

FUJIPOLY[®]**Carbon ZEBRA[®] Connector**FUJIPOLY[®] and ZEBRA[®] are registered Trademarks of Fujipoly Group.**FUJIPOLY DATA SHEET NUMBER FPDS 2K-31 / Version 8****Fuji Polymer Industries Co.,Ltd.** (Overseas office)**JAPAN**

175 Kajiyashiki, Toyota, Aichi Japan 470-0533

[Phone] +81-565-65-1729 **[Facsimile]** +81-565-65-1857**[E-mail]** fujipoly@mx.fujipoly.co.jp

ISO9001(Aichi Plant)

Fuji Polymer Industries Co.,Ltd. (Taipei liaison office)**TAIWAN**

Room B,7F.,No.59,Tiansiang Rd.,Jhongshan District,Taipei City,10452,Taiwan

[Phone] +886-2-2586-5771 **[Facsimile]** +886-2-2586-5745**[E-mail]** fujipolytw@fujipoly.com.tw**Fujipoly America Corporation.****U.S.A.**

900 Milik Street P.O. Box 119 Carteret, NJ 07008-0119

[Phone] +1-732-969-0100 **[Facsimile]** +1-732-969-3311**[E-mail]** info@fujipoly.com **[web site]** www.fujipoly.com

QS9000 / ISO9001

Fujipoly Europe Ltd.**U.K.**

Avant Business Centre, Unit 8, Third Avenue, Bletchley Milton Keynes, MK1 1DR U.K.

[Phone] +44-1908-277800 **[Facsimile]** +44-1908-277900 **[E-mail]** sales@fujipolyeurope.co.uk**Fujipoly Singapore PTE Ltd.****SINGAPORE**

Blk 71 Ayer Rajah Crescent #04-03/06 Singapore 139951

[Phone] +65-6773-3466 **[Facsimile]** +65-6773-2234 **[E-mail]** fujipoly@mbox5.singnet.com.sg

ISO9001

Fujipoly (Thailand) Co.,Ltd.**THAILAND**

55/8 Moo 13 Navanakorn Industrial Estate Phase 4 Phaholyothin Road.

Klong Nueng,Klong Luang,Pathumthanee 12120, Thailand

[Phone] +66-2-529-2732 **[Facsimile]** +66-2-529-2223 **[E-mail]** marketing@fujipoly.co.th

ISO9001 / ISO14001

Fujipoly Hong Kong Ltd.**HONG KONG**

Workshop (F&J), Block 1, 4/F,Kwai Tak Industrial Centre Kwai Tak Street, Kwai Chung, N.t.,Hong Kong.

[Phone] +852-2428-3770 **[Facsimile]** +852-2489-9637 **[E-mail]** info@fujipoly.com.hk**Fujipoly China Ltd., China Factory****CHINA**

1/F., JiaLongDa Bldg., Changlang Road, Jinmei Estate, Changping, Dongguan, GuangDong China 523579

[Phone] +86-769-83989660 **[Facsimile]** +86-769-83989662 **[E-mail]** info@fujipoly.com.hk

ISO9001 / ISO14001

	Page
1] Product Name.	- 02 -
2] Features.	- 02 -
3] Variety of Carbon Zebra Connector. (Table-1)	- 03 -
4] Series of Carbon Connector and Low Temperature Carbon Connector.(Table-3)	- 04 -
5] Maximum Available Size and Standard widths. (Table-4)	- 05 -
6] Tolerance Table.(Table-5, 6, 7)	- 06 -
7] Typical Product Properties.(Table-8)	- 07 -
8] Typical Material Properties.(Table-9)	- 07 -
9] Calculation of Resistance and Force Defiection(Table-10 • 11)	- 08 -
10] Others	- 09 -
11] Trade Marks	- 09 -

FUJIPOLY[®] DATA SHEET FPDS 2K- 31 (Version 8)

