

## PRODUCT APPLICATION :

To protect industrial cable in various industrial circumstance, CPS has diverse and wide solutions.

- Gantry Crane
- Transfer Crane
- Goliath Crane



**C-77** page

▲ Sabin Chain Skid Type at Goliath Crane

## Goliath Crane



**C-71** page

▲ Shift Chain Roller Skid Type at Goliath Crane



**D-77** page

▲ Sabin Chain Skid type at Goliath Crane

## Crane



**C-75** page

▲ Sabin Chain Skid type at Crane



**F-6** page

▲ Special Moving Arm at Crane



**D-65** page

▲ Sabin Chain applied to winding equipment for long stroke cable chain

### Primary Customers

**SAMSUNG**  
SAMSUNG HEAVY INDUSTRIES

**DSME**

**HANJIN SHIPPING**

**KONECRANES**



## Gantry Loader ※ Suitable for high speed and long stroke.



**D-73** page

▲ Sabin Chain Skid type



**D-75** page

▲ Sabin Chain Skid type



**C-67** page

▲ Shift Chain Roller Skid type



**C-13** page

▲ Shift Chain Normal type



**D-45** page

▲ Sabin Chain Normal type

## Robot Carriage



**D-77** page

▲ Sabin Chain Skid type



**D-17** page

▲ Shift Chain Normal type

### Primary Customers



※ Our cable chain is suitable for robot carriage cables.  
We are supplying our cable chain for gantry loader and robot carriage lines from 2007.

## Boarding Bridge



**D-75** page

▲ Sabin Chain Skid Type

## Railway Train, Subway



**K-6** page

▲ CPS FLEX



**L-7** page

▲ CPS FIX

## Industrial Vehicles



**C-9** page

▲ Shift Chain Normal at special vehicle type



**C-13** page

▲ Shift Chain Normal type at high place operation car



**G-5** page

▲ Steel Chain at high place lift car



**K-4** page

▲ CPS FLEX, CPS FIX at high place lift car





- Machining center
- Automatic welding machine
- Washing machine
- CNC machine / Cutting machine
- Printing machine
- Textile machine
- Milling machine
- Setting machine
- Packing machine
- Handling machine
- ETC.,

## Machine Tools



▲ CPS CABLECHAIN (mini)



▲ Shift Chain Normal type



▲ Sabin Chain Normal type (nsb)



▲ Shift Chain Enclosed type

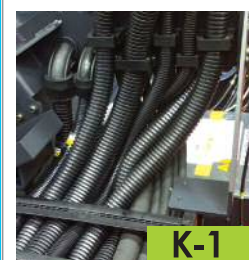


▲ Sabin Chain Enclosed type (nsb)



▲ CPS FLEX

## Machine Tools

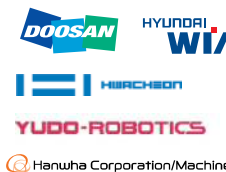


▲ CPS FLEX



▲ Revolving Chain

### Primary Customers



## CleanRoom - Circumstance



▲ Sabin Chain Clean room type at LCD manufacturing m/c (nsb)



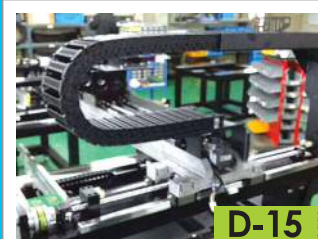
▲ Sabin Chain Clean room type at LCD manufacturing m/c (nsb)



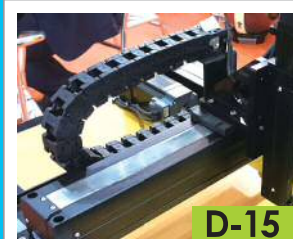
▲ Sabin Chain Clean room type at LCD Printing m/c (nsb)



▲ Sabin Chain Clean room type at Purging m/c (nsb)



▲ Sabin Chain Clean room type at Test Machine of LCD Plant (nsb)



▲ Sabin Chain Clean room type at Servo Robot (nsb)

### Primary Customers





## PRODUCT APPLICATION :

CPS cable chain is installed for very severe circumstance such as  
Thermoelectric power plant with our high quality level and specialists.



**D-77** page

## Thermoelectric Power Plant



**D-77** page

▲ Sabin Chain Skid type (nsb)



**C-71** page

▲ Shift Chain Roller Skid type



**F-6** page

▲ Special moving arm with Sabin Chain Skid type



**F-6** page

▲ Special moving arm with Shift Chain Roller Skid type



**K-4** page

▲ CPSFLEX



**L-7** page

▲ CPSFIX





## PRODUCT APPLICATION :

CPS products can be applied to very various circumstances to protect cables.

**C-13**

page

Shift Chain Normal & Skid type at cereal warehouse in Italy.



## Factory, Diverse Circumstances \* Can be applied to various direction!



**D-35**

page

▲ Sabin Chain Normal type at PCTC ship (flame retarding, ESD/nsb Chain)



**C-15**

page

▲ Shift Chain Normal type at Shipbuilder production line



**C-15**

page

▲ Shift Chain Normal type (Reiteration)



**B-1**

page

▲ CPS mini Chain without guide channel



**C-13**

page

▲ Shift Chain Normal type



**C-13**

page

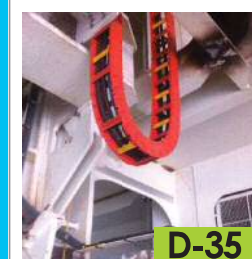
▲ Shift Chain Normal type



**C-17**

page

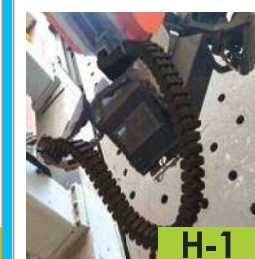
▲ Shift Chain Normal type



**D-35**

page

▲ Sabin Chain (nsb Chain)



**H-1**

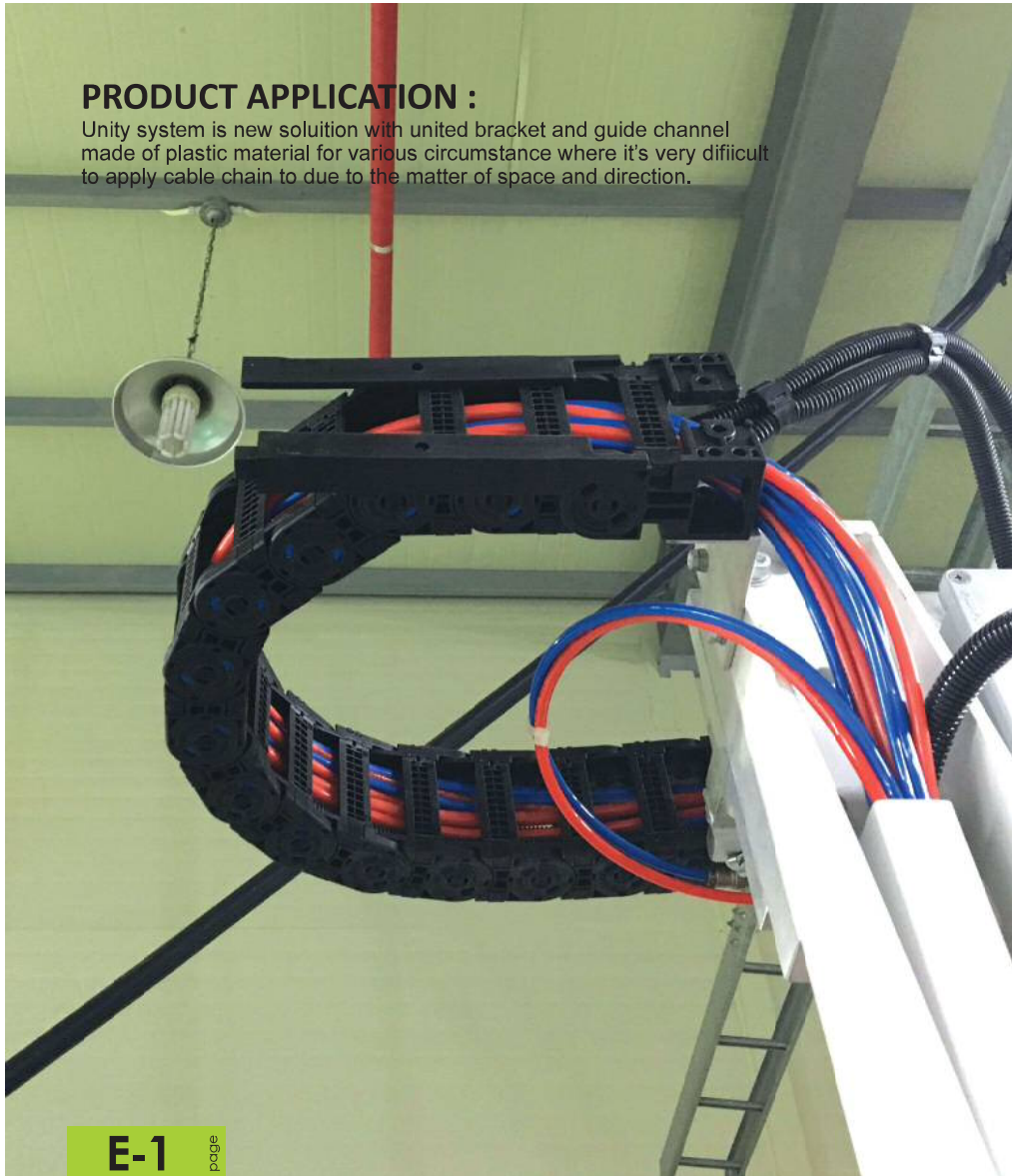
page

▲ Revolving Chain



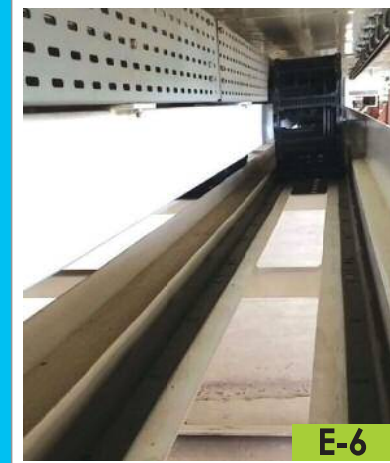
## PRODUCT APPLICATION :

Unity system is new solution with united bracket and guide channel made of plastic material for various circumstance where it's very difficult to apply cable chain to due to the matter of space and direction.



Unity systems with Shift Chain Normal type.

## Installation at Narrow Space



### ST072N

**Application:**  
Narrow space, Production line  
**Location:**  
China  
**Remark:**  
Stroke : 3meters  
**Date of Installation:**  
Aug, 2014



### nsb022CR

**Application:**  
Parts Factory of Apple  
**Location:**  
China  
**Remark:**  
Stroke : 1 meter  
**Date of Installation:**  
Sep, 2014



### ST072N

**Application:**  
Machine tools,  
Side mounted  
**Specification:**  
ST072N with Unity systems



### nsb028CR

**Application:**  
Machine tools,  
Horizontal mounted  
**Specification:**  
nsb028CR with  
Unity systems



### nsb035N

**Application:**  
PCTC ships, Vertical  
mounted  
**Specification:**  
nsb035N with Unity systems



## PRODUCT APPLICATION :

CPS Roboway System is to protect robot cables and hoses.

We are the only one manufacturer of whole components of roboway which is also called robot dresspack in Korea.

We release Roboway system after testing over 2 million times of reliability, which means its quality and durability is guaranteed.



Roboway at a welding robot.

### Primary Customers



## Roboway



I-1 page

▲ ROBOWAY A type(High priced type) at GM in Korea



I-1 page

▲ ROBOWAY at Hyundai Motors in Czech



I-1 page

▲ ROBOWAY in Korea



I-1 page

▲ ROBOWAY B type (Low priced type) at Yaskawa robot



I-1 page

▲ ROBOWAY B type (Low priced type) at Fanuc robot



I-1 page

▲ ROBOWAY B type (Low priced type) at Nachi robot



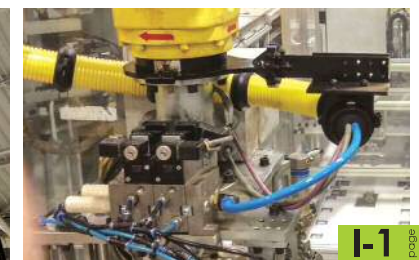
I-1 page

▲ ROBOWAY B type (Low priced type) at Hyundai robot



I-1 page

▲ ROBOWAY A type Brackets (main bracket, sub-bracket)



I-1 page

▲ Components of Roboway (VCG, RKSC, RKS, RKC, RCS)



## PRODUCT APPLICATION :

CPS Roboway components, robo-kit and PAR tube, can be applied to Universal robot series. In many industrial circumstance such as machine tool and production line, Universal robot has necessity to protect outside cables and hoses from diverse movement of robot. With our robo-kit, PAR tube and NHF connector, customer can protect outside cables and hoses of UR series.



I-15

page

For Universal robot series.  
(Robo-kit and PAR tube)

## UR Series with Robo-kit, PAR tube or NFH connectors



I-15

page

▲ Robo-kit & PAR tube for UR series



I-15

page

▲ NFH connector & PAR tube for UR series

## Rotating Machine, Robot



J-1

page

▲ Helix Chain at Hyundai robot



J-1

page

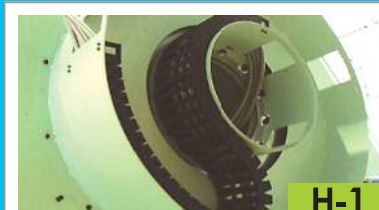
▲ Helix Chain at Kawasaki robot



H-1

page

▲ Revolving Chain at robot



H-1

page

▲ Revolving Chain at wind power generation equipment



C-3

page

▲ Zig-zag Chain (Shift Chain)



# CPS Quality from Reliability Test room

- CPS has a reliability test room in Research Institute building and we are operating this room 24/7.  
The test has effect on making the best product and improvement of our product quality for long time as CPS uses reliability data from this room. There are several equipment and machine for cable chain and also we have a test robot and relevant test equipment for Roboway.

## Cable Chain



nsb050S, nsb065S, nsb080S

- **Specification**  
Gantry loader

- **Remark**  
3m/s, 365days operated
- **Tested from 2013**

Zig-zag type of ST chain

- **Specification**  
Zig-zag operation machine
- **Remark**  
1m/s, 365days operated
- **Tested from 2012**



CPSmini, ST-N / E,  
nsb-CR / N / E

- **Specification**  
Magnetic linear machine
- **Remark**  
3~5m/s, 365days operated
- **Tested from 2010**



Revolving Chain  
Test Equipmnet



Unity Systems

- **Specification**  
Vetical operation machine
- **Remark**  
2m/s, 365days operated
- **Tested from 2013**

ST072N, nsb045CR/N

- **Specification**  
Linear Test Machine
- **Remark**  
3m/s, 365days operated
- **Tested from 2010**



## Special Equipment



CPS FLEX & CPS FIX

- **Specification**  
Pulling-out Test Machine
- **Remark**  
Test criteria is UL1696

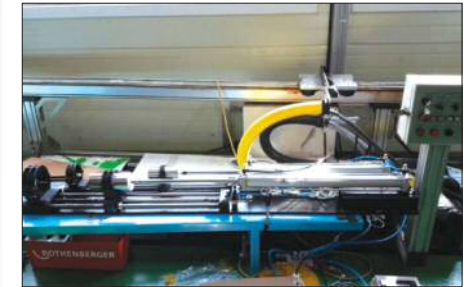
For raw material

- **Specification**  
Impact Strength  
Equipment
- **Remark**  
IZOD, Charpy  
Test



ESD  
Test Equipment

## Roboway



PAR-56Y, PAR-48B & Special Springs for Roboway

- **Specification**  
Test equipment for robot tube and special springs of Roboway
- **Remark**  
Part of Roboway system
- **Tested from 2015**



Roboway-70B

- **Specification**  
Test robot
- **Remark**  
With welding cables and hoses
- **Tested from 2014**



# CP SYSTEM PRODUCT

## CPS CABLECHAIN

Mini type ◀◀B-1 page



## Shift chain®

Normal type ◀◀C-3 page



## Shift chain®

Enclosed type ◀◀C-21 page



## Shift chain®

Sliding type ◀◀C-41 page



## Shift chain®

Enclosed Sliding type ◀◀C-45 page



## Shift chain®

Roller Sliding type ◀◀C-59 page



## Shift chain®

Enclosed Roller Sliding type ◀◀C-75 page



## Sabin chain®

asb Clean Room type ◀◀D-3 page



## Sabin chain®

nsb Clean Room type ◀◀D-17 page



## Sabin chain®

Normal type ◀◀D-35 page



## Sabin chain®

Enclosed type ◀◀D-51 page



## Sabin chain®

Sliding type ◀◀D-65 page



## Unity Systems®

◀◀E-1 page



## Guide Channel System

◀◀F-1 page



## Steel Chain

◀◀G-1 page



## Revolving chain

◀◀H-1 page



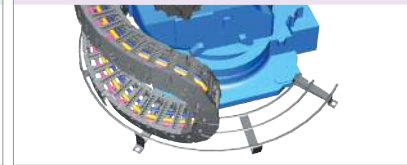
## Roboway®

◀◀I-1 page



## HeliX chain

◀◀J-1 page



## CPSFLEX

◀◀K-1 page



## CPSFIX

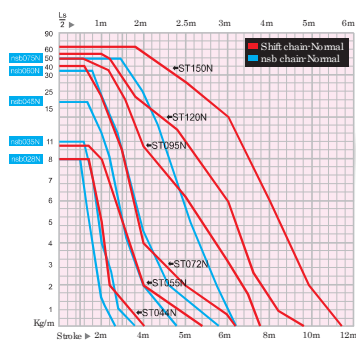
◀◀L-1 page



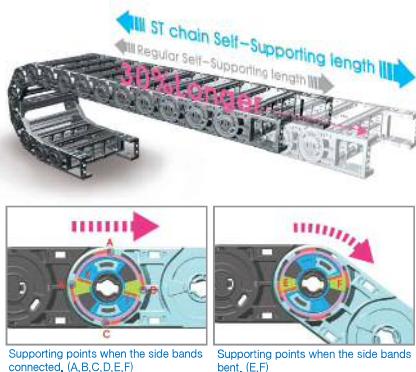


## CHARACTERISTIC AND MERIT OF Shift chain®

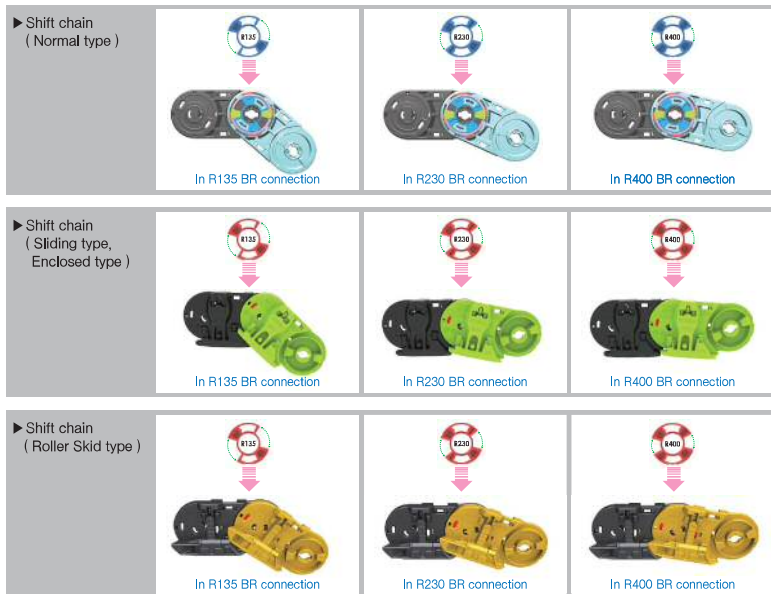
- Shift chain is the next generation cable of chain developed to protect the inner cables and hoses applied to equipment and machinery of overall industries.
- Shift Chain, with the unique structure, is a new concept that the value of Bending Radius is decided by the independent Bending Radius unit inserted.
- As BR unit(Bending radius unit) has 6 points of supporting area when inserted into side band, *its durability and self-supporting level are 30% longer than previous models and other models of CPS.*



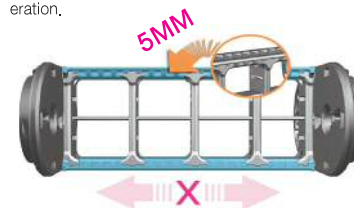
■ Shift chain Self-Supporting Length ■



- Side-band of each model is the same, but BR unit is different to decide Bending Radius value. It's *efficient stock management and cost reduction.*

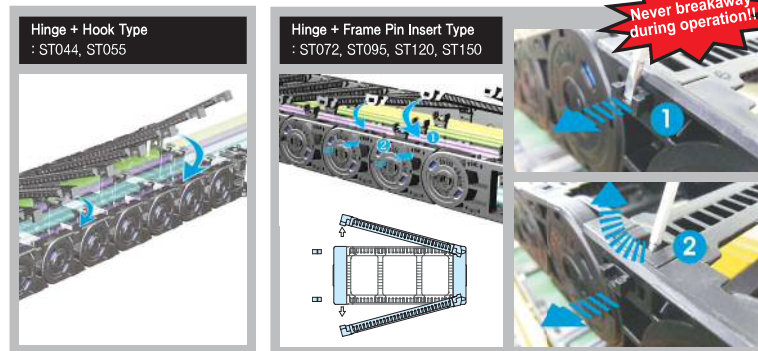


- Frame with teeth every 5mm for long lifetime of cable and stable operation, Divider never moves during operation.

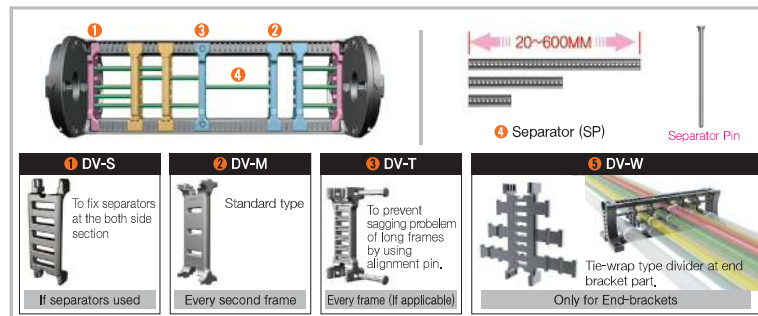


1. Frame with teeth every 5mm!
2. Long life for cable!
3. Stable operation!

- Hinge type frame to keep stable operation, Frame never break away during operation.



- To make sure of long lifetime of cable, divider is designed not to move during operation. Also, there can be diverse section with dividers and separators.



- Shift Chain is produced with high-quality engineering plastic material, which have strong durability and great abrasion resistance, so the chain has less breakage possibility by outside damage and performs stable cable protection in any difficult environment.
- As the chain is verified through the tests for electrostatic discharge (ESD) and explosion proof (ATEX-Directive 94/9/EC), it can be applied in stability to electric equipment and machinery. Also, the chain is UV-coated, and can protect cable in outside installation of the chain. Furthermore, the chain is produced with high-quality engineering plastic, which include none of the 6 harmful substances (restrictives in the Europe market): Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium (Cr6+), PBB, PB DEs etc and which is recyclable and harmless both to user and environment.



