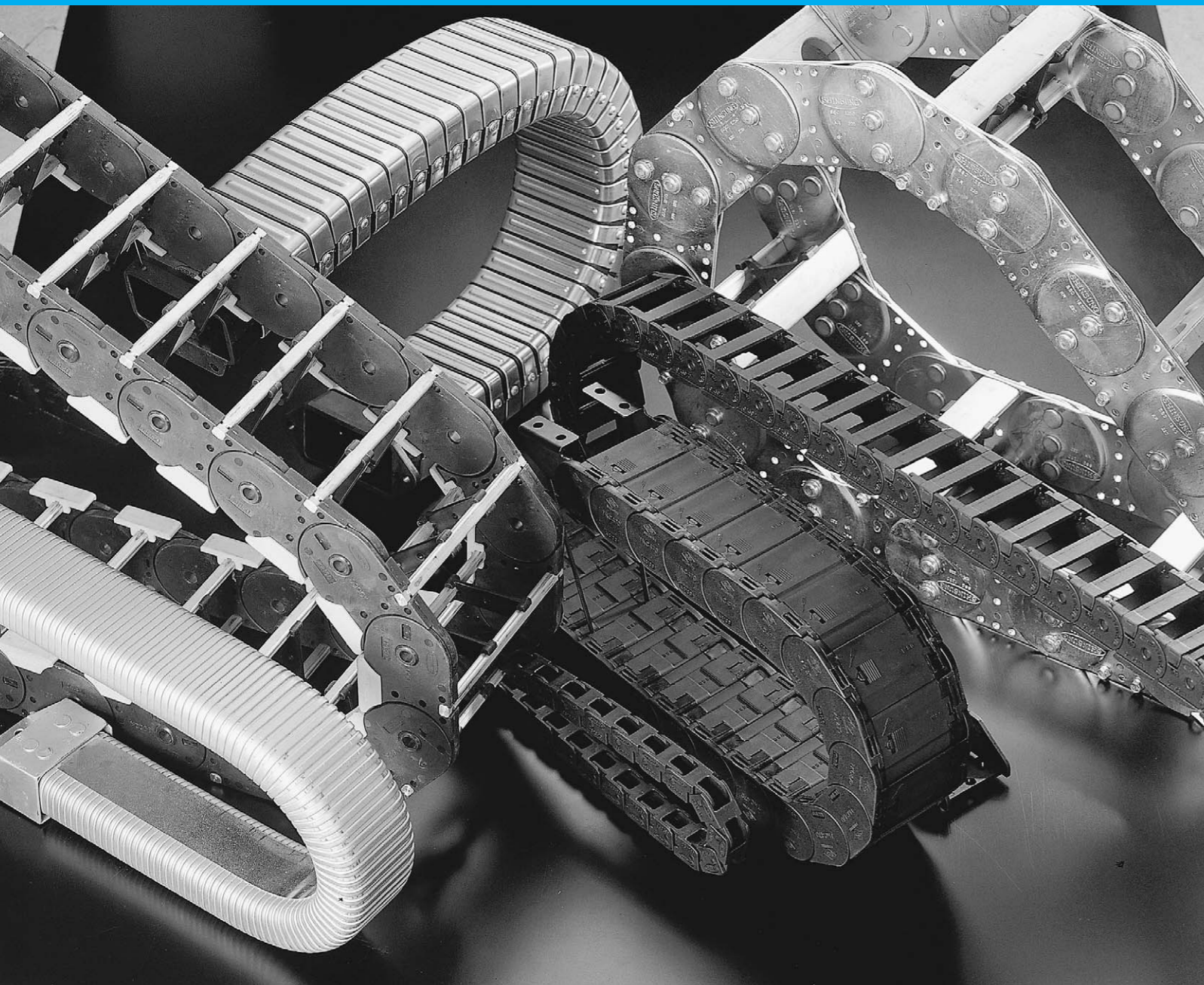

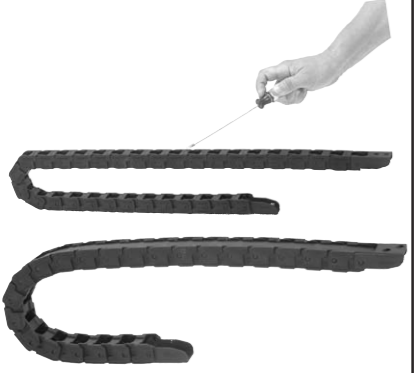







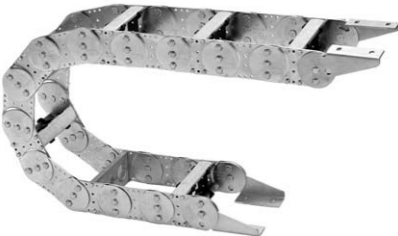


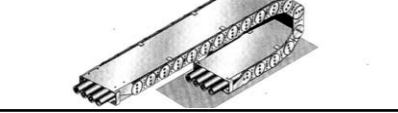

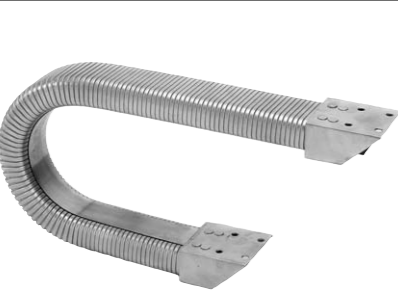
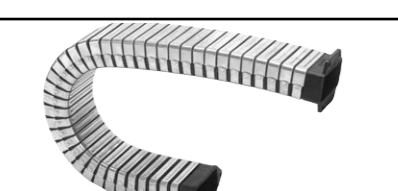
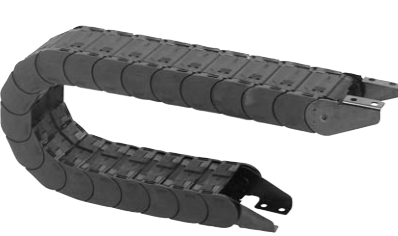
CABLE CHAIN & BELLOWS



NOVIN^{Ball Bearing} CABLE CARRIER CHAIN

Chain Name	Product	Type	Pitch (mm)	Bending Radius KR	Clearance		Divider possible with frame			Divider possible with frame			Sag type	Temperature (°C)	Weight (kg/m)	Page	
					Length	High											
MINI CABLE CHAIN		SMI 0130.06	13	20, 28, 37	6	10	○						○	-30 ~ +130	0.132		
		SMI 0130.10			10		○					○	0.140				
SMI 0130.15	15	○								○	0.150						
SMI 0130.20	20	○								○	0.160						
		SMI 0180.06	18	28, 37, 50	15	15	○						○		0.238		
		SMI 0180.10			20		○					○	0.250				
SMI 0180.15	30	○								○	0.275						
SMI 0180.20	40	○								○	0.300						
MONO CABLE CHAIN		SMO 0320.20	32	37	13	19	○			○			○		0.320		
		SMO 0320.41		37, 77	24	16	○			○	○	○	0.380				
		SMO 0320.42		37, 47, 77, 100	24	19	○			○	○	○					
		SMO 0450.20	45	52, 94, 125, 150, 200	38	24	○			○	○			○	-30 ~ +130	0.650	
		SMO 0450.21		52, 94, 110, 125, 150	58		○			○	○	○	0.750				
		SMO 0450.40		52, 94, 125, 150, 200			78	○			○	○	○	0.740			
		SMO 0450.41		52, 94, 110, 125, 150, 200	103			○			○	○	○	0.850			
		SMO 0450.60		52, 94, 125, 150, 200			108	○			○	○	○	0.930			
		SMO 0450.61		52, 94, 110, 125, 150, 200	62.5			75, 115, 145, 175, 220, 300	65	34	○			○		○	
		SMO 0450.85	130, 150, 190, 245, 300, 385	108		145, 180, 200, 250, 300, 350	○					○	○	○	1.200		
SMO 0625.22	145, 180, 200, 250, 300, 350	108	34				○					○	○	○	1.550		
SMO 0625.23				○				○			○	○	1.400				
SMO 0625.40							○	○	○	1.710							
SMO 0625.42							○	○	○								
SMO 0625.43							○	○	○								
BAND CABLE CHAIN		SBC 0650	65	90, 125, 200, 300				○	○				○	-30 ~ +130			
		SBC 0900	90	130, 150, 190, 245, 300, 385				○	○				○				
		SBC 0850	85	145, 180, 200, 250, 300, 350				○	○				○				
SSK COVER CHAIN		SSK 0460	46	100, 125, 150, 175, 200	50	40		○				○					
		SSK 0920	92	180, 200, 250, 300, 400, 500, 600	75		100	○						○			
SSB BAND CHAIN		SSK 0460	46	100, 125, 150, 175, 200	125	86		○				○	-30 ~ +130				
		SSK 0920	92	180, 200, 250, 300, 400, 500, 600	150		175	○						○			
					200			○				○					
					250		○				○						
					300			○				○					
					350		○				○						
					400			○				○					
							○				○						
CRANE CABLE CHAIN		SCBC 1250	125	200, 250, 300, 400, 500	264			○				○	-30 ~ +130				
CIRCULAR ROBOT CHAIN		SCC 0070	68	100	45	35		○				○	-30 ~ +130				
		SCC 0080	80	100, 150	65	30		○				○					
		SCC 0085	85	175	95	57		○				○					
		SCC 0100	100	125	100	50		○				○					
		SCC 0150	150	220	210	59		○				○					

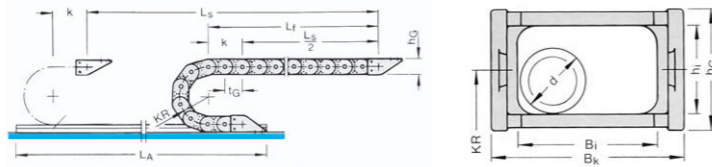
NOVIN^{Ball Bearing} CABLE CARRIER CHAIN

Chain Name	Product	Type	Pitch (mm)	Bending Radius KR	Clearance		Divider possible with frame			Divider possible with frame			Sag type	Temperature (°C)	Weight (kg/m)	Page	
					Length	High											
STEEL CABLE CHAIN		SSC 0650.1	65	75, 95, 115, 135, 155, 200		31								-50 ~ +150			
		SSC 0950	95	95, 140, 170, 200, 260, 290, 320		46											
		SSC 1250	125	145, 220, 260, 300, 340, 380		72											
		SSC 1800	180	265, 320, 375, 435, 490, 605		104											
		SSC 2500	250	365, 445, 600, 760, 920, 1075		220											
		SSC 3200	320	470, 670, 870, 1075, 1275, 1480		300											
OFFSHORE CABLE CHAIN		SPL 5000 SPL 6000 SPL 7000	200 320 450	500, 600, 800, 1000, 1200 700, 900, 1100, 1300, 1500 1100, 1250, 1500, 1800, 2400		150 240 370								-50 ~ +150			
COMPLETELY ENCOLSEEL STEEL CHAIN		SECC 0650.1 SECC 0950 SECC 1250 SECC 1800	65 95 125 180	75, 95, 115, 135, 155, 200 140, 170, 200, 260, 290, 320 145, 220, 260, 300, 340, 380 265, 320, 375, 435, 490, 605		31 38 64 104								-50 ~ +150			
STRIP COVERED CHAIN		SCSC 0650.1 SCSC 0950 SCSC 1250 SCSC 1800	65 95 125 180	75, 95, 115, 135, 155, 200 140, 170, 200, 260, 290, 320 145, 220, 260, 300, 340, 380 265, 320, 375, 435, 490, 605		31 38 64 104								-50 ~ +150			
SQUARE STEEL CABLE CHAIN		SFSC 38 SFSC 60 SFSC 60H SFSC 75 SFSC 75W SFSC 100 SFSC 100-2 SFSC 125-2	38 60 60 75 75 100 100 125	50, 75, 90 75, 90, 125 125, 145, 200, 250, 300 200, 250, 300, 400, 500, 600 400, 500, 600, 700		20 27.5 35 70 75 95								-50 ~ +150			
CABLE DUCT		030.1 050.1 050.2 080.1 080.2 080.3 110.1 110.2 110.3 170.1 170.2 170.3		80 75, 100, 150 110, 150, 200 100, 150, 200 150, 200, 250 200 150, 200, 250 200, 250, 350 300 190, 250, 350 250, 300, 400 365	26 45 80 109 170	24 44 40 54 78 53 73 108 72 102 167								-25 ~ +150	1.200 2.000 2.500 3.000 3.200 5.100 4.800 5.300 6.600 7.200 8.200 9.200		
CONDUFLEX		SCF 055 SCF 060 SCF 085 SCF 115 SCF 120 SCF 175	20 34 47	65, 100, 150 100 100, 150, 200, 250 100, 140, 225, 300 155, 200 185, 250, 350	45 36 73 102 100 162	25 40 38 52 70 72								-20 ~ +130	1.250 1.600 1.900 2.600 3.800 5.200		
SKC CHAIN		SKC 340 SKC 470 SKC 640 SKC 850		70, 100, 150 100, 150, 200, 250 135, 200, 250, 300 180, 250, 350	50 80 90 110 220 80 150 200 300	25 36 53 72								-20 ~ +130	1.500 2.100 2.500 3.500 3.800 4.000 5.000 4.600 5.700 6.500 8.000		

Enquiry form for cable carriers

- Please provide us with the concrete data for a system solution suitable for your application. We will be happy to submit a complete quotation to you.
- The fields marked "red" must be completed. (Your personal details will, of course, be treated confidentially and will not be passed on to any third parties.)

Machine data



Application area:

- Environmental conditions:
- Ambient temperature: °C
- Max. travel length: mm
- Max. acceleration: %
- Max. deceleration: %
- Travel speed: %
- Travel time: times
- max. height H: mm
- max. width B: mm

Installation variant:

- SEBV01  horizontal arrangement "self-supporting"
- SEBV03  horizontal arrangement "with permitted sag"
- SEBV05  horizontal arrangement "sliding in a guide channel"
- SEBV07  horizontal arrangement "turned through 90° – straight"
- SEBV09  horizontal arrangement "turned through 90° – circular"
- SEBV10  vertical arrangement "standing"
- SEBV11  vertical arrangement "hanging"

Enquiry form for cable carriers

Cables and hoses

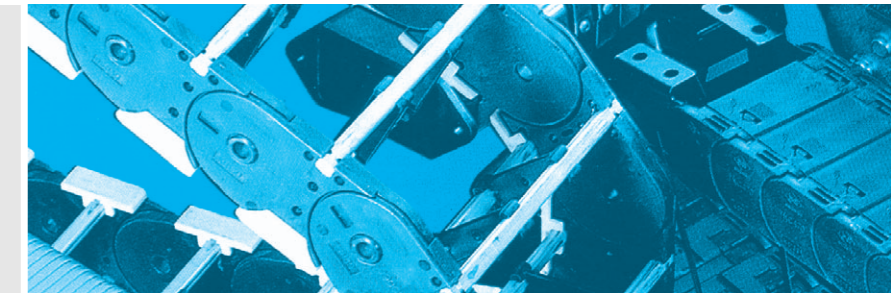
- Cable/hose type:
- Number of cables: Pieces
- Number of cores × cable-cross section: ea
- Cable diameter: mm
- Weight: kg/m
- Minimum bend radius: mm

Design

- Carrier/stay cross-section: enclosed
 openable
- Number of dividers: Pieces/Cross section

Your address data

- Company:
- Sector:
- Name:
- Address:
- Country:
- Phone:
- Fax:
- E-mail:



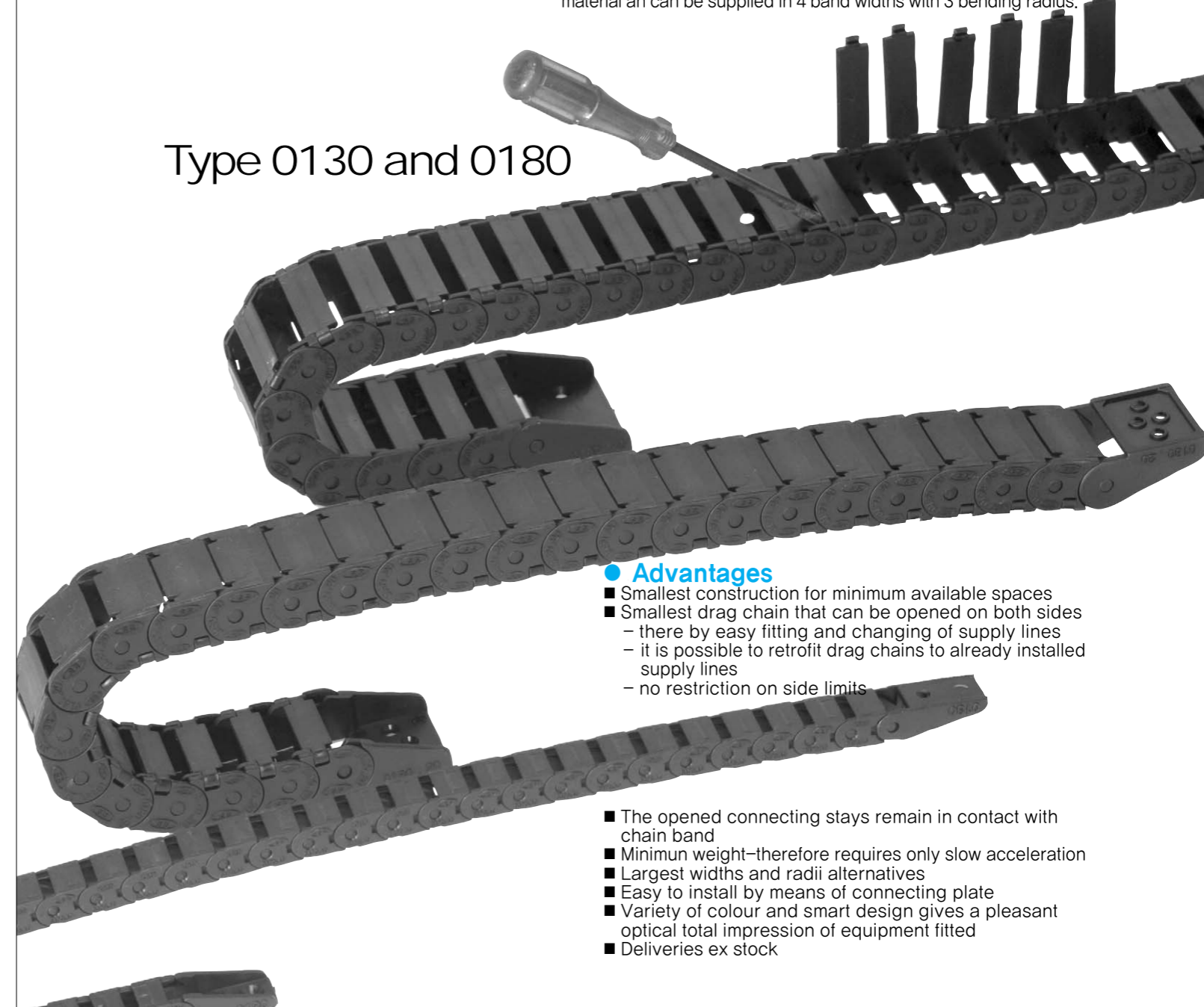
MINI Cable Carrier Chains

NEW!

Mini carrier chains type 0130 and 0180 are fitted to equipment in the following industrial sectors and many others: Measuring and inspection, installation and handling systems, medical equipment, textile-print-and packing, model construction, laboratory and computer techniques. Their use ensures a safe and orderly guidance of supply lines and hereby increasing its life.

These carrier chains are made from a glass fibre reinforced plastic material and can be supplied in 4 band widths with 3 bending radius.

Type 0130 and 0180



Advantages

- Smallest construction for minimum available spaces
- Smallest drag chain that can be opened on both sides
 - there by easy fitting and changing of supply lines
 - it is possible to retrofit drag chains to already installed supply lines
 - no restriction on side limits

- The opened connecting stays remain in contact with chain band
- Minimum weight—therefore requires only slow acceleration
- Largest widths and radii alternatives
- Easy to install by means of connecting plate
- Variety of colour and smart design gives a pleasant optical total impression of equipment fitted
- Deliveries ex stock

MINI Cable Carrier Chains

Mini Cable Carrier Chain-Type SMI 0130/SMI 0180

Dimensions in mm

- **Chain material :** KS/PA glass fibre reinforced
Special materials are available where required.
- **Standard colour :** black
Upon customer request: orange, grey, yellow, White, red, green, blue, yellow-black
- **Maximum temperatures :** -20°C + 135°C
Where continuous temperatures fall either below minimum or exceed maximum, please refer to us.

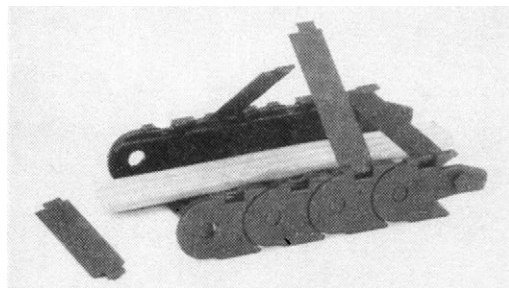
Determination of chain length :

$$L_k = \frac{L_s}{2} + \text{Arc length } L_B$$

Rounded off to chain division t_G

Self-supporting length :

$$L_f = \frac{L_s}{2} + k \quad (k = 2t_G)$$



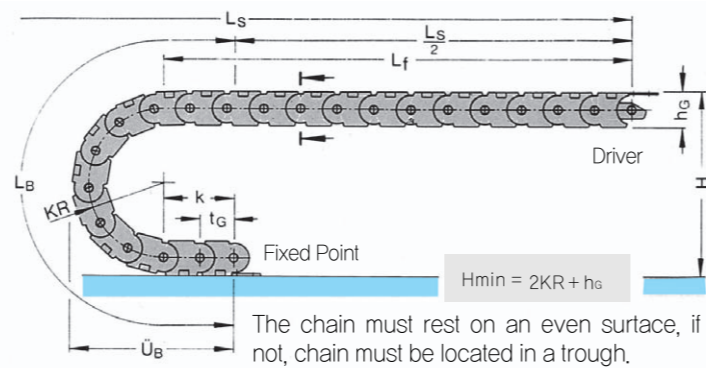
Chain type	Duction - ϕ d_{max}	Weight in kg/m
0130.06	5	0,132
0130.10	8	0,140
0130.15	8	0,150
0130.20	8	0,160
0180.15	13	0,238
0180.20	13	0,250
0180.30	13	0,275
0180.40	13	0,300

Chain connections

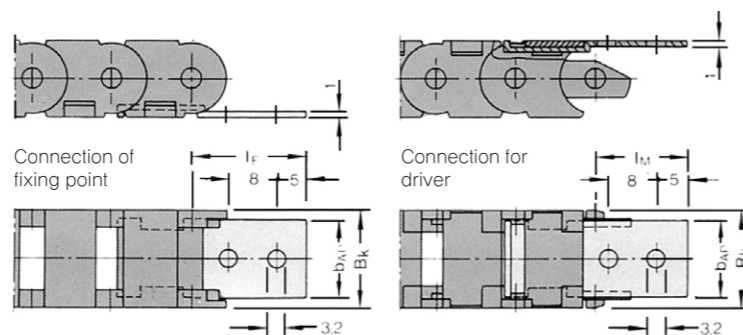
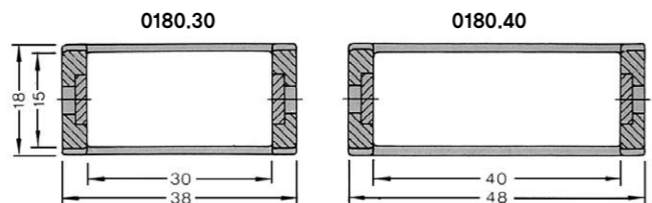
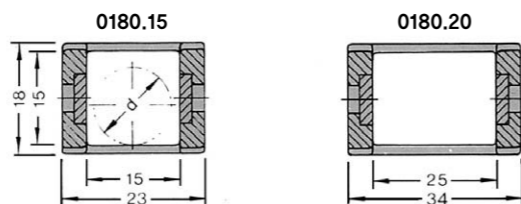
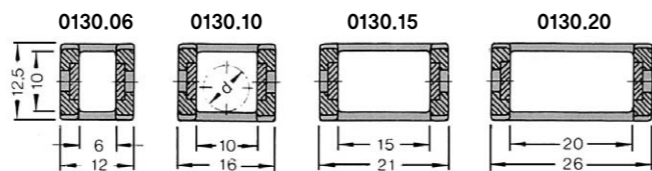
Chain type	l_F	l_M	b_{AP}
0130	18	15	Bk-3,5
0180	16	13	Bk-5,5

The static fixed point of the drag chain must be placed the centre of the travel length. This ensures the shortest possible and most economical chain length between the fixed and moving points.
The chain must rest on an even surface, if not, chain must be located in a trough.

We reserve the right to make technical changes!



Chain type	SMI-0130			SMI-0180		
Chain division t_G	13			18		
Chain link height h_G	12,5			18		
Bening radius KR	20	28	37	28	37	50
Arc length L_s	115	140	168	160	188	229
Arc overhang U_B	52	60	69	73	82	95
Connecting height H_{min}	52,5	68,5	86,5	74	92	118
Self-supporting length L_f (for maximum applied load)	0,5m (0,4kg/m)			0,7m (1kg/m)		

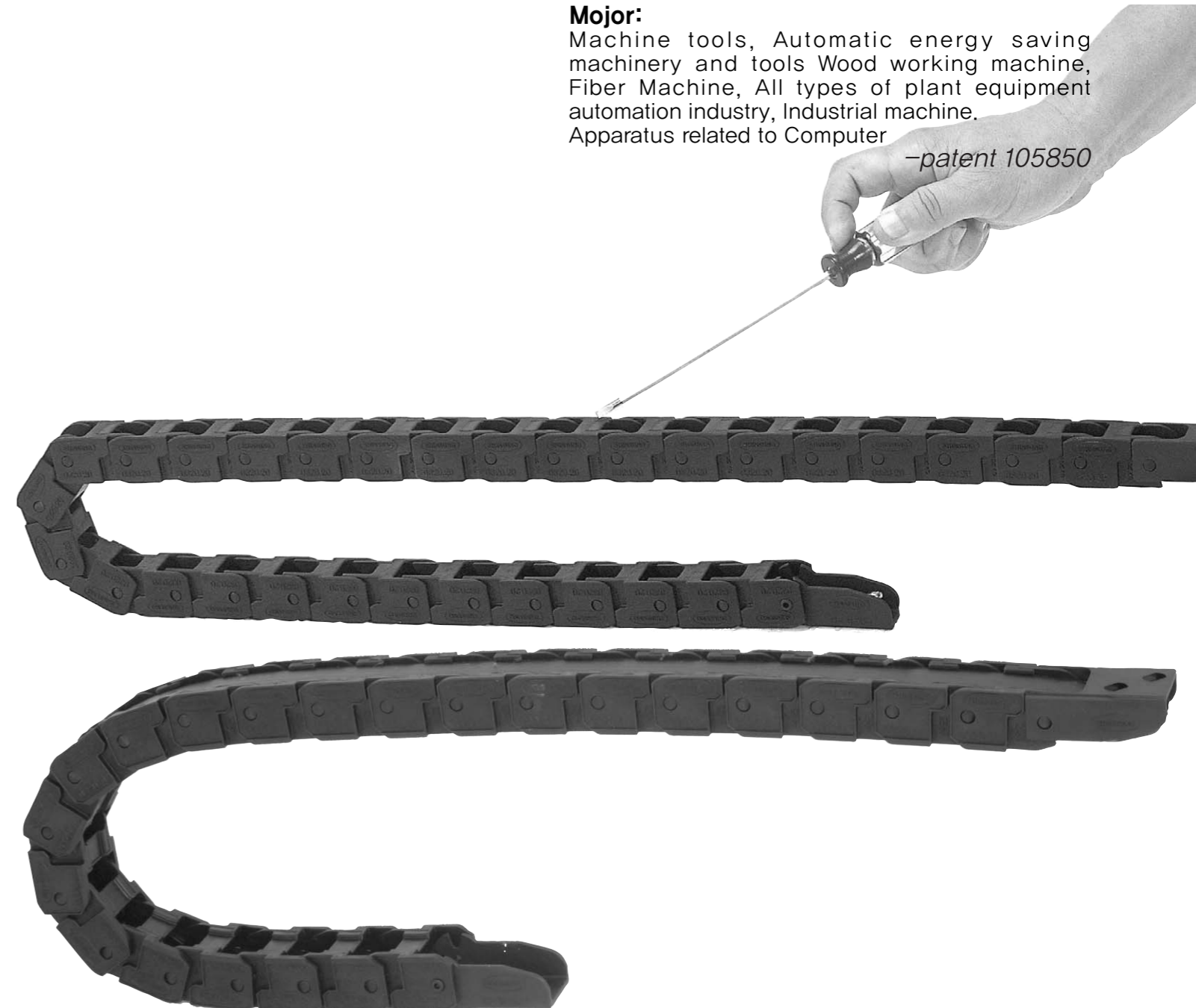


MONO Cable Chains

Mojo:

Machine tools, Automatic energy saving machinery and tools Wood working machine, Fiber Machine, All types of plant equipment automation industry, Industrial machine. Apparatus related to Computer

-patent 105850

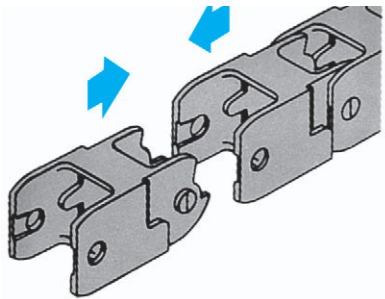


Application

The range of SHINSUNG moulded plastic cable and hose drag chains provides reliable system for the supply of services to moving equipment. They can be used whenever the cables/hoses are light, the travel is small and the operating environment permits the use of plastics.

SHINSUNG plastic drag chains have been in service for many years and they are used to supply robots, machine tools, computerised handling systems and measuring devices.

Structure



The chain is assembled using one-piece moulded units easily snap connected to form a chain of the required length. The design of the link provides the self-supporting feature of the chain. The unique design of the SHINSUNG plastic chain with hinged bars permits the easy installation of cable and hoses. This new design feature allows the chain to be replaced should accidental damage occur without disconnection of the cable and hoses from the supply.

Advantages of the SHINSUNG plastic drag chain:

- Low price
- Light in weight
 - High travel speeds
 - Acceleration and deceleration forces are small
- No maintenance • easily installed

Cables and hoses can be readily installed without disconnection

- Wear on cables and hoses is eliminated
- Corrosion free
- Deliveries ex stock for standard components
- Varying travel lengths easily satisfied
 - * The SHINSUNG moulded plastic drag chains are protected by international patents and trademarks and conform with safety standard requirements.

To specify a SHINSUNG moulded plastic cable drag chain please provide the following information:

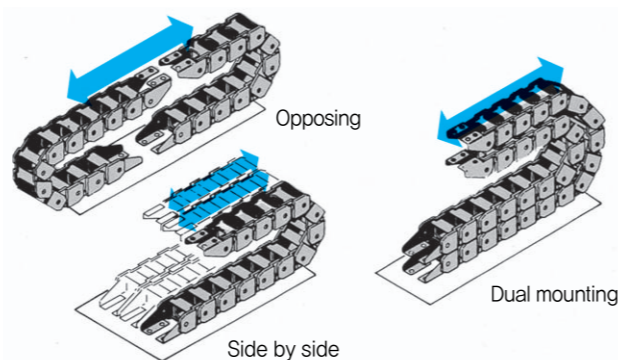
- Length of travel of movable unit
- Number and outside diameter of the cable/hoses to be installed (with/without end fittings)
- Minimum bending radius of cable/hoses (acc. to manufacturer's specification)
- Weight of all cables and hoses(including hose contents)
- Available mounting width
- Type of application(drawing if possible)
- Maximum acceleration/deceleration
- Speed of travel
- Frequency of travel
- Working environment(temperature, radioactive etc.)

Typical Application

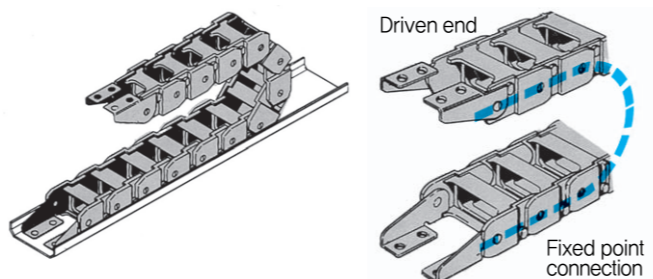


Side mounted(type 210)

Vertically supported Combined horizontal/vertical Vertically suspended



If the carrying capacity of a standard chain is too small, it is easy to use two or more chains as shown.



Support Tray

An even support surface is necessary to ensure correct operation of the SHINSUNG drag chain. If this not available then a support tray in standard lengths of 2000mm can be supplied(special designs on request).

Installing the chain

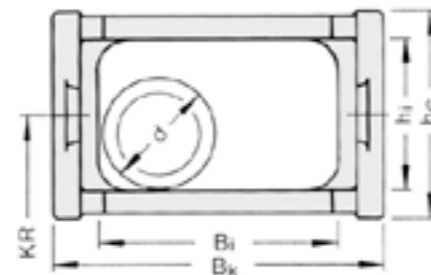
The static fixed point of the drag chain should be placed in the centre of the travel length. This ensures the shortest possible length of chain between the fixed and moving points.

Connecting brackets of galvanised steel are provided as a standard feature and the brackets are normally pressed into place.

For longer lengths of travel and higher loads, the brackets are bolted to the chain.

Technical data

Dimensions in mm.
SHINSUNG reserve the right to modify or improve the chains without prior notice.



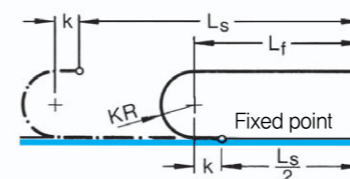
Definitions:

- B_k = chain width
- h_g = link height
- B_i = available width
- h_i = available height
- KR = cable/hose diameter
- d = bending radius

Unsupported length and length of travel

dependent upon additional load

$$\text{Travel } L_s \leq 2(L_f - K)$$



$$L = \frac{L_s}{2} + K \quad k = 2 t_0$$

Length of travel

where self-supporting length is exceeded

Note

When you have selected the chain type which meets your requirements, you will find further information on the following pages:

Chain type	B _k	h _g	B _i	h _i	d _{max}	Bending radius	design of chain section
------------	----------------	----------------	----------------	----------------	------------------	----------------	-------------------------

TYPE : SMO-0320 chain pitch t₀ = 32mm

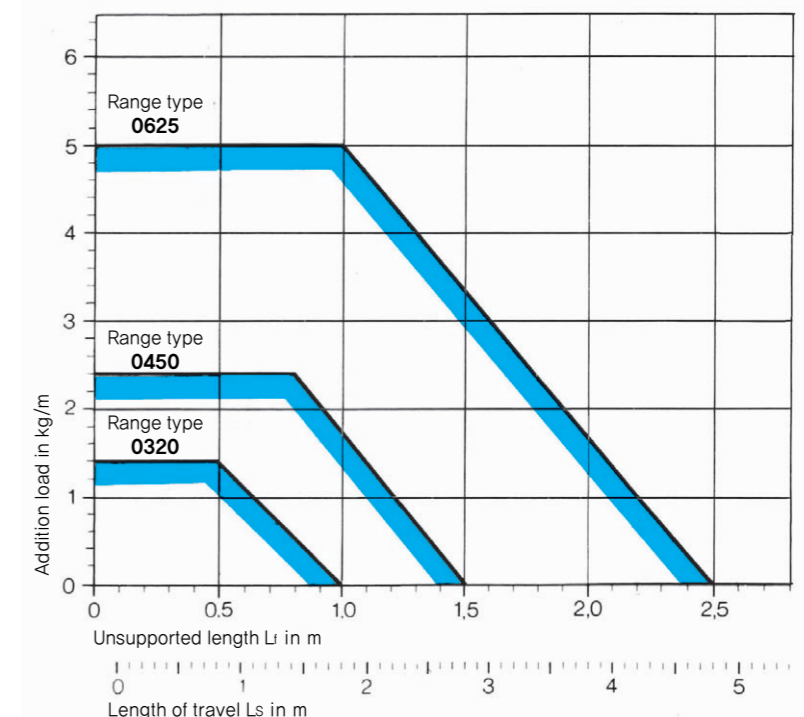
0320.20	24	25	13	19	11	37	closed section
0320.41	35	25	24	18	16	37	with cover strip
0320.42	35	27	24	19	16	37 47 77 100	closed section

TYPE : SMO-0450 chain pitch t₀ = 45mm

0450.20	54	34	38	24	22	52 94 125 150 200	closed section
0450.21	54	40	38	24	22	52 94 110 125 150	with hinged bar
0450.40	74	34	58	24	22	52 94 125 150 200	closed section
0450.41	74	40	58	24	22	52 94 110 125 150 200	with hinged bar
0450.60	94	34	78	24	22	52 94 125 150 200	closed section
0450.61	94	40	78	24	22	52 94 110 125 150 200	with hinged bar
0450.85	119	34	103	24	22	52 94 125 150 200	closed section

TYPE : SMO-0625 chain pitch t₀ = 62,5mm

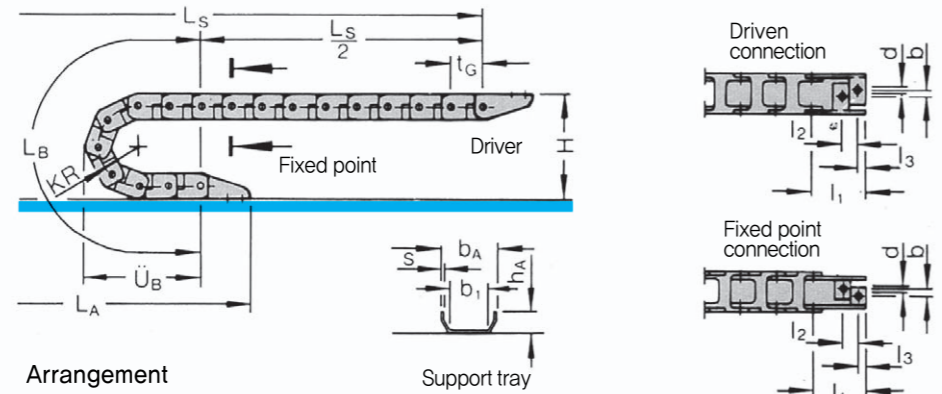
0625.22	93	62	65	34	31	90 125 200 300	closed section
0625.23	93	62	65	34	31	90 125 200 300	with hinged bar
0625.40	126	56	108	34	31	75 90 125 200 300	closed section
0625.42	136	62	108	34	31	90 125 200 300	closed section
0625.43	136	62	108	34	31	90 125 200 300	with hinged bar



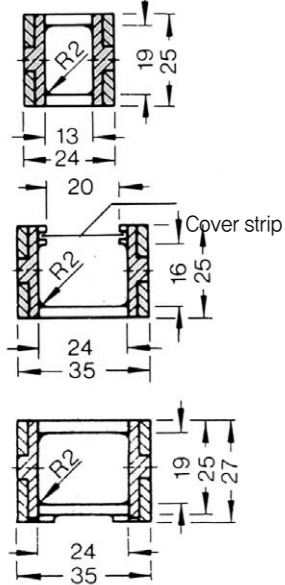
Where the self-supporting length is exceeded, the upper section of the chain sags. This does not affect the operation of the drag chain. Additional support is not necessary.

For longer distances of travel, the moulded plastic drag chain is fitted whereas the upper chain section slides on the lower one. It is essential that it is guided in a trough(Page 17).

TYPE : SMO-0320 • Chain pitch $t_G = 32\text{mm}$



Chain sections



SMO-0320.20

Closed frames
dmax = 11mm

SMO-0320.41

closed frames with cover strip fixed at both ends
dmax = 16mm

SMO-0320.42

Closed frames
dmax = 16mm

To calculate chain length :

$$L_k = \frac{L_s}{2} + L_B$$

rounded to the nearest multiple of 32mm

To calculate support tray length :

$$L_A = \frac{L_s}{2} + U_B + l_1$$

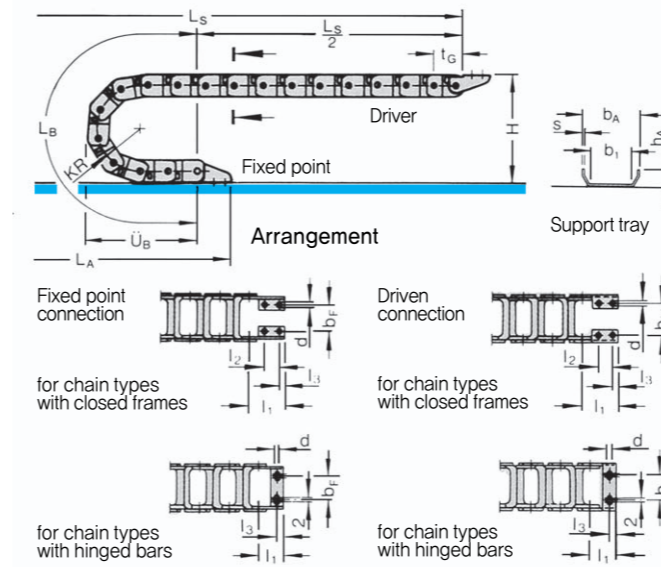
Maximum section length = 2,000mm

Table of dimensions

• Dimensions in mm

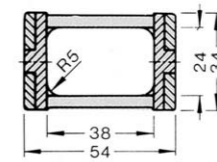
Chain type	0320.20	0320.40	0320.41
Bending radius KR	37	37 77	37 47 77 100
Loop length L_s	245	245	245 370
Loop projection U_B	114	114	114 154
Height H without tray	100	100	100 180
Connecting dimensions	l_1	50	50
	l_2	15	15
	l_3	7,5	7,5
	b	-	11
	d	Ø 7/M6	Ø 7/M6
Dimensions of support tray	b_1	30	40
	b_A	45	55
	h_A	20	20
	S	1,5	1,5
Chain weight in kg/m without connection	0,320	0,380	0,380

TYPE : SMO-0450 • Chain pitch $t_G = 45\text{mm}$ • $d_{max} = 22\text{mm}$

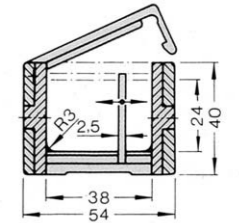


Chain sections

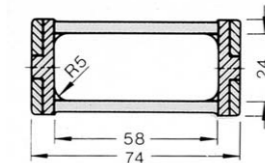
Standard section



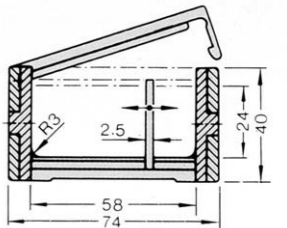
SMO-0450.20 with closed frames



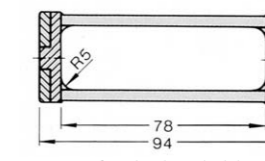
SMO-0450.21 with hinged bars



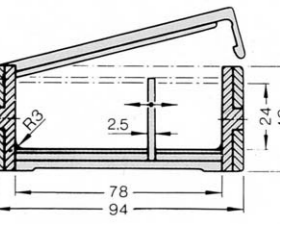
SMO-0450.40 with closed frames



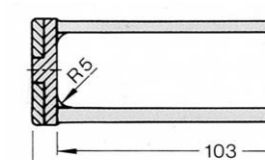
SMO-0450.41 with hinged bows



SMO-0450.60 with closed frames



SMO-0450.61 with hinged bows



SMO-0450.85 with closed frames

To calculate chain length :

$$L_k = \frac{L_s}{2} + L_B$$

rounded to the nearest multiple of 45mm

To calculate support tray length :

$$L_A = \frac{L_s}{2} + U_B + l_1$$

Maximum section length = 2000mm

Order Code for the Cable Drag chains

0450.21 - KR 94 - 3,000L - 55EA:5Sets

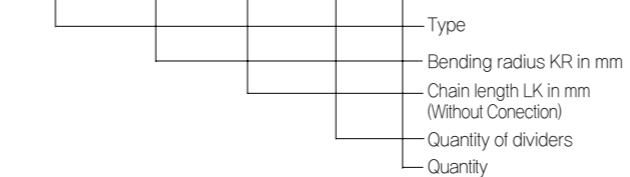


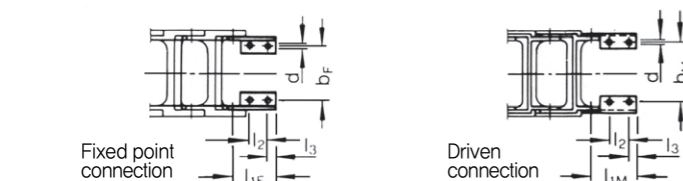
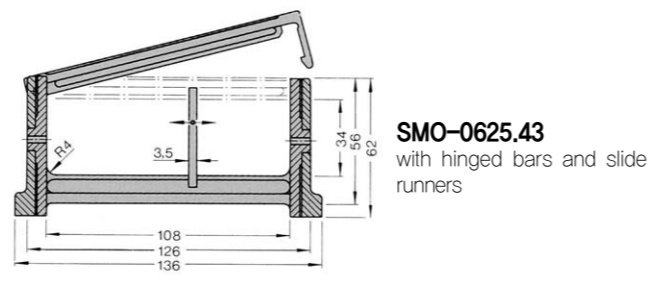
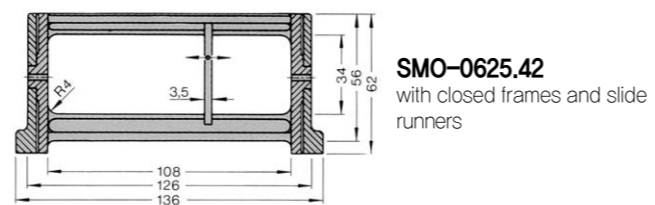
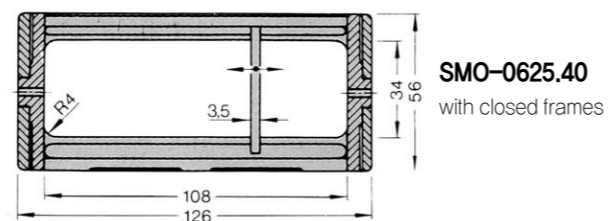
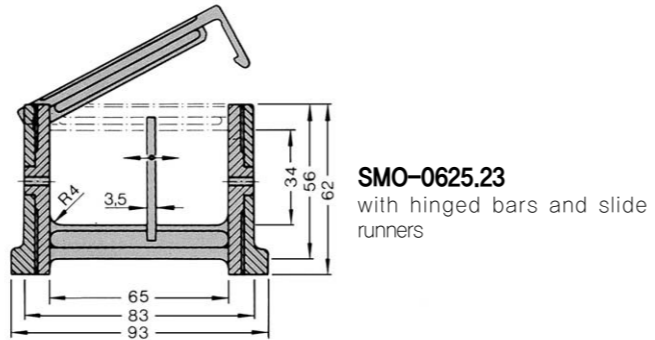
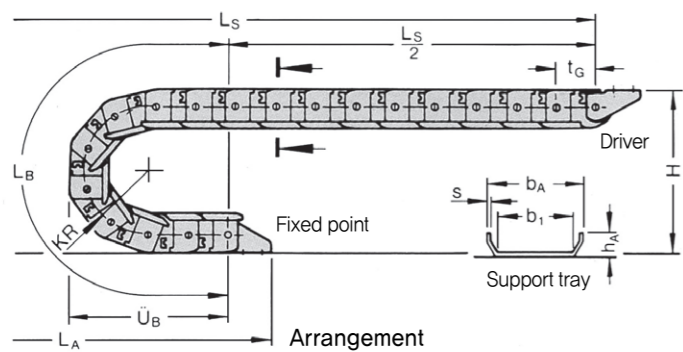
Table of dimensions

All chain type can be supplied with sliding separating plates to divide the cables. Standard is fitting to each second chain link. When ordering, please state the number of separating plates per link required.

