards | Units | Shell | | Insulator |
|---|---|---|---|---|---|
| | | | PSU | PEI | PEEK |
| Dielectric strength | ASTM D 149 IEC 243 | kV/mm | 17-20 | 18 (in oil) | 19-25 |
| Volume resistivity | ASTM D 257 IEC 93 | Ω•cm | $5.10^{16}$ | $> 10^{15}$ | $10^{16}$ |
| Water absorption (24 h at 23° C) | ASTM D 570 ISO 62 | % | 0.3 | 1.2 | < 0.3 |
| Radiation stability | - | Gy | $10^{5}$ | $5.10^{6}$ | $10^{7}$ |
| Flammability | (UL 94) | - | V-0/4.4 | V-0/1.6 | V-0/3.2 |
| Comparative Tracking Index | IEC 112 | V | CTI 150 | CTI 175 | CTI 150 |
| Working temperature range | | °C | -50/+150 | -50/+170 | -50/+250 |
| Sterilization | IEC 601-1 | cycles | ~20 | > 100 | > 200 |

**Synthetic Material Components**

The plastic materials used for molding the housings (PSU or PEI) and insulators (PEEK) of Redel plastic connectors have been carefully selected with regard to their electrical and thermal properties as shown in the opposite table.

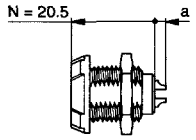
| Characteristics | Standards | Units |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of contacts | | | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 14 |
| Contact ø (male pin) | | mm | 1.3 | 0.9 | 0.9 | 0.7 | 0.7 | 0.7 | 0.5 | 0.5 | 0.5 |
| Solder bucket ø | | mm | 1.1 | 0.85 | 0.85 | 0.6 | 0.6 | 0.6 | 0.45 | 0.45 | 0.45 |
| AWG max. | MIL-W-16878E | | 20 | 22 | 22 | 26 | 26 | 26 | 28 | 28 | 28 |
| Crimp bucket ø | | mm | 1.4 | 1.1 | 1.1 | 0.8 | 0.8 | 0.8 | • | • | • |
| AWG max. - min. [4] | MIL-W-16878E | | 18-20 | 20-24 | 20-24 | 22-26 [5] | 22-26 [5] | 22-26 [5] | • | • | • |
| Wire insulator ø max. | | mm | 2.2 | 1.7 | 1.7 | 1.4 | 1.4 | 1.4 | • | • | • |
| Contact resistance [3] | MIL-Std-202 (307) | m Ω | < 3.5 | < 4.5 | < 4.5 | < 6.5 | < 6.5 | < 6.5 | < 8.5 | < 8.5 | < 8.5 |
| Insulation resistance | MIL-Std-1344A (3003.1) | Ω | $> 10^{12}$ | $> 10^{12}$ | $> 10^{12}$ | $> 10^{12}$ | $> 10^{12}$ | $> 10^{12}$ | $> 10^{12}$ | $> 10^{12}$ | $> 10^{12}$ |
| Operating voltage [1] | IEC 130-1 [2] (§ 14.5) | kV dc | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.3 |
| Operating voltage [1] | IEC 130-1 [2] (§ 14.5) | kV rms | 0.4 | 0.4 | 0.35 | 0.35 | 0.35 | 0.35 | 0.29 | 0.29 | 0.2 |
| Test voltage | MIL-Std-1344A (3001.1) | kV dc | 1.8 | 1.8 | 1.5 | 1.5 | 1.5 | 1.5 | 1.2 | 1.2 | 0.9 |
| Test voltage | MIL-Std-1344A (3001.1) | kV rms | 1.2 | 1.2 | 1.05 | 1.05 | 1.05 | 1.05 | 0.85 | 0.85 | 0.6 |
| Breakdown voltage | IEC 601-1 (§ 20.1) | kV dc | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 |
| Rated current | IEC 512-3 | A | 10 | 8 | 7 | 6 | 5 | 5 | 3 | 3 | 2 |

**Note:** coding shown on insulator is from rear side of plug.

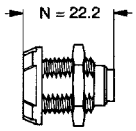
1) Depending upon specific application and related standard, different operating voltages may apply.
2) 1st edition
3) After 1000 mating cycles and corrosion test per MIL-Std-202, method 101D
4) The variance in conductor strandings which are quoted as being a specific AWG is so large that some can have cross section which is not sufficient to guarantee a crimp as per the MIL-C-22520/-01 standard.
5) If conductor ø < ø 0.8 mm.
• Available on request

Data subject to change

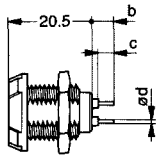
## CONTACTS



Solder contact



Crimp contact



Print contact

| Types | Dimensions (mm) | | | |
|---|---|---|---|---|
| | a | b | c | d |
| M02 | 2.5 | 6 | 5 | 0.7 |
| M04 | 2.5 | 6 | 5 | 0.7 |
| M05 | 2.5 | 6 | 5 | 0.7 |
| M06 | 2.5 | 4 | 3 | 0.5 |
| M07 | 4.5 | 4 | 3 | 0.5 |
| M08 | 4.5 | 4 | 3 | 0.5 |
| M09 | 3.9 | 4 | 3 | 0.5 |
| M10 | 3.9 | 4 | 3 | 0.5 |
| M14 | 3.9 | 4 | 3 | 0.5 |

The female contacts are made of bronze Bz4 (UNS C54400). The male contacts are made of brass (UNS C38500 or C34500). All contacts receive three different platings, copper (0.3 µm) then nickel (3 µm as per FS-QQ-N-290A) and finally 0.5 µm of gold (as per MIL-G-45204C, type 1, class 00).