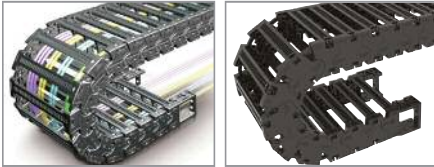


## CHARACTERISTIC AND MERIT OF Sabin chain®

- Sabin Chain is new solution for high speed, low noise and low dust exposed environment. It also guarantees the great durability during operation. Regarding the Clean room type and Normal type, there are two types of Sabin Chain are available. They are nsb chain and asb chain which are special solution for customers.

Type	nsb Chain	asb Chain
Clean Room Type	■	■
Normal Type	■	■
Enclosed Type	■	
Sliding Type	■	

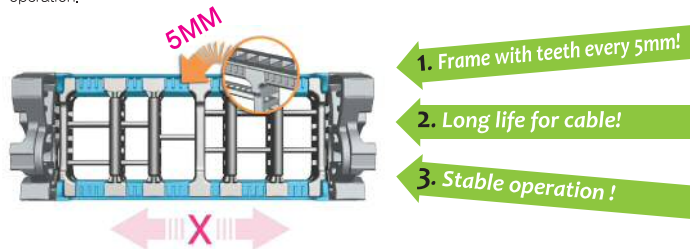
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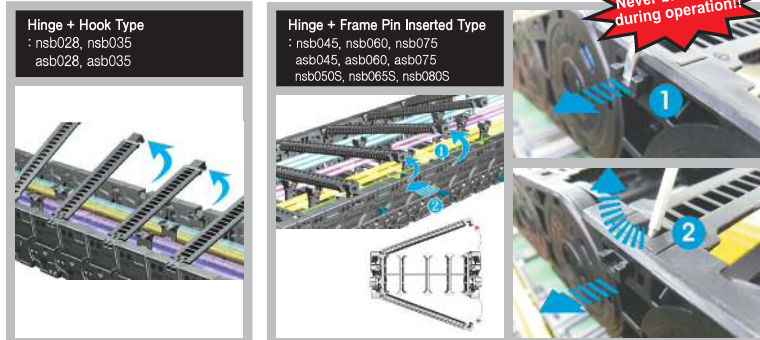
- Sabin chain's side band is holding-band structure that maintains tension at both sides to minimize noise.



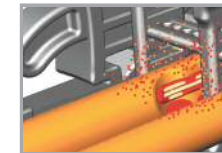
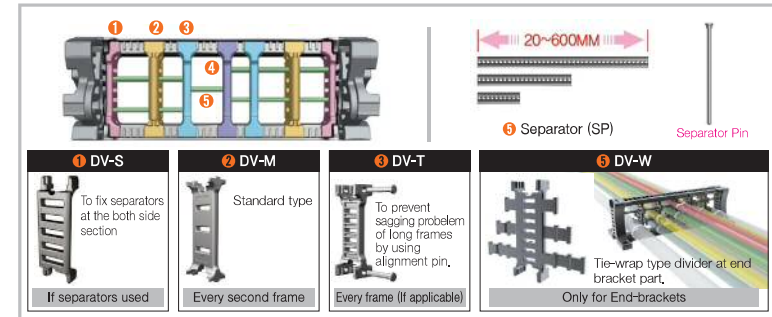
- Frame with teeth every 5mm for long lifetime of cable and stable operation. Divider never moves during operation.



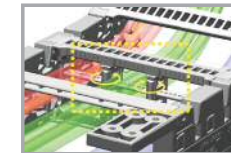
- Hinge type frame to keep stable operation. Frame never break away during operation.



- To make sure of long lifetime of cable, divider is designed not to move during operation. Also, diverse section can be composed with dividers and separators.



▲ Damage to the cables and during operation get dust and dust collects at friction area.



▲ Prevent damage to the cables and reduce dust by using roller type of divider.

- CPS can produce special products according to customer's requests for diverse industrial environment and conditions.

- Sabin Chain is produced with high-quality engineering plastic material, which has strong durability and great frictional resistance, so the chain has less breakage rate from external impact and performs stable cable protection in severe environment.

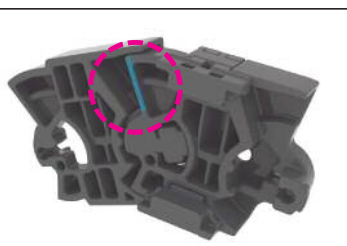
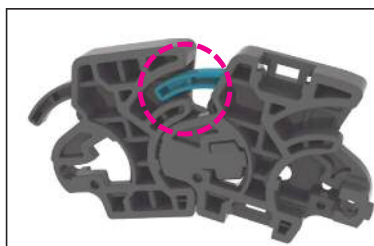
As the chain is verified through the tests for electrostatic discharge (ESD) and explosion proof (ATEX-Directive 94/9/EC), it can be applied to electric equipment and machinery. Also, the chain is UV-coated, and it protect's cables from exposed environment. Furthermore, the chain is produced with high-quality engineering plastic, which include none of the 6 harmful substances (restricted to the Europe market): Lead(Pb), Cadmium(Cd), mercury(Hg), Hexavalent Chromium (Cr6+), PBB, PB DEs etc and which means CPS cable chain is recyclable and harmless for both user and environment.





## Sabin chain® CLEAN ROOM type

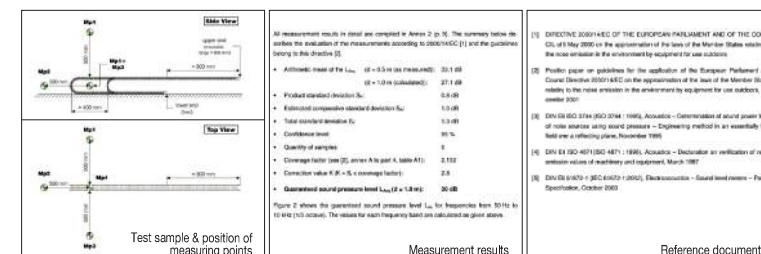
- Sabin Chain Cleanroom type is designed to meet the low noise and low dust required environment which are semiconductor production lines, LCD / PDP production lines, and any application where "cleanliness" and "silence" are regulated by the law.
- High-end technology adapted design of side bands for low noise and low dust.



- Can produce ESD product and special color, (which can be produced as customized product.)
  - Sabin Chain is produced with high-quality engineering plastic material, which has strong durability and great frictional resistance, so the chain has less breakage rate from external impact and performs stable cable protection in severe environment.
- As the chain is verified through the tests for electrostatic discharge (ESD) and explosion proof (ATEX-Directive 94/9/EC), it can be applied to electric equipment and machinery. Also, the chain is UV-coated, and it protect's cables from exposed environment. Furthermore, the chain is produced with high-quality engineering plastic, which include none of the 6 harmful substances (restricted to the Europe market): Lead(Pb), Cadmium(Cd), mercury(Hg), Hexavalent Chromium (Cr6+), PBB, PB DEs etc and which means CPS cable chain is recyclable and harmless for both user and environment.



## THE QUIETEST CABLE CHAIN IN THE WORLD!



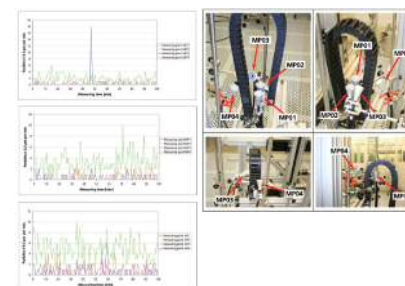
## LOW DUST CHAIN WITH MOST SUITABLE FOR CLEANROOM AREA!



Sabin Chain was given ISO CLASS1 clean room certification according to the Germany IPA Dust Collection Test (VDI 2083 CLASS 1 / DIN EN 14644-1 ISO CLASS 1) It is qualified to be used in semiconductor production lines on automation machine tools and machines requiring quiet and quick applications.

※ This test was done by the IPA TEST CENTER for the semiconductor manufacturer equipment and measurement processed with CLASS1 CLEAN ROOM, (US Federal Standard 209E)

- IPA Test result
- nsb 020CR,20,R48 : ISO Class1
  - nsb 045CR,75,R75 : ISO Class1
  - nsb 035CR,55,R75 : ISO Class2



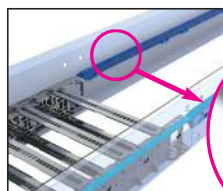
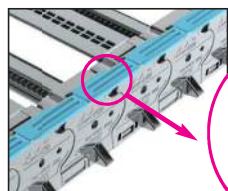


# Sabin chain® SLIDING type

- Sabin chain sliding type is the best solution for long travel and high-speed operating circumstance excellent durability and optimized design.
- Great Low Noise level due to high technology.



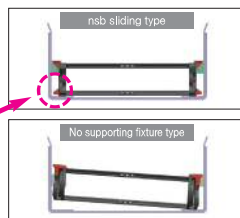
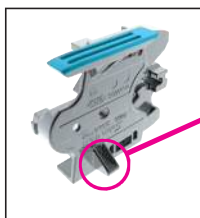
- Low Dust lever due to groove on skid and nylon bar is same material like cable chain.



- Stable operation and Suitable for high speed



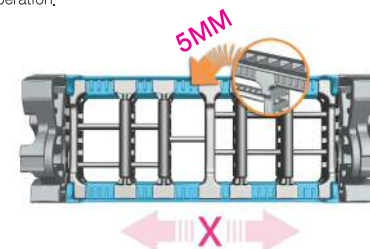
Supporting fixture has been added to keep stable operation inside Guide channel. This type is designed for gantry loader application which has fast movement with lower friction. Moreover, our previous model, our Shift chain sliding type, have risk to be detached between sideband and skid. Thus, detached skid would be inside guide channel or cable chain it means that it disturbs stable and smooth movement. But, nsb sliding type has been designed integral type sideband with skid, there's no risk for this issue.



- Passed over 2million times of reliability test in 2015!

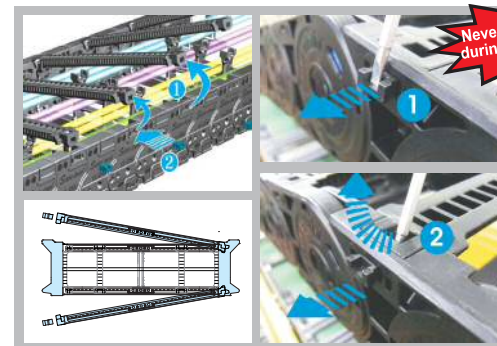


- Frame with teeth every 5mm for long lifetime of cable and stable operation, Divider never moves during operation.

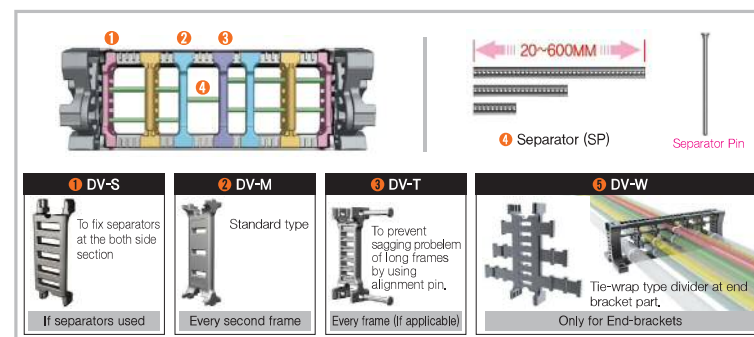


1. Frame with teeth every 5mm!
2. Long life for cable!
3. Stable operation !

- Hinge type frame to keep stable operation and it's very easy to assemble and disassemble.



- To make ensure of long lifetime of cable, divider is designed not to move during operation. Also, diverse section can be composed with dividers and separators.



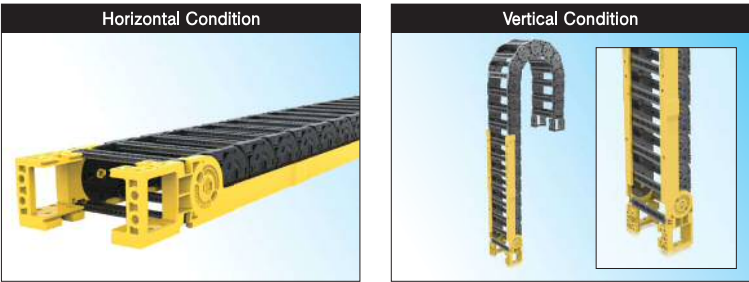
CHARACTERISTIC AND MERIT OF **Unity Systems®**

- Unity system is a new solution for customers who are looking for cost-saving. As it's designed to combine bracket with guide channel made of PA6. (Economical than using aluminum or steel material)  
It can be applied to Normal type, Enclosed type and CR type.

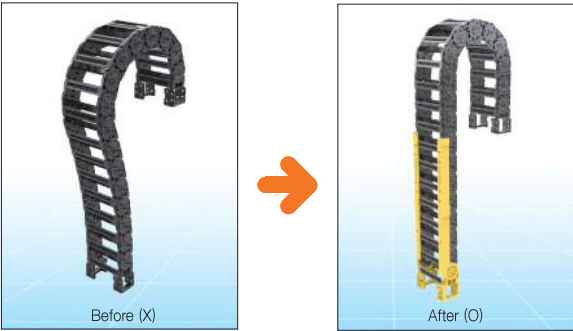


Unity Systems				
Shift Chain	Sabin Chain		Sliding Chain of Shift Chain Sliding Chain of Sabin Chain	Color
	nsb Chain	asb Chain		
- -	nsb020CR nsb022CR	Not developed yet.		Black or Yellow
ST044N ST044E	nsb028CR nsb028N nsb028E			
ST055N ST055E	nsb035CR nsb035N nsb035E			
ST072N ST072E	nsb045CR nsb045N nsb045E			
ST095N ST095E	nsb060CR nsb060N nsb060E			
ST120N ST120E	nsb075CR nsb075N nsb075E			

- Can save cost and steel or aluminum guide channel are another option.



- Vertical type is especially a good solution to prevent falling backward.



- Vertical & side mounted application.

**Unity systems**  
▶ **Application**  
Parts Factory of  
Applm Vertical mounted  
▶ **Specification**  
ST044N with Unity systems

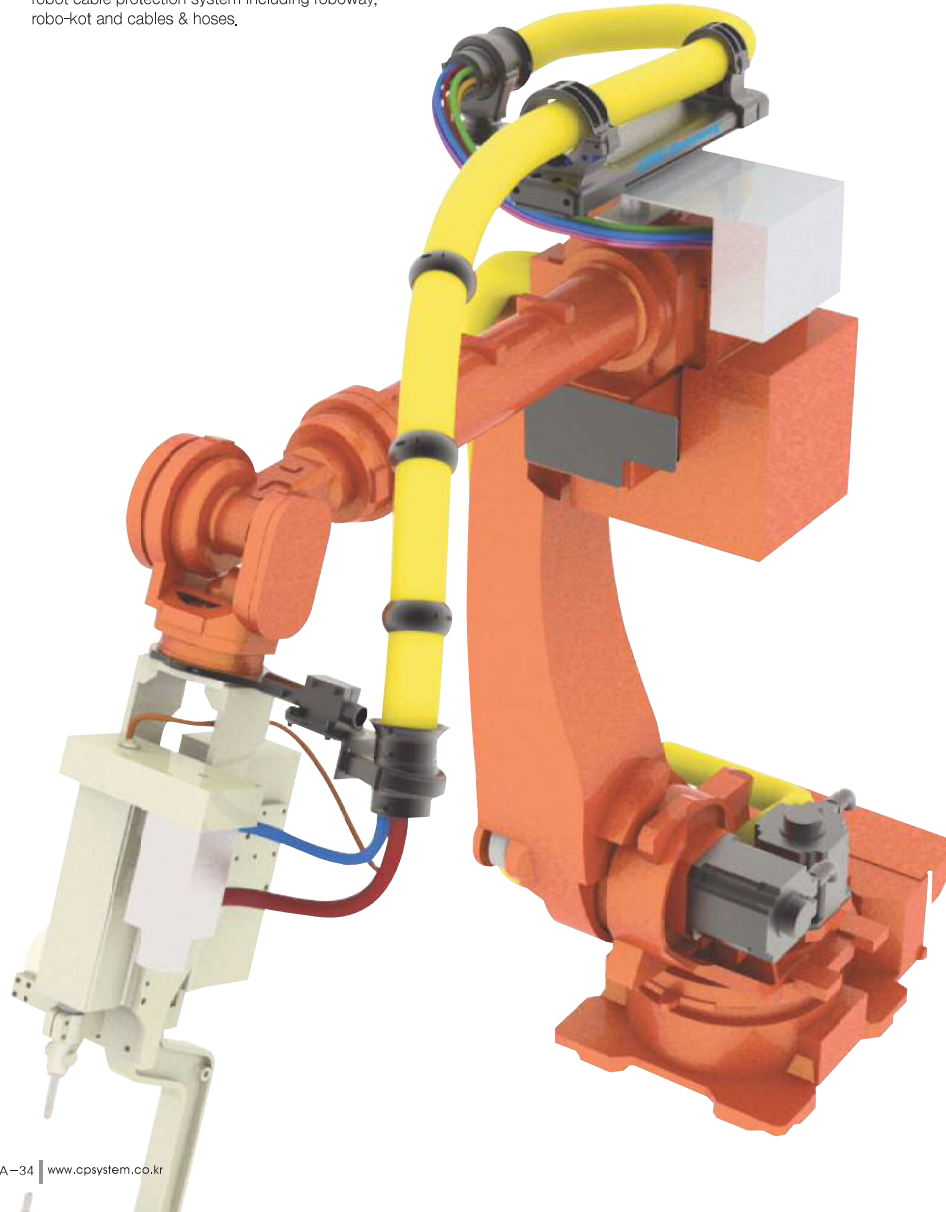
**Unity systems**  
▶ **Application**  
PCTC ships, Vertical mounted  
▶ **Specification**  
nsb035N with Unity systems

**Unity systems**  
▶ **Application**  
Machine tools, Side mounted  
▶ **Specification**  
ST072N with Unity systems



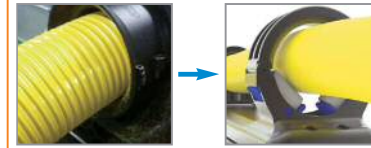
## Roboway®

- Roboway is a new solution for customers who are looking for Robot dresspack system. CPS released roboway after 2 million times of round trip test in our reliability test room. For long time, we have been supplying robot cable protection system including roboway, robo-kot and cables & hoses.

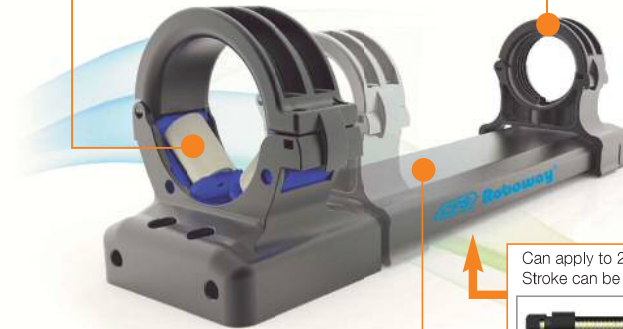
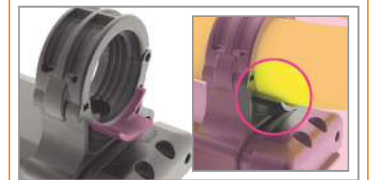


- Roboway can protect cables effectively by making tube's movement to one direction while robot arm operates complicated direction.

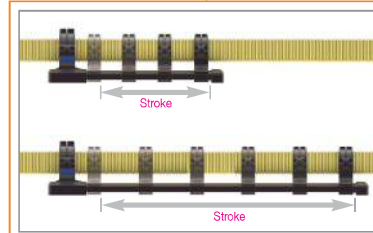
Minimized dust by applying rollers to fixing part.



Design the supporting guide to prevent sagging problem to down side at Moving part.



Can apply to 2~3 special springs. Stroke can be adjusted.



Adjustable stroke structure.

Possible to keep always certain tension to protect tube and cables.

- Released after 2 million times of round trip test in our reliability test room.



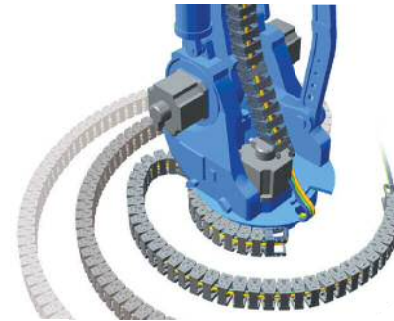
## Revolving chain

- Revolving chain is designed for protecting cables installed to machines or robots and it operates to diverse directions as specially designed for preventing damage from movement in various directions. This movement is performed with free bending control method of cable chain and it is also can be applied to low dust & noise required plant.



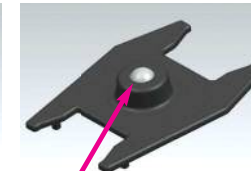
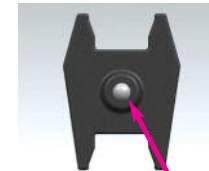
- Free bending radius!

- Appropriate for low noise and dust required environment with its specially designed side band!



- Ball caster for better movement

- In order to reduce friction value and be better movement, you need to apply a ball caster **every 8 links** as standard.
- It could be applied **every 4 links** according to request of customer.



Ball Caster



Applied ball caster

- Released after 2 million times of round-trip round trip test in our reliability test room.



Revolving chain applied to a CPS's test equipment similar to wind power generator.





## CPSFIX -PNC, PWC, PAC

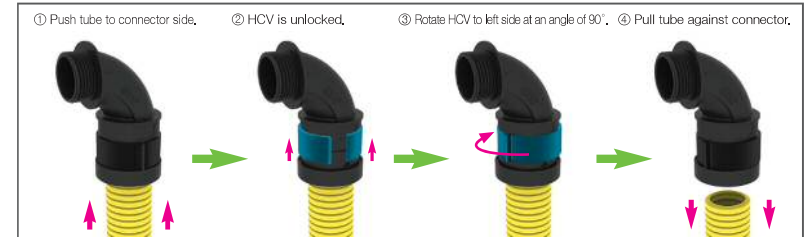
- **Easy to assemble and disassemble!**
- **Intensified pull-out!**
- **Diverse thread available such as G, M, Pg, NPT and UNEF!**



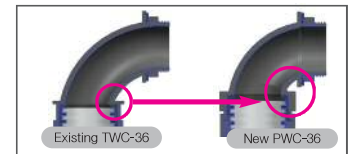
- CPSFLEX & FIX applied to train in Korea.



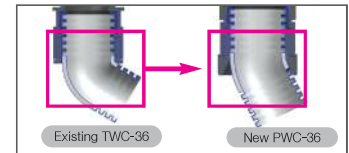
- Possible to apply to a limited and narrow space as it is much smaller than previous version.
- Intension of pulling out with changed design and it protects tube and cable by removing sharp edge.
- We have diverse international thread standard such as G, M, Pg, NPT and UNEF.
- TNC & TWC series can be replaced with new product such as PNC & PWC series as thread standard is same.
- Easy to assemble and disassemble with tube.