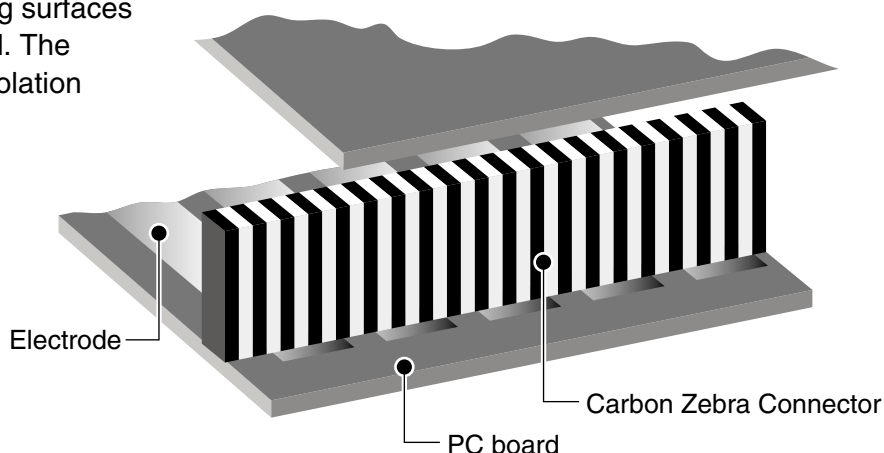
1] Product Name :

Carbon ZEBRA[®] Connector.

Low Temperature Carbon ZEBRA[®] Connector

2] Features :

Fujipoly Carbon Zebra Connectors and Low Temperature Carbon Zebra Connectors consist of alternating layers of conductive carbon filled and non-conductive silicone rubber. Contact density of the carbon Zebra Connector is greater than the contact pad density of either LCD (Liquid Crystal Display) or PCB (Printed Circuit Board). At least one conductive layer will connect when the two mating surfaces are aligned and compressed. The insulation layer will insure isolation from adjacent circuits.



-1) SOLDERLESS CONNECTIONS

Pressure type contact eliminates lead straightening, hole drilling and soldering.

-2) NONABRASIVE CONTACTS (ZERO INSERTION FORCE)

Contact to the LCD is made by deflecting the Carbon Zebra connector between the LCD and PC board. Carbon Zebra connectors are nonabrasive and will not damage indium oxide contact pads on the LCD. Repeated assembly and disassembly of package components will not affect performance.

-3) ENVIRONMENTAL RELIABILITY

The LCD, when mounted with a Carbon Zebra rubber connector, creates a gas tight seal at the contact interface. Assures contact in chemically corrosive atmospheres while at the same time protecting the glass display from shock and vibration.

-4) SMALL GLASS OVERHANG

With a Carbon Zebra connector, LCD terminal overhangs can be as narrow as 0.030"/0.80mm permitting more efficient use of glass size related to character height. (Metal pins normally require a 0.150"/3.8mm glass overhang, reducing character height by as much as 0.240"/6.1mm for a dual in-line LCD.)

-5) HIGH DENSITY CONTACT

Carbon Zebra connectors are available in a variety of contact densities. The most dense allows contact pad spacing as close as 0.010"/0.25mm center-to-center. This spacing can be compared to 0.050"/1.3mm minimum for pins, allowing for increased capacity of LCD formats.

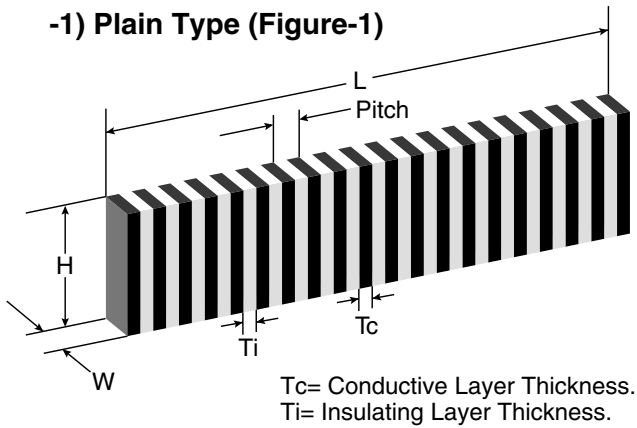
-6) LABOR SAVING EASE OF ASSEMBLY

3] Variety of Carbon Zebra Connector.

