

GOLDFISH Technical Characteristics

Materials And Finishes:

Insulator: Glass-filled nylon, UL 94V-0
 Contacts: Precision machined copper alloy with gold over nickel plate

Electrical Characteristics:

Contact Current Ratings:
 Size 12 Contacts: 35 amperes, continuous.
 50 amperes, continuous (Super conductive material).
 Size 16 Contacts: 20 amperes, continuous.
 Size 20 Contacts: 5 amperes, nominal.
 Size 22 Contacts: 3 amperes, nominal.
 Initial Contact Resistance: Max.(per IEC 512-2, Test 2b)
 Size 12 Contacts: 0.0007 ohms (Super conductive material).
 Size 22 Contacts: 0.012 ohms.
 Size 20 Contacts: 0.007 ohms.
 Size 12 & 16 Contacts: 0.005 ohms.
 Insulator Resistance: 5 G ohms per IEC 512-2, Test 3b.
 Voltage Proof:
 Power Contacts: 1500 V rms..
 Signal Contacts: 1000 V rms..
 Working Voltage:
 Power Contacts: 500 V rms..
 Signal Contacts: 333 V rms..
 Hot Pluggable (50 couplings per UL 1977, paragraph 15):
 Size 12 Contacts: 250 VAC at 25 amperes.
 Size 16 Contacts: Consult factory.

Mechanical Characteristics

Blind Mating System: Male and female connector molded-in guides allow for misalignment to 2.00mm (0.079 inch).
 Polarization: Provided by connector body design.
 Removable Contacts: Insert contact from rear of insulator; release from front of insulator. Female removable crimp contacts feature "Closed Entry" 1000 cycles design.
 Removable Contact Retention in Connector Body:
 Power Contacts: 45 N (10lbs).
 Signal Contacts: 27 N (6lbs).
 Fixed Contacts: Printed board terminations, both straight & right angle, size 12 and 16 female contacts feature "Closed-Entry" 1000 cycles design.
 Fixed Contact Retention in Connector Body: 45 N (10lbs), min.
 Sequential Mating: 2 and 3 level systems available. Consult technical sales for application assistance with contact sequencing.

Climatic Characteristics:

Working temperature: -55° to +125°

Agency Approvals:

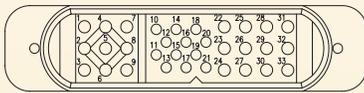
C-UL: File reference E49351
 RWTUV: File reference E006089

(For TUV, first-mate contacts are not designed for use as protective earthing terminals)

CONNECTOR ARRANGEMENTS

(See Step 2 - Ordering Information)

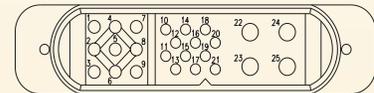
VERSION 01 and 02



VERSION 01: PARTIALLY POPULATED WITH 4 SIZE 16 "A.C." POWER CONTACTS (POSITION 1, 3, 7 & 9), 12 SIZE 16 "D.C." POWER CONTACTS (POSITION 22 THRU 33) AND 9 SIZE 20 SIGNAL CONTACTS (POSITION 12 THRU 21). POWER POSITIONS 7 AND 9 ARE "FIRST-MATE" SEQUENTIAL CONTACTS.

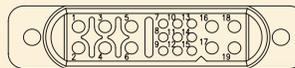
VERSION 02: FULLY POPULATED CONNECTOR WITH 21 SIZE 16 POWER CONTACTS & 12 SIZE 20 SIGNAL CONTACTS. FOR CUSTOMIZED REQUIREMENTS USE VERSION 02.

VERSION 435



VERSION 435: CONNECTOR FULLY POPULATED WITH 9 SIZE 16 POWER CONTACTS, 4 SIZE 12 POWER CONTACTS AND 12 SIZE 20 SIGNAL CONTACTS.

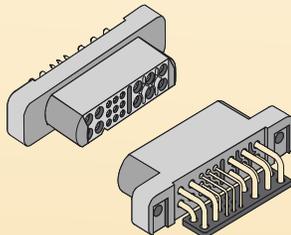
VERSION 109 (BABY GOLDFISH)



VERSION 109: CONNECTOR FULLY POPULATED WITH 10 SIZE 16 POWER CONTACTS AND 9 SIZE #22 SIGNAL CONTACTS.

TYPICAL GOLDFISH CONNECTION SYSTEMS

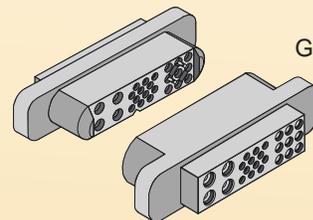
GFSH109F3N



Straight Solder Board Mount
 to
 Right Angle Solder Board Mount

GFSH109M4H

GFSH435F182



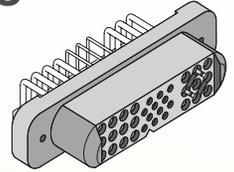
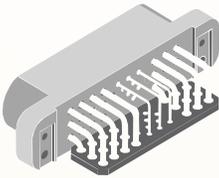
Panel Mount/ Cable Connector
 to
 Panel Mount/ Cable Connector

GFSH435M1H

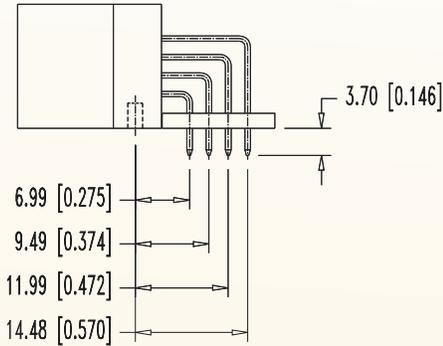
RIGHT ANGLE (90°) PCB MOUNT CONNECTORS

VERSION 01, 02 AND 435

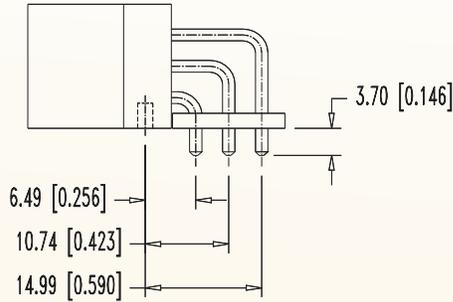
(Specify "4" in step 4 of ordering information)