- Protect cable more safely by removing sharp edge of internal tube!



- Improved supporting unit is to protect tube from excessive bent condition. It protects tube and improves assembling performance.



### Pulling Out Test?

A sample of fitting having the same material and construction type shall be assembled in intended manner to approximately a 500mm (20 in) length of the MPT. The MPT shall not pull out of the fitting when subjected to the appropriate force as below test criteria.

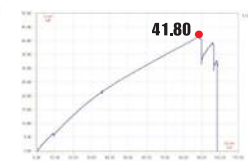
#### ※ Test criteria based on UL 1696

- 80N (18lbf) for tubing having an inside diameter less than 17mm (11/16 in)
- 165N (35lbf) for tubing having an inside diameter of 17mm or larger



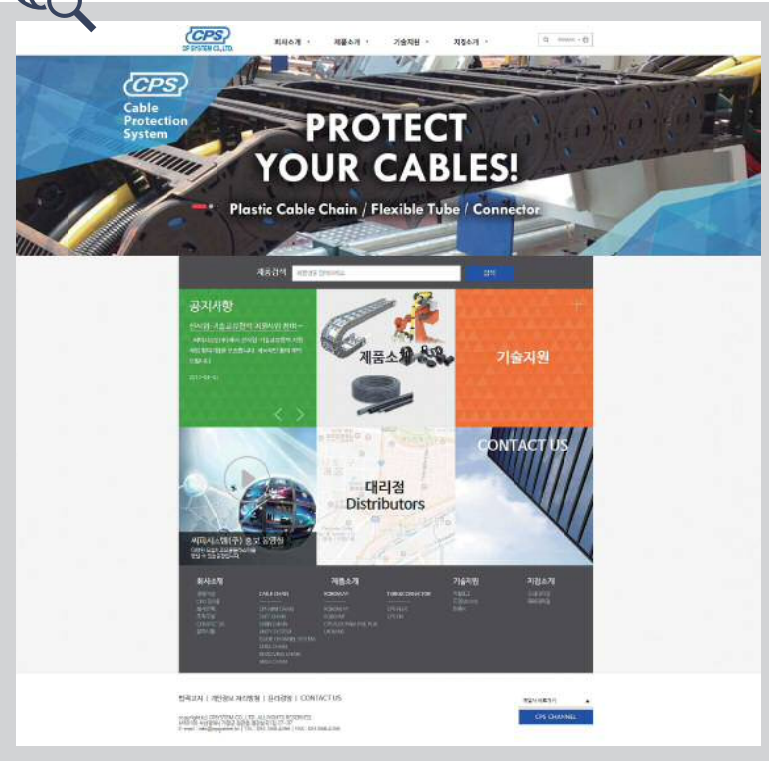
#### ※ Test result

- TWC-36, Pulled out 23.9kgf
- PWC-36, Pulled out 41.8kgf



# On-line support system

 [www.cpsystem.co.kr](http://www.cpsystem.co.kr)

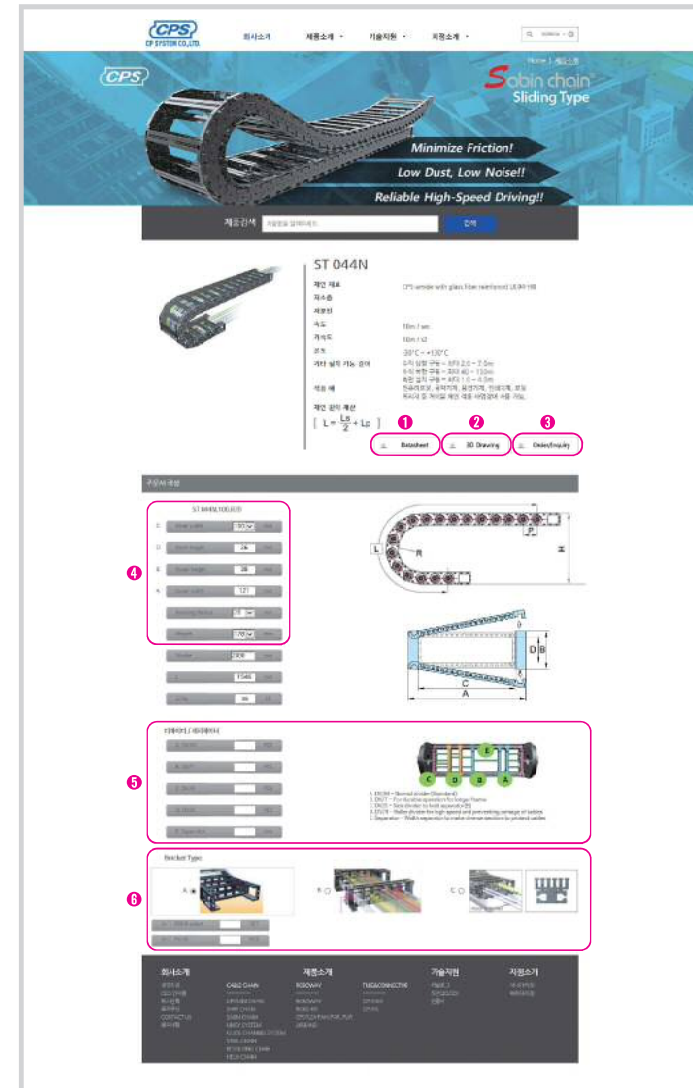


## ON-LINE Service

The newly reorganized by the customer can be chosen to make the website more precise specification can more easily identify and take advantage of a variety of product information at a glance.

- E-Catalogue
- Automatically Select Dimension
- 2D DWG / DXF CAD file download
- 3D STP file download

- 1 Data sheet includes all information of applicable product,
- 2 3D drawing can be downloaded,
- 3 When you order product, please click and select below dimension table exactly,
- 4 Select dimension according to your need,
- 5 Select dividers or separators,
- 6 Select bracket type,





## CEO Greeting

We are CPS that realizes the customer's impression is decided by the customer satisfaction.

CPS is the leading company to develop the cable protection system. We are manufacturer of cable chain(Energy chain), flexible tube(corrugated tube), connectors, robot-kit and Roboway(robot dresspack system).

We are the only-one manufacturer who has localized these all products and is continuously developing them in Korea.

All of our product are manufactured based on the quality control system of ISO9001 and environment control system of ISO14001. Also our product and production system got certified on global standard such as CE, VDE, UL, IPA, TUV(Noise Testing), ATEX and etc.

With our well organized research institute and reliability test lab, we are continuously developing and improving our product to the best to offer customers.

We manage systematically production system from high quality material to delivery service. With efficient management system, we guarantee reasonable price with high quality product against competitors and fast delivery service for customers.

We will do our best effort to offer the best quality product, diverse solutions for customers with our management value that indicates "enterprise shall be disappeared right after stopping technical development".

Thank you all,

CEO  
**Kyung Min, Kim**

## CP SYSTEM CO.,LTD.

*Technology and quality as much as any third party may have a higher self-esteem.*

*We've not satisfied with the current.*

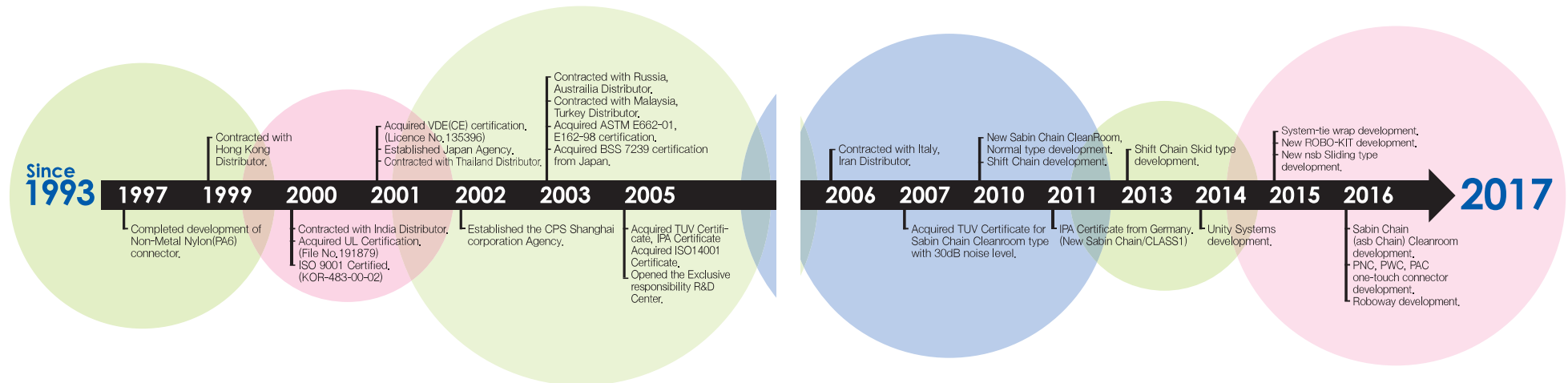
*To meet greater customer satisfaction,  
we will continue to strive to develop new technologies.*

*The best quality, best service and  
new product development under a management philosophy is  
what CPS is committed for innovation.*



<b>Company</b>	CP System co., ltd
<b>Established</b>	Jan-1993
<b>Business Sector</b>	Manufacturer of Cable chain, Flexible tube, Connector and Roboway
<b>Headquarter &amp; Factory</b>	Busan, South Korea,
<b>Website</b>	www.cpsystem.co.kr
<b>E-mail</b>	overseas_info@cpsystem.kr
<b>+Phone</b>	+82 51 526 4393 (Overseas sales Dept.) +82 70 4825 0808 / 0806 (Overseas sales Dept.)

## Company History



## Management Value



*Be Creative*



*Challenge*



*Be Faithful*

**Have creative thinking..!**  
**Enjoy challenges...!**  
**Be faithful....!**

As Quality Management, we are trying to offer the best quality and service.  
 And also we are trying to meet satisfaction of customers by developing new products continuously.



*The Best Quality*



*The Best Service*



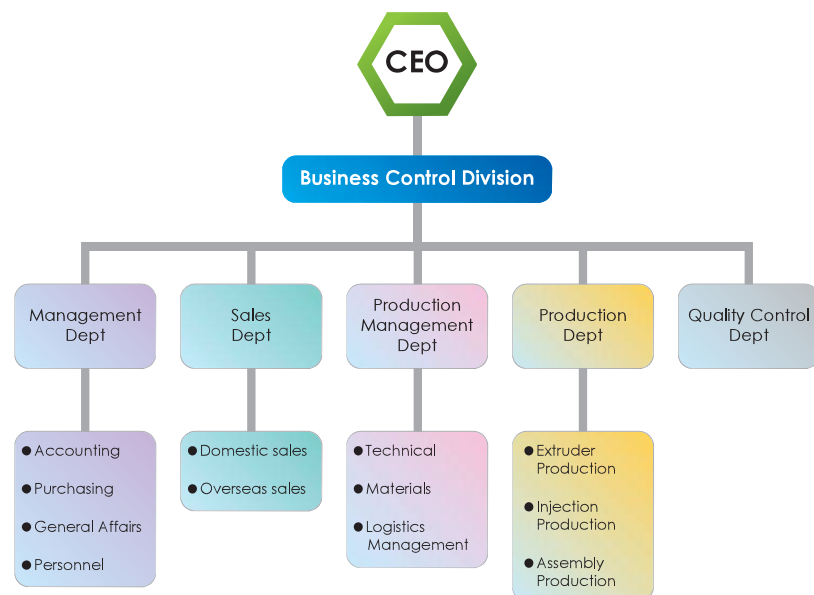
*New Product Development*



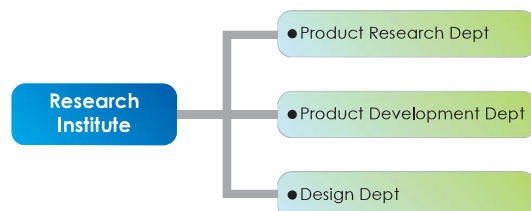
# Company Organization

- CPS Headquarter and Factory is located in Busan, South Korea.  
Also, we have individual Research Institute to develop product and improve its quality continuously from 2005.

## Headquarter & Factory



## Research Institute(R&D Center)



# Research Institute

- CPS Research Institute is striving to develop product and improve quality continuously from 2005 and it developed various range of quality product. As a part of development and improvement of product, they are also researching and experimenting raw material to create the best quality product.



## Recent Research Performance

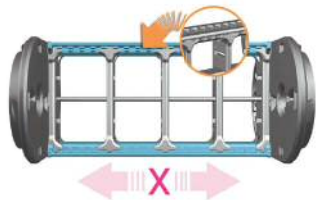
- Sabin Chain Cleanroom type Development
- Robo-kit Development
- Sabin Chain Enclosed type Development
- Shift Chain Development
- Shift Chain Enclosed type Development
- Shift Chain Roller Skid type Development
- Shift Chain Skid type Development
- Unity systems Development
- Sabin Chain Skid type Development
- Roboway system Development
- PNC, PWC, PAC Connector Development
- PAM Development

# What's the cable chain?

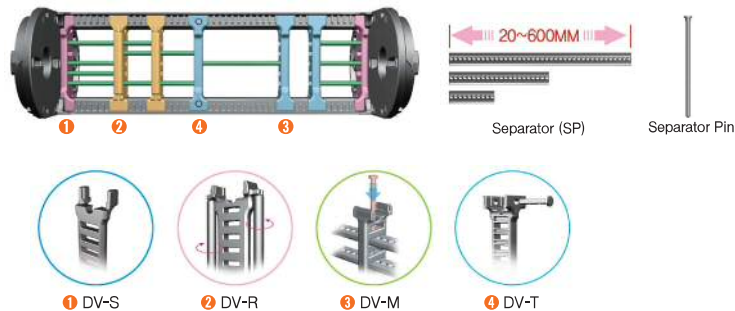
- Cable chain is to protect cables of moving machinery or automatic machinery.  
Without cable chain, it causes damage to cables.  
Hence cables can be protected by using suitable cable chain and it should be considered its stroke, cable types of machinery.

## Good cable chain?

- Protect cable to be longer lifetime of cable
  - Divider never moves



- Can make section composition



1. **Making section** is the one important criteria whether supplier has high technology or not. Without section composition, it's not possible to guarantee long lifetime of cable because of friction and loosing tension of cables.
2. **We have five units for making section.**  
It can protect cables more efficiently and safely by making suitable sections with diverse combination of Dividers and Separators.
3. The length of separator can be cut from 20 mm to 600 mm and be cut and used 5 mm apart.

- Characteristic of plastic frame

Frame(Bar) must be made by engineering plastic.

Friction factor of plastic(synthetic resins) against plastic(synthetic resins) is lower than plastic(synthetic resins) against aluminum(or steel) and it factor makes sure of protection for cables for long time.

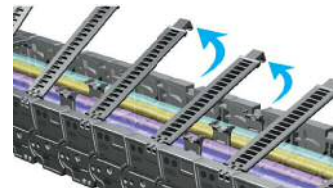
In addition, as plastic is lighter than aluminum and steel, it also guarantees long self-supporting length of cable chain.



- Strong side band and frame structure

Self-supporting length is decided by side band's structure. If there's many supporting points between each side band when assembled, its self-supporting lengths sustain long.

During the operation at high speed or tough circumstance, there is a possibility of separation of frame.  
Good frame structure means frames are strongly assembled with side bands, so they are not separated during operation.

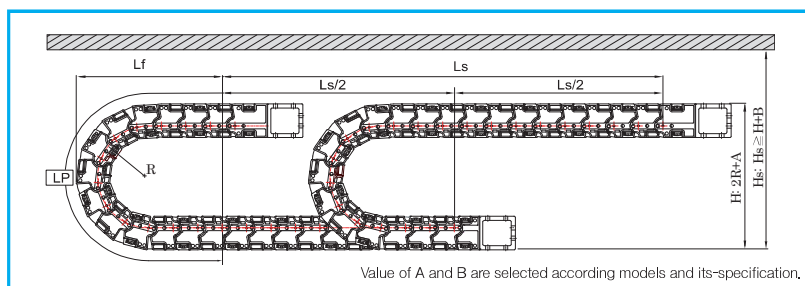




# How to calculate?

L : Cable chain length R : Bending radius value  
 LS : Machine Stroke HS : Safe Space  
 LP : loop length H : Height(minimum)

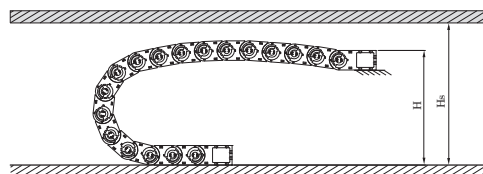
## • Calculation of Cable chain's length



## • Calculation of Cable chain's length

- BR Value(Min) > 8 ~ 10 x the biggest cables' outer diameter
- BR Value(Min) > 15 ~ 20 x the biggest hydraulic hose's outer diameter

## • Calculation of Height(H value)



$$2R + B = H$$

- R : Bending radius value
- B : Outer height of cable chain

$$HS \geq H + \text{"S Value"}$$

## • "S Value"

- CPS mini chain

CPS015	CPS020	CPS030	CPS033
10mm	15mm	30mm	30mm

- Shift chain

ST044N/E	ST055N/E	ST072N/E	ST095N/E	ST120N/E	ST150N/E
30mm	35mm	40mm	50mm	60mm	80mm

- asb chain

asb028CR/CR,L	asb035CR/CR,L	asb045CR/CR,L
30mm	30mm	40mm

- nsb chain

nsb020CR	nsb022CR	nsb028CR/N/E	nsb035CR/N/E	nsb045CR/N/E	nsb060CR/N/E	nsb075CR/N/E
30mm	30mm	30mm	30mm	40mm	40mm	60mm

## • How to select alternative model for other brand

When customers should select alternative models, they must check the following value exactly.

- Model number of existing model,
- Outer width of cable chain,
- Inner width of cable chain,
- Outer height of cable chain,
- Bending radius value,
- H value or HS value,
- Total machine stroke or length of cable chain,
- Speed of machine

## • How to select alternative model for CPS's discontinued models produced until 2010

- Alternative model table for CPS Normal type

CPS Chain Normal type Discontinued production in 2010	Shift Chain Normal type	nsb Chain Normal type
CPS036N	ST044N	nsb028N
CPS050N	ST055N	nsb035N
CPS068N	ST072N	nsb045N
CPS077N	ST072N	nsb045N
CPS095N	ST095N	nsb060N
CPS120N	ST120N	nsb075N

- Alternative model table for CPS Enclosed type

CPS Chain Enclosed type Discontinued production in 2010	Shift Chain Enclosed type	nsb Chain Enclosed type
CPS036E	ST044E	nsb028E
CPS050E	ST055E	nsb035E

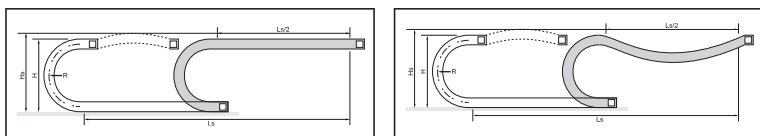
- Alternative model table for CPS Sliding type

CPS Chain Sliding type Discontinued production in 2010	Shift Chain Normal type	nsb Chain Normal type
CPS036S	ST044S	-
CPS068S	ST072S (Discontinued production in 2017)	nsb050S
CPS077S	ST072S (Discontinued production in 2017)	nsb050S
CPS095S	ST095S (Discontinued production in 2017)	nsb065S
CPS120S	ST120S (Discontinued production in 2017)	nsb080S

- Alternative model table for sb chain CR type

sb Clean Room type Discontinued production in 2010	asb chain Clean Room type	nsb Chain Clean Room type
sb018CR	-	nsb020CR
sb020CR	-	nsb022CR
sb025CR	asb028CR	nsb028CR
sb035CR	asb035CR	nsb035CR
sb045CR	asb045CR	nsb045CR
sb060CR	-	nsb060CR
sb075CR	-	nsb075CR

## Self-supporting / Short Stroke



### Self-supporting application

- Self-supporting means that cable chain moves on not sagging and touch-down condition. We call it "self-supporting" or "unsupported length". It's general type of cable chain and CPS' cable chain is very suitable for high speed line and guarantees long lifetime. It could be varied due to inside weight or type of cable chain. There are 3 sections regarding self-supporting.

#### - Self-supporting section without sagging - SPg

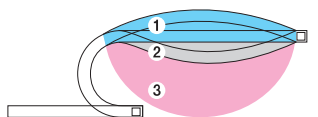
When customer need stable operation of cable chain, they need to keep like No.1 in the picture. It's the most stable operation.

#### - Allowable sagging section within self-supporting section - SPa

If sagging volume is within 50mm like No.2 in the picture, it's called "SPa". It's allowable to operate cable chain, even though it's sagging, however, it could be problem when its speed is fast or its number of moving time is many.

#### - Exceed limit of sagging

If sagging degree is formed like No.3 in the picture, it's dangerous to operate anymore. It usually happens caused after long period usage, thus, customers must replace cable chain with new one immediately.

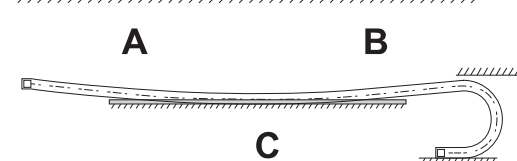
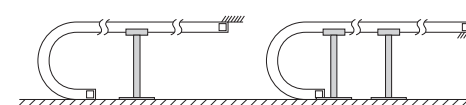


- ① SPg. Self-supporting is good without sagging.
- ② SPa. Allowable sagging section within 50mm. It's fine.
- ③ You can't use this condition for cable chain Normal type. You need to replace it with sliding(skid) type of cable chain.

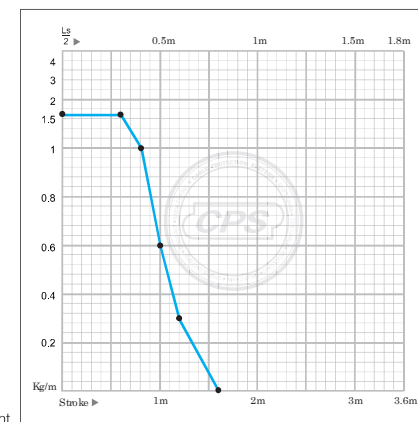


### What to do for not enough self-supporting length maintained

1. Select suitable model and type.
2. Otherwise, it is necessarily to install supporting guide as below:



<Supporting Guide>

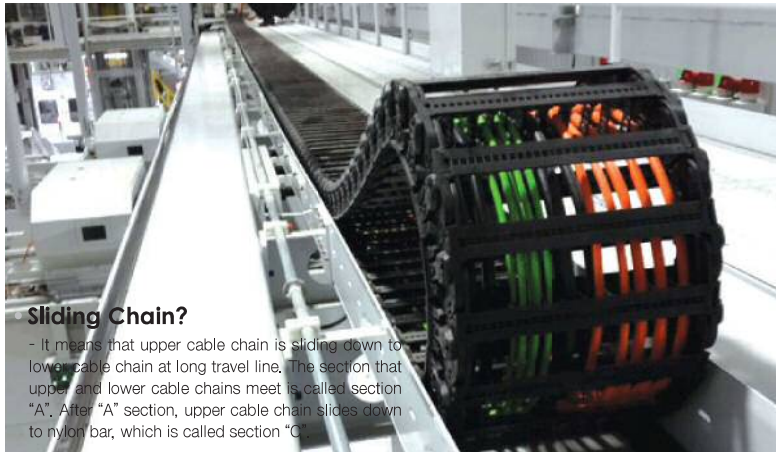


#### ► How to read a graph

Kg/m means weight of bare cable chain.  
Stroke means the travel length of machine movement.