• Dimensions in mm

Chain type	0320.42	0450.21	0450.40	0450.41	0450.60	0450.61	0450.85
Bending radius KR	52 94 125 150 200	52 94 110 125 150 200	52 94 125 150 200	52 94 110 125 150 200	52 94 125 150 200	52 94 110 125 150 200	52 94 125 150 200
Loop length L_s	345 475 575 650 810	345 475 525 575 650 810	345 475 575 650 810	345 475 525 575 650 810	345 475 575 650 810	345 475 525 575 650 810	345 475 575 650 810
Loop projection U_B	159 201 232 257 307	162 204 219 235 260 310	159 201 232 257 307	162 204 219 235 260 310	159 201 232 257 307	162 204 219 235 260 310	159 201 232 257 307
Height H without tray H	138 222 284 334 434	144 228 259 290 340 440	138 222 284 334 434	144 228 259 290 340 440	138 222 284 334 434	144 228 259 290 340 440	138 222 284 334 434
Connecting dimensions	l_1	53	40	53	40	53	40
	l_2	24	-	24	-	24	-
	l_3	8	10	8	10	8	10
	b_F	22	22	42	42	62	62
	b_M	25	25	45	45	65	65
Dimensions of support tray	d	Ø 7/M6	Ø 7/M6	Ø 7/M6	Ø 7/M6	Ø 7/M6	Ø 7/M6
	b_1	65	65	85	85	100	100
	b_A	80	80	100	100	115	115
	h_A	20	20	20	20	20	20
S	1,5	1,5	1,5	1,5	1,5	1,5	
Chain weight in kg/m without connection	0,650	0,750	0,740	0,850	0,930	1,100	1,200

TYPE : SMO-0625 • Chain pitch $t_G = 62,5\text{mm}$ • $d_{\text{max}} = 31\text{mm}$



All chain types can be supplied with separating plates to segregate the cables. They are normally fitted to every second link. When ordering, please state the number of separating plates required per link.

- To calculate chain length :
- To calculate support tray length :

$$L_K = \frac{L_S}{2} + L_B$$

rounded to nearest multiple of 62,5mm

$$L_A = \frac{L_S}{2} + U_B + l_1 F$$

Maximum section length = 2000mm

Chain sections

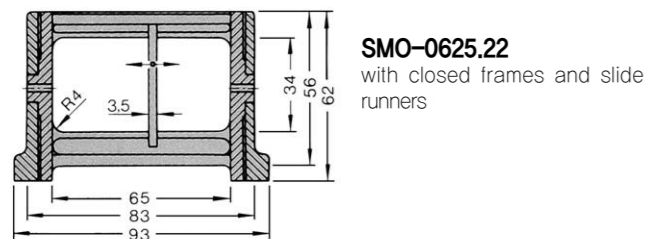
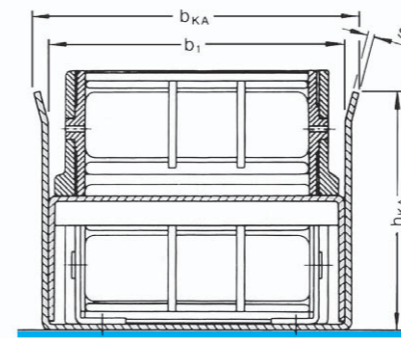


Table of dimensions

• Dimensions in mm

Chain type	0625.22 0625.23				0625.40				0625.42 0625.43				
	90	125	200	300	75	90	125	200	300	90	125	200	300
Bending radius KR	90	125	200	300	75	90	125	200	300	90	125	200	300
Loop length L_s	535	645	880	1195	485	535	645	880	1195	535	645	880	1195
Loop projection U_B	243	278	353	453	228	243	278	353	453	243	278	353	453
Height H without tray H	236	306	456	656	206	236	306	456	656	236	306	456	656
Connecting dimensions	l_{1F}	63				63				63			
	l_{1M}	70				70				70			
	l_2	30				30				30			
	l_3	12,5				12,5				12,5			
	b_F	49				92				92			
	b_M	54				97				54			
Dimensions of support tray	d	$\varnothing 9/M8$				$\varnothing 9/M8$				$\varnothing 9/M8$			
	b_1	100				135				135			
	b_A	115				150				150			
	h_A	20				20				20			
	S	1,5				1,5				1,5			
Chain weight in kg/m without connection	1,550				1,400				1,710				

Guide channels



If the maximum allowable unsupported length of the chain is exceeded (see diagram page 13), the upper section of the chain will rest on the lower one due to the elastic properties of the plastic material. The excellent anti-friction characteristics of the plastic material used ensure that this action does not impair the function of the chain.

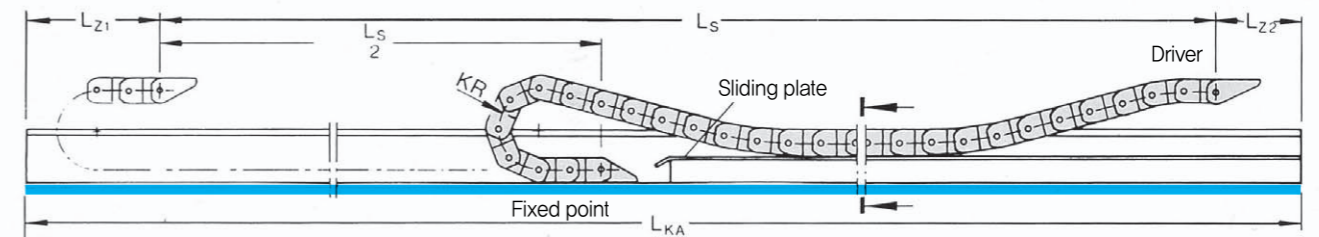
It is essential, however, that a guide channel is fitted.

In a single chain design, the chain slides on a sheet metal plate on the opposite side of the fixed point.

In double chain design, this support is fitted to form a bridge between the fixed point provided with a special sheet metal to reduce the sliding resistance.

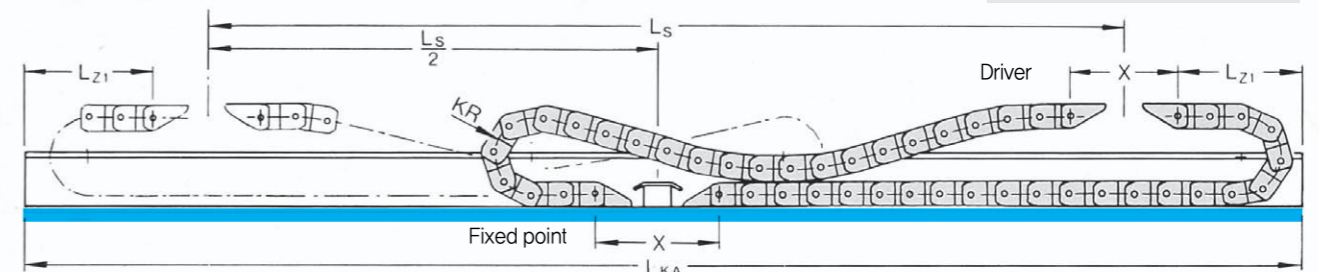
Single chain arrangement

$$\text{Channel length } L_{KA} = L_S + L_{Z1} + L_{Z2}$$

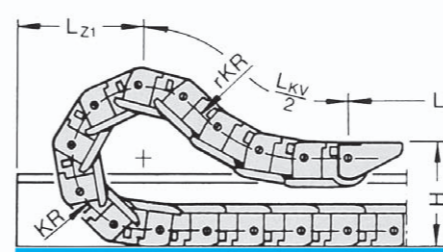


Double chain arrangement

$$\text{Channel length } L_{KA} = L_S + X_{\text{max}} + 2L_{Z1}$$



Design for greater lengths of travel and high speeds



For lengths of travel $\geq 30,000\text{mm}$ and/or travel speeds of $v \geq 60\text{m/min}$, the driven connection should be placed lower (clearance height H_f).

In order to reduce the distance between the loop and the driven connection, the links in this part of the chain can be supplied with a reverse bending radius r_{KR} .

The calculated chain length must then be increased by the value L_{KV} and the channel length by $L_{KV}/2$ (single chain design) or L_{KV} (double chain design).

※ The design of this type of installation should be referred to our engineer.

Cable installation: To facilitate cable installation, apertures can be provided in the channel wall or in the channel floor in the area of the fixed point to your requirements.

Table of dimensions - Guide channels

Chain type	0320.20	0320.40	0450.20 0450.21				0450.40 0450.41				0450.60 0450.61				0625.22 0625.23				0625.42 0625.43							
	0	0320.41	52	94	125	150	200	52	94	125	150	52	94	125	150	200	90	125	200	300	90	125	200	300		
Bending radius KR	37	37	77	52	94	125	150	200	52	94	125	150	52	94	125	150	200	90	125	200	300	90	125	200	300	
Channel dimension	b_1	30	40	60				80				100				97				140						
	b_{KA}	40	50	75				95				115				117				160						
	h_{KA}	50	50	90	70	70	125	125	125	70	70	125	125	70	70	125	125	125	117	117	200	300	117	117	200	300
	s_1	2	2	2				2				2				2				2						
Clearance Connected	L_{Z1}	150	150	200	200	250	270	300	350	200	250	270	300	200	250	270	300	350	270	350	450	550	270	350	450	550
	L_{Z2}	100	100	100				100				100				200				200						
Length	X_{min}	150	150	250				300				350				500				500						

※ All other dimensions are to be taken from the table of dimensions of the selected chain type.

MONO Cable Chains

Material – specification

- Standard colour : black¹⁾
- Standard material : KS/PA²⁾ – glass fibre strengthened

1) Upon request moulded plastic cable drag chains can be supplied in the colours white, red, yellow, beige and on enquiry in further colours. In order to achieve maximum colour effect, several colours can be combined. In both cases, extra price for small quantities.

2) Moulded plastic cable drag chains for application in the range of radio-active radiation or for permanent temperatures below -20 require a material adaptation and can also be delivered by SHINSUNG. Please give us detailed information on your environment conditions.

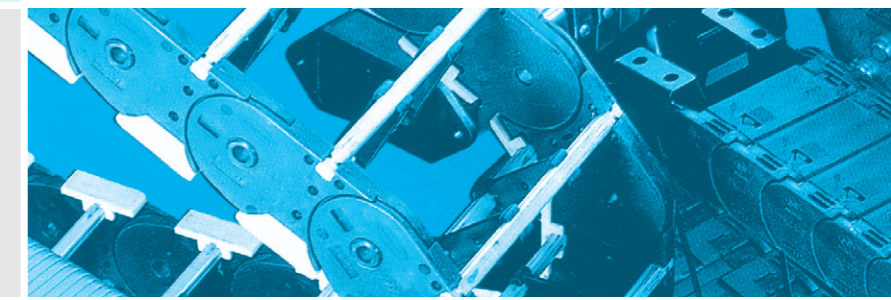
Mechanical properties	Environment	Check value	unit
Tensile strength	dry	190	N/mm ²
	air moist	120	
Tensile dilatation	dry	4	%
	air moist	6	
Elasticity- traction test modulus	dry	10000	N/mm ²
	air moist	7000	
Resilience	dry	55	KJ/m ²
	23°C humid	80	
	-40°C dry	45	
Thermal properties			
Temperature limit of application	Permissible temp. range	-25 ²⁾ to 125	°C
	5000hours	to 135	
	some hours	to 200	
Other properties			
Density	dry	1,4	g/cm ³
Index sliding friction	ungreased	0,4	
Reaction upon burning as per VDE 0304 part 3	dry	11c	

■ Chemical constancy of the standard material at 20°C

Please contact us for all materials not shown in this table.

Against	Constant	Conditional constant
Mineral grease oil and lubricants	x	
Benzine, petroleum, ammonina	x	
Water, sea-water	x	
Acids (inconstant against acids with ph<3)		x
Lyes	x	
Fertilizers	x	

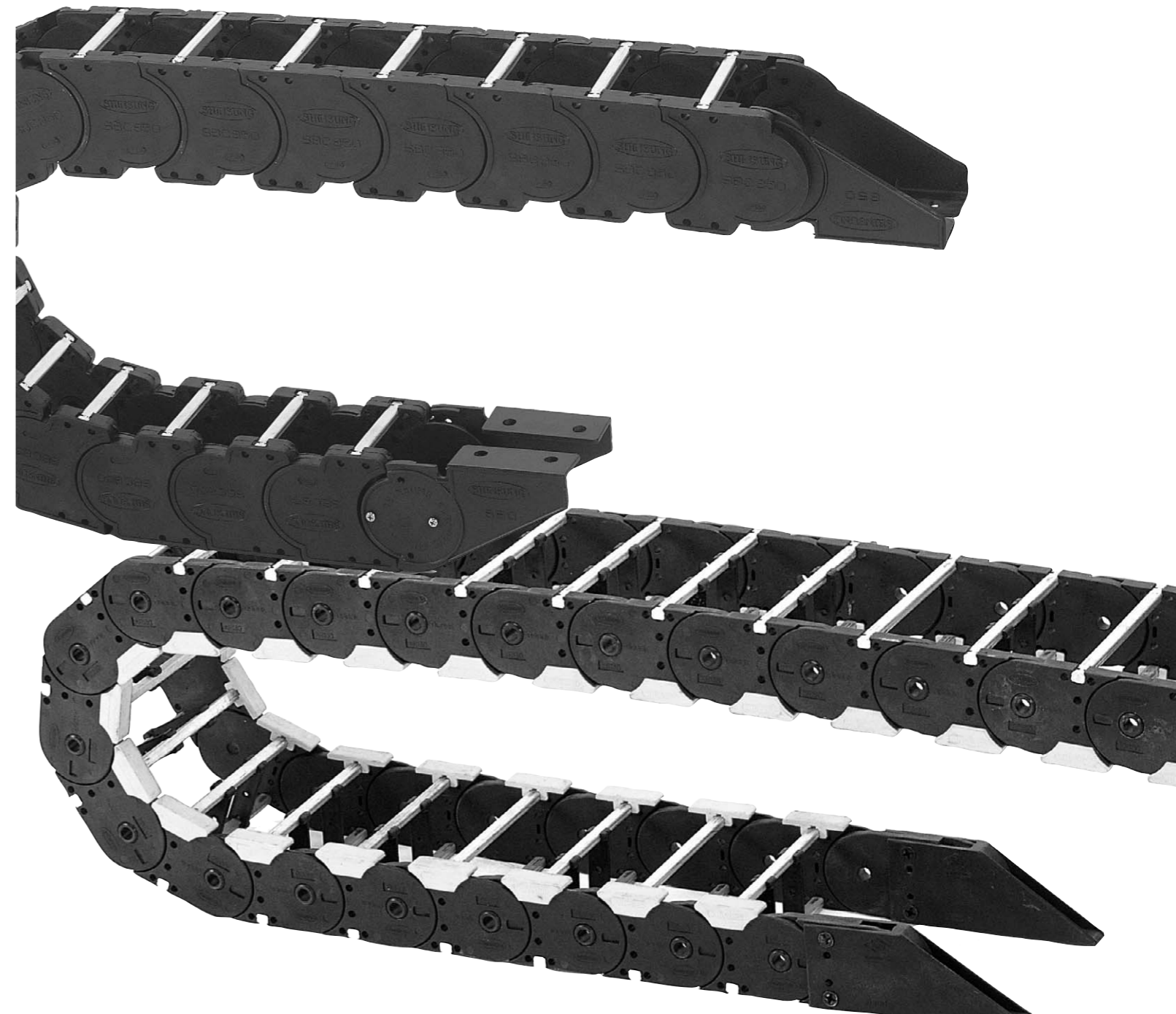
SHINFLEX®



BAND Cable Chains

Major use

Applied to Machine tools automatic energy saving machine, Wood Working machine, Food machine, Fiber machine. Automation industry Industrial machine, Industrial plant etc.



Application

SHINSUNG drag chains with plastic chain bands can be used whenever the cables/hoses are light, the travel is small and the operating environment permits the use of plastics. SHINSUNG drag chains are not only used for guiding cables, but also hoses which may be carrying different conveyants and may be laid side by side. SHINSUNG plastic drag chains have been in service for many years and are used to supply robots, machine tools, computerised handling systems and measuring devices.

Structure

The drag chains consist of two or more plastic chain bands which run parallel and are connected at intervals by stays. The stays, which are available in several types, support the cables/hoses in holes or openings. The chain bands are constructed in such a way that when they are travelling in the normal

direction of operation they do not exceed a certain minimum bending it is very simple to connect the drag chain to moving equipment.

Advantages of the SHINSUNG drag chains with plastic chain bands.

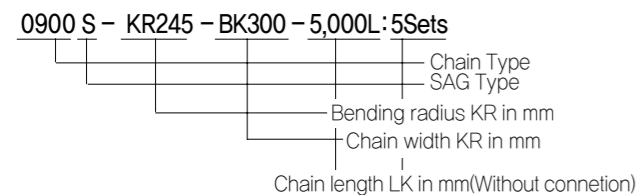
- Wear on cables/hoses is eliminated
- Light in weight – Because the SHINSUNG drag chain with plastic chain bands are so light in weight, they are ideal for high travel speeds even where the length of travel is great.
- Easily installed – cables/hoses can be readily installed without disconnection.
- Corrosion free
- No maintenance
- Deliveries ex stock for standard components.
- Pleasing appearance
- Competitively priced

SHINSUNG moulded plastic drag chains are protected by international patents and trademarks and conform with safety standard requirements.

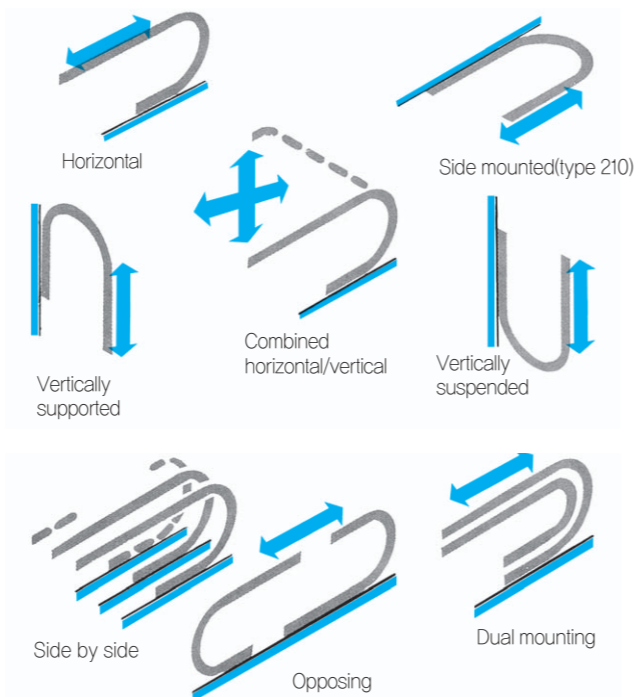
To specify a SHINSUNG moulded plastic cable drag chain please provide the following information:

- ▷ Number and outside diameter of the cable/hoses to be installed(with/without end fittings)
- ▷ Weight of all cables and hoses (including hose contents)
- ▷ Mini. bending radius of cable/hoses (acc.to manufacturer's specification)
- ▷ Length of travel of movable unit.
- ▷ Maximum acceleration/deceleration
- ▷ Speed of travel
- ▷ Frequency of travel
- ▷ Available mounting width
- ▷ Type of application drawing if possible
- ▷ Working environment temperature, humidity, radiation, etc.

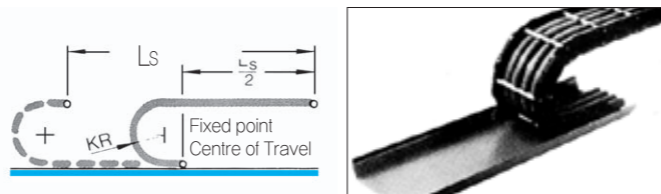
Order Code for the Cable Drag chains



Typical Applications



If the cross section of a stay in the drag chain is too small because of the maximum stay width permissible, the cables/hoses must be split into several stays. Depending on the space available, it is easy to use two or more chains, running inside each other or in opposite directions.



Installing the Chain

The static fixed point of the drag chain should be in the centre of the travel length. This ensures the shortest possible length of chain and cable between the fixed and moving points. Plastic connecting brackets are fixed to the ends of the chain with countersunk head screws.

Support Tray

An even support surface is necessary to ensure correct operation of the SHINSUNG drag chain. If this is not available, then a support tray can be supplied. The trays, which are made from zinc coated steel, are supplied in standard lengths of 3000mm. Special designs on request.

Steel Band Cover

In order to protect the cables/hoses, the drag chains can be covered inside and out by a flat cover strip in high quality spring steel. The steel band is guided through insertable holders inside the drag chain. The steel bands are fixed to the connecting brackets by holders at the fixed point and driven end.

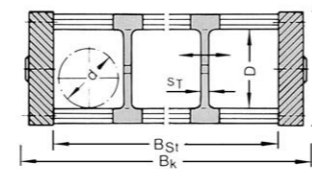
Technical data Measurements in mm

- Key:
- B_k = width drag chain
 - B_{st} = stay width
 - c = distance between openings in hole stays
 - d = cable/hose diameter
 - D = bore diameter in hole stays or compartment height in frame stays.
 - hg = height of chain link
 - KR = bending radius
 - L_l = self-supporting chain length
 - L_k = length of drag chain
 - L_s = travel distance of unit
 - L_s = length of support tray
 - t_g = chain pitch
 - ST = thickness of divider
- Subject to technical modifications!

Chain type	t_g	hg	Bending radii	Stay types available	d_{max}
SBC-0650	65	55	75	Frame stays-with detachable bars	34
			115	Frame stays-with fixed bars	27
			145	Hole stay-split design	36
			175		
			220		
SBC-0900	90	76	130	Frame stays-with detachable bars	52
			150	Frame stays-with fixed bars	42
			190	Solid frame stay-with sliding insert	42
			245		
			300		
			385	Hole stay-split design	48

Stay Designs

RS1 Frame stay -with detachable bars

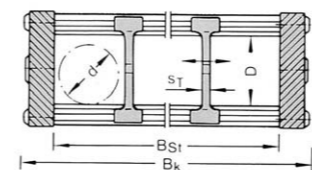


Stays with detachable bars allow easy insertion, addition and replacements of cables and hoses which, from experience, is often preferable.

This type of stay is used mainly where the distance of travel is short and speed of travel slow.

There are no screw connections. Detach the bars by turning 90°. Low priced and available ex stock in standard widths.

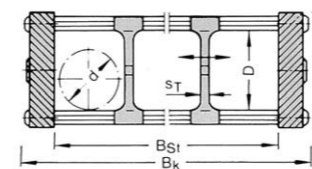
RS2 Frame stay -with fixed bars



For medium lengths of travel and travel speeds.

Adjustable dividers in all types of frame stay enable the cables/hoses to be divided which prevents friction between them. Available ex stock in standard widths.

RM Solid frame stay-with sliding cleat

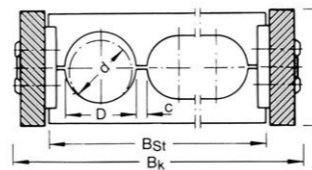


(only for chain type 0900K)

The solid frame stay is used where the maximum stay width of the above-mentioned frame stays is exceeded. The soft metal profile with the plastic profile cleat inserted to protect the cables/hoses guarantees a

high stability level of the drag chain. Available ex stock in standard widths.

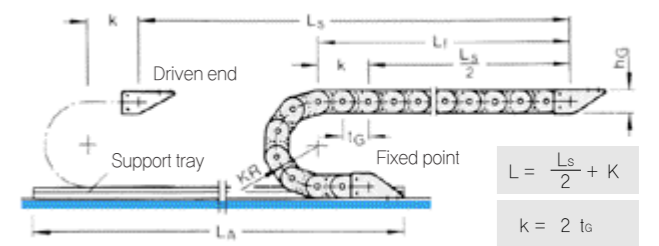
LG Hole stay-split design



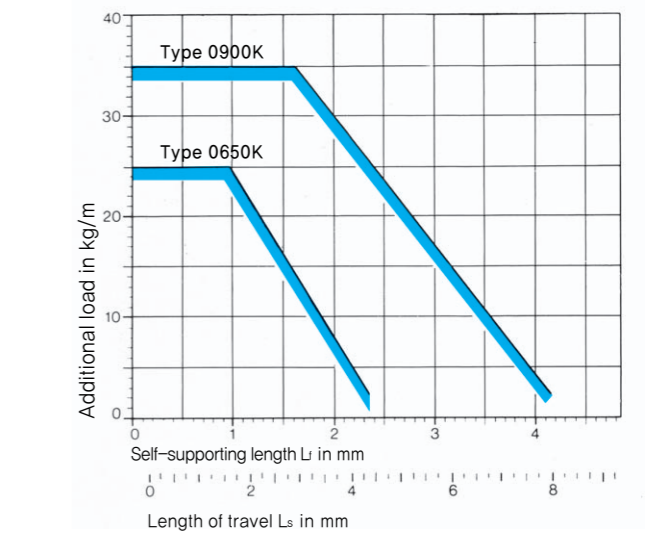
Hole stays ensure optimal laying of cables on the neutral axis of the drag chain. The split design makes the insertion of cables simple even where hoses with fixed fittings/steel reinforcements are used.

Separate hole stay is designed for each requirement.

Arrangement of the drag chain (where $L_s \leq 2(L-K)$)



Self-supporting lengths and distances of travel for double chain arrangements (dependent upon the additional load)



Length of travel (where self-supporting length is exceeded)

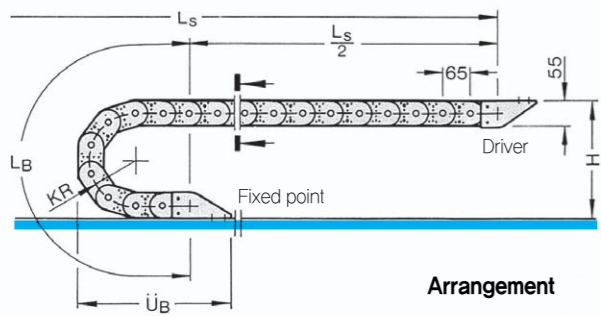
Where the self-supporting length is exceeded, the upper section of the chain sags. This does not affect the operation of the drag chain. Additional support is not necessary. For longer distances of travel, the drag chain where as the upper chain section slides on the lower one. It is essential that it is guided in a trough.

Choosing the drag chain

When deciding upon the drag chain the following aspects should be considered:

- Number and diameter of cables/hoses to be used.
- Choosing the stay type – bear in mind that the hole diameter or the clear height of the opening is $D = 1.1d$ (diameter of cable).
- Determine the smallest permissible bending radius of cables/hoses according to manufacturer's specification and then choose the bending radius.
- Length of chain depending on distance of travel and bending radius chosen.
- Check whether a support tray is required for drag chain.

TYPE: SBC 0650 • Chain pitch $t_c = 65\text{mm}$



Bending radius:
 • KR 75mm • KR 115mm • KR 145mm • KR 175mm
 • KR 220mm • KR 300mm

Variable construction dimensions

• dependent on bending radius. (Dimensions in mm)

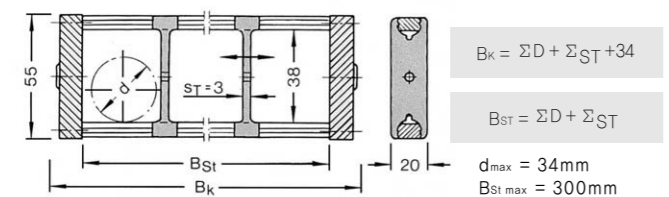
Bending radius KR	75	115	145	175	220	300
Length of curve L_b	495	620	715	810	950	1200
Proj. length of curve \dot{U}_b	328	368	398	428	473	553
Mounting height H	205	285	345	405	495	655

• Calculation of chain length:

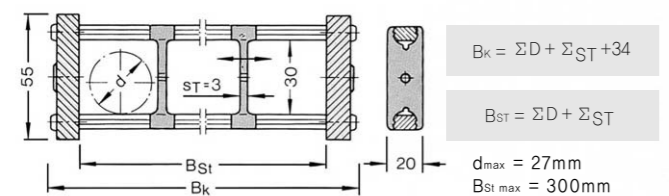
$$L_k = \frac{L_s}{2} + L_b \quad \text{based on chain pitch } 65\text{mm}$$

Stay designs (D = 1.1 cable diameter d)

RS2 Frame stay – with detachable bars



RM Frame stay – with fixed bars

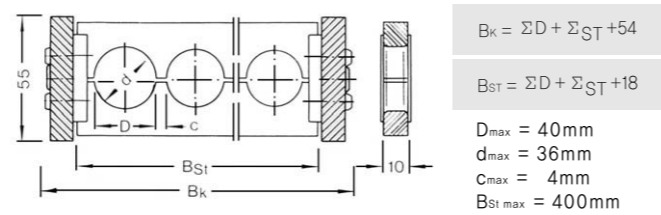


Standard widths for frame stays

Chain width B_k	110	135	160	185	210	235	260	285	310
No. divider/stay	1	1	2	3	3	4	4	5	5
Stay width B_{St}	76	101	126	151	176	201	226	251	276

Individual stay widths and additional dividers/stays on request at additional cost.

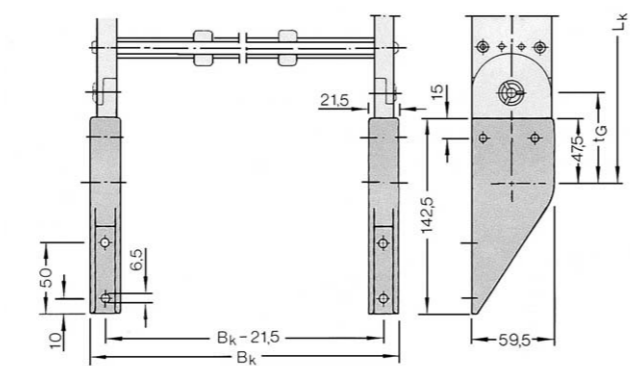
LG Hole Stay – split design



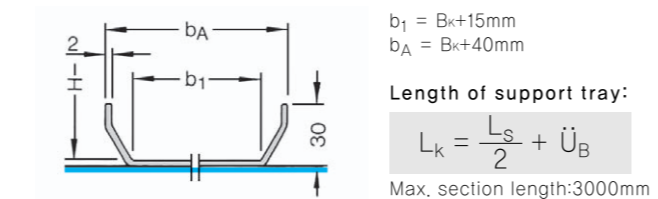
– Hole diagram produced as per customer details
 – Hole stays – available unsplit on request!

※ Where the maximum stay width is exceeded, a multiple chain arrangement must be used or the drag chain must be split into several chains running opposite or inside each other. In border line cases please consult us.

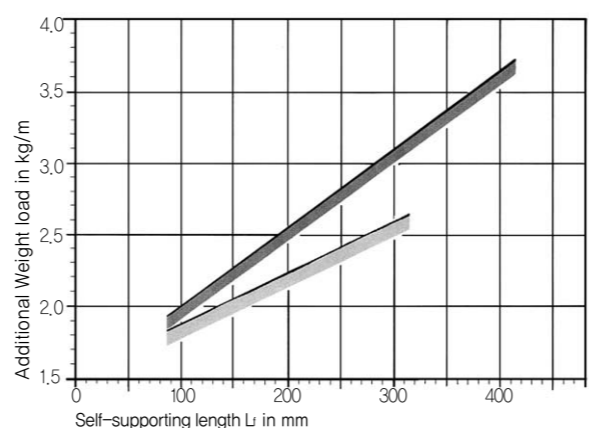
Chain connection



Support Tray

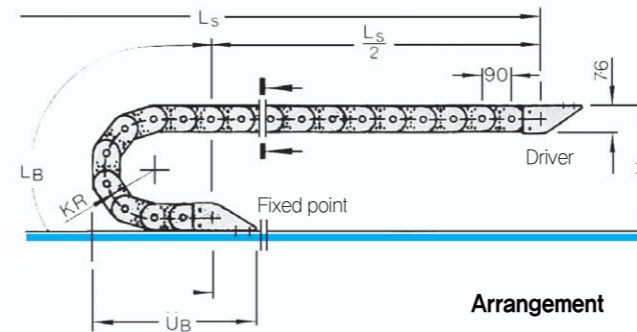


Chain weight for dual arrangement • dependent on chain width



● Frame stays ● Hole stays with 50% holes

TYPE: SBC 0900 • Chain pitch $t_c = 90\text{mm}$



Bending radius:
 • KR 130mm • KR 150mm • KR 190mm • KR 245mm
 • KR 300mm • KR 385mm

Variable construction dimensions

• dependent on bending radius

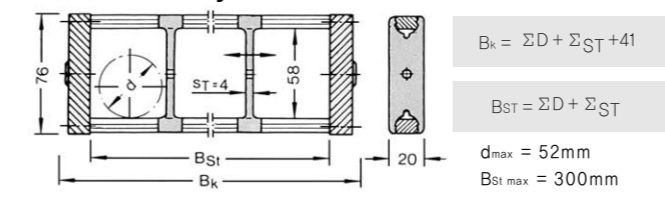
Bending radius KR	130	150	190	245	300	385
Length of curve L_b	770	830	960	1130	1300	1570
Proj. length of curve \dot{U}_b	473	493	533	588	643	728
Mounting height H	336	376	456	566	676	846

• Calculation of chain length

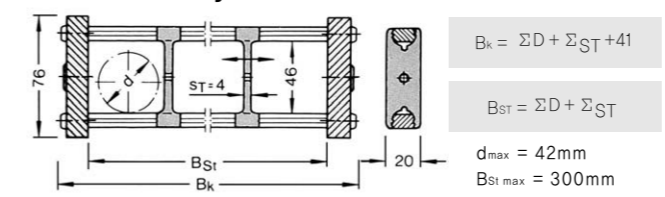
$$L_k = \frac{L_s}{2} + L_b \quad \text{based on chain } 90\text{mm}$$

Stay designs (D = 1.1 cable diameter d)

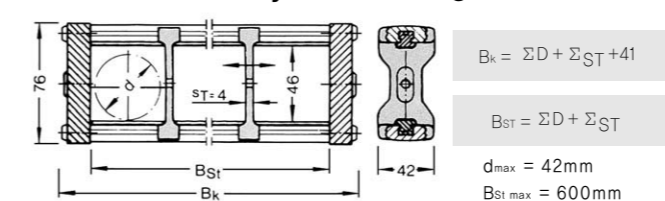
RS2 Frame stay – with detachable bars



RS1 Frame stay – with fixed bars



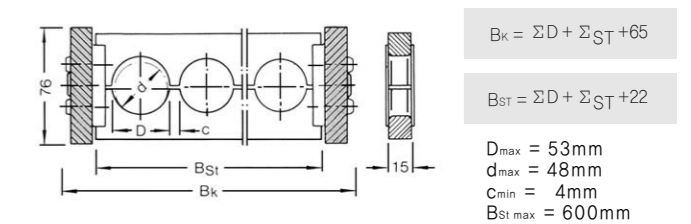
RM Solid frame stay – with sliding cleat



Standard widths for frame stays

Stay design	Frame Stay										Solid Frame Stay																	
	150	175	200	225	250	275	300	325	350	400	450	500	550	600	109	134	159	184	209	234	259	284	309	359	409	459	509	559
No. divider/stay	1	1	2	2	3	3	4	4	6	7	8	9	9	9	1	1	2	2	3	3	4	4	6	7	8	9	9	
Stay width B_{St}	76	101	126	151	176	201	226	251	276	301	326	351	376	401	76	101	126	151	176	201	226	251	276	301	326	351	376	401

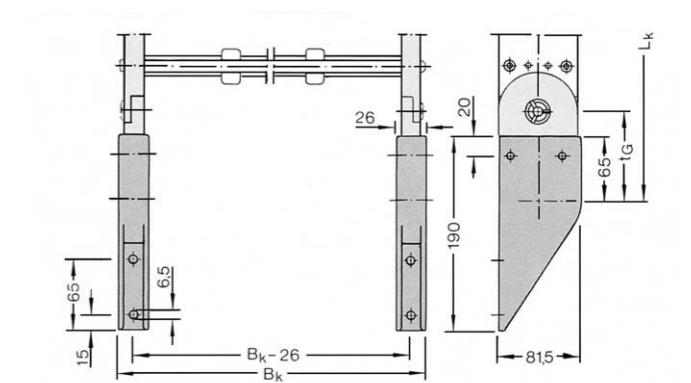
LG Hole Stay – split design



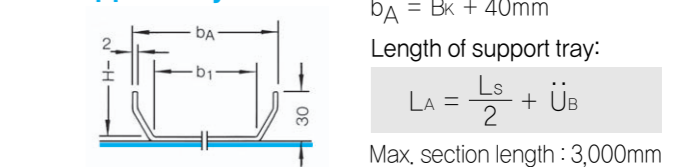
– Hole diagram produced as per customer details
 – Hole stays available unsplit on request!

※ Where the maximum stay width is exceeded, a multiple chain arrangement must be used or the drag chain must be split into several chains running opposite or inside each other. In border line cases please consult us.

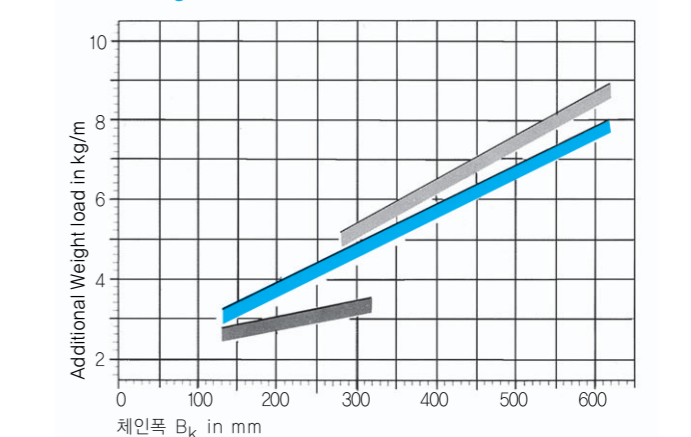
Chain connection dimensions



Support Tray



Chain weight • for dual arrangements • dependent on chain width



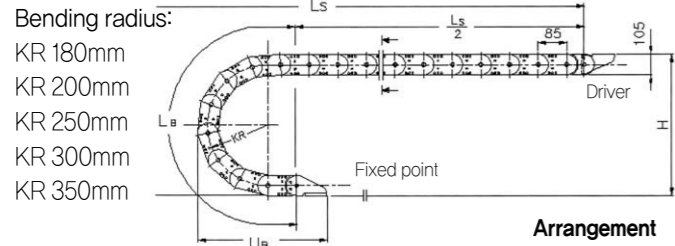
● Frame stays ● Solid stays ● Hole stays with 50% holes

BAND Cable Chains

TYPE: SBC 0850

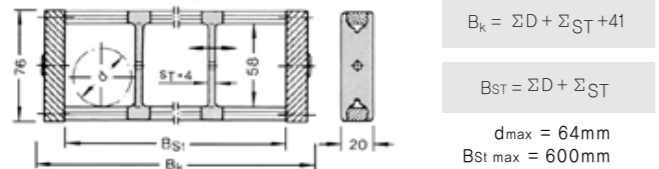
NEW

• Chain pitch $t_c = 85\text{mm}$

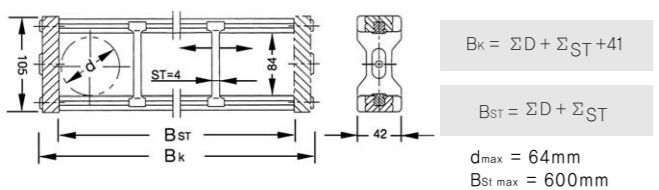


Stay designs (D=1.1 cable diameter d)

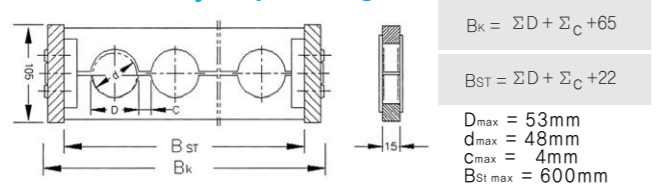
RS1 Frame stay



RS2 Solid frame stay – with sliding cleat

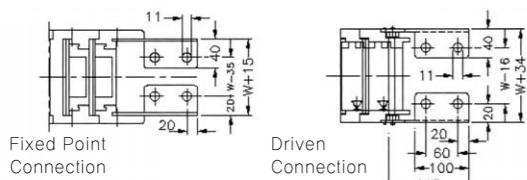


LG Hole Stay – split design



- Hole diagram produced as per customer details
- Hole stays available unsplit on request!

Chain connection dimensions



Standard widths for frame stays

(Dimensions in mm)

Stay design	Solid Frame Stay													
Chain width B_k	150	175	200	225	250	275	300	325	350	400	450	500	550	600
No. divider/stay	1	1	2	2	3	3	4	4	6	7	8	9	9	9
Stay width B_{st}	109	134	159	184	209	234	259	284	309	359	409	459	509	559

Table of Dimensions – Guide channels:

Chain Type	SBC 650K	SBC 0900K
Bending radius KR	75 115 145 175 220 300	130 150 190 245 300 385
b_1	$B_k + 8$	$B_k + 8$
Channel dimensions b_{KA}	$B_k + 30$	$B_k + 30$
h_{KA}	100 150 150 200 250 300	150 150 200 250 300 350
s_1	2.0	2.0
Allowance dimensions L_{Z1}	300 350 380 400 450 550	450 475 500 550 620 700
L_{Z2}	250	300
Connection distance X_{min}	$2 B_k + 200$	$2 B_k + 250$

- All other dimensions are to be taken from the table of dimensions of the selected chain type.