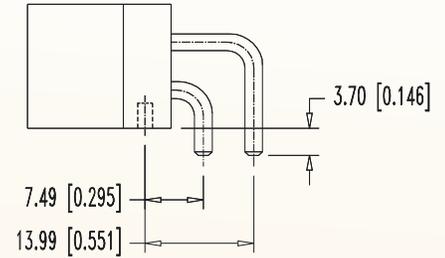
CONTACT TERMINAL EXTENSIONS



SIZE 20 CONTACTS
TERMINAL SIZE = $\varnothing 0.71$ [$\varnothing 0.028$]



SIZE 16 CONTACTS
TERMINAL SIZE = $\varnothing 1.60$ [$\varnothing 0.063$]

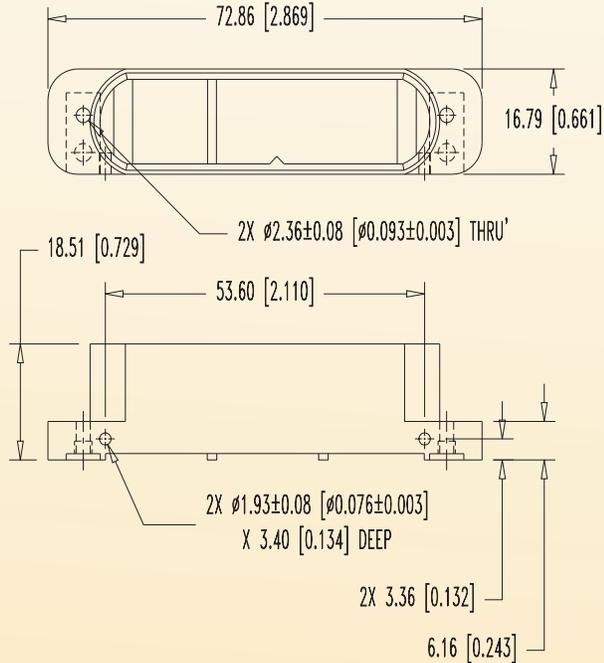


SIZE 12 CONTACTS
TERMINAL SIZE = $\varnothing 2.29$ [$\varnothing 0.090$]
(FOR VERSION 435 ONLY)

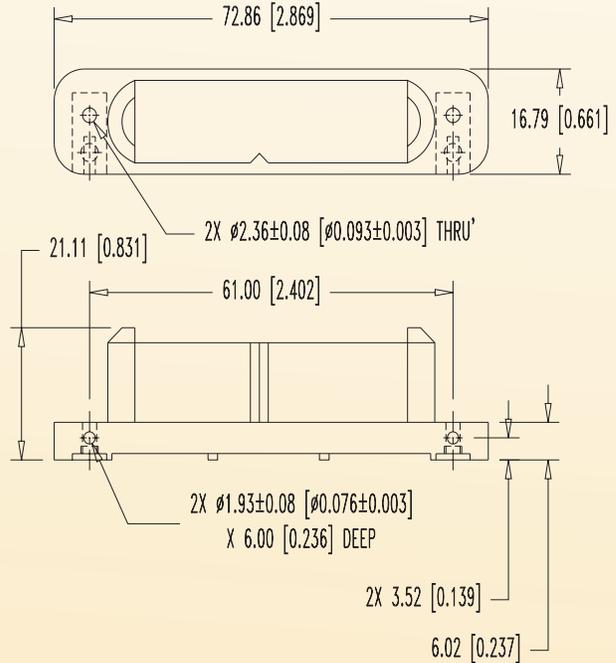
Note: Contacts extensions are the same for both male and female connectors.
Only male connector shown.

OUTLINE DIMENSIONS

MALE CONNECTOR

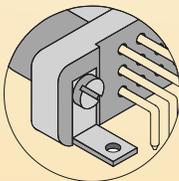


FEMALE CONNECTOR

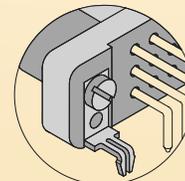


OPTIONAL RIGHT ANGLE CONNECTOR MOUNTING HARDWARE

(See step 5 of ordering information)



"B" MOUNTING BRACKET
(Specify "B" in step 5 of ordering information)
Material: Brass with Tin Plating

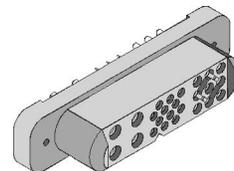
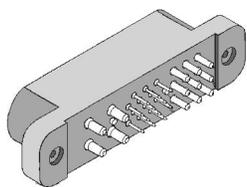


"LN" MOUNTING BRACKET WITH BOARD LOCK
(Specify "LN" in step 5 of ordering information)
Material: Brass with Tin Plating
Suggest 2 x $\varnothing 3.12 \pm 0.05$ (0.123 ± 0.002) holes in printed board.

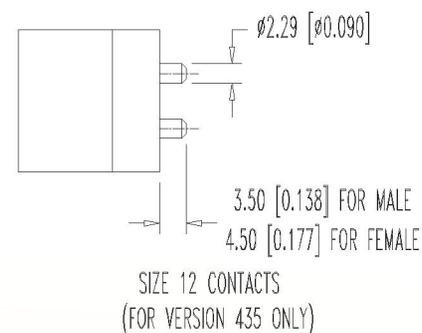
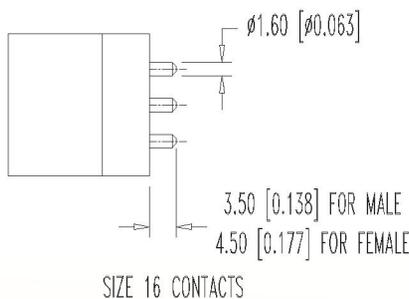
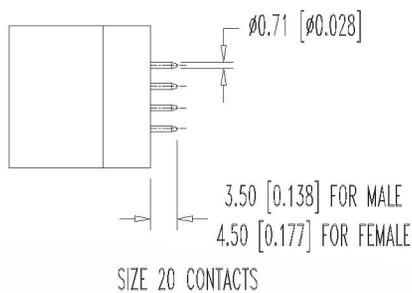
STRAIGHT PCB MOUNT CONNECTORS

VERSION 01, 02 AND 435

(Specify "3" in step 4 of ordering information)

