



前廣企業有限公司
CHANG CHIEN KUNG ENTERPRISE CO., LTD

EcoFlex
Clean Wiring Solution

無塵室專用拖鍊系統

Exclusive operation cable system for cleanroom

Hitachi Cable America,
Tsubakimoto Chain共同合作開發
無塵室專用拖鍊系統

New

1.5M

Compact
Type

R30

Clean
Wiring
Solution

業界最長
Long-Stroke

Compact Type
EcoFlex 新推出!

6M

IPA CLASS 1等級無塵室專用拖鍊,LCD/OLED面板廠,鏡頭光學廠,半導體廠 專用

台灣總代理

前廣企業有限公司

www.chienkung.com.tw



삼원ACT(주)
SAMWON ACT Co., Ltd.

Compact Type EcoFlex 新推出!

- 相較標準尺寸減少 **20 %**,實現輕量化狹窄空間高速運行條件!
- 可適用於如半導體設備一樣小型的短行程空間狹窄的拖鍊!

ST
行距

1.5M

L
弧度壽命

1000万次以上

弧度壽命(R角)會因結構條件有所差異

R
弧度半徑

R30

A
最大加速度

4G

最大加速度會因結構條件有所差異

New

Compact Type EcoFlex!

EcoFlex

Line-up!

Compact Type

適用於小型設備的最佳產品
適合短行程狹窄空間

Standard Type

ECOFLEX主力產品,具備
R40,R70, R100, R130多樣的
彎曲半徑和最長2800MM的行程,適
用範圍廣泛

Long-Stroke Type

與STANDARD TYPE同樣尺
寸,行程最大可規劃至 6000MM的長行
程產品適用於較大型的設備

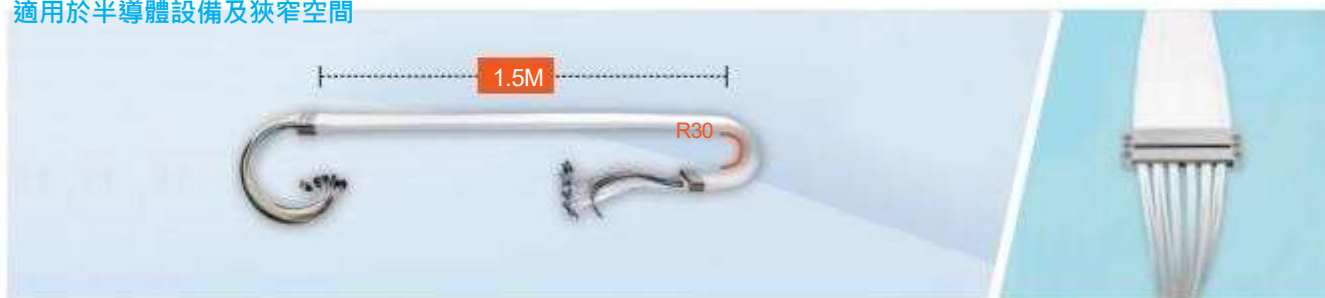
- Value that creates customers' satisfaction and reliability



無塵室專用拖鍊系統

CompactType 減少 20% 大小的**CompactType**

適用於半導體設備及狹窄空間



Standard Type 高性能！穩定結構！標準型

具有1,000萬次以上的運行壽命，減少維修費用，減少因粉塵引起的產品不良。



Long-Stroke Type 業界最長6M長距離型

LCD及OLED適用於大型設備物流移送





SAMWON, Hitachi Cable America,
與專業拖鍊品牌 Tsubakimoto Chain合作共同
開發的無塵室專用拖鍊

ECOFLEX的含意

環保型ECO與代表柔軟Flexible的合成詞

適用於無塵室依照無塵概念研發的拖鍊系統品牌



Silent

● 實現噪音等級38dB(A)以下

Clean

● 實現無塵室空氣淨化度
IPA 最高等級 CLASS 1

Long-Life

● 實現彎曲移動次數1000萬次以上的使用壽命!





● 特色 Features and Benefits

- 01 ePTFE (Expanded polytetrafluoroethylene) 材質外被把構造支架及電纜氣管包覆在內, 而實現了無粉塵無塵室專用拖鍊系統。
- 02 可堆疊式構造, 較多的電纜或氣管可以做彈性的空間運用, 比起傳統拖鍊 (Cable veyor) 重量大幅減少。
- 03 1000萬次以上的移動壽命, 由於ECOFLEX是跨時代的新產品, 可大幅降低不良率, 同時也大幅降低維修的成本及時間。
- 04 業界最長的行程距離 (6M), 可對應物流設備及大型設備的運行環境 (Long Stroke)
- 05 適用於各種自動化設備, 依照客戶需求訂制。100%客制化, 數量沒有限制。



● 規格 Specifications

最大行程 Max. Stroke length	Compact	CSM R=30 : 1,500mm 注1)
	Standard	SM R=40 : 1,200mm / SM R=70 : 2,000mm / SM R=100 : 2,500mm / SM R=130 : 2,800mm 注2)
	Long-Stroke	LSM R=130 : 6,000mm 注3)
電纜最大長度Max. Cable length	8,000mm	
最小彎曲半徑 Min bend radius	R. 40mm	
最快運行速度 Max. Velocity	2m/sec.	
最大加速度 Max. Acceleration	4G	
運行壽命 Flex life	1000萬次以上	
適用溫度環境Ambient temperature	-10℃ ~ +80℃	
適用電纜外徑Cable diameter	3~10mm	
適用電纜型態Cable types	I/O, Encoder, IEEE1394, Ethernet, Power, Video, Pneumatic Tubes (氣管)	
available無塵認證等級Clean room	IPA Class1	
電纜認證Cable certifications	CE & UL 注4)	

- ※ 注1) CSM = Compact Support Member的縮寫是小型拖鍊
 注2) SM = Support Member的縮寫是標準型拖鍊。
 注3) LSM = Long Stroke Support Member的縮寫是長行程拖鍊。(16mm*16mm)
 注4) UL相關認證請洽敝公司。