## MATERIALS AND FINISHES

### Straight plug with cable collet

| P | A | G | M | 0 | 2 | G | L | A | C | 3 | 9 | A | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Variant [1]

Series: **P** Model: (page 6 and 7)

Collet nut color table: (page 8)

Keying: (page 3)

Collet ø (cable): **39** = (2.7 mm - 3.9 mm) **52** = (4.0 mm - 5.2 mm) **65** = (5.3 mm - 6.5 mm)

Type: Multicontact **M0** =(2 to 9) **M1** =(10 and 14)

Cable fixing type: **C** = cable collet

Number of contacts: (page 4)

Outershell: **G** = grey PSU **N** = black PSU **T** [2] = black PEI

Contact type: **A** = male solder **C** = male crimp **L** = female solder [3]

Insulator: **L** = PEEK

**PAG.M0.2GL.AC39A** Straight plug with cable collet and alignement key (G), multicontact type with 2 male contacts to solder, grey PSU outershell, PEEK insulator, collet for a cable ø 2.7 to 3.9 mm and blue collet nut.

### Fixed receptacle with two nuts

| P | K | G | M | 0 | 2 | G | L | L | A |
|---|---|---|---|---|---|---|---|---|---|

Series: **P** Model: (page 6 and 7)

Plastic front nut color table: (page 8)

Keying: (page 3)

Contact type:

**A** = male to solder [3] **D** = male for print [3]
**L** = female to solder **M** = female to crimp
**N** = female for print **V** = female 90° for print

Type: Multicontact **M0** =(2 to 9) **M1** =(10 and 14)

Number of contacts: (page 4)

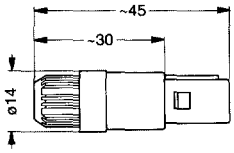
Outershell: **G** = grey PSU **N** = black PSU **T** [2] = black PEI

Insulator: **L** =PEEK

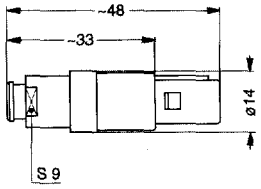
**PKG.M0.2GL.LA** Fixed receptacle with two nuts and alignment key (G), multicontact type with 2 female solder contacts, grey PSU outershell, PEEK insulator, and blue plastic front nut.

**Note:**
1) to order a model with cable collet and nut for fitting a strain relief, a "Z" should be placed in the variant position of the part number. Strain reliefs ordered separately (see page 9).
2) all parts are only available in black.
3) only with H and J keyway and with 10 or 14 contacts.
Data subject to change

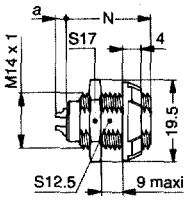
## PA• Straight plug with cable collet



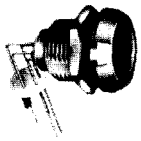

## PA• Straight plug with cable collet and nut for fitting a strain relief

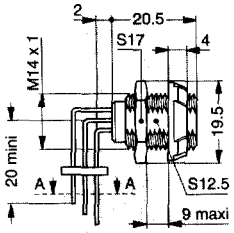



## PK• Fixed receptacle with two nuts (back panel mounting)

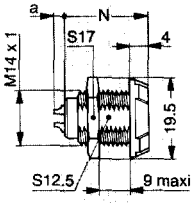



## PK• Fixed receptacle with two nuts, with 90° contacts for printed circuit

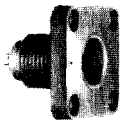


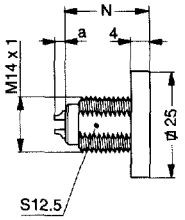



## PL• Fixed receptacle, nut fixing

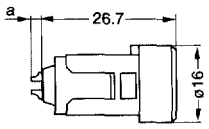



## PM• Fixed receptacle with square flange



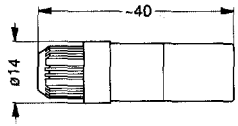



## PY• Fixed receptacle, snap-on fixing

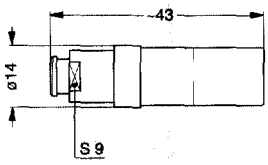



**Note:** only with B keyway (2 to 14 contacts) or H (10 or 14 contacts).

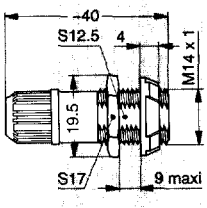
## PR• Free receptacle with cable collet




## PR• Free receptacle with cable collet and nut for fitting a bend relief




## PT• Fixed receptacle with two nuts and cable collet (back panel mounting)




**Note:** all dimensions are in millimeters. Dimensions a and N are indicated on page 5.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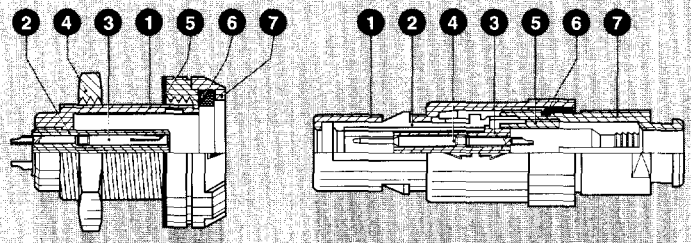
## Part section showing internal components

**Fixed receptacle**

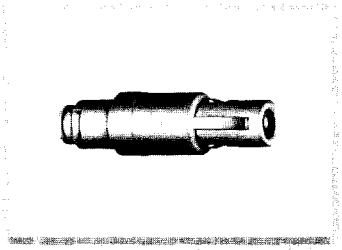
1 Outershell
2 Insulator
3 Female contact
4 Hexagonal nut
5 Flat gasket
6 Gasket
7 Front nut