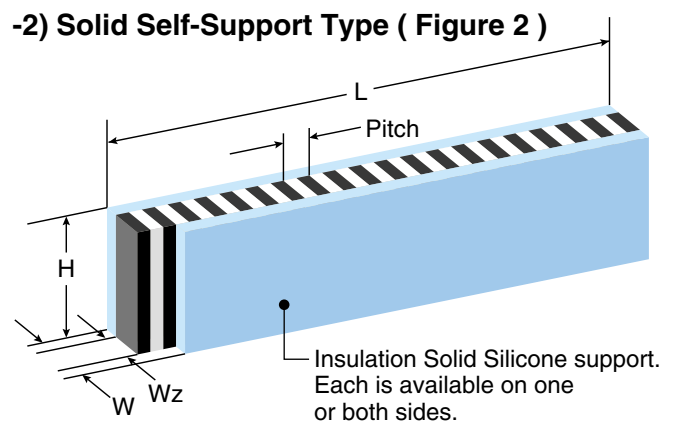
Table - 1

Type of Zebra	Series	LCD Contact Spacing Center-to-Center Minimum	Figure-1	Figure-2	Figure-3	Figure-4
			Plain - Type	Insulation Barrier - Type	Solid Self-Support - Type	Sponge Self-Support - Type
Carbon Connector (Standard)	1002 (CZ410 / CZ710)	0.010"(0.25mm)	Available	Available	Available	Available
	2004 (CZ418)	0.020"(0.50mm)	Available	Available	Available	Available
	2005 (CZ405 / CZ705)	0.006"(0.15mm)	Available	Available	Available	Available
Low Temperature Cobon Connector	LT200 (CZ610)	0.010"(0.25mm)	Available	Available	Available	Not Available

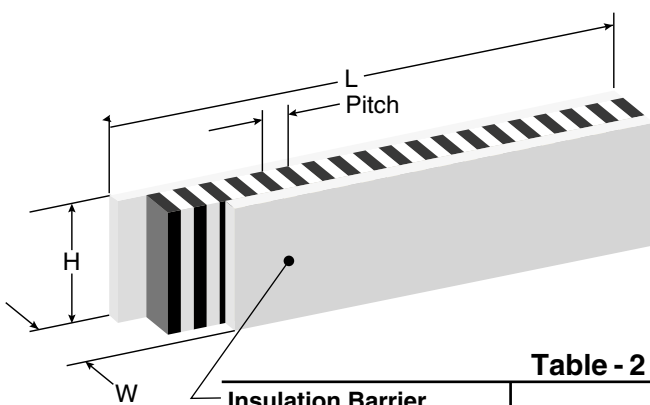
-1) Plain Type (Figure-1)



-2) Solid Self-Support Type (Figure 2)



-3) Insulation Barrier Type (Figure-3)



-4) Sponge Self-Support Type (Figure 4)