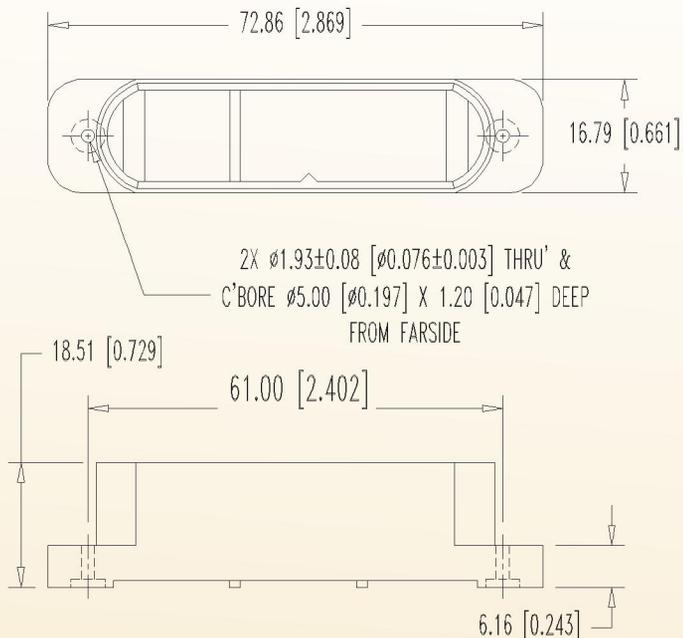


CONTACT TERMINAL EXTENSIONS

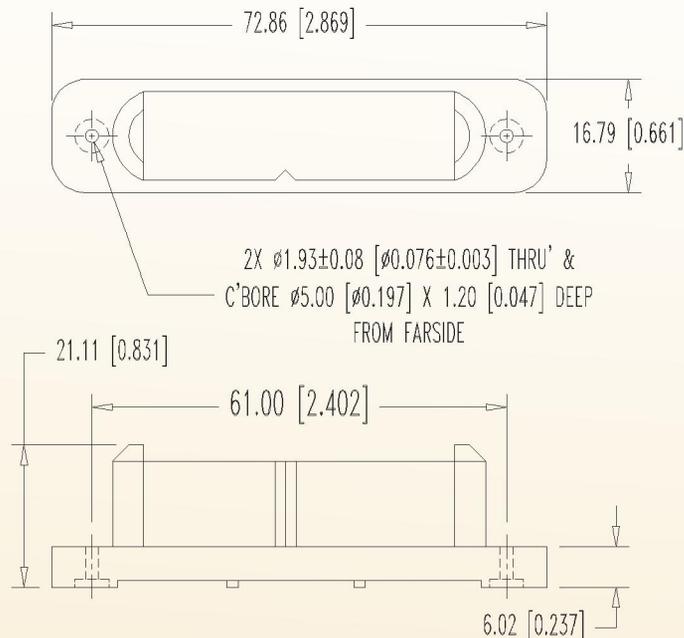


OUTLINE DIMENSIONS

MALE CONNECTOR

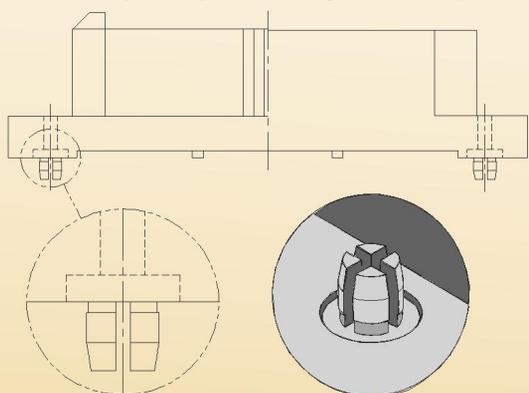


FEMALE CONNECTOR



OPTIONAL STRAIGHT BOARD MOUNTING HARDWARE

(See step 5 of ordering informations)



"PUSH ON" FASTENERS

(Specify "N" in step 5 of ordering information.)

Material: Copper alloy with Tin plating.

Suggest 2 x $\phi 3.12 \pm 0.05$ (0.123 \pm 0.002) holes in printed board.

GOLDFISH SERIES CONNECTOR TOLERANCES

(All dimensions are in millimeters [inches])

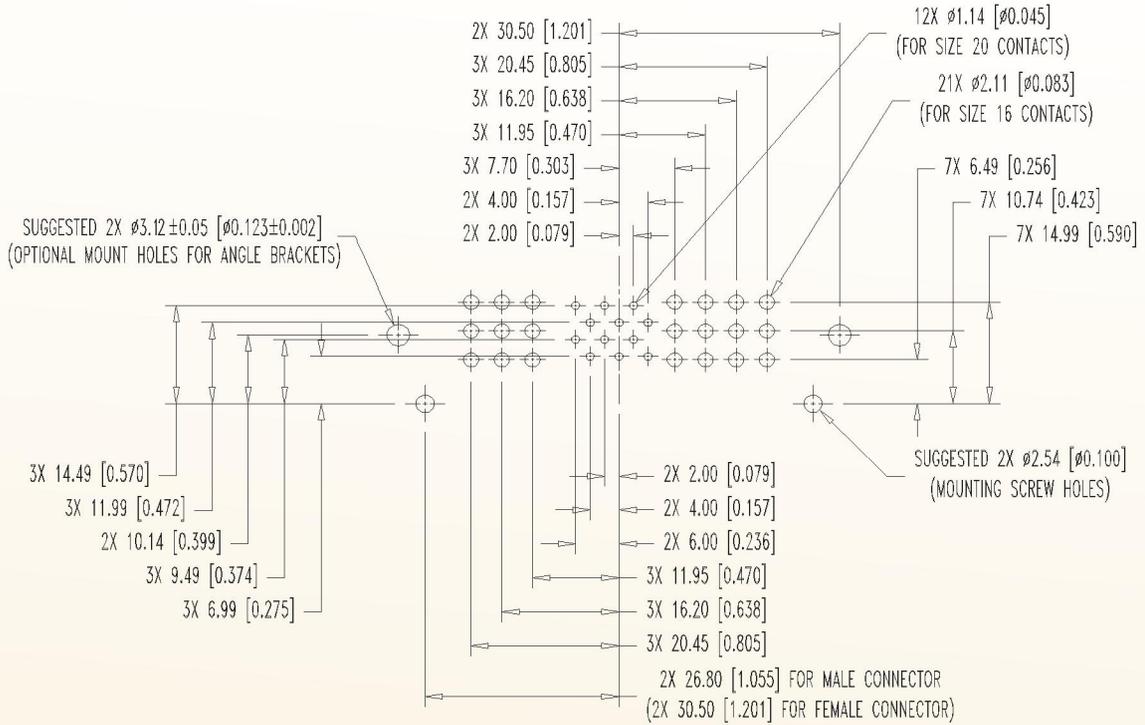
UNLESS OTHERWISE SPECIFIED:

MALE CONTACT MATING DIAMETERS	= ± 0.03 [± 0.001]
CONTACT TERMINATION DIAMETERS	= ± 0.08 [± 0.003]
ALL DIAMETERS	= ± 0.13 [± 0.005]
ALL OTHER DIMENSIONS	= ± 0.38 [± 0.015]

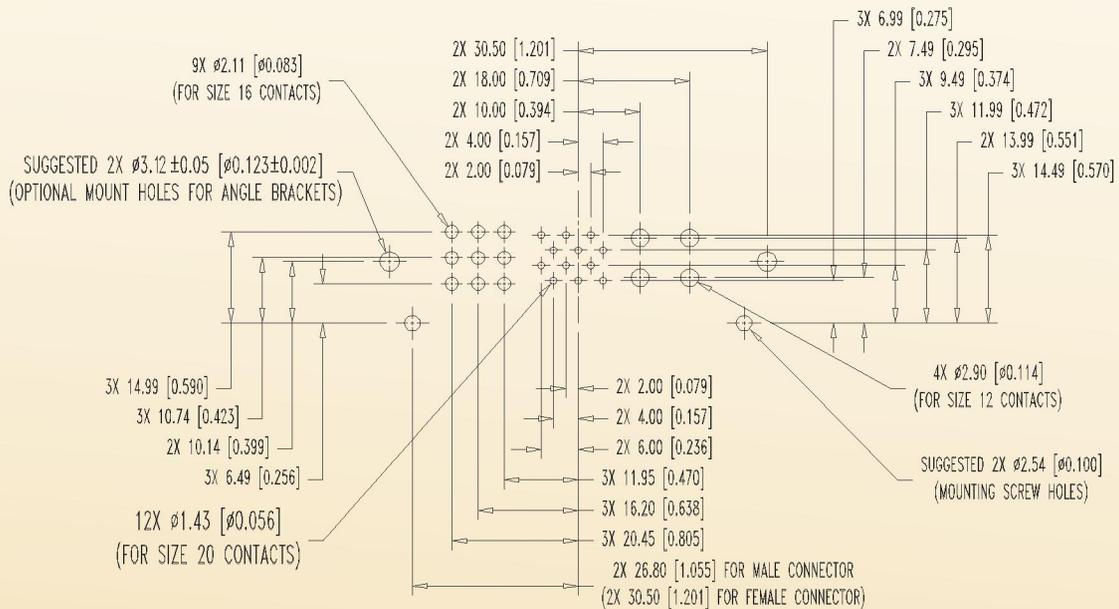
Contact Factory for other tolerances.

PC BOARD CONTACT HOLE PATTERNS FOR RIGHT ANGLE (90°) CONNECTORS

VERSION 01 AND 02
HOLE PATTERN SHOWN IS FOR MALE CONNECTOR
USE MIRROR IMAGE FOR FEMALE CONNECTOR



VERSION 435
HOLE PATTERN SHOWN IS FOR MALE CONNECTOR
USE MIRROR IMAGE FOR FEMALE CONNECTOR



GOLDFISH MOUNTING SCREWS- SELF TAPPING (Order separately)

PART No.	SCREW SIZE	CONNECTORS USED
2076-12-6-16	#6-19 x 6.35mm LONG	GFSH***1H
4546-7-0-16	#2-28 X 4.78mm LONG	GFSH**M4H
4546-7-1-16	#2-28 x 6.35 mm LONG	GFSH**F4H
4546-7-2-16	#2-28 x 7.93 mm LONG	GFSH***3H

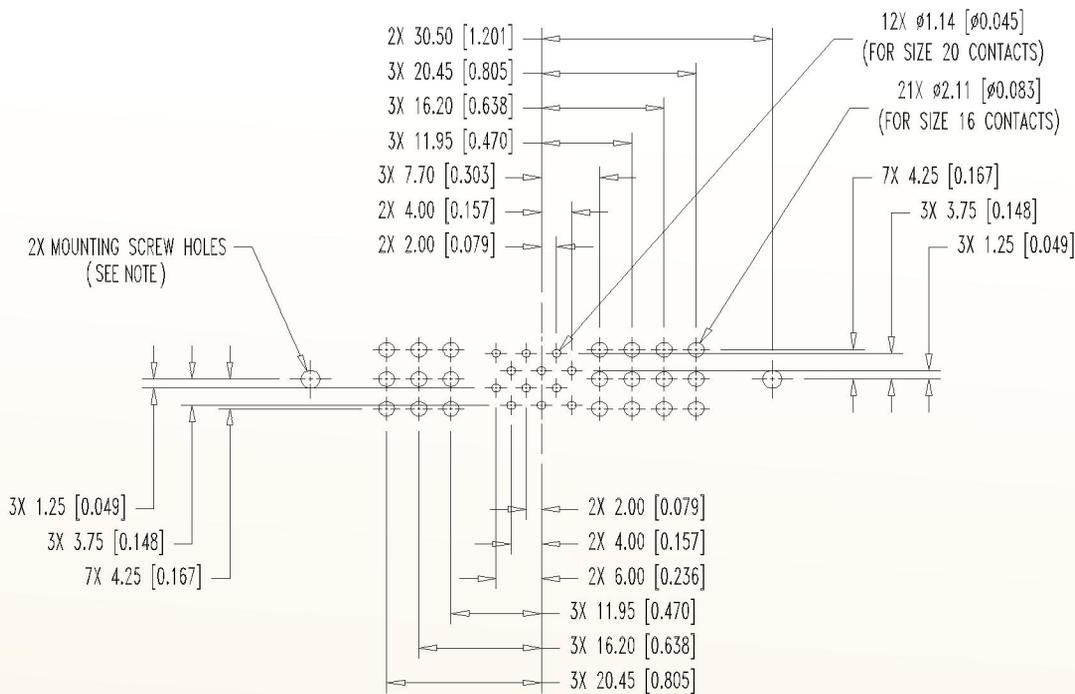


Material: Steel with Zinc plating.