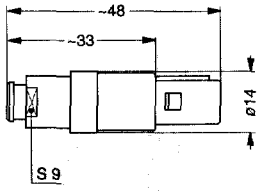



**Straight plug**

1 Outershell
2 Latch sleeve
3 Insulator
4 Male contact
5 Collet
6 Gasket
7 Collet nut

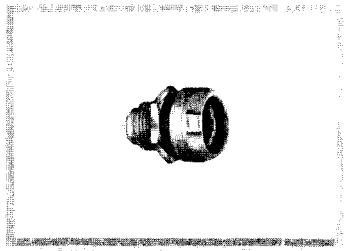
### PF• Straight plug with cable collet and nut for fitting a strain relief

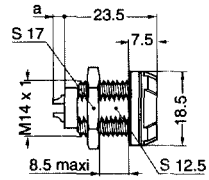




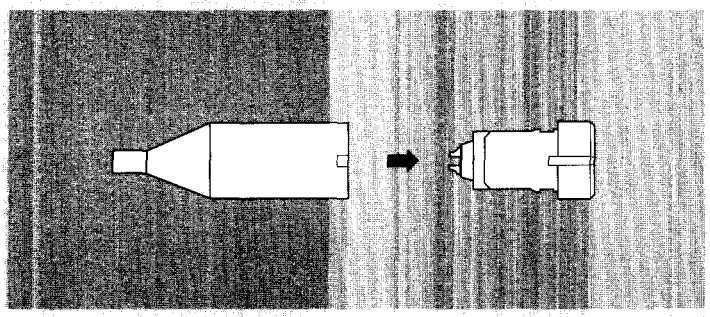

● Gasket material: Elastomer SEBS

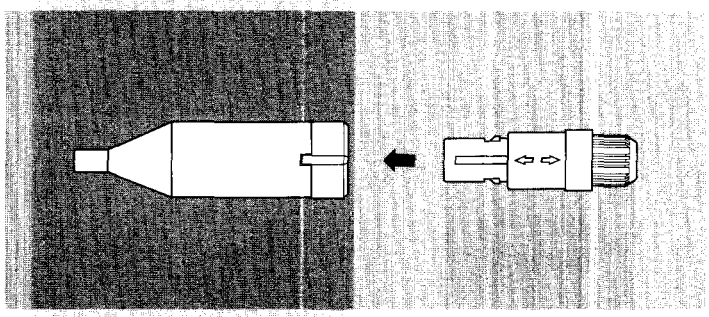
### PN• Fixed receptacle, nut fixing



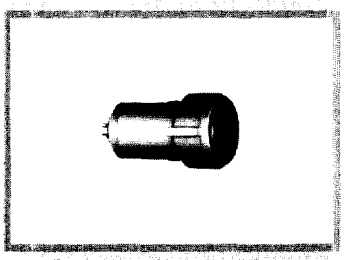


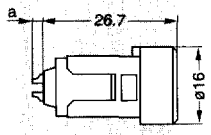

● Gasket material: Elastomer SEBS + Silicone





### PY• One piece fixed receptacle, snap-on fixing

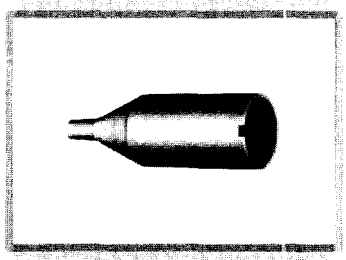


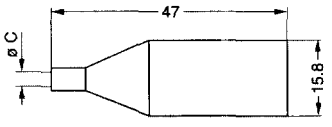



| | Mating straight plug part numb. |
|---|---|
| | PAG.M0.4GL.AC••G |
| | PAH.M1.0GL.LC••A |
| | PAJ.M1.0GL.LC••V |

**Note:** the outershell and the insulator are molded out of the same material (PSU).

### PYG Protective backshell for PY•





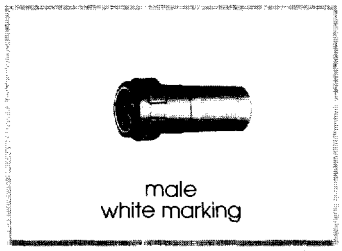

| | ø C (mm) | Mat. | Colors |
|---|---|---|---|
| | 2.5 | PSU | grey |
| | 2.5 | ABS | grey |
| | 2.7 | ABS | grey |

● ABS working temperature: -30°C +90°C
Other sizes upon request.

**Note:** all dimensions are in millimeters. Dimensions a and N are indicated on page 5.

| Ref. | Colors | Ref. | Colors |
|---|---|---|---|
| G | grey | N | black |
| A | blue | R | red |
| J | yellow | V | green |

**Insulator for crimp contacts**

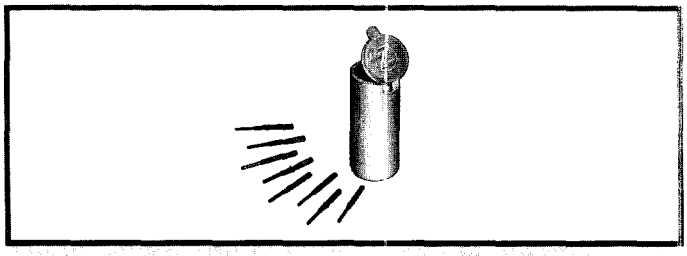


male
white marking

female
red marking

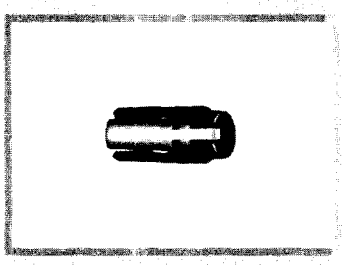
| Type | Female contact |
|---|---|
| M02 | PAG.30.2YL.0 |
| M04 | PLG.40.4YL.0 |
| M05 | PLG.40.5YL.0 |
| M06 | PLG.40.6YL.0 |
| M07 | PLG.40.7YL.0 |
| M08 | PLG.40.8YL.0 |