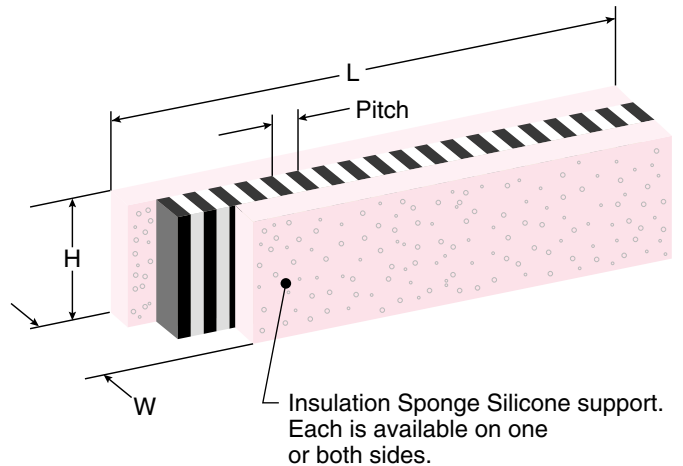


Table - 2

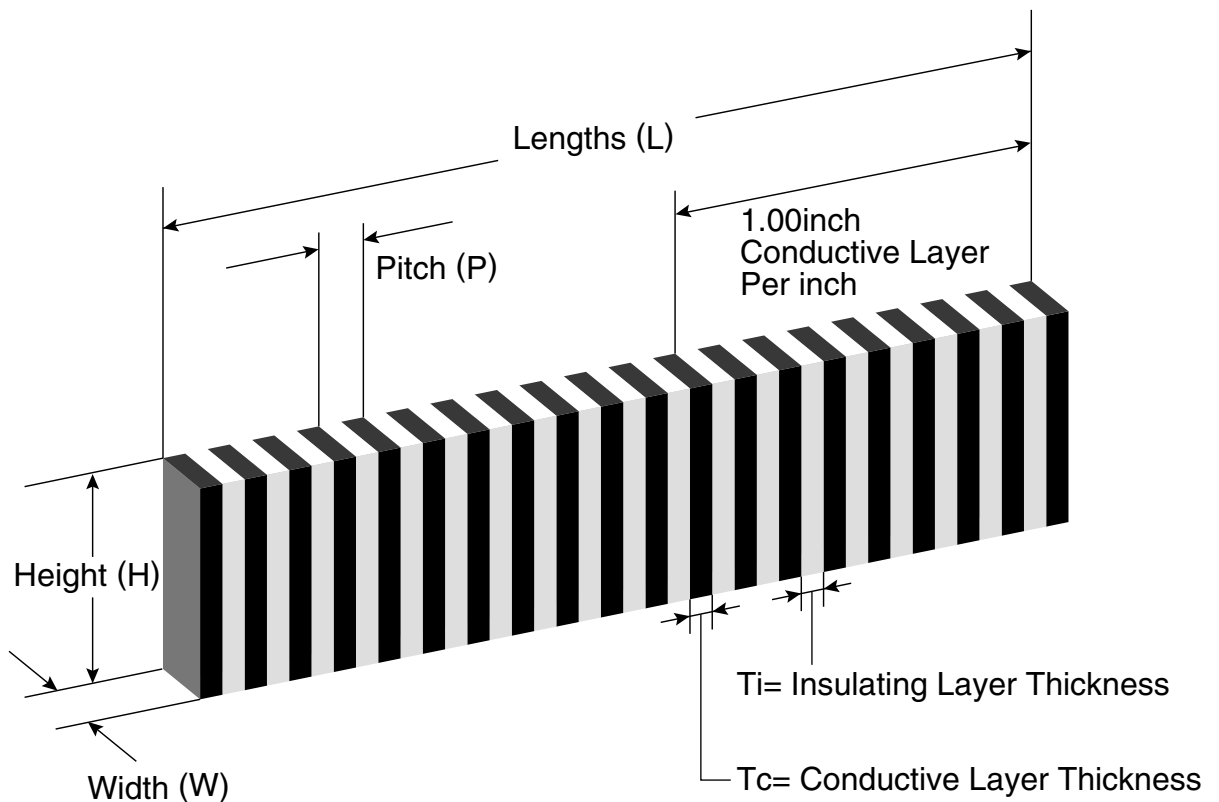
Insulation Barrier	
Color (one only)	White
Thickness	0.002" (0.05mm)
Dielectric Strength	500 volts/mil
Resistance (ohms)	10 ¹²