CONTACT HOLE PATTERNS FOR STRAIGHT CONNECTORS

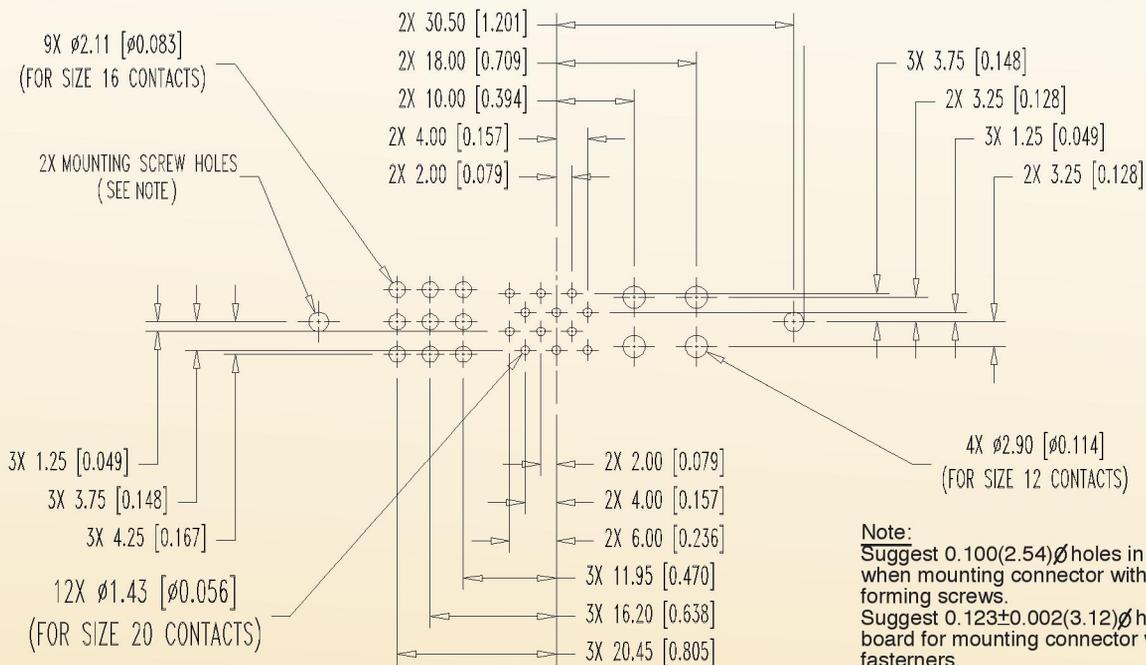
VERSION 01 AND 02

HOLE PATTERN SHOWN IS FOR MALE CONNECTOR
USE MIRROR IMAGE FOR FEMALE CONNECTOR



VERSION 435

HOLE PATTERN SHOWN IS FOR MALE CONNECTOR
USE MIRROR IMAGE FOR FEMALE CONNECTOR



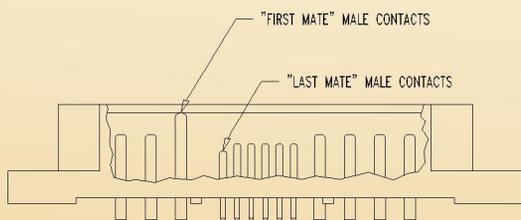
Note:

Suggest 0.100(2.54) ϕ holes in printed board when mounting connector with #2 thread forming screws.

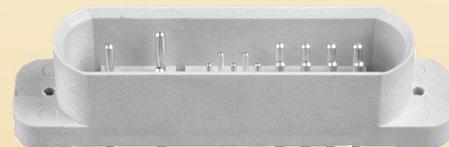
Suggest 0.123 \pm 0.002(3.12) ϕ hole in printed board for mounting connector with push-on fasteners.

SEQUENTIAL MATING CONTACTS

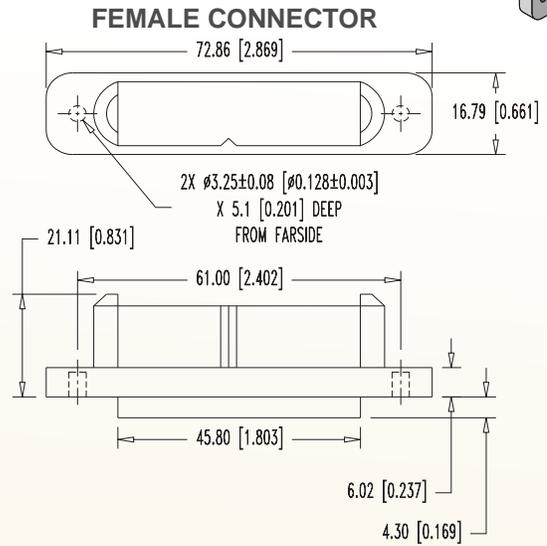
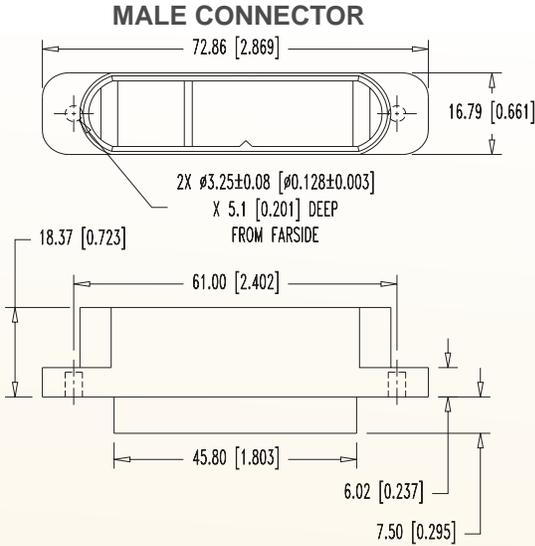
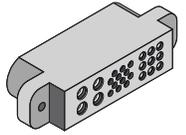
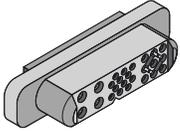
(Contact factory for options and ordering details)



TWO LEVEL SEQUENTIAL MATING STANDARD.
THREE LEVEL SEQUENTIAL MATING AVAILABLE FOR SOME CONFIGURATIONS.



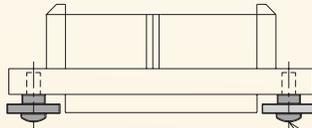
PANEL MOUNT CONNECTORS (REMOVABLE CONTACTS) OUTLINE DIMENSIONS VERSIONS 01, 02 AND 435)



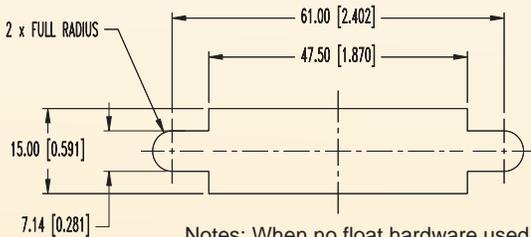
“FLOAT” MOUNTING HARDWARE (See step 5 of ordering information)

VERSION 01, 02 AND 435

VERSION 109 (BABY GOLDFISH)

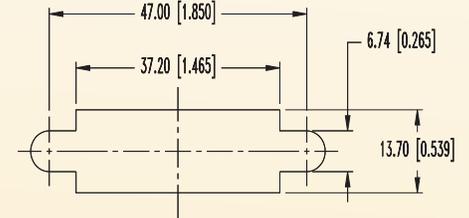


SUGGESTED PANEL CUTOUT



“FLOAT” BUSHINGS &
SELF-TAPPING SCREWS
(Material: Steel with
Zinc Plating)

SUGGESTED PANEL CUTOUT



Notes: When no float hardware used on panel mount connectors, specify “H” in step 5 of ordering information.

