

# Custom Cable Assemblies for Medical Applications and more.



National Cable Molding is one of the United States' premier suppliers of custom molded electrical assemblies for medical applications.

Our capability for very high quality, complex assemblies, short to medium runs and fast prototyping provides a perfect fit for a wide range of products in the electronics industry.

We also offer a highly experienced engineering staff who can assist you in the development of your product.

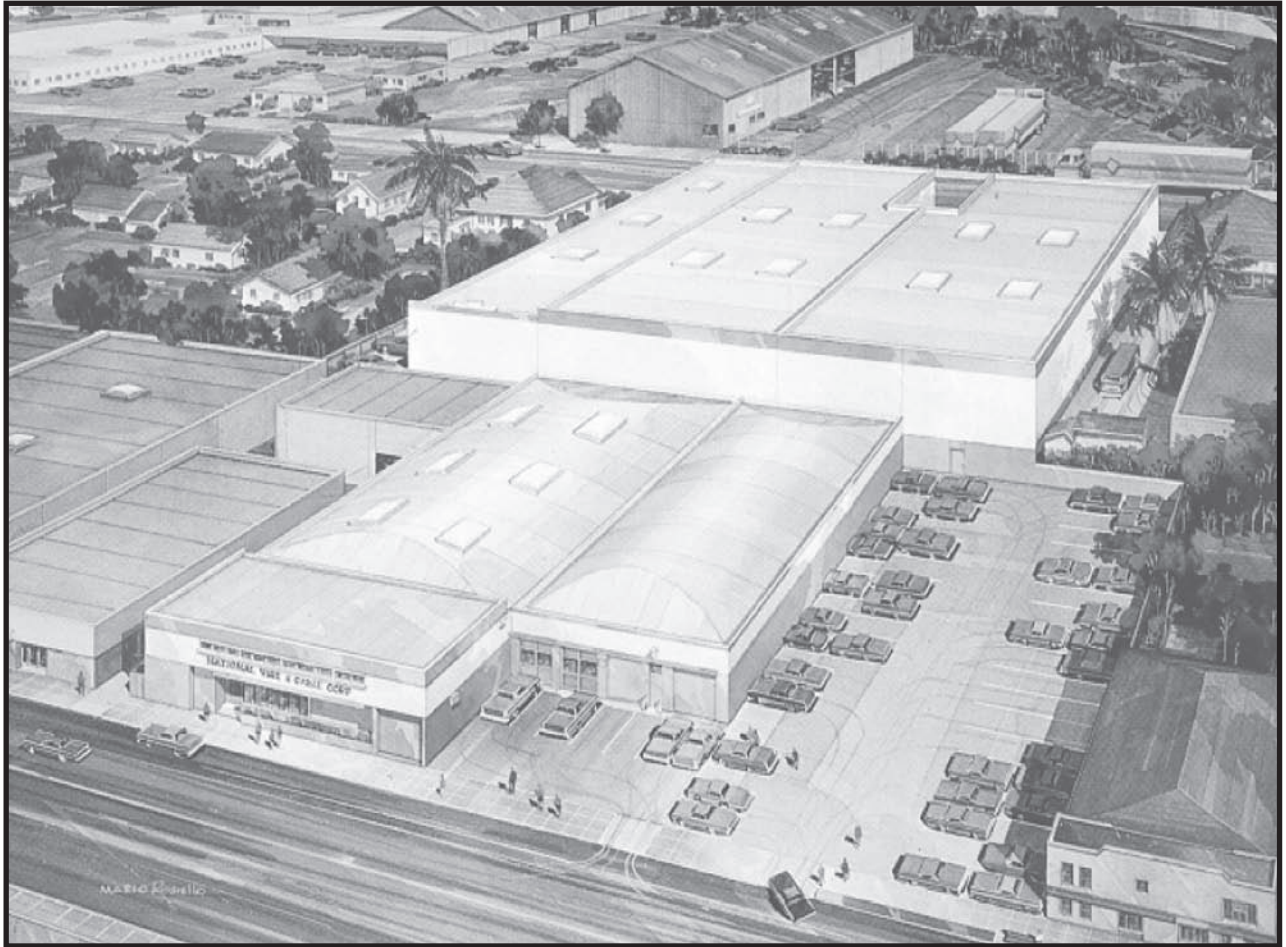


## National Cable Molding

Custom Cable Assemblies

a Division of National Wire and Cable





National Wire and Cable and National Cable Molding Headquarters  
Los Angeles California

# CAPABILITIES

- Medical
- Business Machines
- Communications Equipment
- Computer Equipment
- Audio Systems
- General Instrumentation



National Cable Molding specializes in custom cable assemblies with integral-molded connectors. Our products are designed mainly for the medical environment where quality and reliability are critical. Over the last 35 years our cables have proven themselves time and time again under the most adverse conditions

National Cable Molding shares the same manufacturing facility as the parent corporation, National Wire & Cable. This allows for very tight control over the cable products that we use and eliminates the problems normally associated with buy-out components. Vertical Integration of the manufacturing process is what enables us to deliver superior quality products.

National Cable Molding can build to your exact specifications, or our engineering staff can assist you with designing the right assembly for your application.

Options include molding on an industry standard connector for superior mechanical properties, or integral molding a custom connector to fit your specific application.



## What is the Integral Molding Concept?

1. Bulk cable ends are stripped, individual electrical contacts are attached to wires.
2. Cable end with contacts attached is placed inside proprietary mold tooling system.
3. Hot plastic is injected into tool by unique high-speed molding equipment.
4. Finished connector comes out of tool ready to use. Created directly around cable, contacts and shell.
5. A conventional connector is not used or attached to cable. Instead we form the connector body around the cable and pins by unique molding processes.

## Why Integral Molding is Better:

1. Professional custom-made appearance.
2. More compact, light weight.
3. Highly reliable molded construction.
4. Cable assemblies are supplied ready to use.
5. Permits a wide choice of custom connector shapes.
6. Permits a large cost savings due to high-production techniques.

## Unique Advantages:

### *To Purchasing*

1. No connectors to buy and stock.
2. No bulk cable to buy and stock.
3. In-house assembly and soldering people not required. Training is unnecessary.
4. Cable assemblies arrive complete - ready to use.
5. Shipments scheduled to meet your needs, minimizing your inventory.
6. You deal direct with the original manufacturer of both cable and connectors.
7. No odd hardware and connector accessories to buy and stock.
8. Very low cost compared to conventional construction.

### *To Engineering*

1. Highly reliable due to embedded construction in connector and wires.
2. No failures due to shorts. Molded insulation is excellent dielectric material.
3. Molded insulation provides a distributed strain-relief to all wires and the cable jackets, minimizing failure due to axial strain on the cable.
4. Consistent low capacitance between circuits.
5. Connector body outer surfaces are resilient, crack-proof, dent-resistant
6. Connector Pins cannot "pull back" or move due to cable tensions.

### *To Designers*

1. Permits unlimited choice of custom connector shapes for special applications.
2. Molding allows certain shapes which cannot be obtained in metal connectors.
3. Permits wide choice of colors for connector and cable.
4. Molding allows use of plastic or metal inserts, clips, threaded nuts and other embedded materials not available in standard connectors.

### *To Marketing*

1. Molded connectors have a custom professional appearance.
2. Molded connectors and cable can be color-matched to the equipment.
3. Molded connectors cannot tarnish. They're always glossy, neat in appearance.
4. Your company name, trademarks or part number may be a permanent part of your connector surface.
5. Pricing advantages due to low cost of molded cables.

### *To Production Managers*

1. In-house assembly and soldering personnel not required.
2. Inventory of cable & connectors not required.
3. Assembly personnel training not required.
4. Plant floor-space for assembly operation is free for other uses.
5. No investment in high-production cable-terminating equipment.
6. A single source is responsible for delivery of cable, connectors and effort to provide the finished item, permitting a unified control to meet our schedules.

### *For Quality Control*

1. A single source is responsible for connectors, bulk cable, assembly and molding.
2. Separate inspections of connectors, cable, soldering are avoided.
3. Cable assembly arrives as a single unit; ready for acceptance.
4. Inspection labor time is a minimum.

## The Overall Picture:

Integrally-molded connectors on cable assemblies are being used in increasingly wider applications by manufacturers whose product uses cord or cable assemblies.

The custom professional appearance, reliability and economy of connectors molded on the cable makes this type of assembly a logical choice over conventional methods.

The fact that a molded connector may be custom-shaped for economy, often permits a better product plus added economy, compared to conventional methods.

Although integrally-molded connectors lend themselves to high-volume production, short runs (100 pieces) are still practical due to our proprietary molding and tooling technology plus our selection of standard adjustable tooling.

We provide complete design and engineering services to assist in specifying molded cable and connectors.

As the manufacturer of all components involved in a molded cable assembly, we are able to exercise unified control of design, engineering and manufacture of all wire, cable, contacts, hardware, molding and tooling to produce truly professionals, quality molded-connector cables economically and promptly.

These quality ready-to-use cable assemblies, made to your specifications, delivered promptly, ease the load on your purchasing, supervision and production.

## The Cable

National has a complete wire and cable mill for manufacturing all types of control cable and special-purpose electronic wire. We specialize in custom cable manufacture. These facilities allow us to furnish exactly the cable needed for your particular product, tailored to your own specifications.

Features: Special colors of outer plastic jacket; name or part number permanently embossed in surface of cable jacket; ultra flexible cable constructions; ultra low capacitance cables; special shielding techniques for low noise cable; engineering and design service for your special requirements.

Many standard cable constructions are carried in our warehouse where we stock over 300 different control cable types, in addition to our 100 million foot inventory of electronic hook up wires. These stocks, plus normal 2-shift factory operation, allow rapid supply of cable for molded cable assemblies.

## The Connector

National's proprietary molding and tooling techniques allow us to create the connector directly on the cable by embedding cable, contacts and hardware in hot-injected plastic. Thus a conventional purchased connector is not used with consequent savings.

A connector may be only one pin molded to a leadwire or may have dozens of contacts molded onto large cable with embedded hardware. We mold on a wide selection of connectors using our standard contacts and hardware. Some common types are:

- Male and female plugs on cable
- Male and female contacts on leadwires
- Medical electrodes
- Short plugs
- Molded leg breakouts on cables
- Molded yokes on cables
- Y and Y molded splices
- Test probes and leads

## The Tools

We invite your inquiries on our standard or special connector styles. Our engineering staff will be pleased to discuss your particular requirements.

The tools for high-speed injection molding are precision machines in themselves, having high-accuracy fits on internal and external portions.