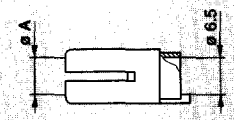
**Crimp contacts, kit with the number of contacts in a tube**



| Type | Contact Nb | ø Contact (mm) | Female |
|---|---|---|---|
| M02 | 2 | 1.3 | PKG.02.657.ZZM |
| M04 | 4 | 0.9 | PKG.04.662.ZZM |
| M05 | 5 | 0.9 | PKG.05.662.ZZM |
| M06 | 6 | 0.7 | PKG.06.657.ZZM |
| M07 | 7 | 0.7 | PKG.07.657.ZZM |
| M08 | 8 | 0.7 | PKG.08.657.ZZM |

## PLA Collet

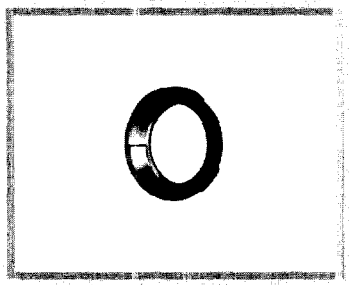


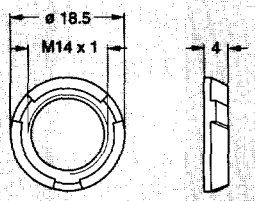



| Part number | ø A (mm) | ø cable (mm) min. | ø cable (mm) max. |
|---|---|---|---|
| PLA.xx.xx.0 | 3.9 | 2.7 | 3.9 |
| PLA.xx.xx.0 | 5.2 | 4.0 | 5.2 |
| PLA.xx.xx.0 | 6.5 | 5.3 | 6.5 |

**Note:** ●● = UG (grey PSU) or TN (black PEI)

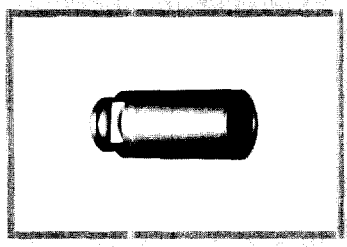
## PKG Plastic front nut for PK● and PT● models

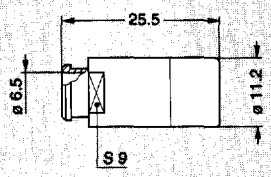





| Part number | Mat. | Colors |
|---|---|---|
| PKG.22.xxx.0 | PSU | grey |
| PKG.22.xxx.0 | PSU | blue |
| PKG.22.xxx.0 | PSU | yellow |
| PKG.22.xxx.0 | PSU | black |
| PKG.22.xxx.0 | PSU | red |
| PKG.22.xxx.0 | PSU | green |
| PKG.22.xxx.0 | PEI | black |

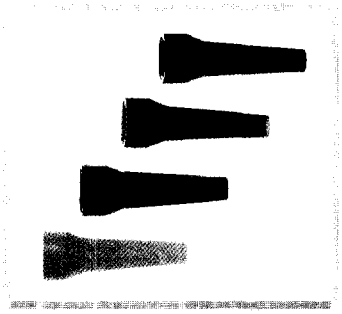
## PAM.13.0●●.0 Nut for fitting a GMA.1B strain relief

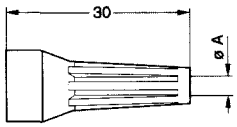





**Note:** ●● = UG (grey PSU) or TN (black PEI)

## GMA.1B Bend relief





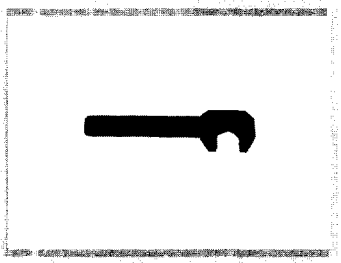

| Part number | Bend relief | cable ø | |
|---|---|---|---|
| | A | max. | min. |
| GMA.1B.025.DG | 2.5 | 2.9 | 2.5 |
| GMA.1B.030.DG | 3.0 | 3.4 | 3.0 |
| GMA.1B.035.DG | 3.5 | 3.9 | 3.5 |
| GMA.1B.040.DG | 4.0 | 4.4 | 4.0 |
| GMA.1B.045.DG | 4.5 | 4.9 | 4.5 |
| GMA.1B.054.DG | 5.4 | 6.0 | 5.4 |
| GMA.1B.065.DG | 6.5 | 7.0 | 6.5 |

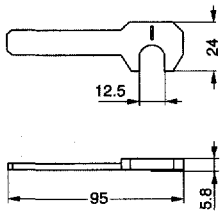
**Note:** the last letter "G" of the part number indicates a grey color, see adjacent table and replace letter "G" by the letter of the color required.

| Ref. | Colors | Ref. | Colors | Ref. | Colors |
|---|---|---|---|---|---|
| A | blue | J | yellow | R | red |
| B | white | M | brown | S | orange |
| G | grey | N | black | V | green |

- material: Polyurethane (Desmopan 786)
- operating temp: -40°C +80°C

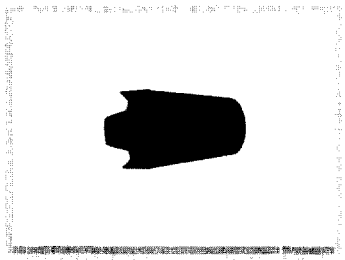
## POP.12.5GN.0 Spanner for outershell [1]