● 用途 Purpose



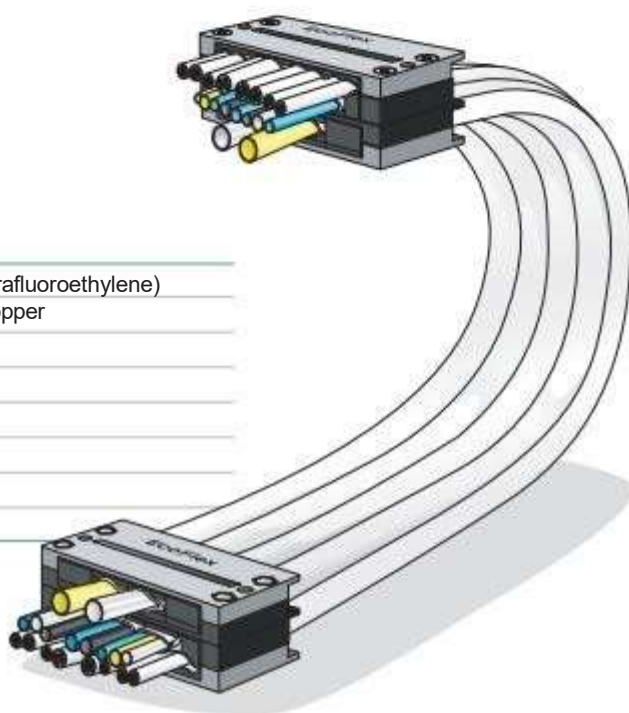
通過替代LCD及OLED, 半導體設備無塵室使用的暴露電纜,
可大幅降低粉塵噪音及延長使用壽命, 維護成本亦可大幅降低

● 結構 Structure



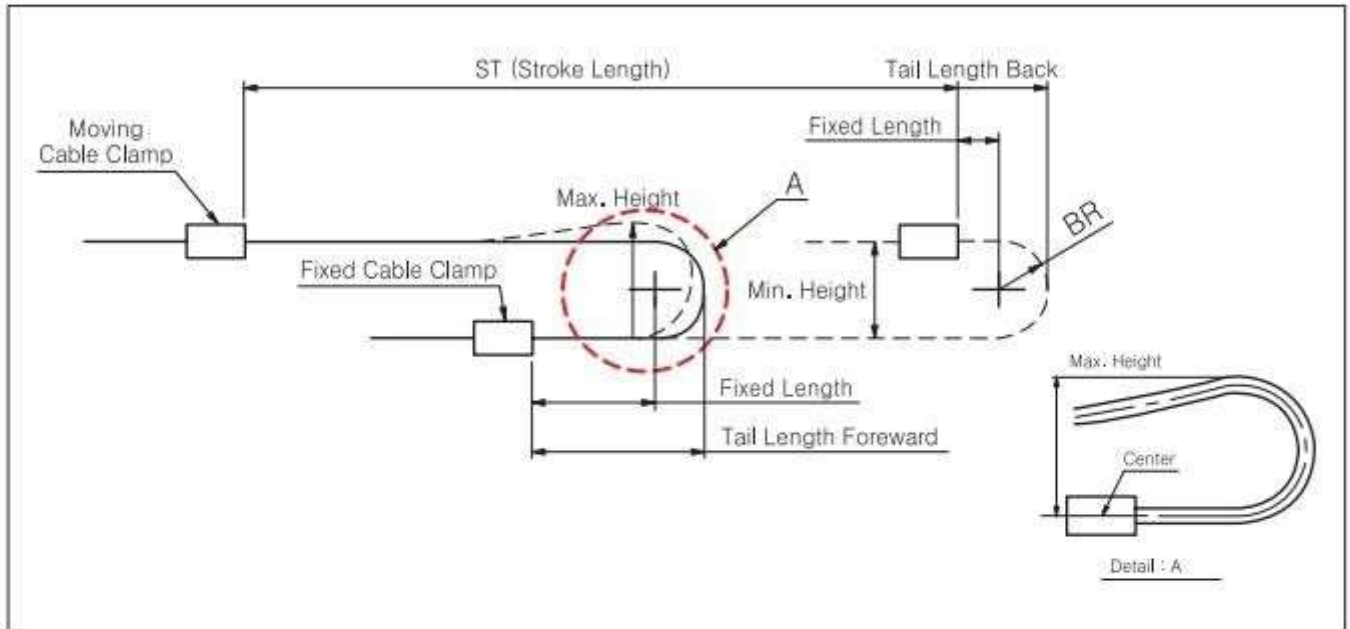
● 材質 Material

皮套 Pod		ePTFE (Expanded polytetrafluoroethylene)
電纜 Cable	導體 Conductor	Tinned Copper or Bare Copper
	絕緣體 Insulation	FEP, HYTREL, ETFE
	包線膜 Binder	ePTFE
	外皮 Jacket	PVC LF
	屏蔽線 Shield	Tinned Copper
支架 Support Member		PA66
夾具 Clamp		Die Casted AL.





● 使用條件 Application Conditions



固定端夾具

Fixed cable clamp

固定端夾具在高度無限制的情況下,可做有條件的堆疊,已增加客戶端的電纜或氣管使用數量。

移動端夾具

Moving cable clamp

固定於移動端的夾具。

彎曲半徑

BR (Bend Radius)

從內側中心點 (center) 到外側電纜的彎曲半徑。

最大高度

Max. Height

根據電纜的彎曲半徑與堆疊層數有所不同,是從固定端夾具的中心到外層末端的距離。

最小高度

Min. Height

彎曲半徑30mm為最小高度,根據彎曲半徑 Support member 的規格會有所不同。

運行長度

(Stroke length)

以移動端夾具計算,移動至兩端的盡頭視為運行長度。

加速度

Acceleration

Stroke length 內運行時的速度變化。

速度

Velocity (m/sec.)