Variable construction dimensions

• dependent on bending radius (Dimensions in mm)

	180	200	250	300	350
Bending radius KR	180	200	250	300	350
Length of curve L_b	905	970	1130	1280	1444
Proj. length of curve U_b	542	562	612	662	712
Mounting height H	465	505	605	705	805

Calculation of chain length

$$L_k = \frac{L_s}{2} + L_b \quad \text{based on chain } 85\text{mm}$$

Details of Chain Band Material

• colour standard : black¹⁾ • Material standard : KS/PA²⁾ glass fibre strengthened

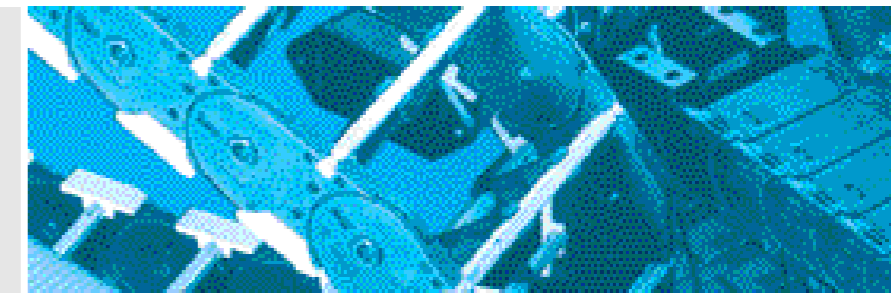
Mechanical properties	Environmental conditions	Check value	Unit
Tensile strength	dry	190	N/mm ²
	air moist	120	
Tensile dilation	dry	4	%
	air moist	6	
Elasticity modulus	dry	10000	N/mm ²
	air moist	7000	
Resilience	23°C	55	KJ/m ²
	23°C	80	
	-40°C	45	
Thermal properties			
Temperature limit of application	Permissible temp. range	-25 ²⁾ to 120	°C
	5,000hours	to 135	
	several hours	to 170	
Other properties			
Density	dry	1.4	g/cm ³
Index sliding friction	ungreased	0.4	
Reaction upon burning as per VDE 0340 part 3	dry	11c	

- 1) Upon request moulded plastic cable drag chains can be supplied in the colours white, red, yellow, beige and on enquiry in further colours. In order to achieve max colour effect, several colours can be combined. In both cases, extra price for small quantities.
- 2) Moulded plastic cable drag chains for application in the range of radio-active radiation or for permanent temperatures below -20°C require a material adaptation and can also be supplied by SHINSUNG. Please give us detailed information on your environmental conditions.

Chemical constancy of the standard material

at 20°C Please contact us for all materials not shown in this table.

Against	Constant	Conditionally constant
Mineral grease oil and lubricants	×	
Benzine, petroleum, ammonina	×	
Water, sea-water	×	
Acids (inconstant against acids with ph(3))		×
Alkali	×	
Fertilizers	×	

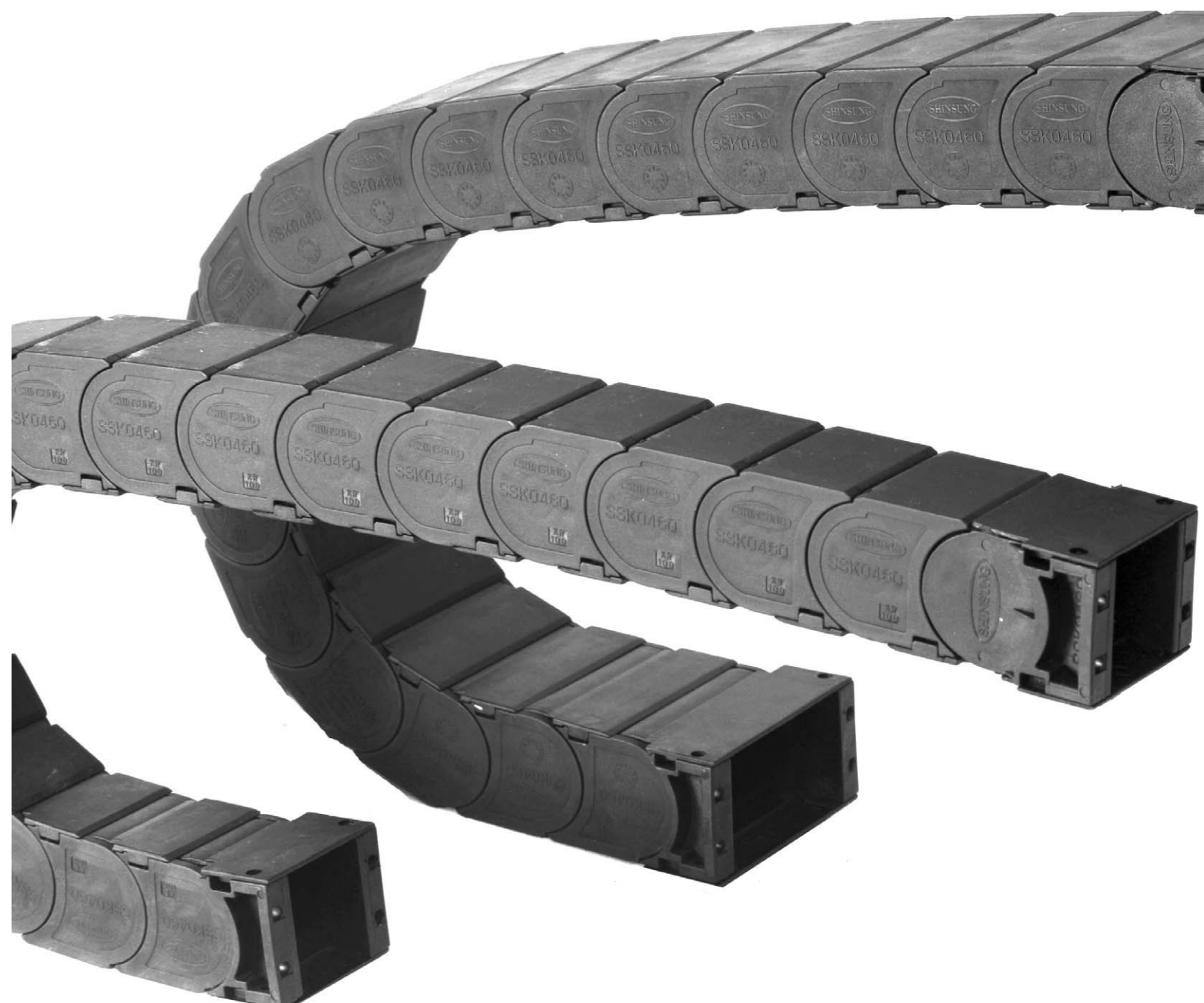


SSK Cover Cable Chain

Major use

Applied to Machine to automatic energy saving machine, Wood Working machine, Food machine, Fiber machine. Automation industry Industrial machine, Industrial plant etc.

NEW!



Special Feature

1. Efficiency of space increased, due to design of most-suited rate to both inner measure and outer measure
2. Simple assembly(Hinged, Snap-open type)
3. Low price
SHINSUNG moulded plastic drag chains are protected by international patents and trademark and conform with safety standard requirements
4. Easily installed
Cable/hoses can be readily installed without disconnection
5. Corrosion free
6. No maintenance
7. Good appearance

Material

- Standard colour : black¹⁾
- Standard material : KS/PA²⁾ – glass fibre strengthened

1) Upon request moulded plastic cable drag chains can be supplied in the colours white, red, yellow, beige and on enquiry in further colours. In order to achieve maximum colour effect, several colours can be combined. In both cases, extra price for small quantities.

2) Moulded plastic cable drag chains for application in the range of radio-active radiation or for permanent temperatures below -20 require a material adaptation and can also be delivered by SHINSUNG. Please give us detailed information on your environment conditions.

Mechanical properties	Environmental conditions	Check value	Unit	
Tensile strength	dry	190	N/mm ²	
	air moist	120		
Tensile dilation	dry	4	%	
	air moist	6		
Elasticity modulus	dry	10000	N/mm ²	
	air moist	7000		
Resilience	23°C	dry	55	KJ/m ²
	23°C	humid	80	
	-40°C	dry	45	
Thermal properties				
Temperature limit of application	Permissible temp. range	-25 ²⁾ to 120	°C	
	5,000hours	to 135		
	several hours	to 170		
Other properties				
Density	dry	1.4	g/cm ³	
Index sliding friction	ungreased	0.4		
Reaction upon burning as per VDE 0340 part 3	dry	11c		

Provide the following information

1. Number and outside diameter of the cable/hoses to be installed(with/without and fittings)
2. Weight of all cables and hoses(including hose contents)
3. Minimum bending radius of cable/hoses(acc. to manufacturer's specification)
4. Movable distance and radius of rotation
5. Max accelention/deceleration
6. Available mounting width, height
7. Working environment temperature, humidity, radiation, etc

Technical data

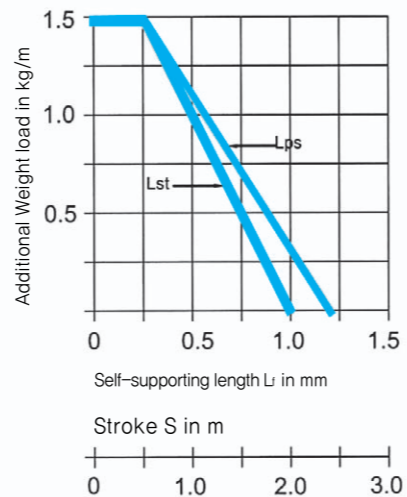
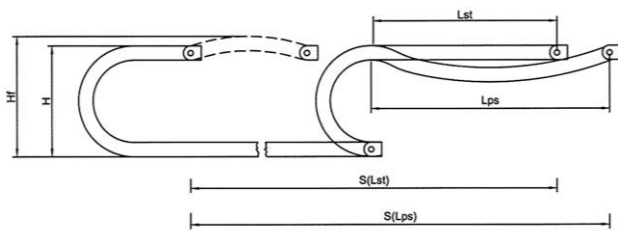
(Dimensions in mm)

Definitions:

- B_K : Chain width
- B_{ST} : Stay Width
- h_G : Heigh of Chain Link
- h_I : Heigh of Stay
- KR : Bending Radius
- D : Straight Diameter
- D_{max} : Max Diameter
- L_s : Travel Lenght

Type	t _G	h _G	KR	h _I	D _{max}	B _K	B _{ST}
SSK 0460	46	50	100	40	37	66	50
			125			91	75
			150			116	100
			175			141	125
			191			166	150
			200			191	175
					216	200	

- L_{ps} = Self supporting chain lenght
- L_{st} = Unit's travel lenght



SSK 0460

TYPE:SSK-0460

• Chain pitch t_G = 46mm

- Bending radius:
- KR 100mm
 - KR 125mm
 - KR 150mm
 - KR 175mm
 - KR 200mm

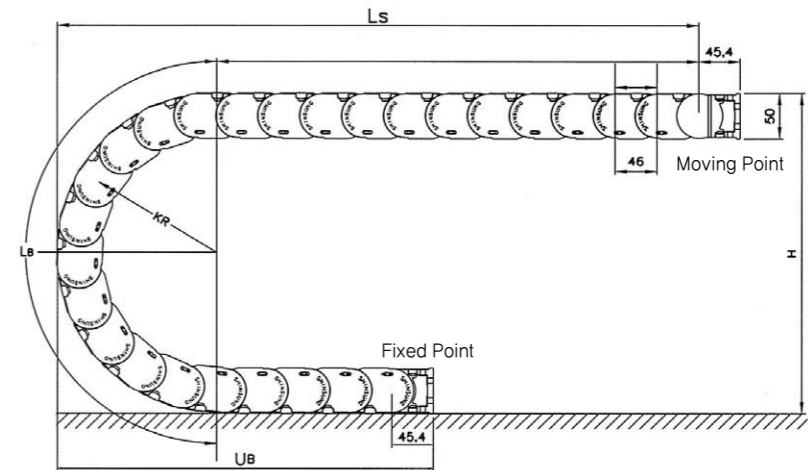


Table of dimensions

(Dimensions in mm)

- L_B : Loop Lenght
- H_A : Chain Height
- U_B : Loop Projection
- H_Z : To Calculate Support Tray lenght

Bending radius KR	100	125	150	175	200
Length of curve L _B	410	485	565	645	725
Proj. length of curve U _B	175	200	225	250	275
Mounting height H	250	300	350	400	450

To Calculate Chain Length

$$L_K = \frac{L_s}{2} + L_B$$

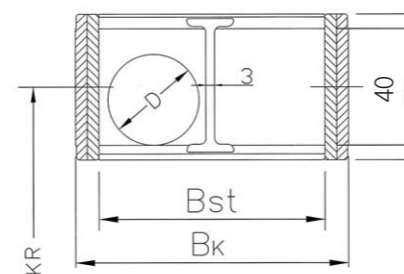
based on chain pitch 46mm

To Calculate Support Tray Length

$$H_z = H + Z$$

Z ≈ 10mm/m Chain length

Stay designs



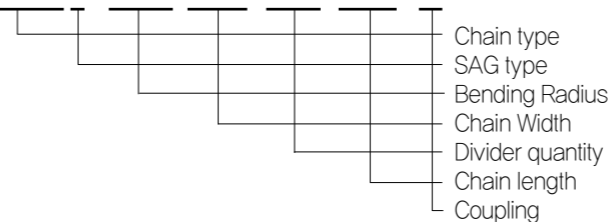
D : 1.1d for cable diameter d
Cable - φ D_{max} = 37mm
h_I : 40mm
h_G : 50mm
S_T : Divider thickness 3mm

$$B_K = \sum D + \sum S_T + 16$$

$$B_{ST} = \sum D + \sum S_T$$

How to order

• SSK 0460 S - KR100 - BK125 - 30EA - L1840 - C



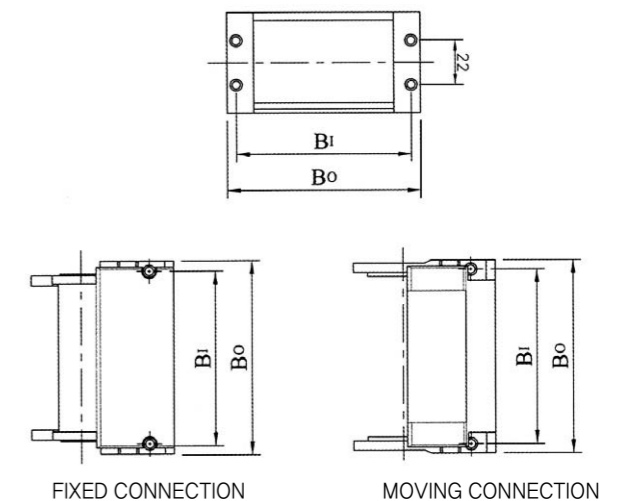
Standard widths for frame stays

(Dimensions in mm)

chain width B _K	66	91	116	141	166	191	216
no. of divider stays/stay	1	1	2	2	2	3	3
Stay width B _{ST}	50	75	100	125	150	175	200

Coupling Dimension

※ Easily installed – cable/hoses can be readily installed without disconnection



B _{st}	50	75	100	125	150	175	200
B _o	71	96	121	146	171	196	221
B _i	60	85	110	135	160	185	210

Special Feature

1. Efficiency of space increased, due to design of most-suited rate to both inner measure and outer measure
2. Simple assembly(Hinged, Snap-open type)
3. Low price
SHINSUNG moulded plastic drag chains are protected by international patents and trademark and conform with safety standard requirements
4. Easily installed
Cable/hoses can be readily installed without disconnection
5. Corrosion free
6. No maintenance
7. Good appearance

Material - specification

- Standard colour : black¹⁾
- Standard material : KS/PA²⁾ - glass fibre strengthened

1) Upon request moulded plastic cable drag chains can be supplied in the colours white, red, yellow, beige and on enquiry in further colours. In order to achieve maximum colour effect, several colours can be combined. In both cases, extra price for small quantities.

2) Moulded plastic cable drag chains for application in the range of radio-active radiation or for permanent temperatures below -20 require a material adaptation and can also be delivered by SHINSUNG. Please give us detailed information on your environment conditions.

Mechanical properties	Environmental conditions	Check value	Unit
Tensile strength	dry	190	N/mm ²
	air moist	120	
Tensile dilation	dry	4	%
	air moist	6	
Elasticity modulus	dry	10000	N/mm ²
	air moist	7000	
Resilience	23°C	55	KJ/m ²
	23°C	80	
	-40°C	45	
Thermal properties			
Temperature limit of application	Permissible temp. range 5,000hours several hours	-25 ^o to 120	°C
		to 135	
Other properties	dry	1.4	g/cm ³
		0.4	
Index sliding friction	dry	11c	
Reaction upon burning as per VDE 0340 part 3	dry		

Provide the following information

1. Number and outside diameter of the cable/hoses to be installed(with/without and fittings)
2. Weight of all cables and hoses(including hose contents)
3. Minimum bending radius of cable/hoses(acc. to manufacturer's specification)
4. Movable distance and radius of rotation
5. Max accelention/deceleration
6. Available mounting width, height
7. Working environment temperature, humidity, radiation, etc

Technical data

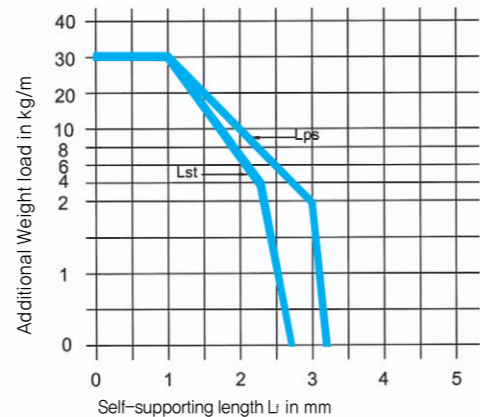
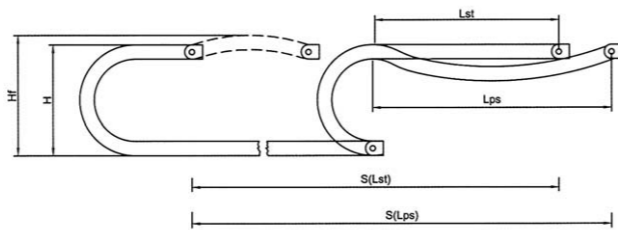
(Dimensions in mm)

Definitions:

- B_k : Chain width
- B_{st} : Stay Width
- h_g : Heigh of Chain Link
- h_i : Heigh of Stay
- KR : Bending Radius
- D : Straight Diameter
- D_{max} : Max Diameter
- L_s : Travel Lenght

Type	t _g	h _g	KR	h _i	D _{max}	B _k	B _{st}
SSK 0920	92	110	80	86	80	125	85
			200			140	100
			250			165	125
			300			190	150
			400			215	175
			500			240	200
			600			300	260
			400	360			
			500	460			
			600	560			

- L_{ps} = Self supporting chain lenght
- L_{st} = Unit's travel lenght



SSK 0920

TYPE:SSK-0920

• Chain pitch t_g : 92mm

Bending radius:

- KR 180mm
- KR 200mm
- KR 250mm
- KR 300mm

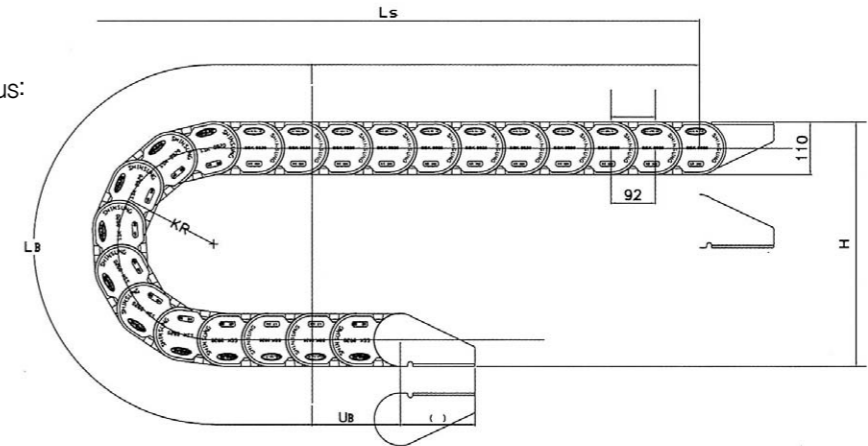


Table of dimensions

(Dimensions in mm)

- L_B : Loop Lenght
- H_A : Chain Height
- U_B : Loop Projection
- H_Z : To Calculate Support Tray lenght

Bending radius KR	180	200	250	300	400	500	600
Length of curve L _B	933	996	1153	1310	1624	1938	2252
Proj. length of curve U _B	419	439	489	539	639	739	839
Mounting height H	470	510	610	710	910	1110	1310

Calculation of chain length • Installation height:

$$L_k = \frac{L_s}{2} + L_B$$

based on chain pitch 92mm

$$H_z = H + Z$$

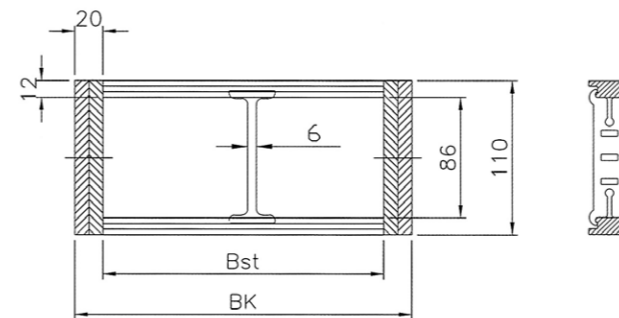
Z ≈ 10mm/m Chain length

Stay designs

Cable - φ D_{max} = 80mm
ST : Divider thickness 8mm
D : 1.1d for cable, hoses

$$B_k = \sum D + \sum ST + 40$$

$$B_{st} = \sum D + \sum ST$$



How to order

• SSK 0920 S - KR180 - Bk125 - 50EA - L1840 - C

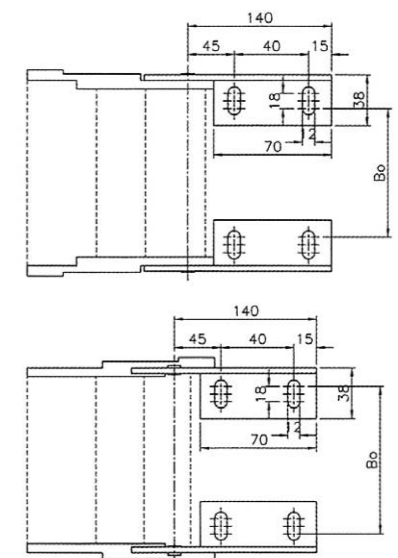
- Chain type
- SAG type
- Bending Radius
- Chain Width
- Divider quantity
- Chain length
- Coupling

Standard widths for frame stays

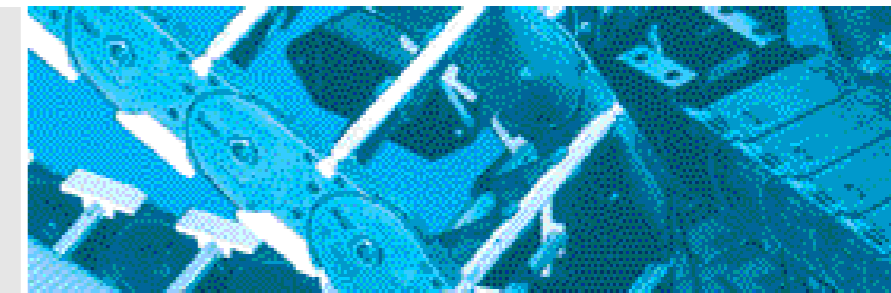
chain width B _k	125	140	150	165	190	215	240	290	340	390	440
no. of divider stays/stay	2	2	2	2	3	3	3	4	4	5	5
Stay width B _{st}	85	100	110	125	150	175	200	250	300	350	400

Coupling Dimension

※ Easily installed - cable/hoses can be readily installed without disconnection



B _k	125	140	165	190	215	240	300	400	500	600
B _{st}	85	100	125	150	175	200	260	360	460	560
B _i	65	80	105	130	155	180	240	340	440	540



SSB Band Cable Chain

NEW!

Major use
Applied to Machine tools automatic energy saving machine, Wood Working machine, Food machine,



Special Feature

1. Efficiency of space increased, due to design of most-suited rate to both inner measure and outer measure
2. Simple assembly(Hinged, Snap-open type)
3. Low price
SHINSUNG moulded plastic drag chains are protected by international patents and trademark and conform with safety standard requirements
4. Easily installed
Cable/hoses can be readily installed without disconnection
5. Corrosion free
6. No maintenance
7. Good appearance

Material – specification

- Standard colour : black¹⁾
- Standard material : KS/PA²⁾ – glass fibre strengthened

1) Upon request moulded plastic cable drag chains can be supplied in the colours white, red, yellow, beige and on enquiry in further colours. In order to achieve maximum colour effect, several colours can be combined. In both cases, extra price for small quantities.

2) Moulded plastic cable drag chains for application in the range of radio-active radiation or for permanent temperatures below -20 require a material adaptation and can also be delivered by SHINSUNG. Please give us detailed information on your environment conditions.

Mechanical properties	Environmental conditions	Check value	Unit	
Tensile strength	dry	190	N/mm ²	
	air moist	120		
Tensile dilation	dry	4	%	
	air moist	6		
Elasticity modulus	dry	10000	N/mm ²	
	air moist	7000		
Resilience	23°C	dry	55	KJ/m ²
	23°C	humid	80	
	-40°C	dry	45	
Thermal properties				
Temperature limit of application	Permissible temp. range 5,000hours several hours	-25° to 120	°C	
		to 135		
		to 170		
Other properties				
Density	dry	1.4	g/cm ³	
Index sliding friction	ungreased	0.4		
Reaction upon burning as per VDE 0340 part 3	dry	11c		

Provide the following information

1. Number and outside diameter of the cable/hoses to be installed(with/without and fittings)
2. Weight of all cables and hoses(including hose contents)
3. Minimum bending radius of cable/hoses(acc. to manufacturer's specification)
4. Movable distance and radius of rotation
5. Max accelention/deceleration
6. Available mounting width, height
7. Working environment temperature, humidity, radiation, etc

Technical data

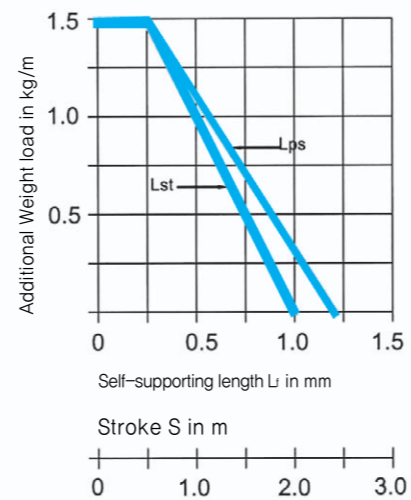
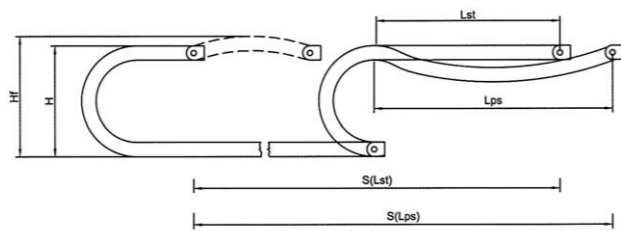
(Dimensions in mm)

Definitions:

- B_K : Chain width
- B_{ST} : Stay Width
- h_G : Heigh of Chain Link
- h_I : Heigh of Stay
- KR : Bending Radius
- D : Straight Diameter
- D_{max} : Max Diameter
- L_s : Travel Lenght

Type	t _G	h _G	KR	h _I	D _{max}	B _K	B _{ST}
SSB 0460	46	50	100	40	37	66	50
			125			91	75
			150			116	100
			175			141	125
			191			166	150
			200			191	175
						216	200

- L_{ps} = Self supporting chain length
- L_{st} = Unit's travel lenght



SSB 0460

TYPE:SSB-0460

• Chain pitch t_G = 46mm

- Bending radius:
- KR 100mm
 - KR 125mm
 - KR 150mm
 - KR 175mm
 - KR 200mm

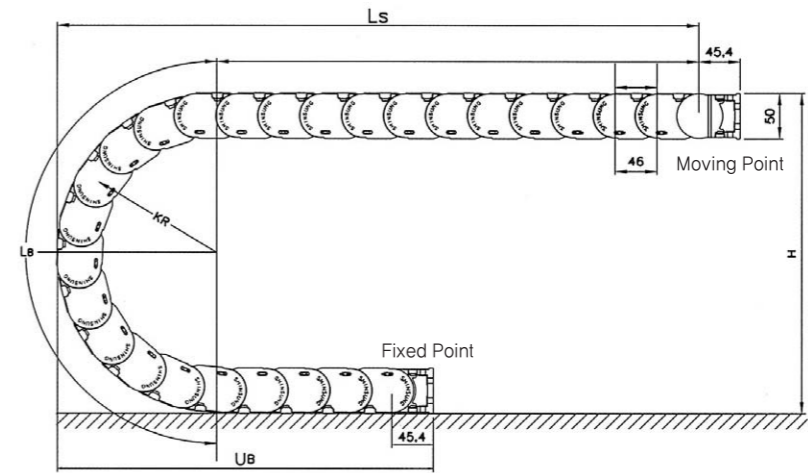


Table of dimensions

(Dimensions in mm)

- L_B : Loop Lenght
- H_A : Chain Height
- U_B : Loop Projection
- H_Z : To Calculate Support Tray lenght

Bending radius KR	100	125	150	175	200
Length of curve L _B	410	485	565	645	725
Proj. length of curve U _B	175	200	225	250	275
Mounting height H	250	300	350	400	450

Calculation of chain length • Installation height:

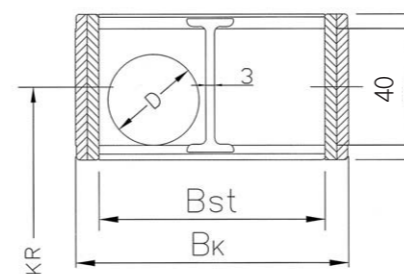
$$L_K = \frac{L_s}{2} + L_B$$

based on chain pitch 46mm

$$H_z = H + Z$$

Z ≈ 10mm/m Chain length

Stay designs



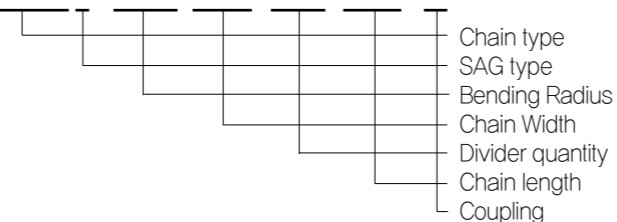
- D : 1.1d for cable diameter d
- Cable – φ D_{max} = 37mm
- h_I : 40mm
- h_G : 50mm
- ST : Divider thickness 3mm

$$B_K = \sum D + \sum ST + 16$$

$$B_{ST} = \sum D + \sum ST$$

How to order

• SSB 0460 S – KR100 – Bk125 – 30EA – L1840 – C

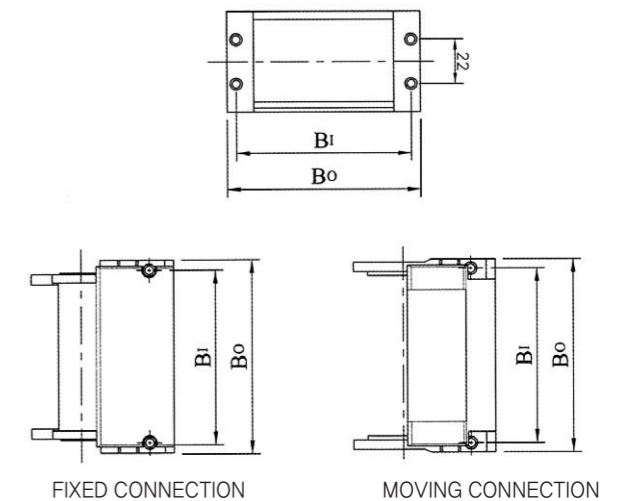


Standard widths for frame stays

chain width B _K	66	91	116	141	166	191	216
no. of divider stays/stay	1	1	2	2	2	3	3
Stay width B _{ST}	50	75	100	125	150	175	200

Coupling Dimension

※ Easily installed – cable/hoses can be readily installed without disconnection



B _{ST}	50	75	100	125	150	175	200
B _O	71	96	121	146	171	196	221
B _I	60	85	110	135	160	185	210

Special Feature

- Efficiency of space increased, due to design of most-suited rate to both inner measure and outer measure
- Simple assembly(Hinged, Snap-open type)
- Low price
SHINSUNG moulded plastic drag chains are protected by international patents and trademark and conform with safety standard requirements
- Easily installed
Cable/hoses can be readily installed without disconnection
- Corrosion free
- No maintenance
- Good appearance

Material - specification

- Standard colour : black¹⁾
- Standard material : KS/PA²⁾ - glass fibre strengthened

1) Upon request moulded plastic cable drag chains can be supplied in the colours white, red, yellow, beige and on enquiry in further colours. In order to achieve maximum colour effect, several colours can be combined. In both cases, extra price for small quantities.

2) Moulded plastic cable drag chains for application in the range of radio-active radiation or for permanent temperatures below -20 require a material adaptation and can also be delivered by SHINSUNG. Please give us detailed information on your environment conditions.

Mechanical properties	Environmental conditions	Check value	Unit
Tensile strength	dry	190	N/mm ²
	air moist	120	
Tensile dilation	dry	4	%
	air moist	6	
Elasticity modulus	dry	10000	N/mm ²
	air moist	7000	
Resilience	23°C	55	KJ/m ²
	23°C	80	
	-40°C	45	
Thermal properties			
Temperature limit of application	Permissible temp. range	-25 ²⁾ to 120	°C
	5,000hours	to 135	
	several hours	to 170	
Other properties			
Density	dry	1.4	g/cm ³
Index sliding friction	ungreased	0.4	
Reaction upon burning as per VDE 0340 part 3	dry	11c	

Provide the following information

- Number and outside diameter of the cable/hoses to be installed(with/without and fittings)
- Weight of all cables and hoses(including hose contents)
- Minimum bending radius of cable/hoses(acc. to manufacturer's specification)
- Movable distance and radius of rotation
- Max accelention/deceleration
- Available mounting width, height
- Working environment temperature, humidity, radiation, etc

Technical data

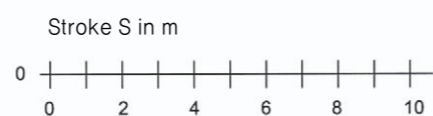
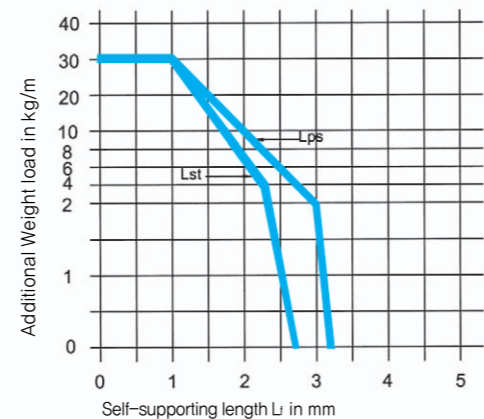
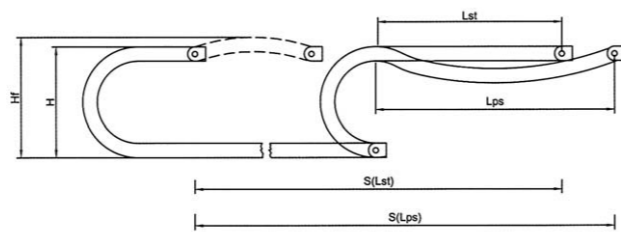
(단위:mm)

Definitions:

- B_k : Chain width
- B_{st} : Stay Width
- h_g : Heigh of Chain Link
- h_i : Heigh of Stay
- KR : Bending Radius
- D : Straight Diameter
- D_{max} : Max Diameter
- L_s : Travel Length

Type	t _g	h _g	KR	h _i	D _{max}	B _k	B _{st}
SSB 0920	92	110	180	86	80	125	85
			200			140	100
			250			165	125
			300			190	150
			400			215	175
			500			240	200
			600			300	260
						400	360
	500	460					
	600	560					

- L_{ps} = Self supporting chain length
- L_{st} = Unit's travel length



SSB 0920

TYPE:SSB-0920

• Chain pitch t_g : 92mm

Bending radius:

- KR 180mm
- KR 200mm
- KR 250mm
- KR 300mm

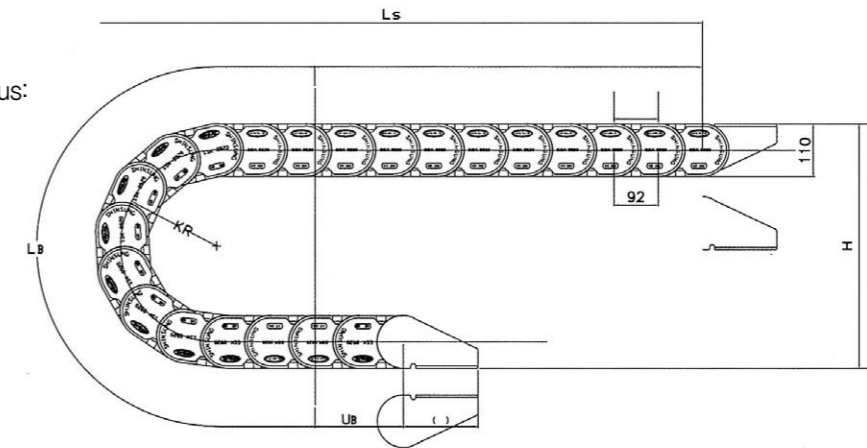


Table of dimensions

(Dimensions in mm)

- L_B : Loop Length
- U_B : Loop Projection
- H_A : Chain Height
- H_Z : To Calculate Support Tray length

Bending radius KR	180	200	250	300	400	500	600
Length of curve L _B	933	996	1153	1310	1624	1938	2252
Proj. length of curve U _B	419	439	489	539	639	739	839
Mounting height H	470	510	610	710	910	1110	1310

Calculation of chain length • Installation height:

$$L_k = \frac{L_s}{2} + L_B$$

based on chain pitch 92mm

$$H_z = H + Z$$

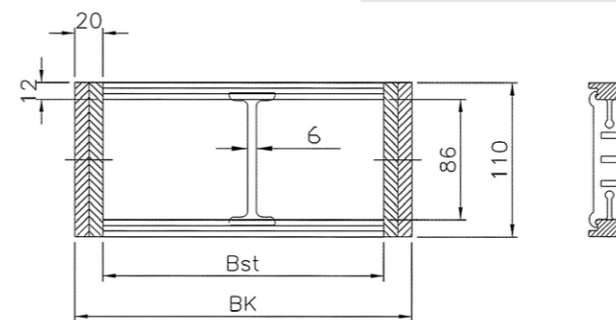
Z ≈ 10mm/m Chain length

Stay designs

Cable - φ D_{max} = 80mm
ST : Divider thickness 8mm
D : 1.1d for cable, hoses

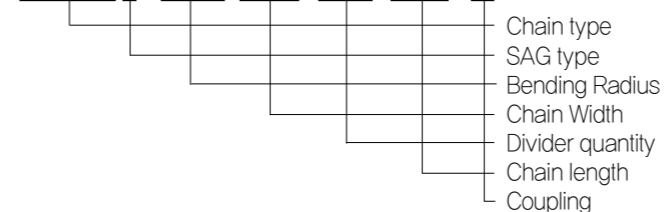
$$B_k = \sum D + \sum ST + 40$$

$$B_{st} = \sum D + \sum ST$$



How to order

• SSB 0920 S - KR180 - Bk125 - 50EA - L1840 - C

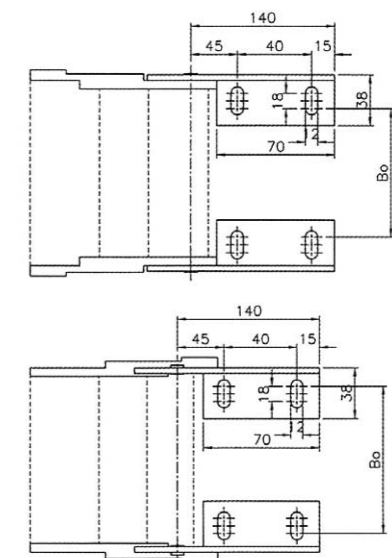


Standard widths for frame stays

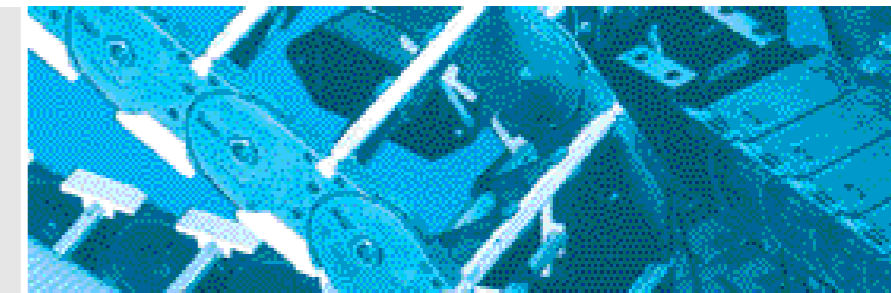
chain width B _k	125	140	150	165	190	215	240	290	340	390	440
no. of divider stays/stay	2	2	2	2	3	3	3	4	4	5	5
Stay width B _{st}	85	100	110	125	150	175	200	250	300	350	400

Coupling Dimension

※ Easily installed - cable/hoses can be readily installed without disconnection



B _k	125	140	165	190	215	240	300	400	500	600
B _{st}	85	100	125	150	175	200	260	360	460	560
B _i	65	80	105	130	155	180	240	340	440	540

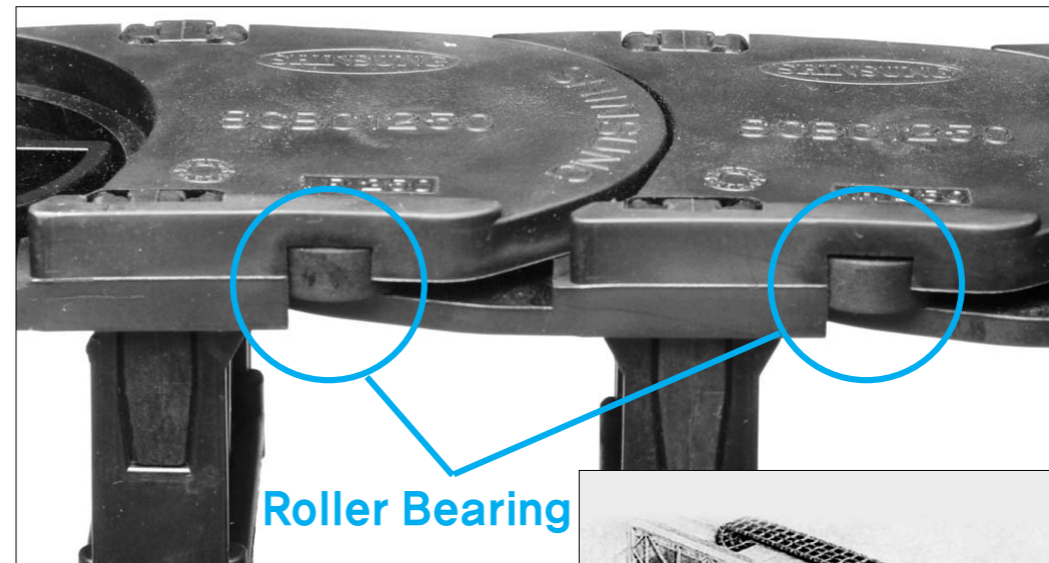


SCBC - CRANE Cable Chain

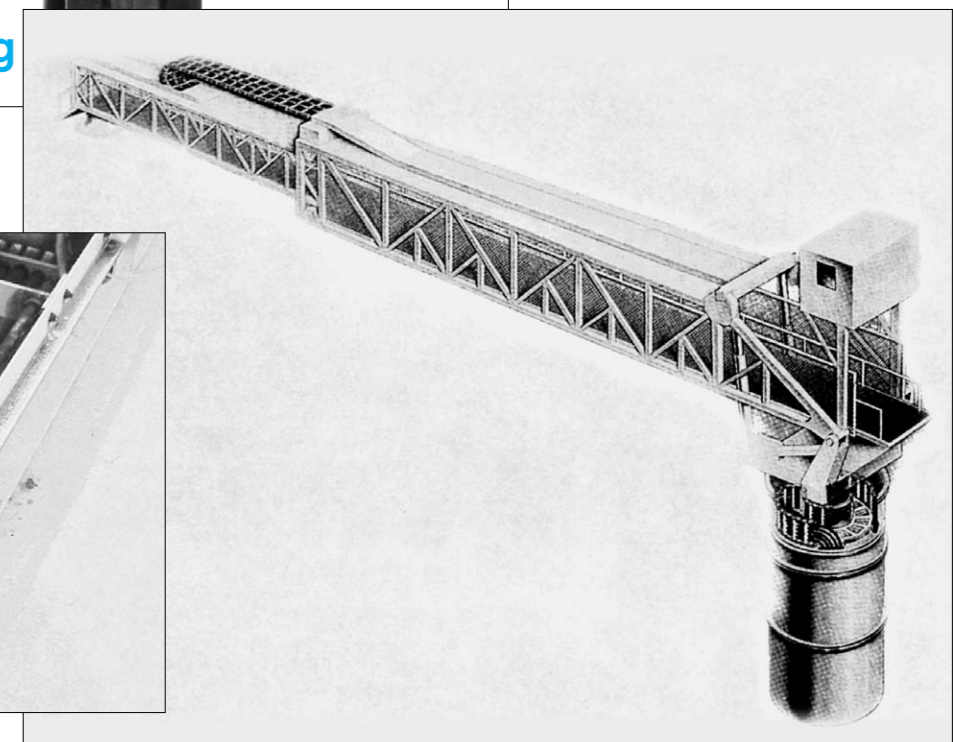
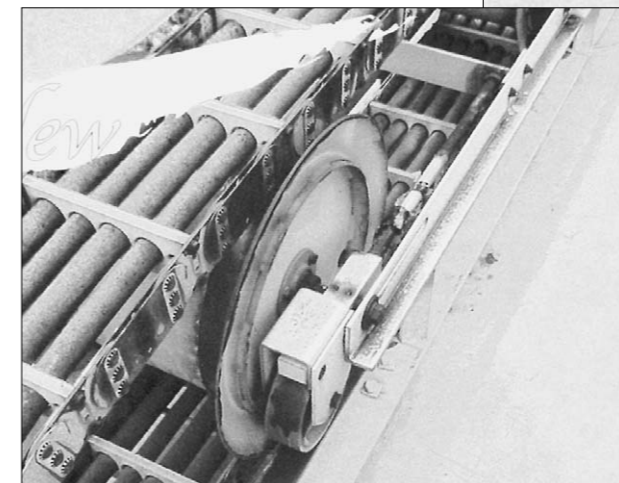
NEW!