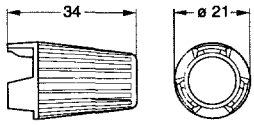





- material: PA 6.6

## POB.18.6GN.0 Spanner for PKG.22.0U● nut [1]

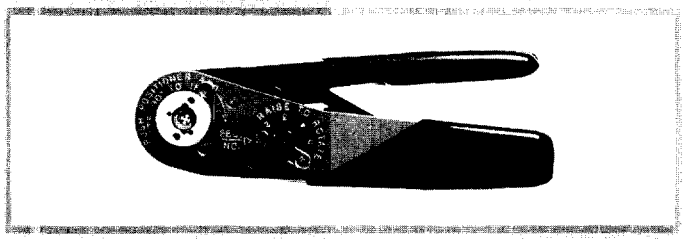




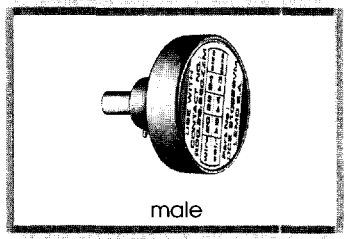

- material: PA 6.6

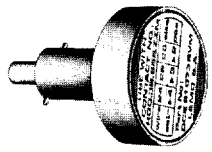
**Note:** 1) both spanners available as a kit, ref. POZ.12.18G.N

## DPC.91.701V Crimping tool

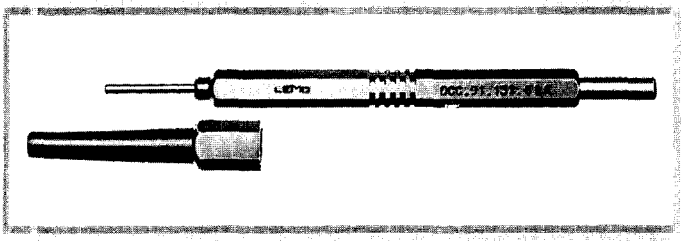


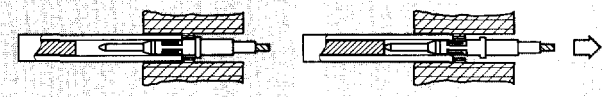
## DCE Positioners for crimp contacts




## DCC Extractor



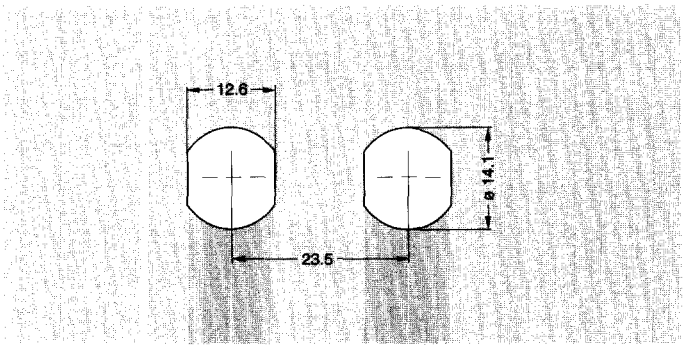


| Type | Contact ø (mm) | Conductor AWG | male | female | Selector N° | Extractors (with push button) |
|---|---|---|---|---|---|---|
| M02 | 1.3 | 18-20 | DCE.91.130.BV | DCE.91.130.BVM | 8-7 | DCC.91.131.5LA |
| M04/M05 | 0.9 | 20-22 (-24)[1] | DCE.91.090.BV | DCE.91.090.BVM | 6-5-5 | DCC.91.090.5LA |
| M06/M07/M08 | 0.7 | 22-24 (-26)[1] | DCE.91.070.BV | DCE.91.070.BVM | 6-5-5 | DCC.91.070.5LA |

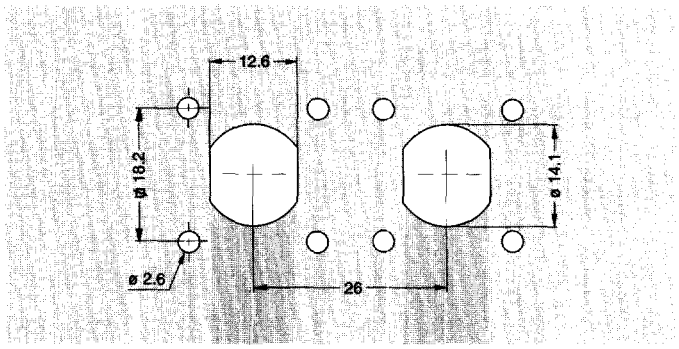
**Note:** 1) the variance in conductor stranding diameter for the minimum AWG is such that some can have a cross section which is not sufficient to guarantee crimping as per MIL-C-22520/-01 standard.