1秒內的移動速度。

電纜最長距離

Max. Cable length

包含POD內置入的長度最長8000mm以內。

後退端長度

Tail length back

後退至末端為止移動時需保留的空間,需要最大高度以上的寬度,從夾具到固定長度 (Fixed Length) 的距離最小100mm以上。

前進端長度

Tail length foreward

前進末端為止移動時需保留的空間,需要最大高度以上的寬度,從夾具到固定長度 (Fixed Length) 的距離最小100mm以上。

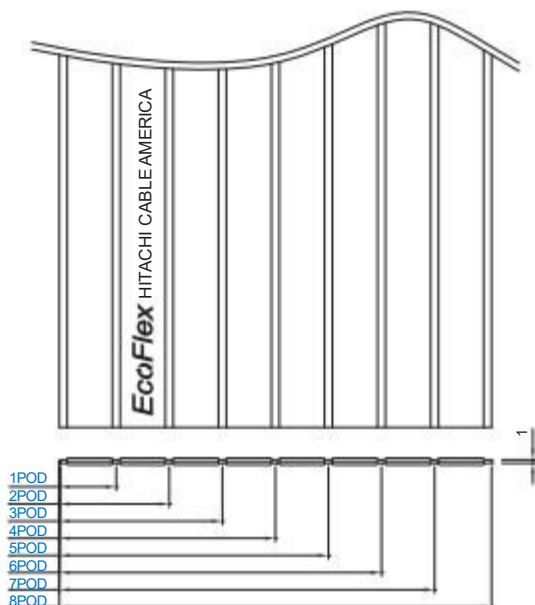
最長行程長度

Max. Stroke length

根據適用 Support member

C. S. M = 1,500mm 以下
S. M = 2,800mm 以下
L. S. M = 6,000mm 以下

● 皮套 Pod



Compact Pod

皮套型號 Pod Model	皮套數量 No. of Pod	皮套厚度 Pod Thickness	皮套寬度 Pod Width	連接寬度 Web Width	整體寬度 Total Width
20398-1	1Pod	Approx. 1mm (0.04")	Approx. 14.2mm (0.56")	Approx. 1.78mm (0.07")	17.78mm (0.70")
20398-2	2Pod				33.78mm (1.33")
20398-3	3Pod				49.78mm (1.96")
20398-4	4Pod				65.79mm (2.59")
20398-5	5Pod				81.79mm (3.22")
20398-6	6Pod				97.79mm (3.85")
20398-7	7Pod				113.78mm (4.48")

Standard Pod

皮套型號 Pod Model	皮套數量 No. of Pod	皮套厚度 Pod Thickness	皮套寬度 Pod Width	連接寬度 Web Width	整體寬度 Total Width
20305-1	1Pod	Approx. 1mm (0.04")	Approx. 19mm (0.75")	Approx. 2.3mm (0.09")	23.6mm (0.93")
20305-2	2Pod				44.9mm (1.77")
20305-3	3Pod				66.2mm (2.61")
20305-4	4Pod				87.5mm (3.45")
20305-5	5Pod				108.8mm (4.29")
20305-6	6Pod				130.1mm (5.13")
20305-7	7Pod				151.4mm (5.97")
20305-8	8Pod				172.7mm (6.81")

Long-Stroke Pod

皮套型號 Pod Model	皮套數量 No. of Pod	皮套厚度 Pod Thickness	皮套寬度 Pod Width	連接寬度 Web Width	整體寬度 Total Width
20396-2	2Pod	Approx. 1mm (0.04")	Approx. 39mm (1.53")	Approx. 7.1mm (0.28")	94.3mm (3.7")
20396-3	3Pod				140.4mm (5.51")
20396-4	4Pod				186.5mm (7.32")

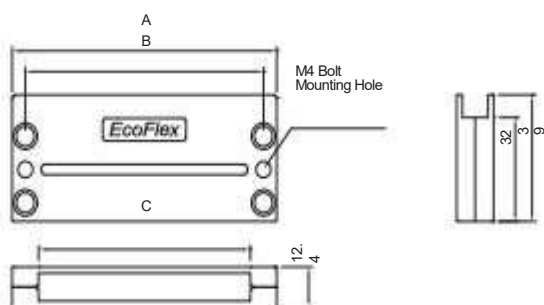
Special Pod

皮套型號 Pod Model	皮套數量 No. of Pod	皮套厚度 Pod Thickness	皮套寬度 Pod Width	整體寬度 Total Width
20306-1	1Pod	Approx. 1mm (0.04")	Approx. 30.0mm (1.18")	34.54mm (1.36")
20332-1			Approx. 39.0mm (1.53")	43.4mm (1.71")
20348-1			Approx. 61.72mm (2.43")	67.0mm (2.64")
20349-1			Approx. 83.06mm (3.27")	88.0mm (3.47")
20326-1			Approx. 105.0mm (4.11")	110.0mm (4.33")
20327-1			Approx. 126.0mm (4.96")	131.0mm (5.16")



● 夾具 Clamp

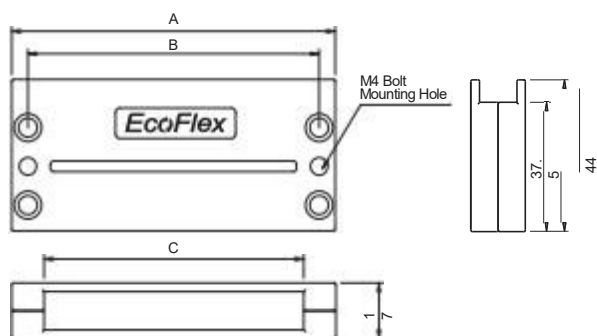
Compact Clamp 輕量型專用夾具



夾具型號 Clamp Model	Pod數量 No. of Pod	A (mm)	B (mm)	C (mm)
CCL-2	2Pod	47.0	38.1	29.1
CCL-3	3Pod	61.0	52.1	43.1
CCL-4	4Pod	74.9	66.0	57.0
CCL-5	5Pod	88.9	80.0	71.0
CCL-6	6Pod	102.9	94.0	85.1
CCL-7	7Pod	116.9	108.0	99.1