4] Series of Carbon Connector (Standard) and Low Temperature Carbon Connector

Table - 3

Series	LCD Contact Spacing Center-to-Center	LCD Sum of the Thickness of an Adjacent Conductive and non-Conductive Layer		Conductive Layer per inch	Individual Conductive and Insulating Layer Thickness		Available Lengths
	Minimum	Nominal	Maximum	Minimum	Minimum	Maximum	Maximum
1002 (CZ410 / CZ710)	0.015" (0.38 mm)	0.004" (0.10 mm)	0.006" (0.15 mm)	240	0.001" (0.025 mm)	0.004" (0.10 mm)	9.0" (230 mm)
2004 (CZ418)	0.020" (0.50 mm)	0.007" (0.18 mm)	0.010" (0.25 mm)	140	0.002" (0.050 mm)	0.006" (0.15 mm)	9.0" (230 mm)
2005 (CZ405 / CZ705)	0.010" (0.25 mm)	0.002" (0.050 mm)	0.004" (0.10 mm)	500	0.0004" (0.010 mm)	0.0024" (0.060 mm)	9.0" (230 mm)
LT200 (CZ610)	0.015" (0.38 mm)	0.004" (0.10 mm)	0.006" (0.15 mm)	240	0.001" (0.025 mm)	0.004" (0.10 mm)	5.0" (127 mm)

Figure - 5



5] Maximum Available Size and Standard Widths.

Table - 4

	Series	Available Lengths	Standard Widths
Plain Type	1002 (CZ410 / CZ710) 2004 (CZ418) 2005 (CZ405 / CZ705)	9.00" (230mm)	0.015"~0.118" (0.38mm~3.00mm) above 0.118" Consult factory
	LT200 (CZ610)	5.00" (127mm)	
Insulation Barrier Type	1002 (CZ410 / CZ710) 2004 (CZ418) 2005 (CZ405 / CZ705)	9.00" (230mm)	0.015"~0.118" (0.38mm~3.00mm) above 0.118" Consult factory
	LT200 (CZ610)	5.00" (127mm)	
Solid Self - Support Type	1002 (CZ410 / CZ710) 2004 (CZ418) 2005 (CZ405 / CZ705)	9.00" (230mm)	0.050" (1.27mm) 0.090" (2.30mm) 0.060" (1.50mm) 0.100" (2.50mm) 0.070" (1.80mm) 0.120" (3.00mm)
	LT200 (CZ610)	5.00" (127mm)	0.080" (2.00mm) 0.140" (3.50mm)
Sponge Self - Support Type	1002 (CZ410 / CZ710) 2004 (CZ418) 2005 (CZ405 / CZ705)	9.00" (230mm)	0.060" (1.50mm) 0.087" (2.00mm) 0.118" (3.00mm) 0.063" (1.60mm) 0.091" (2.30mm) 0.126" (3.20mm) 0.067" (1.70mm) 0.100" (2.50mm) 0.138" (3.50mm) 0.070" (1.80mm) 0.102" (2.60mm) 0.150" (3.80mm) 0.075" (1.90mm) 0.106" (2.70mm) 0.157" (4.00mm) 0.079" (2.00mm) 0.110" (2.80mm)

6] Tolerance Table.

-1) Plain type connector / Insulation Barrier Connector.

Table - 5

Measurement	Mark	MM : Size and Tolerance	inch : Size and Tolerance
Length	L	4.00 ~ 61.00 ± 0.20	0.157" ~ 2.400" ± 0.008"
		61.20 ~ 152.40 ± 0.38	2.410" ~ 6.000" ± 0.015"
		152.60 ~ 200.00 ± 0.50	6.010" ~ 7.870" ± 0.020"
		200.10 ~ 230.00 ± 1.00	7.880" ~ 9.000" ± 0.039"
Height	H	0.50 ~ 19.00 ± 0.127 above 19.00 Consult factory	0.020" ~ 0.750" ± 0.005" above 0.750" Consult factory
Width	W	0.38 ~ 1.00 ± 0.050	0.015" ~ 0.039" ± 0.002"
		1.01 ~ 2.00 ± 0.076	0.040" ~ 0.079" ± 0.003"
		2.01 ~ 3.00 ± 0.127	0.080" ~ 0.118" ± 0.005"
		above 3.00 Consult factory	above 0.118" Consult factory

-2) Solid Self-Support Connector.