## Sliding type / long Stroke

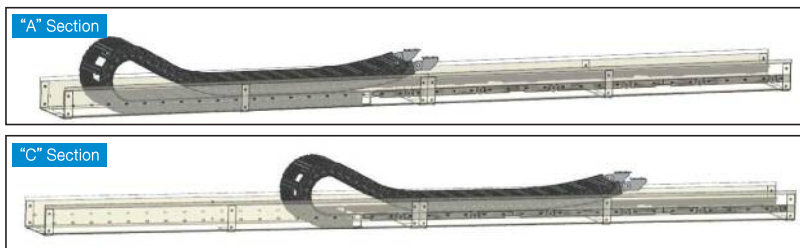


### Sliding Chain?

- It means that upper cable chain is sliding down to lower cable chain at long travel line. The section that upper and lower cable chains meet is called section "A". After "A" section, upper cable chain slides down to nylon bar, which is called section "C".

### Guide Channel?

- The guide channel system is applied to long stroke circumstance. Guide channel consists of 2 sections such as "A" section and "C" section. "A" section is for both cable chain(Upper + down side) and "C" section is cable chain + nylon bar.



### Advantage of Movement in low position

As we recommend low height application for moving bracket part to ensure that ;

1. It can save space,
2. It can make longer lifetime by reducing abrasion.
3. It can move longer.

### Advantage of long stroke cable chain.

- Stable operation
- Long lifetime(at least over 2 million times)
- Ultimate design for special circumstances
- We have experts who have various and long experience

### Must inform us of information below to make ultimate design for you.

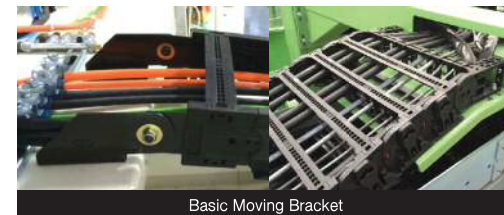
- Machine stroke, speed, acceleration, weight(cables and hoses), specification of cables and hoses, necessary bending radius value, operating cycle(per 1 day or per 1 month) and other relevant conditions
- Contact us at [overseas\\_info@cpsystem.kr](mailto:overseas_info@cpsystem.kr)



### ST120RS

- ▶ **Specification**  
Thermoelectric power plant
- ▶ **Location**  
Korea(Hadong)
- ▶ **Stroke**  
198 meters

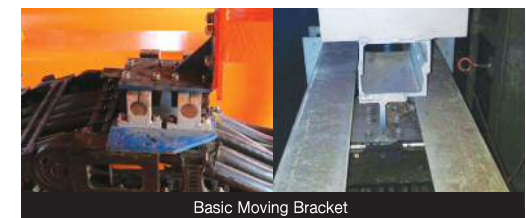
### Moving Bracket & Moving Arm



Basic Moving Bracket

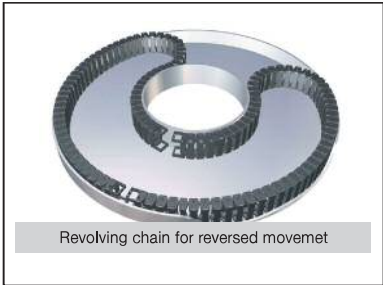
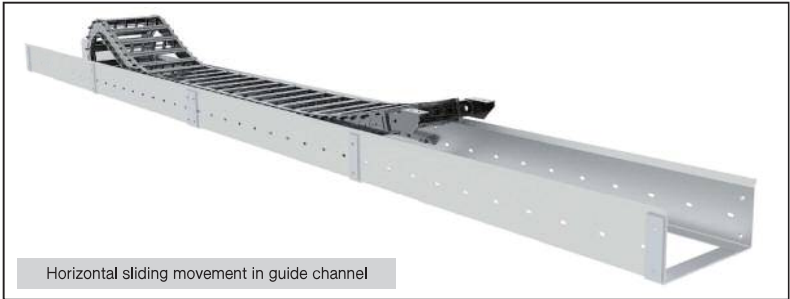
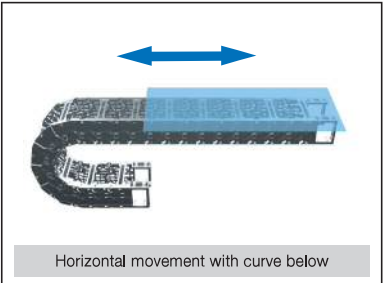
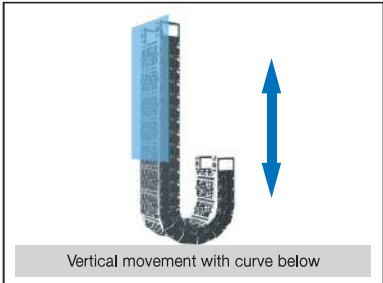
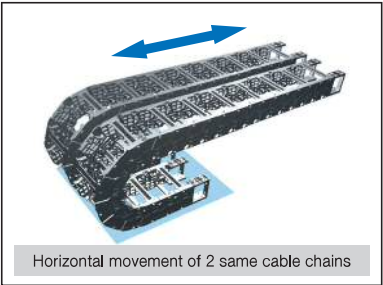
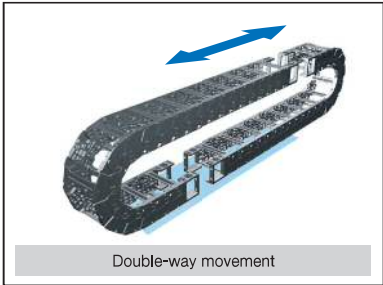
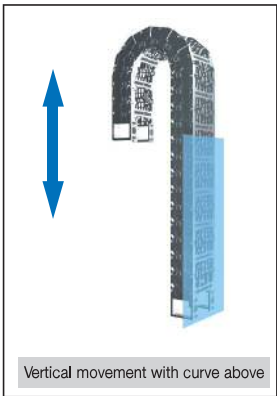
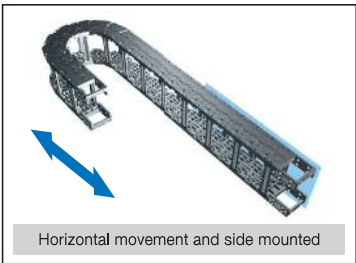
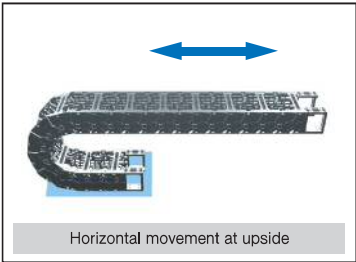
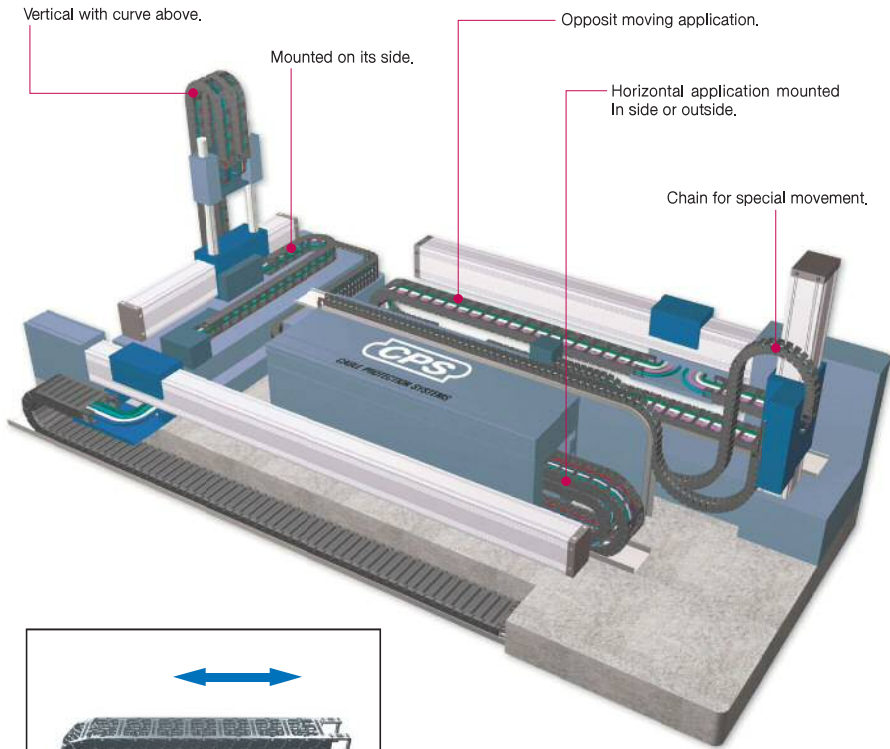


Basic Moving Arm



Basic Moving Bracket

# Diverse application according to moving direction





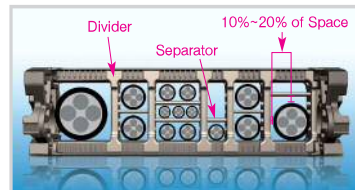
# How to install cable chain with cables



Main purpose of cable chain is to protect cables and prolong cable's lifetime. To make sure, there are several standard guidance for arranging space between cables, cable layout and tension.

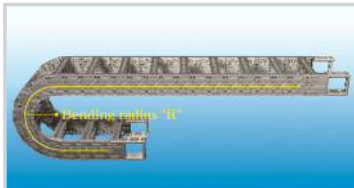
## • Cable Space Standard

Round Cable	10% available space
Flat Cable	10% available space
Hose(Including Hydraulic Hose)	20% available space



## • Cable Layout Standard

- When installing cables, the biggest cables or hoses should be laid at the side and the smallest cables should be laid in the middle to keep balance of weight during operation.



"R" min > 8 ~ 10 X Cable outer diameter  
"R" min > 15 ~ 20 X Hydraulic Hose outer diameter

## • Standard of Cable Tension

- Cables should be located as below at bent side of cable chain during operation,

Correct arrangement of cables			
			Located in the middle between upper-frame and lower-frame : OK
Wrong arrangement of cables			
			There's interference with frame due to short length of cables : NG

## • To prevent twisted error when inserting cables

- Users or installers should use cable winding machine or equipment.  
- Unfold and lay cables on the floor for 1 or half-day.



## Technical sheet

### - ESD & ATEX



#### • ESD Cable Chain

- CPS' cable chain can be produced ESD cable chain for special circumstance, ESD cable chain passed at least 2 millions reliability test and CPS is supplying ESD product for long time.
- ※ If requested, we can produce other models as well.

#### ESD Cable Chain Stock Status

CPS mini Chain	
CPS030	○
CPS033	○
Sabin Chain	
nsb020CR	○
nsb022CR	○
nsb028CR	○
nsb035CR	○

#### • ATEX

- CPS' cable chain obtained ATEX certificate from TUV Nord based on ATEX Directive 2014/4/34/EC. And it meets the Ex II 2 GD grade.



## - Cleanroom & Customized

### • LOW DUST CHAIN WITH MOST SUITABLE FOR CLEAN-ROOM AREA!

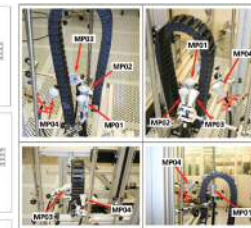
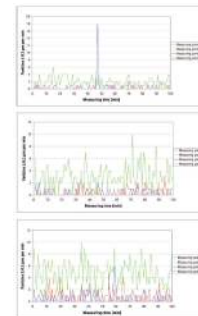


Sabin Chain was given ISO CLASS1 clean room certification according to the Germany IPA Dust Collection Test (VDI 2083 CLASS 1 / DIN EN 14644-1 ISO CLASS 1) thereby surpassing the allowable standard of Class 1 and easily qualifying it for use in semiconductor production lines on automation machine tools and machines requiring quiet and quick applications.

※ This test was done by the IPA TEST CENTER for the semiconductor manufacturer equipment and measurement processed with CLASS1 CLEAN ROOM(US Federal Standard 209E)

#### ► IPA Test result

- nsb 020CR,20,R48 : ISO Class1
- nsb 045CR,75,R75 : ISO Class1
- nsb 035CR,55,R75 : ISO Class2



#### ■ Clean room environment

Air speed(0.45 m/s)  
Temperature( +5° C)  
Humidity (45%)

#### ■ Test equipment

Fraunhofer IPA Test machine

#### ■ Measurement Skill

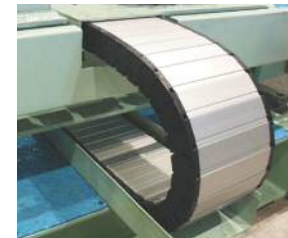
Checking the dust dimension of  $>0.2\mu m$ ,  
 $>0.3\mu m$ ,  $>0.5\mu m$ , use LPSA210 TYPE machine made by PMS.

#### ■ Test operation and analysis

Operated by the guideline of VDI 2083 Part8

#### • Customized Production

- CPS can produce UV Cable chain and Various colors' cable chain for long time.



nsb035N

- Application  
Display production line
- Location  
Korea (L-Display)
- Remark  
Aluminum Frame Cover



nsb035N

- Application  
PCTC Ship
- Location  
Korea (S-heavy industry)
- Remark  
ESD / Orange color
- Stroke  
2.5meters



# CPS mini chain



## >> General information

Item	Value
Material	CPS-Amid(PA6+GF), RoHs
Noise range	40dB(DIN EN 61672-1)
Speed	3m/s
Acceleration	10m/s²
Temperature	-30℃ ~ +130℃
Special production	ESD, UV
Certificate	CE, ATEX(Ex)

## >> Calculation table

Item	Value
Length of Cable Chain	$L = \frac{1}{2} \times LS + LP$
Bending Radius	
The biggest Cable inserted	Multiply 8~10 and the biggest cable
The biggest Hydraulic Hose inserted	Multiply 15~20 and the biggest hose

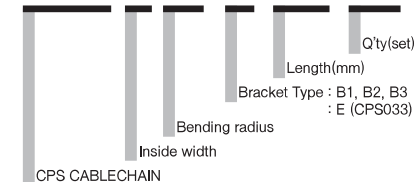
## >> Dimension table

CPS Cable Chain MINI Type	Pitch	Bending Radius(R)	Weight kg/m	Speed m/sec	Temperature °C	Size				Frame type	Section - composition
						A	B	C	D		
CPS 015	15	18, 28, 38	0,100 0,105 0,111 0,115	3	-30 ~ +130	12,6 16,6 21,6 26,6	13	6 10 15 20	10		
CPS 020	20	28, 38, 48	0,245 0,260 0,285 0,310	3	-30 ~ +130	24 29 39 49	20	15 20 30 40	14,5		
CPS 030	30	38, 48, 75, 100	0,380 0,400 0,420 0,440	3	-30 ~ +130	29 39 49 64	26	15 25 35 50	19		
CPS 033	33	35, 45, 75, 100, 120	0,550 0,590 0,610 0,680 0,700	3	-30 ~ +130	45 55 65 85 95	31	27 37 47 67 77	23		

(Dimensions in mm)

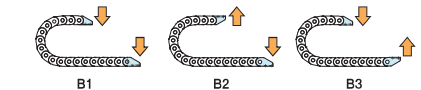
## >> Ordering

**CPS 015, 10, R28 / B2 - 550L : 10ST**

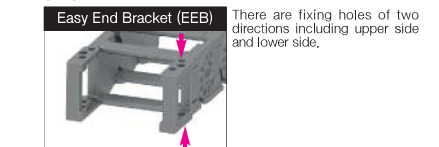


## >> Bracket type

**- CPS015, CPS020, CPS030**



**- CPS033**



## >> Application of CPS mini Chain

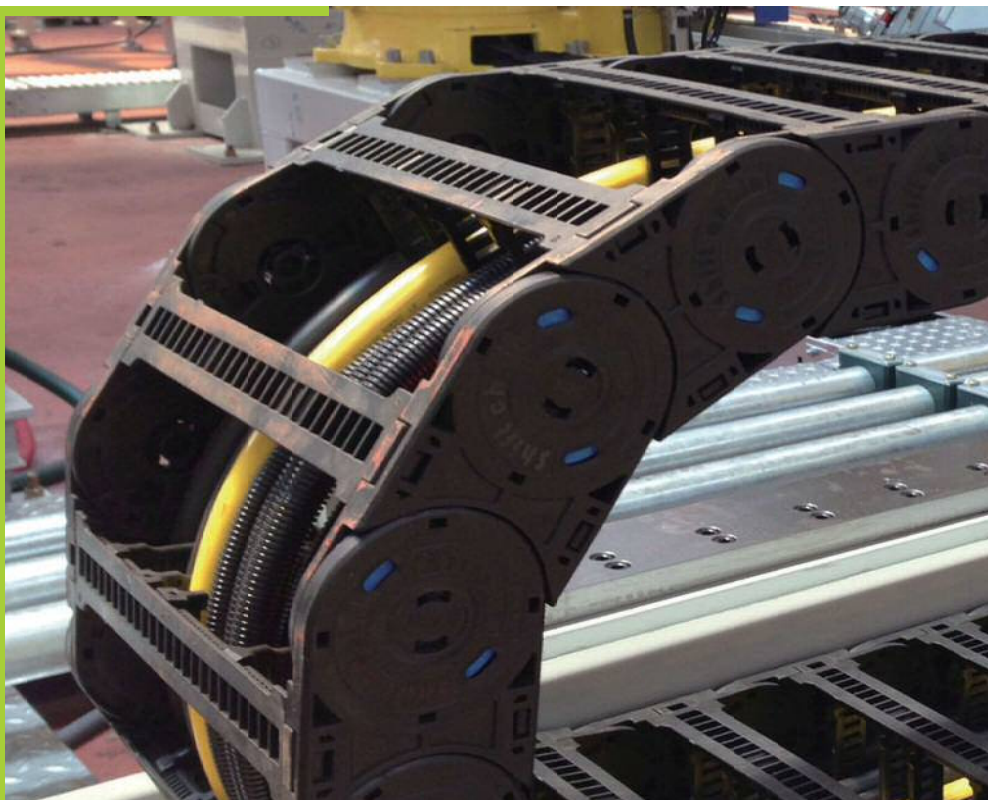


▲ Factory lines,



▲ Machine tools,

# Shift Chain



**Shift chain®**

## ST - N : Normal type

▶ST044N	C-9
▶ST055N	C-11
▶ST072N	C-13
▶ST095N	C-15
▶ST120N	C-17
▶ST150N	C-19

## ST - E : Enclosed type

▶ST044E	C-27
▶ST055E	C-29
▶ST072E	C-31
▶ST095E	C-33
▶ST120E	C-35
▶ST150E	C-37

## ST - S : Skid type

▶ST044S	C-43
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## ST - ES : Enclosed Skid type

▶ST044ES	C-51
▶ST072ES	C-53
▶ST095ES	C-55
▶ST120ES	C-57

## ST - RS : Roller Skid type

▶ST044RS	C-65
▶ST072RS	C-67
▶ST095RS	C-69
▶ST120RS	C-71
▶ST150RS	C-73

## ST - ERS : Enclosed Roller Skid type

▶ST044ERS	C-81
▶ST072ERS	C-83
▶ST095ERS	C-85
▶ST120ERS	C-87



## Shift Chain - Enclosed type



### » General information

Item	Value
Material	CPS-Amid(PA6+GF), RoHs
Speed	3m/s
Acceleration	10m/s²
Temperature	-30°C ~ +130°C
Special production	ESD, UV
Certificate	CE, ATEX(Ex)

### » Dimension table

Shift Chain E Type	Pitch	Bending Radius (R)	Weight kg/m	Speed m/s	Temperature °C	Size				Frame type	Section- composition
						A	B	C	D		
ST 044E	44	70, 90, 120, 150	1,03 1,21 1,37 1,58	3	-30 ~ +130	56 76 96 121	38 55 75 100	24,5			
ST 055E	55	100, 125, 150, 200	1,36 1,56 1,79 1,97 2,21	3	-30 ~ +130	71 96 121 146 171	50 75 100 125 150	38,5			
ST 072E	72	120, 145, 200, 250, 300	2,37 2,61 2,85 3,09 3,33	3	-30 ~ +130	82 107 132 157 172 182	50 75 100 125 150	44			
ST 095E	95	150, 200, 230, 280, 400	3,55 3,79 4,04 4,29 4,53	3	-30 ~ +130	138 163 188 213 236	82 125 150 175 200	55			
ST 120E	120	200, 250, 300, 350, 400, 500	5,79 6,43 7,07 7,71	3	-30 ~ +130	192 242 292 342	108 150 200 250 300	76			
ST 150E	150	305, 405, 505, 605	8,16 8,76 10,50 12,33 14,16	3	-30 ~ +130	246 296 346 396 446	200 250 300 350 400	110			

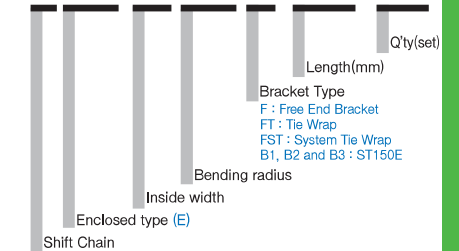
(Dimensions in mm)

### » Calculation table

Item	Value
Length of Cable Chain	$L = \frac{1}{2} \times LS + LP$
Bending Radius	
The biggest Cable inserted	Multiply 8~10 and the biggest cable
The biggest Hydraulic Hose inserted	Multiply 15~20 and the biggest hose

### » Ordering

**ST 044E, 100, R120 / F - 1500L : 10ST**



### » Bracket type

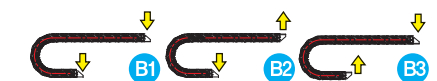
- ST044, ST055, ST072, ST095, ST120



- ST150

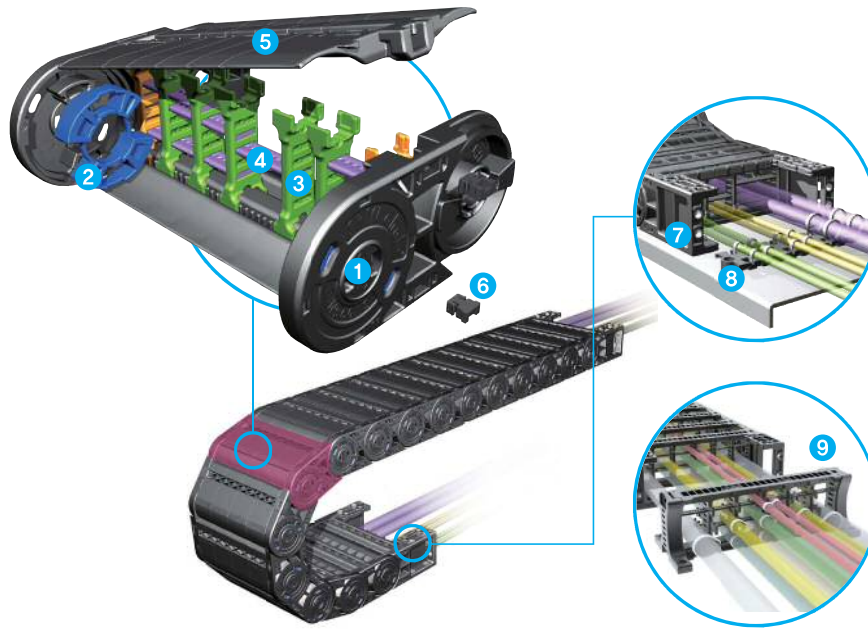


For ST150E, its end parts of cable chain being fixed are used with steel bracket, and it is possible to be installed B1, B2, B3 types of brackets,



# Shift Chain - Enclosed type

## >> Part of Shift Chain Enclosed type



### 1 Side Band (SB)

A unit that connects each side band and between them BR is inserted to strengthen clamping force.

