

CONTACTS







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CONTACT TECHNOLOGY

INTRODUCTION

Preci-Dip, a world wide leading manufacturer of precision machined contacts and related interconnect components is continuously improving its ability to design innovative contacts. This catalog provides general technical information on Preci-Dip contacts. It should help potential users make the best technical choice for a given application.

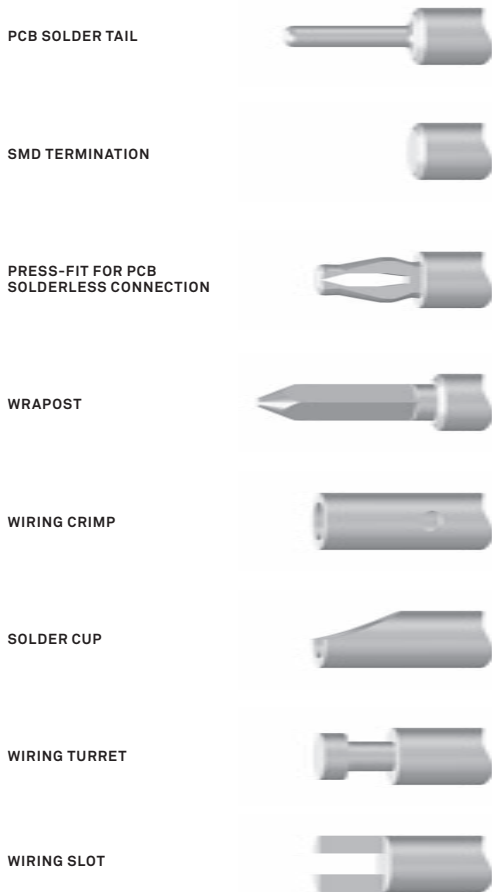
TO FIND INDIVIDUAL SPECIFICATIONS OF STANDARD CONTACTS, PLEASE CONSULT OUR SEARCH ENGINE AT WWW.PRECIDIP.COM

If no adequate solution can be found there, please contact us, only a selected choice of all existing contacts is displayed. Further, Preci-Dip will be pleased to offer full support to design and manufacture customer specific contacts.

THREE MAIN GROUPS OF CONTACT PRODUCTS ARE DESCRIBED AND OFFERED

- Spring-loaded contacts
- Socket contacts also called female contacts or pin receptacles
- Pin or male contacts and PCB terminals

All of these can be manufactured with different type of terminations:



THIS CATALOG SECTION CONTAINS GENERAL TECHNICAL INFORMATION ON PRECI-DIP CONTACTS

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Socket contact selector	177	Socket contacts	180
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CONTACT TECHNOLOGY

SOCKET CONTACT SELECTOR

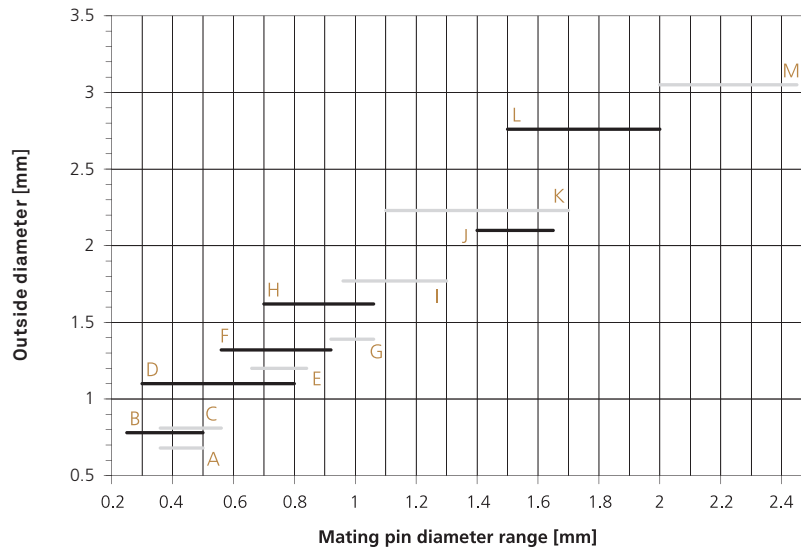
CONTACT SELECTOR BY MATING PIN DIAMETER

The mating pin diameter range and insertion characteristics of socket contacts are identified with the clip code, given by the last 4 digits of the part number.

1 TO SEARCH A SUITABLE SOCKET CONTACT TO MATE WITH A KNOWN PIN:

With the graph on the right, find the group code corresponding to the mating pin diameter. In the table below right, search the clip codes corresponding to the group and the page number of the corresponding data sheet.

All clip codes from the same group are interchangeable within a given contact body. This allows for contacts with a larger range of insertion characteristics to fulfill the requirements of special applications



2 TO SEARCH THE CHARACTERISTICS OF A KNOWN CLIP CODE:

Find the corresponding page number for each clip code data sheet in the table on the right side

GROUP	CLIP CODE	TYP. INSERTION FORCE [N]	TEST PIN DIAM. [mm]	SEE PAGE
A	0110	0.25	0.38	183
B	5410	0.20	0.30	183
C	1110	1.0	0.43	183
	2110	0.8	0.46	184
	0510	0.5	0.52	184
D	3020	0.45	0.30	184
	1210	3.0	0.43	185
	3010	2.0	0.43	185
	2210	0.6	0.46	185
	3110	0.7	0.46	186
	3130	0.4	0.46	186
	3160	0.2	0.46	186
	5210	0.56	0.76	187
	E	1410	1.5	0.78
F	1610	3.5	0.76	187
	0610	1.5	0.76	188
	4710	0.4	0.76	188
G	1810	2.0	1.04	188
H	3410	4.0	1.04	189
I	0210	5.0	1.15	189
	2710	2.2	1.15	189
J	4910	3.0	1.61	190
K	1310	1.3	1.27	190
	2310	3.0	1.30	190
	3920	2.5	1.61	191
L	0710	4.0	1.88	191
M	4010	10.0	2.41	191



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CONTACT TECHNOLOGY

GENERAL SPECIFICATIONS

GENERAL TECHNICAL SPECIFICATIONS

The contacts are manufactured by high speed turning process with, if necessary, additional secondary machining operation for example for flats, slots or solder cups. The preferred diameter range lies between 1 and 6 mm and contact length up to 40 mm are standard.

MATERIALS

CONTACT BODIES

- Brass CuZn36Pb3, C36000
- Brass CuZn35Pb2, C34500 for contacts with crimp terminations
- Bronze CuSn4Pb4Zn4, C54400 for contacts with compliant press-fit terminations

CLIPS

- Beryllium copper alloy C17200

SPRINGS

- Stainless steel X12CrNi177 mat. Nr 1.4310, DIN 17224
- Music wire mat. Nr 1.1211, DIN 17223

HOODS

- Stainless steel AISI 305

All these materials are compliant with RoHS requirements. Lead content of copper alloys is less than 4% in accordance with Exception 6 of the RoHS directive 2002/95/CE.

PLATING

Contact plating is made up of basis underplating acting as diffusion barrier and of finishing layer.

UNDERPLATING

- Nickel (Ni) electro-deposited, acc. to SAE-AMS-QQ-N-290
- Electroless nickel phosphorus alloy for max. corrosion and wear resistance and for lowest magnetic permeability (plating suffix N)

FINISH

- Gold (Au) acc. to ASTM B488, type II C, plating codes 1 (0.25 µm), 3 (0.75 µm), 4 (1.27 µm) and 7 (gold flash)
- Tin (pure tin Sn), plating code 8, standard tin plating with excellent solderability, RoHS compliant
- Tin-Lead (SnPb90/10) acc. to ASTM B545, plating code 9. This plating is **not RoHS compliant**.
- Silver (Ag) acc. to ASTM B700, plating code 6

ELECTRICAL AND MECHANICAL CHARACTERISTICS

See individual data pages

ENVIRONMENTAL CHARACTERISTICS

The contacts withstands following environmental tests without mechanical and electrical defects:

- Dry heat steady state IEC 60512-11-9.11i / 60068-2-2.Bb: 125 °C, 16 h
- Damp heat cyclic IEC 60512-11-12.11m / 60068-2-30.Db: 25/55 °C, 90 – 100 %rH, 1 cycle of 24 h
- Cold steady state IEC 60512-11-10.11j / 60068-2-1.A: -55 °C, 2 h
- Thermal shock IEC 60512-11-4.11d / 60068-2-14.Na: -55/125 °C, 5 cycles 30 min
- Sinusoidal vibrations IEC 60512-6-4.6d / 60068-2-6.Fc: 10 to 500 Hz, 10 g, 1 octave/min, 10 cycles for each axis
- Shock IEC 60512-6-3.6c / 60068-2-27.Ea: 50 g, 11 ms, 3 shocks in three axis

During the above two tests no contact interruption >50 ns does appear.

- Solderability J-STD-002A, Test A, 245 °C, 5 s, solder alloy SnAg3.8Cu0.7
- Resistance to soldering heat J-STD-020C, 260 °C, 20 s
- Resistance to corrosion:
 - 1) Salt spray test IEC 60068-2-11.Ka: 48 h
 - 2) Sulfur dioxide (SO₂) test IEC 60068-2-42.Kc: 96 h at 25 ppm SO₂, 25 °C, 75 %rH
 - 3) Hydrogen sulfide (H₂S) test IEC 60068-2-43.Kd: 96 h at 12 ppm H₂S, 25 °C, 75 %rH



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CONTACT TECHNOLOGY

SPRING-LOADED CONTACTS

SPRING-LOADED CONTACTS

Spring-loaded contacts were initially designed since 1995 for mobile phones. The application requires miniature, reliable, contacts with very high mating cycles count at low cost. The basic design of spring-loaded contact with hollow piston consists of a contact body or barrel, a contact member or piston and an helical compression spring. The piston is retained in the barrel by a crimp. The electrical contact is established by pressure between the piston and a fixed, flat, conducting area of the opposite part.