By proprietary molding and tool-making techniques on our special machinery, we are able to tool cable-connector designs at greatly reduced cost compared to conventional methods.

These great savings are passed on to the customer in the form of lower unit prices.

A wide variety of standard cable-connector tools are available for producing your assembly with no tooling costs. Often our mold specialists can adjust our non-standard tools for your special needs with only a minor engineering change.

Due to their proprietary nature, tools are generally retained by us when they may be used on other work by adjustments. Where the customer must have privacy of use, there is a nominal engineering change.

## How to get the Ball Rolling

1. Specify the type of cable
  - a. number of conductors and wire gauge
  - b. voltage ratings, shielding

We carry many standard cables, or will make cable to your exact needs.

2. Specify connector your assembly must mate
  - a. number of contacts
  - b. shell style or type -- manufacturer's part number desirable
3. Specify quantity, cable length and delivery rate you'll need
4. Specify colored or special marking you prefer
  - a. your name or part number on cable sheath
  - b. your name or part number on connectors
  - c. cable or connector color

## Technical Notes

Connectors with round shells may have several clocking angles and keyway positions, allowing simple polarization of similar plugs. right-angles cable exit direction may also be controlled by position of keyway. Integrally-molded plastic strain-relief tube may be included on any connector.

Raised markings may be included on connector. Bold Gothic type is normally used. Trademarks may also be molded-in. Permanent indent-marking is available on cable sheath.

Threaded molded-in inserts for screws, external fittings are available, also alligator flat-jaw clamps and chain loops. Consult our engineering for details of accessories and mounting.

Special-purpose exterior surface shapes are available, such as flats, inset or raised areas, slots, grooves, keys, through or blind holes, finger grips, knurled or patterned areas. Consult our design service for suggestions and innovations.

## TABLE OF CONTENTS

FIGURE NO.	MOLD NO.	DESCRIPTION
1a	T-151	MS CONNECTOR, WITH STRAIN RELIEF
1	T-188	SAFETY YOKE ASSEMBLY
2a	T-115	MS CONNECTOR, STANDARD VERSION
2	T-214	SAFETY CHOKE YOKE ASSEMBLY
3a	T-102	RIGHT ANGLE MS CONNECTOR - STANDARD
3a	T-216	RIGHT ANGLE MS CONNECTOR - LOW PROFILE
3	B-01-090	RIGHT ANGLE MS CONNECTOR - STRAIN RELIEF
4a	T-180	DIN CONNECTOR, STRAIN RELIEF VERSION
4	T-148	YOKE BREAKOUT ASSEMBLY, MINIATURE VERSION
5a	T-109	DIN CONNECTOR, STANDARD VERSION
5	T-103	STANDARD YOKE BREAKOUT ASSEMBLY
6a	B-01-155	ACCESSORY CONNECTOR
6a	B-01-155	MINI-DIN CONNECTOR
6	T-131	RESISTOR YOKE BREAKOUT ASSEMBLY
7a	B-01-131	H.P. INSTRUMENT CONNECTOR
7	T-136	YOKE BREAKOUT ASSEMBLY, STRAIN RELIEF VERSION
<b><u>PHONE PLUGS</u></b>		
8a	T-108	.250" DIA. TWO CONNECTOR PHONE PLUG (Style A)
8a	T-108	.250" DIA. THREE CONNECTOR PHONE PLUG (Style B)
8a	T-108	.250" DIA. FOUR CONNECTOR PHONE PLUG (Style C)
8a	T-108	.173" DIA. THREE CONNECTOR PHONE PLUG (Style D)
8a	T-108	TWO CONDUCTOR POWER JACK (Style E)
<b><u>YOKE BREAKOUT LEAD TERMINATIONS</u></b>		
8	T-144	STANDARD MEDICAL-GRADE SNAP
8	T-133	PINCH CLIP
8	T-140	.125" PIN PLUG
8	T-116B	BANANA PLUG
<b><u>ADDITIONAL PHONE PLUG CONNECTORS</u></b>		
9	T-116B	TWO COND. 2.5 mm or 3.5 mm PHONE PLUG (Style A)
9	T-116B	THREE COND. 2.5mm or 3.5mm PHONE PLUG (Style B)
9	B-01-006	.250 TWO OR THREE COND. 90DEG PHONE PLUG (Style C)
9	B-01-026	TWO COND. 2.5mm or 3.5mm PHONE PLUG (Style D)
9	B-01-026	THREE COND. 2.5mm or 3.5mm PHONE PLUG (Style E)
9	B-01-205	.281 FIVE COND. PHONE PLUG (Style F)

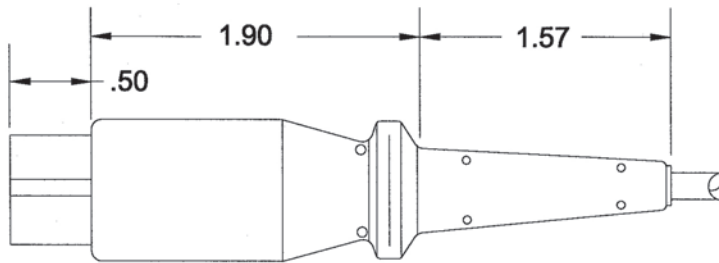
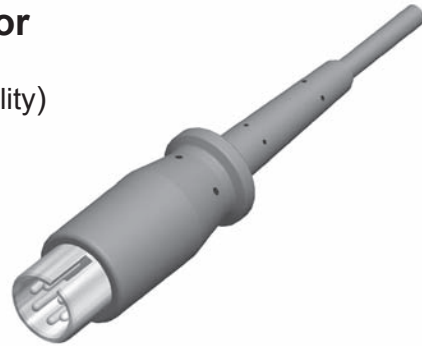
## TABLE OF CONTENTS

FIGURE NO.	MOLD NO.	DESCRIPTION
10	T-188	HARNESS ASSEMBLY
<b><u>SUBMINIATURE CONNECTORS</u></b>		
11	T-236-1	9 POS MALE/FEMALE W/PAN HEAD SCREWS
11	T-236	9 POS MALE/FEMALE W/THUMBSCREWS
11	T-238	25 POS MALE/FEMALE with Pan Head Screws or Thumbscrews
12		CABLE AND LEAD RETAINERS
<b><u>MOLDED LEADWIRE ASSEMBLIES</u></b>		
13		SAFETY LEADWIRE ASSEMBLY FOR T-188 AND T214 SAFETY YOKES WITH STRAIN RELIEF SNAP
14		SAFETY LEADWIRE ASSEMBLY FOR T-188 AND T-214 SAFETY YOKES
<b><u>ADDITIONAL LEADWIRE TERMINATIONS</u></b>		
15a	T-140	2.5mm PHONE PLUG
15a	T-179-B3	2.5mm or 3.5mm PHONE PLUG
15a	T-100	.125 PIN CONNECTOR
15a	T-179-B3	STANDARD BANANA PLUG
15a	T-184	STANDARD BANANA PLUG
15a	T-176	STANDARD BANANA PLUG
15a	T-116B	STANDARD BANANA PLUG
15	T-162	1/4" MALE SNAP WITH 1/4 WATT RESISTOR
15	T-164-F	STD. MEDICAL SNAP WITH 1/4 WATT RESISTOR
15	T-129	STANDARD MALE SNAP
15	T-164-M	STANDARD MALE SNAP WITH 1/4 WATT RESISTOR
15	CB-02-008	ALLIGATOR CLIP
15	T-169	1.5mm SAFETY SOCKET
15	T-138	3mm or 4mm BANANA JACKET

**Military Style Connector**

Strain Relief Version  
(with molded-in resistor capability)

**Mold No. T-151**



**PIN ARRANGEMENTS**

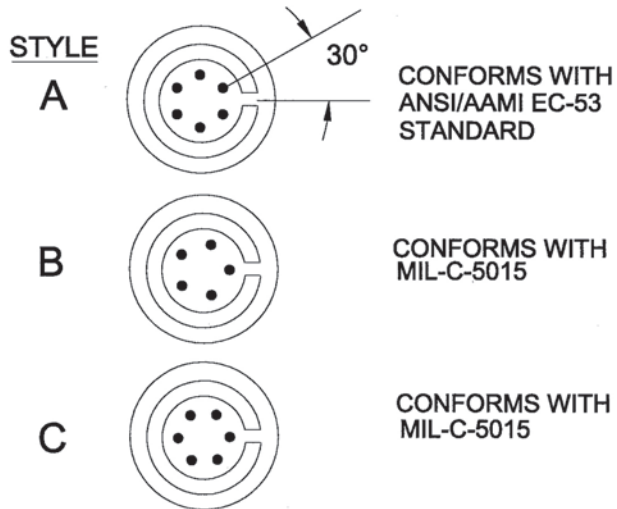


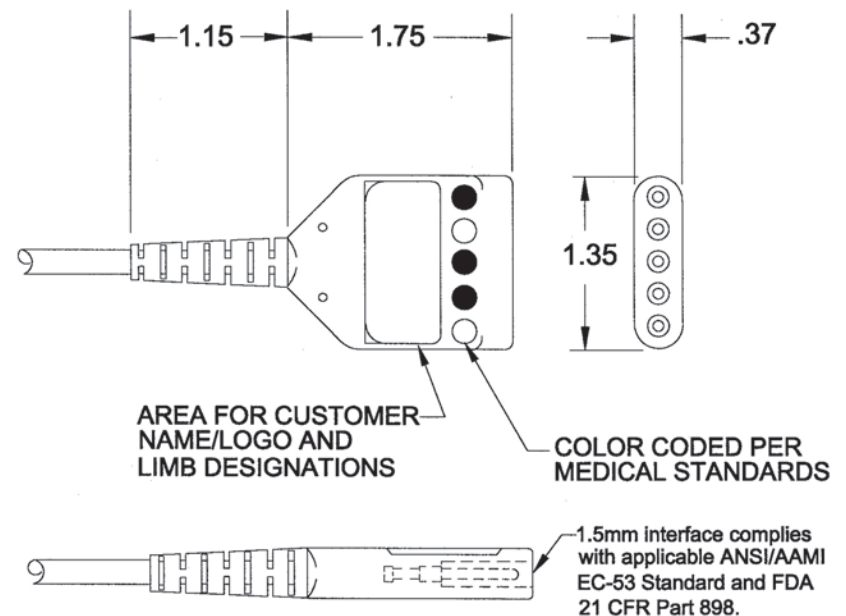
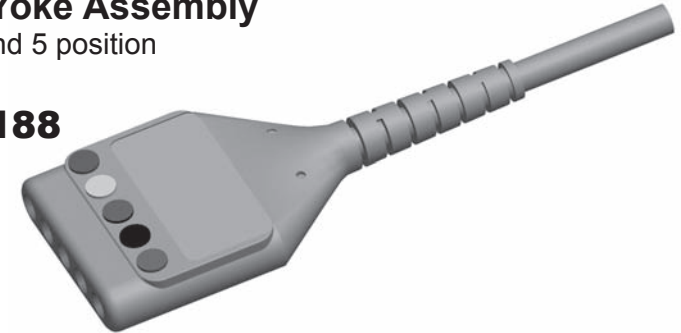
FIGURE 1A

Order Desk **323-225-5611**  
[www.nationalwire.com](http://www.nationalwire.com)

**Strain Relief Yoke Assembly**

Available in 3, 4 and 5 position  
(5 position shown)

**Mold No. T-188**



1. Assembly may be ETO gas sterilized.
2. Optional colors for cable and yoke assembly are medium gray, light gray and black. (Color matching available).
3. Mates with leadwire assemblies as shown on sheets 14 and 15.
4. Bedsheet clip cable strap available (see sheet 13).