CRIMPING, INSERTION AND EXTRACTION TOOLS

CONTACT EXTRACTION
TOOLS

Shown for reference only.



CONTACT INSERTION
TOOLS

Shown for reference only.



CYCLE-CONTROLLED STEP
ADJUSTABLE HAND CRIMP TOOLS

Shown for reference only.

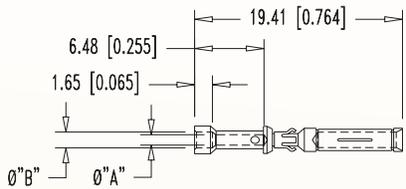


Contacts	Hand Crimp tools	Automatic feed, strip & crimp tool	Insertion tools	Extraction tools
Size 12	9501 with 9502-19 positioner	—	9099-3	2711-0
Size 16	9501 with 9502-1 positioner	9550-0	9099	9081
Size 20	Male: 9507 with 9502-21 Positioner Female: 9507 with 9502-22 positioner	9550-1	9099-4	9081-2
Size 22	9507 with 9502-12 Positioner for Male Contacts or 9502-20 Positioner for Female Contacts.	9550-1	9099-1	9081-3

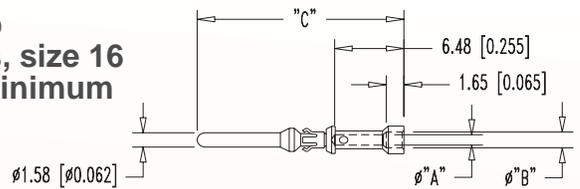
Note: Contact factory for Automatic feed Pneumatic crimp tool details.

REMOVABLE CONTACTS - CRIMP TERMINATIONS

(For solder contacts, please contact factory)

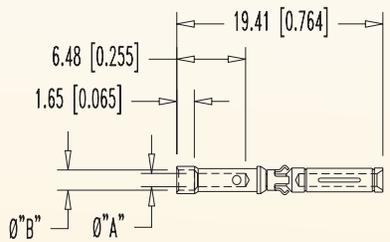


**20 Amp
Power contacts, size 16
1,000 cycles minimum**

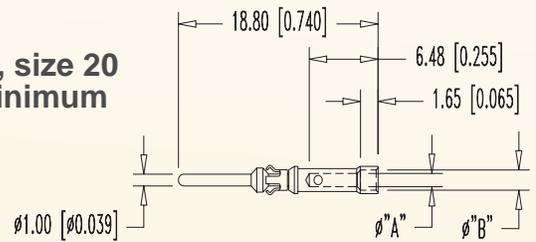


PART NUMBER	WIRE SIZE AWG/[mm ²]	ø "A"	ø "B"
FC112N2	12/[4.0]	2.49 [0.098]	N/A
FC114N2	14-16/[2.5-1.5]	2.06 [0.081]	2.67 [0.105]
FC116N2	16-18/[1.5-1.0]	1.70 [0.067]	2.36 [0.093]
FC120N2	20-22-24/[0.5-0.3-0.25]	1.14 [0.045]	1.65 [0.065]

PART NUMBER	WIRE SIZE AWG/[mm ²]	ø "A"	ø "B"	"c"
MC112N	12/[4.0]	2.49 [0.098]	N/A	19.41 [0.764]
MC112N-133.5				21.74 [0.856]
MC114N	14-16/[2.5-1.5]	2.06 [0.081]	2.67 [0.105]	19.41 [0.764]
MC114N-133.5				21.74 [0.856]
MC116N	16-18/[1.5-1.0]	1.70 [0.067]	2.36 [0.093]	19.41 [0.764]
MC116N-133.5				21.74 [0.856]
MC120N	20-22-24/[0.5-0.3-0.25]	1.14 [0.045]	1.65 [0.065]	19.41 [0.764]
MC120N-133.5				21.74 [0.856]

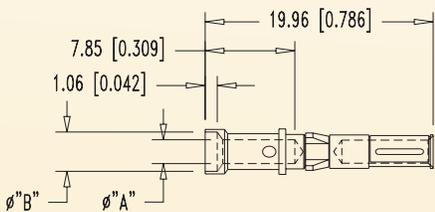


**5 Amp
Signal contacts, size 20
1,000 cycles minimum**

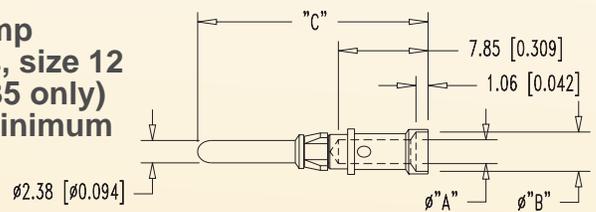


PART NUMBER	WIRE SIZE AWG/[mm ²]	ø "A"	ø "B"
FC720N2	20-22-24/[0.5-0.3-0.25]	1.14 [0.045]	1.73 [0.068]

PART NUMBER	WIRE SIZE AWG/[mm ²]	ø "A"	ø "B"
MC720N	20-22-24/[0.5-0.3-0.25]	1.14 [0.045]	1.73 [0.068]



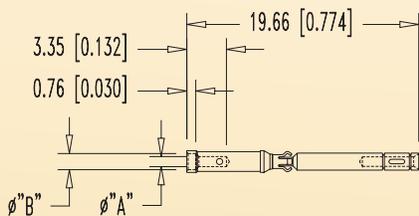
**35 / 50 Amp
Power contacts, size 12
(for version 435 only)
1,000 cycles minimum**



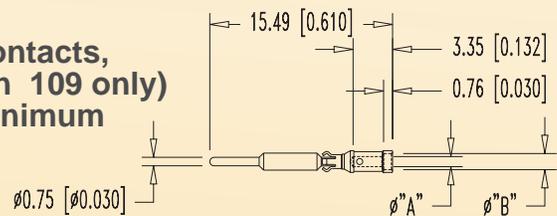
PART NUMBER	CURRENT RATING	WIRE SIZE AWG/[mm ²]	ø "A"	ø "B"
FC612N2	35 AMP	12/[4.0]	2.54 [0.100]	4.32 [0.170]
* FC612N2S	50 AMP			
FC610N2	35 AMP	10/[5.3]	3.73 [0.147]	-
* FC610N2S	50 AMP			