Based on this initial model, new contacts with improved characteristics were designed:

- Low resistance spring-loaded contacts with shaped piston
- High-reliable contacts with clip. This contact design is protected by international patents

Main advantages

- Very long life time
- Many types of terminations available (see page Introduction)
- Small dimensions for use in applications with limited space (min. contact height 3 mm, min. contact diameter 1 mm)
- Very good resistance to shocks and vibrations
- Best adapted where conventional connection solutions cannot satisfy the application requirements:
 - In case of important positioning tolerances of the connectors parts
 - For compensation of errors of parallelism and flatness
 - To make connection with pivoting, rotating or non parallel mating movement
 - For connections with sliding mating action (push and lock)

HOLLOW PISTON + BARREL

SHAPED PISTON + BARREL

CLIP COAXIAL DESIGN

CLIP IN-LINE DESIGN



patented

patented

MECHANICAL

Min. diameter	1.8 mm	1.5 mm	1.8 mm	1.0 mm
Min. initial height	3 mm	6 mm	5 mm	10 mm
Travel / height ratio	Max. 0.3	Max. 0.2	Max. 0.2	Max. 0.15
Max. travel (stroke)	2 mm	2 mm	1.5 mm	1.5 mm
Min. initial spring force	0.2 N	0.2 N	0.2 N	0.2 N
Mechanical life	Min. 100'000 cycles	Min. 50'000 cycles	Min. 40'000 cycles	Min. 40'000 cycles

ELECTRICAL

Contact resistance	Max. 15 mΩ*	Max. 10 mΩ*	Max. 20 mΩ	Max. 20 mΩ
Max. operating current	3.5 A cont.** / 7 A peak		2 A cont.** / 4 A peak	

* Static measurement in halfway position of piston travel.

** Above max. current values are for single contacts in free air and for 10°C temperature rise.



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CONTACT TECHNOLOGY

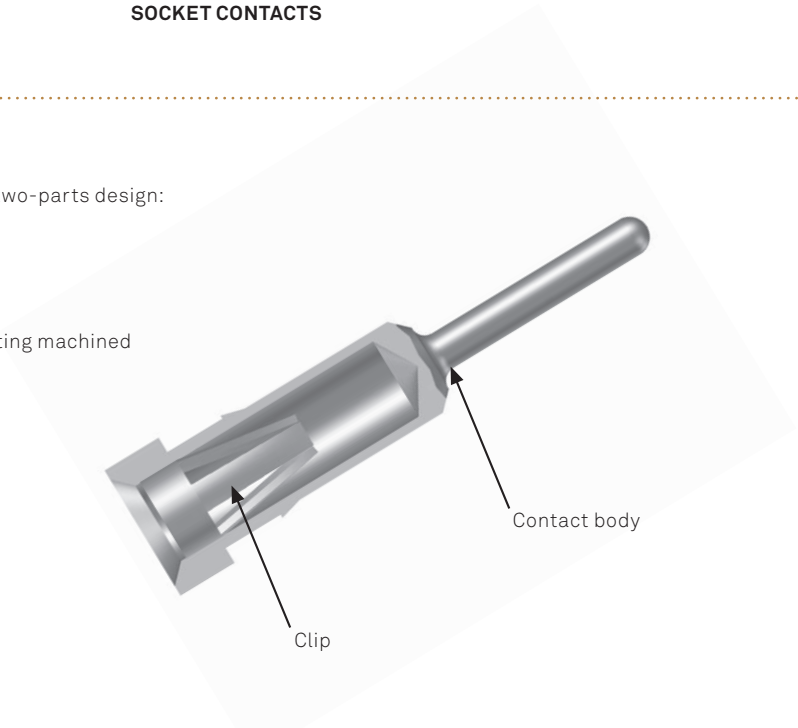
SOCKET CONTACTS

SOCKET CONTACTS

The Preci-Dip technology for socket contacts is based on a two-parts design:

- Contact body
- Multi-finger contact spring called clip

These socket contacts with clip are compatible with all existing machined and stamped mating pin contacts of same size



CONTACT BODIES AND CLIPS ARE MANUFACTURED AND PLATED SEPARATELY

The contact bodies are manufactured by high speed turning process with additional secondary machining operation if required.

The clip are stamped and formed from sheet material. Depending on size and characteristics, the clips are designed with 3 to 8 contact finger. The choice of heat treated beryllium copper alloy gives the best possible combination of mechanical and electrical properties for use in electrical contacts. More than 40 clips are pre-tooled, covering a mating pin diameter range from 0.25 to 2.5 mm. They can accept square or rectangular pin.

The clip is assembled into the contact body by press-fit on automatic equipment including on-line inspections.

MAIN ADVANTAGES OF THE TECHNOLOGY

- The combination of existing standard clip with specific contact body gives a flexibility unknown with traditional contact design
- Production of machined specific contact bodies is cost effective starting at medium sized quantities
- Preci-Dip automatic high speed contact assembly lines are optimized for large production runs but also for smaller series

MECHANICAL CHARACTERISTICS

- Insertion characteristics
Insertion and withdrawal force for standard clips are displayed on the corresponding data sheets. The values are measured with polished steel gauges with spherical tip and are typical average measurements. These data are for general information and selection of best suited clip for a given application.
- Compliancy
Each clip is able to accept a broad range of mating pins. This ability is called «compliancy». The compliancy factor Δ specifies the resulting operating range after insertion of the largest permissible mating pin.
- Clip retention
This is the force needed to pull-out the press-fitted clip from its contact body. Clip retention is greater than 40 N.
- Mechanical life
The mechanical life expectancy is dependent on the surface smoothness and diameter of the mating pin and on the plating. For some applications, more than 1000 mating cycles are possible.

ELECTRICAL CHARACTERISTICS

- Current rating
The given currents are for one mated combination of socket and pin contact, in free air and for 10°C temperature rise.



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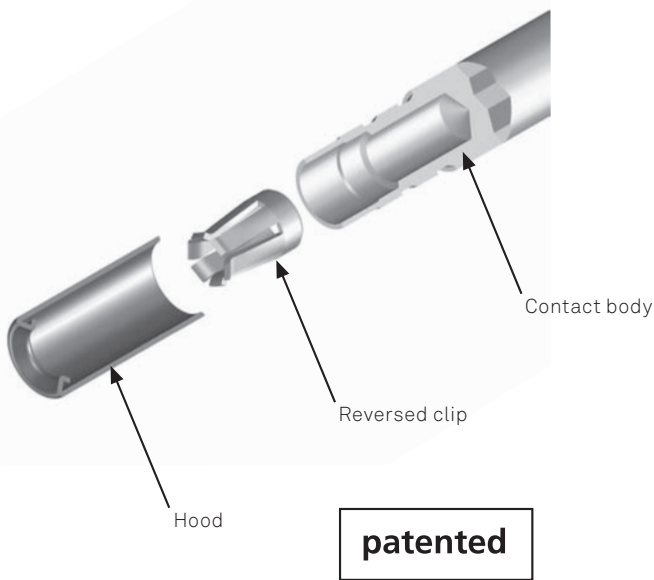
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CONTACT TECHNOLOGY

SOCKET CONTACTS

CONTACTS WITH REVERSED CLIP

The clip technology for socket contacts was improved with the introduction of a new, patented, reversed clip. This was designed to overcome some limitations of the basic clip, especially to place the first contact point closer to the front end of the contact. The geometry of the contact fingers shows a very smooth contact area allowing high cycles count.



The technical characteristics of reversed clip contacts match with the highest requirements of military aerospace standard AS39029 (former MIL-C-39029).

This standard is the reference for many connectors dedicated for other fields of applications like aircrafts, railway and heavy duty industries.

Furthermore, the three-part design of these contacts allows localized finish for best cost-performance ratio.

MIL QUALIFIED CONTACTS

Crimp contacts, pin and socket, size 22, 20, 16 and 12, have passed successfully all qualification tests according to AS39029 and are QPL listed for applications in connectors MIL-DTL-38999 Series I, III and IV.

The test results have shown results that are much superior to specs requirements.

These removable crimp contacts must be supplied with color coding for single contact identification. Preci-Dip has completed its manufacturing capacities with marking equipments for color code.



TYPE OF CONTACT	SIZE	MIL PART NUMBER	PRECI-DIP PART NUMBER
Socket	22	AS/M39029/56-348	83011-1P4-7010-B1
	20	AS/M39029/56-351	83021-1P4-7110-B1
	16	AS/M39029/56-352	83031-1P4-7210-B1
	12	AS/M39029/56-353	83041-1P4-7310-B1
Pin	22	AS/M39027/58-360	82011-40-01
	20	AS/M39027/58-363	82021-40-01
	16	AS/M39027/58-364	82031-40-01
	12	AS/M39027/58-365	82041-40-01

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CONTACT TECHNOLOGY

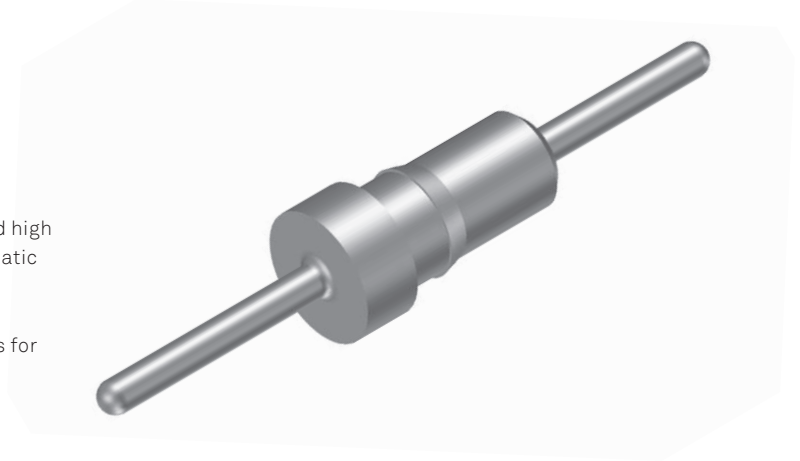
PIN CONTACTS

PIN CONTACTS

Precision screw-machined pin contacts are the best choice for many applications:

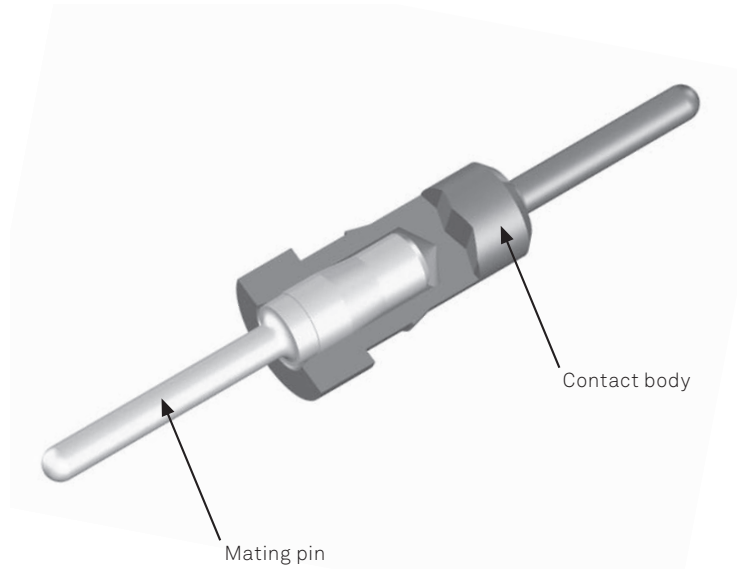
- High quality, low dimensional tolerances
- Best surface of the mating end for applications requiring high mating cycle count
- Wide range of dimensions and geometry
 - Length from 3 to 50 mm
 - Diameter from 0.25 to 6 mm
- Low initial (tooling) costs and attractive prices for medium and high volume production due to manufacturing on high speed automatic lathes

With its own plating unit, Preci-Dip offers single source services for finished contacts



BI-BLOC PIN CONTACTS

Preci-Dip offers «selective plated» bi-bloc pin contact with the high quality of machined contact and the advantages of selective plating. These contacts are made from 2 parts: the contact body with termination and the connecting or mating pin manufactured separately and assembled after plating.