Table - 6

Measurement	Mark	MM : Size and Tolerance	inch : Size and Tolerance
Length	L	4.00 ~ 61.00 ± 0.20	0.157" ~ 2.400" ± 0.008"
		61.20 ~ 152.40 ± 0.38	2.410" ~ 6.000" ± 0.015"
		152.60 ~ 200.00 ± 0.50	6.010" ~ 7.870" ± 0.020"
		200.10 ~ 230.00 ± 1.00	7.880" ~ 9.000" ± 0.039"
Height	H	1.00 ~ 19.00 ± 0.127 above 19.00 Consult factory	0.039" ~ 0.750" ± 0.005" above 0.750" Consult factory
Width	W	1.27 ~ 2.00 ± 0.15	0.050" ~ 0.079" ± 0.006"
		2.03 ~ 2.54 ± 0.18	0.080" ~ 0.100" ± 0.007"
		2.55 ~ 3.50 ± 0.20	0.101" ~ 0.140" ± 0.008"
		above 3.50 Consult factory	above 0.140" Consult factory

-3) Sponge Self-Support Connector.

Table - 7

Measurement	Mark	MM : Size and Tolerance	inch : Size and Tolerance
Length	L	4.00 ~ 61.00 ± 0.20	0.157" ~ 2.400" ± 0.008"
		61.20 ~ 152.40 ± 0.38	2.410" ~ 6.000" ± 0.015"
		152.60 ~ 200.00 ± 0.50	6.010" ~ 7.870" ± 0.020"
Height	H	1.00 ~ 19.00 ± 0.127 above 19.00 Consult factory	0.039" ~ 0.750" ± 0.005" above 0.750" Consult factory
Width	W	1.52 ~ 4.00 ± 0.10 above 4.00 Consult factory	0.060" ~ 0.157" ± 0.004" above 0.157" Consult factory

7] Typical Product Properties.

Table - 8

Operating Temperature Range	(Standard) Carbon Connector Series : 1002 (CZ410 / CZ710) / 2004 (CZ418) / 2005 (CZ405 / CZ705)	-55°F ~ +260°F (-50°C ~ +125°C)	
	Low Temperature Carbon Connector Series : LT200 (CZ610)	-85°F ~ +260°F (-65°C ~ +125°C)	
Current Carrying Capacity	(Standard) Carbon Connector Series : 1002 (CZ410 / CZ710) / 2004 (CZ418) / 2005 (CZ405 / CZ705)	50mA	0.035" x 0.035" Pad (0.90mm x 0.90mm)
	Low Temperature Carbon Connector Series : LT200 (CZ610)	50mA	
Resistance Between Layers	(Standard) Carbon Connector Series : 1002 (CZ410 / CZ710) / 2004 (CZ418) / 2005 (CZ405 / CZ705)	10 ¹² ohms	
	Low Temperature Carbon Connector Series : LT200 (CZ610)	10 ¹² ohms	

8] Typical Material Properties.

Table - 9

Item	Conductive Layer	Insulating Layer	Support Rubber	Support Sponge
material	Carbon Filled Silicone Rubber	Non-conductive Silicone Rubber	Non-conductive Silicone Rubber	Non-conductive Silicone Sponge
Color	Black	Off-white	Light blue	Pink
Hardness Shore A	73	70	25	10
Tensile Strength MPa	5.8	6.9	4.9	2.9
Elongation %	100	250	250	100
Tear Strength KN/m	7	10	10	5
Volume Resistivity MΩ·m	5x10 ⁻⁸	1x10 ⁶	1x10 ⁶	1x10 ⁶

9] Calculation of Resistance and Force Deflection.