## PANEL MOUNT

**For PL•, PK•, PN• and PT•**



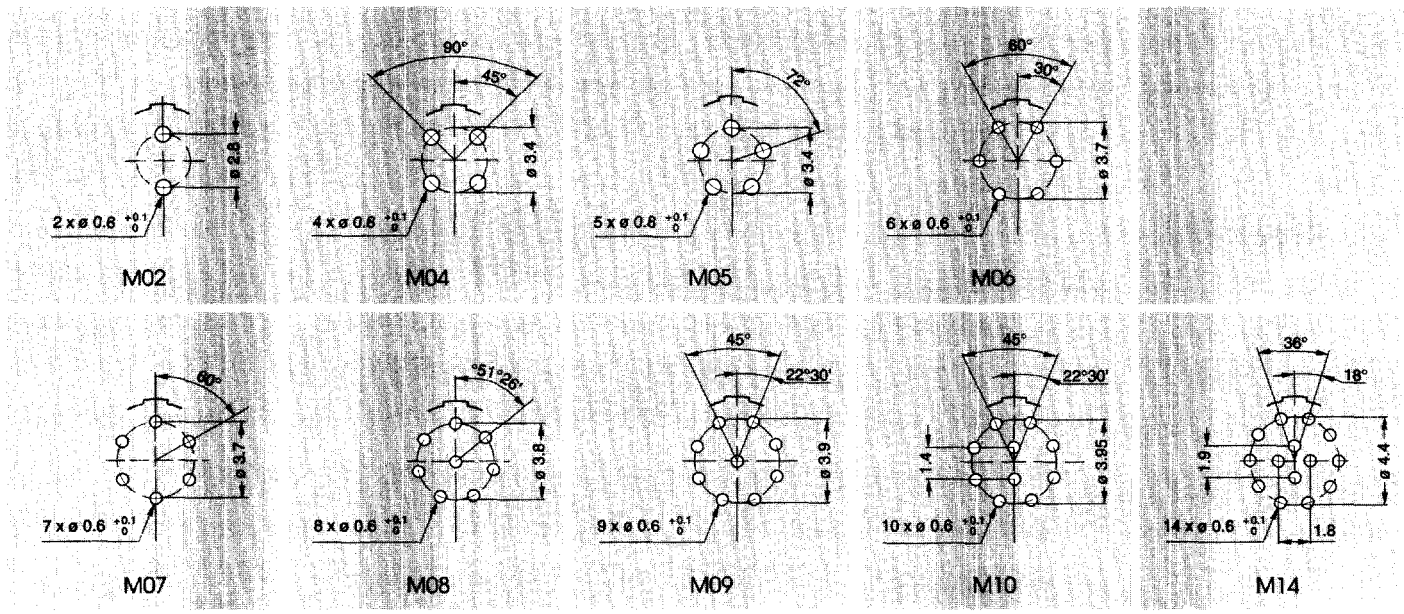

**For PM•**



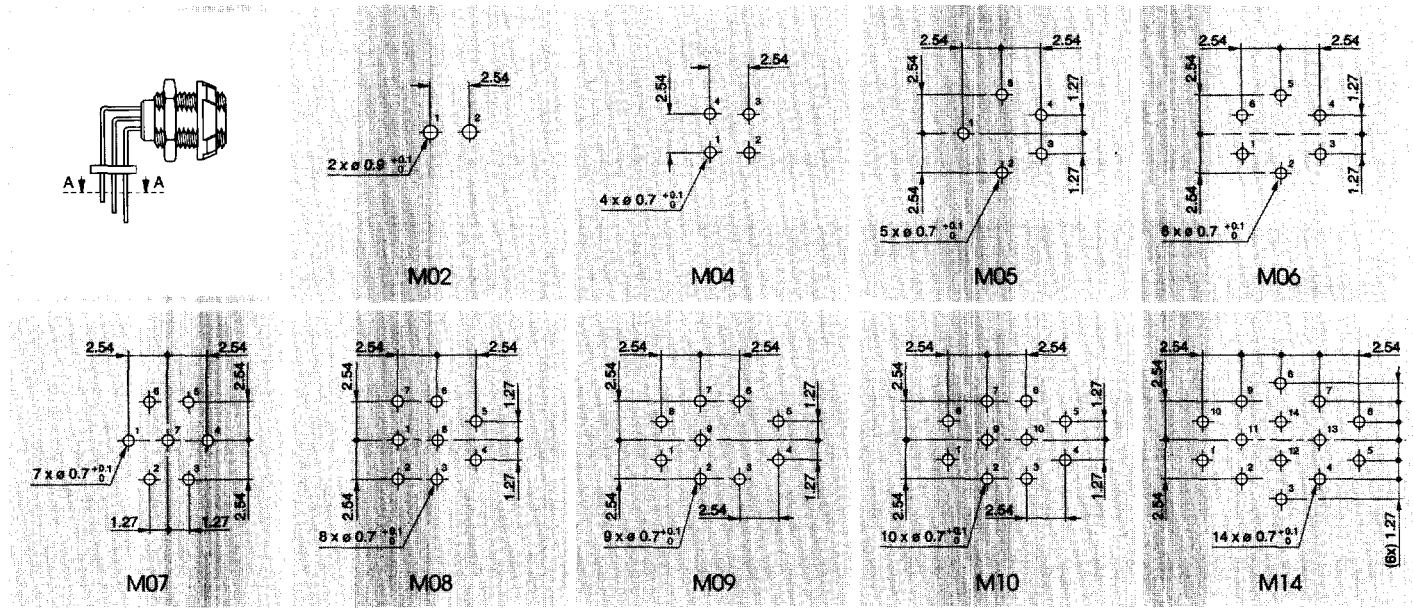

**Note:** PY• is also designed for snap-on fixing into customer housing. Consult factory for information.

## PCB DRILLING PATTERN

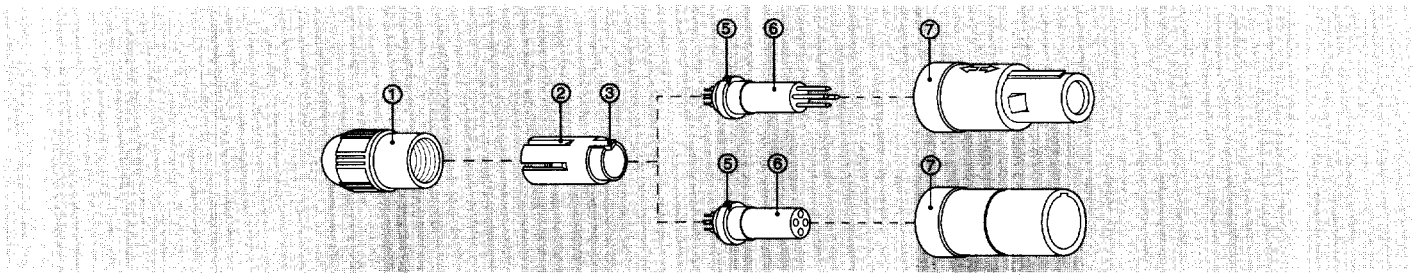
**For straight contacts**

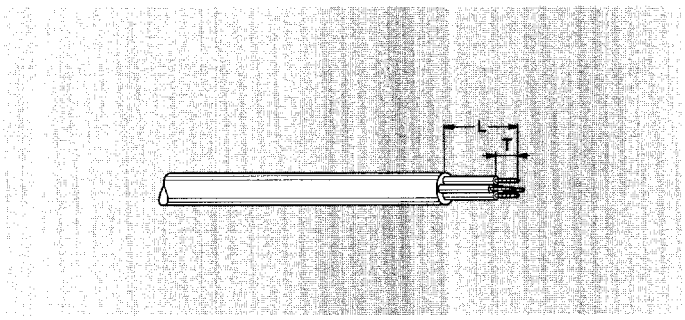



**For 90° elbow contacts (A-A view)**



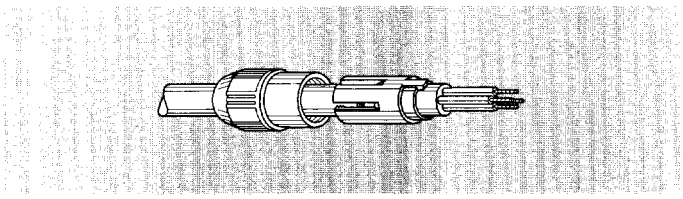
## Solder contacts



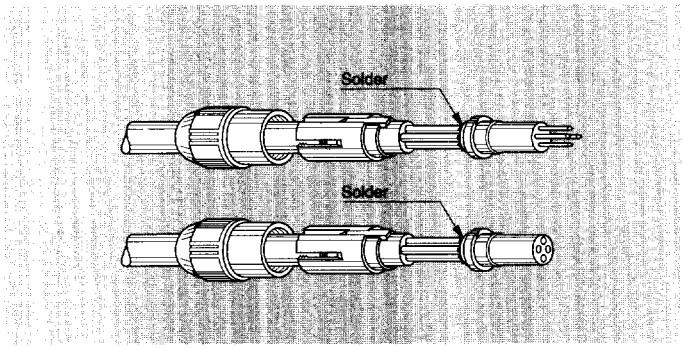




1. Strip the cable according to the lengths given in the table. Tin the conductors.

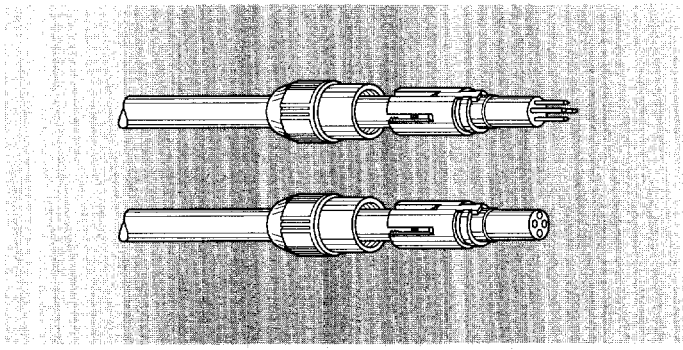
| Type | Dimensions (mm) | |
|---|---|---|