※ 注意) 安裝夾具時務必使用M4螺絲

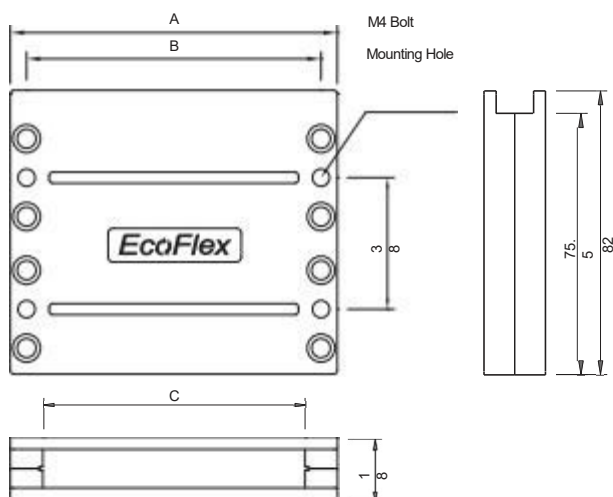
Standard Clamp 標準型專用夾具



夾具型號 Clamp Model	Pod數量 No. of Pod	A (mm)	B (mm)	C (mm)
ECL-2	2Pod	57.2	47.7	38.2
ECL-3	3Pod	76.3	66.8	57.3
ECL-4	4Pod	95.4	85.9	76.4
ECL-5	5Pod	114.5	105.0	95.5
ECL-6	6Pod	133.6	124.1	114.6
ECL-7	7Pod	152.7	143.2	133.7
ECL-8	8Pod	171.8	162.3	152.8

※ 注意) 安裝夾具時務必使用M4螺絲

Long-Stroke Clamp 長距離及高負載專用夾具



夾具型號 Clamp Model	Pod數量 No. of Pod	A (mm)	B (mm)	C (mm)
LCL-4	4Pod	95.4	85.9	76.4
LCL-6	6Pod	133.6	124.1	114.6
LCL-8	8Pod	171.7	162.2	152.7

※ 注意) 安裝夾具時務必使用M4螺絲

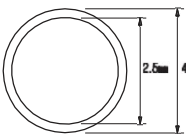
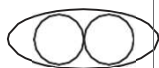
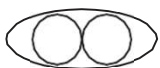
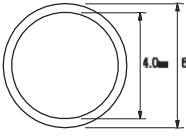
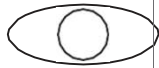
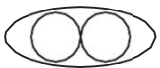
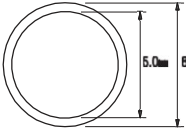
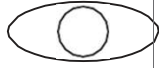
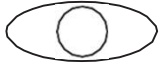
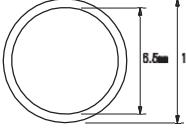
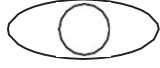
● Compact型電纜 Compact Type Cable

No.	電纜編號 Cable Code	剖面圖 Cross Section	規格 Specifications	材質結構 Construction		外徑Out diameter	POD置入數量 No. of insert in IPod
1	AA		20AWG 4Core Shield Servo Motor Power	Conductor Insulator Binder	Bare Copper FEP ePTFE	Approx. 4.4mm	2
2	AB		18AWG 4Core Shield Servo Motor Power	Conductor Insulator Binder	Bare Copper FEP ePTFE	Approx. 5.0mm	1
3	AC		16AWG 4Core Shield Servo Motor Power	Conductor Insulator Binder	Bare Copper FEP ePTFE	Approx. 5.8mm	1
4	AD		20AWG 6Core Shield Servo Motor Power	Conductor Insulator Binder	Bare Copper FEP ePTFE	Approx. 5.2mm	1
5	AE		26AWG 5Pair Shield Servo Motor Encoder Signal, Control	Conductor Insulator Binder	Tinned Copper ETFE ePTFE	Approx. 4.5mm	2
6	AF		26AWG 8Pair Signal I/O	Conductor Insulator Binder	Tinned Copper ETFE ePTFE	Approx. 4.5mm	2
7	AG		#22 2C+#26 2P Shield Servo Motor Encoder Signal, Control	Conductor Insulator Binder	Tinned Copper FEP/ETFE ePTFE	Approx. 4.1mm	2
8	AG1		#22 2C+#26 3P Shield Servo Motor Encoder Signal, Control	Conductor Insulator Binder	Tinned Copper FEP/ETFE ePTFE	Approx. 4.6mm	1
9	AQ		22AWG 7Core Shield Signal I/O	Conductor Insulator Binder	Tinned Copper FEP PTFE	Approx. 4.9mm	1