Order Desk **323-225-5611**  
[www.nationalwire.com](http://www.nationalwire.com)

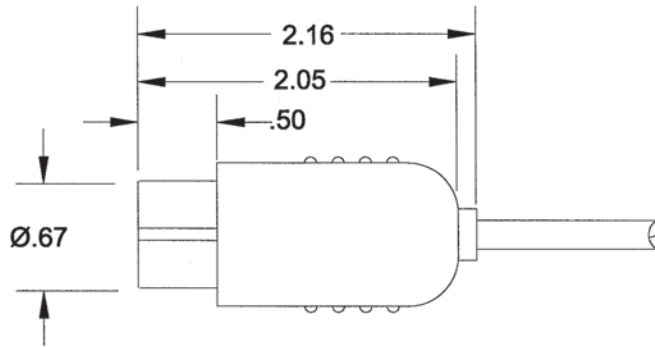
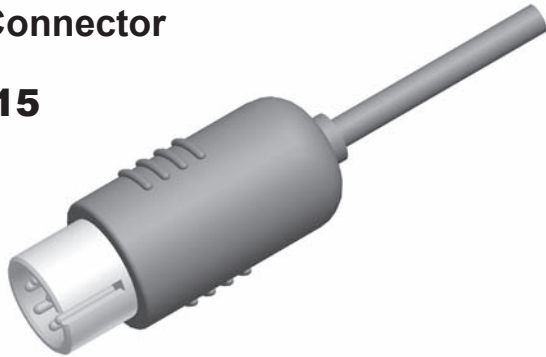
FIGURE 1



**Military Style Connector**

Standard Version

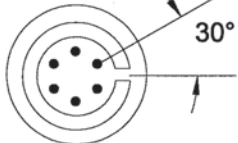
**Mold No. T-115**



**PIN ARRANGEMENTS**

**STYLE**

**A**



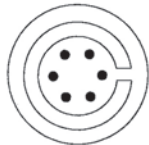
CONFORMS WITH  
ANSI/AAMI EC-53  
STANDARD

**B**



CONFORMS WITH  
MIL-C-5015

**C**



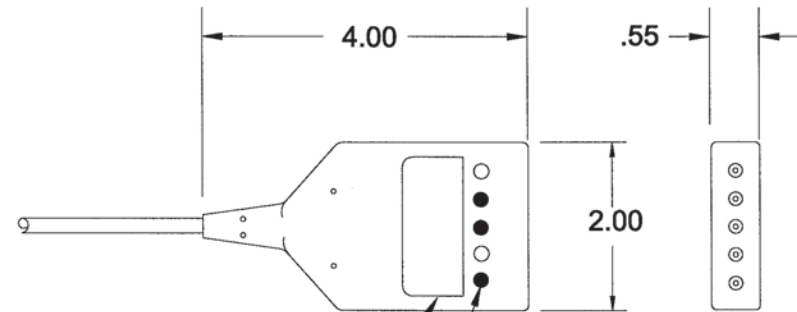
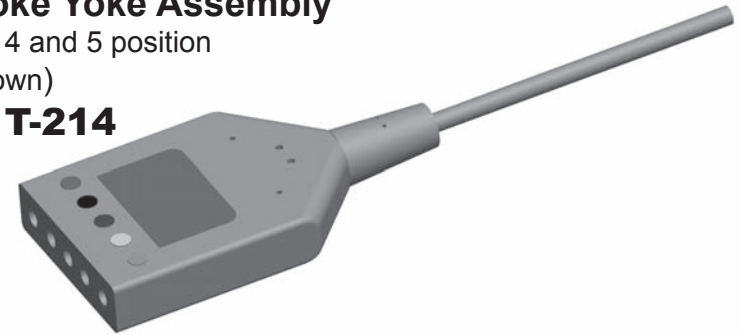
CONFORMS WITH  
MIL-C-5015

**Safety Choke Yoke Assembly**

Available in 3, 4 and 5 position

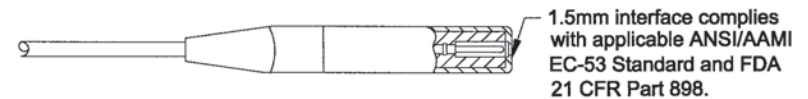
(5 position shown)

**Mold No. T-214**



AREA FOR CUSTOMER  
NAME/LOGO AND  
LIMB DESIGNATIONS

COLOR CODED PER  
MEDICAL STANDARDS



1. Assembly may be ETO gas sterilized.
2. Yoke capable of molded -in 1 Watt resistors and RF chokes in each position.
3. Optional colors for cable and yoke assembly are: Medium gray, light gray and black. (Color matching available).
4. Mates with leadwire assemblies as shown on sheets 14 and 15.
5. Bedsheet clip cable strap available (see sheet 13).

FIGURE 2a

Order Desk **323-225-5611**  
www.nationalwire.com

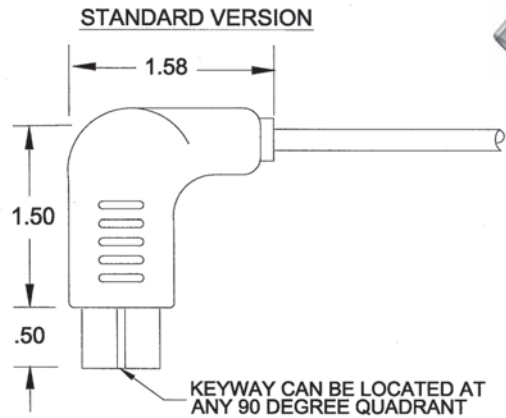
FIGURE 2

Order Desk **323-225-5611**  
www.nationalwire.com

**Right Angle Military Style Connector**

Standard Version

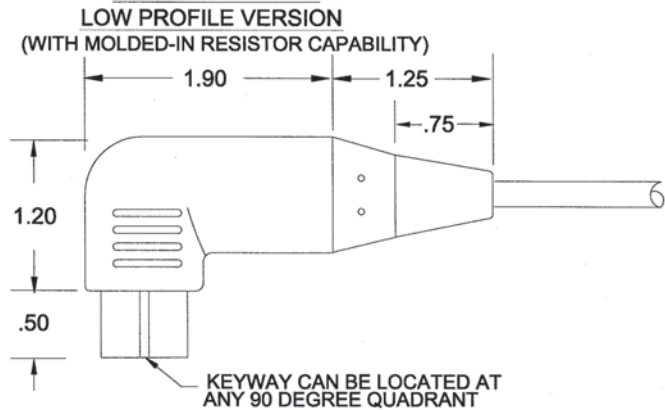
**Mold No. T-102**



Low Profile Version

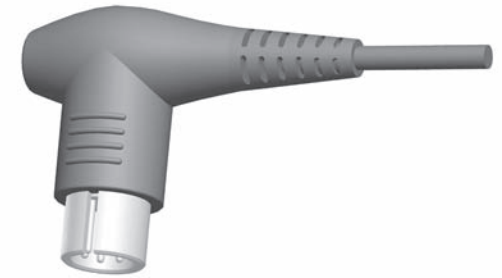
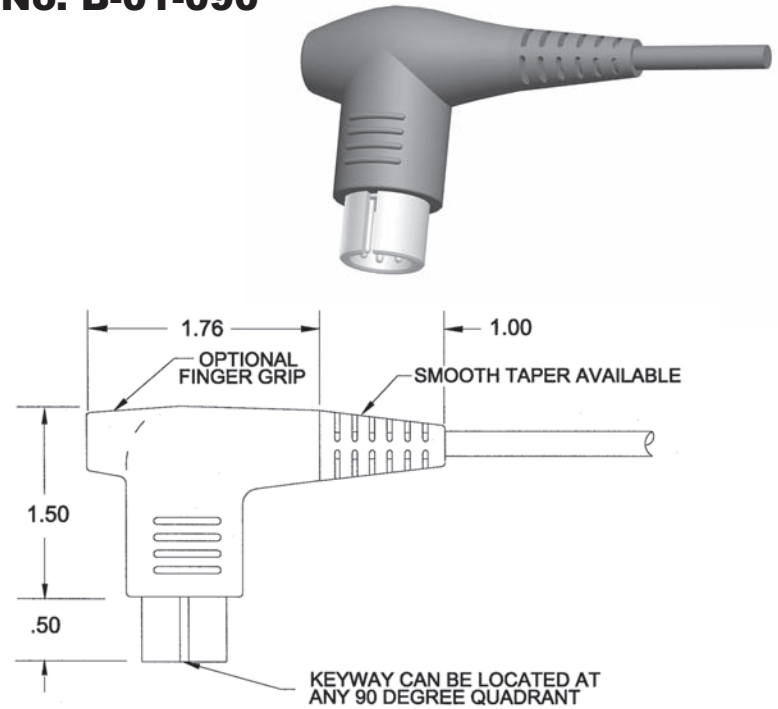
(with molded-in resistor capability)