PART NUMBER	CURRENT RATING	WIRE SIZE AWG/[mm ²]	ø "A"	ø "B"	"c"	REMARKS
MC612N	35 AMP	12/[4.0]	2.54 [0.100]	4.32 [0.170]	20.18 [0.794]	STANDARD
* MC612NS	50 AMP				23.18 [0.913]	1st-MATE
MC612N-228.1	35 AMP	10/[5.3]	3.73 [0.147]	-	20.18 [0.794]	STANDARD
* MC610N	35 AMP				23.18 [0.913]	1st-MATE
* MC610NS	50 AMP	10/[5.3]	3.73 [0.147]	-	20.18 [0.794]	STANDARD
MC610N-228.1	35 AMP				23.18 [0.913]	1st-MATE

* High conductivity copper alloy with gold over nickel plate.



**3 Amp signal contacts,
size 22 (For version 109 only)
1,000 cycles minimum**



PART NUMBER	WIRE SIZE AWG/[mm ²]	ø "A"	ø "B"
FC422N6	22/[0.3]	0.89 [0.035]	1.42 [0.056]
FC420N6	20/[0.5]	1.14 [0.045]	-

PART NUMBER	WIRE SIZE AWG/[mm ²]	ø "A"	ø "B"
MC422N	22/[0.3]	0.89 [0.035]	1.42 [0.056]
MC420N	20/[0.5]	1.14 [0.045]	-

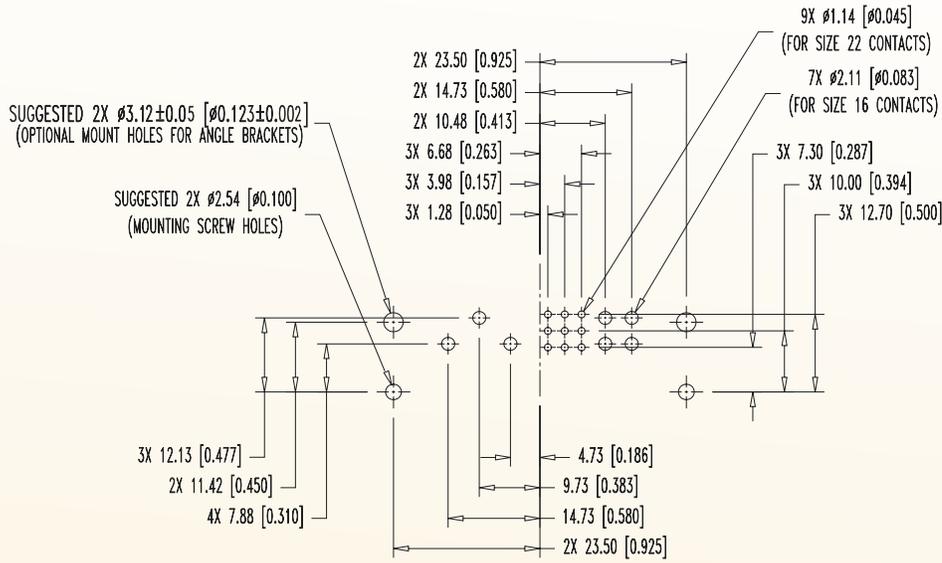
Notes

**Material and finishes for all contacts:
Precision machined copper alloy with gold over nickel plate.**

PC BOARD CONTACT HOLE PATTERNS FOR VERSION 109 (BABY GOLDFISH)

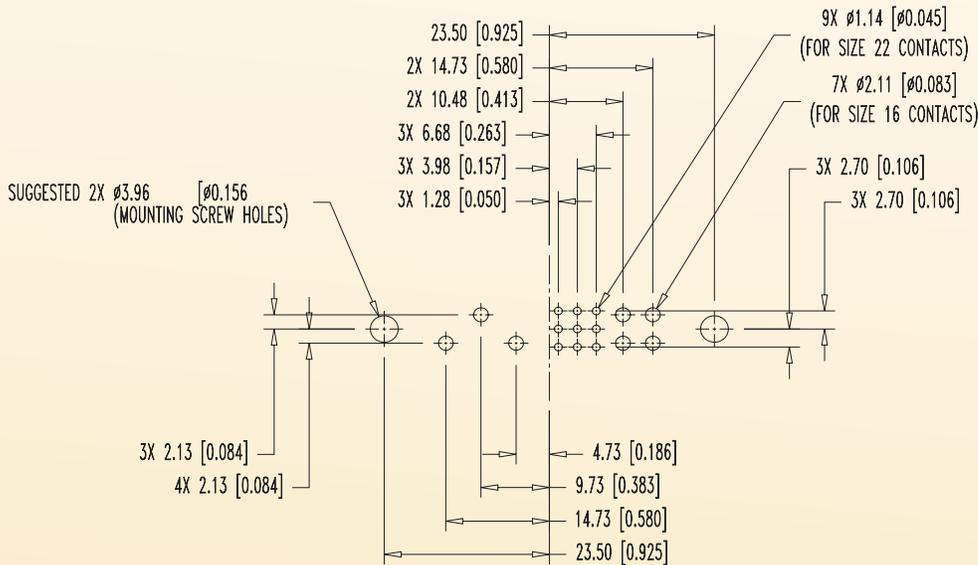
RIGHT ANGLE (90°) P.C.B. MOUNT

HOLE PATTERN SHOWN IS FOR MALE CONNECTOR
USE MIRROR IMAGE FOR FEMALE CONNECTOR



STRAIGHT P.C.B. MOUNT

HOLE PATTERN SHOWN IS FOR MALE CONNECTOR
USE MIRROR IMAGE FOR FEMALE CONNECTOR

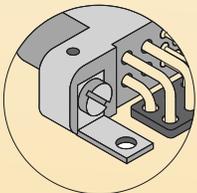


VERSION 109 (BABY GOLDFISH)

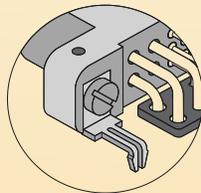
OPTIONAL MOUNTING HARDWARE

(See step 5 of ordering information)

90° RIGHT ANGLE MOUNTING BRACKETS

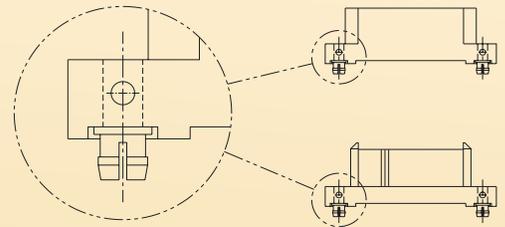


“B” MOUNTING BRACKET
(Specify “B” in step 5 of ordering information)
Material: Brass with Tin Plating.