Standard型電纜 Standard Type Cable

No.	電纜編號 Cable Code	剖面圖 Cross Section	規格 Specifications	材質結構 Construction		外徑Out diameter	POD置入數量 No. of insert in IPod
1	A		20AWG 4Core Shield Servo Motor Power	Conductor Insulator Binder Sheath	Bare Copper FEP ePTFE PVC LF	Approx. 5.3mm	2
2	B		18AWG 4Core Shield Servo Motor Power	Conductor Insulator Binder Sheath	Bare Copper FEP ePTFE PVC LF	Approx. 6.0mm	2
3	C		16AWG 4Core Shield Servo Motor Power	Conductor Insulator Binder Sheath	Bare Copper FEP ePTFE PVC LF	Approx. 6.8mm	1
4	D		20AWG 6Core Shield Servo Motor Power	Conductor Insulator Binder Sheath	Bare Copper FEP ePTFE PVC LF	Approx. 6.2mm	2
5	E		26AWG 5Pair Shield Servo Motor Encoder Signal, Control	Conductor Insulator Binder Sheath	Tinned Copper ETFE ePTFE PVC LF	Approx. 5.1mm	2
6	F		26AWG 8Pair Signal I/O	Conductor Insulator Binder Sheath	Tinned Copper ETFE ePTFE PVC LF	Approx. 5.1mm	2
7	G		#22 2C+#26 2P Shield Servo Motor Encoder Signal, Control	Conductor Insulator Binder Sheath	Tinned Copper FEP/ETFE ePTFE PVC LF	Approx. 5.1mm	2
8	I		26AWG 4Core Shield IEEE1394 Communication	Conductor Insulator Binder Sheath	Tinned Copper FEP ePTFE PVC LF	Approx. 5.5mm	2
9	CA		#26, #30 8 Conductor Composite, Vision spec. Shield Video, Vision	Conductor Insulator Binder Sheath	Tinned Copper #26 PE/#30 FEP PTFE PVC LF	Approx. 6.7mm	1
10	L		26AWG 4Pair Shield CAT.5e Ethernet Communication	Conductor Insulator Binder Sheath	Tinned Copper FEP ePTFE PVC LF	Approx. 5.8mm	2
11	Q		22AWG 7Core Shield Signal I/O	Conductor Insulator Binder Sheath	Tinned Copper FEP ePTFE PVC LF	Approx. 6.6mm	1

● 工業氣管 Air Tube

No.	氣管編號 Tube Code	剖面圖 Cross Section	規格 Specifications	材質結構 Construction	外徑 Out Diameter	COMPACT POD 置入數量No. of insert in 1Pod	Standard Pod置入數量 No. of insert in 1Pod
1	A4		Air Tube Out Dia. : 4.0mm Inner Dia. : 2.5mm 0.8Mpa at 20°C	Material : Urethane Maker : SMC, Nitta Moore ETC. Color : BK,YL,BU,GN,CL,WH	Approx. 4.0mm	2 	2 
2	A6		Air Tube Out Dia. : 6.0mm Inner Dia. : 4.0mm 0.8Mpa at 20°C	Material : Urethane Maker : SMC, Nitta Moore ETC. Color : BK,YL,BU,GN,CL,WH	Approx. 6.0mm	1 	2 
3	A8		Air Tube Out Dia. : 8.0mm Inner Dia. : 5.0mm 0.8Mpa at 20°C	Material : Urethane Maker : SMC, Nitta Moore ETC. Color : BK,YL,BU,GN,CL,WH	Approx. 8.0mm	1 	1 
4	A10		Air Tube Out Dia. : 10.0mm Inner Dia. : 6.5mm 0.8Mpa at 20°C	Material : Urethane Maker : SMC, Nitta Moore ETC. Color : BK,YL,BU,GN,CL,WH	Approx. 10.0mm	X	1 