| | L | T |
| M02 | 14.0 | 4.0 |
| M04, M05 | 13.0 | 3.0 |
| M06 - M14 | 12.5 | 2.5 |



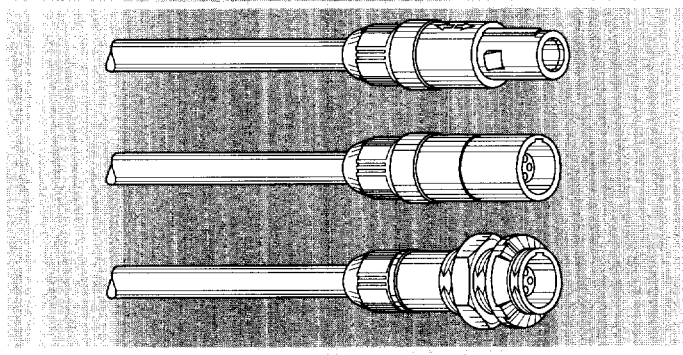
2. Slide the collet nut ① and then the collet ② onto the cable.




3. Solder conductors into contacts, making sure that neither solder nor flux gets onto the insulator or cable insulation.



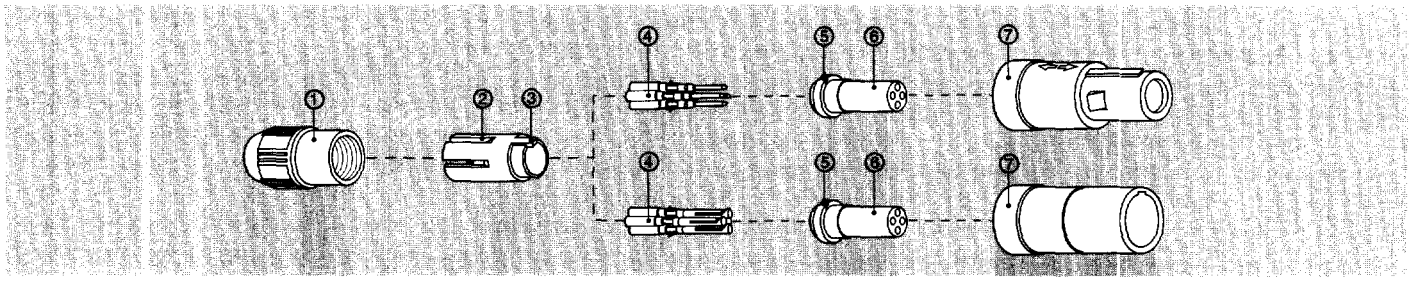
4. Slide the collet ② forward and locate tag ③ in the slot ⑤ on the insulator ⑥.
   Slide collet nut ① over collet ② and then push the whole assembly into the shell ⑦ whilst turning it to ensure that the tag ③ locates in the inside slot of the shell. Tighten the collet nut ①.
   - Torque maxi = 0.25 Nm.
   - Receptacle mounting nut torque = 2 Nm.