Use of structure

Domestically developed perfectly closed-up type Steel Cable Carrier Chain. Use of structure: As perfect closed-up type applied to Iron manufacturing equipment, conveyance equipment, machine tool, industrial machine, industrial plant equipment, automobile industry, ironworks, rolling equipments, harbor equipments, etc. this is a Perfect Steel Cable Carrier Chain.



Roller Bearing



Application

1. Crane Chain is a new item developed to be used for container crane for the first in the country, by SHINSUNG ELECTRIC CO., LTD using for electric wire transfer of Container Crane, crane electric wire transfer equipment for industrial purpose.
2. Crane Chain, though cable reel, feston system applied, but can work as their substitute, and can be applied to even in the circumstance where cable reel or festoon system is not applied.

Structure

1. As done with double locking equipment, no phenomenon happens that frame comes off or is broken away.
2. Made as double locking equipment, so there are no damage to frame nor breaking away in strong vibration of hydraulic hose and in putting in and out many electric wires.
3. With wide area of the frame base, it moves smoothly without breaking away at friction part of both upper and lower part, in time of friction of both upper and lower part.

Advantages

1. It is light as production of Fiber Glass material, compared with the size of chain
2. No breaking away from frame, no damage with double locking equipment
3. With its own sliding structure, no special slide equipment is required.
4. With wide base of chain, it moves smoothly without breaking away in time of friction of both upper and lower part
5. Simple to instal cable, hose, and also simple to assemble and disassemble
6. Easy to instal divider
7. Not to be corroded
8. Very suitable to long-distance transport

Material

KR-PA Strengthens glass fibre, and standard Color basic is black

Provide the following information

1. Number and outside diameter of the cable/hoses to be installed(with/without and fittings)
2. Weight of all cables and hoses(including hose contents)
3. Minimum bending radius of cable/hoses(acc. to manufacturer's specification)
4. Movable distance and radius of rotation
5. Max acceleration/deceleration
6. Available mounting width, height
7. Working environment temperature, humidity, radiation, etc

Technical data

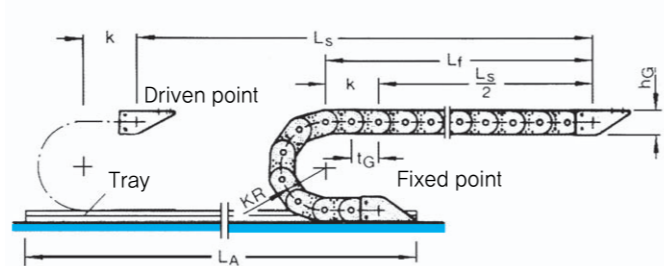
(Dimensions in mm)

Definitions:

- L_s : Travel Length
- B_k : Chain width
- B_{st} : Stay Width
- KR : Bending Radius
- h_i : Height of Stay
- D : Straight Diameter
- D_{max} : Max Diameter

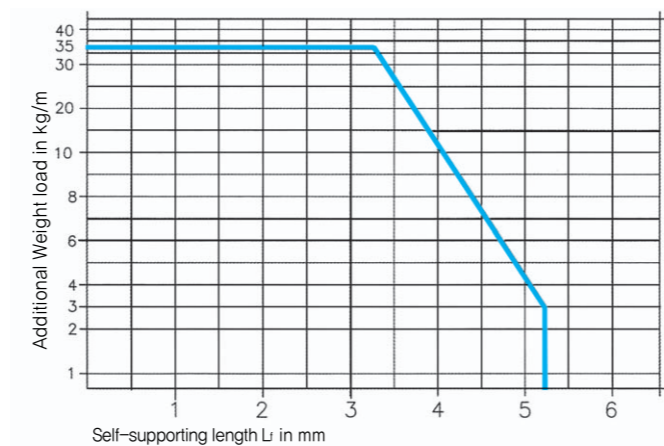
Type	t_g	h_g	KR	h_i	D_{max}	B_k	B_{st}
SCBD 1250	125	131	200	95	90	320	264
			250			370	314
			300			420	364
			400			500	444
			500			600	544

Cable Carrier Arrangement



$$L_k = \frac{L_s}{2} + K \quad K = 2t_g$$

자체지지 길이와 작업이동거리



TYPE:SCBC 1250

• Chain pitch t_g : 125mm

Bending radius:

- KR 200mm
- KR 250mm
- KR 300mm
- KR 400mm
- KR 500mm

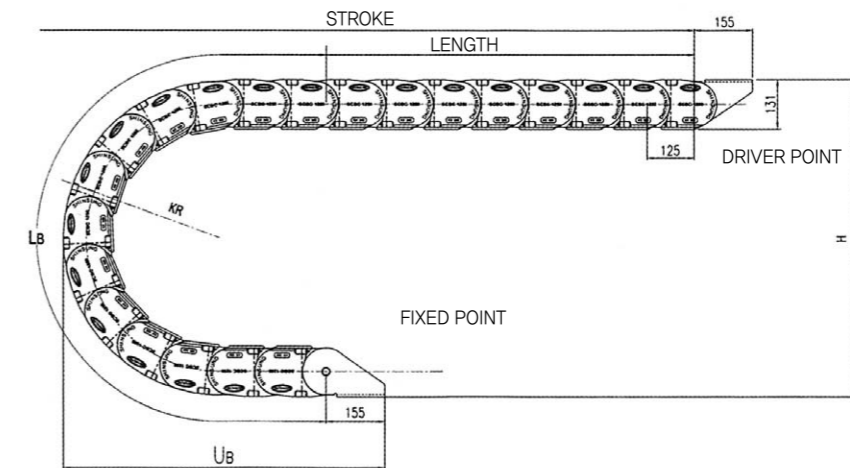


Table of dimensions

(Dimensions in mm)

- L_B : Loop Length
- U_B : Loop Projection
- H_A : Chain Height
- H_z : To Calculate Support Tray length

Bending radius KR	200	250	300	400	500
Length of curve L_B	1259	1285	1442	1756	2070
Proj. length of curve U_B	670	720	770	870	970
Mounting height H	531	631	731	931	1131

Calculation of chain length

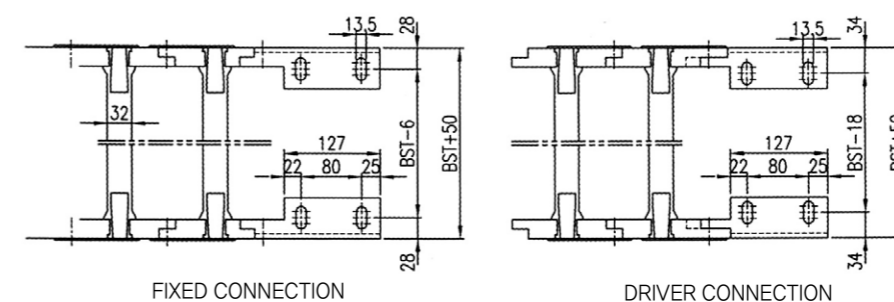
$$L_k = \frac{L_s}{2} + L_B \quad \text{based on chain pitch 125mm}$$

Standard widths for frame stays

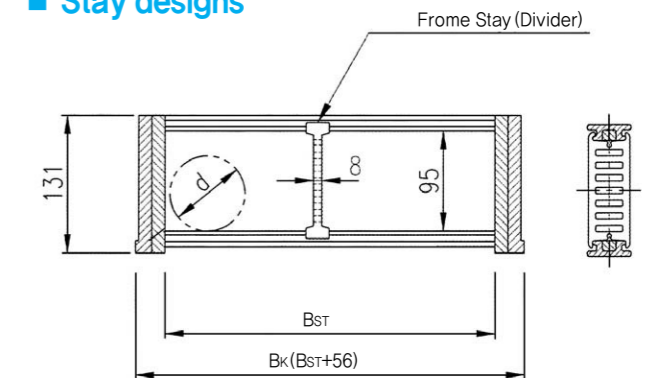
chain width B_k	320	370	420	500	600
no. of divider stays/stay	2	3	4	5	6
Stay width B_{st}	264	314	364	444	544

Coupling Dimension

※ Depend on other dimension



Stay designs

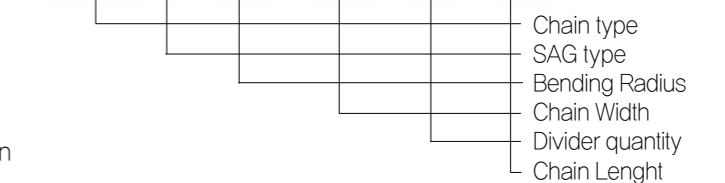


$D = 1.1d$ for cable diameter d
 $d_{max} = 87mm$
 $ST = \text{Divider thickness } 8mm$

$$B_k = \sum D + \sum ST + 5.6$$

How to order

• SCBC1250 S - KR200 - Bk320 - D200 - L7000

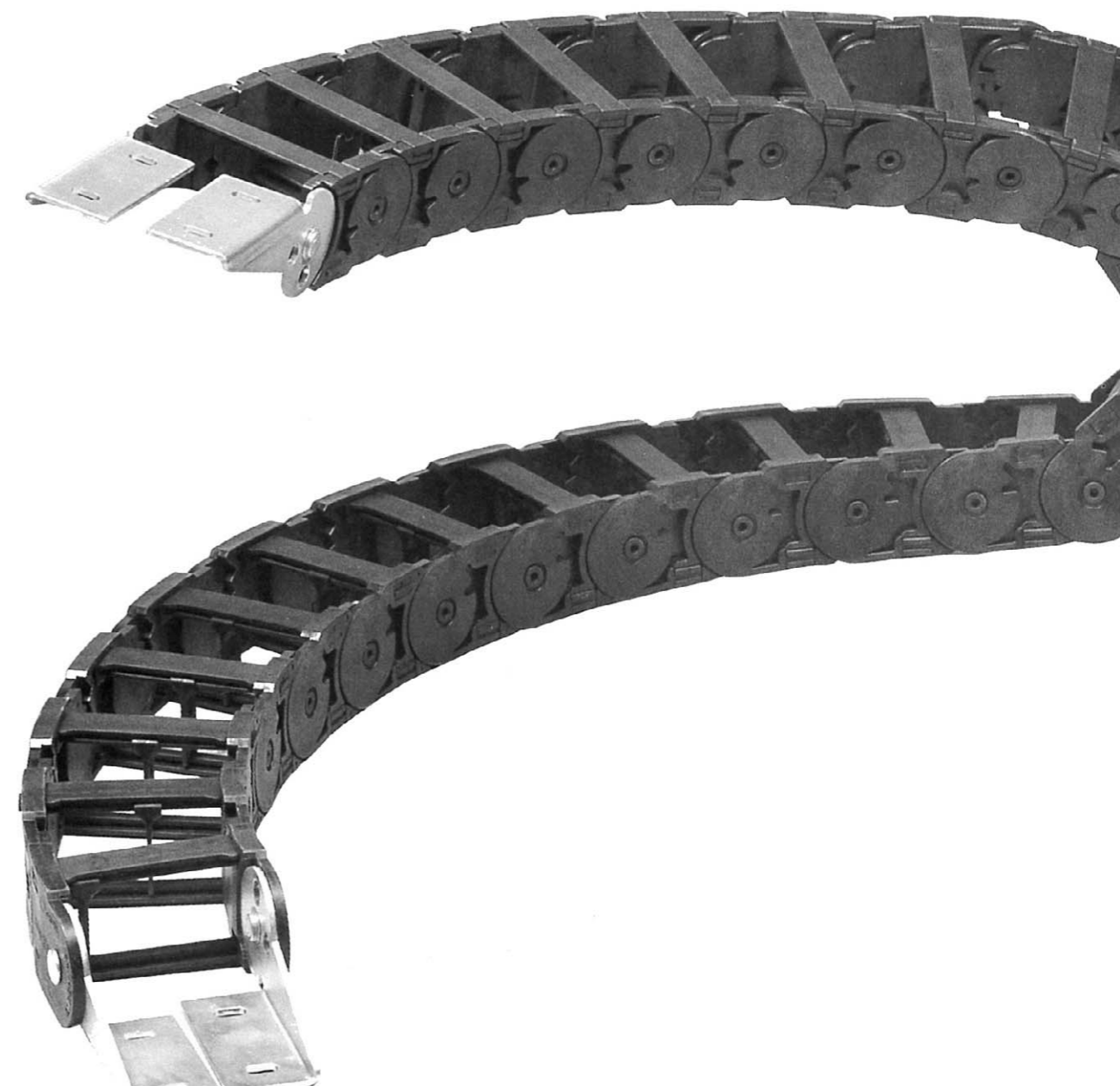




SCC - Circular Robot Chain

Use of structure

Domestically developed perfectly closed-up type Steel Cable Carrier Chain. Use of structure: As perfect closed-up type applied to Iron manufacturing equipment, conveyance equipment, machine tool, industrial machine, industrial plant equipment, automobile industry, ironworks, rolling equipments, harbor equipments, etc. this is a Perfect Steel Cable Carrier Chain.



Special Features

1. Applicable to use environment of both directions of cable or hose
2. Various sizes of installing support tray
3. Fixing two steel brackets (fixed by screw to end part of both side)
4. Can assemble without dismantling cable or hose (easy to install)
5. Corrosion free
6. Pleasing appearance
7. Above 200°, special accessory is required, white above 360° impossible to install
8. Speed of transportation 180°/sec

Material of duct parts

KS-PA strengthens glass fibre and standard color basic is black

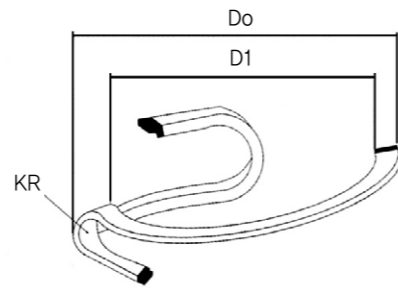
Provide the following information

1. Number and outside diameter of the cable/hoses to be installed(with/without and fittings)
2. Weight of all cables and hoses(including hose contents)
3. Minimum bending radius of cable/hoses (acc. to manufactures's specification)
4. Movable distance and radius of rotation
5. Max accelention/deceleration
6. Available mounting width, height
7. Working environment temperature, humidity, radiation, etc

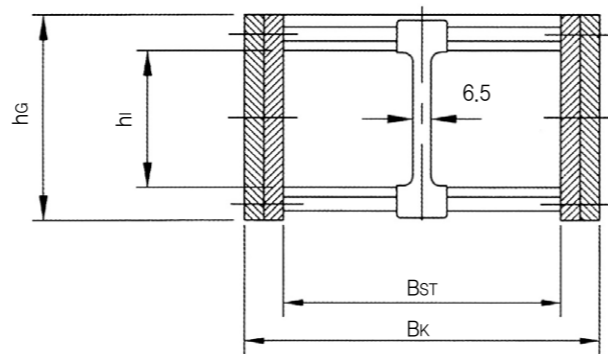
Technical data

(Dimensions in mm)

SCC Arrangement



Chain-cross section



Technical Characteristics

- t_g : chain pitch
- h_g : height of chain link
- D : height of stay
- KR : bending radius
- D_o : outer diameter
- D_i : inner diameter
- B_k : chain width
- B_{st} : stay width

Type	t_g	h_g	D	KR	D_o	D_i	B_k	B_{st}	h_i
0070	68	45	35	100	755	600	69	45	35
0080	80	43	30	100/150	830	630	93	65	30
0085	85	77	57	175	1340	1060	132	95	57
0100	100	74	50	125	1184	954	128	100	50
0150	150	85	59	220	2000	1400	272	210	59

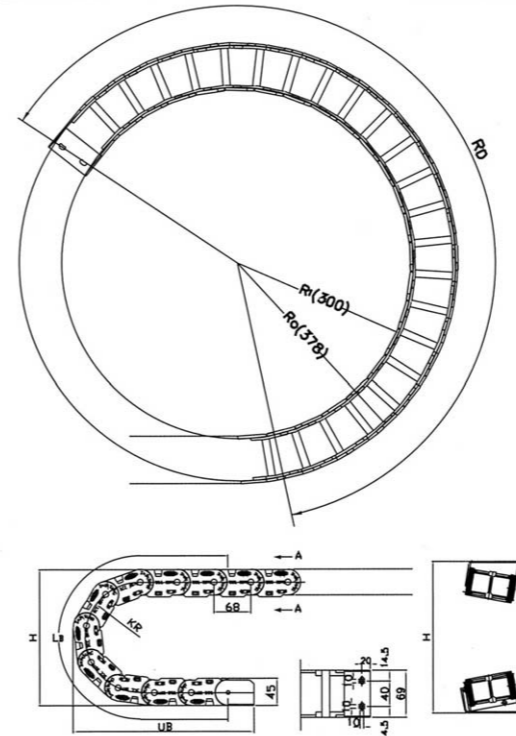
※ On special character of product, curvature was applied to body itself of SCC chain, it may not be exactly agreed with the measure of the abovementioned mark, so you are requested to refer to this, and you may requestus when you need on exact data.

To Calculate Chain Length

L_k : Number of link = 3,14
 R_o : Outer radius
 A_R : Degree of installed
 t_g : Chain pitch
 L_B : Length of bending line

$$L_k = \frac{\pi \times R_o \times A_R}{360^\circ \times t_g} + \frac{L_B}{t_g}$$

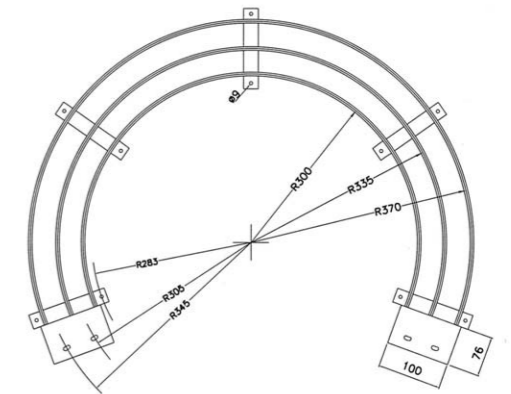
TYPE : SCC-0070



Definitions:

- KR: Bending radius
- B_k : Width of chain
- B_{st} : Stay width
- h_g : Chain link height
- h_i : Height of stay
- L_B : Length of bending line
- U_B : Projecting part
- H: Height of connection
- R_o : Outer radius
- R: Inner Radius
- L_s : Unit's travel length
- R_d : Degree of rotation

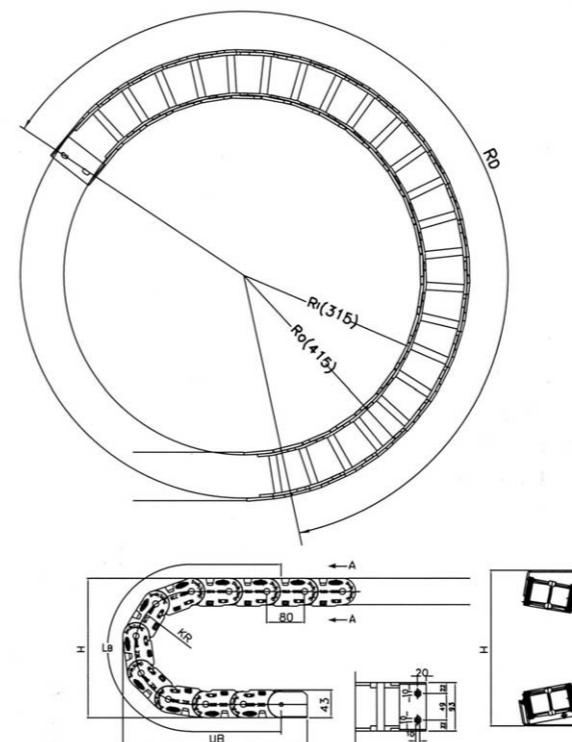
Guide Tray



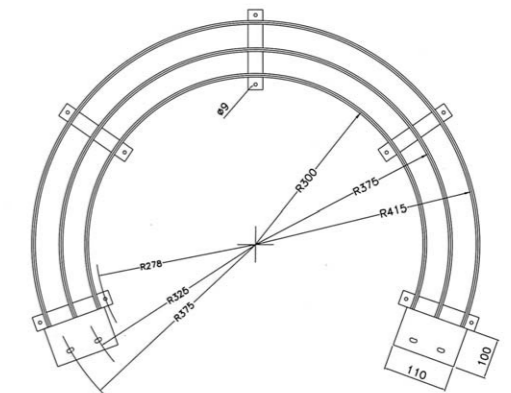
Technical Data

KR	H	L_B	U_B	B_k	B_{st}	h_g	h_i
100	305	590	285	69	45	45	35
RD	90°	180°	270°	360°			
LINK	13	18	22	26			

TYPE : SCC-0080



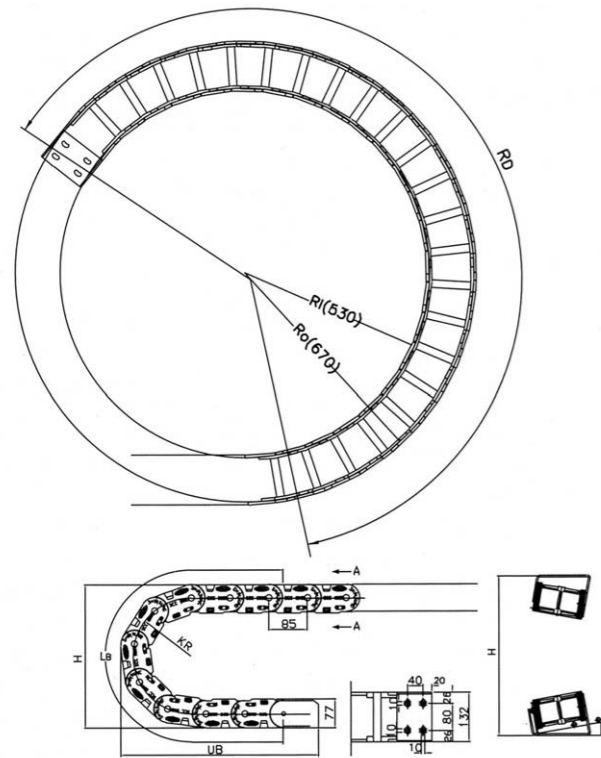
Guide Tray



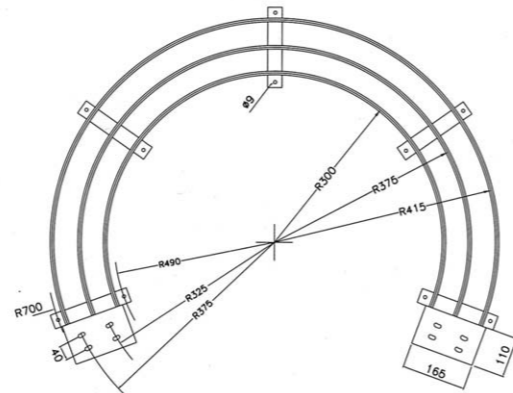
Technical Data

KR	H	L_B	U_B	B_k	B_{st}	h_g	h_i
100	315	635	300	93	65	43	30
150	390	795	350				
RD	90°	180°	270°	360°			
KR100	12	16	20	24			
KR150	14	18	23	27			

TYPE : SCC-0085



■ Guide Tray



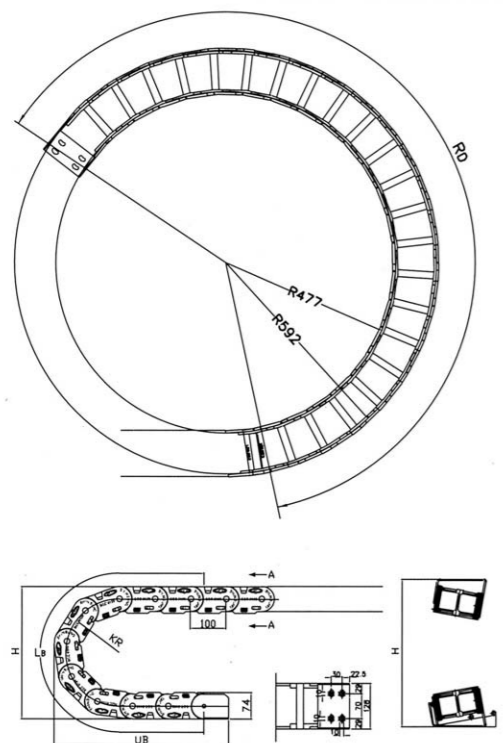
■ Technical Data

KR	H	L _B	U _B	B _K	B _{ST}	h _G	h _i
175	465	890	490	132	88	77	57
RD	90°	180°	270°	360°			
LINK	17	23	29	35			

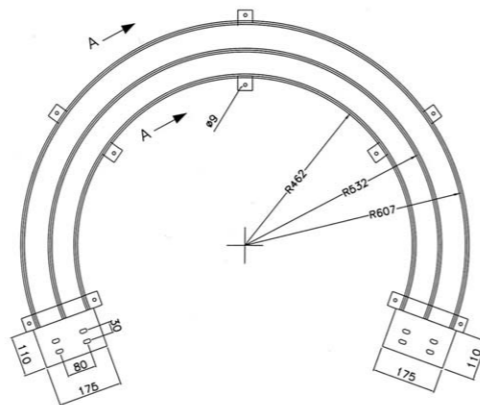
Definitions:

- KR: Bending radius
- LB: Length of bending line
- Ls: Unit's travel length
- BK: Width of chain
- UB: Projecting part
- RD: Degree of rotation
- Bst: Stay width
- H: Height of connection
- R0: Outer radius
- R1: Inner Radius
- hg: Chain link height
- hi: Height of stay

TYPE : SCC-0100



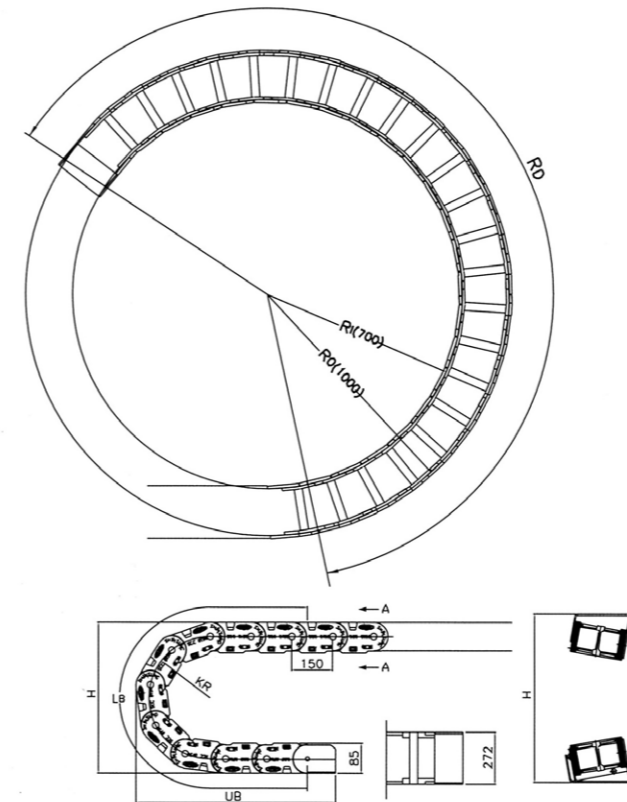
■ Guide Tray



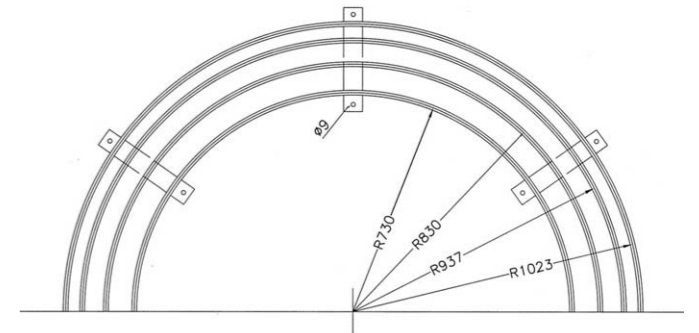
■ Technical Data

KR	H	L _B	U _B	B _K	B _{ST}	h _G	h _i
125	400	795	485	128	100	74	50
RD	90°	180°	270°	360°			
LINK	13	17	22	27			

TYPE : SCC-0150



■ Guide Tray



■ Technical Data

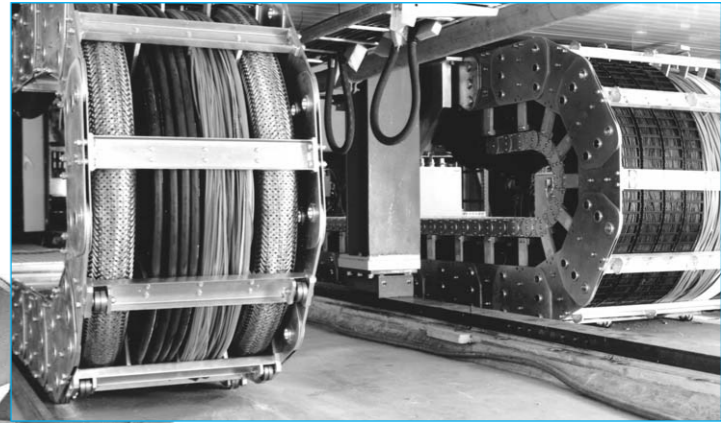
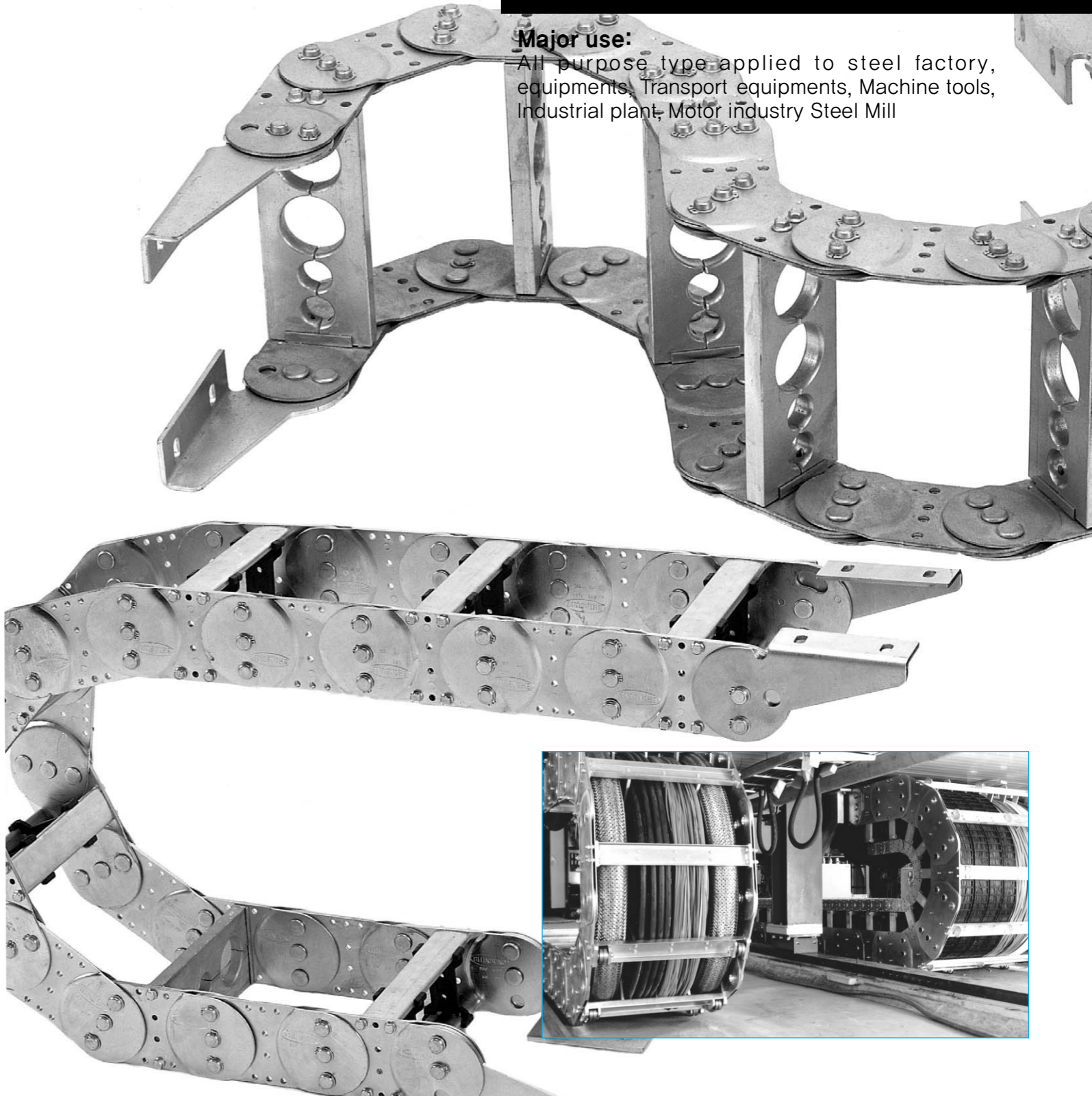
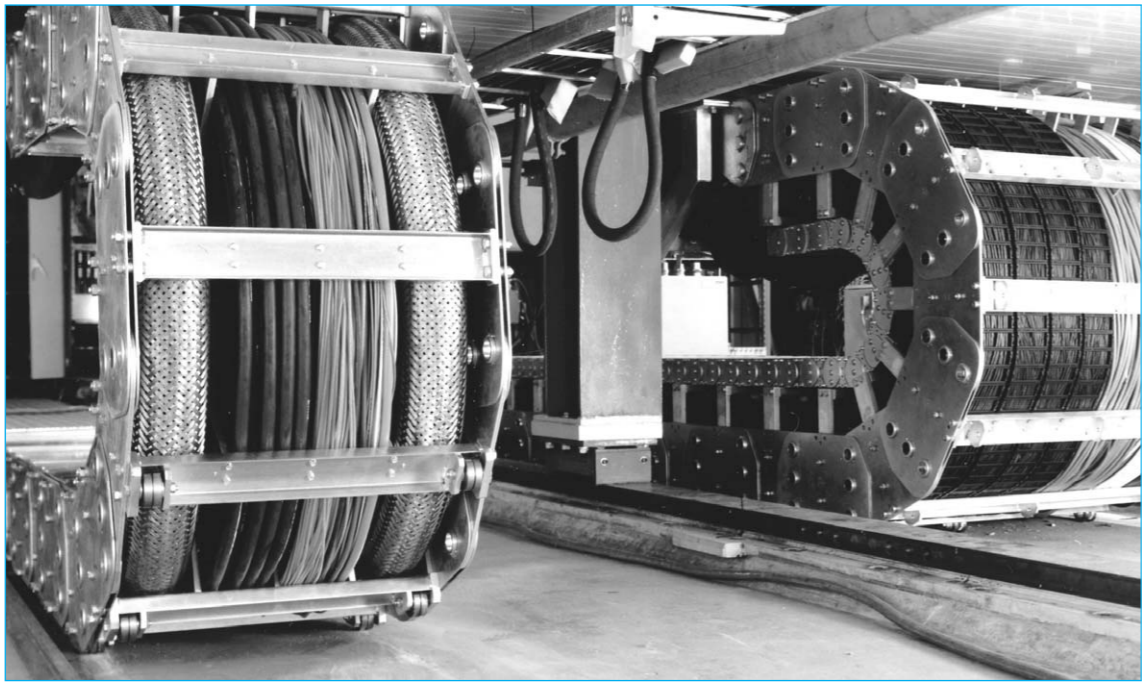
KR	H	L _B	U _B	B _K	B _{ST}	h _G	h _i
220	610	1290	715	272	210	85	59
RD	90°	180°	270°	360°			
LINK	14	19	23	28			

Definitions:

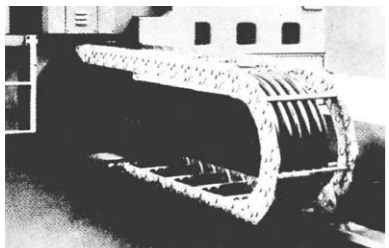
- KR: Bending radius
- LB: Length of bending line
- Ls: Unit's travel length
- BK: Width of chain
- UB: Projecting part
- RD: Degree of rotation
- Bst: Stay width
- H: Height of connection
- R0: Outer radius
- R1: Inner Radius
- hg: Chain link height
- hi: Height of stay

STEEL Cable Chains

Major use:
All purpose type applied to steel factory, equipments, Transport equipments, Machine tools, Industrial plant, Motor industry Steel Mill



Application



SHINSUNG drag chains are used where energy has to be supplied to mobile machine parts or apparatus. The chain joint lock in the opposite direction. In SHINSUNG drag chains, cables and hoses conveying varying substances can be carried

alongside one another at the same time. SHINSUNG drag chains have already been in use for many years in mechanical engineering, apparatus engineering, the automobile industry, in smelting plants and rolling mills, in materials-handling technology, in nuclear technology and in the offshore area, to name but a few branches: they have become a by-word in quality for optimal careful-laying of supply lines. SHINSUNG drag chains act as a carrying, leading and protective element at one and the same time for all supply cables and hoses.

Assembly

SHINSUNG drag chains consist of two or more chain bands, running parallel to one another, and made of high grade, surface galvanized sheet steel. Chain bands of rust and acid resistant material available on request.

The Chain bands are connected at intervals by stays. The stays, which can be supplied in various designs, take up the supply leads to be led in bore holes or opening. The drag chains are constructed in such a way that the curvature radius necessary in use is always guaranteed. The leads laid are thus not subject to any kind of mechanical stress. The chain joints block in the opposite direction.

There are hardly any special structural requirements for connecting a SHINSUNG drag chain to mobile machinery.

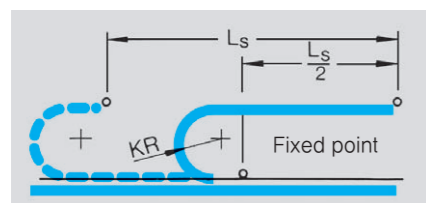
Reasons for using SHINSUNG drag chains

- No wear on cables and hoses
- Long life of lines assured by protection from mechanical stress
- Avoidance of periods of disturbance and down time
- Little space required
- Low maintenance requirements
- Short delivery times for standard measurements
- Simple assembly
- Good visual impression

To calculate a technical offer we need the following details:

- Number and outside diameter of the cables/hoses to be installed (with/without fittings)
- Weight of all cables and hoses including hose contents
- Mini. bending radius of cables/hoses acc. to manufacturer's specifications
- Length of travel mobile unit.
- Maximum acceleration/deceleration
- Speed of travel
- Frequency of travel
- Type of application drawing if possible
- Working environment

Chain Connection

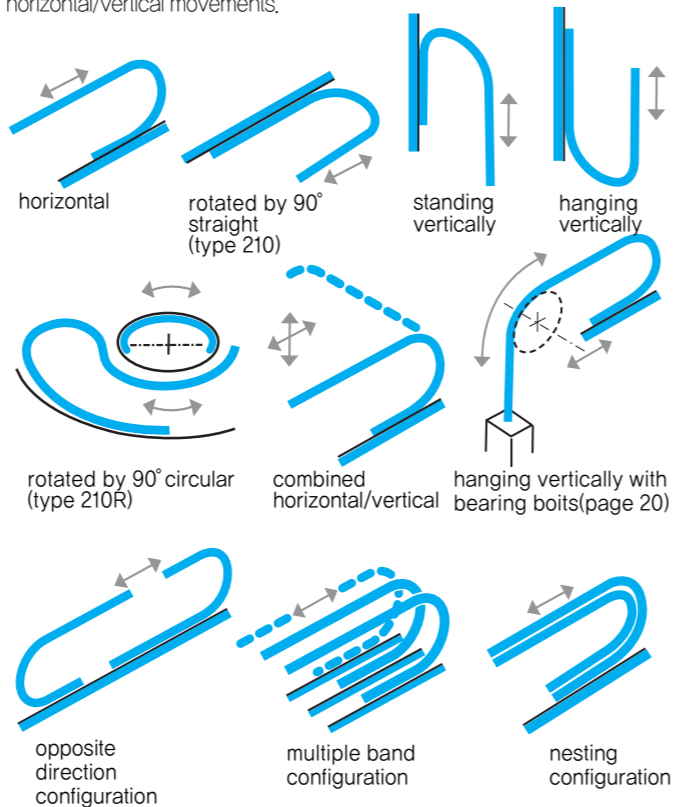


The fixed point connection should be laid in the middle of the travel length. This arrangement yields the shortest connection between the fixed point and the mobile unit, and

thus also the most economic lengths of drag chain, cables and hoses. Connection is made by the connection angles which are fastened to the ends of the chain bands with bolts.

Installation Variations

SHINSUNG drag chains can, apart from for normal horizontal movements, also be used for vertical, circular and combined horizontal/vertical movements.



A flat surface is required to support the drag chain. This surface must be kept clear in the chains working area. Should the given conditions be insufficient, then a trough should be employed.

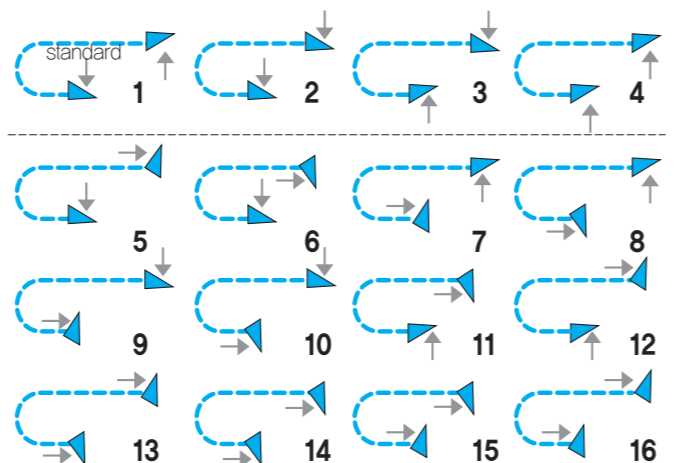
Should the stay cross-section of a cable drag chain prove inadequate because of the maximum permissible stay width, then the cables and hoses should be distributed over several stays.

Depending on the space available, the drag chains can be arranged to run as multiple band chains, within one another, or running in opposing directions.

Connection Variants

Connection variants 1-4 for all chain types!

For the chain types 0650.1, 0950, 1250 and 1800 the connecting angles at the fixed point and at the driver can also be fastened turned by 90° to the chain as flange connection (Variants 5 to 16).



※ Please indicate the desired, connection variant on your order.

Overview of Types

(Measurement in mm)

Key:

- B_k = width drag chain
- B_{st} = width of stay
- c = distance between openings in hole stays
- d = diameter of bore hole stays, or clearance height in frame stays
- $D = 1,1 d$ for electric cables
- $D = 1,2 d$ for hoses
- Minimum supplement = 2
- h_c = chain link height
- KR = Bending radius
- L = self-supporting chain length
- LS = Unit's travel length
- t_c = chain pitch
- ST = thickness of divider stays

Future bending radius on request.

We reserve the right to make technical improvement.