**Exclusive operation cable system
for cleanroom**

EcoFlex
Clean Wiring Solution

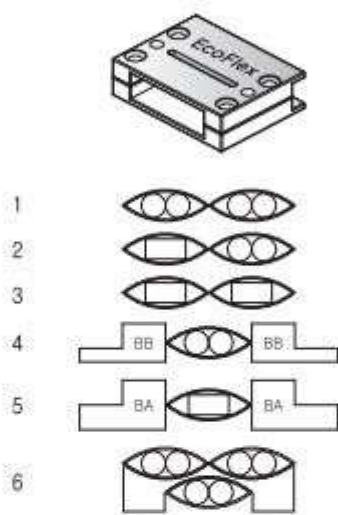


● 各夾具電纜 / S.M結構

Construction for Cable and Support Member

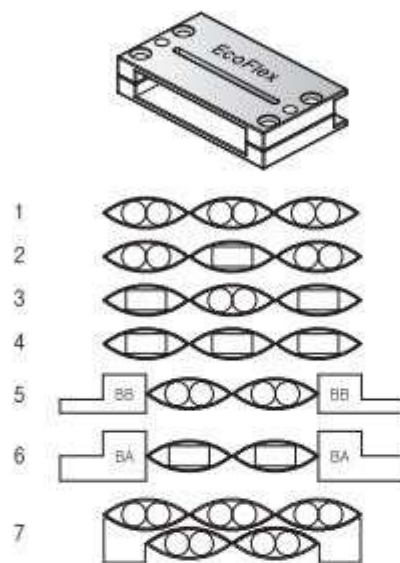
Clamp Model. **ECL-2**

POD數 No. of Pod	寬度 Width	深度 Depth	固定孔 Mounting
2Pod	57.2mm	44.0mm	47.7mm



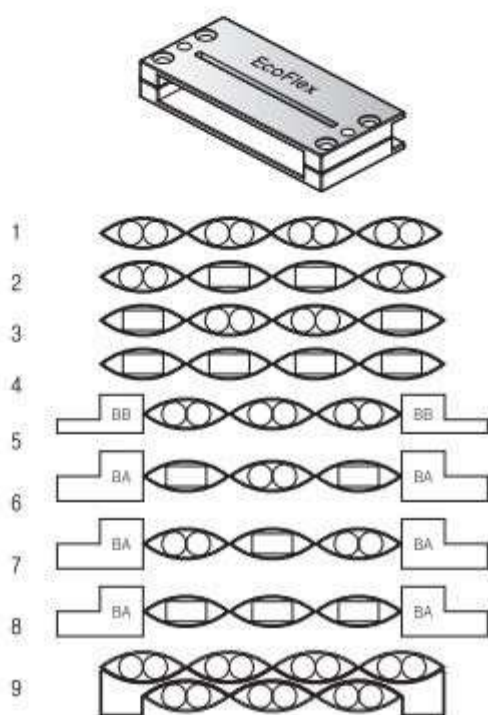
Clamp Model. **ECL-3**

POD數 No. of Pod	寬度 Width	深度 Depth	固定孔 Mounting
3Pod	76.3mm	44.0mm	66.8mm



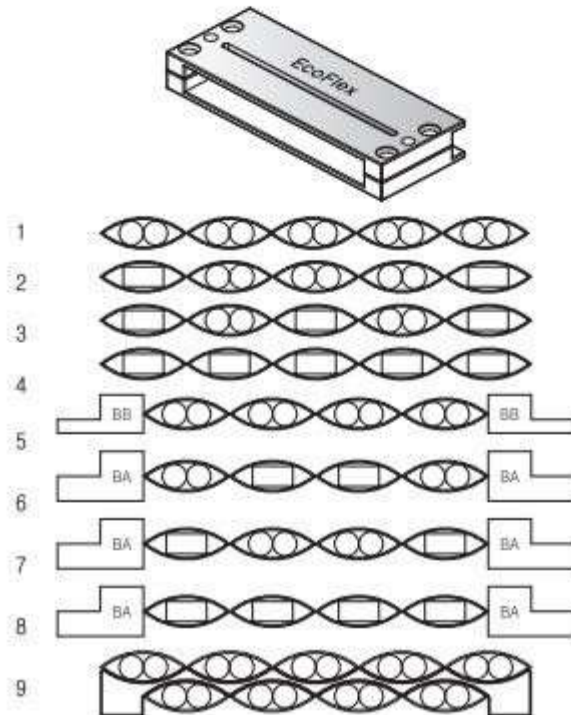
Clamp Model. **ECL-4**

POD數 No. of Pod	寬度 Width	深度 Depth	固定孔 Mounting
4Pod	95.4mm	44.0mm	85.9mm



Clamp Model. **ECL-5**

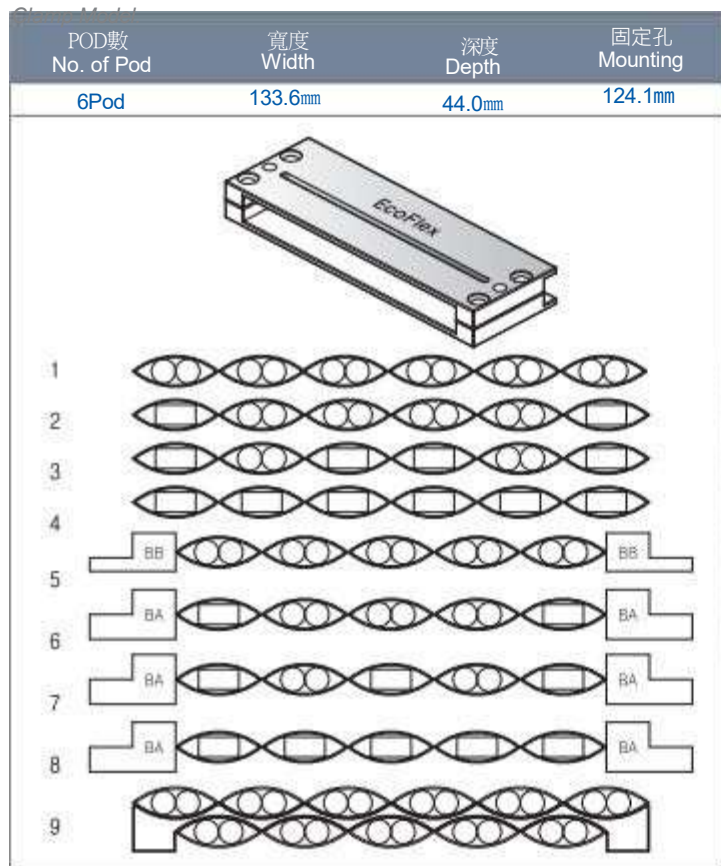
POD數 No. of Pod	寬度 Width	深度 Depth	固定孔 Mounting
5Pod	114.5mm	44.0mm	105.0mm



● 各夾具電纜 / S . M結構 Construction for Cable and Support Member

ECL-6

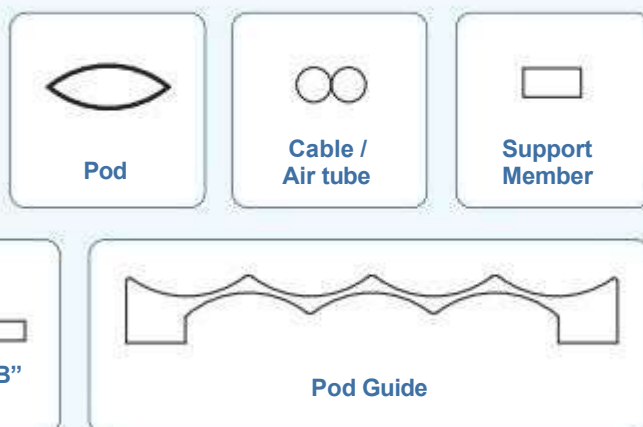
POD數 No. of Pod	寬度 Width	深度 Depth	固定孔 Mounting
6Pod	133.6mm	44.0mm	124.1mm



The diagram illustrates the ECL-6 cable assembly. It shows a top view of the cable with 6 pods. The cable is composed of multiple layers of pods, with some layers having support members (BA or BB) attached. The diagram is numbered 1 through 9, showing the different components and their arrangement. A 3D perspective view of the cable assembly is also shown at the top left of the diagram area.



● Symbol

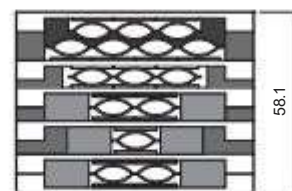
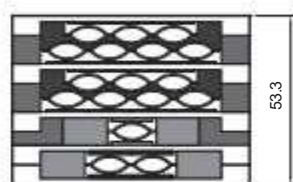
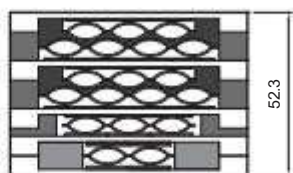




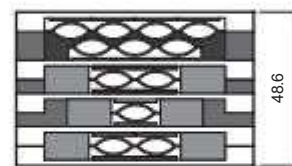
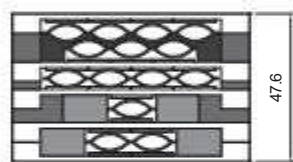
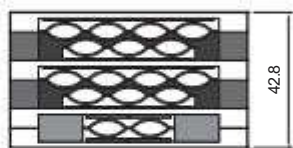
● Compact Pod Clamp 各層結構實例 Construction for Cable and Support Member