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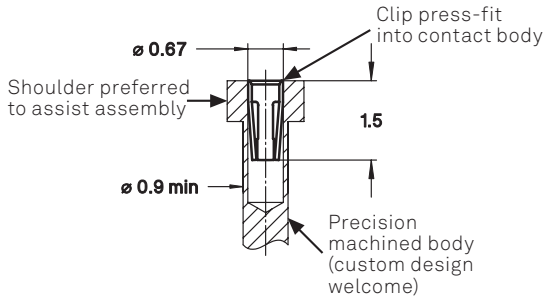
CONTACT DATA

STANDARD CLIP

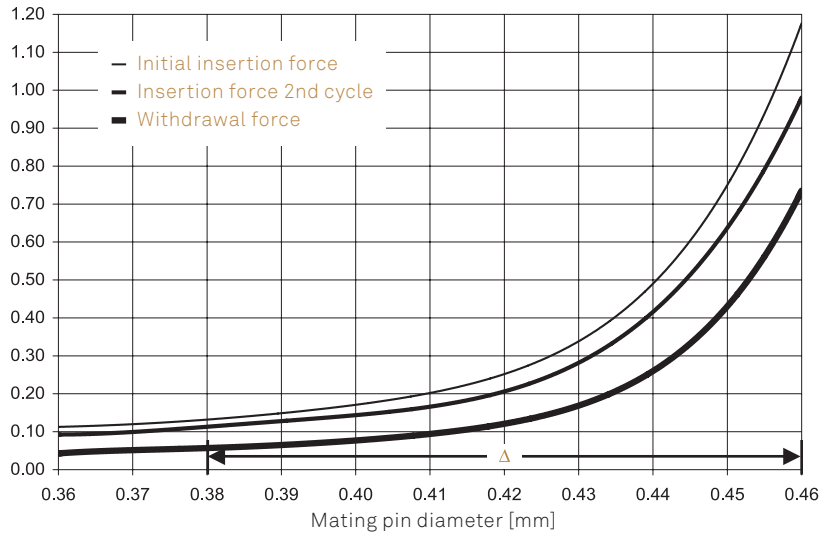
CLIP CODE 0110

4-FINGER

MATING PIN DIAMETER RANGE	0.36-0.46 mm
COMPLIANCY Δ	0.08 mm
MIN. MATING PIN LENGTH	1.8 mm
CURRENT RATING	1 A



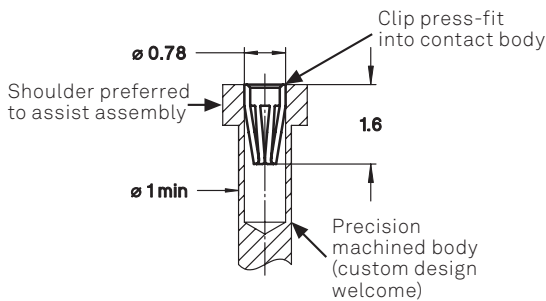
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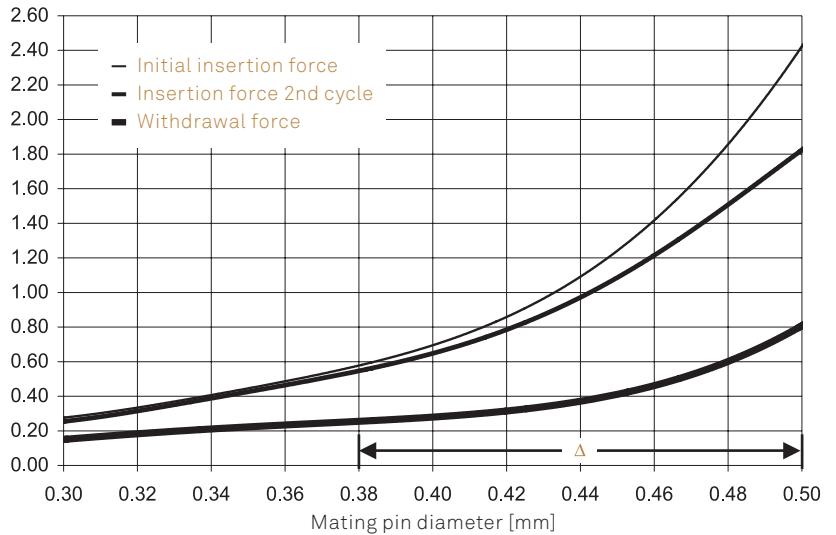
CLIP CODE 5410

6-FINGER

MATING PIN DIAMETER RANGE	0.3-0.5 mm
COMPLIANCY Δ	0.12 mm
MIN. MATING PIN LENGTH	1.8 mm
CURRENT RATING	1 A



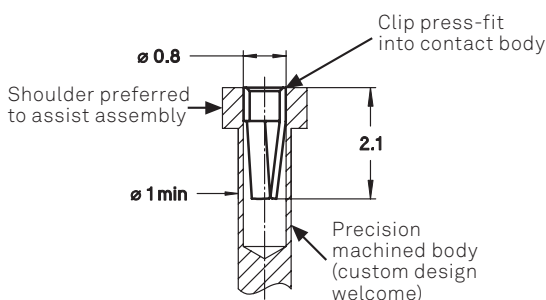
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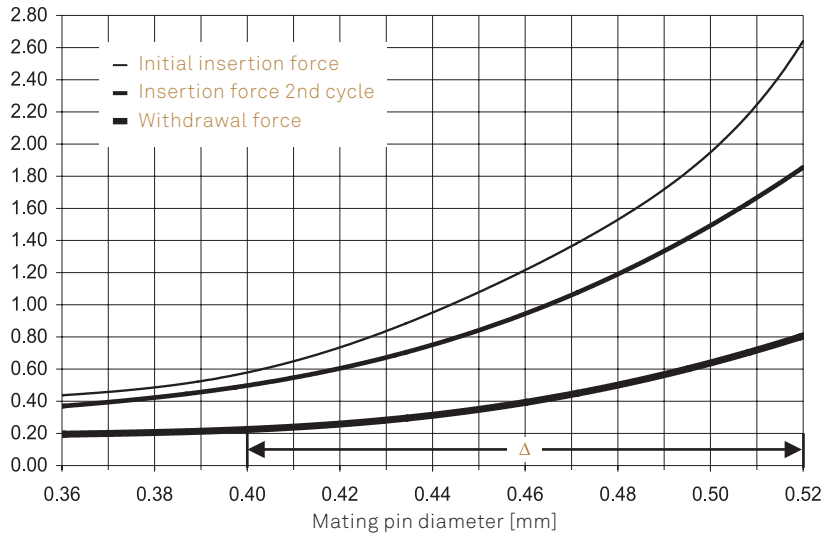
CLIP CODE 1110

3-FINGER

MATING PIN DIAMETER RANGE	0.36-0.52 mm
COMPLIANCY Δ	0.12 mm
MIN. MATING PIN LENGTH	2.3 mm
CURRENT RATING	3 A



Force [N]



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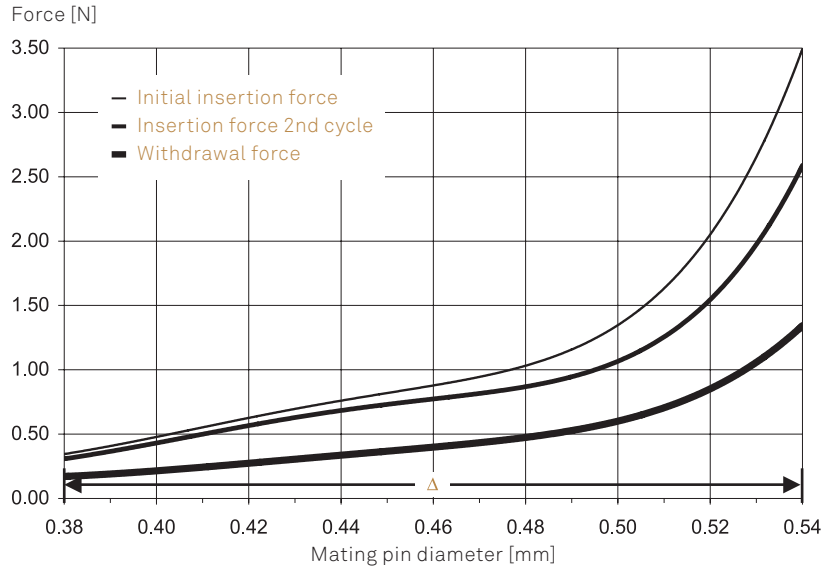
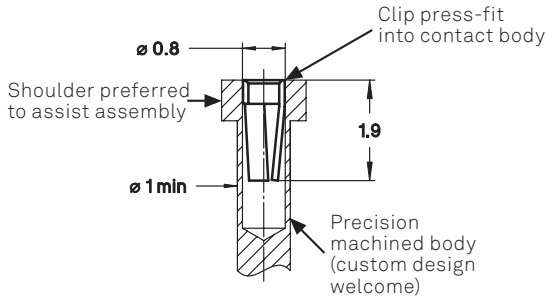
CONTACT DATA