**Mold No. T-215**



Strain Relief Version

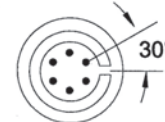
**Mold No. B-01-090**



**PIN ARRANGEMENTS**

STYLE

A



CONFORMS WITH  
ANSI/AAMI EC-53  
STANDARD

B



CONFORMS WITH  
MIL-C-5015

C

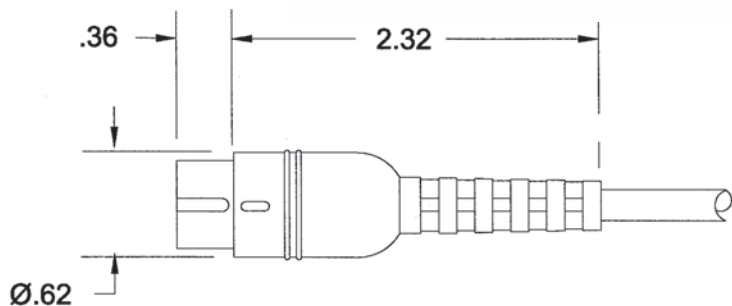
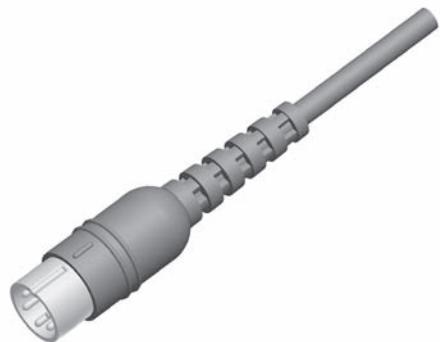


CONFORMS WITH  
MIL-C-5015

FIGURE 3a

FIGURE 3

**DIN Connector**  
Strain Relief Version  
**Mold No. T-180**



**PIN ARRANGEMENTS**

**STYLE**

**A**



5 PIN  
AT 180°

**B**



5 PIN  
AT 240°

**C**



6 PIN  
AT 240°

**D**

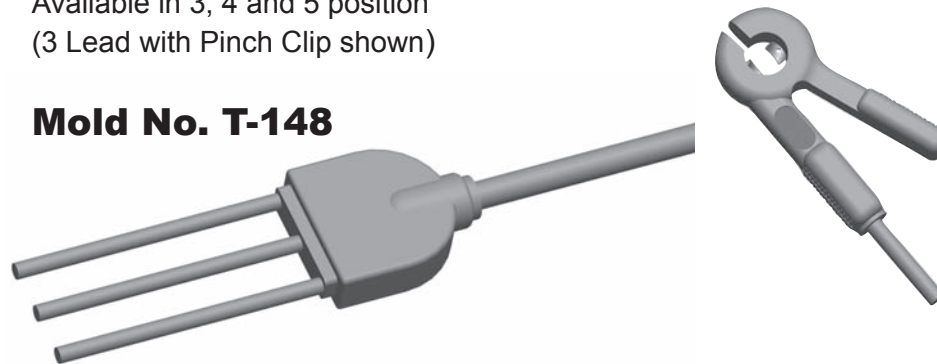


7 PIN  
AT 270°

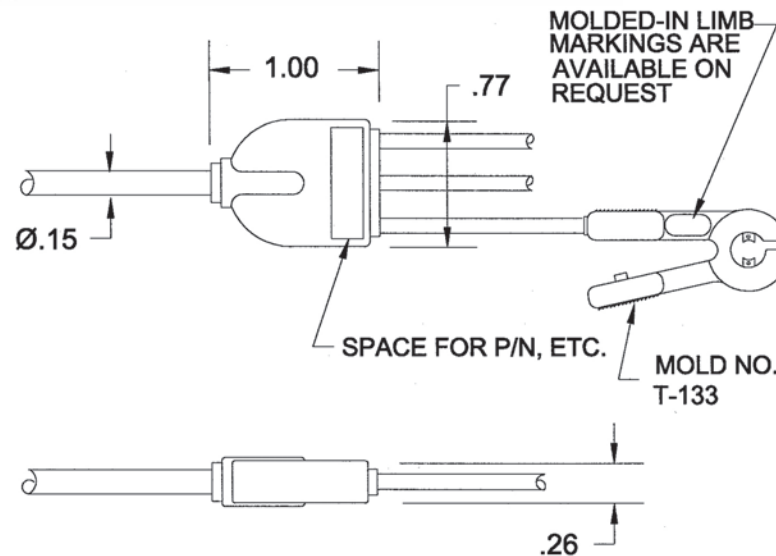
FIGURE 4a

Order Desk **323-225-5611**  
[www.nationalwire.com](http://www.nationalwire.com)

**Miniature Yoke Breakout Assembly**  
Available in 3, 4 and 5 position  
(3 Lead with Pinch Clip shown)



**Mold No. T-148**



1. Assembly may be ETO gas sterilized.
2. Optional colors for cable and yoke assembly are:  
Medium gray, light gray and black.  
(Color matching available).
3. See sheet 8 for additional yoke breakout lead terminations.

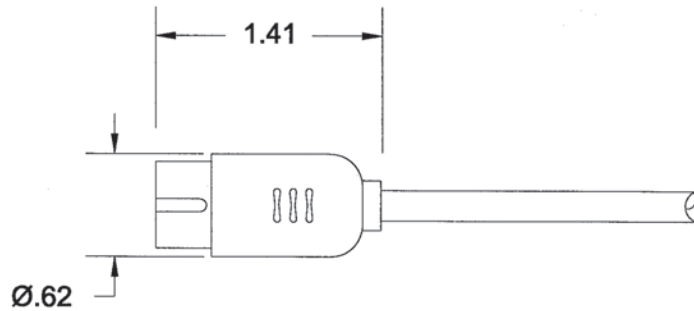
Order Desk **323-225-5611**  
[www.nationalwire.com](http://www.nationalwire.com)

FIGURE 4

**DIN Connector**

Standard Version

**Mold No. T-109**



**PIN ARRANGEMENTS**

**STYLE**

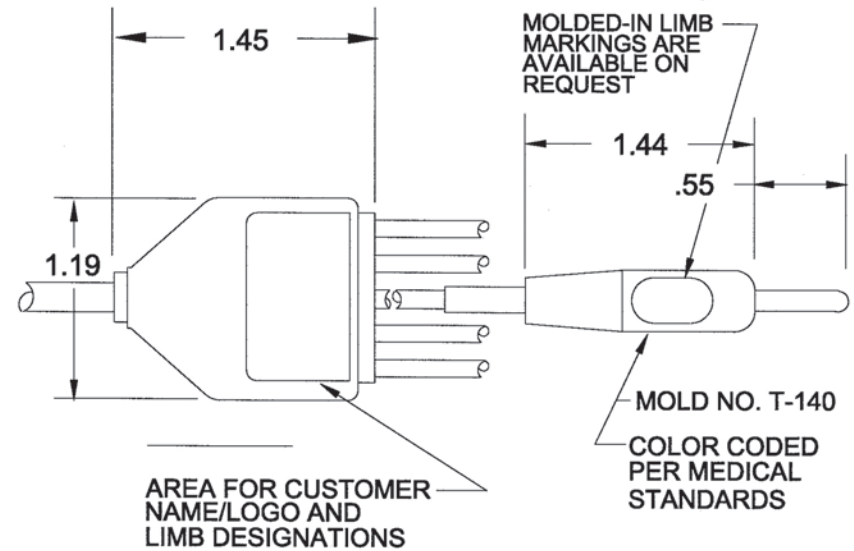
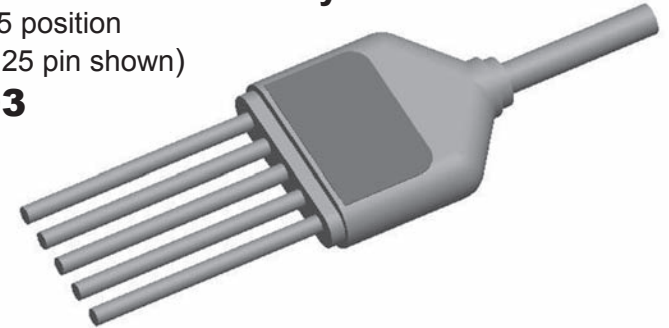
A		5 PIN AT 180°
B		5 PIN AT 240°
C		6 PIN AT 240°
D		7 PIN AT 270°

**Standard Yoke Breakout Assembly**

Available in 3, 4 and 5 position

(5 lead version with 125 pin shown)

**Mold No. T-103**



1. Assembly may be ETO gas sterilized.
2. Optional colors for cable breakout assembly and leads are: medium gray, light gray and black. (Color matching available). Colored leads available.
3. See sheet 8 for additional yoke breakout lead terminations.
4. Lead retainer with bedsheet clip available (see sheet 13).

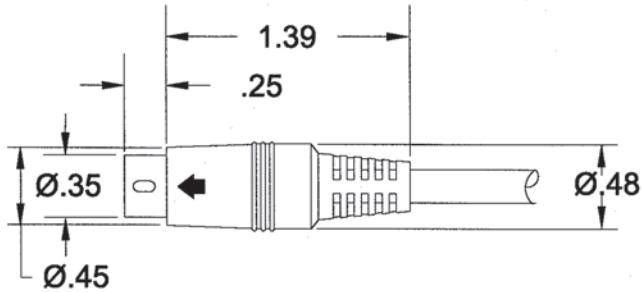
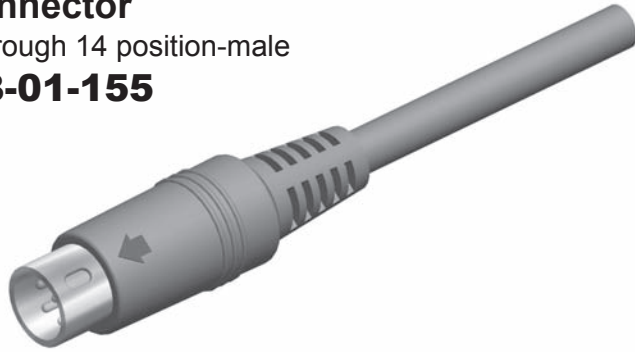
FIGURE 5a