### 2 Bending Radius Unit (BR)

A unit that inserted between each side band. There are 6 supporting points to create durability.

### 3 Divider (DV-S, M, R, T)

A unit that divides inserted cables horizontally.

### 4 Separator (SP)

A unit that divides inserted cables vertically to prevent twisting and breaking problem.

### 5 FRU, FRD

A unit that connects left and right side band and there are 2 types of frame : FRU, FRD.

### 6 Frame Pin (FP)

The connecting pin for preventing the breakaway of Frame connected at Side Band, combining and fixing the Frame and Side Band. For Shift chain(ST)072E, 092E, 120E, 150E type, one side of the frame is fixed by inserting a fixing pin to prevent frame open, which caused by any external impact.

### 7 Free End Bracket (FEB)

A unit that connects at last side band (left&right). It can be fixed stronger using steel washers.

### 8 Tie Wrap (TW)

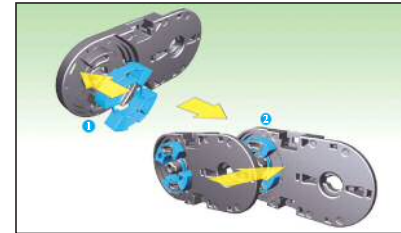
A unit that ties cables to maintain straightness of them. It can be assembled to bracket directly or installed separately from bracket.

### 9 System Tie Wrap (STW)

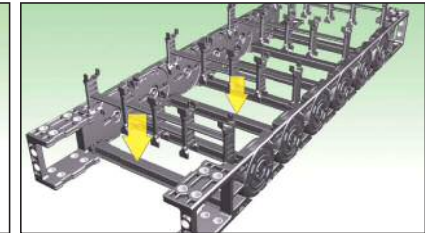
System-Tie Wrap has to be assembled on fixing and moving point of bracket and can be assembled without any tie wrap plate. This tie wrap is used to stay the cables on several floors prevent the cables from being twisted and it can also be assemble without any tools or bolt. This tie wrap has two types, one is to assemble inside bracket the other one is outside.

## >> Assemble procedure of Shift Chain Enclosed type

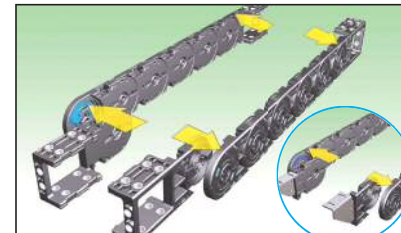
The assembling process of Shift Chain E-Type is like below and you must use rubber hammer with careful combination of Divider and Separator. Be careful of different assembling process depending on product specification such as ST044E, 055E Type, ST072E, 095E, 120E Type, ST150E Type etc.



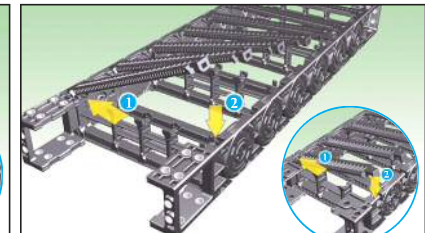
**1** Insert BR unit to each side band, connect the side bands as many as you need, then do the same process to the other side of side band.



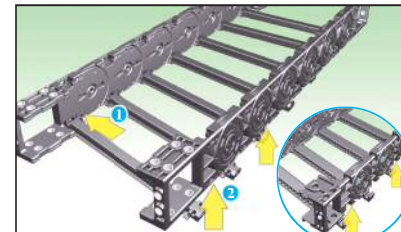
**5** Fix the separator and divider patterns to the bottom-side frames as needed.



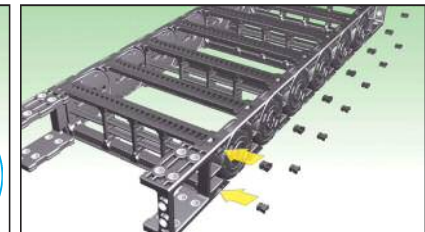
**2** Assemble the end brackets on both ends using the same method.  
For ST150E, assemble steel brackets on both ends.



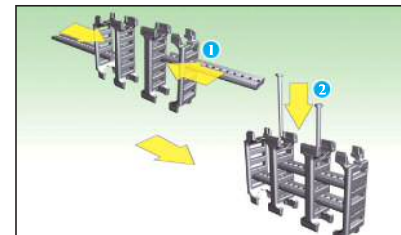
**6** Attach frames to one side groove on the side band, and then the other side.  
ST044E, 055E frame type.



**3** Attach frames to one side groove on the side band, and then the other side.  
ST 044E, 055E are Hinge Type or Hook Type without frame pin.



**7** Insert frame pins to secure the frames and complete carrier.  
(ST072E, 095E, 120E, 150E are applied with frame pin, and ST044E, 055E are Hinge Type or Hook Type without frame pin.)



**4** For ST072E, 095E, 120E, and 150E, connect the pin of separator in hole of divider after inserting separator in hole of divider. For ST044E and ST055E, separator fixing pins are not used.



**8** Assembled Shift Chain E-Type is assembled.



# Shift Chain - Enclosed type

## >> Part list of Shift Chain Enclosed type

- Composition of Cable chain(Standard)  
= Side band(RH) + Frame + Side band(LH) + Bending radius Unit + Free end bracket
- M divider(normal divider) should be applied every second frames to make a section composition.
- ※ Please refer to below part list and description to understand composition of cable chain.

Model	Classification	Part number	Description
ST044E	SIDE BAND	ST-SB044N/E(LH) ST-SB044N/E(RH)	Left side band of ST044E Right side band of ST044E
	BENDING RADIUS	ST-BR044,R70,90,120,150	Bending radius unit for side band
	FRAME(DOWN) FRAME(UP)	ST-FRD044,35 ST-FRU044,35 ST-FRD044,55 ST-FRU044,55 ST-FRD044,75 ST-FRU044,75 ST-FRD044,100 ST-FRU044,100	Inside frame, 35mm Outside frame, 35mm Inside frame, 55mm Outside frame, 55mm Inside frame, 75mm Outside frame, 75mm Inside frame, 100mm Outside frame, 100mm
	FRAME(DOWN-FIXING END) FRAME(UP-FIXING END) FRAME(DOWN-MOVING END) FRAME(UP-MOVING END)	ST-RDFF044,35,55,75,100 ST-RFUF044,35,55,75,100 ST-RDME044,35,55,75,100 ST-RFUM044,35,55,75,100	Inside half-frame for fixing end bracket Outside half-frame for fixing end bracket Inside half-frame for moving end bracket Outside half-frame for moving end bracket
	FREE END BRACKET	ST-FEB044E	End bracket of ST044E
	DIVIDER	sb-DV028/M sb-DV028/S	Normal divider To fix separators at the both side section
	SEPARATOR	S-SP/M,35	Separator, 35mm
		S-SP/M,50	Separator, 50mm
		S-SP/M,75	Separator, 75mm
		S-SP/M,100	Separator, 100mm
	TIE WRAP	S-TW036/025CR,35 S-TW036/025CR,55 S-TW036/025CR,75 S-TW036/025CR,100	Tie wrap for end bracket to fix cables, 35mm Tie wrap for end bracket to fix cables, 55mm Tie wrap for end bracket to fix cables, 75mm Tie wrap for end bracket to fix cables, 100mm
		S-TW036/025CR,125	Tie wrap for end bracket to fix cables, 125mm
	SYSTEM TIE WRAP	sb-DV028/W S-TWEB028	Divider for fixing cables at end bracket System tie wrap to arrange for cables right after moving bracket or fixing bracket

Model	Classification	Part number	Description
ST055E	SIDE BAND	ST-SB055N/E(LH) ST-SB055N/E(RH)	Left side band of ST055E Right side band of ST055E
	BENDING RADIUS	ST-BR055,R100,125,150,200	Bending radius unit for side band
	FRAME(DOWN) FRAME(UP)	ST-FRD055,50 ST-FRU055,50 ST-FRD055,75 ST-FRU055,75 ST-FRD055,100 ST-FRU055,100 ST-FRD055,125 ST-FRU055,125 ST-FRD055,150 ST-FRU055,150	Inside frame, 50mm Outside frame, 50mm Inside frame, 75mm Outside frame, 75mm Inside frame, 100mm Outside frame, 100mm Inside frame, 125mm Outside frame, 125mm Inside frame, 150mm Outside frame, 150mm
	FRAME(DOWN-FIXING END) FRAME(UP-FIXING END) FRAME(DOWN-MOVING END) FRAME(UP-MOVING END)	ST-RDFF055,75,100,125,150 ST-RFUF055,75,100,125,150 ST-RDME055,75,100,125,150 ST-RFUM055,75,100,125,150	Inside half-frame for fixing end bracket Outside half-frame for fixing end bracket Inside half-frame for moving end bracket Outside half-frame for moving end bracket
	FREE END BRACKET	ST-FEB055E	End bracket of ST055E
	DIVIDER	sb-DV035/M sb-DV035/S	Normal divider To fix separators at the both side section
	SEPARATOR	S-SP/M,35	Separator, 35mm
		S-SP/M,50	Separator, 50mm
		S-SP/M,75	Separator, 75mm
		S-SP/M,100	Separator, 100mm
	TIE WRAP	S-SP/M,125	Separator, 125mm
		S-SP/M,150	Separator, 150mm
		S-TW036/025CR,50 S-TW036/025CR,75 S-TW036/025CR,100 S-TW036/025CR,125	Tie wrap for end bracket to fix cables, 50mm Tie wrap for end bracket to fix cables, 75mm Tie wrap for end bracket to fix cables, 100mm Tie wrap for end bracket to fix cables, 125mm
		S-TW036/025CR,150 S-TW036/025CR,175 S-TW036/025CR,200	Tie wrap for end bracket to fix cables, 150mm Tie wrap for end bracket to fix cables, 175mm Tie wrap for end bracket to fix cables, 200mm
	SYSTEM TIE WRAP	sb-DV035/W S-TWEB035	Divider for fixing cables at end bracket System tie wrap to arrange for cables right after moving bracket or fixing bracket

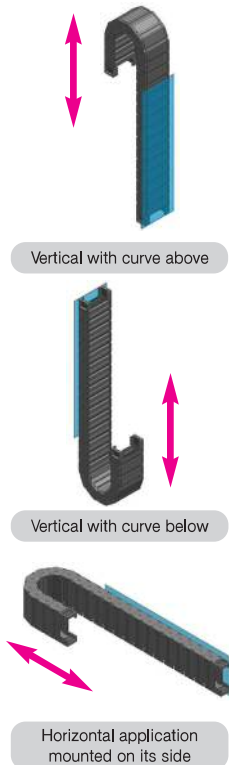
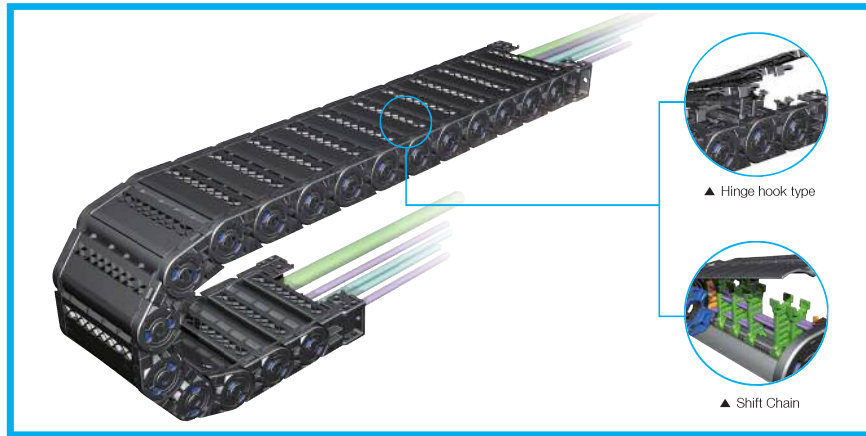
Model	Classification	Part number	Description
ST072E	SIDE BAND	ST-SB072N/E(LH) ST-SB072N/E(RH)	Left side band of ST072E Right side band of ST072E
	BENDING RADIUS	ST-BR072,R120,145,200,250,300	Bending radius unit for side band
	FRAME PIN	S-FP/S1	Frame pin
	FRAME(DOWN) FRAME(UP)	ST-FRD072,50 ST-FRU072,50 ST-FRD072,75 ST-FRU072,75 ST-FRD072,100 ST-FRU072,100 ST-FRD072,125 ST-FRU072,125 ST-FRD072,150 ST-FRU072,150	Inside frame, 50mm Outside frame, 50mm Inside frame, 75mm Outside frame, 75mm Inside frame, 100mm Outside frame, 100mm Inside frame, 125mm Outside frame, 125mm Inside frame, 150mm Outside frame, 150mm
	FRAME(DOWN-FIXING END) FRAME(UP-FIXING END) FRAME(DOWN-MOVING END) FRAME(UP-MOVING END)	ST-RDFF072,50,75,100,125,150 ST-RFUF072,50,75,100,125,150 ST-RDME072,50,75,100,125,150 ST-RFUM072,50,75,100,125,150	Inside half-frame for fixing end bracket Outside half-frame for fixing end bracket Inside half-frame for moving end bracket Outside half-frame for moving end bracket
	FREE END BRACKET	ST-FEB072E sb-FEB/WH045	End bracket of ST072E Steel washer for end bracket
	DIVIDER	sb-DV045/M sb-DV045/S	Normal divider To fix separators at the both side section
	SEPARATOR	sb-SP/400,400 SP-PIN045	Separator, 400mm Separator pin to fix
		S-TW50 S-TW75 S-TW100 S-TW125 S-TW150	Tie wrap for end bracket to fix cables, 50mm Tie wrap for end bracket to fix cables, 75mm Tie wrap for end bracket to fix cables, 100mm Tie wrap for end bracket to fix cables, 125mm Tie wrap for end bracket to fix cables, 150mm
	SYSTEM TIE WRAP	sb-DV045/W S-TWEB045	Divider for fixing cables at end bracket System tie wrap to arrange for cables right after moving bracket or fixing bracket

Model	Classification	Part number	Description
ST095E	SIDE BAND	ST-SB095N/E(LH) ST-SB095N/E(RH)	Left side band of ST095N Right side band of ST095N
	BENDING RADIUS	ST-BR095,R150,200,230,280,400	Bending radius unit for side band
	FRAME PIN	S-FP/S1	FRAME PIN
	FRAME(DOWN) FRAME(UP)	ST-FRD095,100 ST-FRU095,100 ST-FRD095,125 ST-FRU095,125 ST-FRD095,150 ST-FRU095,150 ST-FRD095,175 ST-FRU095,175 ST-FRD095,200 ST-FRU095,200	Inside frame, 100mm Outside frame, 100mm Inside frame, 125mm Outside frame, 125mm Inside frame, 150mm Outside frame, 150mm Inside frame, 175mm Outside frame, 175mm Inside frame, 200mm Outside frame, 200mm
	FRAME(DOWN-FIXING END) FRAME(UP-FIXING END) FRAME(DOWN-MOVING END) FRAME(UP-MOVING END)	ST-RDFF095,100,125,150,175,200 ST-RFUF095,100,125,150,175,200 ST-RDME095,100,125,150,175,200 ST-RFUM095,100,125,150,175,200	Inside half-frame for fixing end bracket Outside half-frame for fixing end bracket Inside half-frame for moving end bracket Outside half-frame for moving end bracket
	FREE END BRACKET	ST-FEB095E sb-FEB/WH080	End bracket of ST095E Steel washer for end bracket
	DIVIDER	sb-DV060/M sb-DV060/S	Normal divider To fix separators at the both side section
	SEPARATOR	sb-SP/400,400 SP-PIN060	Separator, 400mm Separator pin to fix
		S-TW50 S-TW75 S-TW100 S-TW125 S-TW150	Tie wrap for end bracket to fix cables, 50mm Tie wrap for end bracket to fix cables, 75mm Tie wrap for end bracket to fix cables, 100mm Tie wrap for end bracket to fix cables, 125mm Tie wrap for end bracket to fix cables, 150mm
	SYSTEM TIE WRAP	sb-DV060/W S-TWEB060	Divider for fixing cables at end bracket System tie wrap to arrange for cables right after moving bracket or fixing bracket

Model	Classification	Part number	Description
ST120E	SIDE BAND	ST-SB120N/E(LH) ST-SB120N/E(RH)	Left side band of ST120N Right side band of ST120N
	BENDING RADIUS	ST-BR120,R200,250,300,350,400,500	Bending radius unit for side band
	FRAME PIN	S-FP/S2	FRAME PIN
	FRAME(DOWN) FRAME(UP)	ST-FRD120,150 ST-FRU120,150 ST-FRD120,200 ST-FRU120,200 ST-FRD120,250 ST-FRU120,250 ST-FRD120,300 ST-FRU120,300	Inside frame, 150mm Outside frame, 150mm Inside frame, 200mm Outside frame, 200mm Inside frame, 250mm Outside frame, 250mm Inside frame, 300mm Outside frame, 300mm
	FRAME(DOWN-FIXING END) FRAME(UP-FIXING END) FRAME(DOWN-MOVING END) FRAME(UP-MOVING END)	ST-RDFF120,150,200,250,300 ST-RFUF120,150,200,250,300 ST-RDME120,150,200,250,300 ST-RFUM120,150,200,250,300	Inside half-frame for fixing end bracket Outside half-frame for fixing end bracket Inside half-frame for moving end bracket Outside half-frame for moving end bracket
	FREE END BRACKET	ST-FEB120E sb-FEB/WH075	End bracket of ST120E Steel washer for end bracket
	DIVIDER	sb-DV075/M sb-DV075/S	Normal divider To fix separators at the both side section
	SEPARATOR	sb-SP/400,400 SP-PIN075	Separator, 400mm Separator pin to fix
		S-TW50 S-TW75 S-TW100 S-TW125 S-TW150	Tie wrap for end bracket to fix cables, 50mm Tie wrap for end bracket to fix cables, 75mm Tie wrap for end bracket to fix cables, 100mm Tie wrap for end bracket to fix cables, 125mm Tie wrap for end bracket to fix cables, 150mm
	SYSTEM TIE WRAP	sb-DV075/W S-TWEB075	Divider for fixing cables at end bracket System tie wrap to arrange for cables right after moving bracket or fixing bracket

Model	Classification	Part number	Description
ST150E	SIDE BAND	ST-SB150N/E(LH) ST-SB150N/E(RH)	Left side band of ST120N Right side band of ST120N
	BENDING RADIUS	ST-BR150,R305,405,505,605	Bending radius unit for side band
	FRAME PIN	S-FP/S2	FRAME PIN
	FRAME(DOWN) FRAME(UP)	ST-FRD150,200 ST-FRU150,200 ST-FRD150,250 ST-FRU150,250 ST-FRD150,300 ST-FRU150,300 ST-FRD150,350 ST-FRU150,350 ST-FRD150,400 ST-FRU150,400	Inside frame, 200mm Outside frame, 200mm Inside frame, 250mm Outside frame, 250mm Inside frame, 300mm Outside frame, 300mm Inside frame, 350mm Outside frame, 350mm Inside frame, 400mm Outside frame, 400mm
	FRAME(DOWN-FIXING END) FRAME(UP-FIXING END) FRAME(DOWN-MOVING END) FRAME(UP-MOVING END)	ST-RDFF150,200,250,300,350,400 ST-RFUF150,200,250,300,350,400 ST-RDME150,200,250,300,350,400 ST-RFUM150,200,250,300,350,400	Inside half-frame for fixing end bracket Outside half-frame for fixing end bracket Inside half-frame for moving end bracket Outside half-frame for moving end bracket
	STEEL END BRACKET	ST-SEB150E/B1-B2-B3	Steel and bracket of ST150E
	DIVIDER	sb-DV100/M sb-DV100/S	Normal divider To fix separators at the both side section
	SEPARATOR	sb-SP/600,600 SP-PIN100	Separator, 600mm Separator pin to fix
		S-TW50 S-TW75 S-TW100 S-TW125 S-TW150	Tie wrap for end bracket to fix cables, 50mm Tie wrap for end bracket to fix cables, 75mm Tie wrap for end bracket to fix cables, 100mm Tie wrap for end bracket to fix cables, 125mm Tie wrap for end bracket to fix cables, 150mm

# ST 044E



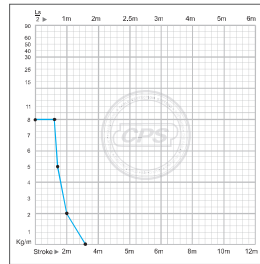
## » Calculation of the chain length

$$[ L = \frac{L_s}{2} + L_p ]$$

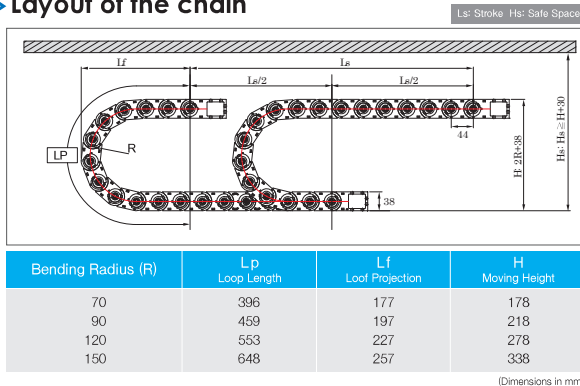
## » Other installation length

Vertical curve above = max 2,0m  
Vertical curve below = max 40m  
Side Mounted, Unsupported = max 1,0m

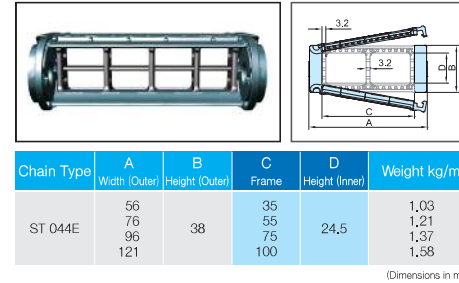
## » Load diagrams self-supporting length