STANDARD CLIP

CLIP CODE 2110

3-FINGER

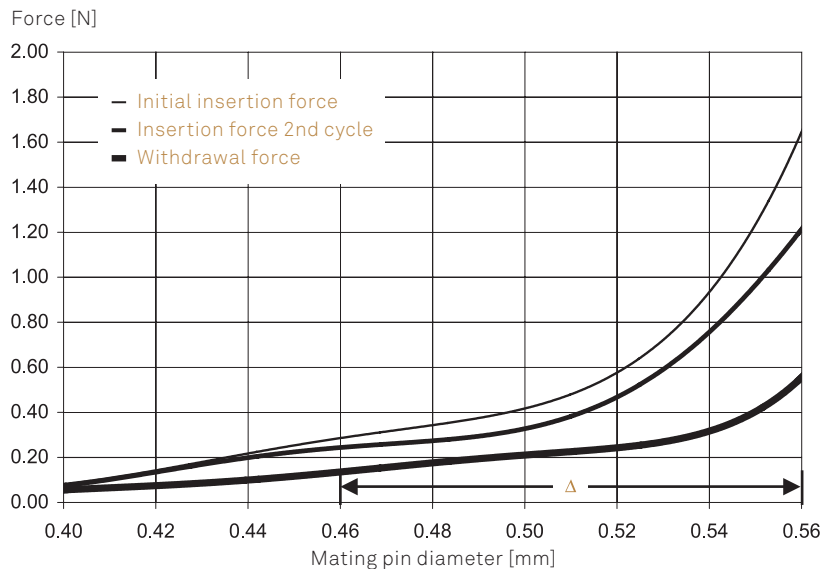
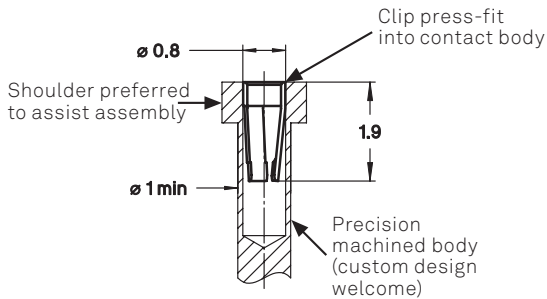
MATING PIN DIAMETER RANGE	0.38-0.54 mm
COMPLIANCY Δ	0.16 mm
MIN. MATING PIN LENGTH	2.2 mm
CURRENT RATING	2 A



CLIP CODE 0510

3-FINGER

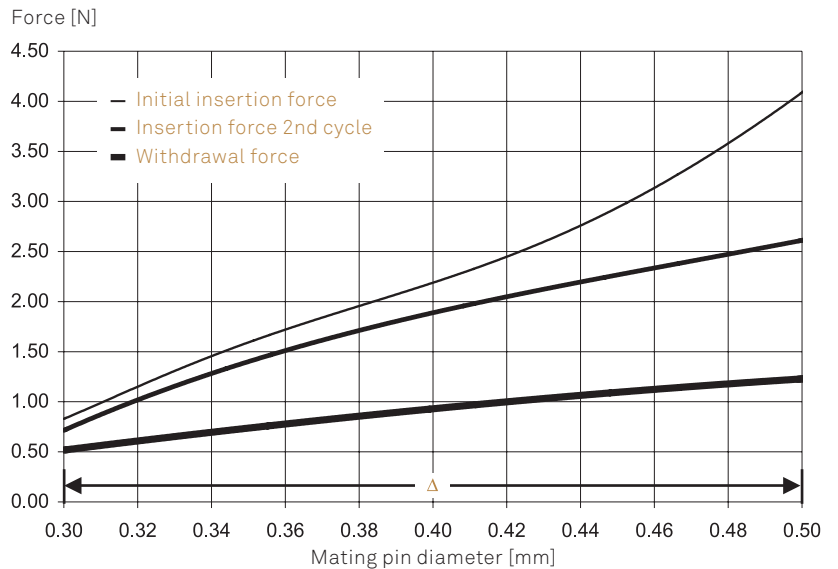
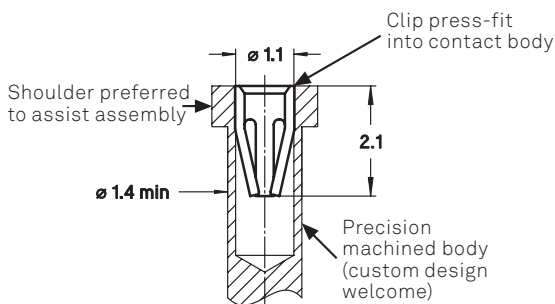
MATING PIN DIAMETER RANGE	0.4-0.56 mm
COMPLIANCY Δ	0.1 mm
MIN. MATING PIN LENGTH	2.2 mm
CURRENT RATING	2 A



CLIP CODE 3020

4-FINGER

MATING PIN DIAMETER RANGE	0.3-0.5 mm
COMPLIANCY Δ	0.2 mm
MIN. MATING PIN LENGTH	2.4 mm
CURRENT RATING	3 A





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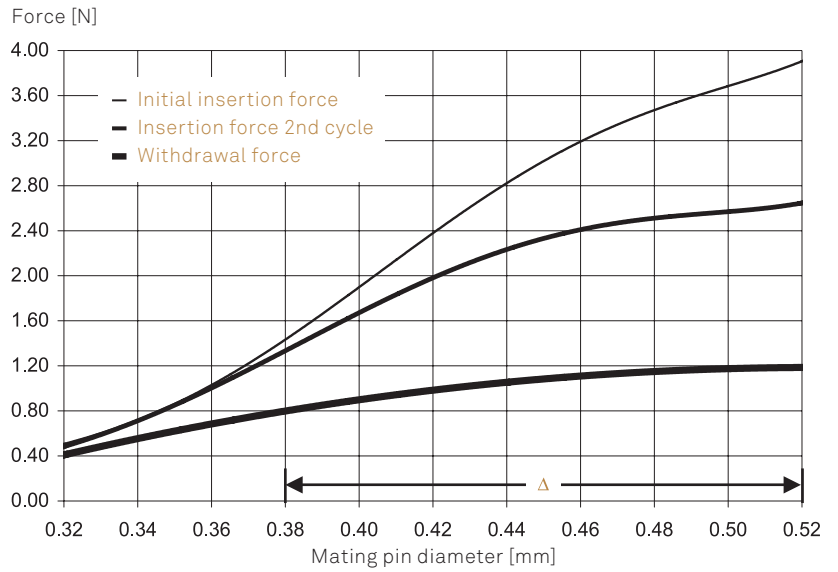
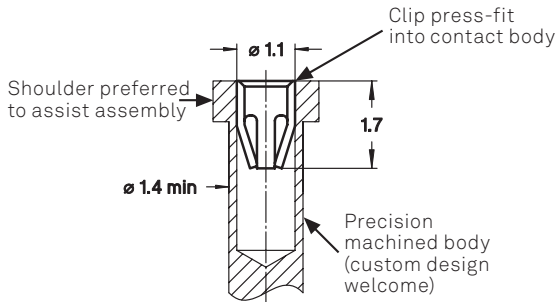
CONTACT DATA

STANDARD CLIP

CLIP CODE 1210

4-FINGER

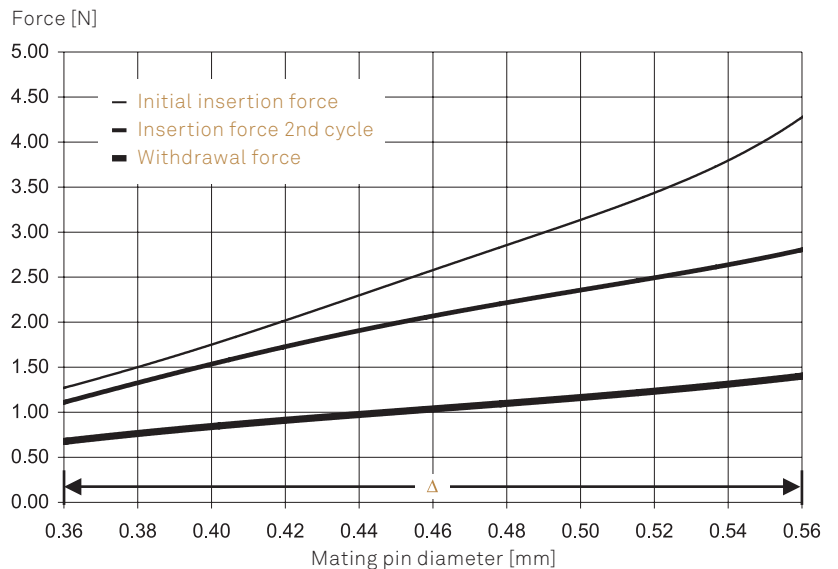
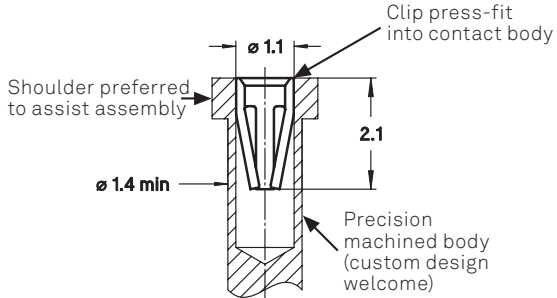
MATING PIN DIAMETER RANGE	0.32-0.52 mm
COMPLIANCY Δ	0.14 mm
MIN. MATING PIN LENGTH	2 mm
CURRENT RATING	3 A



CLIP CODE 3010

4-FINGER

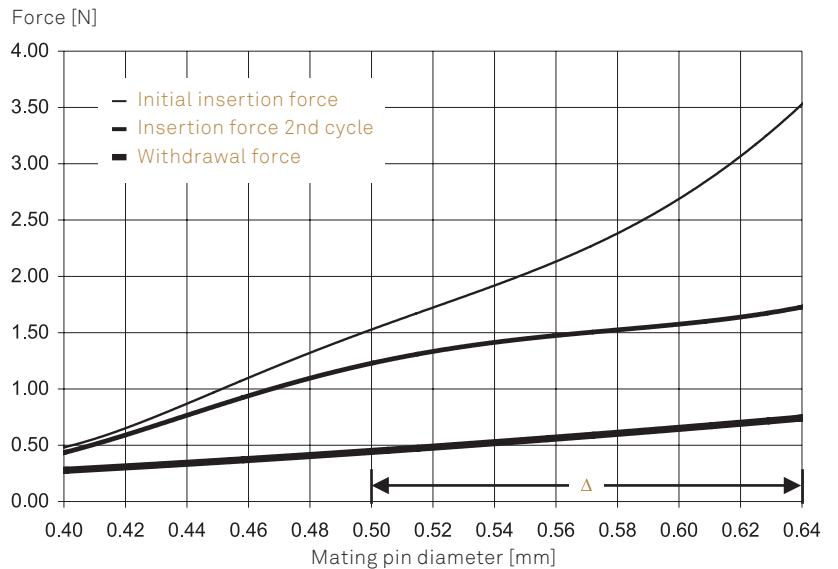
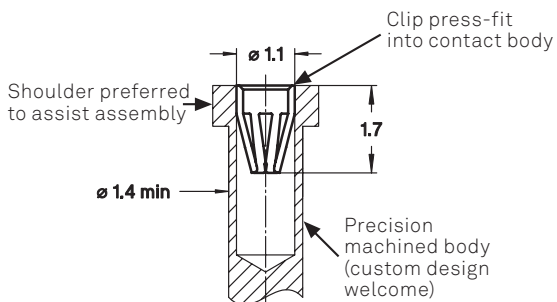
MATING PIN DIAMETER RANGE	0.36-0.56 mm
COMPLIANCY Δ	0.2 mm
MIN. MATING PIN LENGTH	2.4 mm
CURRENT RATING	3 A