FIGURE 5

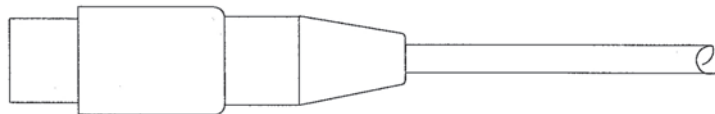
**Mini DIN Connector**

Available in 3 through 14 position-male

**Mold No. B-01-155**



**ACCESSORY CONNECTOR**



CUSTOMER SPECIFIED  
CONNECTOR CAN BE  
INSTALLED ON  
REQUEST

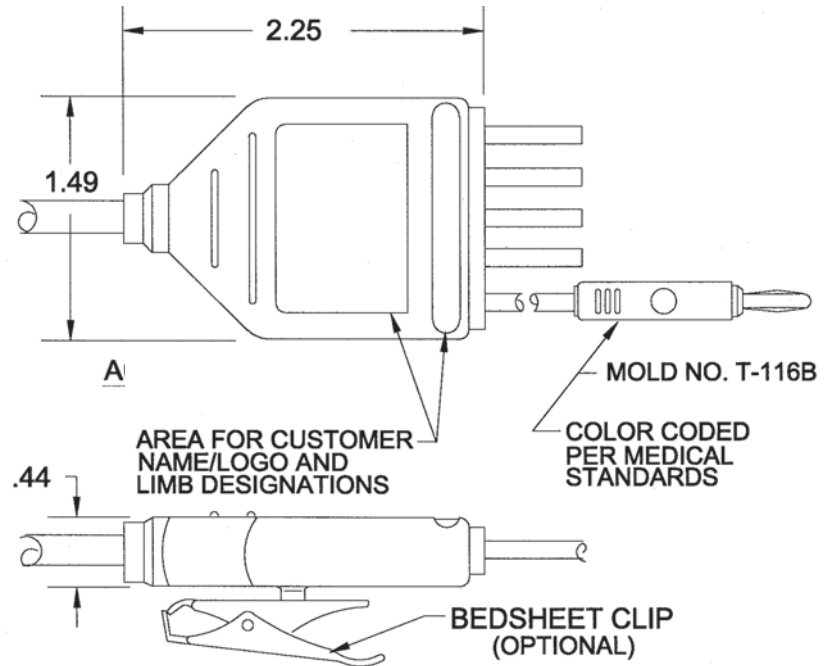
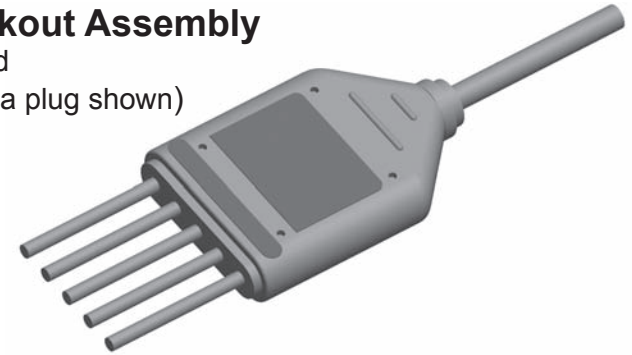
FIGURE 6a

**Resistor Yoke Breakout Assembly**

Available in 3, 4 and 5 lead

(5 lead version with banana plug shown)

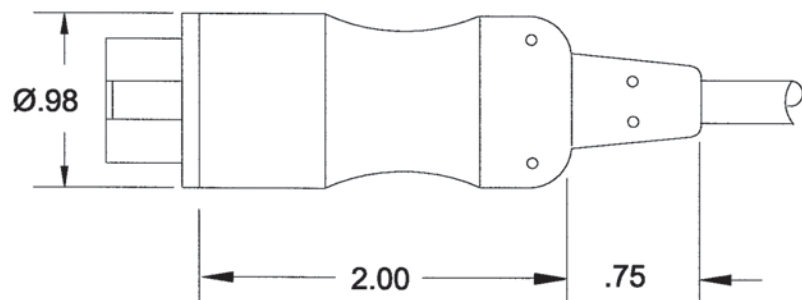
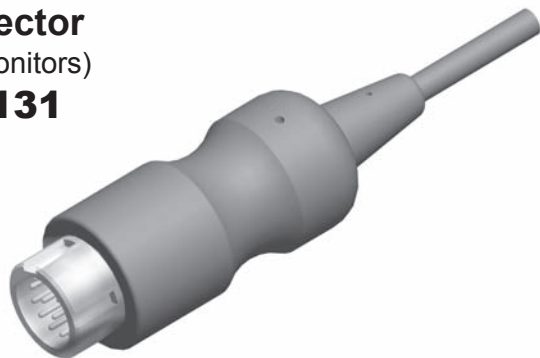
**Mold No. T-131**



1. Assembly may be ETO gas sterilized.
2. Yoke capable of molded-in series resistors (1 Watt or smaller for each position).
3. Optional colors for cable and breakout assembly are: Medium gray, light gray and black. (Color matching available). Colored leads available.
4. See sheet 8 for additional yoke breakout leads terminations.

FIGURE 6

**Instrument Connector**  
(Compatible with HP monitors)  
**Mold No. B-01-131**



**STYLE**

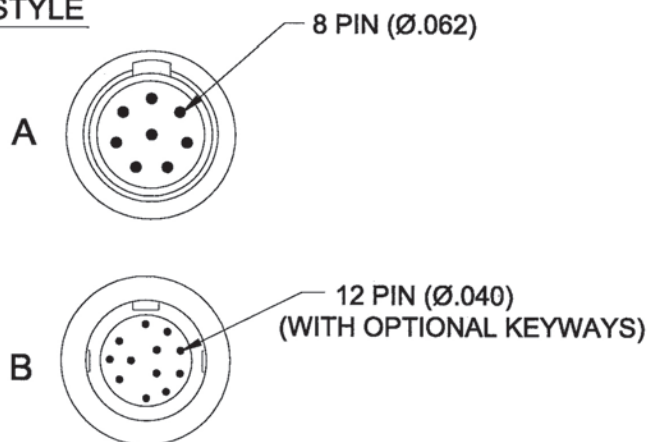
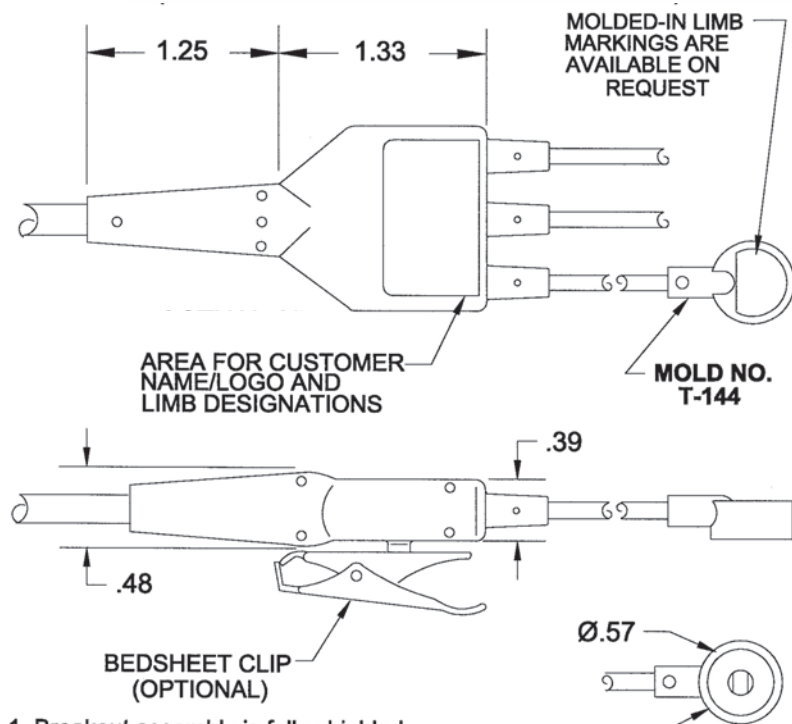
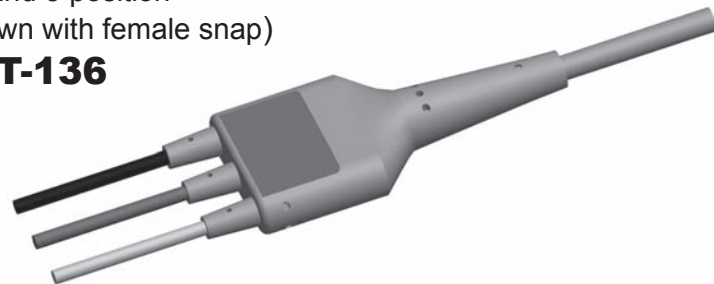


FIGURE 7a

Order Desk **323-225-5611**  
www.nationalwire.com

**Strain Relief Yoke Breakout Assembly**  
Available in 3 and 5 position  
(3 position shown with female snap)  
**Mold No. T-136**

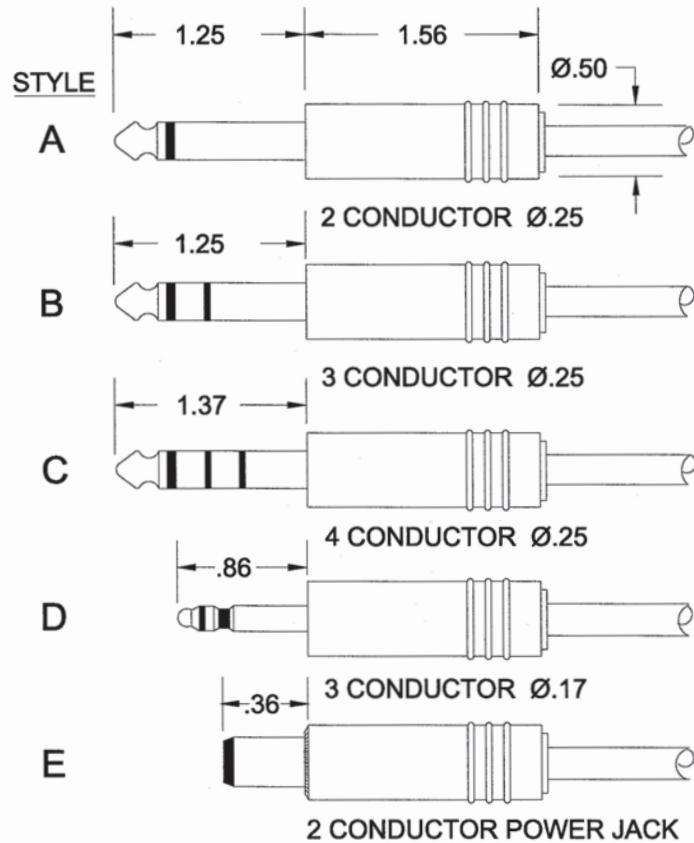
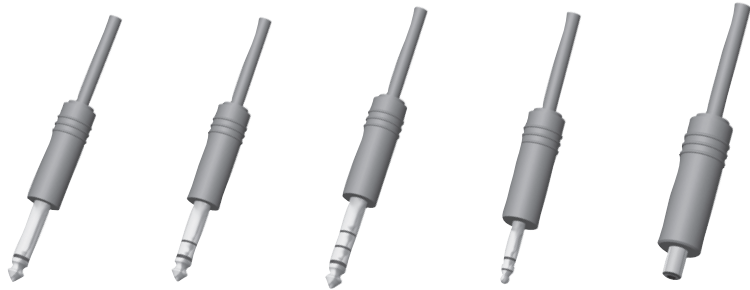


1. Breakout assembly is fully shielded.
2. Assembly may be ETO gas sterilized.
3. Optional colors for cable and breakout assembly are: Medium gray, light gray and black. (Color matching available). Colored leads available.
4. See sheet 8 for additional yoke breakout lead terminations.