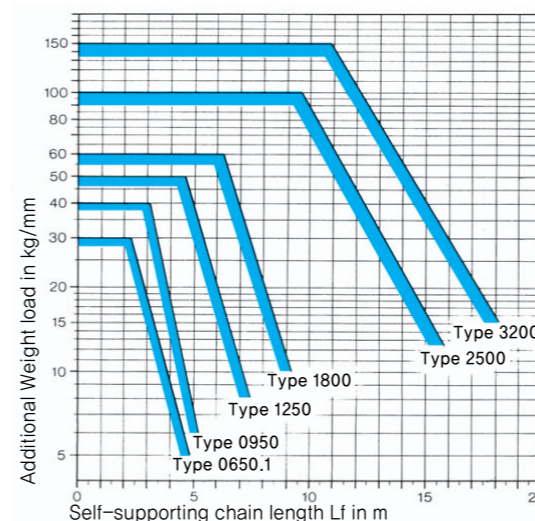
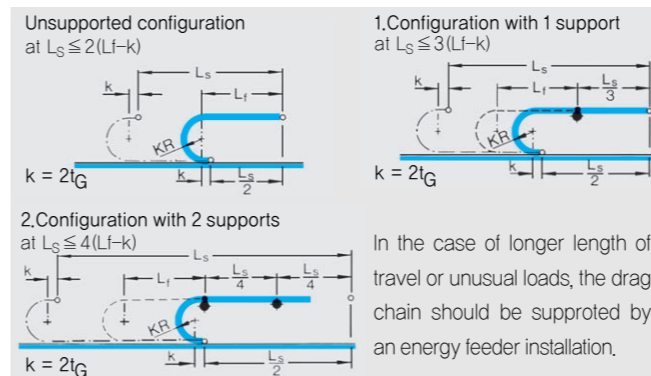
Chain type

Chain type	tg	hg	Bending radius		Available Stay forms	dmax
SSC-0650.1	65	50	75	135	Frame stay	28/25
			95	200	Hole Stay	36/32
SSC-0950	95	68	140	260	Frame stay	42/38
			170	290	Solid frame stay	34/30
SSC-1250	125	94	200	320	Hole stay	43/38
			145	300	Frame stay	65/58
SSC-1800	180	140	220	340	Solid frame stay	58/52
			260	380	Hole stay	67/60
SSC-2500	250	220	265	435	Solid frame stay	95/86
			320	490	Hole stay	100/90
SSC-3200	320	300	375	605	Special stay	
			365	760	Hole stay-Split model	164/150
SPL 5000 SPL 6000 SPL 7000			445	920	Special stay	
			600	1075	Hole stay-Split model	200/180
			470	1075	Special stay	
			670	1275		
			870	1480		

Energy feeder chains for offshore technology (pages 46-47)

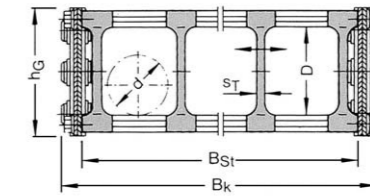
Overview of Types for dual-band chains

depending on additional load

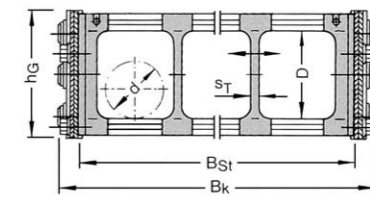


Stay Designs

● RS2 Frame stays – 나선식 측면바가 있는 프레임스테이 with screwed profile bars (for chain types 06501, 0950 and 1250) Standard widths available from stock!

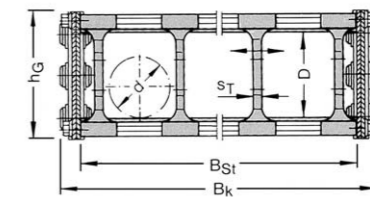


● RS1 Frame stay-with detachable profile bar (for chain types 06501, 0950 and 1250)



Frame stays with detachable profile bars give you the practical advantage of being able to lay, add and exchange cables and hoses quickly. Detach profile bar by turning 90° (no screw connection). Standard widths available from stock!

● RM Solid frame stay-with sliding rail (for chain types 0950, 1250 and 1800)

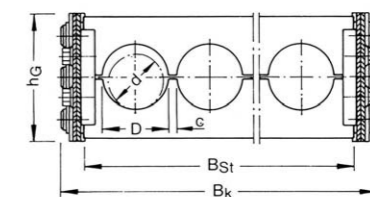


The solid frame stay is used if the maximum width of the frame stay listed above is exceeded. The light metal profile with the inserted synthetic profile rail for protecting the cables/hoses ensures high stability of the drag chain. Standard widths available from stock!!

available from stock!!

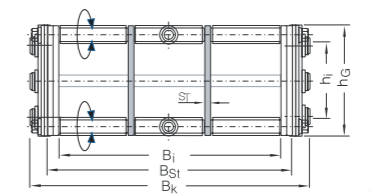
● LG Hole stay-split model (for chain types: All chain types)

Hole stays ensure optimal laying of cables/hoses in the drag chains neutral axis. The divided design simplifies cable laying, even for hoses with fixed fittings and cables with fixed plugs. Individual aperture design for each case! Unsplit hole stays available on request.



● RR Tubular stay (for chain types: All chain types)

Gentle cable laying by means of means of rollers, Ldeal when using hydraulic "soft" sheaths.



● LGM Modular Hole stay (for chain types: All chain types)

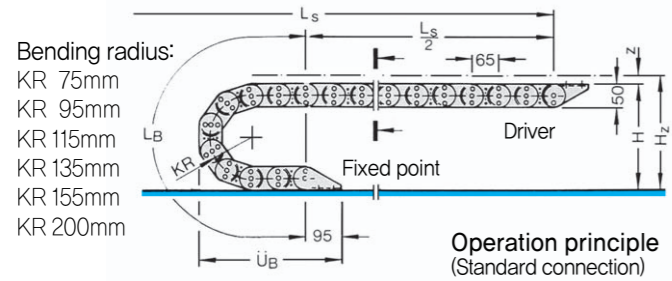


Drag chains are designed with the following in mind:

- The number of cables and hoses to be laid, and their external diameters (n.b.: hose diameter at operational pressure).
- Choice of stay design taking into account the fact that the bore hole diameter or clearance height $D = 1,1d$ or $1,2 d$ (cable/hose diameter).
- Determine the smallest permissible bending radius of the cables/hoses according to manufacturer's specification and then choose the bending radius.
- Calculate the chain length according to the traverse and the bending radius selected.

The plastic modular hole stay system enables you to create your own customized hole stay quickly and easily. Hole stay inserts are available for series S 1250 and SX 1250. Available hole diameters: 10, 15, 20, 25, 30, 40 and 50mm. Please do get in touch with us, we would be happy to advise you.

TYPE:SSC-0650.1 • Chain pitch t_0 : 65mm



Variable structural dimensions

• depending on bending radius (Dimensions in mm)

Bending Radius KR	75	95	115	135	155	200
Arc length L_B	496	558	621	684	747	888
Arc overhang \ddot{U}_B	325	345	365	385	405	450
Height H_{min}	200	240	280	320	360	450

• Calculation of chain length:

$$L_K = \frac{L_S}{2} + L_B$$

rounded to pitch 65mm

• Installation height:

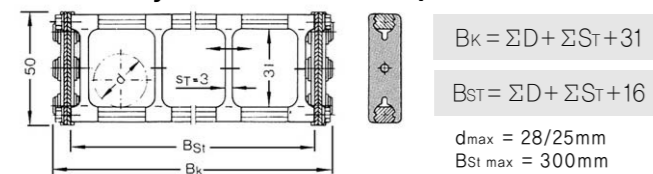
$$H_z = H + Z$$

(necessary clearance)
 $Z \approx 10\text{mm/m}$ Chain length

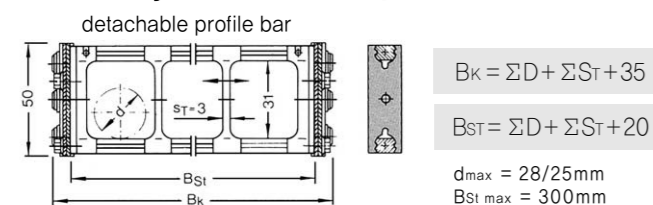
■ Stay designs

$D = 1,1 d$ for electric cables $D = 1,2 d$ for hoses

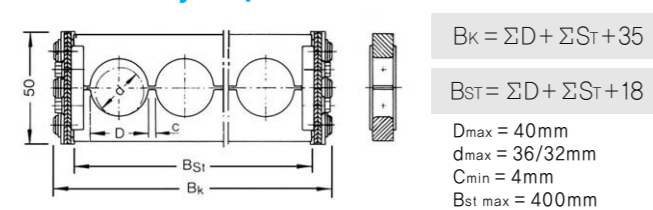
Frame stay – with detachable profile bar



Frame stay – with screwed profile bars



■ Hole Stay – split model



– Hole pattern, made to order as per customer's details.
– Hole stays–unsplit model available on request!

※ Where the maximum stay width is exceeded, the drag chain should be configured as a multiple band chain, or distributed over several chains running in opposite directions or inside each other page 31 please consult us in borderline cases.

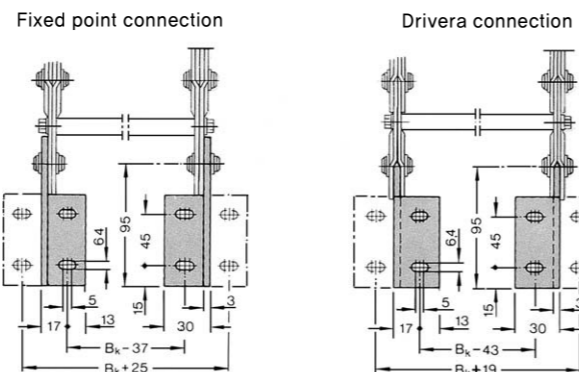
■ Standard widths for frame stays

(Dimensions in mm)

chain width B_K	100	125	150	175	200	225	250	275	300
no. of divider stays/stay	–	1	2	2	3	4	4	5	6
Stay width B_{St}	85	110	135	160	185	210	235	260	285

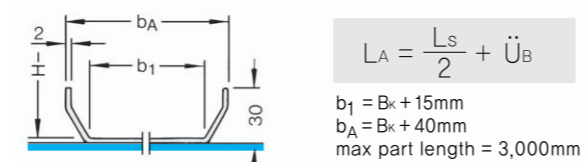
※ Individual stay widths and additional dividing stays available, on request, at extra cost.

■ Chain connection dimensions

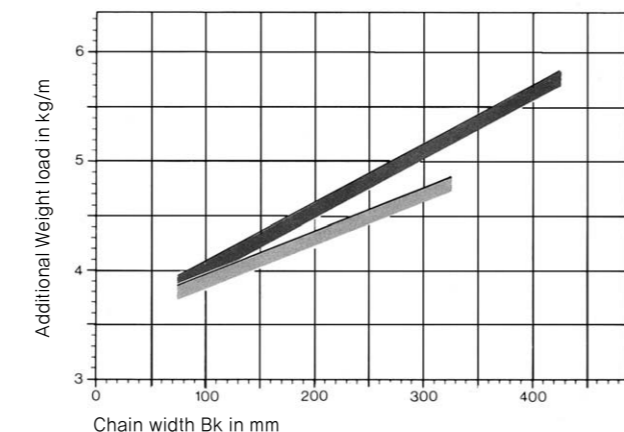


- The connection angles at the closed chain end always form the fixed point!
- In the standard method of fastening, the fastening bore holes of both connections are within the chain width. The screw-on surfaces may also be placed outwards.
- Details of connection type and variants should be given in the order.

■ Trough

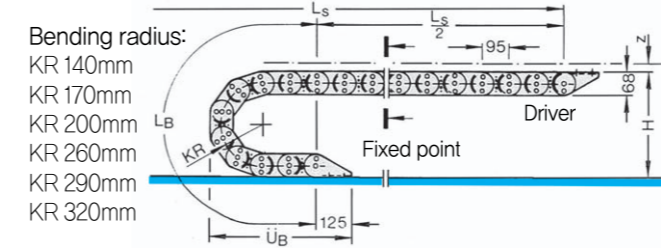


■ Chain dead weight – for dual band chains



● Frame stays ● Solid frame stays ● Hole stays(50% bore hole proportion)

TYPE:SSC-0950 • Chain pitch t_0 = 95mm



Variable structural dimensions

• depending on bending radius (Dimensions in mm)

Bending Radius KR	95	140	170	200	260	290	320
Arc length L_B	711	820	914	1008	1197	1291	1385
Arc overhang \ddot{U}_B	445	490	520	550	610	640	670
Height H_{min}	303	348	408	468	588	648	708

• Calculation of chain length: • Installation height:

$$L_K = \frac{L_S}{2} + L_B$$

rounded to pitch 95mm

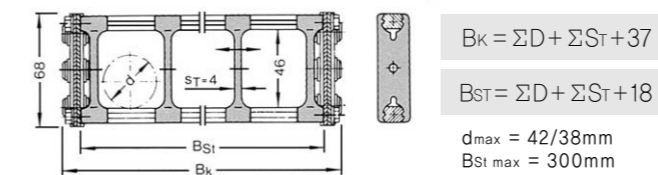
$$H_z = H + Z$$

$Z \approx 10\text{mm/m}$ Chain length

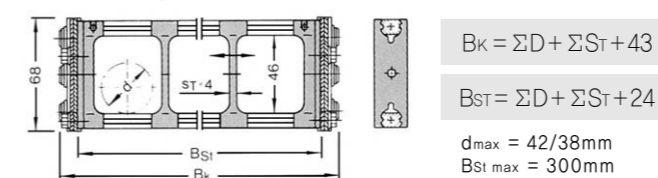
■ Stay designs

$D = 1,1 d$ for electric cables $D = 1,2 d$ for hoses

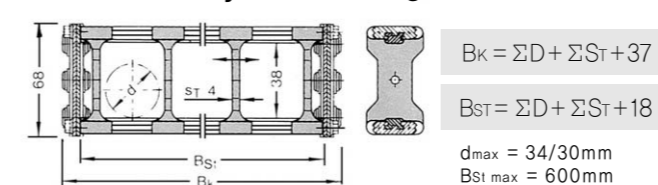
Frame stay – with screwed profile bars



Frame stay – with detachable profile bar



Solid frame stay – with sliding rail



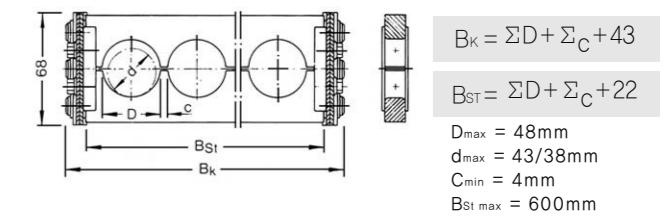
■ Standard widths for frame stays

(Dimensions in mm)

Stay design	Frame stays										Solid Frame Stays															
chain width B_K	150	175	200	225	250	275	300	350	400	450	500	550	600	150	175	200	225	250	275	300	350	400	450	500	550	600
no. of divider stays/stay	1	1	2	2	3	3	4	5	6	7	8	9	10	1	1	2	2	3	3	4	5	6	7	8	9	10
Stay width B_{St}	131	156	81	206	231	256	281	331	381	431	481	531	581	131	156	81	206	231	256	281	331	381	431	481	531	581

Individual stay widths and additional dividing stays available, on request, at extra cost.

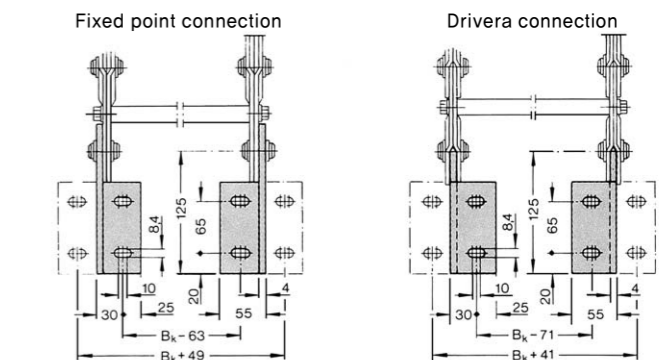
■ Hole Stay – split model



– Hole pattern, made to order as per customer's details.
– Hole stays–unsplit model available on request!

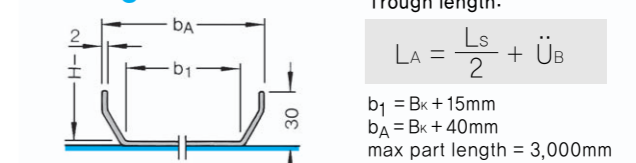
※ Where the maximum stay width is exceeded, the drag chain should be configured as a multiple band chain, or distributed over several chains running in opposite directions or inside each other(page 31), please consult us in borderline cases.

■ Chain connection dimensions (Standard connection)



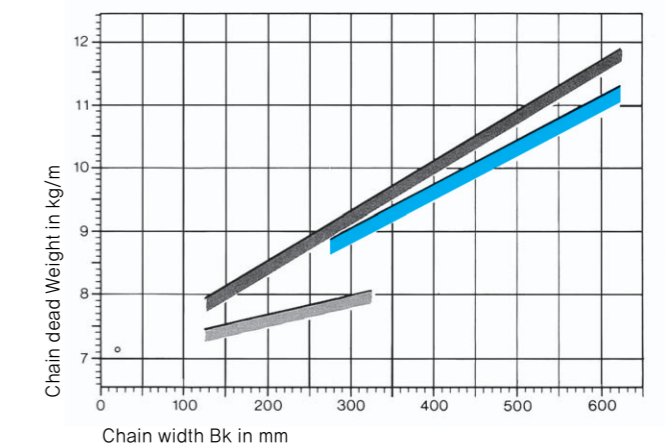
- The connection angles at the closed chain end always form the fixed point!
- In the standard method of fastening, the fastening bore holes of both connections are within the chain width. The screw-on surfaces may also be placed outwards.
- Details of connection type and variants should be given in the order.

■ Trough



■ Chain dead weight – for dual band chains

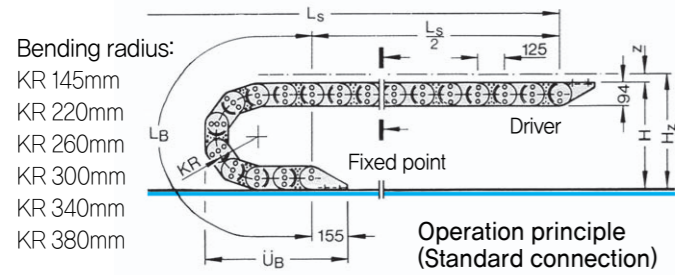
• depending on the chain width



● Frame stays ● Solid frame stays ● Hole stays with 50% bore hole proportion

TYPE:SSC-1250

• Chain pitch to : 125mm



Variable structural dimensions

• depending on bending radius (Dimensions in mm)

Bending Radius KR	145	220	260	300	340	380
Arc length L_s	955	1191	1317	1442	1568	1694
Arc overhang \ddot{U}_B	597	672	712	752	792	832
Height H_{min}	384	534	614	694	774	854

• Calculation of chain length: • Installation height:

$$L_K = \frac{L_s}{2} + L_B$$

rounded to pitch 125mm

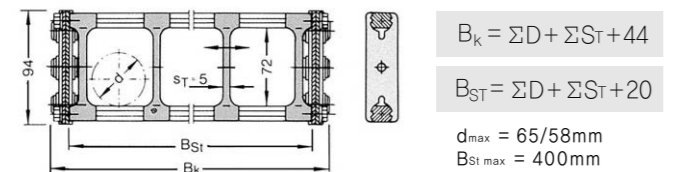
$$H_z = H + Z$$

$Z \approx 10\text{mm/m}$ Chain length (necessary clearance)

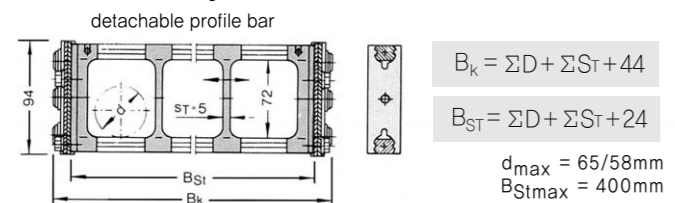
Stay designs

$D = 1,1 d$ for electric cables $D = 1,2 d$ for hoses

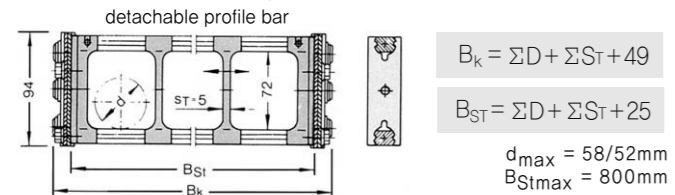
RS2 Frame stay – with screwed profile bars



RS1 Frame stay – with detachable profile bar



RM Solid frame stay – with sliding rail

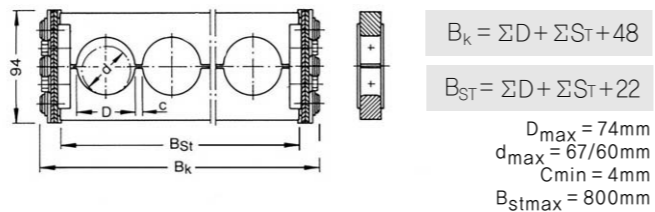


Standard widths for frame stays (Dimensions in mm)

Stay design	Frame stays										Solid Frame Stays															
chain width B_K	200	250	300	350	400	450	500	550	600	650	700	750	800	200	250	300	350	400	450	500	550	600	650	700	750	800
no. of divider stays/stay	1	2	3	4	5	5	6	7	8	9	9	10	10	1	2	3	4	5	5	6	7	8	9	9	10	10
Stay width B_{St}	176	226	276	326	376	426	476	526	576	626	676	726	776	176	226	276	326	376	426	476	526	576	626	676	726	776

※ Individual stay widths and additional dividing stays available, on request, at extra cost.

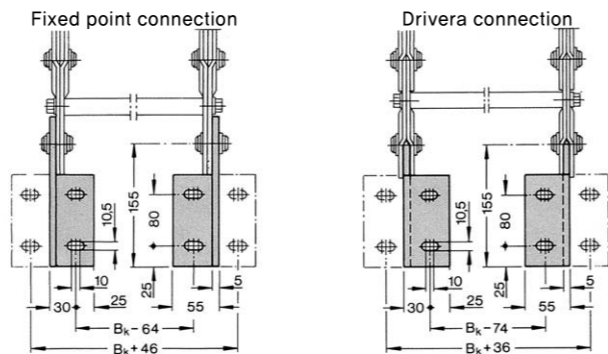
LG Hole Stay-split model



– Hole pattern, made to order as per customer's details.
 – Hole stays-unsplit model available on request!

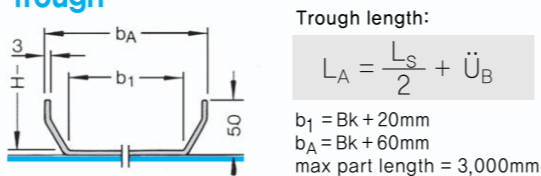
※ Where the maximum stay width is exceeded, the drag chain should be configured as a multiple band chain, or distributed over several chains running in opposite directions or inside each other (page 31), please consult us in borderline cases.

Chain connection dimensions (Standard connection)



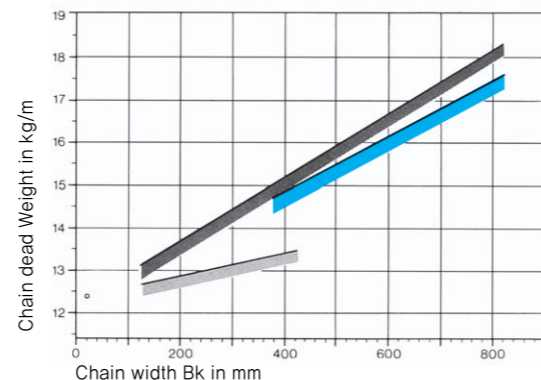
• The connection angles at the closed chain end always form the fixed point!
 • In the standard method of fastening, the fastening bore holes of both connections are within the chain width. The screw-on surfaces may also be placed outwards.
 • Details of connection type and variants should be given in the order.

Trough



Chain dead weight – for dual band chains

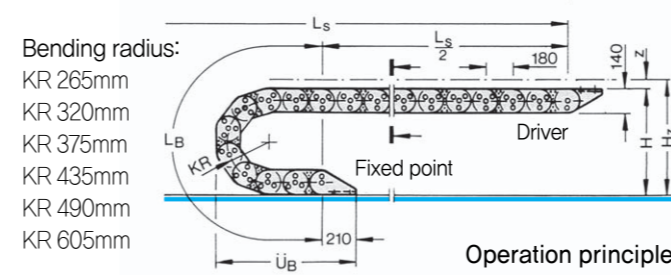
• depending on the chain width



● Frame stays ● Hole stays (50% bore hole proportion)

TYPE:SSC-1800

• Chain pitch to : 180mm



Variable structural dimensions

• depending on bending radius (Dimensions in mm)

Bending Radius KR	265	320	375	435	490	605
Arc length L_s	1552	1725	1898	2086	2259	2620
Arc overhang \ddot{U}_B	905	960	1015	1075	1130	1245
Height H_{min}	670	780	890	1010	1120	1224

• Calculation of chain length: • Installation height:

$$L_K = \frac{L_s}{2} + L_B$$

rounded to pitch 180mm

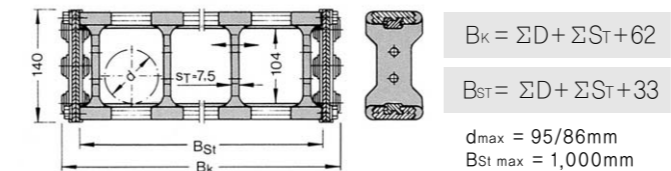
$$H_z = H + Z$$

$Z \approx 10\text{mm/m}$ Chain length (necessary clearance)

Stay designs

$D = 1,1 d$ for electric cables $D = 1,2 d$ for hoses

RM Solid frame stay – with sliding rail

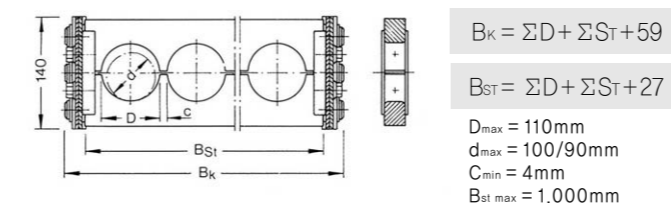


Standard widths – for frame stays (Dimensions in mm)

chain width B_K	250	300	350	400	450	500	600	700	800	900	1000
no. of divider stays	1	1	2	2	3	3	4	5	6	7	8
Stay width B_{St}	221	271	321	371	421	471	571	671	771	871	971

※ Individual stay widths and additional dividing stays available, on request, at extra cost.

LG Hole Stay-split model



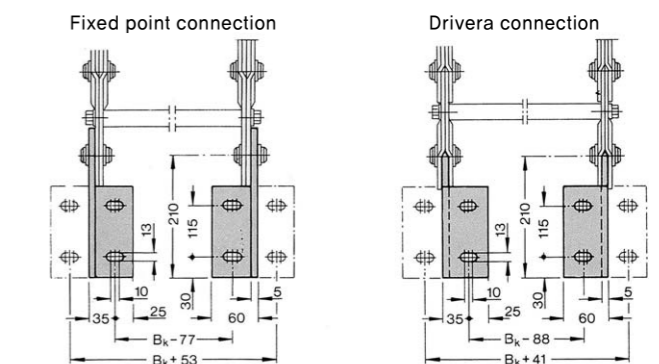
– Hole pattern, made to order as per customer's details.
 – Hole stays-unsplit model available on request!

Special stay

Special stay
 Apart from the stay designs shown here, special stays can, according to construction and material, be manufactured as needed according to your technical specifications.

※ Where the maximum stay width is exceeded, the drag chain should be configured as a multiple band chain, or distributed over several chains running in opposite directions or inside each other (page 31), please consult us in borderline cases.

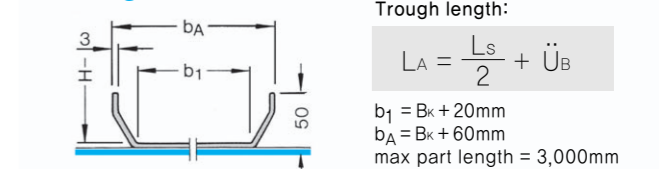
Chain connection dimensions (Standard connection)



• The connection angles at the closed chain end always form the fixed point!

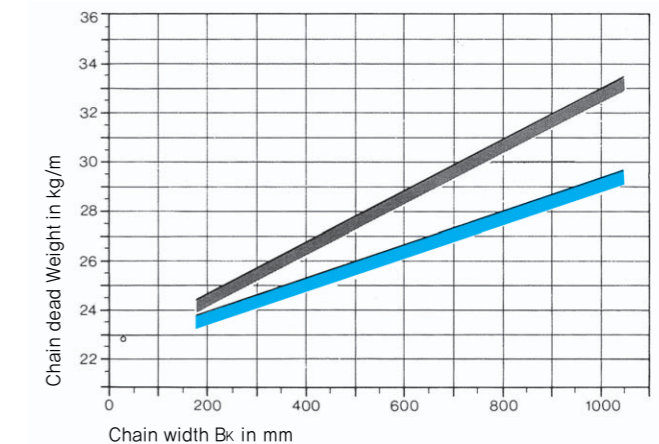
In the standard method of fastening, the fastening bore holes of both connections are within the chain width. The screw-on surfaces may also be placed outwards. Details of connection type and variants should be given in the order.

Trough



Chain dead weight – for dual band chains

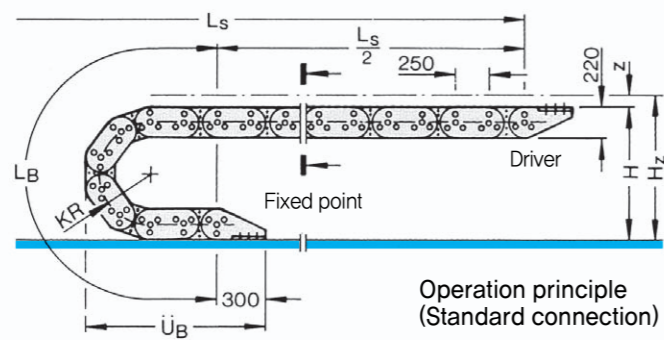
• depending on the chain width



● Solid frame stays ● Hole stays (50% bore hole proportion)

TYPE:SSC-2500

• Chain pitch tg : 250mm



Bending radius:
 KR 365mm
 KR 445mm
 KR 600mm
 KR 760mm
 KR 920mm
 KR 1075mm

Operation principle (Standard connection)

Variable structural dimensions

• depending on bending radius (Dimensions in mm)

Bending Radius KR	365	445	600	760	920	1075
Arc length L _B	2146	2398	2885	3388	3890	4377
Arc overhang Ü _B	1275	1355	1510	1670	1830	1985
Height H _{min}	950	1110	1420	1740	2060	2370

• Calculation of chain length: • Installation height:

$$L_k = \frac{L_s}{2} + L_B$$

rounded to pitch 250mm

$$H_z = H + Z$$

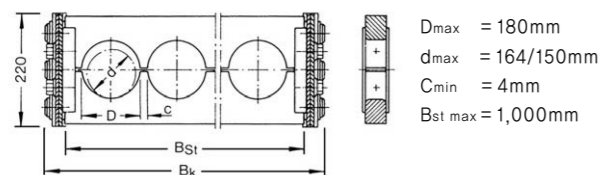
(necessary clearance)

Z ≈ 3...15mm/m chain length

Stay designs

D = 1,1 d for electric cables D = 1,2 d for hoses

LG Hole stay – split model



– Hole pattern, made to order as per customer's details.

• Chain width: $B_k = \sum D + \sum C + 78$

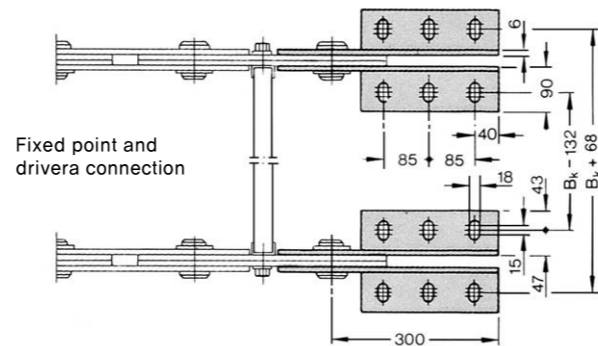
• Stay width: $B_{ST} = \sum D + \sum C + 40$

Special stay

Apart from the stay designs shown here, special stays can, according to construction and material, be manufactured as needed according to your technical specifications.

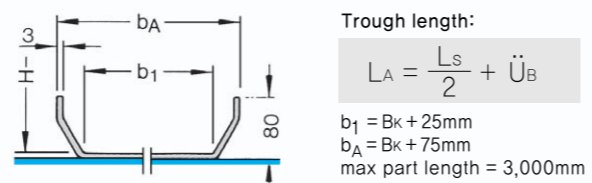
※ Where the maximum stay width is exceeded, the drag chain should be configured as a multiple band chain, or distributed over several chains running in opposite directions or inside each other (page 31), please consult us in borderline cases.

Chain connection dimensions (Standard connection)



• The fixed point and driver connection of the drag chain are identical and are achieved by double connection angles!
 • Please indicate connections variants on your order.

Trough



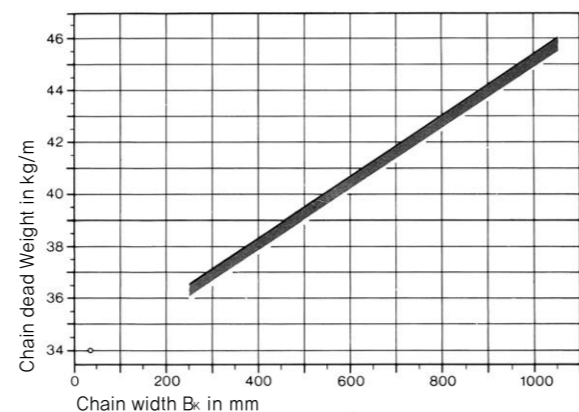
Trough length:

$$L_A = \frac{L_s}{2} + \ddot{U}_B$$

b₁ = B_k + 25mm
 b_A = B_k + 75mm
 max part length = 3,000mm

Chain dead weight – for dual band chains

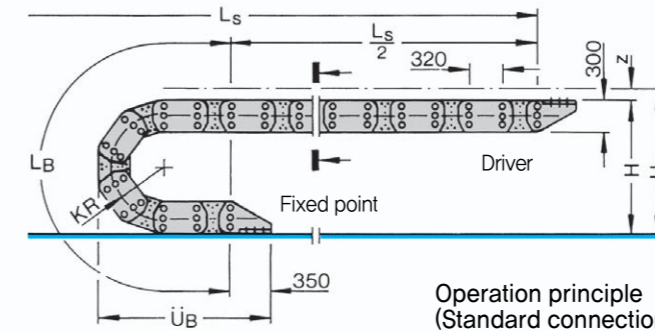
• depending on the chain width



● Hole stays (50% bore hole proportion)

TYPE:SSC-3200

• Chain pitch tg : 320mm



Bending radius:
 KR 470mm
 KR 670mm
 KR 870mm
 KR 1075mm
 KR 1275mm
 KR 1480mm

Operation principle (Standard connection)

Variable structural dimensions

• depending on bending radius (Dimensions in mm)

Bending Radius KR	470	670	870	1075	1275	1480
Arc length L _B	2757	3385	4013	4657	5286	5930
Arc overhang Ü _B	1610	1810	2010	2215	2415	2620
Height H _{min}	1240	1640	2040	2450	2850	3260

• Calculation of chain length: • Installation height:

$$L_k = \frac{L_s}{2} + L_B$$

rounded to pitch 320mm

$$H_z = H + Z$$

(necessary clearance)

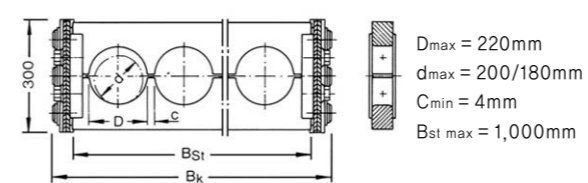
Z ≈ 3...15mm/m chain length

Stay designs

D = 1,1 d for electric cables D = 1,2 d for hoses

LG Hole stay – split model

– Hole pattern, made to order to customer's specification.



• Chain width: $B_k = \sum D + \sum C + 90$

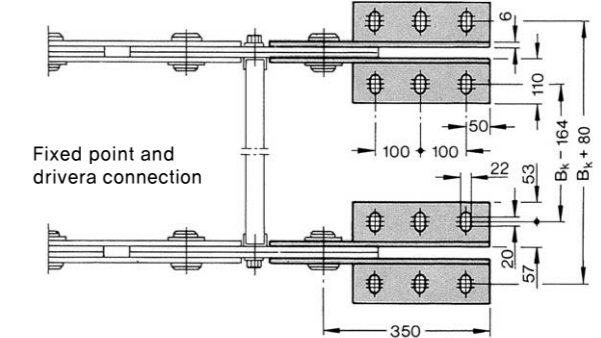
• Stay width: $B_{ST} = \sum D + \sum C + 40$

Special stay

Apart from the stay designs shown here, special stays can, according to construction and material, be manufactured as needed according to your technical specifications.

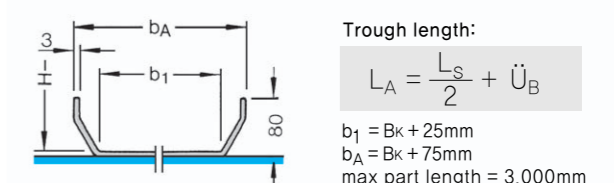
※ Where the maximum stay width is exceeded, the drag chain should be configured as a multiple band chain, or distributed over several chains running in opposite directions or inside each other (page 31), please consult us in borderline cases.

Chain connection dimensions (Standard connection)



• The fixed point and driver connection of the drag chain are identical and are achieved by double connection angles!
 • Please indicate connections variants (page 31) on your order.

Trough



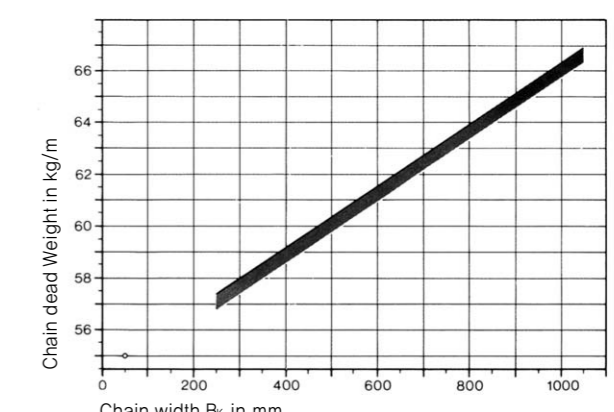
Trough length:

$$L_A = \frac{L_s}{2} + \ddot{U}_B$$

b₁ = B_k + 25mm
 b_A = B_k + 75mm
 max part length = 3,000mm

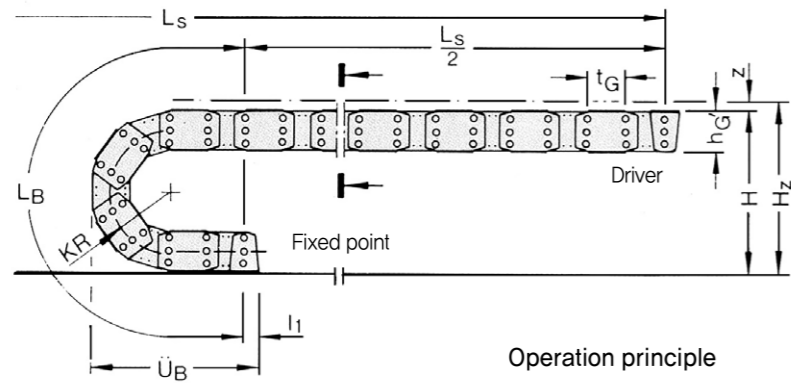
Chain dead weight – for dual band chains

• depending on the chain width



● Hole stays (50% bore hole proportion)

Drag chains for offshore technology



Operation principle

Technical data

Chain type SPL 5,000
pitch $t_G = 200\text{mm}$
link height $h_G' = 206\text{mm}$

Chain type SPL 6,000
pitch $t_G = 320\text{mm}$
link height $h_G' = 306\text{mm}$

Chain type SPL 7,000
pitch $t_G = 450\text{mm}$
link height $h_G' = 458\text{mm}$

- These drag chains were specially developed to ensure the safe conveyance of flexible cables and hoses in order to supply energy to mobile units on drilling platforms.
- This mode of energy supply avoids the tangling of cables/hoses which can occur there as a result of high wind speeds.
- Energy supply can be catered for on a made-to-measure basis for each case, using standard components.
- The chain bands and the stays which take up the supply cables are made of stainless steel which is adapted to requirements.

Unsupported chain lengths – depending on bending radius.

• Further bending radii on request

Chain type	SPL5000					SPL6000					SPL7000				
	500	600	800	1000	1200	700	900	1100	1300	1500	1100	1250	1500	1800	2400
Bending radius KR															
Arc length L_B	2370	2685	3315	3940	4570	3480	4110	4735	5365	5995	5255	5725	6510	7450	9335
Arc overhang \ddot{U}_B	1075	1175	1375	1575	1775	1615	1815	2015	2215	2415	2425	2575	2825	3125	3725
Height min	1250	1450	1850	2250	2650	1750	2150	2550	2950	3350	2750	3050	3550	4150	5350

• Calculation of chain length:

$$L_K = \frac{L_S}{2} + L_B$$

rounded to pitch 320mm

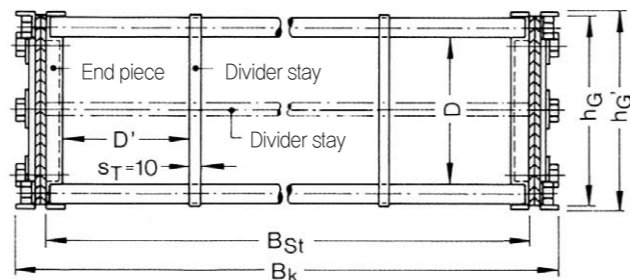
• Installation height:

$$H_z = H + Z$$

$Z \approx 3 \dots 15\text{mm/m}$ chain length
(necessary clearance)

■ Stay Design

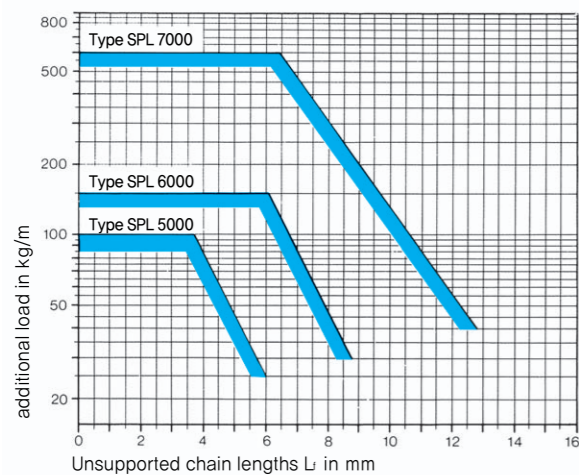
A tubular construction with dividers (if required) to separate the various types of hose/cable is used to carry the supply cable/hoses. Special stays on request. Please note the guidelines for laying cables/hoses in drag chains.



Chain type	B_K	B_{St}	D	h_G'	h_G'
SPL 5000	$\Sigma D' + \Sigma s_T + 117$	$\Sigma D' + \Sigma s_T + 38$	150	200	206
SPL 6000	$\Sigma D' + \Sigma s_T + 123$	$\Sigma D' + \Sigma s_T + 38$	240	300	306
SPL 7000	$\Sigma D' + \Sigma s_T + 150$	$\Sigma D' + \Sigma s_T + 60$	370	450	458

Unsupported chain lengths

- depending on additional load



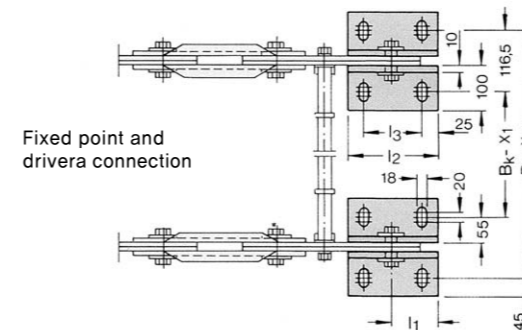
$$\text{Travel } L_S = 2(L_f - 2t_G)$$

- In the case of longer length of travel and heavier loads, the drag chain can be supported by a trolley system.

■ Chain connection (Standard connection)

The screw-on surfaces of the connection angles can be positioned to the inside, the outside, or both sides (as shown) on the chain band.

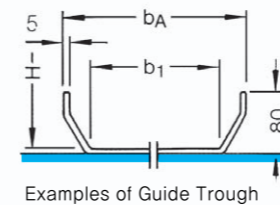
Connection brackets are usually located between the outer plates. Connection type and variant should be indicated on the order. Special construction chain connection angles on request.



Chain type	l_1	l_2	l_3	x_1	x_2
SPL 5000	75	150	100	189	44
SPL 6000	125	250	200	195	38
SPL 7000	200	280	175	200	38

■ Trough

- Guide troughs and usually specially constructed for these types of chain.