CLIP CODE 2210

6-FINGER

MATING PIN DIAMETER RANGE	0.4-0.64 mm
COMPLIANCY Δ	0.14 mm
MIN. MATING PIN LENGTH	2 mm
CURRENT RATING	3 A





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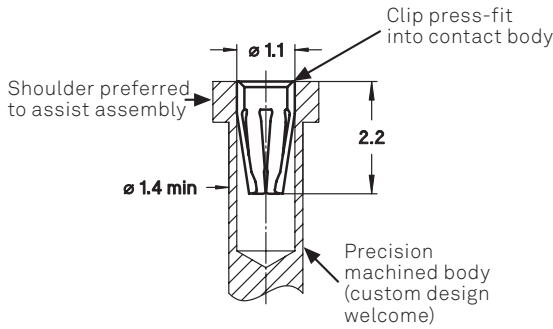
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STANDARD CLIP

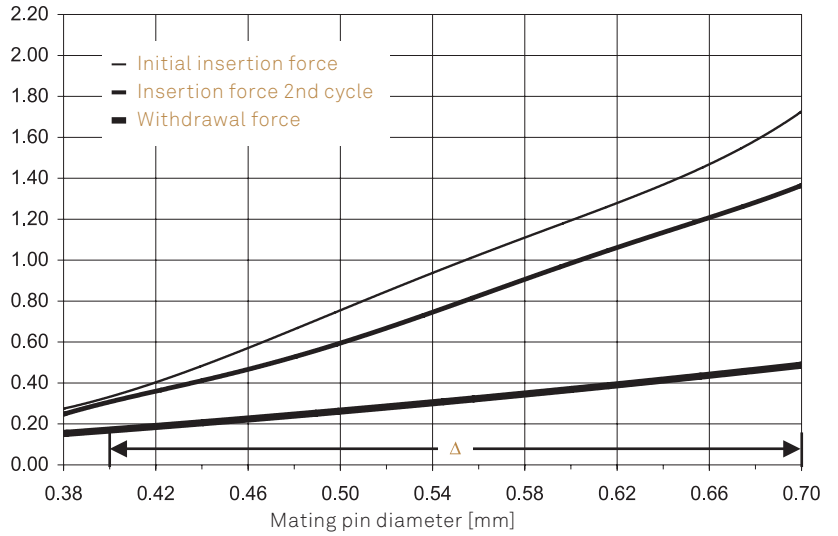
CLIP CODE 3110

6-FINGER

MATING PIN DIAMETER RANGE	0.38-0.7 mm
COMPLIANCY Δ	0.3 mm
MIN. MATING PIN LENGTH	2.5 mm
CURRENT RATING	3 A



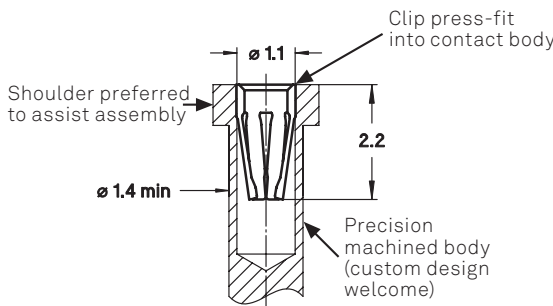
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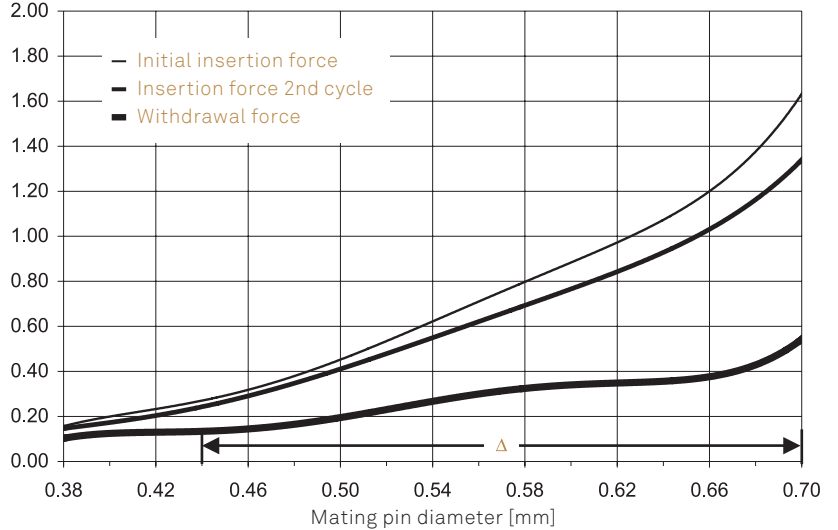
CLIP CODE 3130

6-FINGER

MATING PIN DIAMETER RANGE	0.38-0.7 mm
COMPLIANCY Δ	0.26 mm
MIN. MATING PIN LENGTH	2.5 mm
CURRENT RATING	3 A



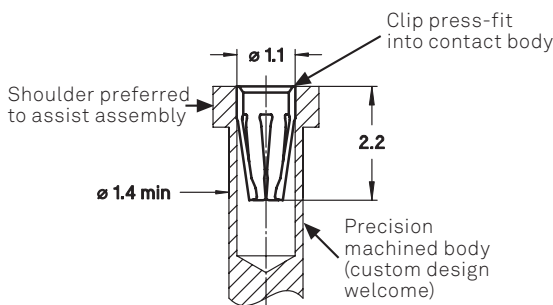
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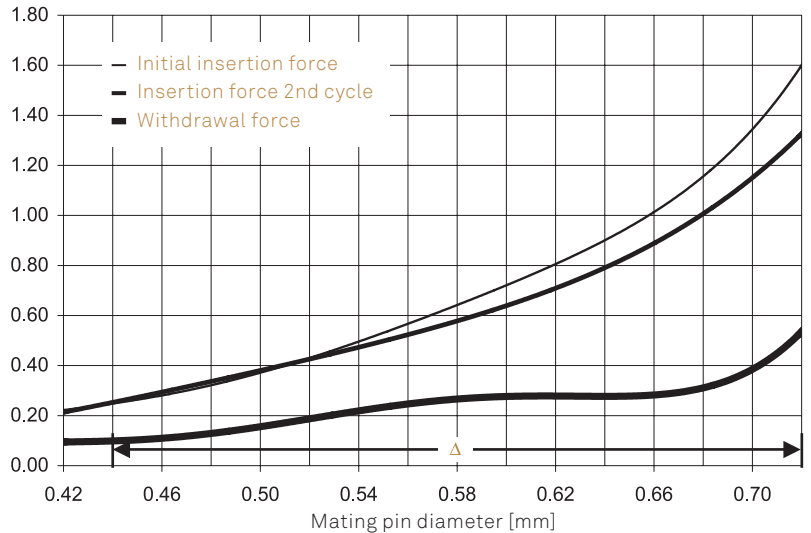
CLIP CODE 3160

6-FINGER

MATING PIN DIAMETER RANGE	0.42-0.72 mm
COMPLIANCY Δ	0.28 mm
MIN. MATING PIN LENGTH	2.5 mm
CURRENT RATING	3 A



Force [N]





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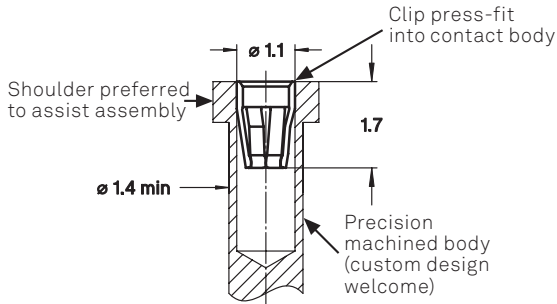
CONTACT DATA

STANDARD CLIP

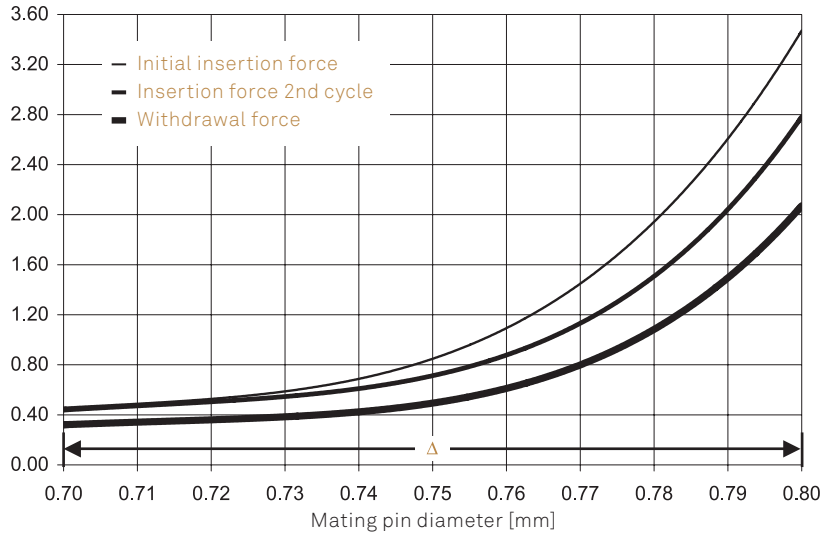
CLIP CODE 5210

6-FINGER

MATING PIN DIAMETER RANGE	0.7-0.8 mm
COMPLIANCY Δ	0.1 mm
MIN. MATING PIN LENGTH	2.2 mm
CURRENT RATING	4.5 A



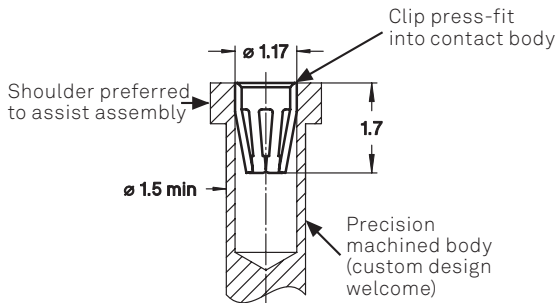
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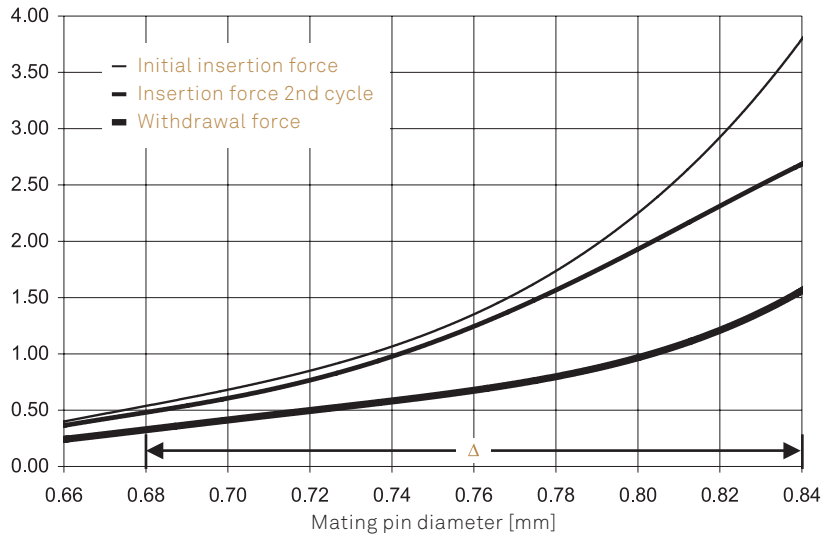
CLIP CODE 1410