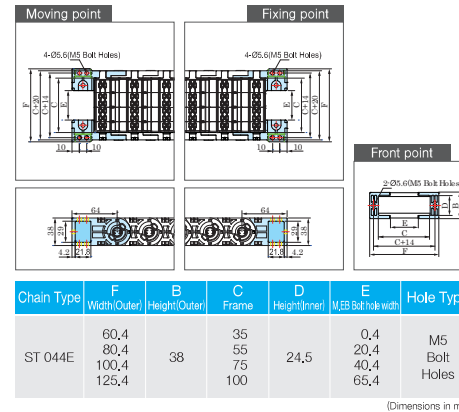
## » Layout of the chain



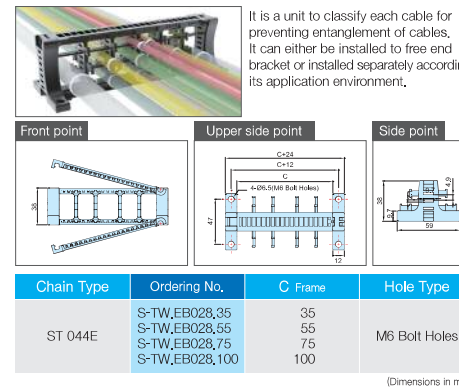
## » Chain cross section



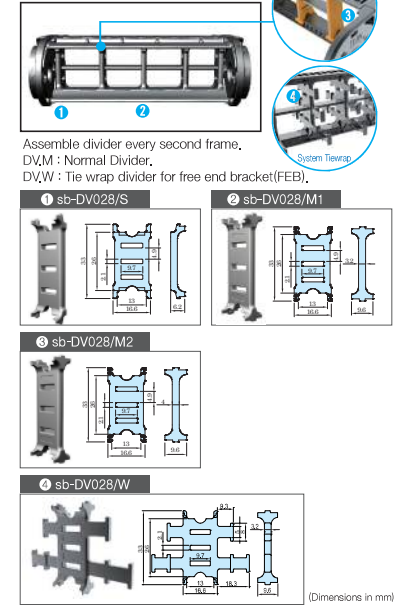
## » Free end bracket



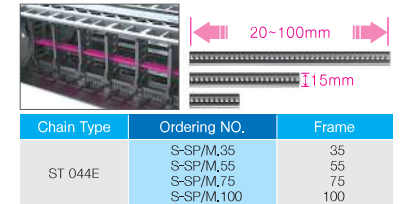
## » System tie wrap (STW)



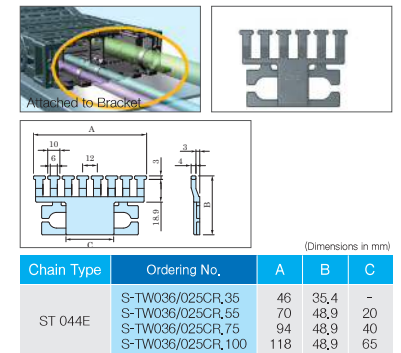
## » Dividers (DV)



## » Separators (SP)

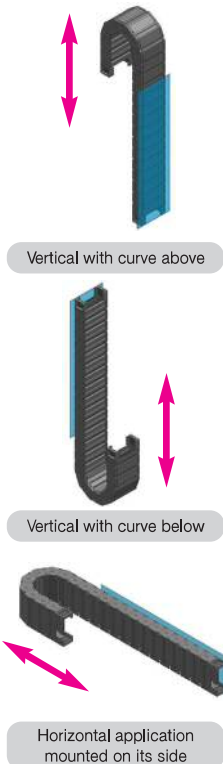
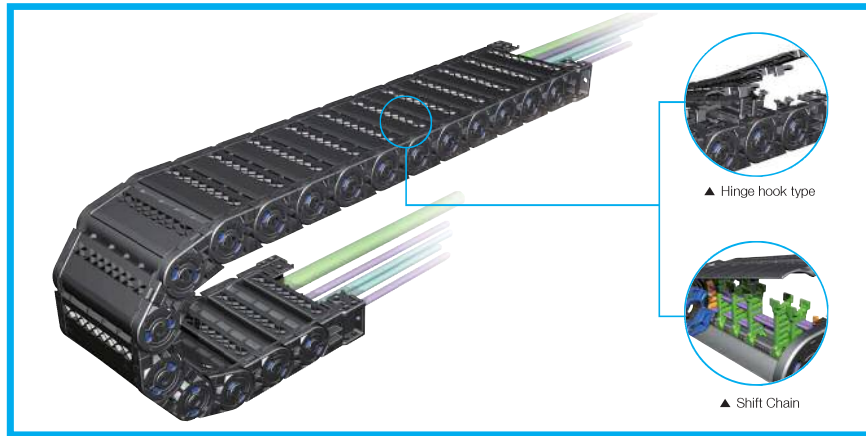


## » Tie wrap (TW)





# ST 055E



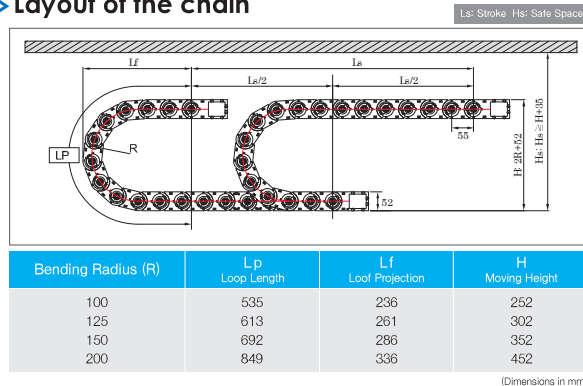
## » Calculation of the chain length

$$[ L = \frac{L_s}{2} + L_p ]$$

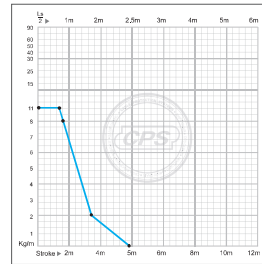
## » Other installation length

Vertical curve above = max 3,0m  
Vertical curve below = max 50m  
Side Mounted, Unsupported = max 1,0m

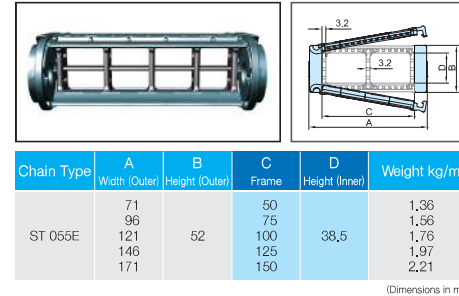
## » Layout of the chain



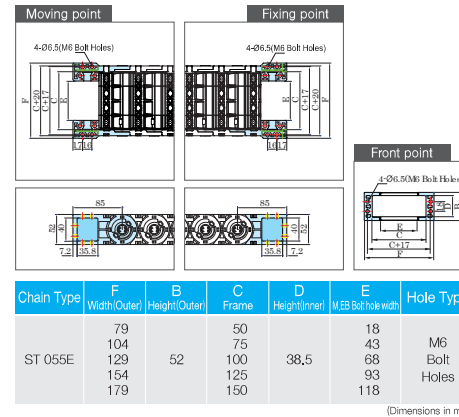
## » Load diagrams self-supporting length



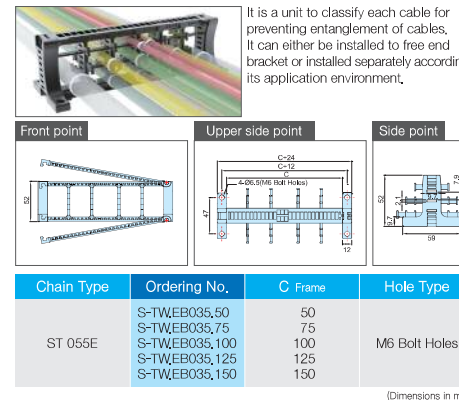
## » Chain cross section



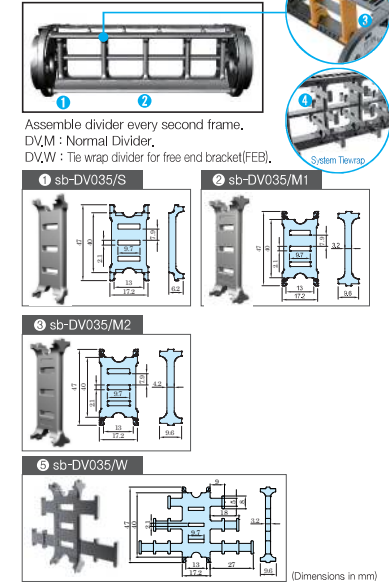
## » Free end bracket



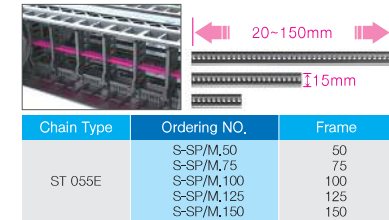
## » System tie wrap (STW)



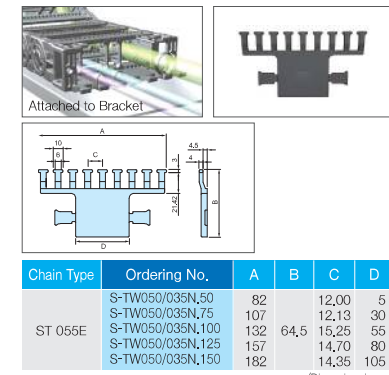
## » Dividers(DV)



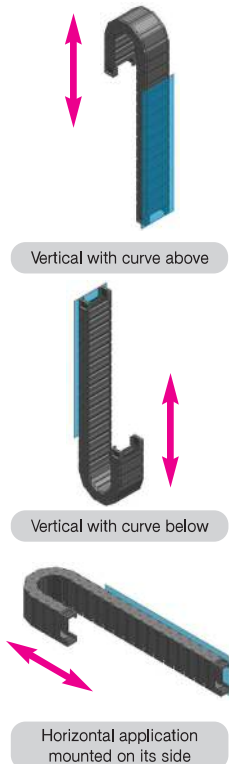
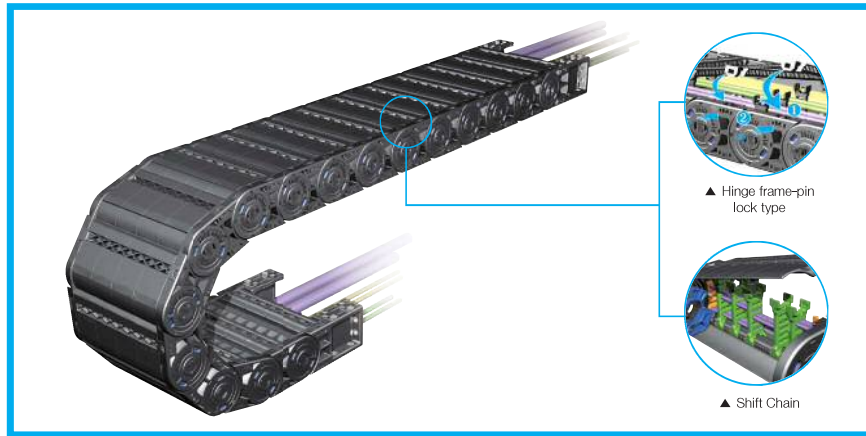
## » Separators(SP)



## » Tie wrap (TW)



# ST 072E



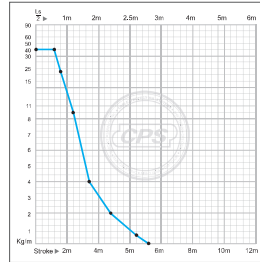
## » Calculation of the chain length

$$[ L = \frac{L_s}{2} + L_p ]$$

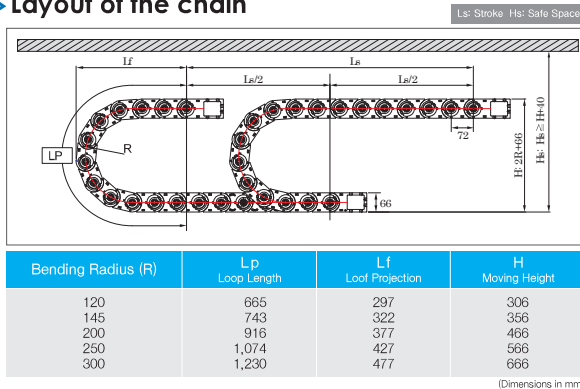
## » Other installation length

Vertical curve above = max 6,0m  
Vertical curve below = max 100m  
Side Mounted, Unsupported = max 2,5m

## » Load diagrams self-supporting length



## » Layout of the chain



## » Chain cross section

Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
ST 072E	82	66	50	44	2,37
	107		75		2,61
	132		100		2,85
	157		125		3,09
	182		150		3,33

(Dimensions in mm)

## » Free end bracket

Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Front point	
					E M.E.B Bolt hole width	Hole Type
ST 072E	82	66	50	44	10	M6 Bolt Holes
	107		75		35	
	132		100		60	
	157		125		85	
	182		150		110	

(Dimensions in mm)

## » System tie wrap (STW)

Chain Type	Ordering No.	C Frame	Hole Type
ST 072E	S-TWEB045,50	50	M6 Bolt Holes
	S-TWEB045,75	75	
	S-TWEB045,100	100	
	S-TWEB045,125	125	
	S-TWEB045,150	150	

(Dimensions in mm)

## » Dividers (DV)

Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Front point	
					E M.E.B Bolt hole width	Hole Type
ST 072E	82	66	50	44	10	M6 Bolt Holes
	107		75		35	
	132		100		60	
	157		125		85	
	182		150		110	

(Dimensions in mm)

## » Separators (SP)

Chain Type	Ordering NO.
ST 072E	sb-SP/400,400

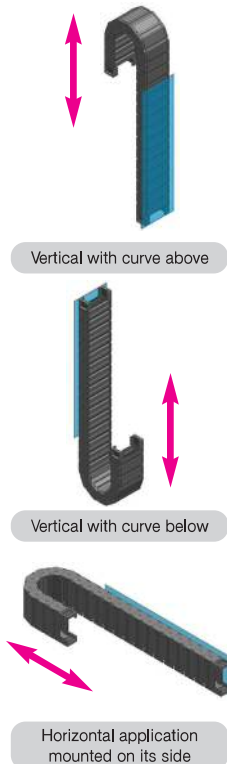
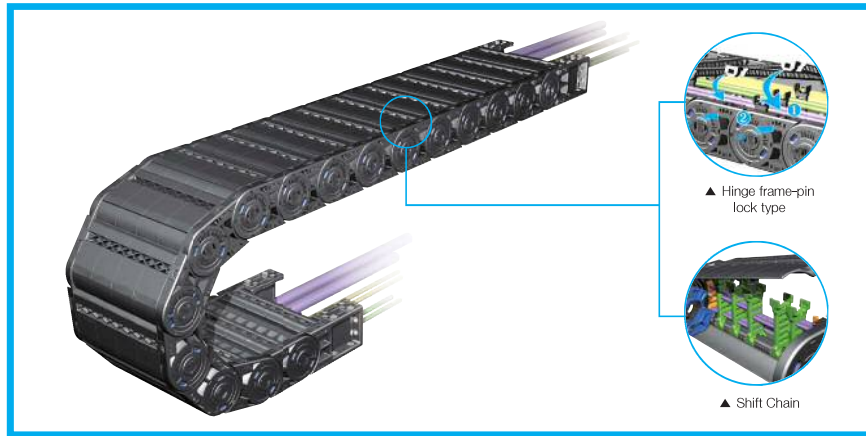
## » Tie wrap (TW)

Chain Type	Ordering No.	A	B
ST 072E	S-TW50	58	65
	S-TW75	75	82
	S-TW100	98	105
	S-TW125	122	129
	S-TW150	141	148

(Dimensions in mm)



# ST 095E



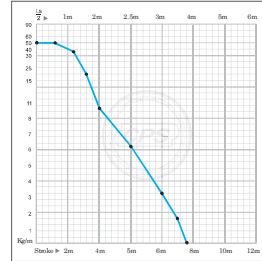
## » Calculation of the chain length

$$[ L = \frac{L_s}{2} + L_p ]$$

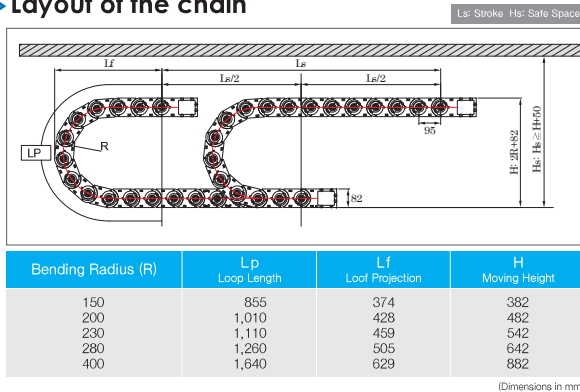
## » Other installation length

Vertical curve above = max 6,0m  
Vertical curve below = max 100m  
Side Mounted, Unsupported = max 3,0m

## » Load diagrams self-supporting length



## » Layout of the chain



## » Chain cross section

Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
ST 095E	138 163 188 213 238	82	100 125 150 175 200	55	3,55 3,79 4,04 4,29 4,53

(Dimensions in mm)

## » Free end bracket

Chain Type	F Width/Outer	B Height/Outer	C Frame	D Height/Inner	E MEB Bolt hole width	Hole Type
ST 095E	138 163 188 213 238	82	100 125 150 175 200	55	49 74 99 124 149	M10 Bolt Holes

(Dimensions in mm)

## » System tie wrap (STW)

It is a unit to classify each cable for preventing entanglement of cables. It can either be installed to free end bracket or installed separately according to its application environment.

Chain Type	Ordering No.	C Frame	Hole Type
ST 095E	S-TW/EB060,100 S-TW/EB060,125 S-TW/EB060,150 S-TW/EB060,175 S-TW/EB060,200	100 125 150 175 200	M10 Bolt Holes

(Dimensions in mm)

## » Dividers(DV)

Assemble divider every second frame.  
DV/M : Normal Divider.  
DV/W : Applicable to System Tie Wrap or FEB.

Chain Type	Ordering No.	A	B
ST 095E	sb-DV060/S sb-DV060/M sb-DV060/W	58 75 98 122 141	65 82 105 129 148

(Dimensions in mm)

## » Separators(SP)

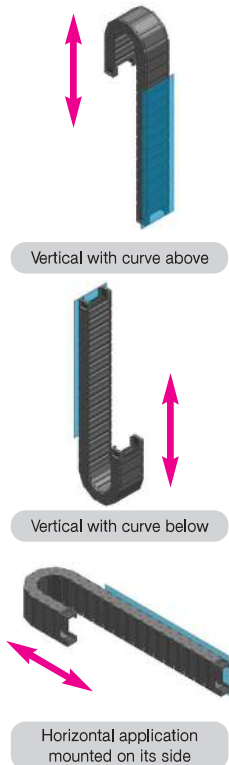
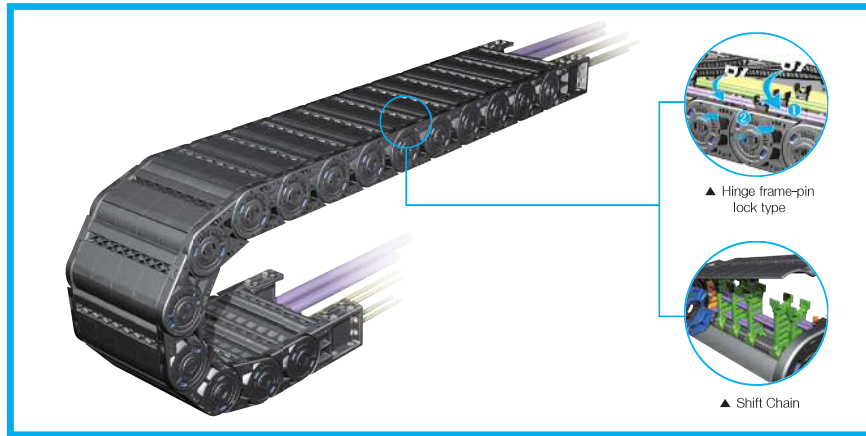
Chain Type	Ordering NO.
ST 095E	sb-SP/400,400

## » Tie wrap (TW)

Chain Type	Ordering No.	A	B
ST 095E	S-TW50 S-TW75 S-TW100 S-TW125 S-TW150	58 75 98 122 141	65 82 105 129 148

(Dimensions in mm)

# ST 120E



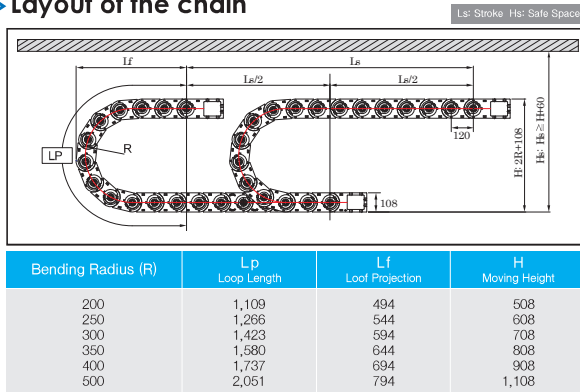
## » Calculation of the chain length

$$[ L = \frac{L_s}{2} + L_p ]$$

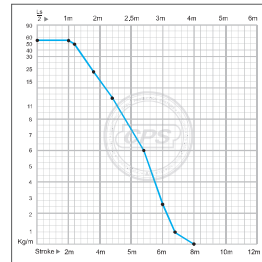
## » Other installation length

Vertical curve above = max 6,0m  
Vertical curve below = max 120m  
Side Mounted, Unsupported = max 3,0m

## » Layout of the chain



## » Load diagrams self-supporting length



## » Chain cross section

Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
ST 120E	192 242 342	108	150 200 250 300	76	5,79 6,43 7,07 7,71

(Dimensions in mm)

## » Free end bracket

Chain Type	F Width(Outer)	B Height(Outer)	C Frame	D Height(Inner)	E M.E.B Bolt hole width	Hole Type
ST 120E	200 250 300 350	108	150 200 250 300	76	90 140 190 240	M10 Bolt Holes

(Dimensions in mm)

## » System tie wrap (STW)

It is a unit to classify each cable for preventing entanglement of cables. It can either be installed to free end bracket or installed separately according to its application environment.

Chain Type	Ordering No.	C Frame	Hole Type
ST 120E	S-TWEB075,150 S-TWEB075,200 S-TWEB075,250 S-TWEB075,300	150 200 250 300	M10 Bolt Holes

## » Dividers(DV)

Assemble divider every second frame.  
DV/M : Normal Divider.  
DV/W : Applicable to System Tie Wrap or FEB.