Trough length:

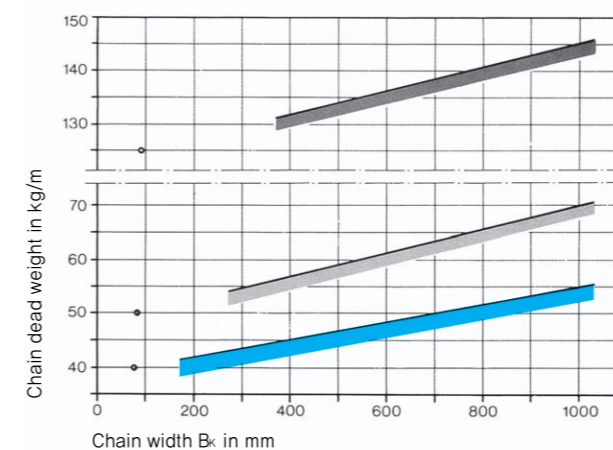
$$L_A = \frac{L_S}{2} + \ddot{U}_B$$

$b_1 = B_K + 25\text{mm}$
 $b_A = B_K + 75\text{mm}$
max part length = 3,000mm

Examples of Guide Trough

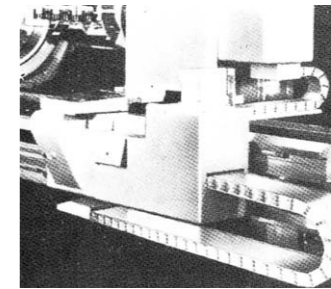
■ Chain dead weight – for dual band chains

- a depending on additional load



- Type SPL 5000
- Type SPL 6000
- Type SPL 7000

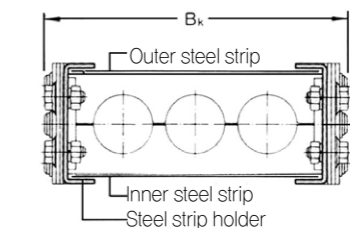
■ Accessories – Steel strip covering



In order to protect the supply cables/hoses from hot shavings and heavy dirt, the drag chains can be supplied with a stainless steel acid-proof spring band steel cover (thickness: 0.4 Or 0.5mm, according to use). Maximum steel strip width : 625mm

Fastening the inner steel strip: with steel strip holder to connecting angles

Fastening the outer steel strip: with the fixing screws, to the connecting angles

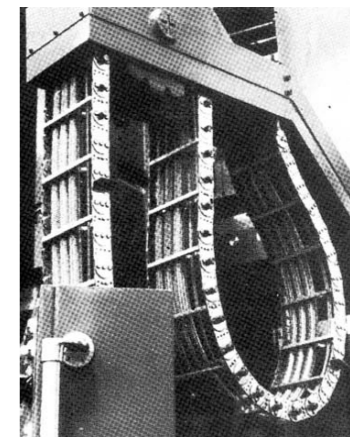


Dimension table

※ Steel strip cover for chain types 2500 and 3200 on request.

Chain type	Steel strip length		Steel strip width
	Outer steel strip	Inner steel strip	
0650.1	$L_K + 280$	$L_K + 130$	$B_K - 20$
0950	$L_K + 360$	$L_K + 150$	$B_K - 25$
1250	$L_K + 470$	$L_K + 170$	$B_K - 32$
1800	$L_K + 640$	$L_K + 200$	$B_K - 40$

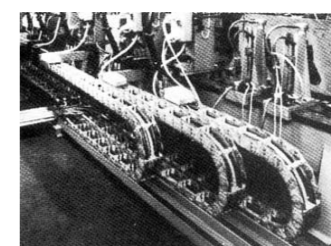
Drag chains with supporting struts



• Drag chains are used as vertically suspended chains with supporting struts in, for example, the machine industry in order to supply energy from control panels of adjustable height. The drag chain is run over gearwheels whose toothing corresponds to the chain pitch, and whose reference circle diameter is greater than or equal to the selected bending radius. It is driven by a separate geared motor or by a counterweight.

The arrangement of this drag chain depends on the unit weight, and should be carried out by our technicians.

Drive arms



• The drag chain is pulled by the connecting angles fastened to the chain bands. A simple steel construction, which in most cases is made by the customer, is all that is needed to connect the drag chain and the mobile unit.

Specially manufactured parts for higher speeds or a large amount of lateral play on request.

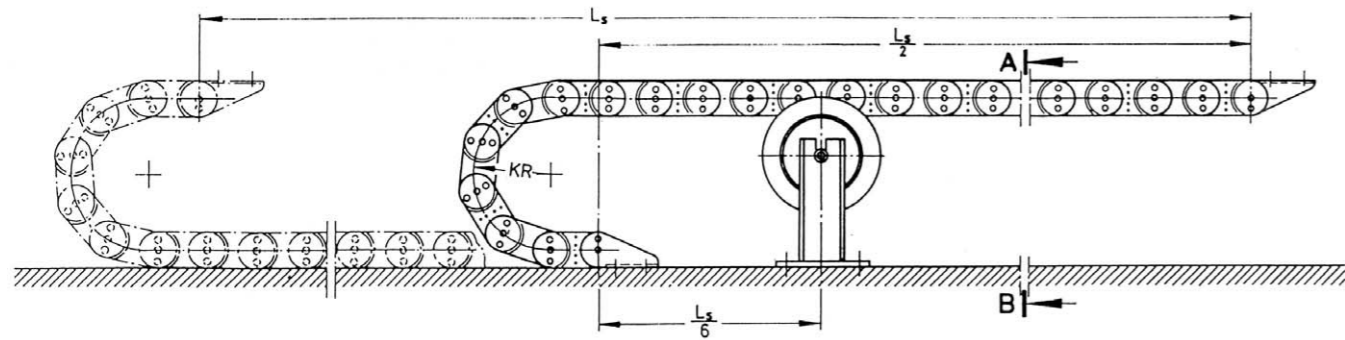
STEEL Cable Chains

SHINFLEX®

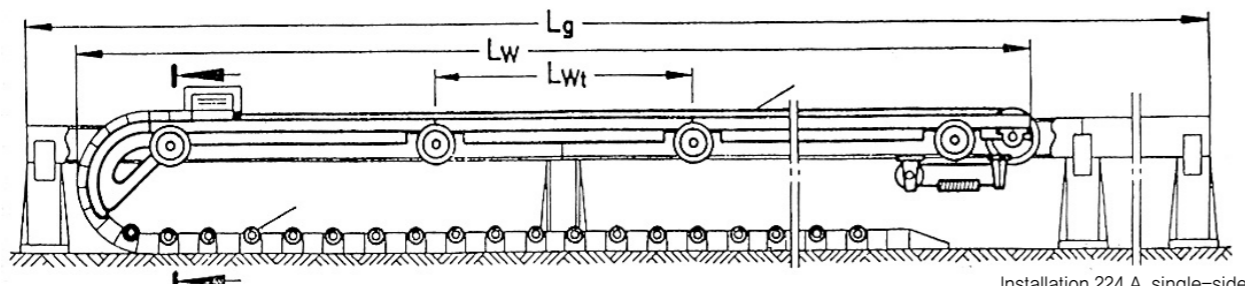
■ To equip special system

With respect to the cable chain which has presently been developed, what is becoming the biggest point of problem was that it was very difficult to instal cable chain in the narrow space, along with prevention of phenomenon being drooped when long cable chain is installed. As result of installing expcriences obtained from installation and undertaking for several years, such point of problems has completely been settled. How to support Supporting Roller enumerated in the following, single circumference equipment, double circumference system, circular cable chain, etc. are our special know-how, and such special system installing, undertaking requires technical consultation in advance, so you are asked to consult us with our technical part or business part in advance.

■ Supporting Roller

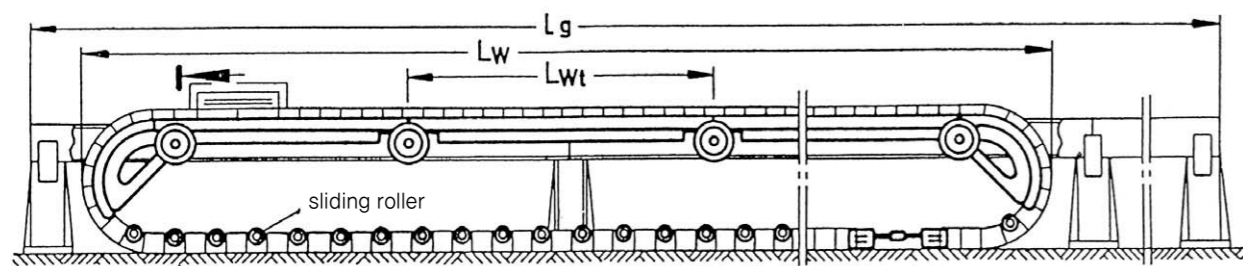


■ Installation Single Side



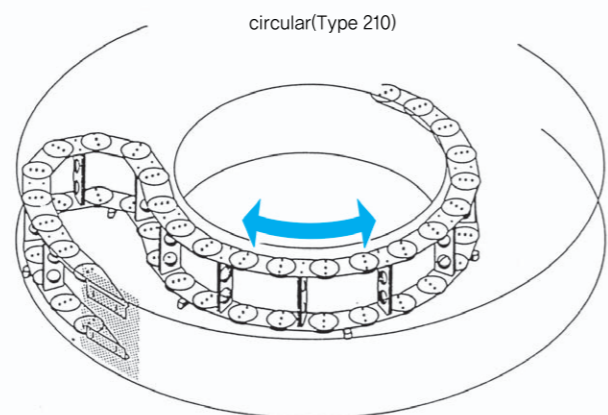
Installation 224 A, single-side

■ Installation Double Side



Installation 224 A, double-side

■ Circular Cable Chain



Completely Enclosed Steel Chain

SECC Cable Chains

NEW!

PATENT

Use of structure

Domestically developed perfectly closed-up type Steel Cable Carrier Chain. Use of structure: As perfect closed-up type applied to Iron manufacturing equipment, conveyance equipment, machine tool, industrial machine, industrial plant equipment, automobile industry, ironworks, rolling equipments, harbor equipments, etc. this is a Perfect Steel Cable Carrier Chain.

Completely enclosed design to protect chain contents from steel and wood chips, dust, etc.

Openable and removable cover frames

Special tough construction with double spring washer, antifriction plates and rivet fixing

Large selection of chain-frames:
-aluminum draw plates cut to size;
-aluminum drilled frames, according to customer drawings

SECC Steel Cable Chain Completely Enclosed Steel Chain

Character

Steel Chain of Perfect-closed type developed domestically for the first time!

Major Use: Absolute perfect Steel Drag Chain of perfect closed-type applied to electrical machines including iron equipments, movement equipment, machine tool, industrial plant, motor industry, iron works, and rolling equipments etc.

Outline: As perfect closed-type made by cover type applying Solide frame Stay, it can be protected from oil, cutting oil and chip, etc, possible for

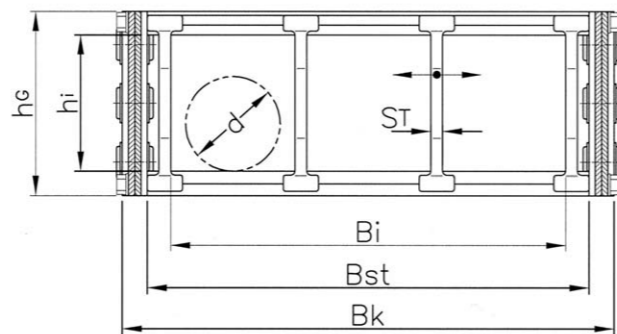
Technical Data

- B_k: Chain width
- B_{st}: Stay width
- t_s: Chain pitch
- h_s: Chain height
- KR: Bending radius
- Sr: Divide thickness
- D: Cable diameter(d1/d2)
- d1: 1.1d for electric cables
- d2: 1.2d for hoses

TYPE	t _s	h _s	KR		STAY TYPE	ST	D _{max}
SECC-0650.1	65	50	75	135	Solid Frame Stay	4	27/25
			95	155			
			115	200			
SECC-0950	95	68	140	260	Solid Frame Stay	4	40/37
			170	290			
			200	320			
SECC-1250	125	94	145	300	Solid Frame Stay	5	63/58
			220	340			
			260	380			
SECC-1800	180	140	265	435	Solid Frame Stay	7.5	95/87
			320	490			
			375	605			

※ Other specification is same with SSC Steel chain

Stay Design



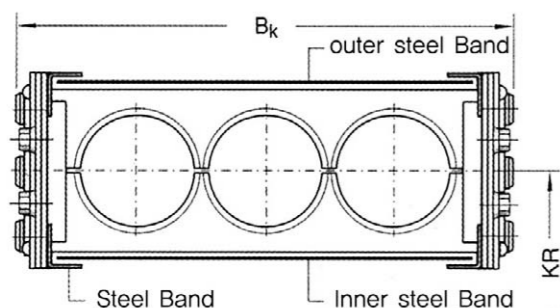
TYPE	B _k min	B _k max	B _k max	B _i
SECC-0650.1	100	500	B _k -15	B _k -35
SECC-0650.1	125	600	B _k -19	B _k -37
SECC-0650.1	150	800	B _k -24	B _k -49
SECC-0650.1	250	1000	B _k -25	B _k -49

SCSC Steel Cable Chain Strip Covered Steel Chain

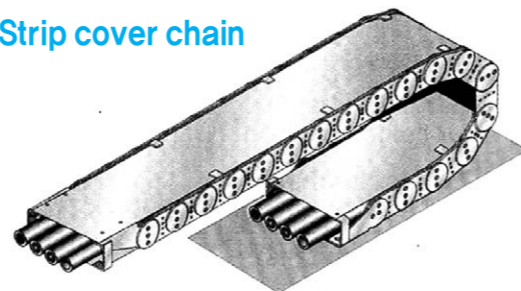
Character

This products electric wire and hose inside the chain, by inserting steel or SUS plate(Strip) in both the upper and lower of steel drag chain. Steel or SUS plate are installed in both the upper and lower parts, it can protect cutting oil, oil, filth and chip from and chip from outside.

Stay Design



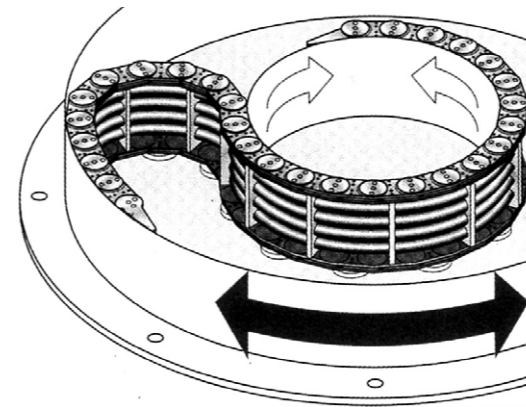
Strip cover chain



TYPE	Striper length		Striper width
	Inner length	outer length	
SCSC 0650.1	L _k +280	L _k +130	B _k -22
SCSC 0950	L _k +360	L _k +150	B _k -27
SCSC 1250	L _k +470	L _k +170	B _k -34
SCSC 1800	L _k +640	L _k +200	B _k -40
SCSC 2500	L _k +945	L _k +255	B _k -48

STEEL CIRCULAR CABLE CARRIER CHAIN

Horizontal-type 60 Circular Rotation Transform-instalment EBV09



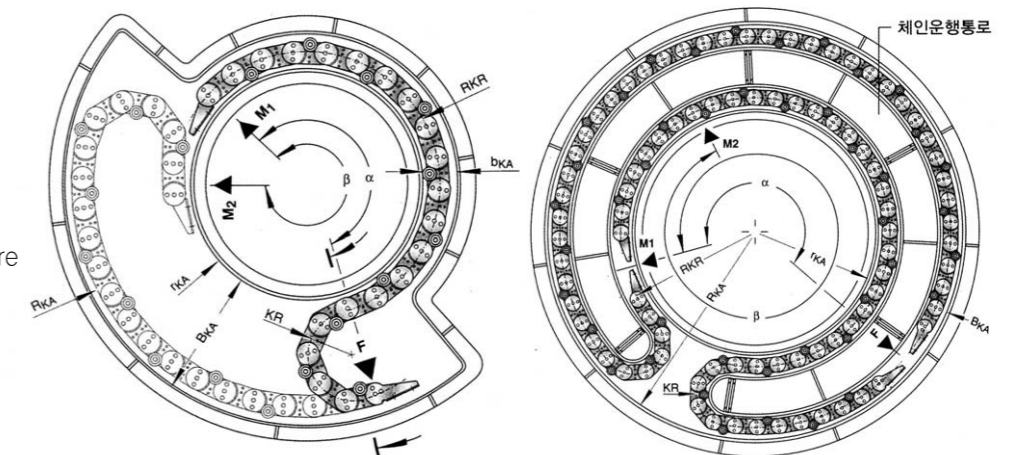
This arrangement works by moving smoothly forming circular by turning 90 attached to the machine.

Generally in this case, this help operate by instaling cable carrier equipments, they are, supporting equipment, cable carrier, bolster, etc, which can move freely.

ROTATION CABLE CHAIN PICTURE TURNING ANGLE UP TO 600

Explanation of term

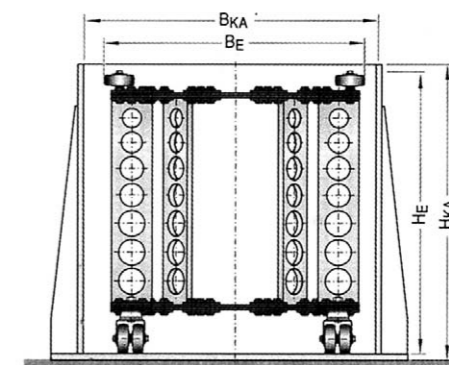
- α: Fixed Viewpoint Angle
- β: Treating course
- BE: Chain movement
- bKA: Pipe of narrow space
- BKA: 관가로
- KR: Radius of Curvature
- RKR: Radius outside of Curvature
- rKA: Radius inside of pipe
- RKA: Radius outside of pipe
- F: Fixed point
- M1: Chain end spot/place 1
- M2: Chain end spot/place 2



CHAIN CONVEYANCE EQUIPMENT AND CHAIN PROGRESS PICTURE

Rotating angle up to 500

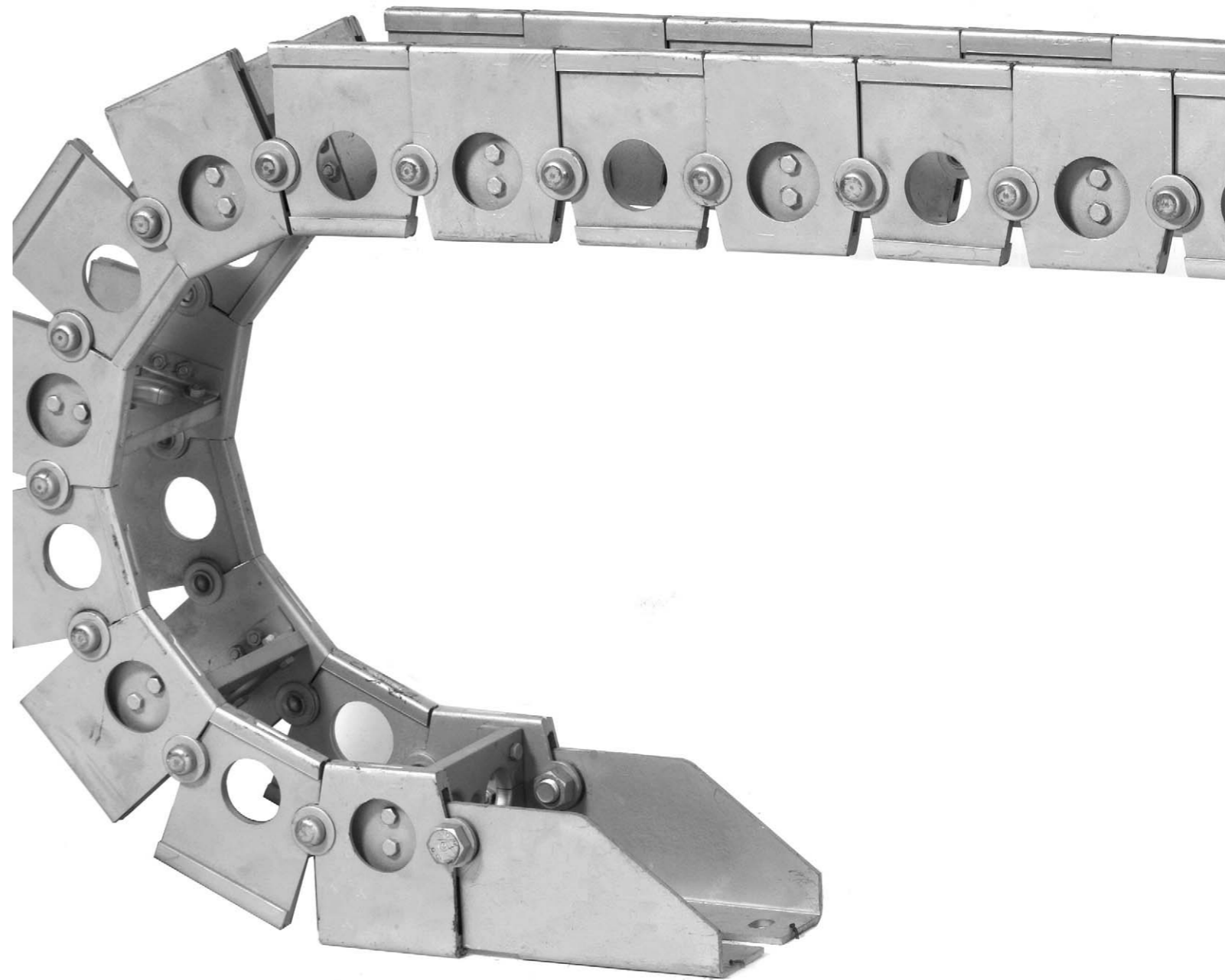
For safety operation taking size and height of chain, etc into consideration, chain is safely operated on the chain conveyance equipment.





SFSC Cable Chains

SFSC Cable Chain is excellent in intensity and durability, and is widely used in all industrial circles of machine tool, industrial machine, transport machine, woodworking machine and steel machine, etc. where accuracy and safety are required.



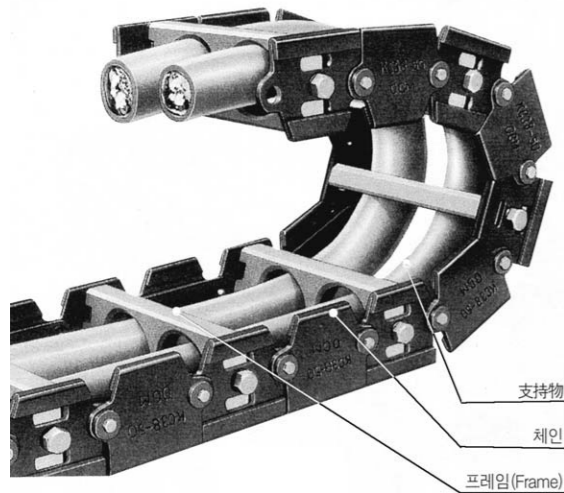
Characteristics

SFSC Cable Chain has four parts of link plate to assemble and disassemble stay. Stay by these parts can surely be preserved. When stay is small, it can support fully as one link plate, and nab! pin case of division-type, it can simply be fixed with two bolts, without connecting a special bolt and division stay. Rink plate is strong against abrasion, and there is no drooping, even when it is used for long time. Also, upon actual user's demand, safety cover of chain is made and provided.

Principle of Operation

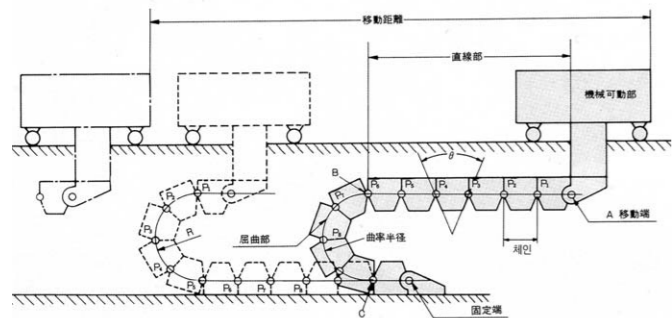
The following sketch is a sketch of operation principle of general way to use the square steel chain. The moving part of chain is attached to machine moving part, fixed part to entrance part of cable, hose, etc. the perimeter side of rink plate of chain is supported as rectangular shape and between A and B is supported at contact face, it becomes horizontal state, as the chain become straight line without a support.

At between bent B and bent C, inside perimeter side of link plate is done as trapezoid shape, angle(O) is always maintaining certain curvature radius(R). Reaching the movement part of machine operation part, we can notice the chain state referring to sign of P1,P2— before and after moving. Likewise, chain moves freely within certain moving distance according to operation part.



Structure

Cable Chain is formed with stay which two series chain and two rinks are mutually connected as regular curvature radius. Support structure of Cable Hose is supported by hole of the stay.



Selection of Square Steel Chain

Selection is drawn up based on the following conditions. Also, in case of excepting the catalogue descriptions, or in case where it is difficult to select, the moving distance is too long, you are requested to contact the technical Dept. of our company for consultation.

1. Installation : Chain should be installed in the central position horizontally
2. Fixed part : Should be installed in the central position of moving distance.
3. Moving speed : under 60m/mm
4. Surroundings should be good
5. Should use stain fitted to chain.

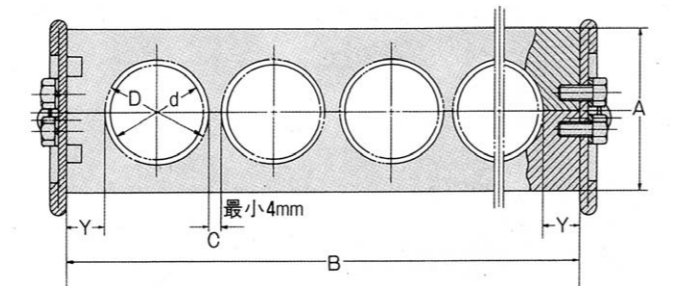
Required item	Unit	Description
Out diameter—nos of support	mm	Necessary in deciding stay specification
Weight of support	kgf/m	Total weight of support
Allowable curvature radius of support	mm	Decided by characteristic of support
Required Moving distance	mm	Decided by the stroke of machine

How to select

1. Stay No. and applied chain No. (Temporary selection)
It shall be decided from the support biggest outside diameter of standard stay size table, from chain no. and marking where is applied selecting stay no.
2. How to select Chain Number
Using simple selection diagram, please select chain which meets the weight of support and the required moving distance from the allowable curvature radius of support. Also, in case where the selected chain is smaller in size than the applied chain number of 1 item, please decide a chain in the least size from the applied chain.
3. How to select stay
If the stay selected by 2 item is in chain number applied by 1 item, the stay selected by 1 item is better, and in case of bigger size than it, on the contrary, please select the stay size number applied to the chain from standard stay diagram.
4. How to decide stay hole
Stay hole is decided by the following diagram

Biggest outside diameter of support	Stay Hole diameter D
Under 20	d+1~2
Under 20, above 40	d+2~3
Above 40	d+3~4

5. How to decide standard stay size (AXB)
A decides Stay Number, please decide, after getting the least required width (b) of stay for B according to the following



Stay width, least required width, diameter total of stay hole space total of stay hole, distance to link plate inner wall from stay hole wall. (see the following diagram)

(Notice) Though the space O of Stay Hole is 4mm to the least, please do with spare in case of hydraulic hose, etc.

Stay Number	Numerical value of Y
SFSC 38	10
SFSC 60	10
SFSC 60H	10
SFSC 75	10
SFSC 75W	10
SFSC 100	10
SFSC 100-2	10
SFSC 125-2	10

Link Number of Cable Chain and Necessary Number of Stay

Calculation of Chain Link Number

When chain selection is made, the required least number of chain is gained by the following expression.

$$L_{min} = \frac{S}{2} + \pi R + 2A_1$$

(In case where the fixed part is in the center of moving distance)

Here, L_{min} = required least length mm
 S = required moving distance
 R = Curvature radius of chain mm
 A_1 = Coupling length of cable chain to spare mm

For decision of link number, it is gained by the following expression.

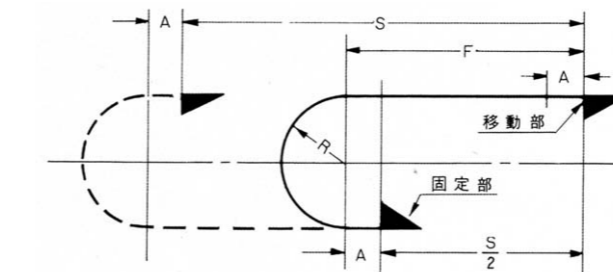
$$Q_1 = \frac{L_{min}}{P} = \frac{\frac{S}{2} + \pi R + 2A_1}{P}$$

Here, Q_1 = link number
 P = chain pitch mm

Single number under the decimal point of L_1 numerical value gained from the above expression is rounded off and in case where the numerical value becomes an even number link, cardinal number with 1 link added (both ends link on formal way) is necessary. When corrected above, both the length of proper chain and length of chain link are changed, it is necessary to calculate again.

$$L_{min} : P \times Q \quad A = \frac{L - (\frac{S}{2} + \pi R)}{2} \quad F = \frac{S}{2} + A$$

Here, L = Chain length after corrected, mm
 Q = Link number after corrected
 A = Length to spare after corrected mm
 F = Free Span of Chain mm



How to select Stay Shape

There are one boy type and division type in Stay, and division type is convenient to use in the following cases, as it is easy to put support to it and take off. The way to get the size is same to both one body type and division type.

- In case where the moving distance is long,
- In case where one uses electric wire attached by coupling, electric wire, etc. or hydraulic hose,
- In case where number of support is many.

As for chain selection from the former moving distance, please re-confirm if Free Span gained by chain length after corrected, is more than the allowable numerical value from the support weight to spare, in the simple selection diagram.

Calculation of Stay

Stay of our SFSC Cable Chain to put and take off can be gained wholly by the following expression regardless of size.

$$N = \frac{Q-1}{2}$$

Here, N = Stay number Q = Link number after corrected

[Calculation instance]

(Question) How do SFSC75 Cable chain link nos, stay nos and chain free span become in the following conditions ?

- Required moving distance: 8,000mm
- Length to spare: $A_1 = 70$ mm
- Curvature radius $R = 200$ mm (support roller is installed in two places)

(Answer) Calculation of Link nos.

$$Q_1 = \frac{\frac{S}{2} + \pi R + 2A_1}{P} = \frac{\frac{8000}{2} + 3.14 \times 200 + 2 \times 70}{75} \approx 63.57$$

In such case, When rounding off from below decimal point, it becomes 64. Here, when changed to odd number again, it becomes 65 links.

Required number of Stay is as follows: $N = \frac{Q-1}{2} = \frac{65-1}{2} = 32$

So, the number after correcting becomes as follows.

Chain length after correcting = $P \times Q = 75 \times 65 = 4,875$ mm

Length to spare after correcting $A =$

$$A = \frac{L - (\frac{S}{2} + \pi R)}{2} = \frac{4875 - (\frac{8000}{2} + 3.14 \times 200)}{2}$$

Free Span of Chain $F = \frac{S}{2} + A = \frac{8000}{2} + 123.5 = 4123.5$ mm

With respect to 4,123mm, in case of chain free, as calculated by being installed with support rollers in two places, it is necessary to multiply 1/2 of this numerical value.

$$4,123.5 \times \frac{1}{2} = 2,061.75\text{mm}$$

Above calculation becomes Free Span which is actually used, and the allowable weight of support becomes about 40kgf/m, from simple selection diagram, so they can be used within this. Also in case of support roller 1 place, it is good to multiply 2/3 in accordance with support roller two places.

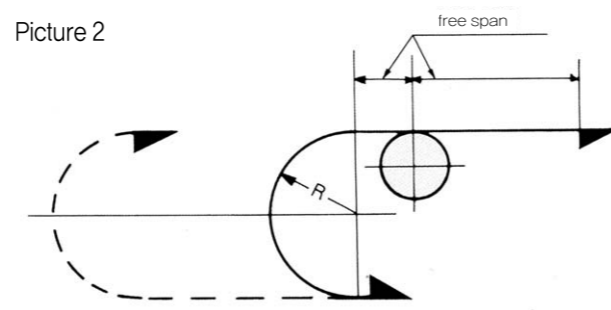
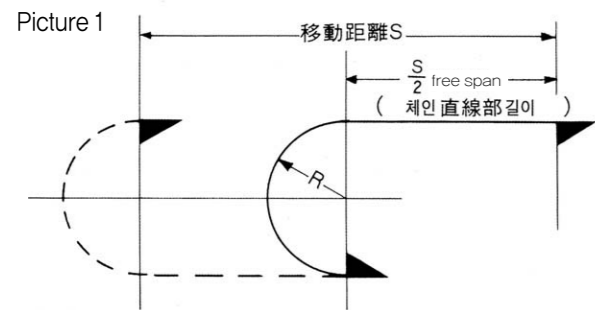
(Remarks)

Length of support and hose, is proper when it expresses, [(pitch x link number + take-in length) x 1.02, so when hose of high voltage is used, the length is contracted, so please decide by seeing the catalogue of hose maker.

RELATIONSHIP BETWEEN MOVING DISTANCE OF CABLE CHAIN AND SUPPORT ROLLER

Free Span, allowable Free Span

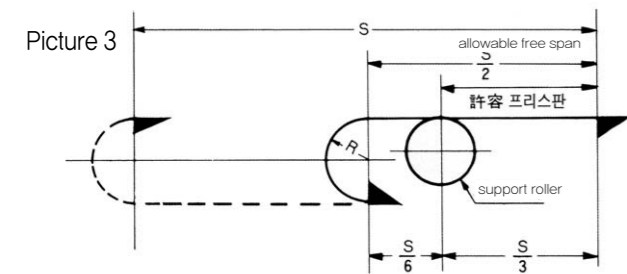
The length of straight line part of chain afloat in the air, required to the certain moving distance of machine is called "Free Span". Like the picture 1, when there is no support, Free Span becomes 1/2 of certain moving distance(S). In the same time, chain has long moving distance, so it is supported with support roller. In this case, Free Span becomes like picture 2. Next, with size of cable chain and weight of support, for allowable numerical value of Free Span, the maximum numerical value allowed hereafter is called "Allowable Free Span"



INSTALLATION OF SUPPORT ROLLER

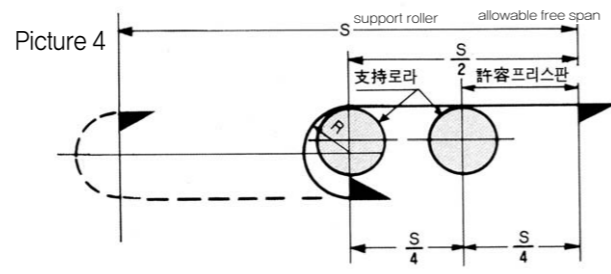
1. In case of Support Roller one place

When installed in the position of picture 3 for support roller one place, the moving distance becomes like the following. Moving distance = allowable free span x 3



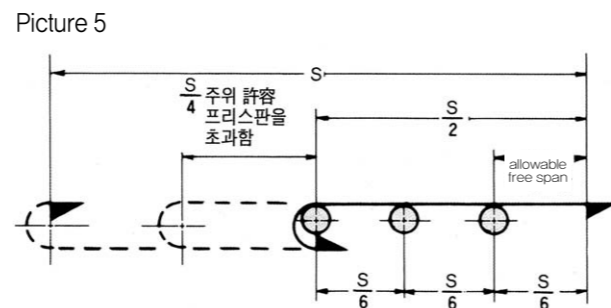
2. In case of Support Roller two places

When support roller two places are installed in the position of picture 4, the moving distance becomes like the following. Moving distance = allowable Free Span x 4



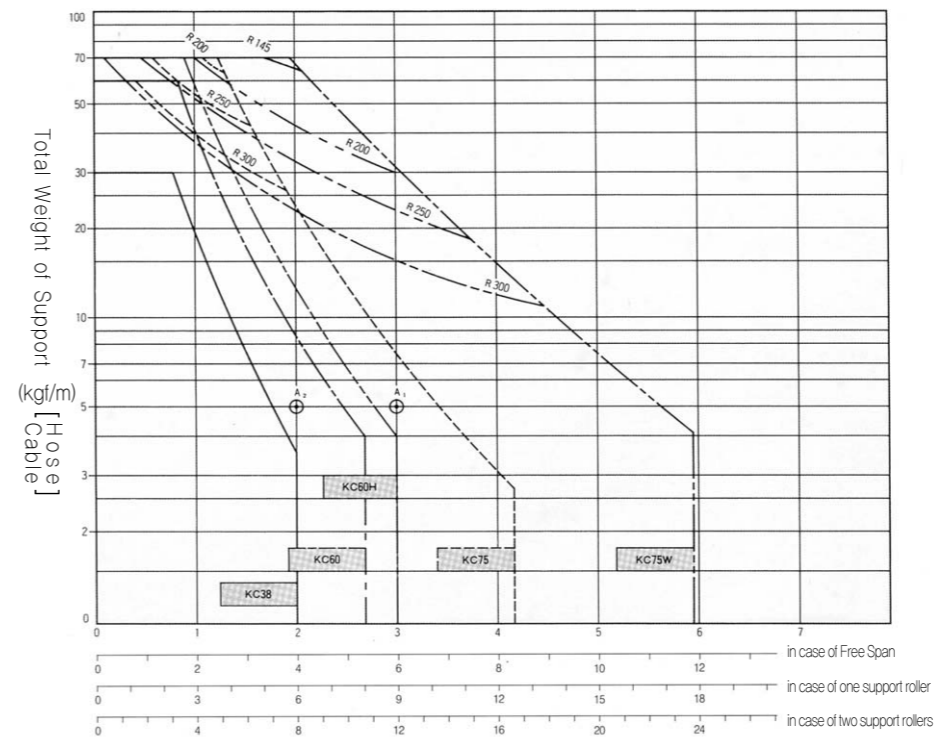
(Notices)

Support Roller can't be installed more than three places. When roller space is done with allowable free span (see picture 5), it becomes part of Free Span which exceeds the allowable free span within the certain moving distance.



SIMPLE ELECTION DIAGRAM(1)

SFSC 38, SFSC 60, SFSC 60H, SFSC 75, SFSC 75W



(Notice) 1. For SFSC 38, don't use support roller. Also, don't use SFSC 60, if possible.
2. For SFSC 38, SFSC 60, SFSC 60H, capacity is decided regardless of curvature radius.

How to see Diagram, how to select the specification

By Gaining the intersectional point between the whole weight (avertical shaft) of Support and certain moving distance (horizontal shaft), and decides after seeing to which chain number the area belongs. When the intersectional points become more than two kinds, please select smaller size.

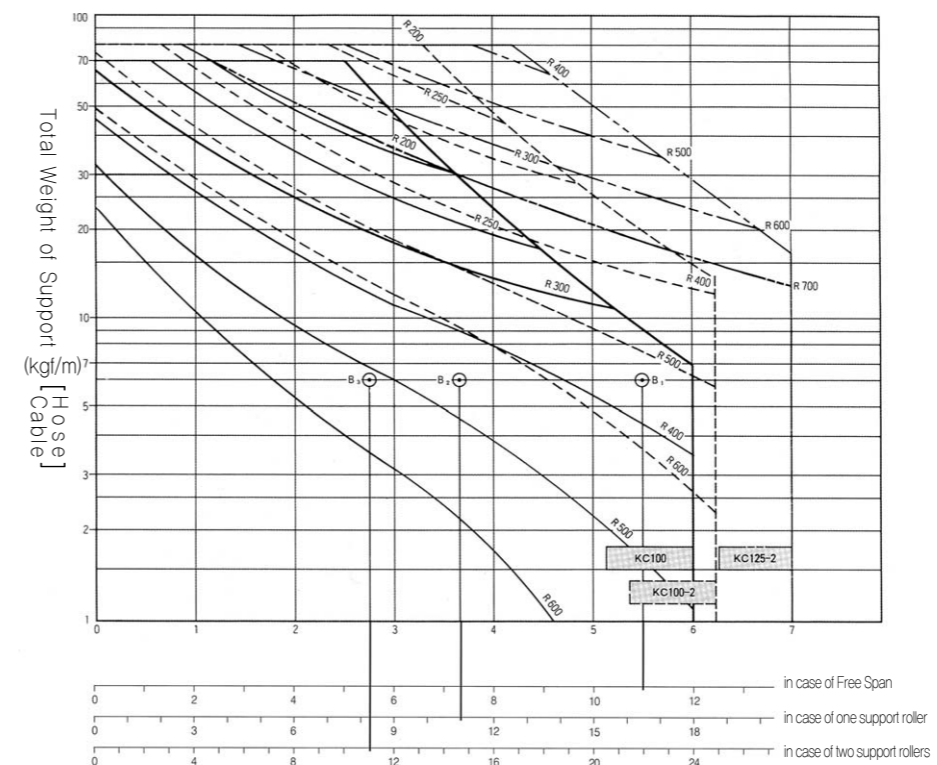
(Instance 1) (Question) With total weight of support 5kgf/m, when the allowable curvature radius of support is 280mm, and the certain moving distance is 6m, which is better, in selecting cable chain?

(Answer) First of all, please review the case which is free with support roller not used. When we gain the intersectional point A1 of both the whole weight of support and moving distance 6m (horizontal shaft), the point is in the area of both SFSC 75 and SFSC 75W. In such case, there are two kinds of chains which meet with the conditions, but as aforementioned, it becomes SFSC 75 selecting the smaller size. Next, when we select the least radius, bigger than the allowable curvature radius, for curvature radius, above A1 fitted to 300mm becomes R 300.

(Notice) When one support roller is installed, it becomes intersectional point A2 by selecting with same way, and SFSC 60 also meets the condition, but it is above ordinary chain size, so it is economical not to use support roller.

SIMPLE ELECTION DIAGRAM(2)

SFSC 100, SFSC 100-2, SFSC 125-2



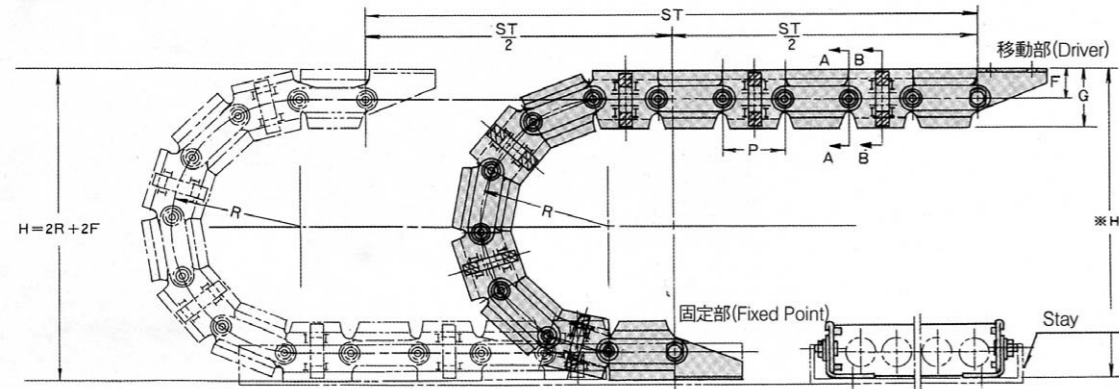
(Notice) 1. SFSC 100-2, SFSC 125-2 is a structure which two rink plate two sheeets were united and the curvature radius becomes bigger, so for SFSC 100, like less than DFSC 75, rink plate is formed with one shect, so as for the curvature radius above R 500, please let it become as lower as possible

How to see Diagram, how to select specification

In case where the allowed curvature radius 450mm of support and the required movement distance 11m, with total weight 6kgf/m of support, which is narrow in selecting cable chain?

(Answer) For curvature radius, the least radius, bigger than the allowable curvature radius 450mm is used. So 500mm is selected. As for chain selected item, in the same way, like (example 1) intersecting point is gained, when reviewing the case of free, so SFSC 100-2 is used. In the case where support roller is installed to one place, it becomes intersecting point B3, and can't use SFSC 100. On the case where roller are installed to two places, it becomes intersecting B, and can use SFSC 100 as well. As marked in the simple selection diagram, it becomes the curvature radius R500, and in such case, it is decided as SFSC 100-2 R500.

SQUARE STEEL CABLE CHIN STANDARD



- Chain Stay (please use Stay just shown in the following diagram)
- Please make H become a little higher than H by about 10mm, than H, height at attaching side of machine movement part.