6-FINGER

MATING PIN DIAMETER RANGE	0.66-0.84 mm
COMPLIANCY Δ	0.16 mm
MIN. MATING PIN LENGTH	2.2 mm
CURRENT RATING	4.5 A



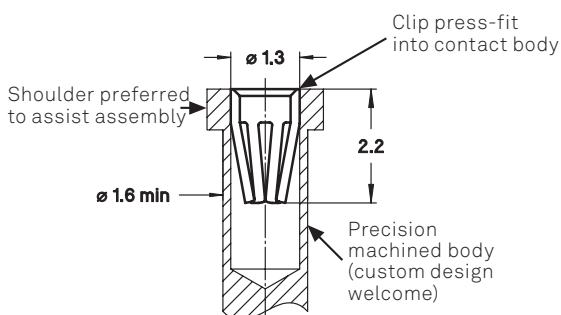
Force [N]



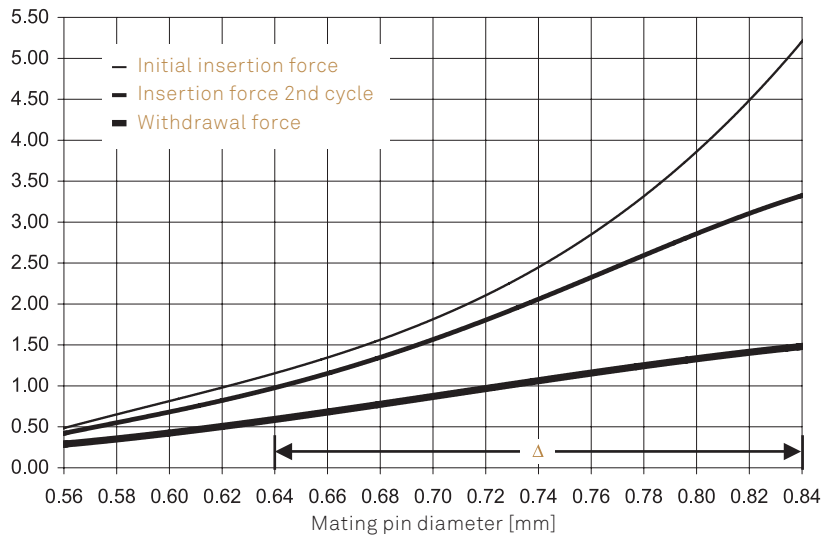
CLIP CODE 1610

6-FINGER

MATING PIN DIAMETER RANGE	0.56-0.84 mm
COMPLIANCY Δ	0.2 mm
MIN. MATING PIN LENGTH	2.7 mm
CURRENT RATING	5 A



Force [N]



CONTACTS



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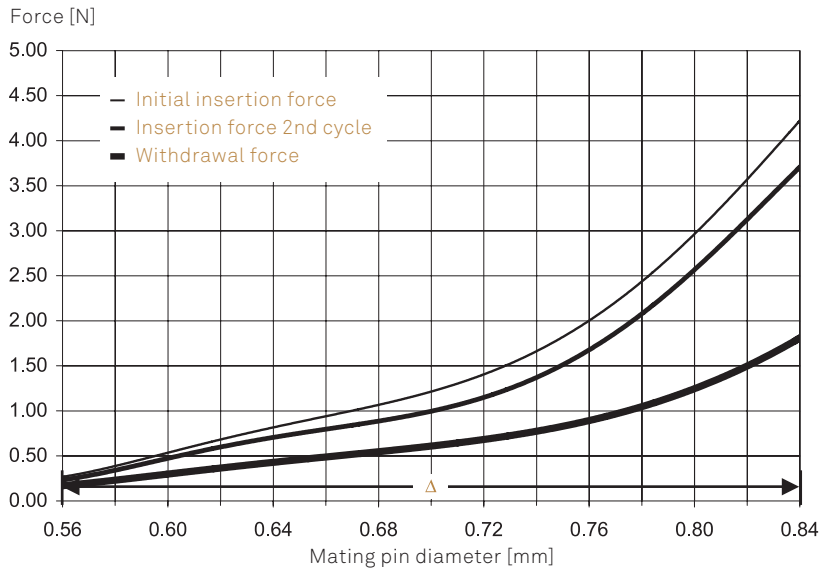
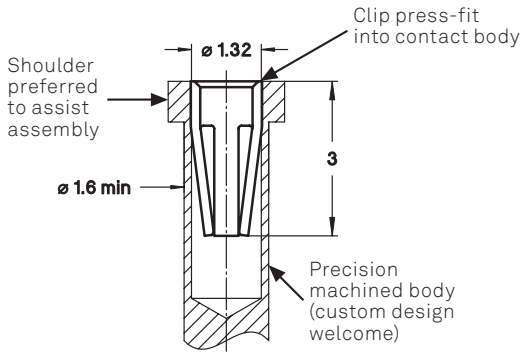
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CONTACT DATA

STANDARD CLIP

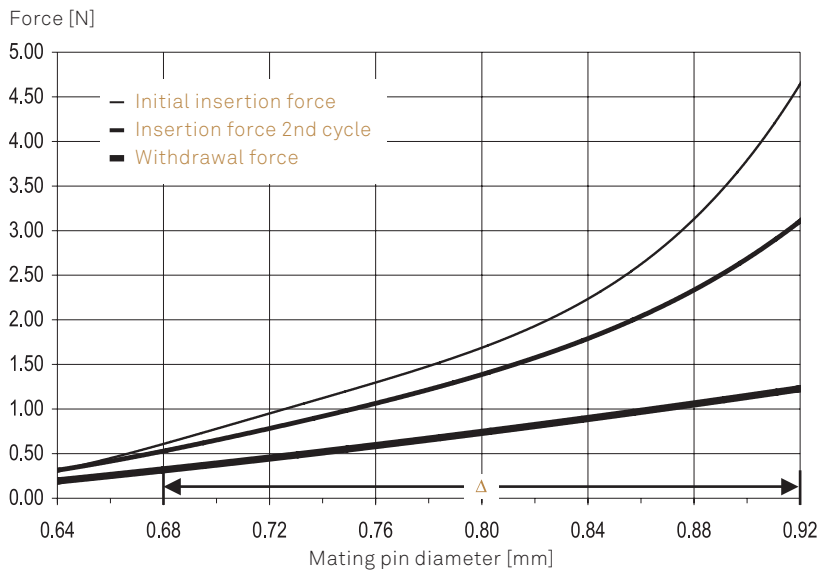
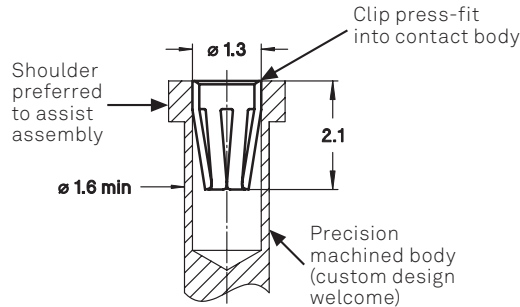
CLIP CODE 0610 4-FINGER

MATING PIN DIAMETER RANGE	0.56-0.84 mm
COMPLIANCY Δ	0.28 mm
MIN. MATING PIN LENGTH	3.5 mm
CURRENT RATING	5 A



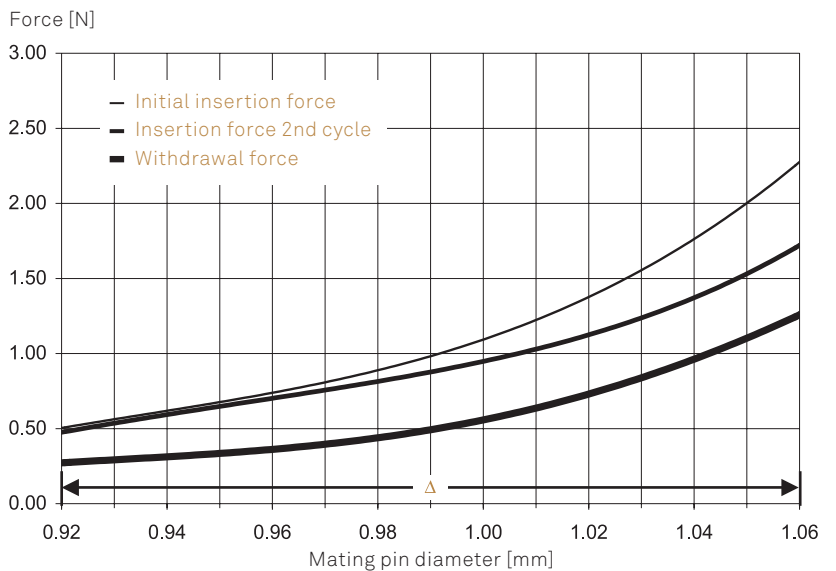
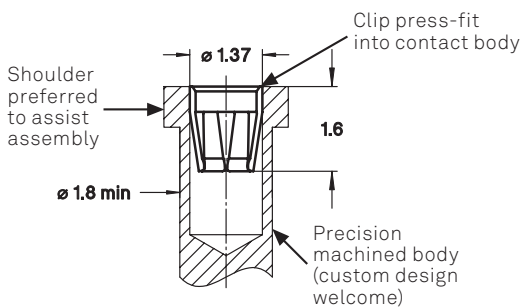
CLIP CODE 4710 6-FINGER

MATING PIN DIAMETER RANGE	0.64-0.92 mm
COMPLIANCY Δ	0.24 mm
MIN. MATING PIN LENGTH	2.6 mm
CURRENT RATING	5 A



CLIP CODE 1810 6-FINGER

MATING PIN DIAMETER RANGE	0.92-1.06 mm
COMPLIANCY Δ	0.14 mm
MIN. MATING PIN LENGTH	2.2 mm
CURRENT RATING	8 A





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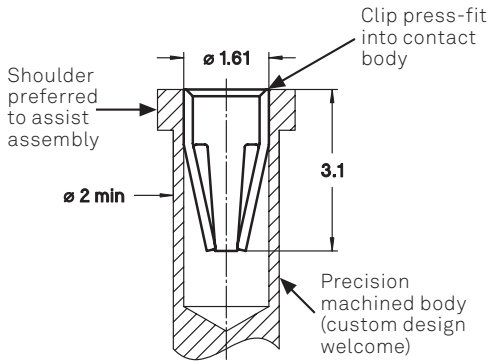
CONTACT DATA