Order Desk **323-225-5611**  
www.nationalwire.com

FIGURE 7

**Phone Plugs**  
**Mold No. T-108**



**Yoke Breakout Lead Terminations**

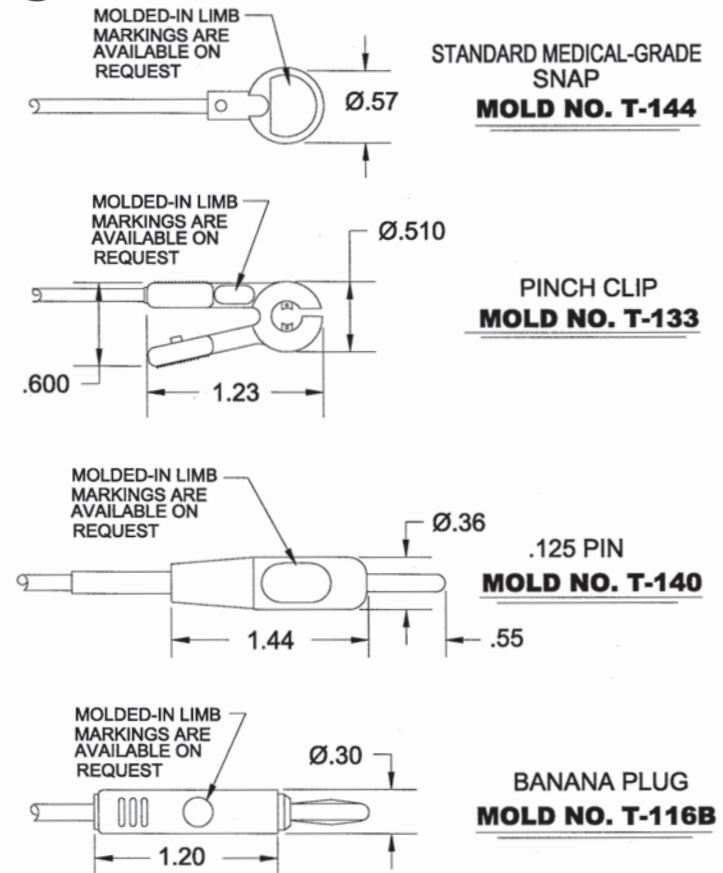


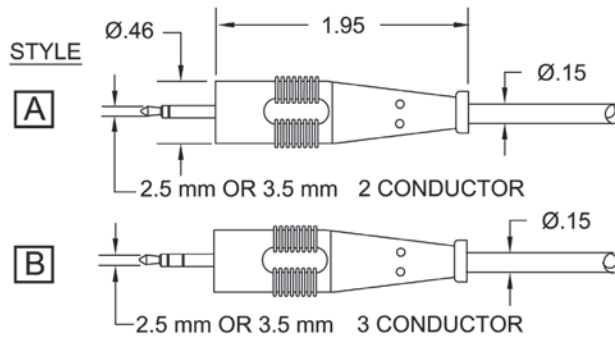
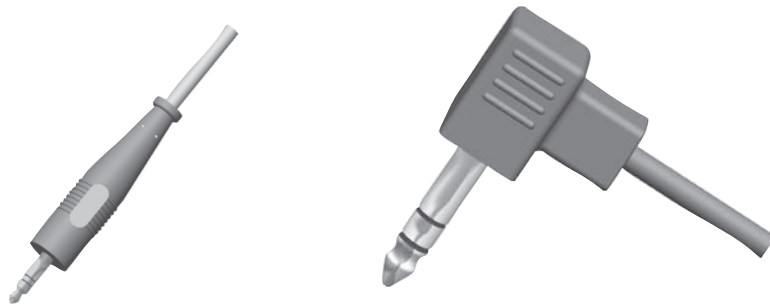
FIGURE 8a

Order Desk **323-225-5611**  
[www.nationalwire.com](http://www.nationalwire.com)

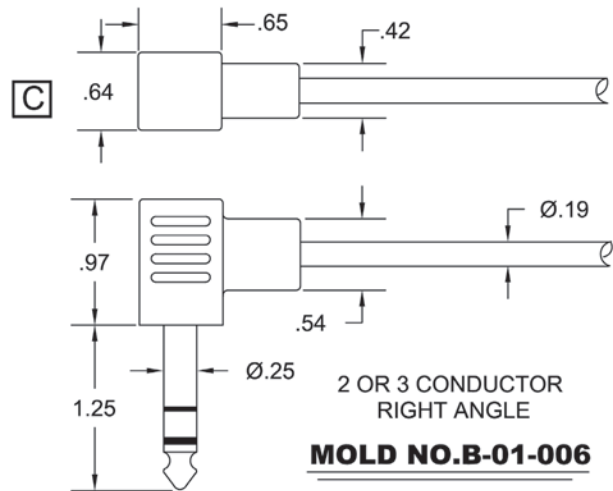
Order Desk **323-225-5611**  
[www.nationalwire.com](http://www.nationalwire.com)

FIGURE 8

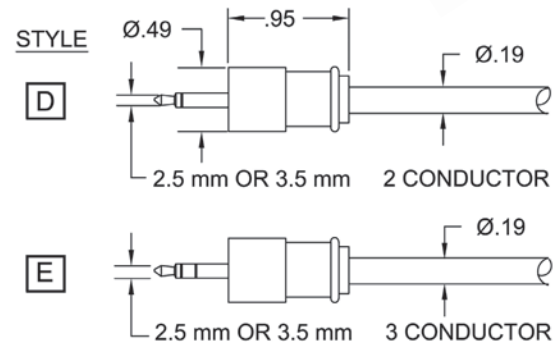
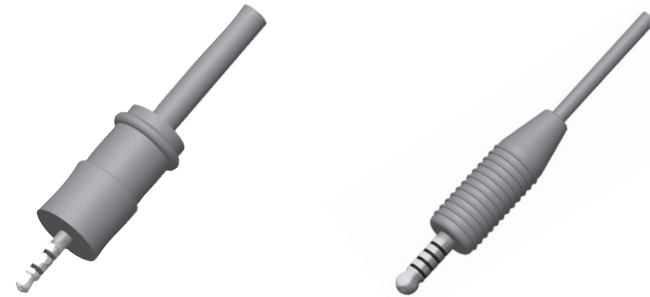
**Additional Phone Plug Connectors**