Chain Type	Ordering No.	A	B
ST 120E	sb-DV075/S sb-DV075/M sb-DV075/W	58 75 98 122 141	65 82 105 129 148

(Dimensions in mm)

## » Separators(SP)

20-300mm  
15mm

Chain Type	Ordering NO.
ST 120E	sb-SP/400,400

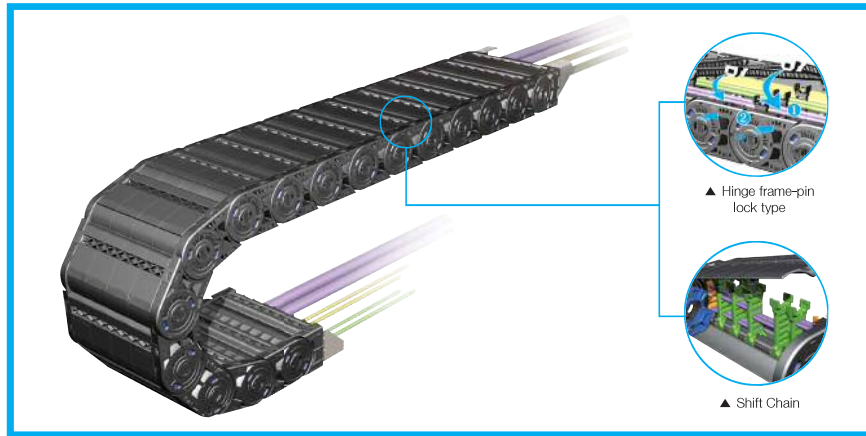
## » Tie wrap (TW)

Chain Type	Ordering No.	A	B
ST 120E	S-TW50 S-TW75 S-TW100 S-TW125 S-TW150	58 75 98 122 141	65 82 105 129 148

(Dimensions in mm)



# ST 150E



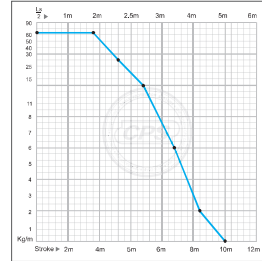
## » Calculation of the chain length

$$[ L = \frac{L_s}{2} + L_p ]$$

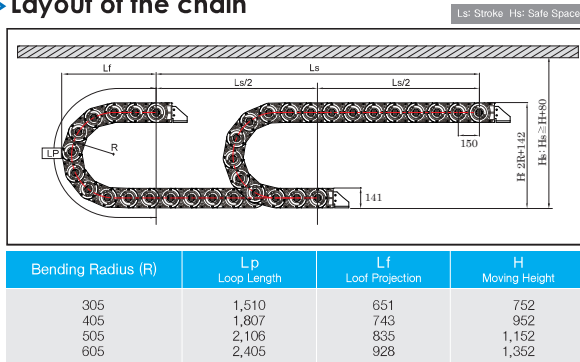
## » Other installation length

Vertical curve above = max 7,0m  
Vertical curve below = max 150m  
Side Mounted, Unsupported = max 4,0m

## » Load diagrams self-supporting length



## » Layout of the chain

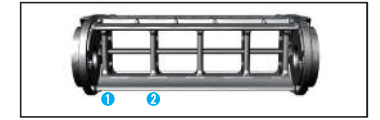


(Dimensions in mm)

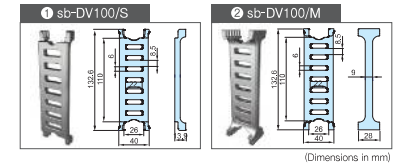
## » Chain cross section

Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
ST 150E	246	141	200	110	8,16
	296		250		8,76
	346		300		10,50
	396		350		12,33
	446		400		14,16

## » Dividers(DV)



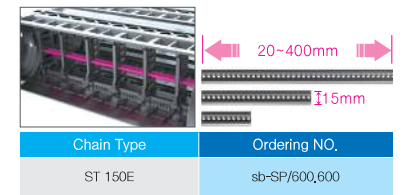
Assemble divider every second frame.  
DV,M : Normal Divider.



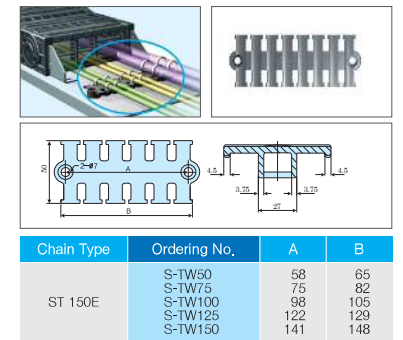
## » Free end bracket

Moving point		Fixing point	

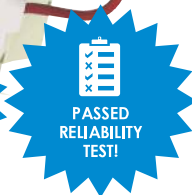
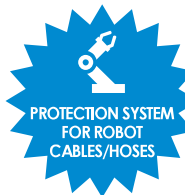
## » Separators(SP)



## » Tie wrap (TW)



(Dimensions in mm)



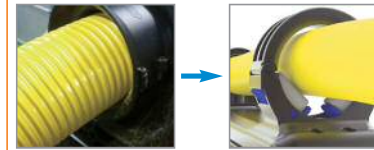
## » General information

Item	Value
Composition	Roboway, Robo-kit
Application	Welding Robot, Handling Robot
Tube Temperature	-50℃ ~+95℃
Color of Tube	Yellow, Black
Certificate	CE
Certificate	CE, ATEX(Ex)

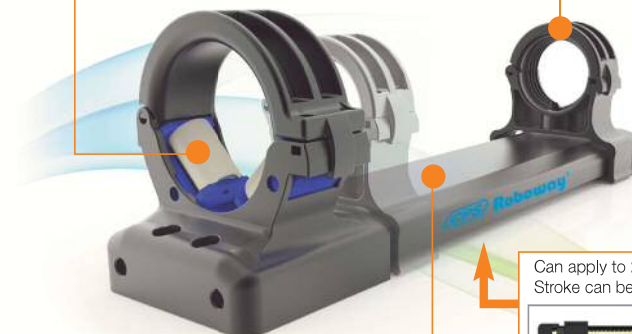
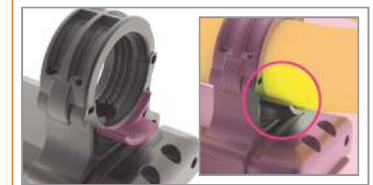
Roboway can protect cables effectively by making tube's movement to one direction while robot arm operates to complicated direction.

## » Product characteristic #1

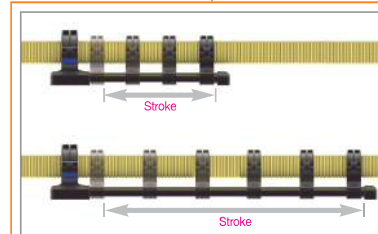
Minimized dust by applying rollers at fixing part.



Design the supporting guide to prevent sagging to down side at Moving part.



Can apply to 2~3 special springs.  
Stroke can be adjusted.

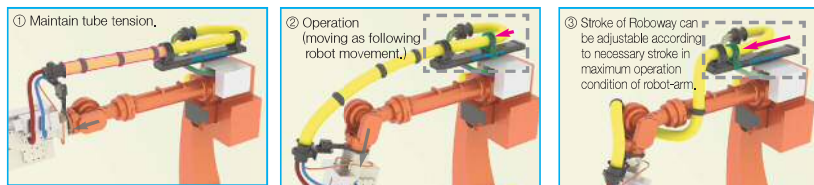


Adjustable stroke structure,

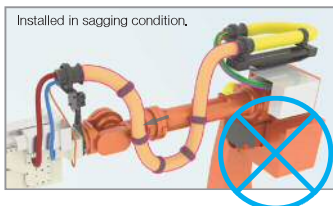
Possible to keep always certain  
tension to protect tube and cables.



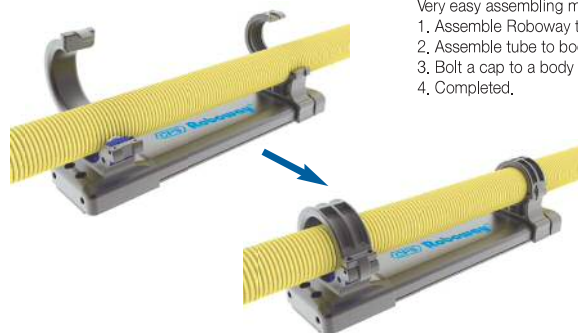
## >> Product characteristic #2



Tube could be damaged or broken when robot-arm operates in sagging condition as it causes tube to bump against robot-arm strongly and many times.

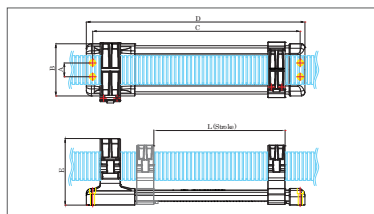


## >> Product characteristic #3



Very easy assembling method as below:  
1. Assemble Roboway to main bracket.  
2. Assemble tube to body after opening a cap of Roboway.  
3. Bolt a cap to a body after closing a cap.  
4. Completed.

## >> Roboway Dimension

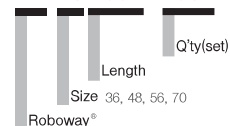


Type	A Bolt hole width	B Width	C Bolt hole width	D Length	E Height	L Stroke
RW-36	30	96		L+170	137	300 / 400 / 500 / 600
RW-48	30	96		L+202	137	
RW-56	40	150		L+215,5	192	350 / 450 / 550 / 650
RW-70	40	150		L+249	192	

(Dimensions in mm)

## >> Ordering

**RW-48 400L : 10ST**



## >> Components / A type (48,56,70 size)

※ Roboway® Components can be changed by order specification.

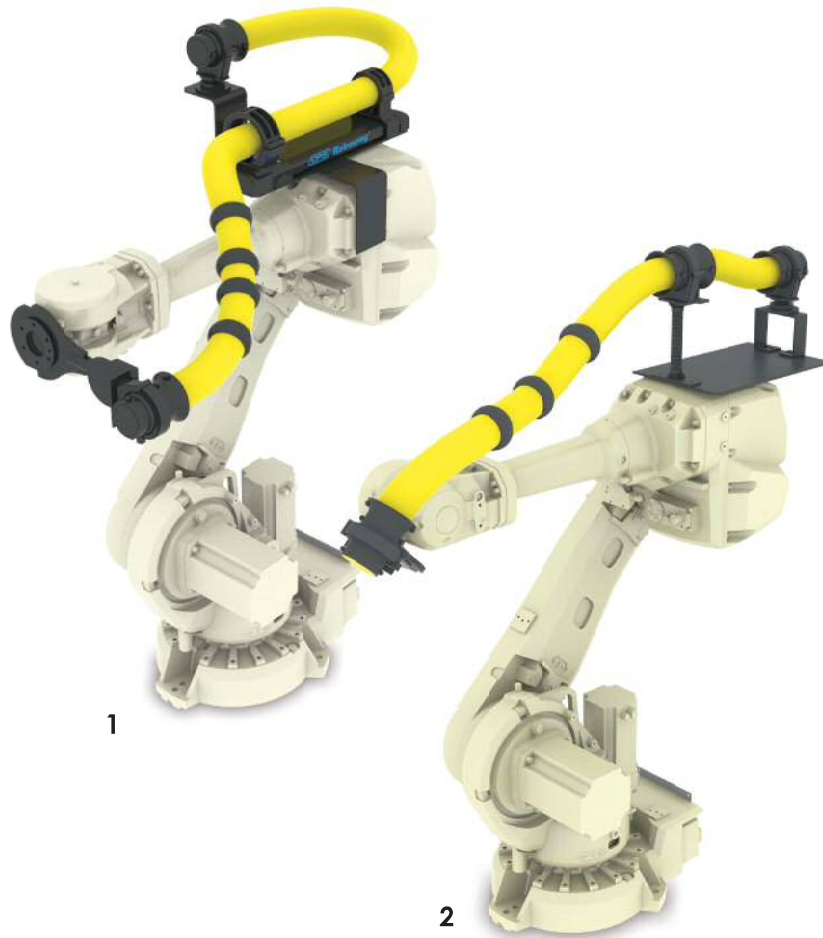


## >> Components / B type (48,56,70 size)

※ Roboway® Components can be changed by order specification.



## Roboway® Application to ABB



Part Number	Robot Specification	Description	No.
ROBOWAY-70B (A-type)	ABB 4600	ABB 4600 with Roboway-70B (450mm)	1
ROBOWAY-70B (B-type)	ABB 6640-255	ABB 6640-255	2



Part Number	Robot Specification	Description	No.
ROBOWAY-70B (A-type)	IRB 660	-	1
ROBOWAY-70B (B-type)	IRB 6650S	IRB 6650S	2

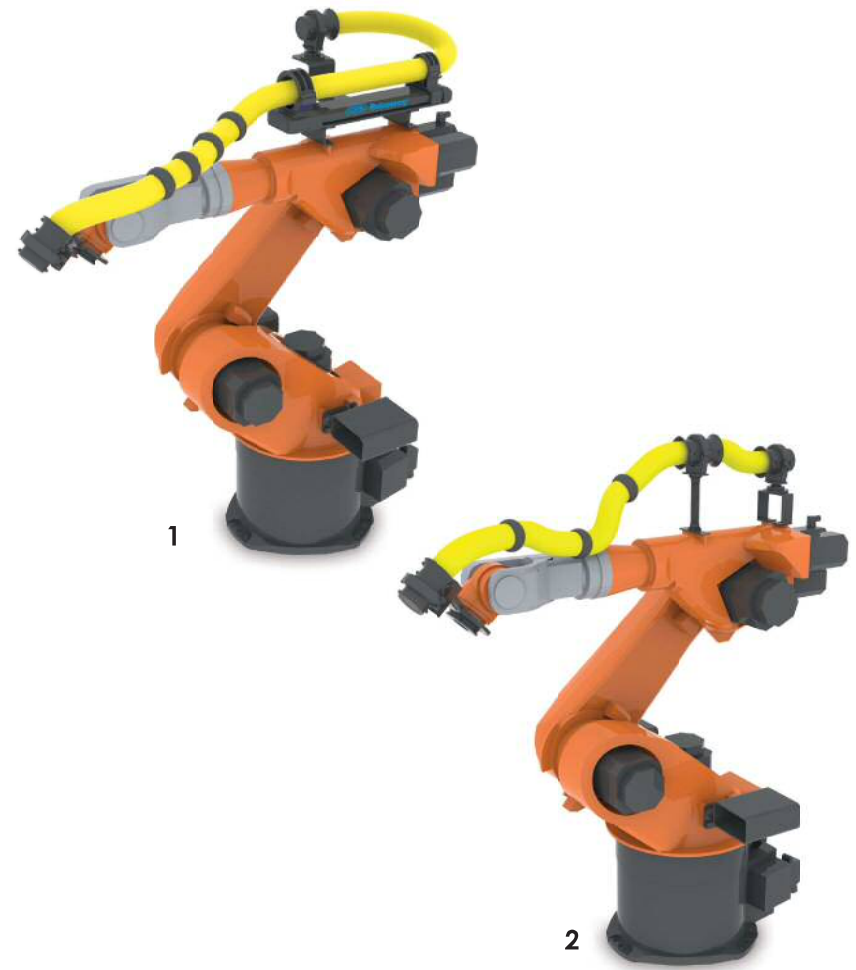


## Roboway® Application to ABB



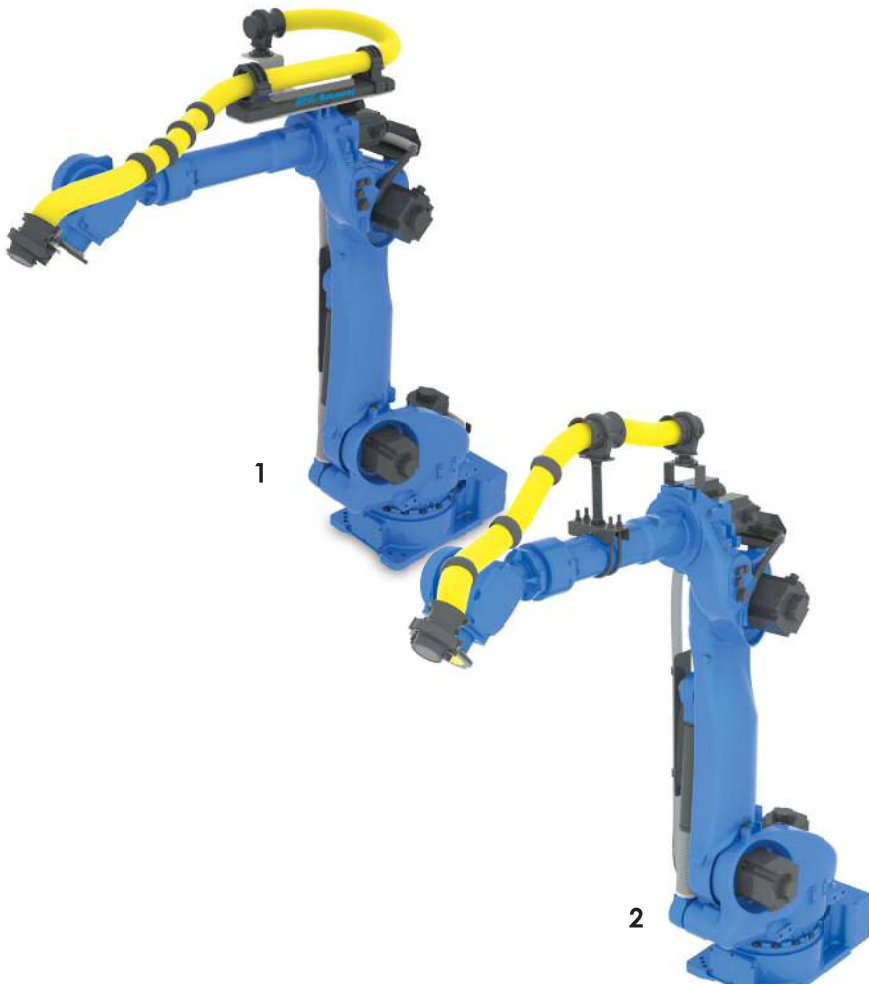
Part Number	Robot Specification	Description	No.
ROBOWAY-70B (A-type)	IRB 7500	IRB 7500 with Roboway-70B (450mm)	1
ROBOWAY-70B (B-type)	IRB 7500	IRB 7500	2

## Roboway® Application to KUKA



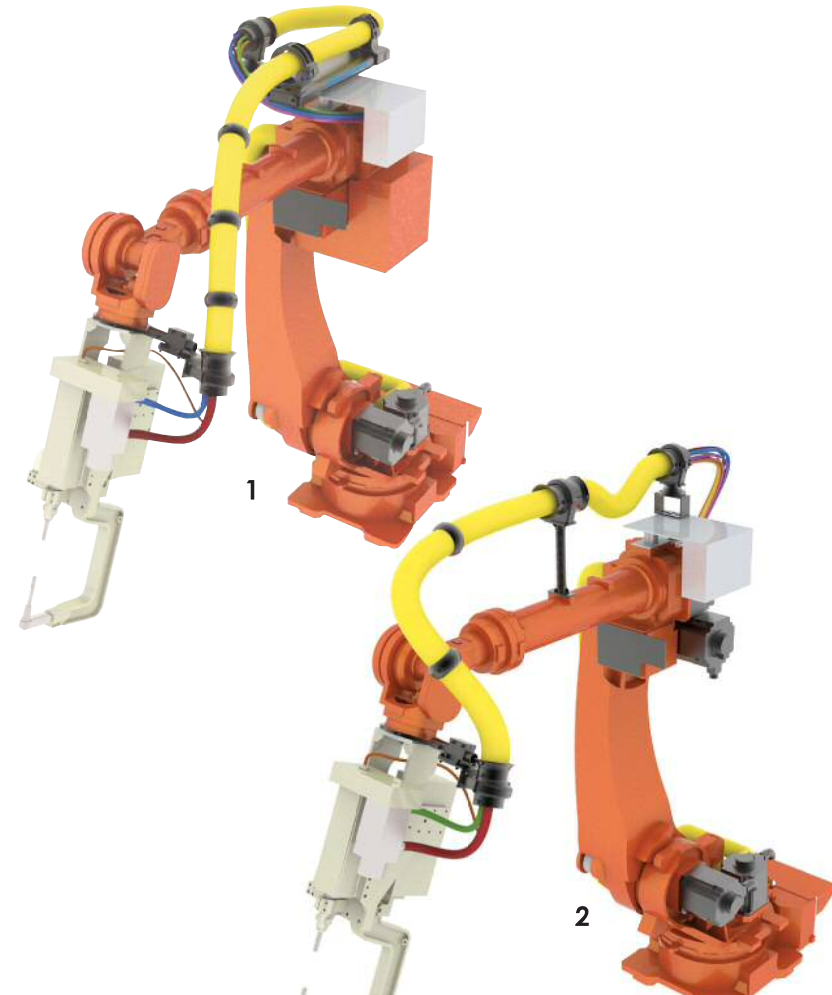
Part Number	Robot Specification	Description	No.
ROBOWAY-70B (A-type)	KR60-3	KR60-3 with Roboway-70B (450mm)	1
ROBOWAY-70B (B-type)	KR60-3	KR60-3	2

## Roboway® Application to Yaskawa



Part Number	Robot Specification	Description	No.
ROBOWAY-70B (A-type)	MH180	MH180 with Roboway-70B (450mm)	1
ROBOWAY-70B (B-type)	MH180	MH180	2

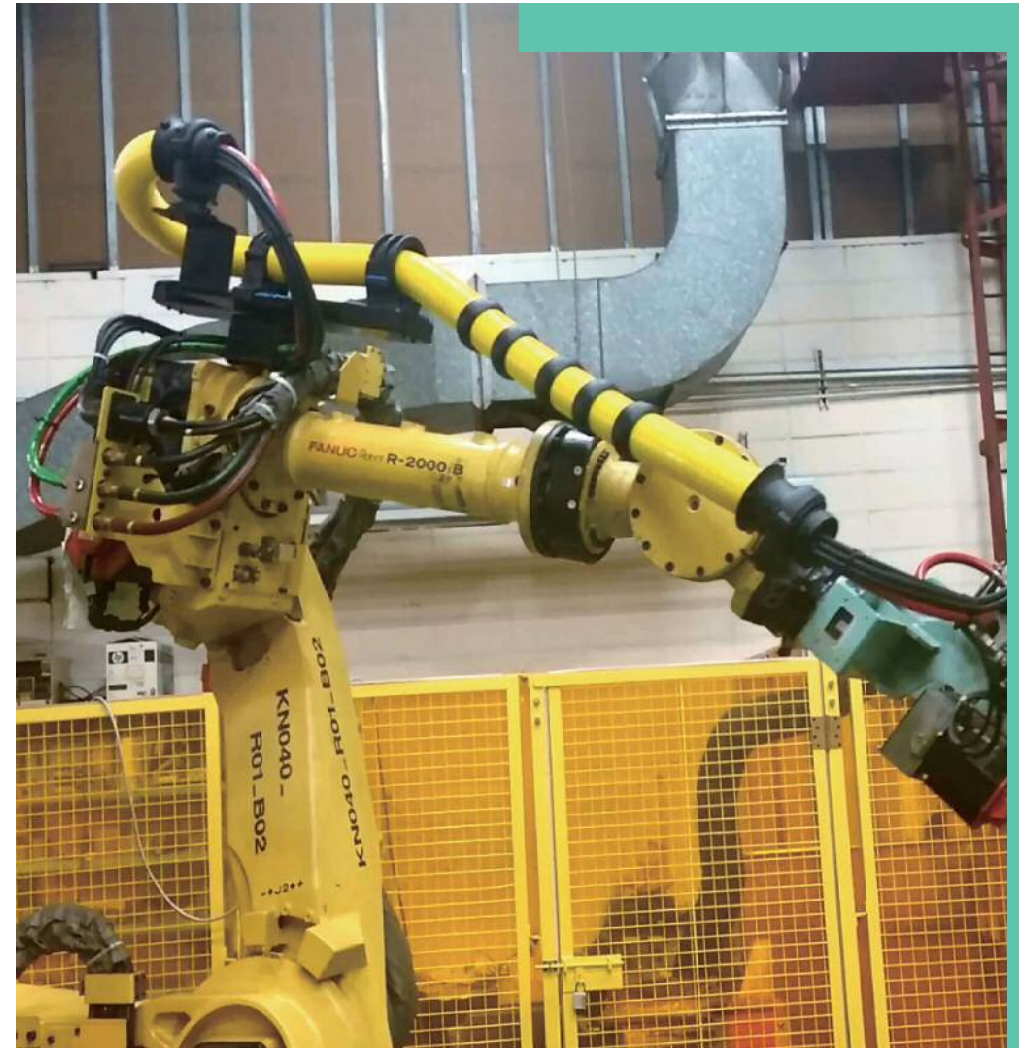
## Roboway® Application to Hyundai



Part Number	Robot Specification	Description	No.
ROBOWAY-70B (A-type)	HS-180	HS-180 with Roboway-70B (450mm)	1
ROBOWAY-70B (B-type)	HS-180	HS-180	2



## Roboway® Application to Fanuc



Part Number	Robot Specification	Description	No.
ROBOWAY-70B (A-type)	Fanuc - 2000iB	Fanuc - 2000iB with Roboway-70B (450mm)	1
ROBOWAY-70B (B-type)	Fanuc - 2000iB	Fanuc - 2000iB	2

## >> Components



**RKD**  
22/28/36/48/56/70  
**Tube Ball Joint Sleeve**  
RKD is also tube ball joint like RKS, however, its shape is a little bit different as ball joint direction is bidirectional unlike RKS.