-1) Resistance.

For the purpose of calculating the resistance of a Carbon Connector and testing them for compliance, please use the following formula.

Table - 10

Inches	Metric
$R = \frac{2.37 \times h}{(Ew \times w)} = \text{ohms}$	$R = \frac{60 \times h}{(Ew \times w)} \text{ Where, cw, and w are in "cm"}$
Ew = Electrode Pad width in inches W = Width of ZEBRA portion in inches H = Connector Height (H) in inches	Ew = Electrode Pad width in mm w = Width of ZEBRA portion in mm h = Connector Height (H) in mm

-2) Force Deflection.

Connector should be deflected 5% to 25% of Height (H) To calculate Force for deflection, use following formula.

Plain ZEBRA or Insulation Barrier Type

Table - 11

Inches	Metric
$F (N) = 5806D \times W \times L \times 9.8 \times 10^{-3}$	$F (N) = 9D \times W \times L \times 9.8 \times 10^{-3}$
$D = \frac{H - H_1}{H} \times 100\% \text{ (Deflection in percent)}$	
H = Height of Connector (inches or mm) H ₁ = Deflected height of Connector (inches or mm) L = Length of Connector (inches or mm) W = Width of Connector (inches or mm)	

Insulation Silicone Support Type

Table - 12

Inches	Metric
$F (N) = [(5806D \times W \times L) + \{1161D \times (W - W_1) \times L\}] \times 9.8 \times 10^{-3}$	$F (N) = [(9D \times W \times L) + \{1.8D \times (W - W_1) \times L\}] \times 9.8 \times 10^{-3}$
$D = \frac{H - H_1}{H} \times 100\% \text{ (Deflection in percent)}$	
H = Height of Connector (inches or mm) H ₁ = Deflected height of Connector (inches or mm) L = Length of Connector (inches or mm) W = Width of Connector (inches or mm) W ₁ = Width of ZEBRA Connector (inches or mm)	

10] Others

Fujipoly website <http://www.fujipoly.com>

11] Trade Marks.



ZEBRA®

Notes :

- All Fujipoly test data in this document is based on Fujipoly test method and is believe to be accurate and reliable. Nevertheless, any Fujipoly test data shows typical product properties, and does not show the guaranteed product properties.
- Some Silicone oil could exude from the product according to operating conditions.
- Some low molecular Siloxane could vaporize from the product according to operating conditions.
- It is advisable to use the product under recommended operating condition. Some more Silicone oil could exude from the product if it was used over the recommended condition.
- It is advisable to use the product under parallel and even compression. Some more Silicone oil could exude from the product if it was used under excessive or partial stress.
- Products testing by the purchaser is recommended in order to meet expected results such as performance and application.

April.18th 2008	version 8
January.16th 2006	version 7
September.1st 2005	version 6
February.14th 2003	version 5
January.31th 2002	version 4
January.8th 2001	version 3
December.8th 2000	version 2
ISSUED : July.31th 2000	version 1

STATEMENT OF LIEU OF WARRANTY: All technical information and data in this document is based on tests and is believed to be accurate and reliable. Nevertheless, since the products described herein are not provided to conform with mutually accepted specifications and the use thereof is unknown, the manufacturer and seller of the product do not guarantee results, freedom from patent infringement, or suitability of the product for any application thereof. The manufacturer and seller of the product, described in this document will provide all possible technical assistance and will replace any products proven defective. No statement or recommendation made by the manufacturer or seller, not contained herein, shall have any force of effect unless in conformity with an agreement signed by an officer of the seller or manufacturer. Product testing by the purchaser is recommended in order to confirm expected results.

Copyright ' 1996 Fujipoly.

*FUJIPOLY® and ZEBRA® are registered Trademarks of Fujipoly Group.