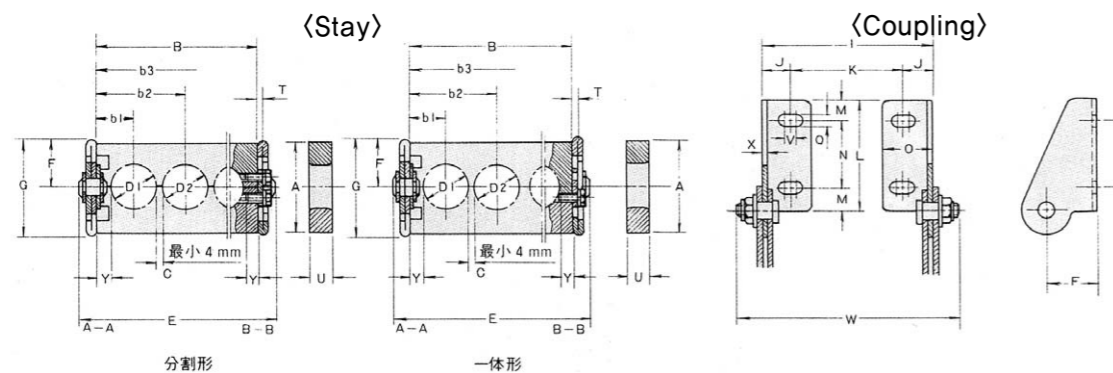
Standard Curvature radius

CHAIN TYPE	Pitch P	Standard Curvature Radius R											
SFSC 38	38	50	75	90									
SFSC 60	60		75	90	125								
SFSC 60H	60		75	90	125								
SFSC 75	75				125	145	200	250	300				
SFSC 75W	75				125	145	200	250	300				
SFSC 100	100						200	250	300	400	500	600	
SFSC 100-2	100						200	250	300	400	500	600	
SFSC 125-2	125									400	500	600	700

Each part Dimension Diagram

CHAIN TYPE	P	F	G	U	E	Y最小	T	체인개량중량 (kg/m)
SFSC 38	38	20	38	10	B+13.6 (+16.0)	10	2.0	2.0
SFSC 60	60	27.5	55	10	B+15.8 (+18.2)	10	2.3	3.0
SFSC 60H	60	27.5	55	10	B+19.4 (+21.8)	10	3.2	3.9
SFSC 75	75	35	70	15	B+22.4 (+25)	10	3.2	6.4
SFSC 75W	75	70	105	15	B+22.4 (+26.6)	10	3.2	8.5
SFSC 100	100	75	115	20	B+28.6 (+32.8)	18	4.5	10.3
SFSC 100-2	100	75	115	20	B+47.0 (+51.2)	18	4.5	19.7
SFSC 125-2	125	95	150	20	B+47.0 (+51.2)	18	4.5	28.1

- (Notice) 1. SFSC 100-2, SFSC 125-2 are structure united by two sheets if Rink plate, and it can be a little different from the shape of the chart, so be care about it.
 2. () dimension of E indicates the case where safe cover is sticked, For indication of cable chain sticked by safe cover, please fill SF in the next to Chain Type.(example SFSC 75, SF-R200)



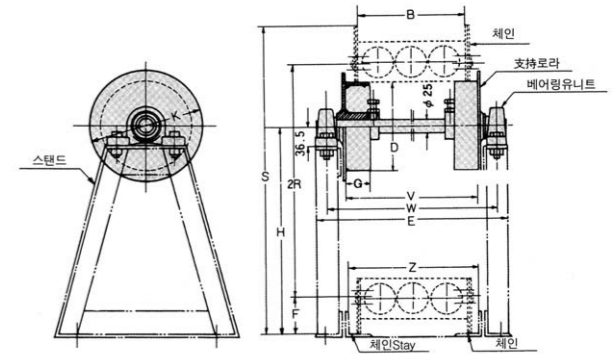
Coupling Size Table

CHAIN TYPE	I	J	K	L	M	N	O	Q	V	X	W
SFSC 38	B+4.0	14	B-24	50	10	30	25	6.4	4	2.0	B+23
SFSC 60	B+4.6	13.3	B-22	60	15	30	28	8.8	5	2.3	B+27
SFSC 60H	B+6.4	14.7	B-23	60	15	30	29.3	8.8	5	3.2	B+31
SFSC 75	B+6.4	24.2	B-42	80	15	50	40	8.8	10	3.2	B+39
SFSC 75W	B+6.4	24.2	B-42	80	15	50	40	8.8	10	3.2	B+39
SFSC 100	B+9.0	25	B-41	100	20	60	47	14	10	4.5	B+48
SFSC 100-2	B+39	35	B-31	100	20	60	65	14	10	6.0	B+68
SFSC 125-2	B+39	40	B-41	125	25	75	75	18	10	6.0	B+68

- (Notice) 1. For coupling of SFSC 100, SFSC 100-2, it is necessary to be attached toward outside direction.
 2. There is no division type in SFSC 38.
 3. SFSC is omitted in the Type blank of applied chain. (example SFSC 38 = 38)

Standard Stay Size Table

CHAIN TYPE	max.outside diameter of support	Standard stay size AxB										Applied Chain Type	
SFSA 35	Ø18以下	35x60	35x80	35x100	35x150	35x200	35x250	35x300					38, 60H, 60H
SFSA 45	Ø27以下	45x80	45x100	45x125	45x150	45x200	45x250	45x300	45x350				60, 60H
SFSA 50	Ø32以下	50x80	50x100	50x125	50x150	50x200	50x250	50x300	50x350	50x400			75, 75W
SFSA 65	Ø48以下	65x80	65x105	65x125	65x150	65x200	65x250	65x300	65x350	65x400	65x450	65x500	75, 75W, 100, 100-2
SFSA 75	Ø55以下		75x105	75x125	75x150	75x200	75x250	75x300	75x350	75x400	75x450	75x500	75, 100, 100-2, 125-2
SFSA 90	Ø60以下				90x150	90x200	90x250	90x300	90x350	90x400	90x450	90x500	90x550, 90x600
SFSA 110	Ø80以下				110x150	110x200	110x250	110x300	110x350	110x400	110x450	110x500	110x550, 110x600



Support Roller Standard Table

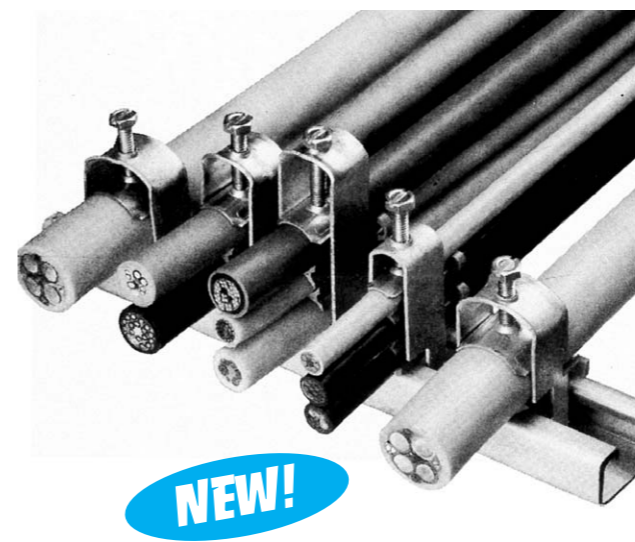
CHAIN TYPE	Dimension	V	W	E	Chain Curvature radius	F	H	S	D	G	K	Z
SFSC 75	80	B+45	B+115	B+153	125	35	2R-82.5	2R+70	165	45	205	B+40
SFSC 75W	80	B+45	B+115	B+153	125	70	2R-47.5	2R+140	165	45	205	B+40
SFSC 100	100	B+66	B+144	B+182	200	75	2R-75	2R+150	216	50	270	B+60
SFSC 125-2	100	B+66	B+144	B+182	300	95	2R-70	2R+190	216	50	270	B+60

Chain & Stay

1. Chain type indication
 Indicates both chain type and curvature radius.

2. Stay indicatuon
 Indicates Stay, Stay Number and length, Division type
 In case of Stay, S is attached to the end of Stay B dimension.
 Stay type x Stay B dimension(example SFSA 50x 100S0)

Tension reductions for electric cables



The professional cabel tension reduction belongs to completing the reliable cable carrier system.

The diameter adapted cables and hoses have to be clamped at the end points of the cable carrier system. The clamping surface should be lacated in a distance of $\geq 30 \times$ largest single diameter with regard to the last movable hinge of the cable carrier system, in order to achieve tension compenstation between them movable and unmovable cable sections.

Principally the SHINSUNG instructions for installing the cables/hoses into cable carrier systems have to be considered!

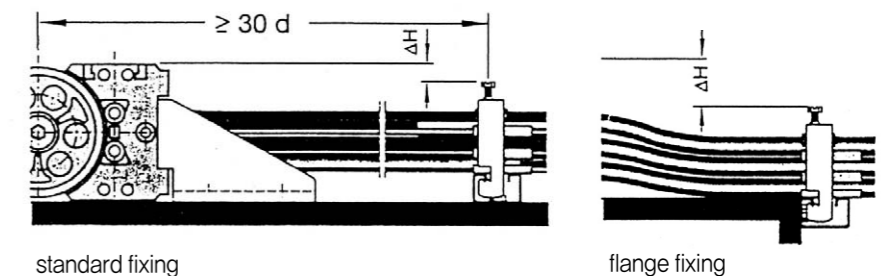
Tension reduction on both sides:
 As per standard both sides should be tension reduced. The forces acting with cable carrier systems should not be transmitted to cables/hoses!

One-side tension reduction:
 In som cases the one-side tension reduction of cables/hoses can be necessary or significant.

Limitation of applications:

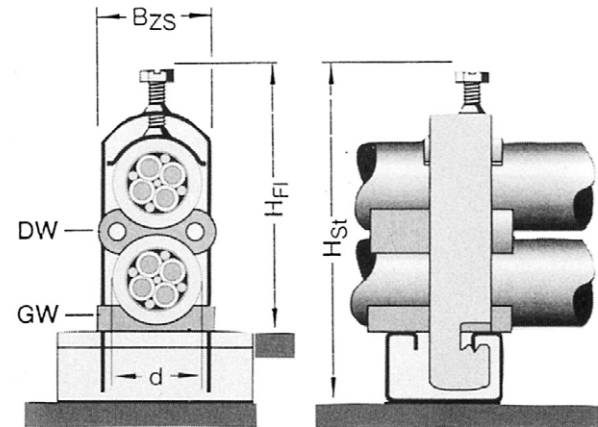
This tension reduction device has always to be installed at the driver, i.e. at the movable end of the cable carrier system.

A dimension of at least ΔH 10mm should be respected between screw head and top edge of the cable carrier system in case of a cable carrier system sliding with the upper part on the lower part!



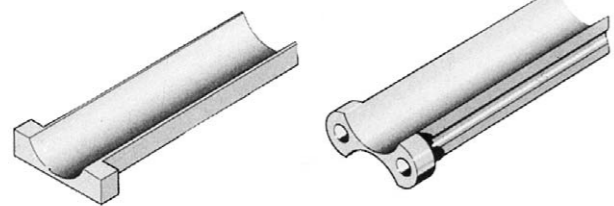
SFSC Cable Chains

Total tension reduction

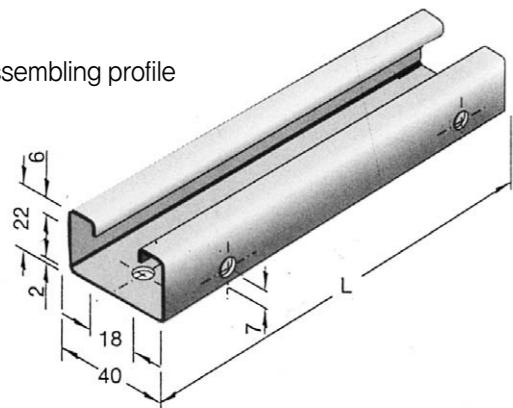


Countertrough SGW

Double trough SDW



Assembling profile



Assembling profile for tension reduction clamps

- for standard and flange fixing
- solid design, galvanized
- suitable for one-, double- and triple clamps
- clamp to be fixed laterally and from above
- assembling profile to be screwed at the ends fixing holes to be drilled during assembling, max. hole $\varnothing 8.5\text{mm}$ (for bolts M8)
- Available length L : as per order
- Weight : 1,650kg/m

Tension reduction elements

Further sizes and types on request!

Definitions:

d = outer diameter of cables/hoses

Bzs = width of the tension reduction clamp

Hst = installing height with standard fixing

HFI = installing height with flange fixing

*suitable for diameter range 6–8mm only with sufficient rigid coating

SZS-1—single clamp for one cable/hose

type	for cable/hose diameter d	installing height in mm		width Bzs in mm	article no.
		Hst	HFI		
K 12 AC	6* – 12mm	58 – 64	36 – 42	18	17500
K 16 AC	> 12 – 16mm	65 – 68	42 – 46	22	17507
K 20 AC	> 16 – 20mm	69 – 72	46 – 50	26	17508
K 24 AC	> 20 – 24mm	73 – 76	50 – 54	31	17509
K 28 AC	> 24 – 28mm	77 – 80	54 – 58	35	17511

SZS-2—double clamp for two cables/hoses above each other

type	for cable/hose diameter d	installing height in mm		width Bzs in mm	article no.
		Hst	HFI		
K 12/2 AC	6* – 12mm	68 – 80	46 – 58	18	17512
K 16/2 AC	> 12 – 16mm	81 – 88	58 – 66	22	17513
K 20/2 AC	> 16 – 20mm	91 – 98	68 – 76	26	17514
K 24/2 AC	> 20 – 24mm	101 – 108	78 – 86	31	17515
K 28/2 AC	> 24 – 28mm	109 – 116	86 – 94	35	17516

SZS-2—triple clamp for three cables/hoses above each other

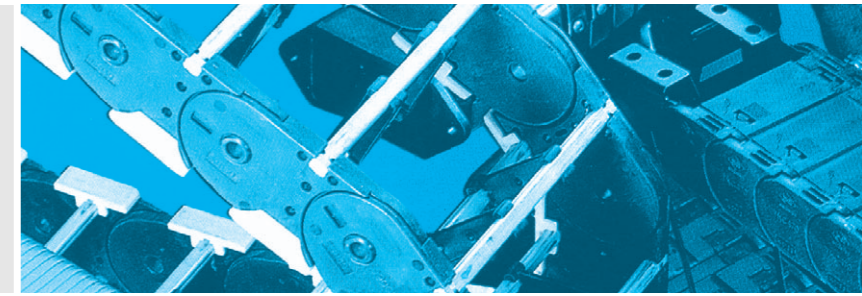
type	for cable/hose diameter d	installing height in mm		width Bzs in mm	article no.
		Hst	HFI		
K 12/3 AC	6* – 12mm	82 – 94	50–72	18	17517
K 16/3 AC	> 12 – 16mm	96 – 108	74–86	22	17518
K 20/3 AC	> 16 – 20mm	110 – 120	86–98	26	17519
K 24/3 AC	> 20 – 24mm	122 – 134	100–112	31	17521
K 28/3 AC	> 24 – 28mm	136 – 146	112–124	35	17522

SGW—counter trough for constant clamping pressure reception

type	clamping range for cable/hose outer diameter	article no.
GW 6–12	6* – 12mm	17523
GW 12–16	> 12 – 16mm	17524
GW 16–20	> 16 – 20mm	17526
GW 20–24	> 20 – 24mm	17527
GW 24–28	> 24 – 28mm	17528

SDW—double trough for clamping pressure reception on both sides

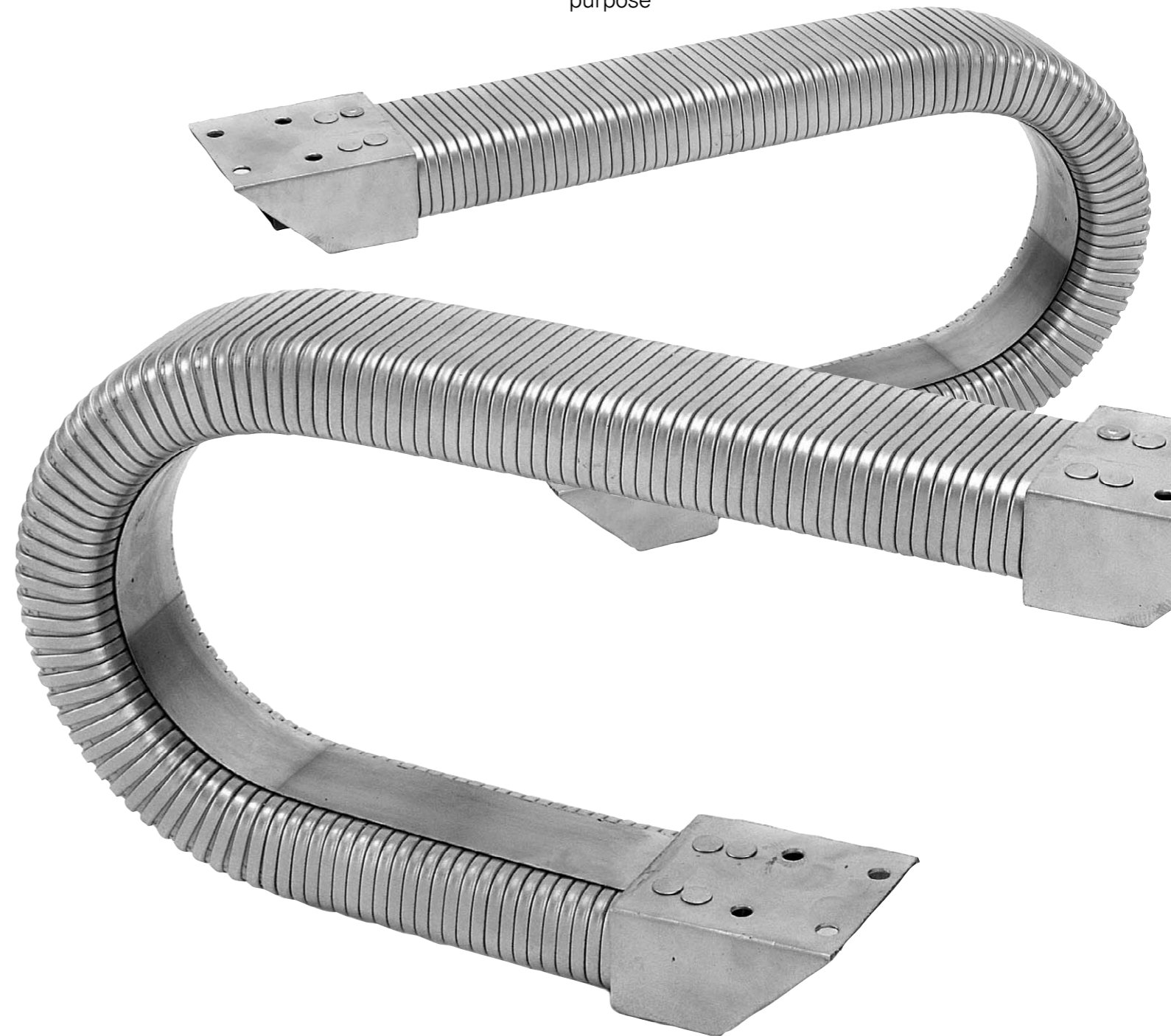
type	clamping range for cable/hose outer diameter	article no.
GW 6–14	6* – 12mm	17529
GW 14–22	> 16–22mm	17532
GW 22–30	> 22–30mm	17533



Cable Duct

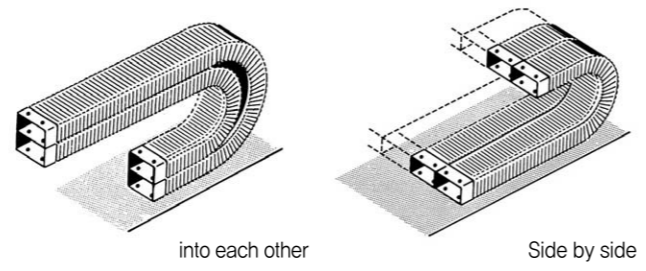
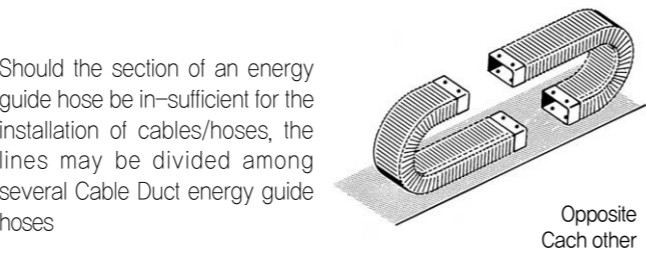
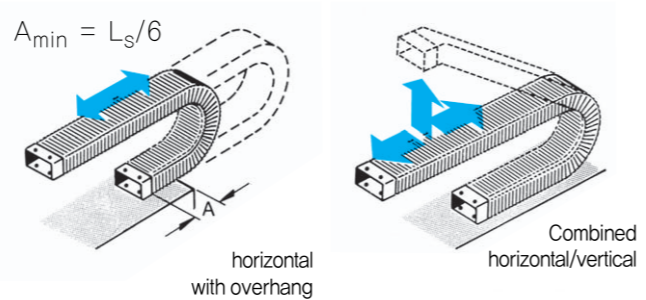
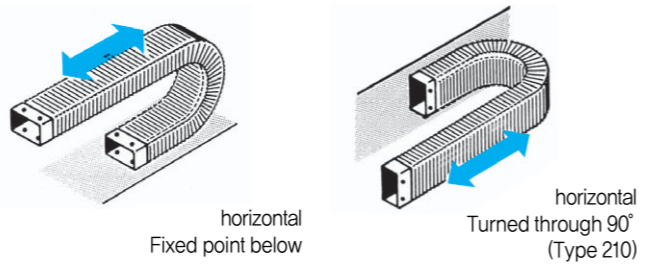
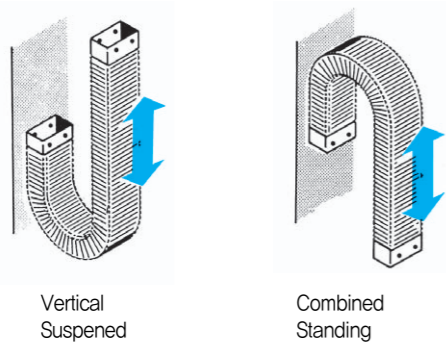
Mojo

machine tools, industrial machine, robot industrial purpose



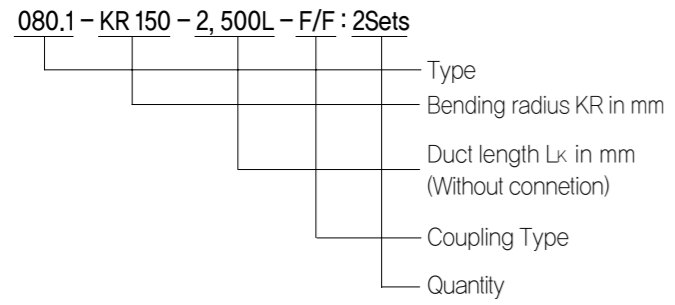
Character

The SHINSUNG Cable Duct are used for the guide of cables and hoses to movable consumers. Cable Duct guide hoses consist of flexible metal spiral tubes which are cantilevered in certain lengths by inserted, Pretensioned special steel bands. Energy guide hoses Cable Duct can be used for horizontal, for vertical and for combined horizontal-vertical motions. The use at a movable consumer requires scarcely constructive preconditions.

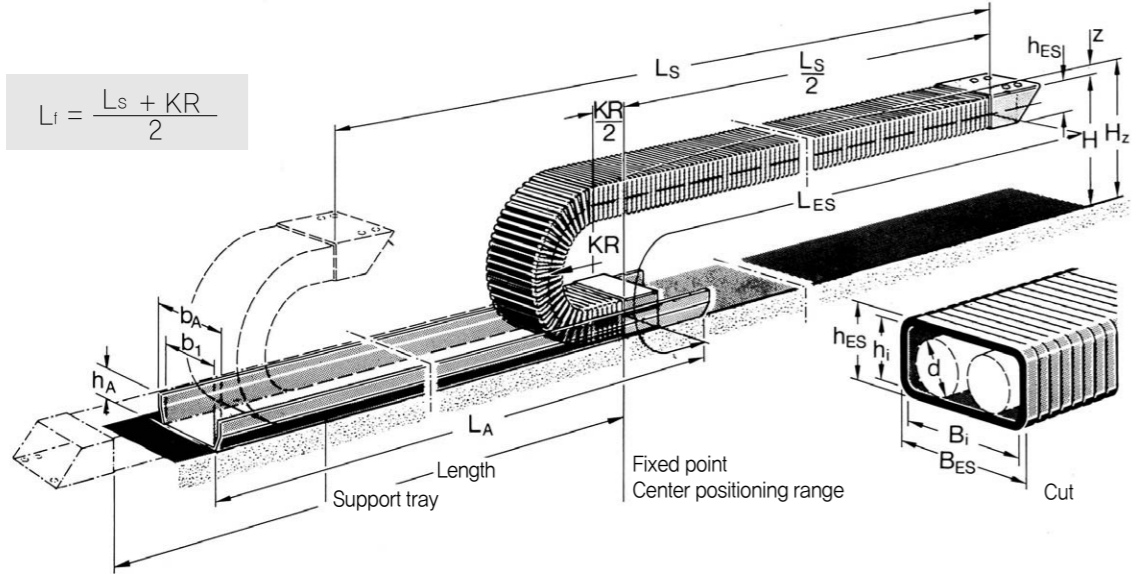


Should the section of an energy guide hose be insufficient for the installation of cables/hoses, the lines may be divided among several Cable Duct energy guide hoses

Order code for the cable duct



Technical data



$$L_f = \frac{L_s + KR}{2}$$

Cable Duct connection

The fixed point connection should be ensured in the centre of the travel stroke as this produces the shortest connection between fixed point and movable consumer and thus the most economic length of energy guide hose and line.

Straight-line length of energy guide Cable Duct

$$L_{es} = \frac{L_s}{2} + L_B$$

Circular dim, LB(table of dimensions)

Support tray

For the support of the Cable Duct energy guide Cable, an even surface or possibly a support tray will be required.

Purchase-order length of energy guide Cable Duct

$$Length = L_{es} - LVK$$

Cable shortening LvK(table of dimensions)

Required clear height :

$$H_z = 2KR + h_{es} + Z$$

Prestress z = 50mm

Legth of support tray :

$$L_A = \frac{L_s}{2} + ZA$$

Length allowance Za(table of dimensions)
sheet thickness : 1,5mm
Max.part length : 3000mm

Table of Dimensions:Further dimensions available upon request

• Subject to alternation!

TYPE SCD	030.1	050.1	050.2	080.1	080.2	080.3	110.1	110.2	110.3	170.1	170.2	170.3																	
Cable duct width	mm	30	50	50	85	85	85	115	115	115	175	175																	
Cable duct height	mm	30	30	50	45	60	85	60	80	115	80	175																	
Cable inside width	mm	26	45	45	80	80	80	109	109	109	170	170																	
Cable duct inside height	mm	24	24	44	40	54	78	53	73	108	72	167																	
Bending rading KR	mm	80	75	100	150	110	150	200	100	150	200	150	200	250	200	250	300	190	250	350	250	300	400	365					
Circular dim L _B	mm	330	310	415	620	455	620	830	415	620	830	620	830	103	830	620	830	1035	830	1035	1450	1245	790	1035	1450	1035	1245	1660	1510
Built-in height H	mm	190	180	230	330	270	350	450	245	345	445	360	460	54	485	360	460	560	480	580	780	715	460	580	780	610	710	910	905
Permissible unsupported hose Length L ₂	mm	1000 - 1500						1500 - 2000						1500 - 2500															
Cable duct shortening LVK	mm	depending on Loading																											
Cable duct weight without joining pieces	kg/m	45	45	80	70	95	135	95	125	180	125	175	245																
Length allowance for support tray	mm	220	215	250	325	275	335	410	280	350	425	355	430	505	445	375	450	525	460	535	685	630	445	535	685	550	625	775	755
Tray inside width b ₁	mm	40	65	65	100	100	100	135	135	135	200	200	200																
Tray total width	mm	55	80	80	115	115	115	150	150	150	215	215	215																
Tray height h _A	mm	20	20	20	20	20	20	20	20	20	20	20																	

1) Bending radius:

The bending radius depends in general on the engineering conditions. For its determination attend to the minimum required bending radius specified by the manufactures of the service lines. specified bending radius = KR max Prodation Conditioned allowancesi - 20 - 30mm

Number and outside diamter of the cables/hoses to be insalled(attend to fixed armatures)
Weight of cables or hoses including of hose content
Required minimum bending radius of cables or hoses as per manufacturer's statement.

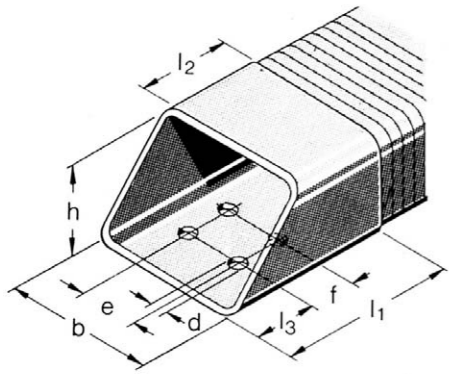
2) Permissible unsupported Cable length L_f

Cable Duct energy guide hoses can be used in horizontal applications within the stated permissible unsupported lengths without additional supports. If the permissible unsupported length of the energy guide hose is exceeded, the required stroke can possibly be reached by a support, this does reduce, however, the permissible unsupported length L₁ by abt. 20%!

- Travel of the consumer
- Max. acceleration or deceleration
- Speed of travel
- Frequency of travel
- Available mounting width
- Installation variant dwg if possible
- Type of connection
- Working environment

CABLE Duct

■ Fitting dimension for Energy guide Cable Duct Diagonal connector Dimensions

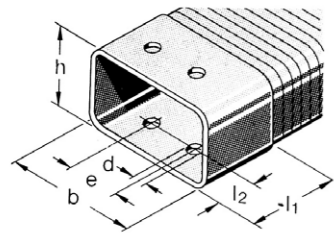


Type SCD	b	h	e	f	d	l1	l2	l3
030.1	34	34	0	40	9	120	60	10
050.1	54	34	20	40	9	120	60	10
050.2	54	54	20	40	9	120	60	10
080.1	90	50	50	40	9	120	60	10
080.2	90	65	50	40	9	120	60	10
080.3	90	90	50	40	9	120	60	10
110.1	120	65	80	40	9	120	60	10
110.2	120	85	80	40	9	120	60	10
110.3	120	120	80	40	9	120	60	10
170.1	180	85	140	40	9	120	60	10
170.2	180	115	140	40	9	120	60	10
170.3	180	180	140	40	9	120	60	10

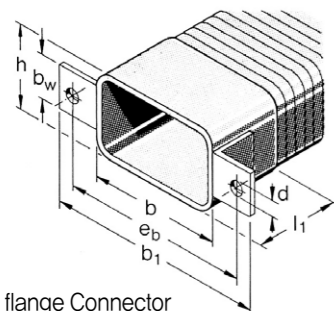
■ Diagonal Connector

Applications with diagonal connectors

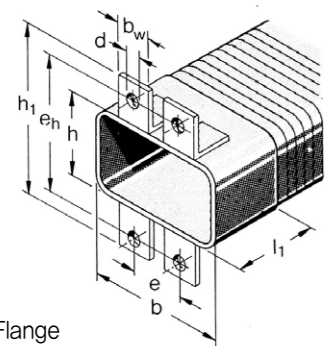
The Connectors can be changed and, if necessary, can be changed at a later stage. Type of connection required should be given when ordering!



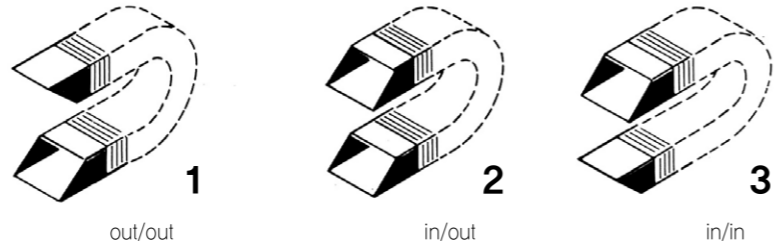
Standard Connector



Cross flange Connector



High Flange

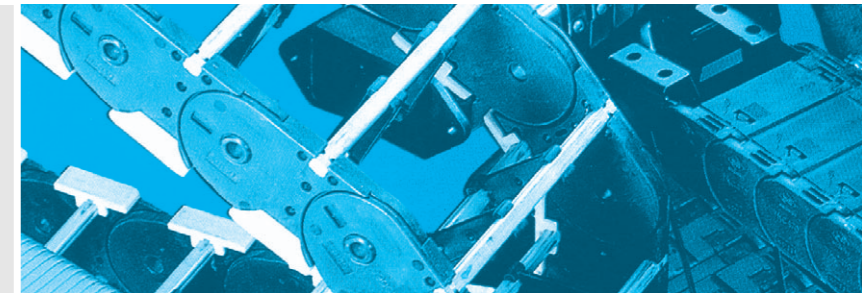


Variants for oblique joining piece

■ Standard Connector, Cross flange Connector, High Flange Connector

Type SCD	b	h	e	eb	eh	d	l1	l2	bw	b1	b2
030.1	34	34	-	56	56	9	60	20	20	74	74
050.1	54	34	20	76	56	9	60	20	20	94	74
050.2	54	54	20	76	76	9	60	20	20	94	94
080.1	89	49	50	111	71	9	75	20	20	129	89
080.2	89	64	50	111	86	9	75	20	20	129	104
080.3	89	89	50	111	111	9	75	20	20	129	129
110.1	119	64	80	141	86	9	95	20	20	159	104
110.2	119	84	80	141	106	9	95	20	20	159	124
110.3	119	119	80	141	141	9	95	20	20	159	159
170.1	179	84	140	201	106	9	95	20	20	219	124
170.2	179	114	140	201	136	9	95	20	20	219	154
170.3	179	179	140	201	201	9	95	20	20	219	219

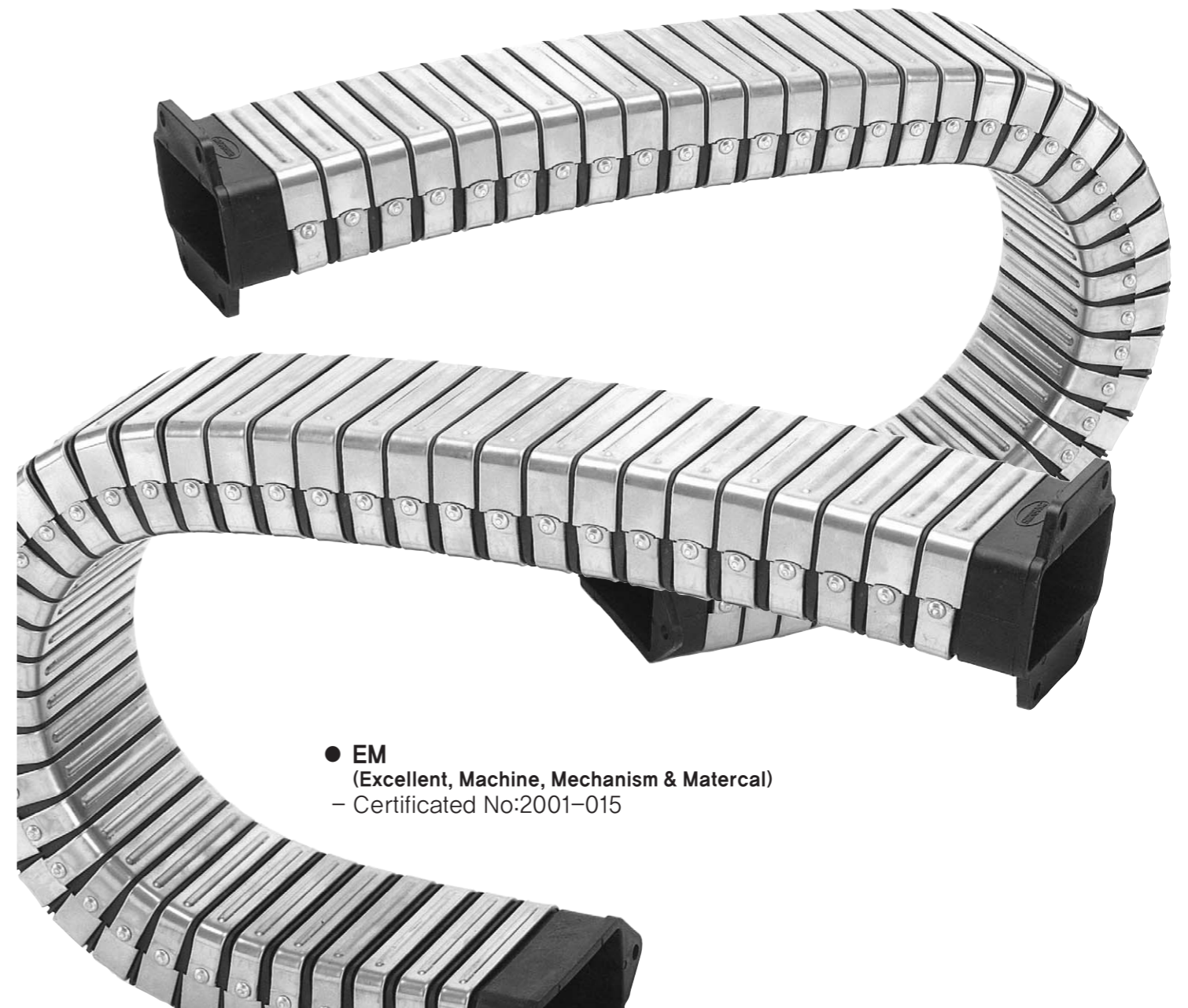
※ Front-flange joining Connector as per customers' designation are also available. Those pieces can be combined. The requested type of connection and its variant is to be stated with the order.



SCF Energy Conduits

Mojoir use

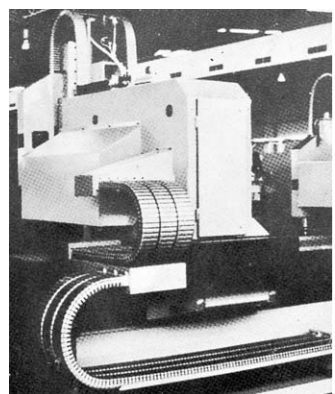
Applied to machine tools, Industrial machine, Robot for industrial purpose.



● **EM**
(Excellent, Machine, Mechanism & Material)
- Certificated No:2001-015

SCF Energy Conduits

Application



SHINSUNG flexible conduit, SCF is an extension of our range of energy supply products based on many years of experience in this field. SCF flexible conduit is used to guide flexible cables/hoses and has proved successful in machine and apparatus construction, handling systems and robots.

SHINSUNG flexible conduit, SCF consists of stainless steel segments and frames made from polyamide reinforced with glass fibres.

The segments and frames are assembled to the required length which therefore eliminates the need to order to every individual requirement and therefore allows stock holding.

Partly damaged flexible conduit does not need to be replaced but can easily be repaired!

SCF is available with different bending radius. The bending line lies along the neutral axis of the flexible conduit so that the movement of the cables and hoses relative to the SCF is minimal. The cables/hoses which are housed within the SCF are protected by the plastic frames.

The use of offers the following advantages :

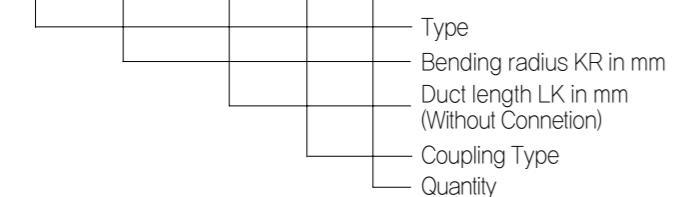
- Cables/hoses protected from dirt and chips
- Long life of cables/hoses due to protection within plastic frames
- Space required is minimal
- Low noise factor
- Safe
- Easy assembling
- Maintenance free
- Good appearance
- Ordering to contract unnecessary due to ability to hold stock

The following details are required to prepare a technical quotation :

- Number and external diameter of cables/hoses to be housed (not fittings)
- Weight of cables and hoses (incl. hose contents)
- Smallest permissible bending rad. of cables/hoses (as manufacturers' spec.)
- Length of travel
- Maximum acceleration/deceleration
- operating speed
- Width available for installation
- Type of application (drawing if possible)
- Type of connectors
- Duty cycle
- Working environment

Order Code for the SCF

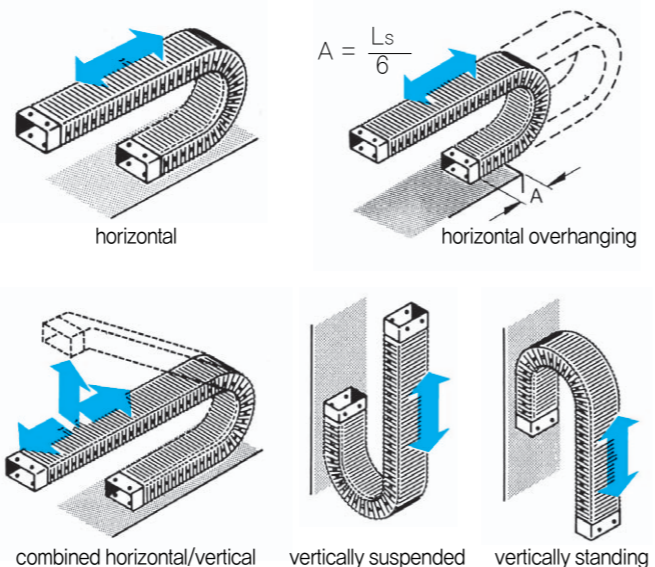
055 - KR 100 - 3,000L - S/C : 2Sets



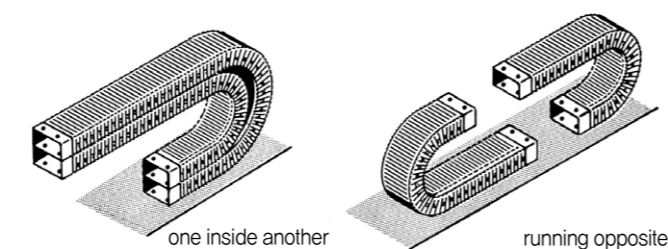
Typical applications

Energy flexible conduit can be used for horizontal, vertical and combined horizontal/vertical movements.

It can easily be applied on moving units.

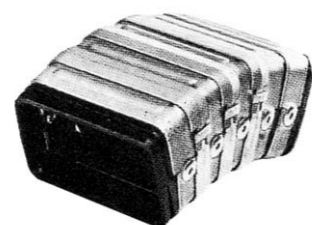


If the cross-section of the flexible conduit is not sufficient to carry the cables/hoses then the latter must be divided. Depending on the space available, the flexible conduits can be arranged side by side, one inside another or running in opposite directions.



EM patent No.2001-015

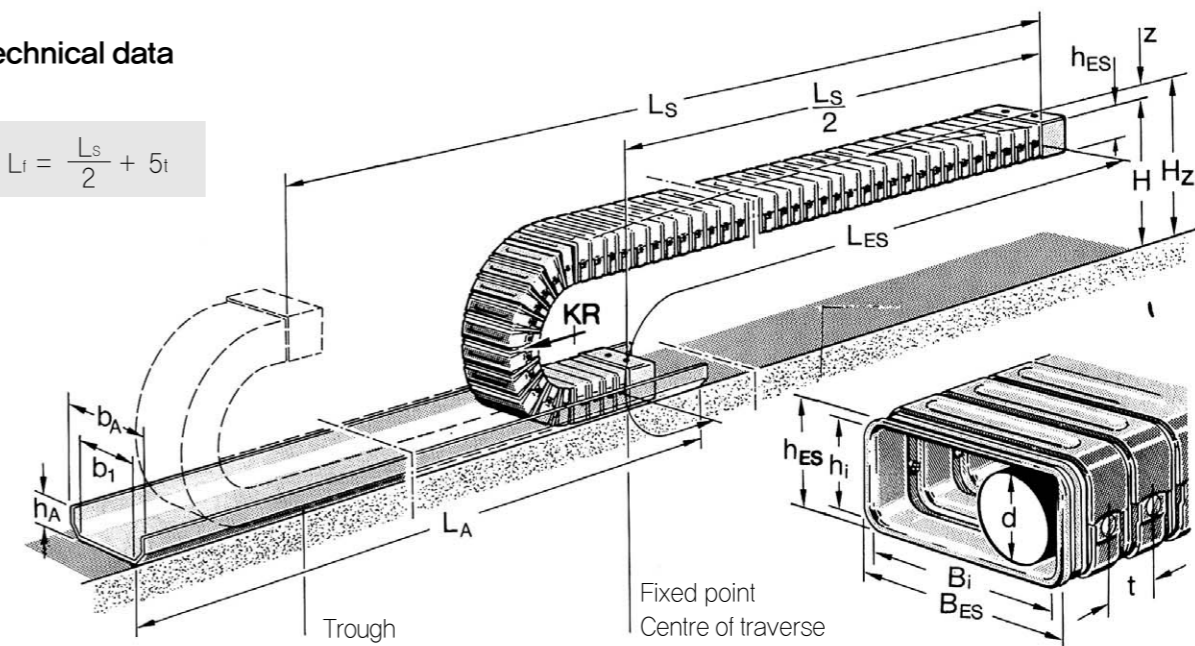
Energy Flexible conduit with protective guards



SHINSUNG type 055, 085 and 115 SCF which are used in applications where there is an accumulation of chippings, can be fitted with protective guards made in stainless steel. The connecting slots of the plastic frames are protected from dirt by the guards.