STANDARD CLIP

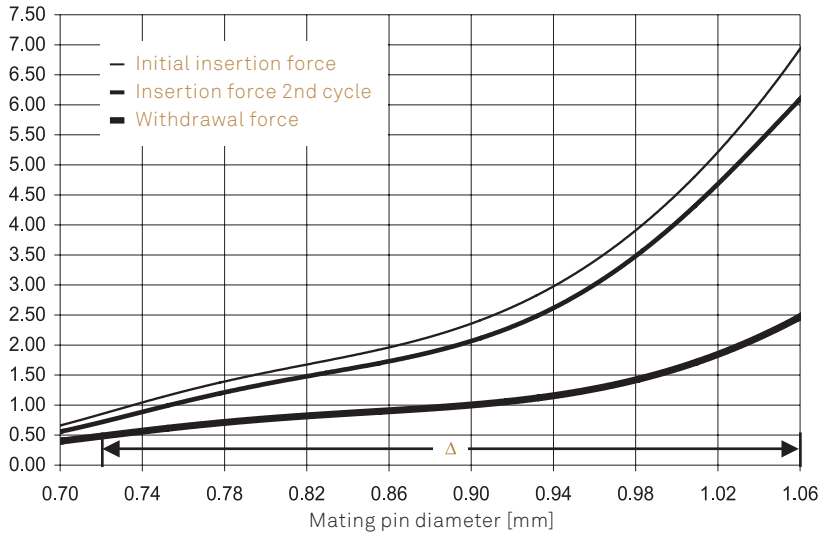
CLIP CODE 3410

4-FINGER

MATING PIN DIAMETER RANGE	0.7-1.06 mm
COMPLIANCY Δ	0.34 mm
MIN. MATING PIN LENGTH	3.7 mm
CURRENT RATING	8 A



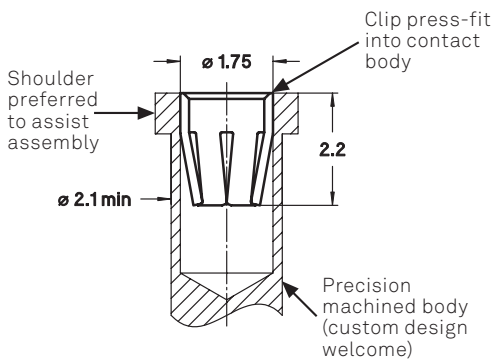
Force [N]



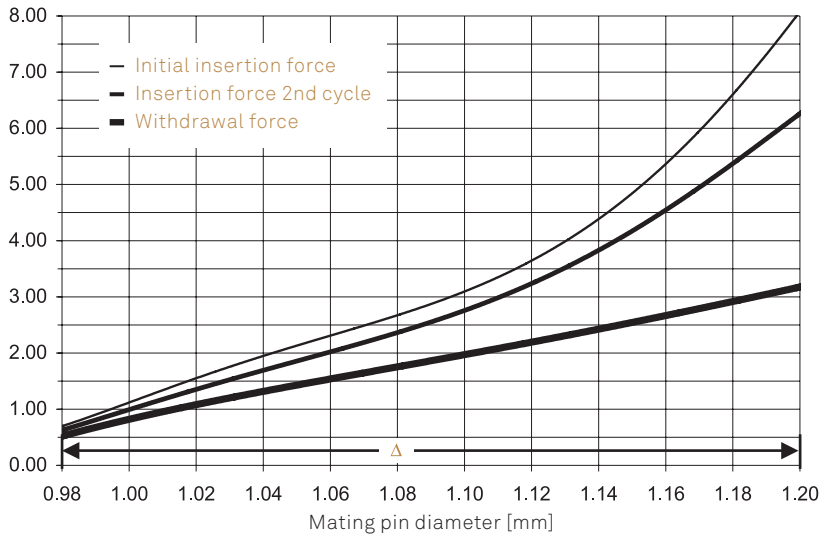
CLIP CODE 0210

6-FINGER

MATING PIN DIAMETER RANGE	0.98-1.2 mm
COMPLIANCY Δ	0.22 mm
MIN. MATING PIN LENGTH	3 mm
CURRENT RATING	8 A



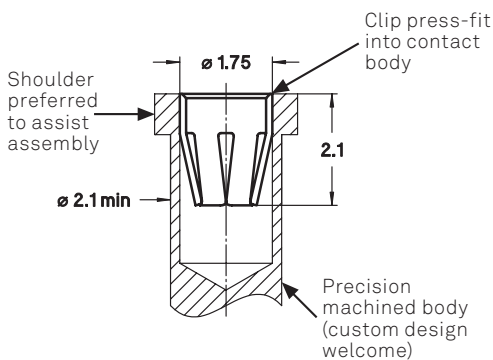
Force [N]



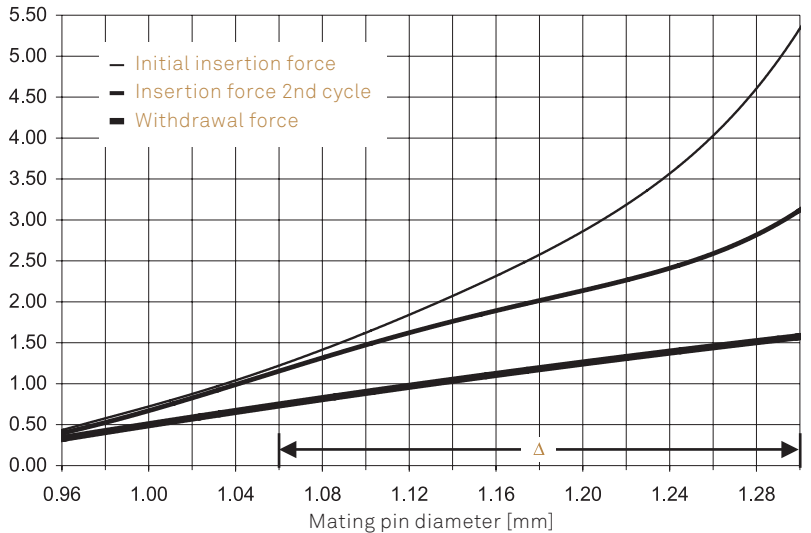
CLIP CODE 2710

6-FINGER

MATING PIN DIAMETER RANGE	0.96-1.3 mm
COMPLIANCY Δ	0.24 mm
MIN. MATING PIN LENGTH	3 mm
CURRENT RATING	8 A



Force [N]



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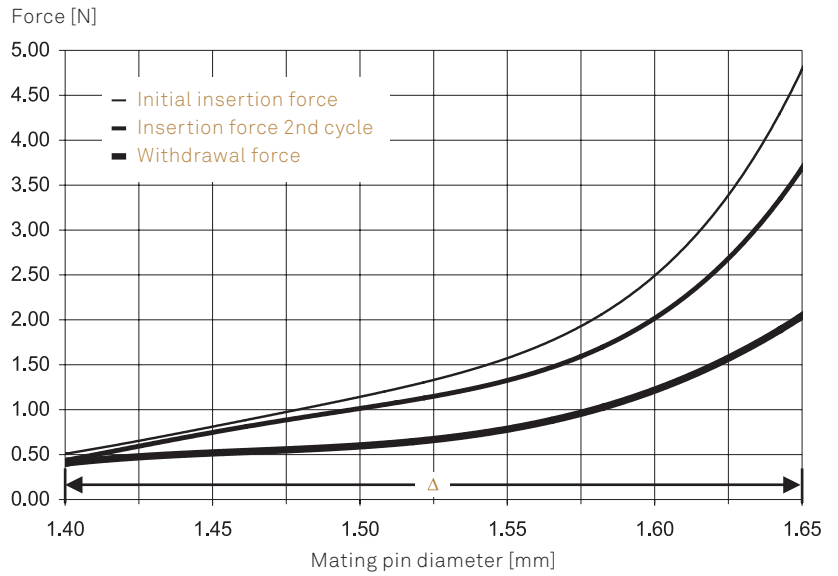
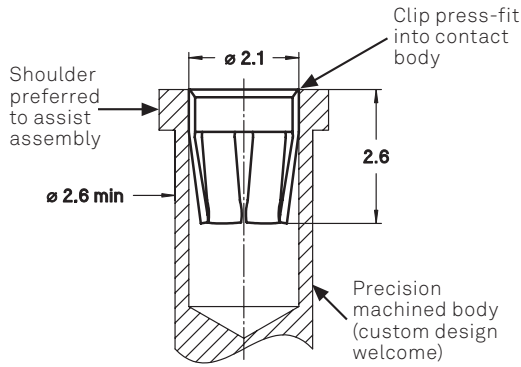
CONTACT DATA

STANDARD CLIP

CLIP CODE 4910

6-FINGER

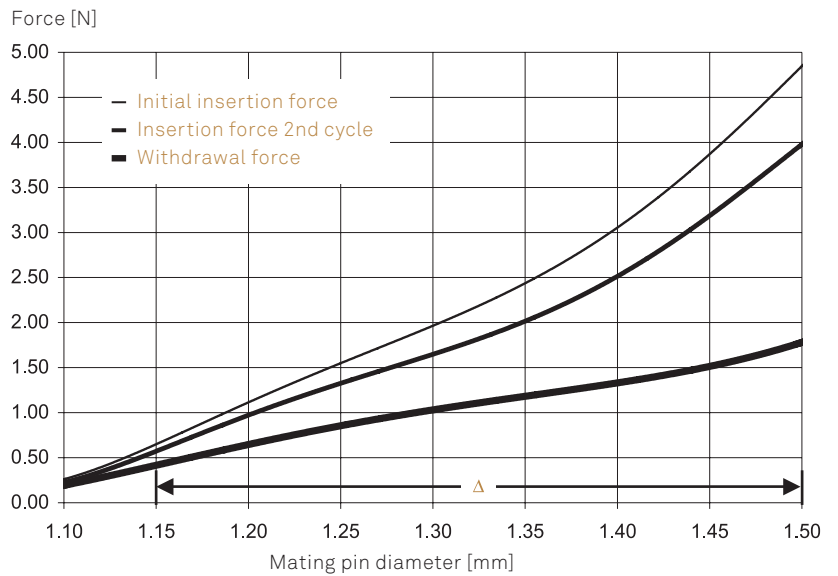
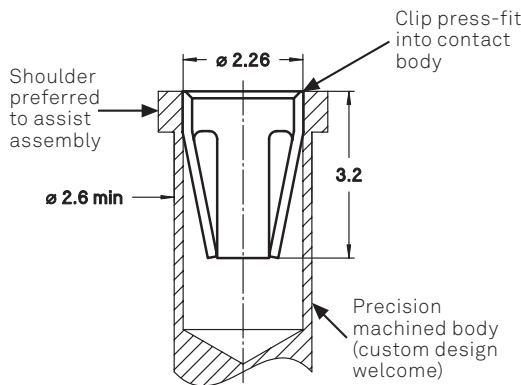
MATING PIN DIAMETER RANGE	1.4-1.65 mm
COMPLIANCY Δ	0.25 mm
MIN. MATING PIN LENGTH	3.4 mm
CURRENT RATING	11 A