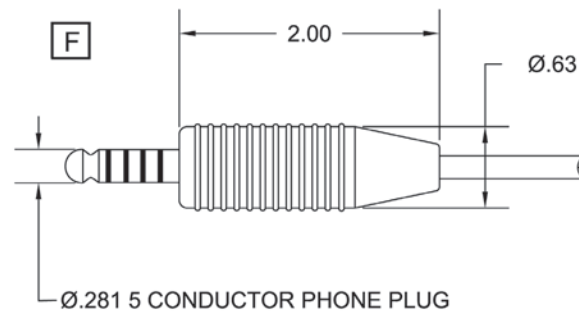
**MOLD NO. T-116B**



**MOLD NO. B-01-006**



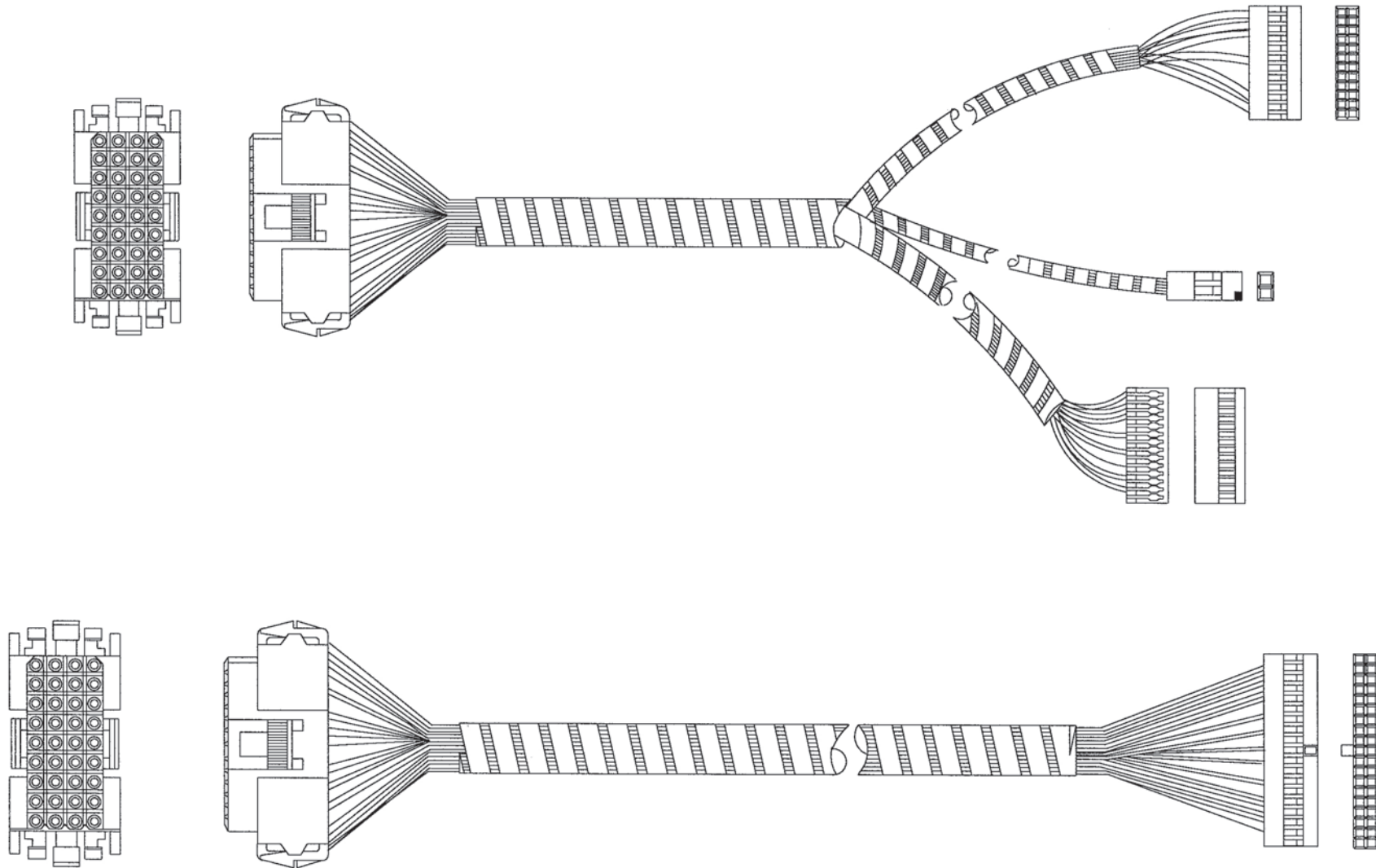
**MOLD NO. B-01-026**



**MOLD NO. B-01-205**



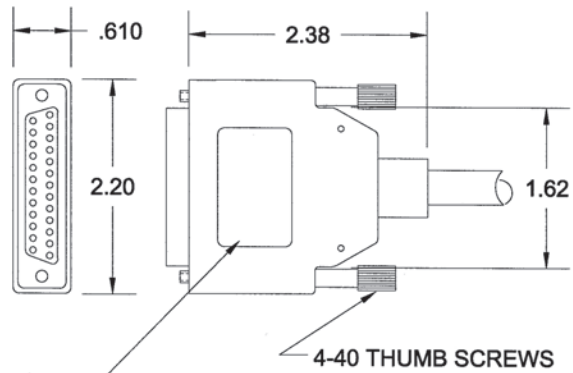
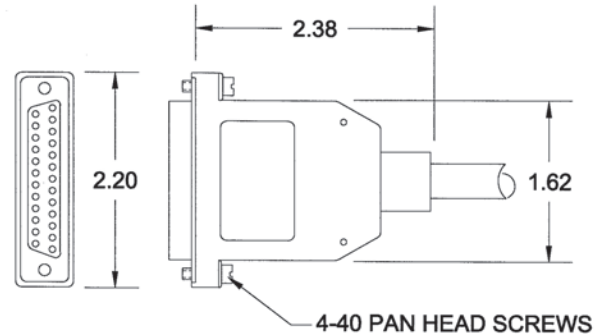
**Harness Assemblies**



**Subminiature D Connectors**



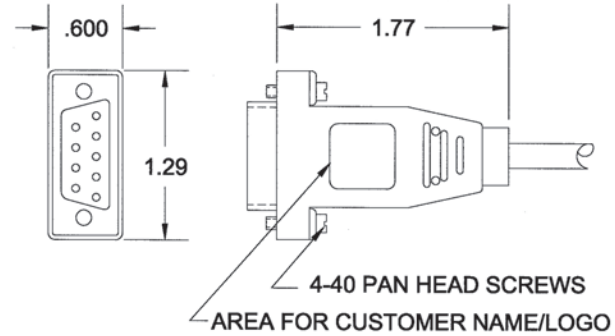
**25 POSITION**



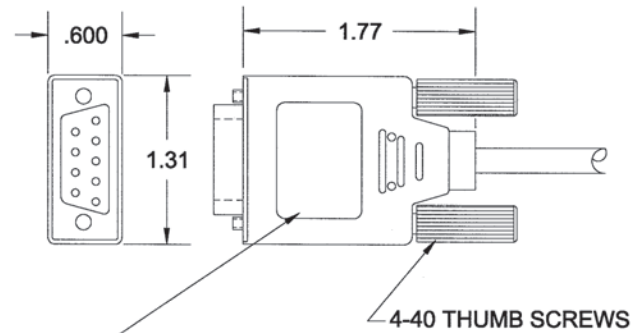
AREA FOR CUSTOMER NAME/LOGO

**MOLD NO. T-238**

**9 POSITION**



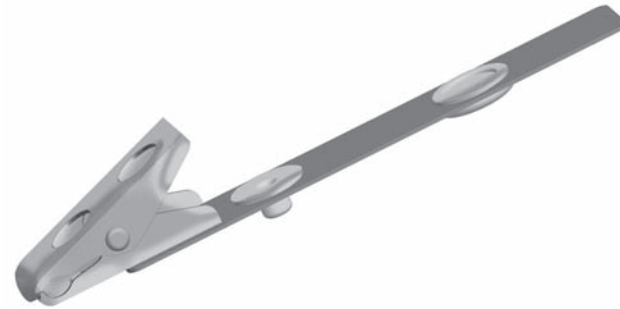
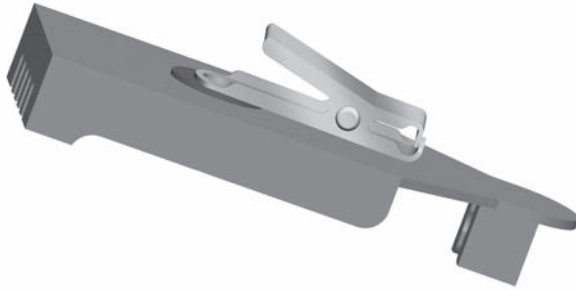
**MOLD NO. T-236-1**



AREA FOR CUSTOMER NAME/LOGO

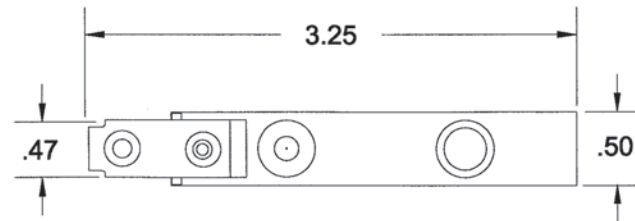
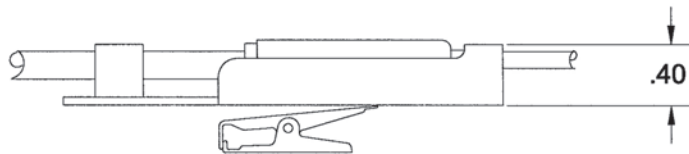
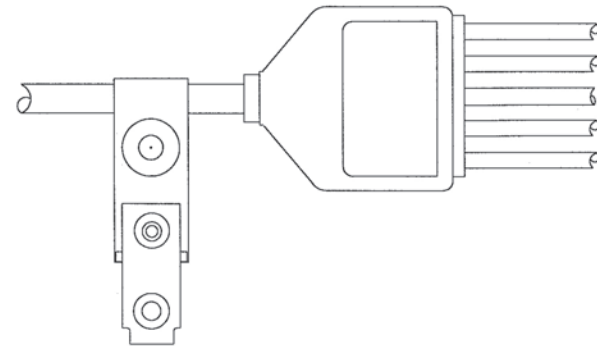
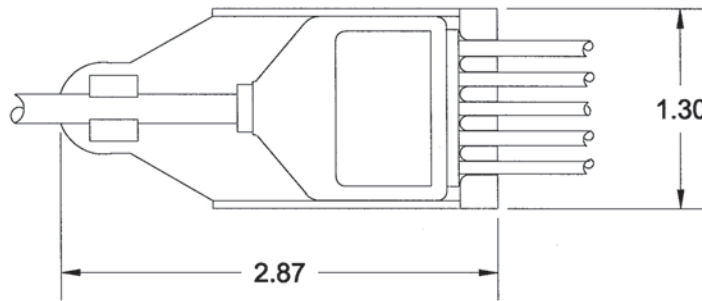
**MOLD NO. T-236**

**Cable and Lead Retainers**



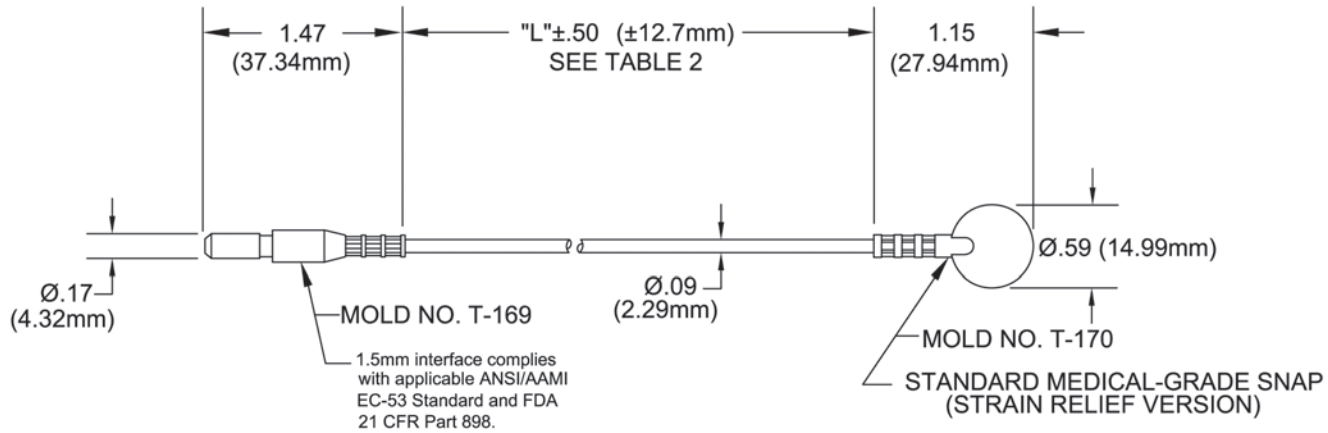
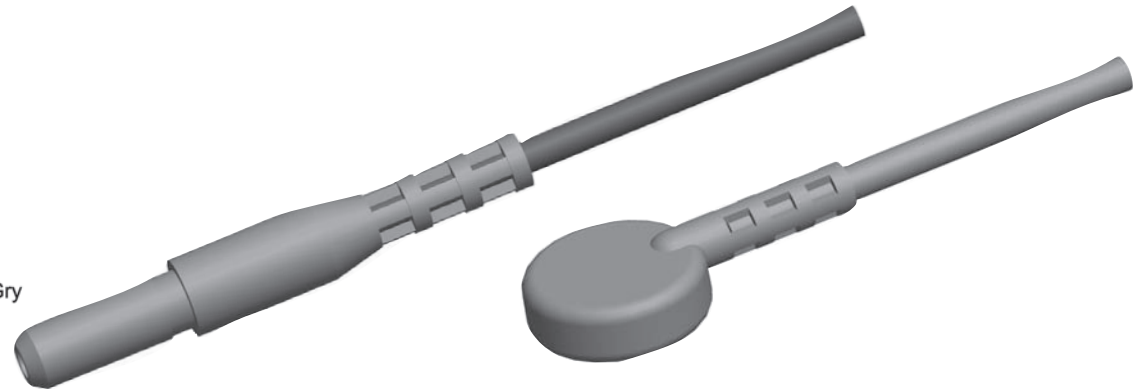
**RETAINER LEAD ASSEMBLY**  
APPLICABLE TO T-103, 3 OR 5 LEAD YOKE ASSEMBLIES

**BEDSHEET CLIP WITH STRAP**  
APPLICABLE TO T-103, T-131, T-136



**Molded Leadwire Assemblies**

1. Molded assembly may be ETO gas sterilized.
2. Molded parts to be same color (Table 1.)
3. Lead wire assy. mates with T-188 and T-214 safety yokes.
4. Optional lead wire colors are: Blk, Wht, Red, Brn, Grn, Lt. Gry And medium gray (color matching available).
5. Insulated wire is 22 AWG consisting of 41 strands of 38 AWG tinned copper for high flexibility.