Assembly example for CCL-4

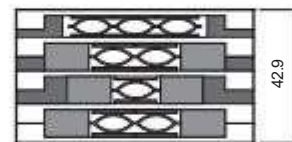
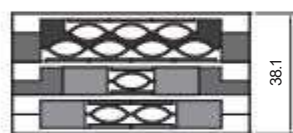
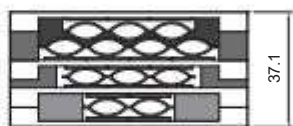
6層



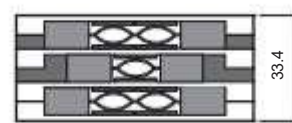
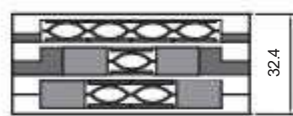
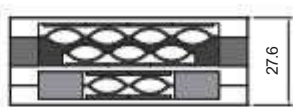
5層



4層



3層



2層



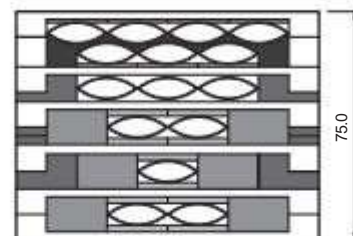
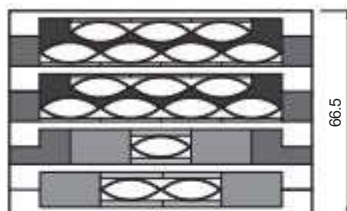
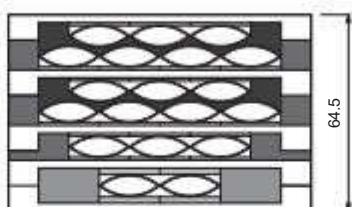
1層



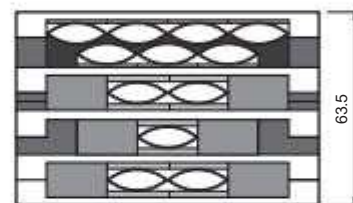
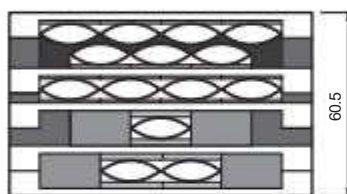
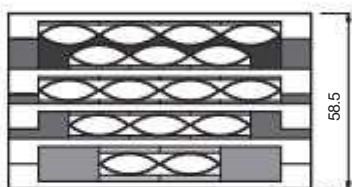
Standard Pod Clamp 各層結構實例 Construction for Cable and Support Member

Assembly example for ECL-4

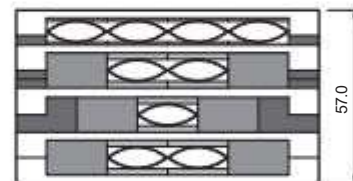
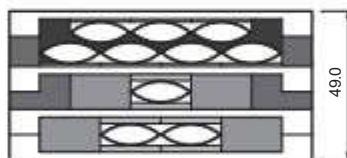
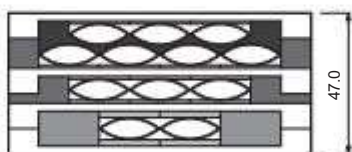
6層



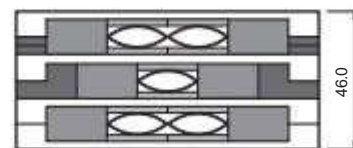
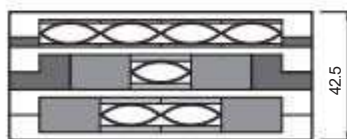
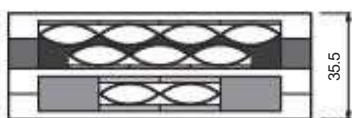
5層



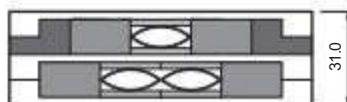
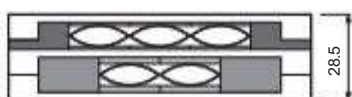
4層



3層



2層



1層



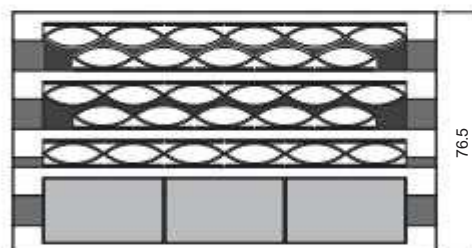
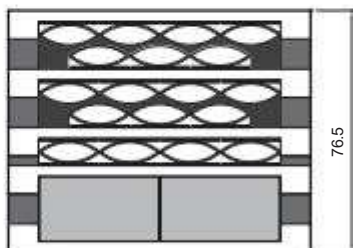


Long-Stroke Clamp 各層結構實例 Construction for Cable and Support Member

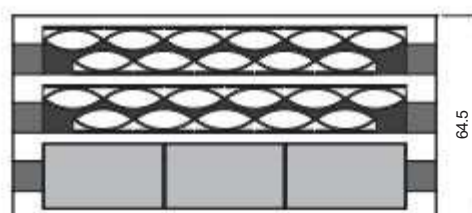
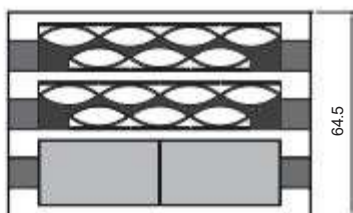
Assembly example for LCL-4