“LN” MOUNTING BRACKET WITH BOARD LOCK
(Specify “LN” in step 5 of ordering information)
Material: Brass with Tin Plating
Suggest 2 x $\phi 3.12 \pm 0.05$ (0.123 ± 0.002)
holes in printed board.

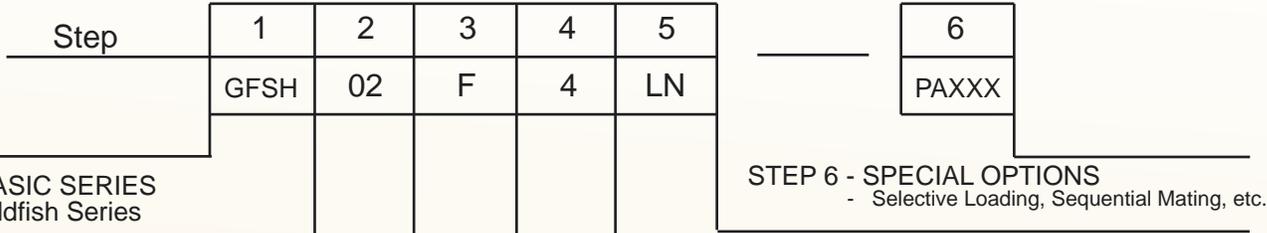
STRAIGHT PCB BOARD LOCK



“N” PUSH-ON FASTENER
(Specify “N” in step 5 of ordering information)
Material: Copper alloy with Tin Plating.
Suggest 2 x $\phi 3.96$ (0.156 ± 0.05 (± 0.002))
holes in printed board.

GOLDFISH ORDERING INFORMATION

Specify complete connector by following step 1 through step 6,



STEP 1 - BASIC SERIES
GFSH = Goldfish Series

STEP 2 - CONNECTOR VERSION

- 01 = 33 Contact Connector. Partially populated with 16 size 16 Power contacts and 9 size 20 signal contacts.
 - 02 = 33 Contact Connector fully populated with 21 Size 16 Power Contacts and 12 Size 20 Signal Contacts.
 - 435 = 25 Contact Connector populated with 9 Size 16 Power Contacts, 12 Size 20 Signal Contacts and 4 Size 12 Power Contacts.
 - 109 = 16 Contact Connector populated with 10 Size 16 Power Contacts, 9 Size 22 Signal Contacts.
- * Consult factory for additional versions.

STEP 3 - CONNECTOR GENDER

- F = Female
- M = Male

CUSTOM CONNECTORS!
GOLDFISH CONNECTORS ARE OFTEN PARTIALLY POPULATED UNIQUELY FOR EACH INDIVIDUAL CUSTOMER. CONTACT YOUR LOCAL POSITRONIC SALES OFFICE FOR ASSISTANCE ON THIS AND OTHER CUSTOM VARIATIONS.

STEP 6 - SPECIAL OPTIONS
- Selective Loading, Sequential Mating, etc.

STEP 5 - MOUNTING STYLE

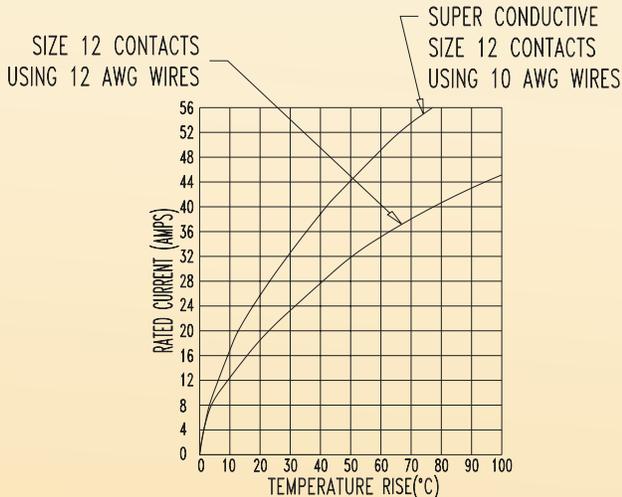
- 82 = Panel Mount "Float" Hardware for 1.5mm thick panel
- 83 = Panel Mount "Float" Hardware for 2.3mm thick panel
- B = Right angle P.C.B. mount through hole Angle Brackets.
- LN = Right angle P.C.B. mount Board Lock Angle Brackets.
- N = Straight P.C.B. mount Push-on Fasteners.
- H = Mounting hole. For use with self-tapping screws (order screws separately -see page 4 & 7)

STEP 4 - TYPE OF CONTACT

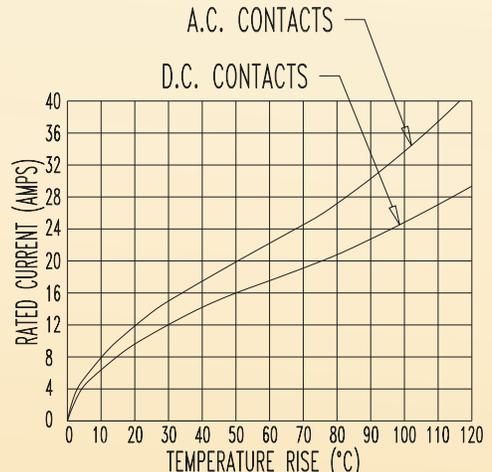
- 1 = Removable Contact, panel mount connector. Contacts ordered separately.
- 3 = Straight solder P.C.B. Mount.
- 4 = Right Angle (90°) solder P.C.B. Mount.
- 38 = Straight solder P.C.B. Mount. Super Conductivity - 50 ampere, size 12, power contacts. (Version 435 only).
- 48 = Right Angle (90) solder P.C.B. Mount. Super Conductivity - 50 ampere, size 12, power contacts. (Version 435 only).
- 93 = Press-Fit, compliant termination, contact factory for details.
- 94 = Press-Fit, compliant termination, contact factory for details.

GOLDFISH TEMPERATURE RISE CURVES.

Tested per IEC publicaion 512-3, test 5a



Above curve developed using GOLDFISH connector using size 12 contact, 10 AWG and 12 AWG wires. All size 12 contacts under load.



Above curve developed using GOLDFISH connector using size 16 contact and 12 AWG wire. All size 16 contacts under load.

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