**VCG**  
22/28/36/48/56/70  
**Cable End Finishing**  
VCG is clamp for robot cables/hoses at end position of tube.



**RKC**  
22/28/36/48/56/70  
**Tube Clamps**  
RKC is tube clamp in combination with RKS+RKAC or RKD+RKAC to holds tube's movement while robot operates.



**RKSC**  
22/28/36/48/56/70  
**Strain Relief Insert**  
22~36 of RKSC : It clamp for VCG.  
48~70 of RKSC : It clamp for Tube and RKS.



**RKR-22/28/36/48/56/70**  
**Rotating Connector**  
RKR in combination with RKC is to release tube's tension and fatigue as it can rotate with robot-arm movement.



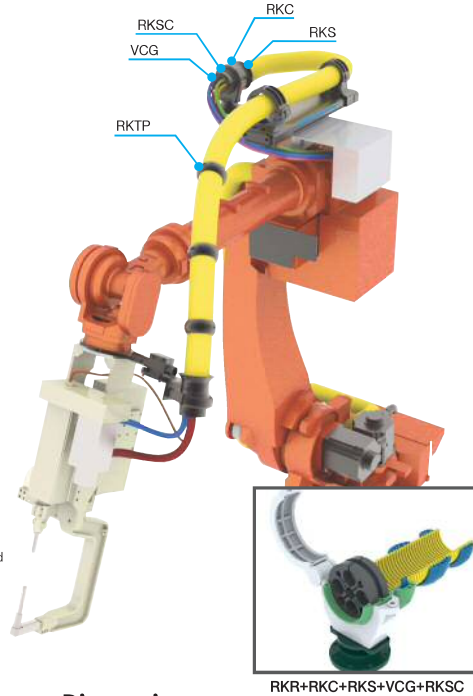
**RKTP-22/28/36/48/56/70**  
**Abrasion Protection Connector**  
RKTP is made of reinforced polyamide 6.  
It is to protect abrasion and damage of tube when tube bumps on robot arm.



**RKS-22/28/36/48/56/70**  
**Tube Ball Joint**  
RKS is tube ball joint to strengthen tube's flexibility and release tube's tension loaded by robot operation.



**RKTC-48/56/70**  
If robot tube got damaged such as cut or stretched condition, you don't need to replace total tube by using RKTC as it can cover damaged area.

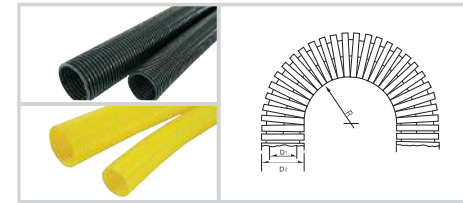


## >> Dimension

Product	Conduit Size	Width	Height	Length	Outer Diameter
RKTP	22	28,0	48,4		48,4
	28	30,0	53,0		53,0
	36	30,0	62,0		62,0
	48	30,0	80,0	-	80,0
	56	40,0	93,2		93,2
RKTG	70	40,0	108,0		108,0
	48	50,0	78,0		78,0
	56	60,0	90,2	-	90,2
RKC	70	60,0	105		105
	22	30,0	50,0	49,0	45,0
	28	30,0	59,5	58,8	53,5
RKS	36	45,0	85,3	90,2	75,0
	48	49,5	105,0	128,2	94,0
	56	40,0	138,1	150,1	116,2
	70	40,0	145,5	164,9	131,0
RKD	22	50,0	23,0	23,0	23,0
	28	60,0	27,0	27,0	27,0
	36	100,3	80,5	80,5	80,5
	48	89	92,3	92,3	92,3
	56	102	105,3	105,3	105,3
RKSC	70	102	120,1	120,1	120,1
	22	40,0	22,0	22,0	22,0
	28	63,5	30,0	30,0	30,0
	36	120,0	83,0	83,0	83,0
RKR	22	10,5	29,5		29,5
	28	13,0	34,5		34,5
	36	20,6	44,6	-	44,6
	48	22,0	67,5		67,5
	56	26,0	81,2		81,2
VCG	70	26,0	96,0		96,0
	22	43,0	18,5		43,0
	28	55,0	23,0		55,0
	36	98,0	42,0	-	98,0
	48	98,0	42,0		98,0
RKTC	56	98,0	42,0		98,0
	70	98,0	42,0		98,0
	22	10,5	25,5		25,5
	28	13,0	30,5		30,5
	36	20,6	40,6	-	40,6
RKTP	48	24,0	62,5		62,5
	56	34,0	75,8		75,8
	70	34,0	90,0		90,0

## >> CPSFLEX® -PAM, PAR Specification

PAM is the highest quality of corrugated tube only for robots.  
PAR is corrugated for robots and rotating machinery.



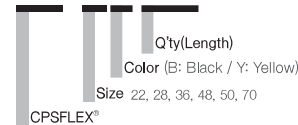
- Material : High Quality Polyamide 11/12 (PAM)  
: High Quality Polyamide 12 (PAR)
- Construction : Inside & Outside Corrugated Plastic Hose
- Degrees of Protection : IP 68
- The max. Instantaneous Temperature : -50°C to +95°C
- Short Term : up to +150°C
- Self-Extinguishing : UL94-V2, Halogen-Free
- Color : Black & Yellow
- Connections : Roboway, Robo-kit, CPSFIX
- Application : Robots (Welding robot, Handling robot, Rotating machinery)

Black	Yellow	Inner Diameter (D1)	Outer Diameter (D2)	Bending Radius (R)mm ±10%	Packing meter / roll
PAM / PAR-22B	PAM / PAR-22Y	21,7	28,5	45	50
PAM / PAR-28B	PAM / PAR-28Y	27,8	34,5	55	50
PAM / PAR-36B	PAM / PAR-36Y	36,0	42,5	60	30
PAM / PAR-48B	PAM / PAR-48Y	46,5	54,5	70	30
PAM / PAR-56B	PAM / PAR-56Y	56,3	67,2	110	30
PAM / PAR-70B	PAM / PAR-70Y	70,0	82,5	160	10

(Dimensions in mm)

## >> CPSFLEX® -PAM Ordering ※ Please refer to page K-13 and K-14 more detail.

### PAM - 70Y : 10M



## >> NORFLEX® -PUR Tube

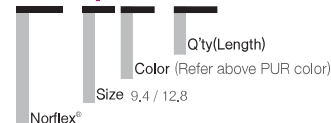


- Material : Smooth interior and exterior: wall: special premium polyurethane(Pre-PUR®)
- Properties : Fabric reinforced / highly abrasion-proof  
: Highly flexible / crush resistant  
: Good resistance to oil, gasoline and chemicals  
: Comform to RoHS guideline
- Color : Transparent, Blue, Gray, Black, Red, Green, Yellow  
(TR, BL, GR, BK, RE, GN, YE)
- Application : Suitable to apply at industrial robot, automatic welding facility, especially it has resistance at hot spot welding flame and very suitable to apply at injection molding as a high pressure air or cooling water hose and also some other place need flexible and high anti-abrasion.

Inner Diameter (in/mm)	Outer Diameter (mm)	min. Burst Pressure (bar)	Bending Radius (mm)	Weight (kg/m)	Packing (m/roll)
3/8" (9,4)	16,0	80	55,3	0,153	50
1/2" (12,8)	19,5	80	68,8	0,230	50

## >> NORFLEX® Ordering

### PUR - 9,4 BK : 50M



## >> ROBO-KIT Ordering

### RKC-70 : 10EA



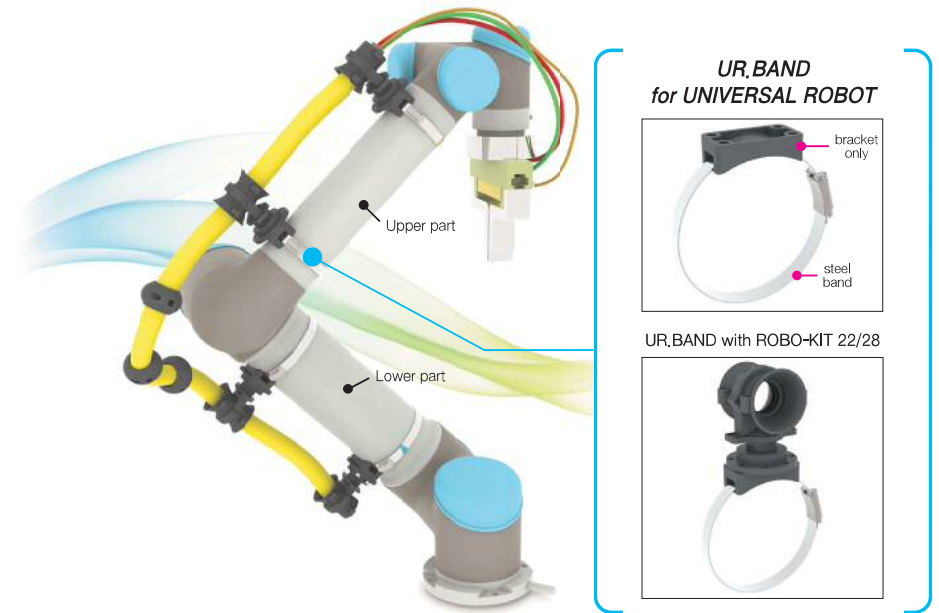


## Roboway® for UR



### » UR.BNAD for UNIVERSAL ROBOT

ROBO-KIT 22/28 can be specially applied to Universal Robot or compact robot to protect outside cables/hoses.



### » UR.BNAD size table only for UNIVERSAL ROBOT

Type	Inner Diameter		Applicable products
● UR5,BAND	Upper part	Ø85	ROBO-KIT 22/28
	Lower part	Ø100	
● UR10,BAND	Upper part	Ø86	
	Lower part	Ø108	

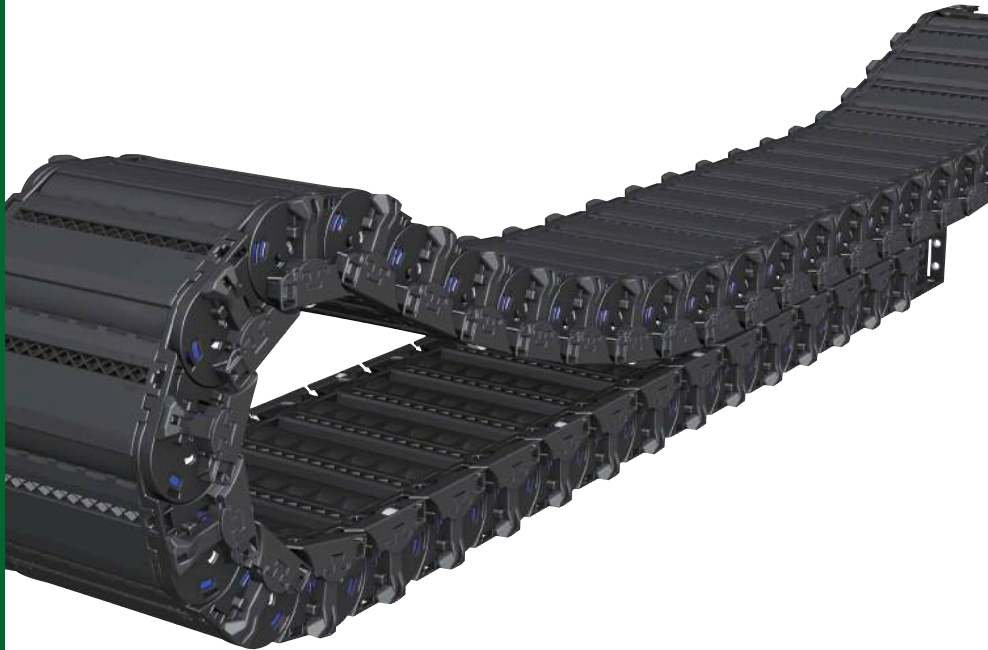
※ UR,BAND consists of brackets and steel band.

### » Ordering (ROBO-KIT should be ordered separately.)

**UR5,BAND 075 : 2EA**

	Q'ty
Inner Diameter (Order after check the upper and lower robot body diameter)	
UR, band for UNIVERSAL ROBOT (UR5 / UR10 Bracket and steel band included.)	

# Shift Chain - Enclosed roller skid type



## >> General information

Item	Value
Material	CPS-Amid(PA6+GF), RoHs
Speed	3m/s
Acceleration	10m/s²
Temperature	-30°C ~ +130°C
Certificate	CE, ATEX(Ex)

## >> Calculation table

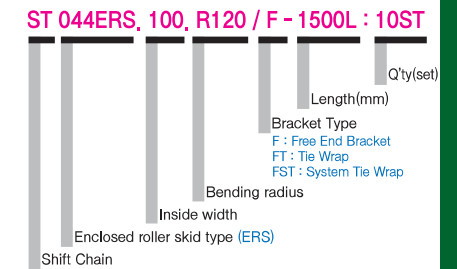
Item	Value
Length of Cable Chain	$L = \frac{1}{2} \times LS + LP$
Bending Radius	
The biggest Cable inserted	Multiply 8~10 and the biggest cable
The biggest Hydraulic Hose inserted	Multiply 15~20 and the biggest hose

## >> Dimension table

Shift Chain ERS Type	Pitch	Bending Radius (R)	Weight kg/m	Speed m/s	Temperature °C	Clearance				Frame style	Divider possible with frame
						A	B	C	D		
ST 044ERS	44	70, 90, 120, 150	1,07 1,16 1,23 1,33	3	-30 ~ +130	73 93 113 138	35 55 75 100	40,5	24,5		
ST 072ERS	72	120, 145, 200, 250, 300	2,53 2,55 2,77 2,89 3,01	3	-30 ~ +130	104 129 154 179 204	50 75 100 125 150	69	44		
ST 095ERS	95	150, 200, 230, 280, 400	4,20 4,45 4,70 4,95 5,19	3	-30 ~ +130	168 193 218 243 268	100 125 150 175 200	85	55		
ST 120ERS	120	200, 250, 300, 350, 400, 500	5,17 5,48 5,78 6,09	3	-30 ~ +130	218 268 318 368	150 200 250 300	112	76		
ST 150ERS	150	305, 405, 505, 605	10,23 10,84 11,45 12,06 12,67	3	-30 ~ +130	287 337 387 437 487	200 250 300 350 400	145	110		

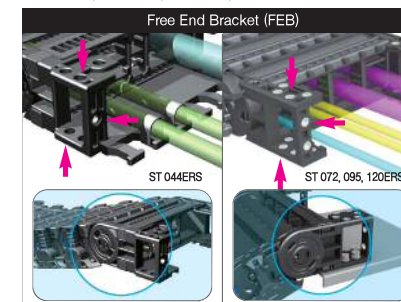
(Dimensions in mm)

## >> Ordering



## >> Bracket type

- ST044, ST072, ST095, ST120

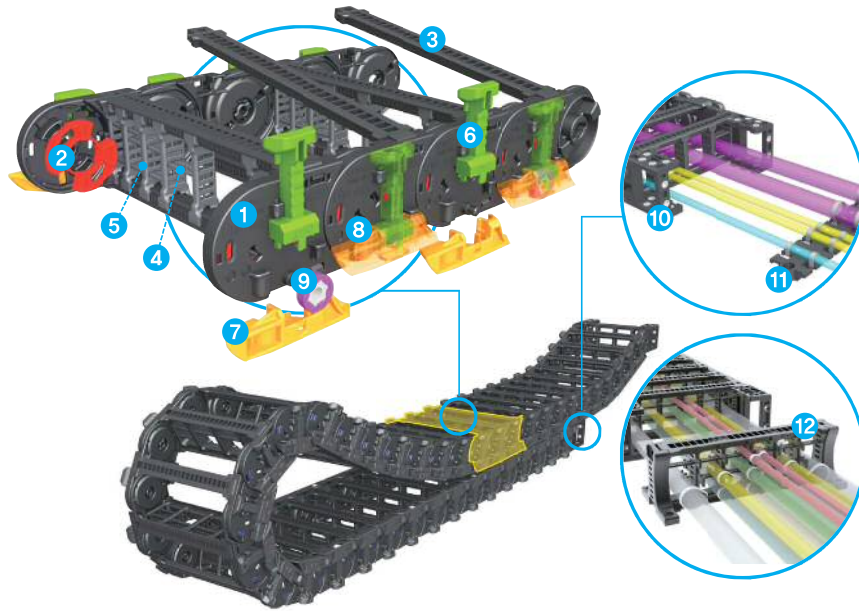


- ▶ BR should not be inserted in the joint of side band and Free End Bracket,
- ▶ Normal Frame, not FRU/FRD, is inserted into Free End Bracket,



# Shift Chain - Enclosed roller skid type

## >> Part of Shift Chain Enclosed Roller skid type



### 1 Side Band (SB)

A unit that connects each side band and between them BR is inserted to strengthen clamping force.

### 2 Bending Radius Unit (BR)

A unit that inserted between each side band. There are 6 supporting points to create durability.

### 3 FRU, FRD [FRU(D) Enclosed type applicable]

A unit that connects left and right side band and there are 2 types of frame : FRU, FRD.

### 4 Separator (SP)

A unit that divides inserted cables vertically to prevent twisting and breaking problem.

### 5 Divider (DV-S, M, R, T)

A unit that divides inserted cables horizontally.

### 6 Support

A unit that supports skid & roller skid which makes skid & roller skid move up and down.

### 7 ⑧ Skid, Roller Skid

Skid : A unit that minimizes friction between upper and lower cable chain.  
Roller Skid : A unit that minimizes friction between upper and lower chain, while roller is combined type..

### 9 Roller

A unit that minimizes friction between upper and lower cable chain. It contains bearing in the core.

### 10 Free End Bracket (FEB)

A unit that connects at last side band (left&right). It can be fixed stronger using steel washers.

### 11 Tie Wrap (TW)

A unit that ties cables to maintain straightness of them. It can be assembled to bracket directly or installed separately from bracket.

### 12 System Tie Wrap (STW)

System-Tie Wrap has to be assembled on fixing and moving point of bracket and can be assembled without any tie wrap plate. This tie wrap is used to stay the cables on several floors prevent the cables from being twisted and it can also be assemble without any tools or bolt. This tie wrap has two types, one is to assemble inside bracket the other one is outside.

## >> Assembly procedure of Shift Chain Enclosed Roller skid type

Assembly procedure of Shift chain ERS-type is as follows. The assembling process of shift Chain ERS-type is like below and users must use rubber hammer with careful combination of Divider and Separator. (Disassembly process for repair and replacement is in reverse order)

 <p><b>1</b> Insert BR Unit into each Side Band. (Side Band is divided into right and left side according to the direction.)</p>	 <p><b>11</b> Insert the ⑧ shaped-FRD inserted to F.FEB and insert it with the hinge facing RH direction, as above. (⑧: Normal FRD ⑨: Built-up only for F.FEB) Insert the divider with separator to divide the inside of chain.</p>
 <p><b>2</b> Continue to insert BR Unit into Side Band as you want to make it. Assembly Side Band which is inserted BR Unit as above.</p>	 <p><b>12</b> Continue to insert the FRU(⑩: Normal FRU) with the hinge facing RH direction. (Assemble the from F.FEB to M.FEB in order.)</p>
 <p><b>3</b> Continue to connect each Side Band as long as you want to make it.</p>	 <p><b>13</b> Insert ⑩ Normal FRU as many as you need and insert them one by one with the hinge facing RH direction, as above. Insert Frame-pin into the hole which is seen where the end of FRU and Side Band meet. (M.FEB is not turning to up and down when FRU assembling.)</p>
 <p><b>4</b> Connect the Side Band as many as you need.</p>	 <p><b>14</b> Insert Roller into mounted Side Band.</p>
 <p><b>5</b> Assemble the F.FEB according to the direction of right and left side. (Do not insert the BR Unit to Side Band connected to F.FEB, Side of F.FEB is not enclosed.)</p>	 <p><b>15</b> Continue to insert Roller into Side Band. Basically, you insert one roller per 4 Link.</p>
 <p><b>6</b> Do not insert a BR to M.FEB. (M.FEB will be making a turn to up and down.)</p>	 <p><b>16</b> Insert Roller Skid into Side Band where roller inserted in. Skid is divided into Roller Skid (Skid with mount for roller) and normal Skid. (Skid without mount)</p>
 <p><b>7</b> Assemble the M.FEB according to the direction of right and left side. (Side of M.FEB is not enclosed.)</p>	 <p><b>17</b> Insert support into groove of side band until you hear the "click". (Same support for both LH and RH.)</p>
 <p><b>8</b> Insert one ⑧ Shaped-FRD into F.FEB. (⑧: Normal FRD ⑨: Built-up only for F.FEB) Find one ⑧ shaped-FRD and insert it with the hinge facing RH direction, as above.</p>	 <p><b>18</b> Insert a normal Skid into Side Band which is not inserted a roller.</p>
 <p><b>9</b> Continue to insert the FRD(⑩: Normal FRD) with the hinge facing RH direction. (Assemble the from F.FEB to M.FEB in order.)</p>	 <p><b>19</b> Insert Skid and Support into all Side Band links. (Check that Skid is working up-and-down properly when you push the assembled Skids by hands.)</p>
 <p><b>10</b> Insert the frame as many as you need and insert them one by one with the hinge facing RH direction, as above. (M.FEB is not turned to up and down when FRD assembling.)</p>	 <p><b>20</b> Insert steel washers into M.FEB and F.FEB.</p>