Assembly example for LCL-8

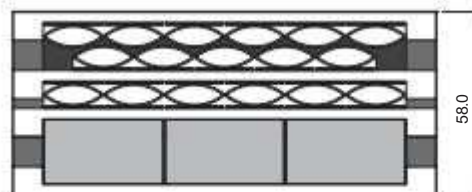
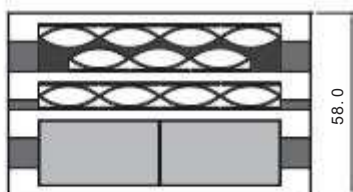
6層



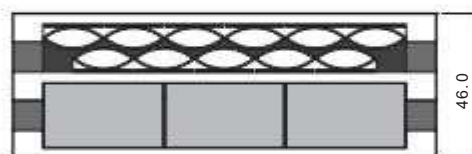
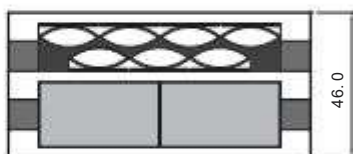
5層



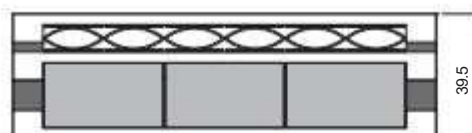
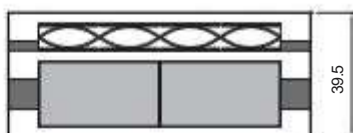
4層



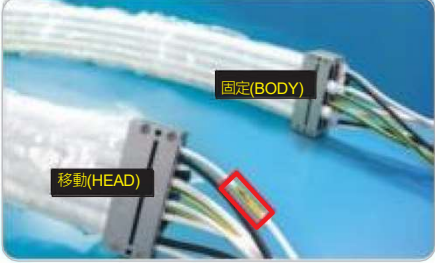
3層



2層

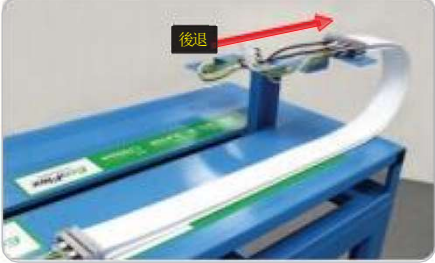


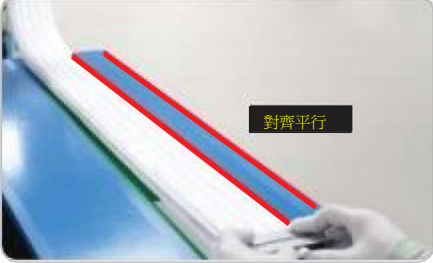
● 電纜安裝順序

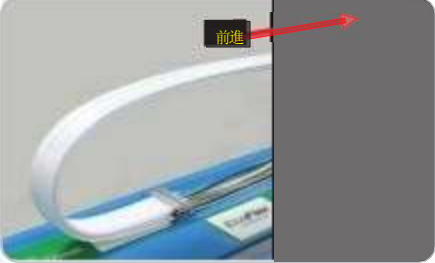
- 01 

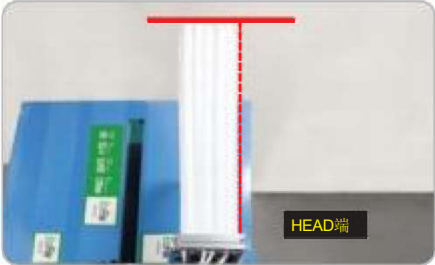
確認產品的移動側(HEAD CLAMP)黃色 LABEL與固定側(BODY CLAMP)位置。
- 02 

確認位置後移動側(HEAD CLAMP)與固定側(BODY CLAMP)上用六角螺絲輕微固定。(固定螺絲尺寸:M4)
- 03 

去除產品外包裝。
- 04 

先把移動部(HEAD CLAMP)後退到最末端。
- 05 

找齊工作檯面直線基準，將固定部CLAMP左右調整至平行，再將六角螺絲進行固定。
- 06 

移動部(HEAD CLAMP)前進至末端。
- 07 

產品側面直線為基準，將產品移動部(HEAD CLAMP)左右調整至平行，再將六角螺絲進行固定。
- 08 

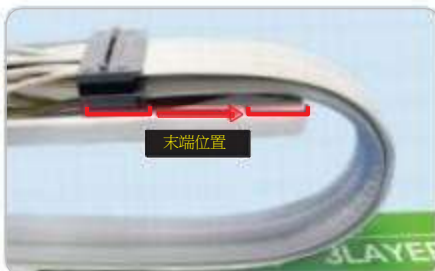
多次進行前進/後退動作，確認產品安裝是否傾斜。
- 09 

為防止異物及刮傷，可用包膜進行外包覆。

● 安裝錯誤範例

- 01 

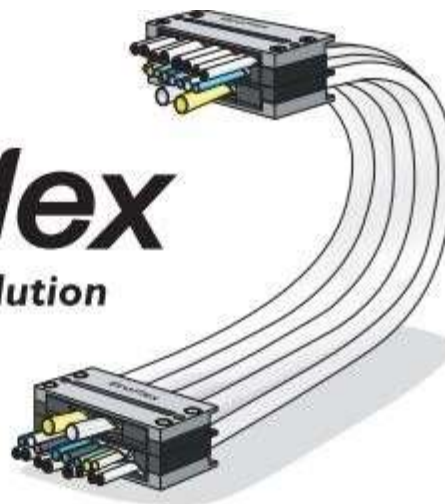
尾部發生干涉。
後退至極限時不能與機構發生干涉，確保留有安全空間。
* 易造成產品損傷。
- 02 

需確保固定長度(Fixed Length)
前進(BODY)及後退(HEAD)時從夾具引出的固定長度須確保100mm以上。
* 會造成拖鍊破損及降低使用壽命。
- 03 

HEAD部固定部錯誤。
安裝HEAD部時需安裝在移動部末端。
* 如圖所示進行安裝時會造成POD及電纜損傷。

EcoFlex

Clean Wiring Solution



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