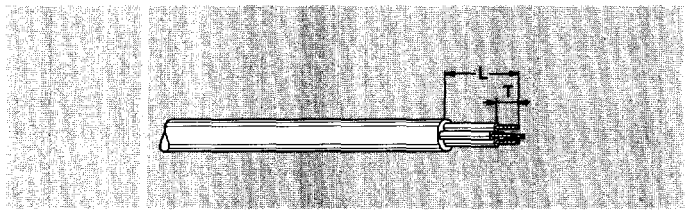


**For PSU only:**
**We recommend ONLY the use of VTCS-6 Clear Vibra-tite to secure the connector backnut. The use of other materials could result in damage to the connector. Please contact LEMO USA for more information or to purchase Vibra-tite.**

**The only recommended chemical cleaner is Isopropyl Alcohol.**

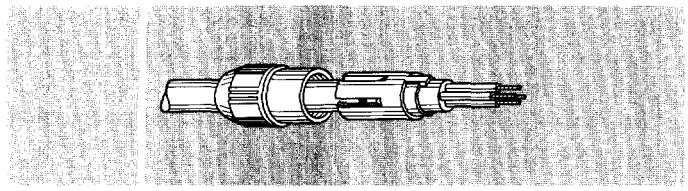
## Crimp contacts



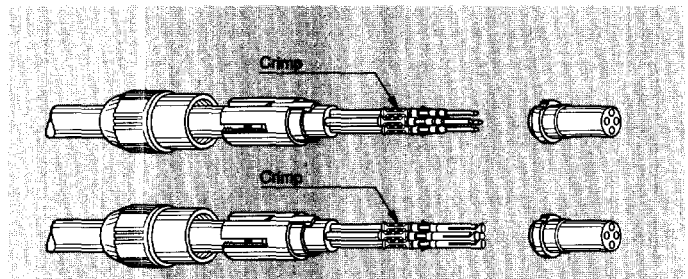




1. Strip the cable according to the lengths given in the table.

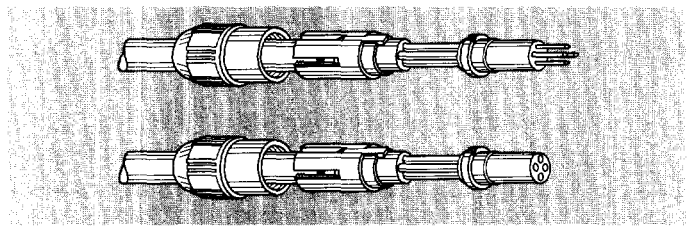
| Type | Dimensions (mm) | |
|---|---|---|
| | L | T |
| M02 - M08 | 15 | 3.9 |



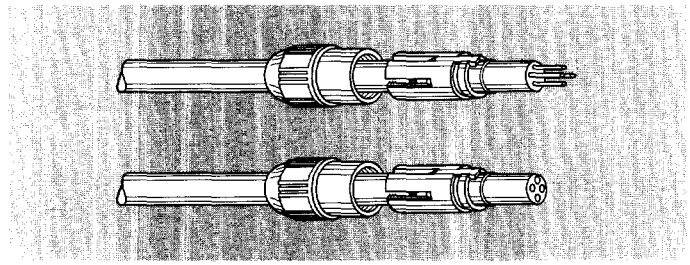
2. Slide the collet nut ① and then the collet ② onto the cable.



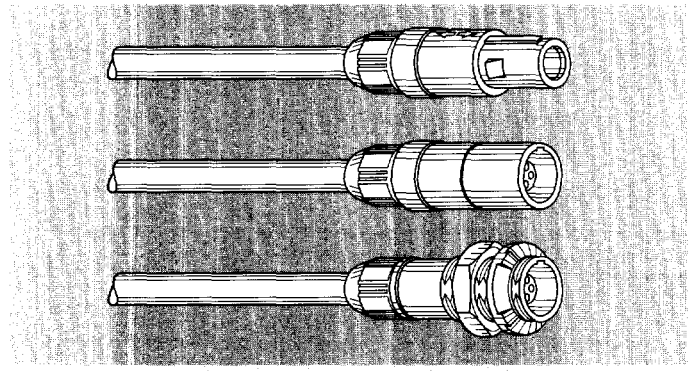

3. Fix the appropriate positioner (table page 7) in the crimping tool. Set selector to the number corresponding to the conductor AWG as indicated on the positioner label. Fit conductor into contact ④ and make sure it is visible through the inspection hole in the crimp barrel. Slide conductor-contact combination into the open crimping tool; make sure that the contact is fully pushed into the positioner. Close the tool. Remove from crimping tool and check that conductor is secure in contact and shows in inspection hole.



4. Now arrange contact-conductor combinations according to the insert marking and locate them into the insert ⑥. Check that all contacts are correctly located and remain in position when given a gentle pull.



5. Slide the collet ② forward and locate tag ③ in the slot ⑤ on the insulator ⑥. Slide collet nut ① over collet ② and then push the whole assembly into the shell ⑦ whilst turning it to ensure that the tag ③ locates in the inside slot of the shell. Tighten the collet nut ①.
   - Torque maxi = 0.25 Nm.
   - Receptacle mounting nut torque = 2 Nm.



**For PSU only:**
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**The only recommended chemical cleaner is Isopropyl Alcohol.**

LEMO USA has a nation-wide sales network that can help you with your connectors needs. Please contact us for your local sales representative and distributor.

LEMO USA

*Electronic Connectors*

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e-mail: lemous@lemo.ch, website http://www.lemo.ch