CLIP CODE 1310

4-FINGER

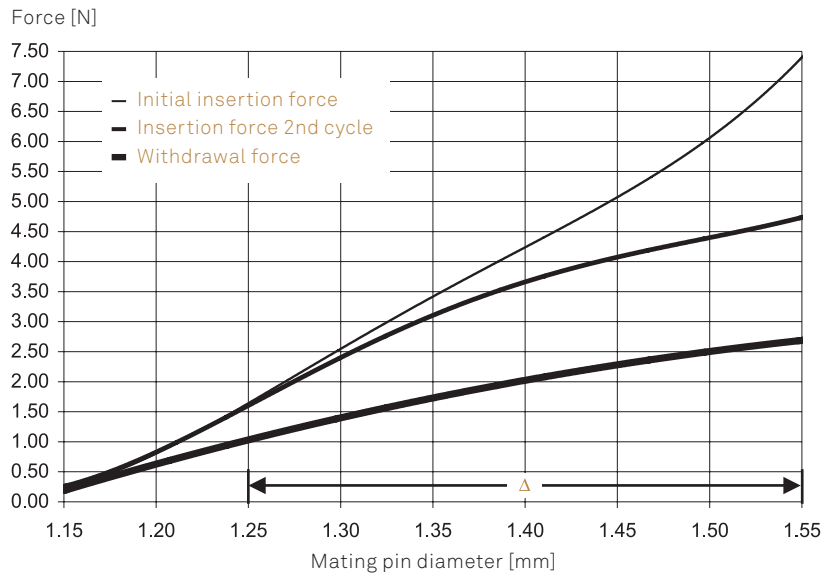
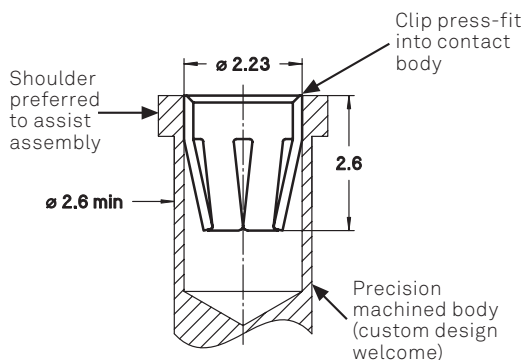
MATING PIN DIAMETER RANGE	1.1-1.5 mm
COMPLIANCY Δ	0.35 mm
MIN. MATING PIN LENGTH	4.2 mm
CURRENT RATING	11 A



CLIP CODE 2310

6-FINGER

MATING PIN DIAMETER RANGE	1.15-1.55 mm
COMPLIANCY Δ	0.3 mm
MIN. MATING PIN LENGTH	3.5 mm
CURRENT RATING	11 A





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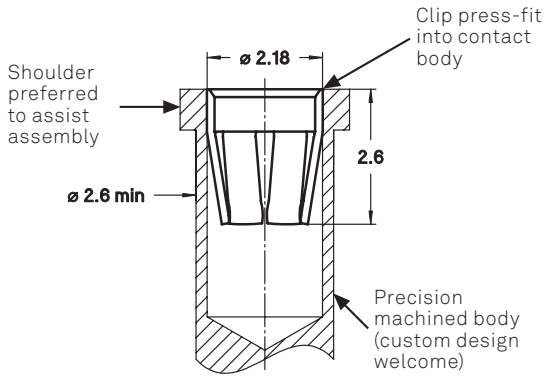
CONTACT DATA

STANDARD CLIP

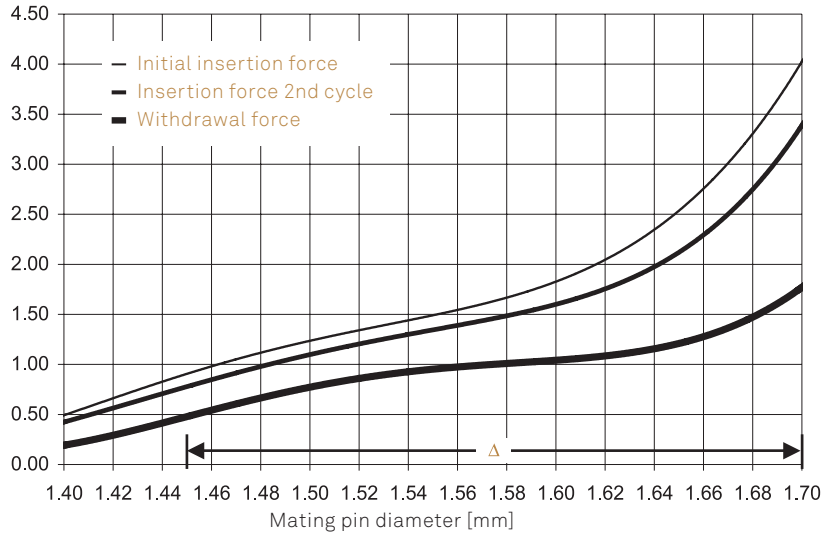
CLIP CODE 3920

6-FINGER

MATING PIN DIAMETER RANGE	1.4-1.7 mm
COMPLIANCY Δ	0.25 mm
MIN. MATING PIN LENGTH	3.5 mm
CURRENT RATING	11 A



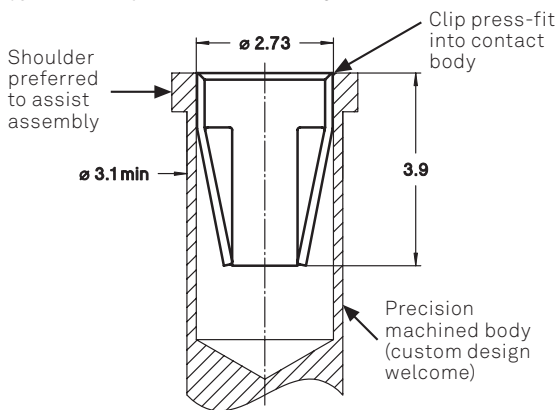
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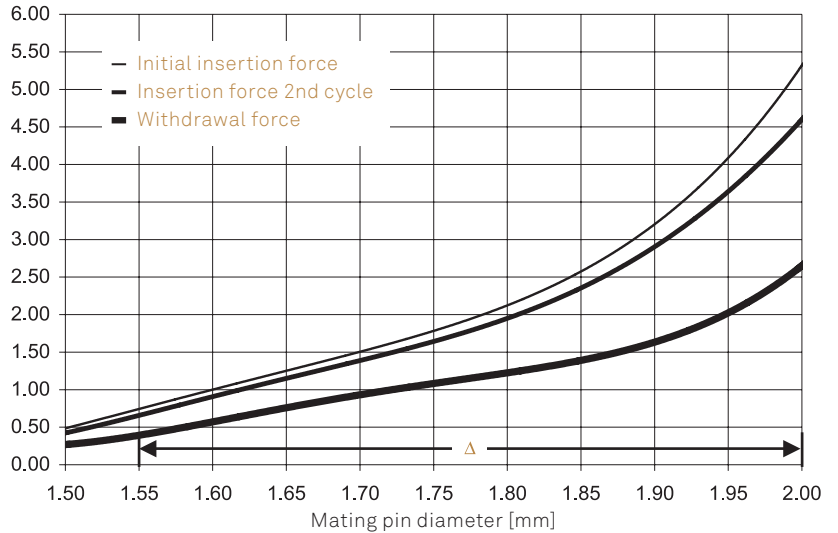
CLIP CODE 0710

4-FINGER

MATING PIN DIAMETER RANGE	1.5-2 mm
COMPLIANCY Δ	0.45 mm
MIN. MATING PIN LENGTH	5 mm
CURRENT RATING	15 A



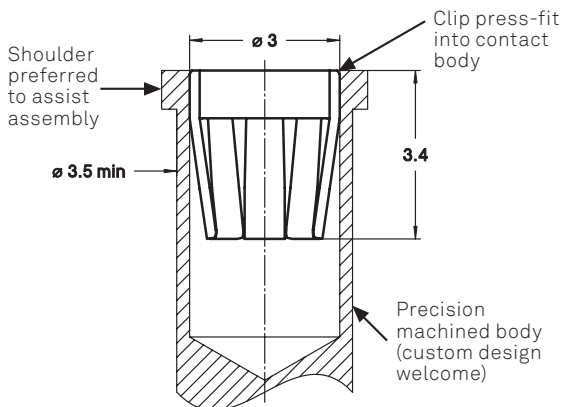
Force [N]



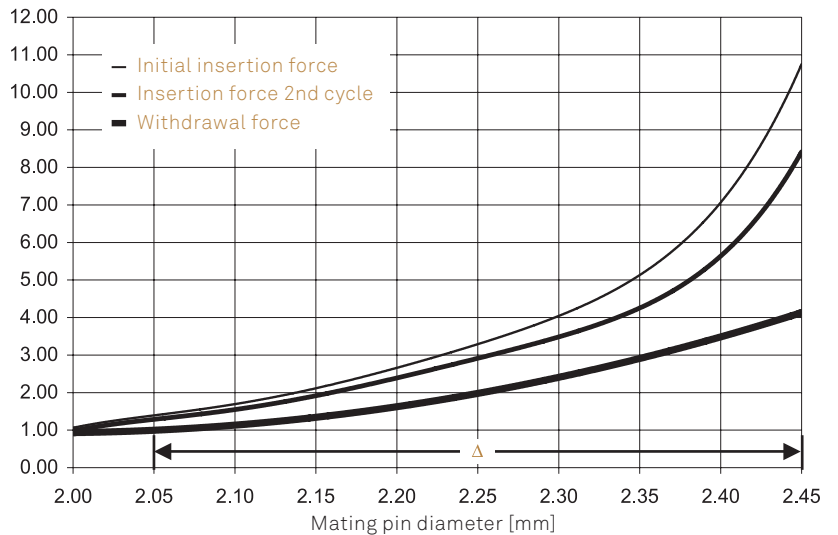
CLIP CODE 4010

8-FINGER

MATING PIN DIAMETER RANGE	2-2.45 mm
COMPLIANCY Δ	0.4 mm
MIN. MATING PIN LENGTH	4.7 mm
CURRENT RATING	18 A



Force [N]



CONTACTS