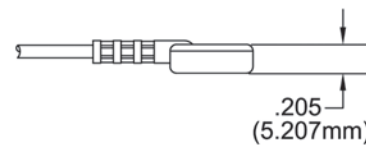


**TABLE 1**

DASH NO.	COLOR
-1	BLACK
-2	WHITE
-3	RED
-4	BROWN
-5	GREEN

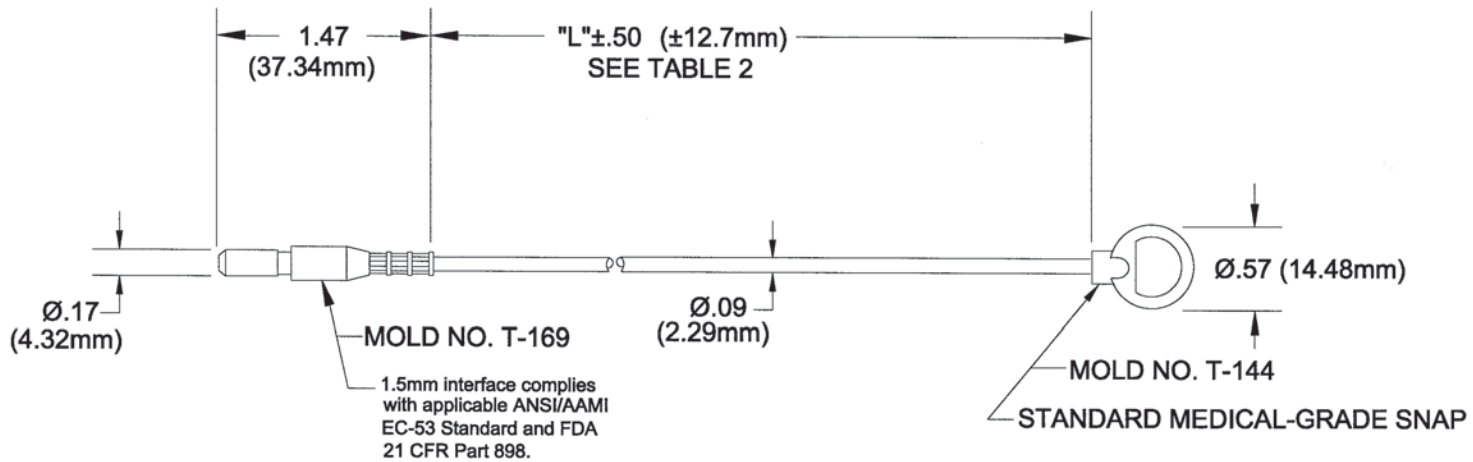
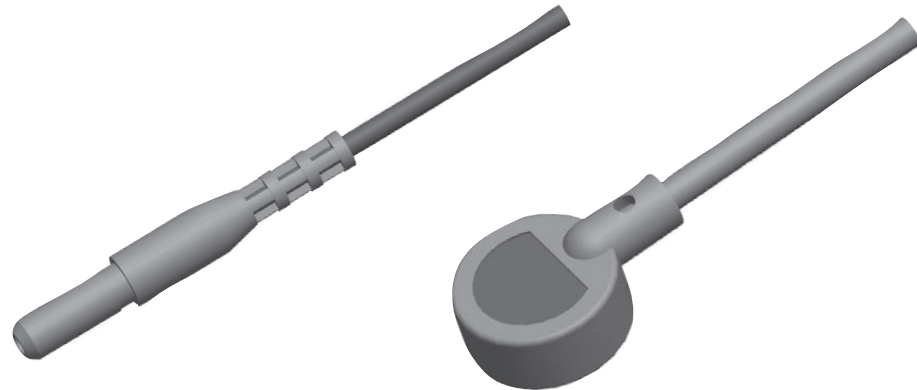
**TABLE 2**

DASH NO.	"L"(LENGTH)	
	INCHES	CM'S
-12	12	30.48
-16	16	40.64
-18	18	45.72
-24	24	60.96
-36	36	91.44



**Molded Leadwire Assemblies**

1. Molded assembly may be ETO gas sterilized.
2. Molded parts to be same color (Table 1.)
3. Lead wire assy. mates with T-188 and T-214 safety yokes.
4. Optional lead wire colors are: Blk, Wht, Red, Brn, Grn, Lt. Gry  
And medium gray (color matching available).
5. Insulated wire is 22 AWG consisting of 41 strands of 38 AWG tinned copper for high flexibility.

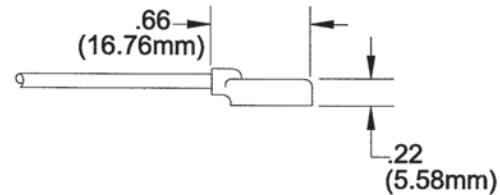


**TABLE 1**

DASH NO.	COLOR
-1	BLACK
-2	WHITE
-3	RED
-4	BROWN
-5	GREEN

**TABLE 2**

DASH NO.	"L"(LENGTH)	
	INCHES	CM'S
-12	12	30.48
-16	16	40.64
-18	18	45.72
-24	24	60.96
-36	36	91.44



**Additional Molded Leadwire Terminations**

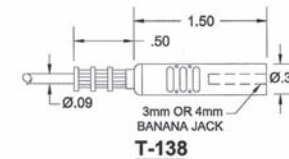
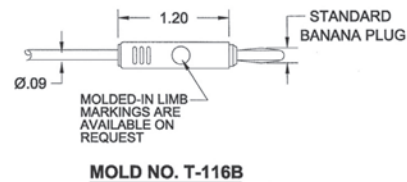
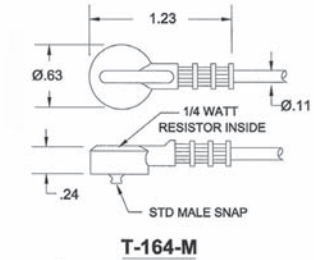
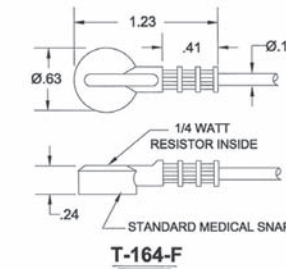
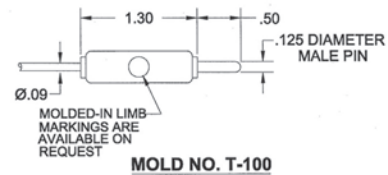
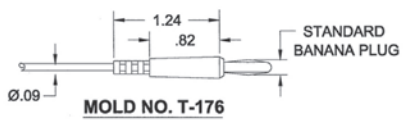
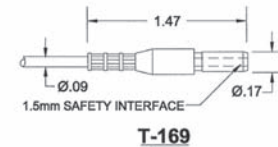
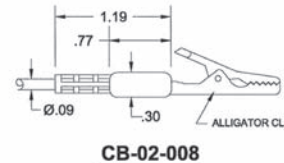
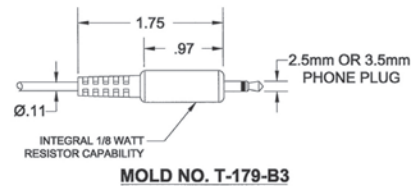
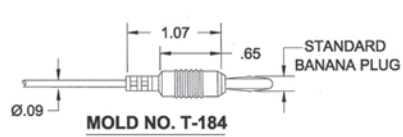
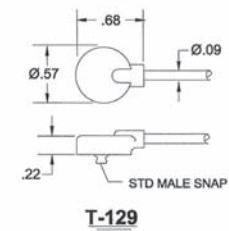
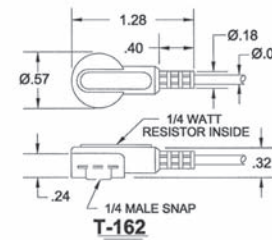
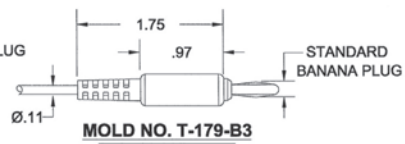
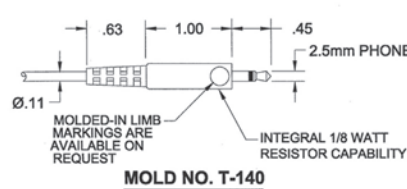
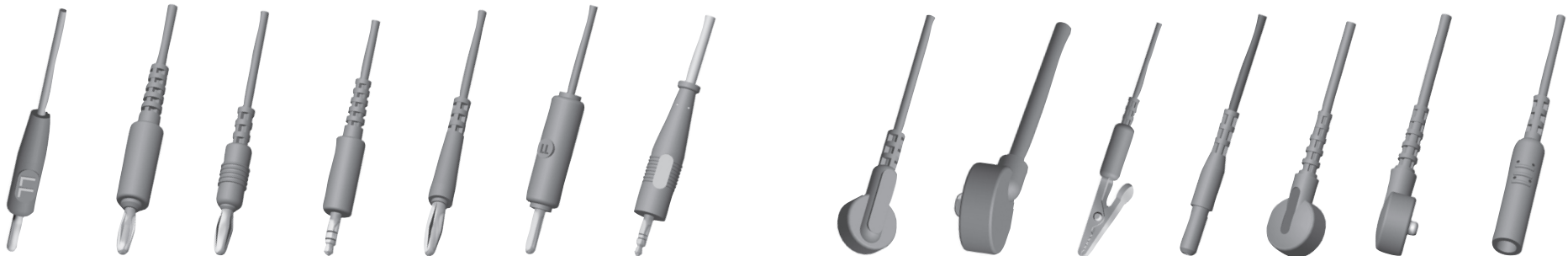


FIGURE 15a

FIGURE 15