Technical data

$$L_t = \frac{L_s}{2} + 5t$$



To guarantee optimum operation of the SCF flexible conduit, a clean flat surface should be provided. If this is not possible than a trough is required.

The fixed point should be at the centre of the traverse thereby giving the shortest connection between the fixed point and the moving unit.

Length of the flexible energy conduit :

$$L_{ES} = \frac{L_s}{2} + L_B \quad \text{based pitch } t$$

Length of trough :

$$L_A = \frac{L_s}{2} + Z_A \quad \begin{matrix} \text{Plate thickness : 1,5mm} \\ \text{Max. section length : 3000mm} \end{matrix}$$

Connection height :

$$H = 2KR_{max} + h_{ES} \quad KR_{max} = \text{nom.} KR \cdot 1,10$$

Connection height :

$$H_z = H + Z \quad \begin{matrix} \text{(clear height required)} \\ \text{Pre-tension } Z = 30\text{mm} \end{matrix}$$

Table of Dimensions

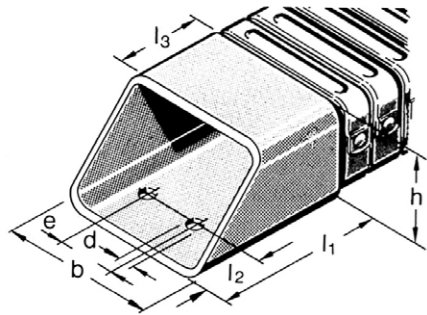
We reserve the right to make technical alterations!

SCF Type	055	060	085	115	120	175												
Overall width B _{ES}	62	60	92	123	127	190												
Overall height h _{ES}	38	52	52	67	86	94												
Overall width B _i	45	36	73	102	100	162												
Inside height h _i	25	40	38	52	70	72												
max. cable/hose ϕd_{max}	20	32	34	47	64	65												
Conduit pitch t	20	20	20	25	25	30												
Bending radius KR	65	100	150	100	100	150	200	250	140	225	300	155	200	185	250	350		
Curve dimension L _s	405	515	675	515	515	675	830	985	690	960	1200	740	880	830	1035	1400		
Connection height H	181	258	368	272	272	382	492	602	375	562	727	427	526	501	644	864		
Permissible self-supporting conduit length L _t	1,2...1,5			1,5...2,0			2,0...2,5			2,0...3,0								
Weight	1,25			1,6			1,9			2,6			3,8			5,2		
Trough Dimensions	Z _A	230	265	315	270	300	350	390	450	385	475	545	410	455	485	550	650	
	b ₁	65		65		100		135		135		200						
	b _A	80		80		115		150		150		215						
	h _A	20		20		20		20		20		20						

When constructing the SCF conduit, please note the "Guidelines for laying cables/hoses in flexible conduit". SCF flexible conduit can be used for horizontal installations without extra fittings within the range of permissible unsupported lengths. If these are exceeded or for other types of installation, please consult our Engineering Department.

■ Connector Dimensions for SCF flexible Conduit

Diagonal Connectors



Diagonal Connectors

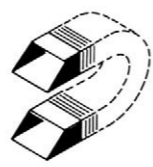
Type	b	h	e	d	l ₁	l ₂	l ₃
SCF-055	55	36	22	6,5	44	12,5	20
SCF-060	55	52	22	6,5	44	12,5	20
SCF-085	85	50	50	6,5	70	15,0	32
SCF-115	117	66	70	8,5	84	17,5	34
SCF-120	120	84	70	8,5	82	17,5	48
SCF-175	182	92	100	10,5	100	22,5	45

Applications with diagonal connectors

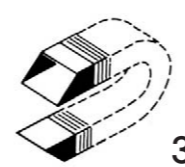
The connectors can be combined and, if necessary, can be changed at a later stage. Type of connection required should be given when ordering!



1
Screw-on surface
outside/outside

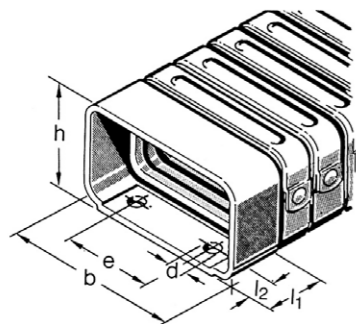


2
Screw-on surface
inside/outside



3
Screw-on surface
inside/inside

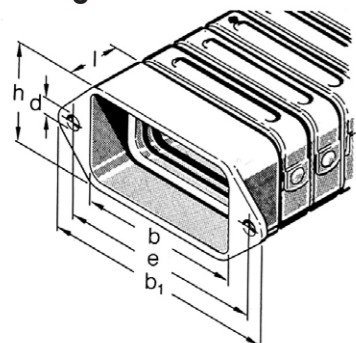
Standard Connector



standard Couplings

Type	b	h	e	d	l ₁	l ₂
SCF-055	55	36	22	6,5	20	8,5
SCF-060	55,5	50	22	6,5	20	10,0
SCF-085	85	52	50	6,5	25	10,0
SCF-115	116	68	65 - 70	8,5	35	10,0
SCF-120	120	84	70	8,5	35	12,5
SCF-175	182	92	100	10,5	40	15,0

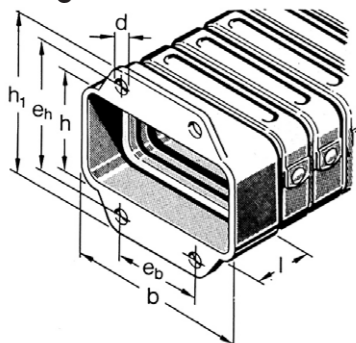
Cross flange Connector



Cross Couplings

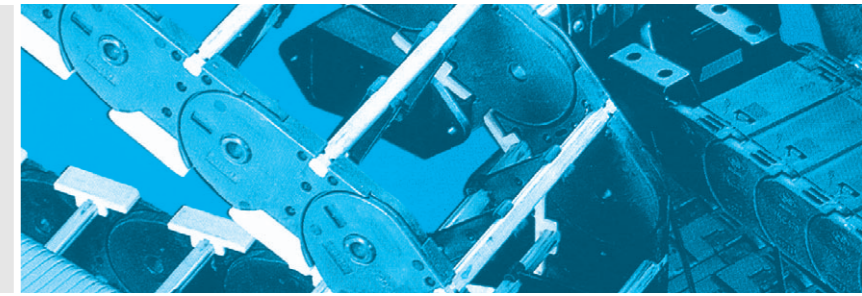
Type	b	h	b ₁	e	d	l
SCF-055	55	35	90	75	6,5	20
SCF-060	52	52	90	76	6,5	18
SCF-085	85	50	120	105	6,5	25
SCF-115	110	64	160	140	8,5	35
SCF-120	120	92	160	140	8,5	35
SCF-175	182	90	226	200	10,5	40

High flange Connector



High Couplings

Type	b	h	h ₁	e _b	e _h	d	l
SCF-055	55	35	70	18	55	6,5	20
SCF-060	55	50	85	18	68	6,5	18
SCF-085	85	50	85	45	70	6,5	25
SCF-115	116	64	110	60	90	8,5	35
SCF-120	120	82	123	70	103	8,5	35
SCF-175	182	90	136	95	110	10,5	40



SKC Chain

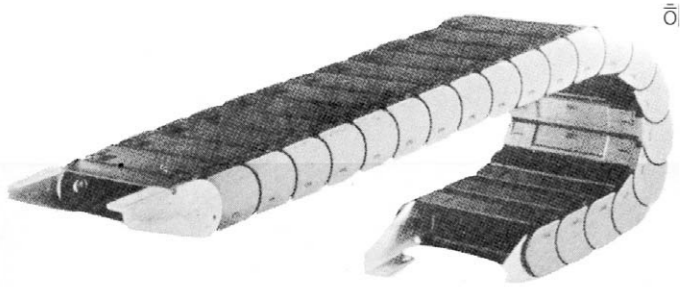
MAJOR USE

Applied to Machine tool, industrial machine, all kinds of plant works, motor industry, assembled machine and robot, etc.



SKC Cable Chain Glass Fiber

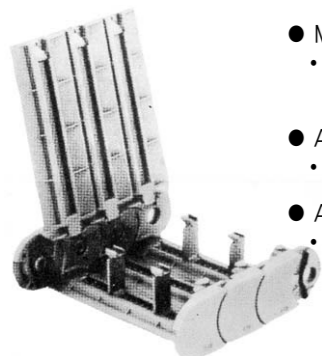
TYPE SKC



SHINSUNG SKC is installed for machine manufacturing, plant works, motor industry, assembly machine, robot and other field done with openable crossbar(bolt), it is fully closed up, so it protects connected electric wire, from becoming dirty and popplued, as in the past. Openble crossbar helps electric wire to be easily inserted and exchanged and even help the connected electric wires be installed without disjoining. Electric wire protective Conduit, G. Flex can be installed to the direction that horizontal dir ection and horizon & vertical are combined. With respect to movable distance, preliminary knowledge on structure in case of installing a almost not necessary.

Special features

- To protect connected electric wire from being polluted,
- To protect electric wire from being easily damaged,
- With Ablage to protect crossbar, the life span of E/W is high,
- Good appearance,
- High stability
- Easy to control
- Stable against corrosion and chemicals,
- Simple installing-connected with nut.



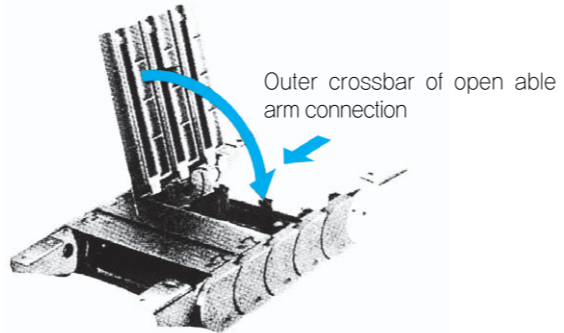
- Materials of duct parts
 - Ks-P strengthens glass fibre, and standard color basic is black,
- Allowable scope of temperature
 - -10~+80°C
- Allowable speed of transportation
 - 120m/min when arranged without support
 - 80m/min when arranged with supprot

Following instructions(matters) are required, to supply technique fully.

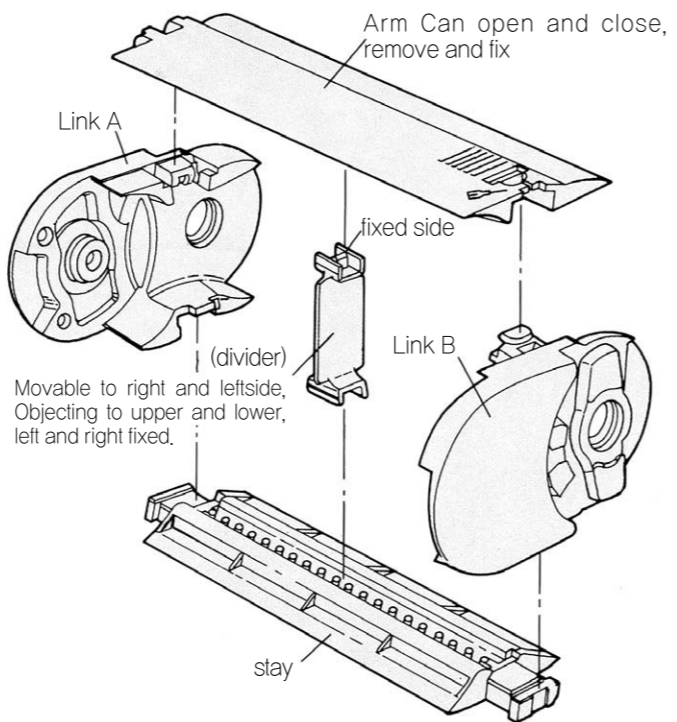
- To connect, pcs of E/W and outer dia to come next,
- All cable E/W and weight to Conduit including contents of Conduit
- Minimum allowable curvature of radius of E/W (by order-giver's instruction)
- Movable distance
- Speed of transportation
- Max. acceleration delay
- Frequent moving
- Wide installing at option
- Transformation of equipment/transformation of connection equipment chart
- Influence of circumerence(temperature, air humidity, etc)

Structure

This constituted with Five parts such as ARM, Link(A), Link(B), Stay, Divider. It can easily assembled without separate tool, ARM can be easily opened in the indicated place with a dirver using the principle of lever.

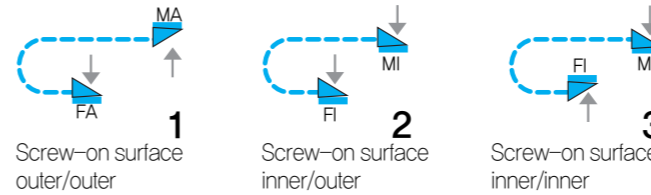


Divider used for separation(decomposition) of E/W can be movable, or can be fixed or assembled by simple replacing.



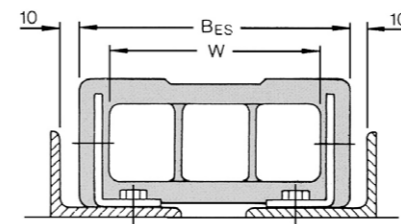
Duct Connection

For vertex connection, it should be done in the center of move-route. By arranging such way, the vertex and moving transfer distance are connected to the shortest, so the length of duct and length of E/W also becomes the most economical. Connection can be done by connection coupling made with thin steel plate. In coupling, the edge is pressed into the hole of side-joining plate with outer blot, and in the vertex, it is pushed in the part of hole.

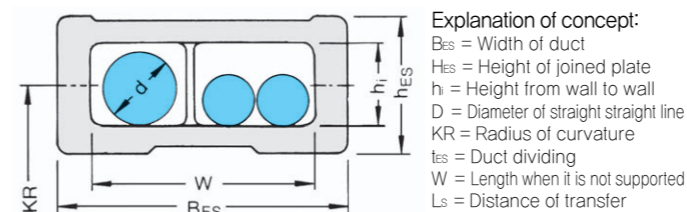


Connected transformation

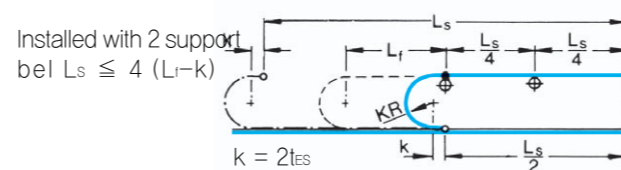
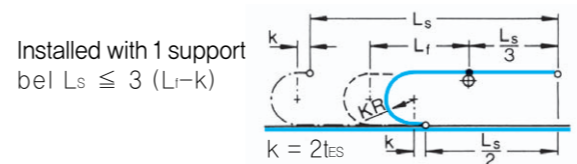
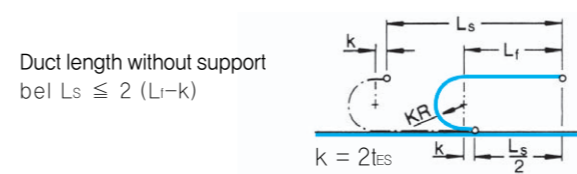
※ Connected type desired can be directed when or der is place



TYPE SKC



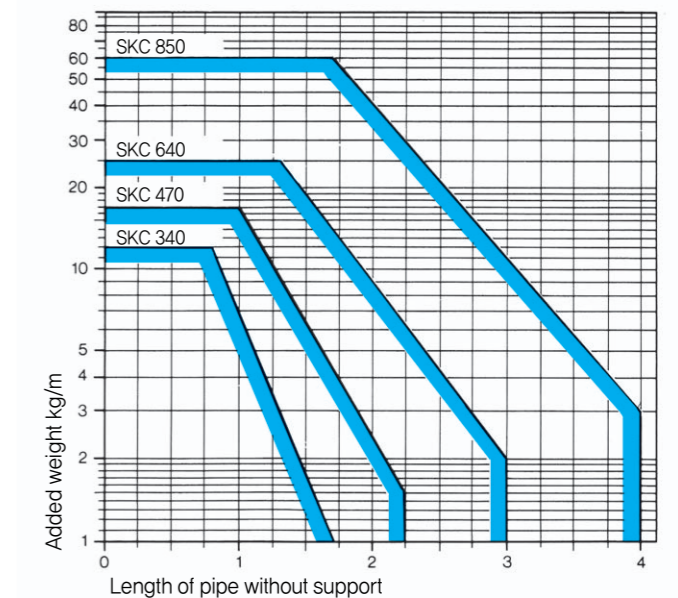
- Be sure to preserve change of technique
- Length when it is not supported depends on added weight



Type	Radius of Curvature	duct size				WEIGHT in kg/m		
		t _{ES}	h _{ES}	h _i	d _{max}	B _{ES}	W	
SKC 340	70	34	40	25	22	70	50	
	100					130	2.1	
	150					150	2.5	
SKC 470	100	47	55	36	32	106	80	
	150					160	2.5	
	200					186	3.5	
	250					186	160	3.5
SKC 640	135	64	75	50	44	140	110	
	200					220	4.0	
	250					250	5.0	
	300					250	220	5.0
SKC 850	180	85	100	68	60	186	150	
	250					236	200	6.5
	350					336	300	8.0

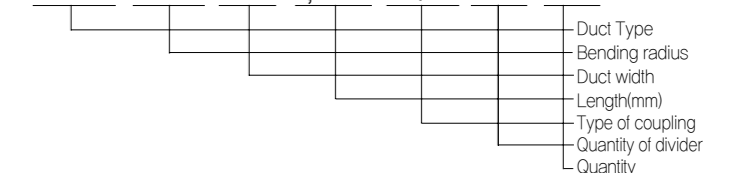
Principle to install Cable Duct

- Be sure to check if single cross section for connected E/W is enough or not.
- 100% of duct cross section should be existed as vacant space.
- If cross section of E/W protective duct is not enough in connection E/W, cable and duct should be dismantled totally.
- Be sure to confirm if the radius of curvature allowed by E/W according to order-giver's instruction is smaller than radius of curved line of same as it.
- Please inspet if duct loading by loading chart of duct is within per-mitted elicacy.

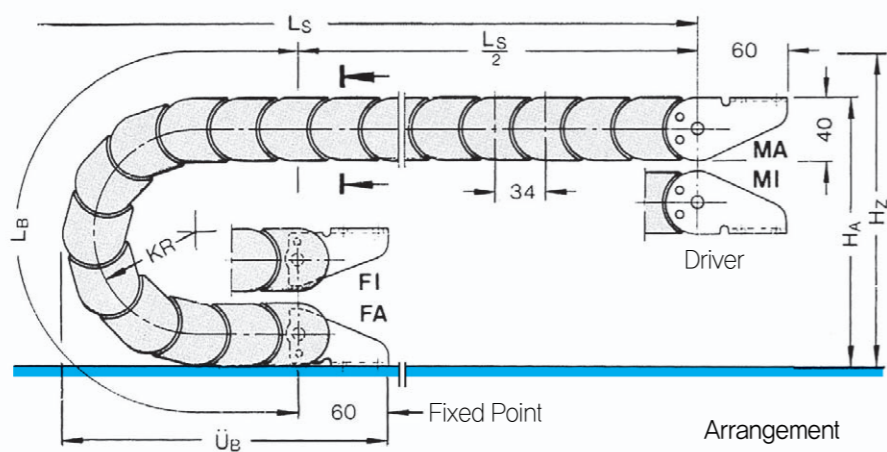


How to indicate when ordered.

• Please fill out the following items.
 SKC 340-KR 100-W 130-2, 000L-MA/FA-30EA : 2Sets



TYPE : SKC - 340



Connected transformation(body) :

- Coupling connecting MA = Outside nut fixing side(standard)
- Coupling connecting MI = Inside nut fixing side(standard)
- Vertex connecting F1 = Inside nut fixing side

Explanation of concept :

- L_B : Length of bending Line
- $Ü_B$: Projecting part
- H_A : Height of connection
- H_z : Height of extra path required

Forming dimension changed depends on radius of bending

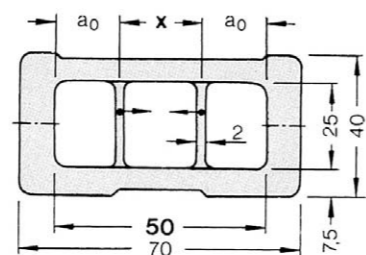
KR	L_B	$Ü_B$	H_A	H_z min
70	356	218	210	280
100	450	248	270	340
150	607	298	370	440

Cable Duct Length $L_{ES} = \frac{L_S}{2} + L_B$ Becomes round at 34mm part

■ Duct-Cross section

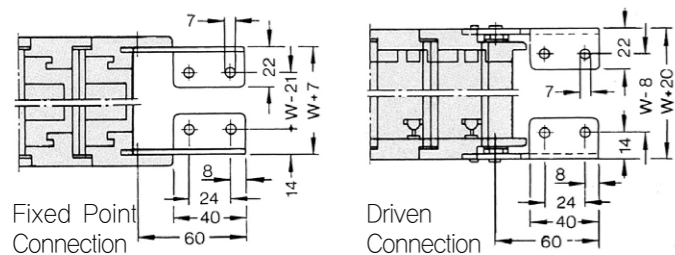
Electric Wire - \varnothing dmx = 22mm
 a_0 min = 20mm

Divider inside the width, it is fixed to height of 5mm or is arranged in a movable state without layer by replacing. Nos of divider cross section can be instructed upon ordering. Divider is installed generally each 4th duct piece part.

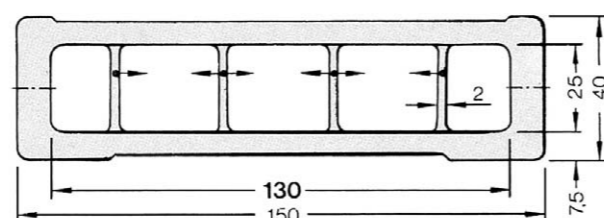


SKC 340 - W 50

■ Connecting Measurement

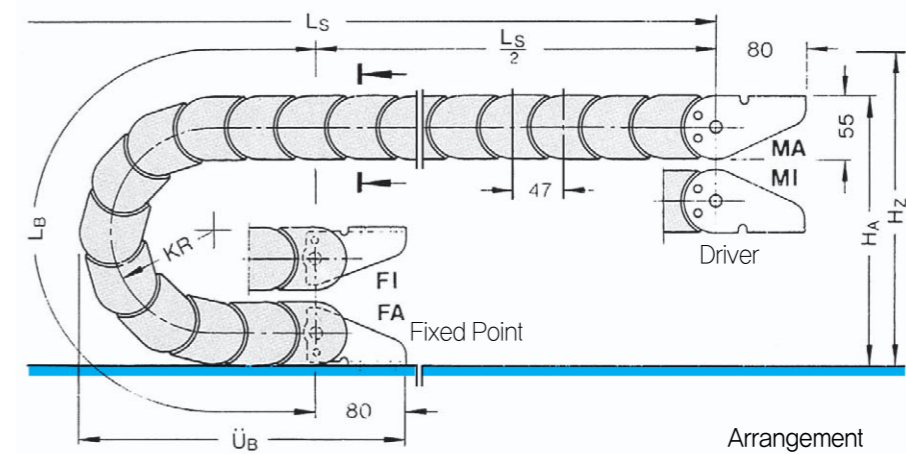


※ Type of connection desired can be instructed upon ordering.



SKC 340 - W 130

TYPE:SKC - 470



Connected transformation(body) :

- Coupling connecting MA = Outside nut fixing side(standard)
- Coupling connecting MI = Inside nut fixing side(standard)
- Vertex connecting F1 = Inside nut fixing side

Explanation of concept :

- L_B : Length of bending Line
- $Ü_B$: Projecting part
- H_A : Height of connection
- H_z : Height of extra path required

Forming dimension changed depends on radius of bending

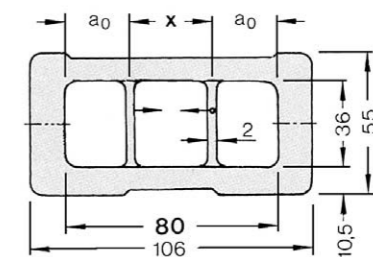
KR	L_B	$Ü_B$	H_A	H_z min
100	502	302	285	355
150	660	352	385	455
200	816	402	485	555
250	973	452	585	655

Cable Duct Length $L_{ES} = \frac{L_S}{2} + L_B$ Duct pitch is based on 47mm

■ Duct-Cross section

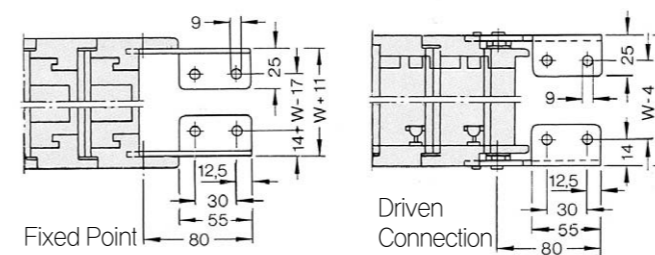
Electric Wire - \varnothing dmx = 32mm
 a_0 min = 22.5mm

Divider inside the width, it is fixed to height of 5mm or is arranged in a movable state without layer by replacing. Nos of divider cross section can be instructed upon ordering. Divider is installed generally each 4th duct piece part.

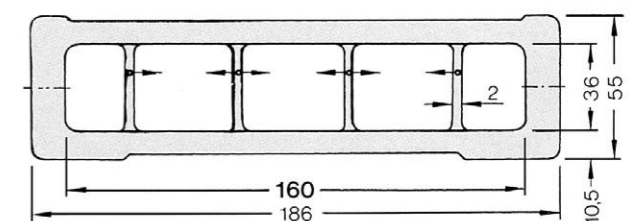


SKC 470 - W 80

■ Connecting Measurement

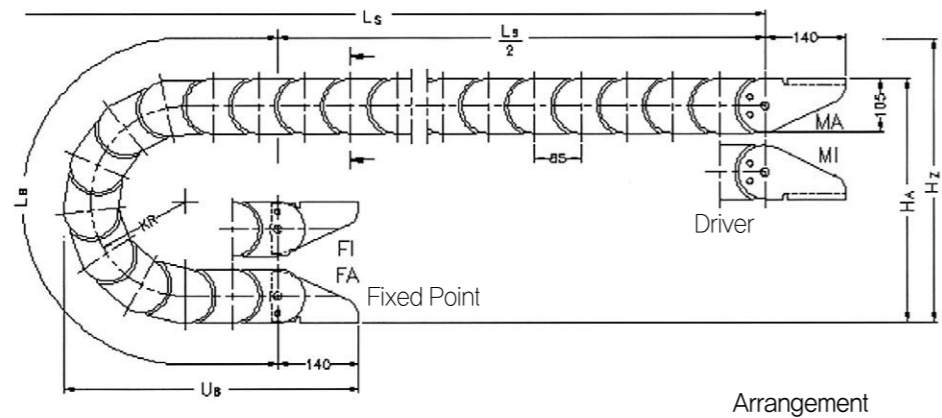


※ Type of connection desired can be instructed upon ordering.



SKC 470 - W 160

TYPE : SKC - 640



Arrangement

Connected transformation(body) :

- Coupling connecting MA = Outside nut fixing side(standard)
- Coupling connecting MI = Inside nut fixing side(standard)
- Vertex connecting F1 = Inside nut fixing side

Explanation of concept :

- L_B : Length of bending Line
- U_B : Projecting part
- H_A : Height of connection
- H_z : Height of extra path required

Forming dimension changed depends on radius of bending

KR	L_B	U_B	H_A	H_z min
135	680	413	378	448
200	885	478	508	578
250	1042	528	608	678
300	1200	578	708	778

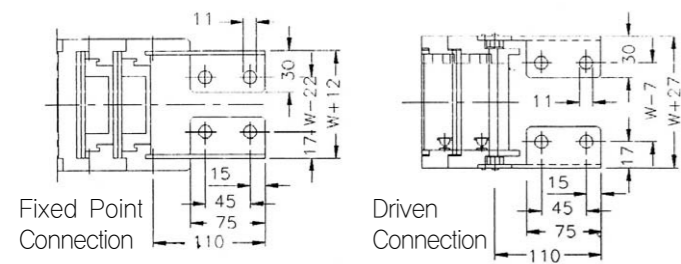
Cable Duct Length $L_{ES} = \frac{L_s}{2} + L_B$ Duct Pitch is based on 64mm

■ Duct-Cross section

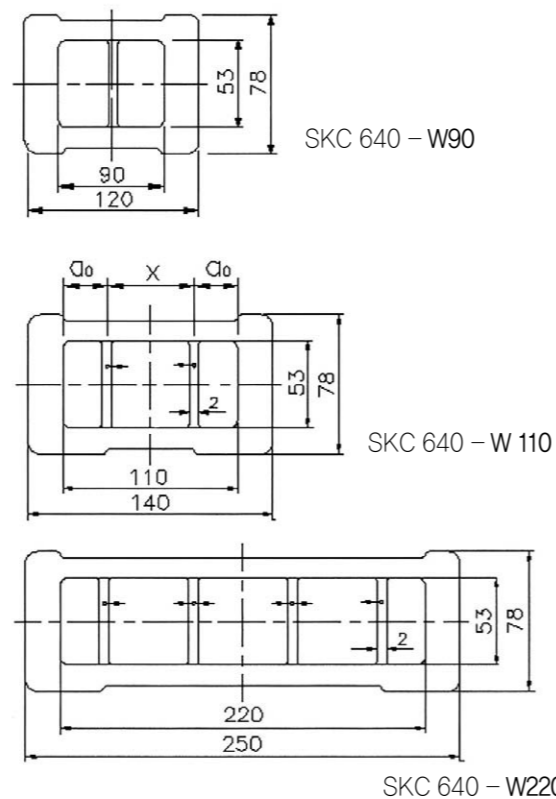
Electric Wire - \varnothing dm_x = 47mm
 a_0 min = 30mm

Divider inside the width, it is fixed to height of 5mm or is arranged in a movable state without layer by replacing. Nos of divider cross section can be instructed upon ordering. Divider is installed generally each 4th duct piece part.

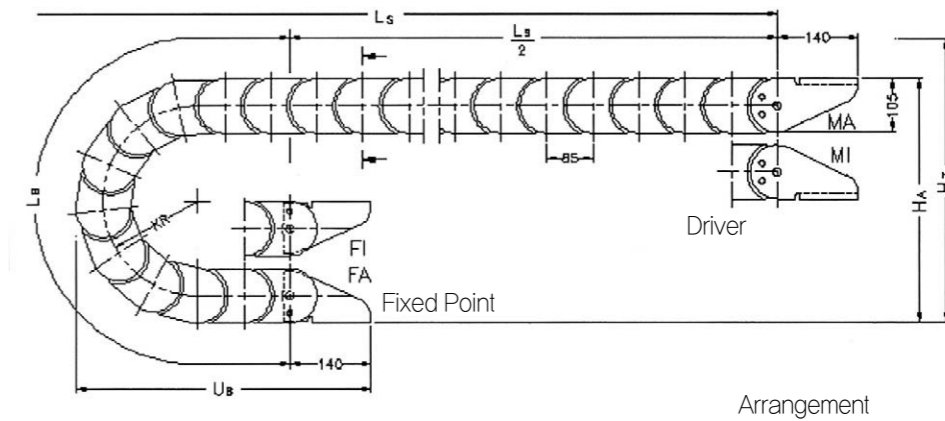
■ Connecting Measurement



※ Type of connection desired can be instructed upon ordering.



TYPE : SKC - 850



Arrangement

Connected transformation(body) :

- Coupling connecting MA = Outside nut fixing side(standard)
- Coupling connecting MI = Inside nut fixing side(standard)
- Vertex connecting F1 = Inside nut fixing side

Explanation of concept :

- L_B : Length of bending Line
- U_B : Projecting part
- H_A : Height of connection
- H_z : Height of extra path required

Forming dimension changed depends on radius of bending

KR	L_B	U_B	H_A	H_z min
180	906	542	495	565
250	1126	612	635	705
350	1440	712	835	905

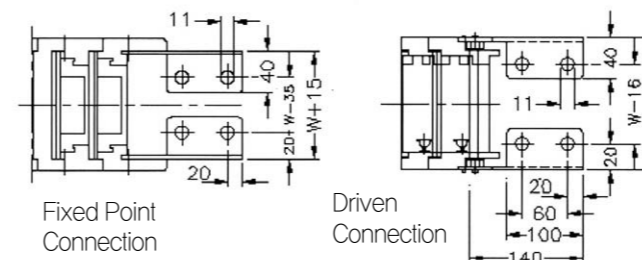
Cable Duct Length $L_{ES} = \frac{L_s}{2} + L_B$ Duct Pitch is based on 85mm

■ Duct-Cross section

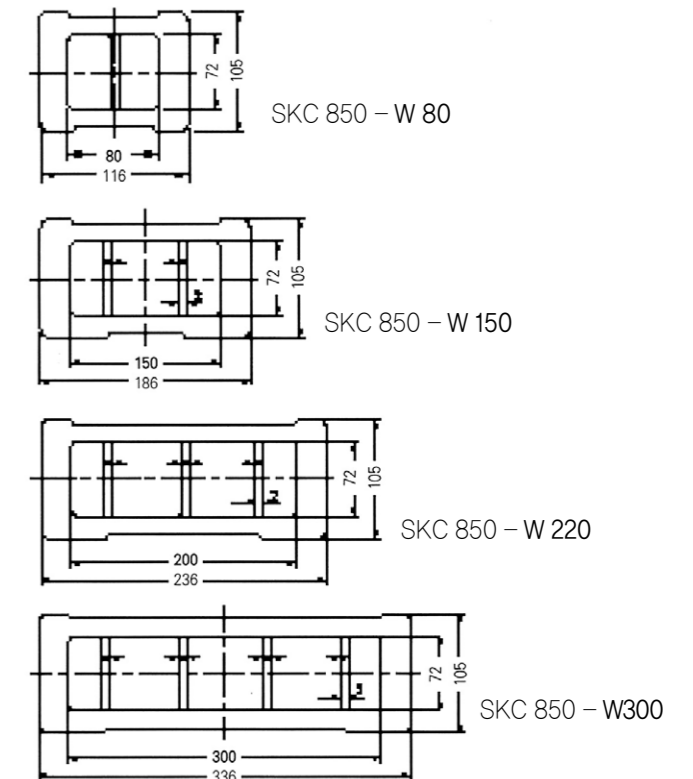
Electric Wire - \varnothing dm_x = 64mm
 a_0 min = 44mm

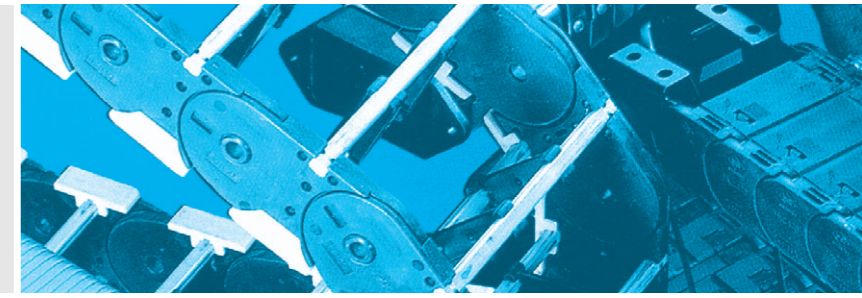
Divider inside the width, it is fixed to height of 5mm or is arranged in a movable state without layer by replacing. Nos of divider cross section can be instructed upon ordering. Divider is installed generally each 4th duct piece part.

■ Connecting Measurement



※ Type of connection desired can be instructed upon ordering.





SHINSUNG Ball Screw Covers

Mojo use

Machine tools, industrial machine, Wood working machine, Robot, all Kinds of plant and ball screw and cylinder protection of automation machine.



Centry Covers Protect...

■ Operating Personnel ■ Machine ■ Machine Productivity

Centry Covers protect skilled operating personnel from exposure to machinery hazards, reduce operating housekeeping, guard the accuracy of precision equipment and eliminate potential for damaged machinery and costly downtime.

Easily installed, Centry Covers automatically expand to protect precision equipment and controlling surfaces from the debris, chips and contaminants often found in the working environment.

Available in a variety of resilient metals including corrosion resistant materials, Centry Covers are manufactured in a complete range of sizes to meet any OEM specification. Centry Covers are made to specific sizes and must be used as such, without modification.

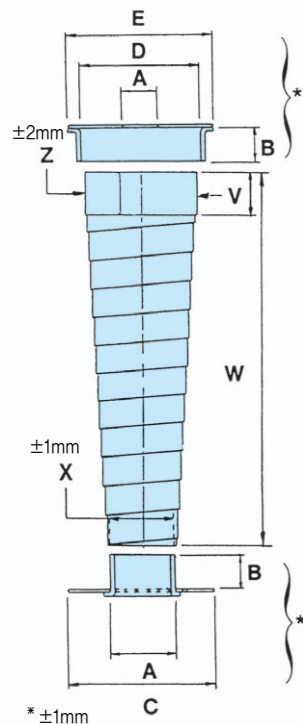
■ METRIC

How to determine size requirements...

- Cover
- X Inside Diameter = shaft $O + 8mm$
if no flanges are used, X = shaft $\varnothing + 4mm$ min.
- W Extended Length = max. exposed length of shaft
- V Compressed Length = min. exposed length of shaft
- Y Stroke = $W - V$
- Z Outside Diameter = max. allowable area
- Tolerances: "X" $\pm 1mm$, "Z" $\pm 2mm$

Flanges (required for use over-vertical shafts)

- A = $X - 4mm$
- B = $V \times .75$
- C = Z
- D = $Z + 5mm$
- E = $Z + 12mm$
- F = $X - 5mm$



They are made as integral units and cannot be cut to length, as coil springs might.

Unless otherwise specified, Centry Covers are constructed for the large end to travel and must be allowed to rotate freely during operation.

Standard Centry covers are constructed for over end shaft installation. Special open wound Centry Covers are available, upon request, for installation, without dismantling of equipment.

Use the Metric or Imperial sections below. Determine your size requirements, then select your part number using pages 72 and 73 for metric or page 73 for imperial.

■ IMPERIAL

How to determine size requirements...

- Cover
- X Inside Diameter = shaft $O + .250$
if no flanges are used, X = shaft $\varnothing + 4mm$ min.
- W Extended Length = max. exposed length of shaft
- V Compressed Length = min. exposed length of shaft
- Y Stroke = $W - V$
- Z Outside Diameter = max. allowable area
- Tolerances: "X" $+0.094 - 0.000$, "Z" $+ 0.000, - 1.25$

Flanges (required for use over-vertical shafts)

- A = $X - 125$
- B = $V \times 75$
- C = Z
- D = $Z + 125$
- E = $Z + 375$
- F = $X - 188$

Metric Part Number System

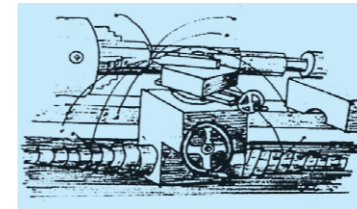
CC XXX.XXXX.XXX X X X

- X = inside Diameter
- W = Extended Length
- V = Compressed Length
- MATERIALS**
A = 1095 Scaleless Blue
D = 301 Stainless
(Other materials available upon request.)
- TRAVEL**
A = Horizontal/Vertical Large End Travels
B = Horizontal/Vertical Small End Travels
D = Diagonal Large End Travels
E = Diagonal Small End Travels
H = Horizontal Only Large End Travels
I = Horizontal Only Small End Travels
V = Vertical Only Large End Travels
W = Vertical Only Small End Travels
- INSTALLATION/DUTY/OD**
E = Over End OD per catalog
W = Open Wound OD per catalog
(light & heavy duty plus various OD's avail)

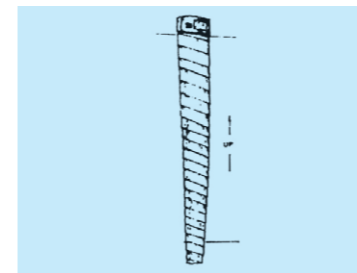
CC designates helical wound metal Centry Cover. Consult factory for additional sizes: materials, extra or light duty or special OD requirements.

1. OVER END

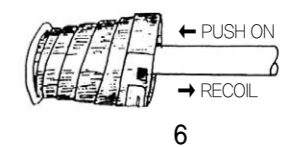
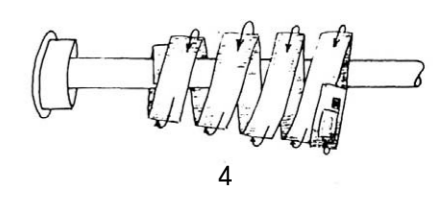
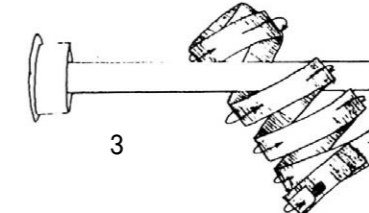
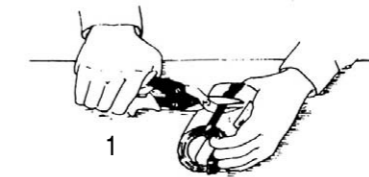
① Horizontal



② Vertical



2. OPEN WOUND



Centry® Covers Metric Sizes

PART NO. X W V Z	PART NO. X W V Z	PART NO. X W V Z	PART NO. X W V Z	PART NO. X W V Z	PART NO. X W V Z	PART NO. X W V Z
010 0100 013 17	030 0350 050 55	040 0450 060 56	050 0250 050 62	055 0750 075 83	060 1000 100 89	065 1700 120 105
013 0050 013 19	0750 57	0550 60	0300 71	0900 90	1100 92	1900 111
0100 013 23	030 0900 060 61	0650 64	0350 66	1100 94	1200 96	2100 116
017 0350 025 28	030 1000 075 59	0750 66	0450 70	055 0900 100 84	1300 100	2300 120
020 0150 020 28	030 1000 075 59	0900 65	0550 74	1100 86	1400 102	2500 124
0200 30	032 0100 020 49	040 0650 075 63	050 0400 060 52	1200 89	1500 104	2800 128
0250 33	0150 55	0750 66	0600 72	1300 90	1800 106	065 2000 150 109
0300 36	032 0350 035 53	0900 72	0750 78	1500 96	1900 108	2400 120
020 0300 030 37	032 0150 060 43	1100 78	0900 84	1800 104	2100 113	2800 136
0400 45	035 0150 030 46	1300 82	1100 87	2000 103	2300 117	3000 142
022 0100 020 31	035 0350 035 52	1500 90	1200 88	2100 88	2500 121	3500 138
025 0100 020 35	0450 54	040 1000 100 67	050 0330 075 58	1700 96	2800 126	065 3000 200 131
0150 36	035 0350 050 51	1200 70	0750 78	1800 98	3000 125	3300 138
0200 41	035 0350 050 51	1500 74	0900 84	1900 100	3500 137	070 0275 025 93
0250 41	035 0750 075 55	1800 82	1100 87	2000 103	3750 158	0300 94
0330 44	0850 58	040 1800 120 82	1200 88	2100 100	060 1200 150 93	070 0150 030 85
025 0150 025 37	0900 58	2000 86	1300 84	2200 102	2200 109	0250 90
0250 42	1000 60	2200 90	1500 87	2300 112	2800 116	070 0250 050 88
025 0400 030 43	035 1500 100 63	045 0200 035 55	1800 93	2500 113	3000 125	0350 91
0500 49	038 0085 020 42	045 0450 050 65	045 0400 060 65	2800 116	055 2600 150 111	0450 94
0650 58	040 0100 020 54	0600 66	0750 71	3500 126	2800 116	065 0150 030 81
025 0330 050 44	040 0150 030 52	045 0400 060 65	050 2800 150 118	060 0100 020 81	3000 121	0250 85
0600 48	040 0250 050 58	0600 68	3000 123	3500 126	3500 126	065 0150 030 81
0750 52	0500 69	0750 71	3600 122	055 2500 200 119	065 0150 030 81	0650 97
025 0500 035 49	040 0150 030 52	045 0800 075 78	050 1100 200 79	3250 128	065 0250 050 80	070 0550 060 95
0750 52	0350 58	0900 68	2700 100	3500 135	0350 85	0650 97
025 0750 075 49	0500 69	1200 84	3250 128	3600 119	0450 90	0700 103
030 0050 013 42	040 0250 050 54	045 1500 100 87	3500 134	060 0150 030 75	065 0550 060 91	070 0750 075 98
0150 55	0300 56	1800 93	055 0150 030 68	0250 82	065 0600 097	0900 100
030 0100 020 41	0350 55	045 1400 120 82	0250 75	060 0250 050 76	065 0650 094	1000 103
030 0150 030 42	0400 56	045 0850 150 68	055 0150 035 71	0350 80	065 0750 097	1100 106
0250 50	0450 58	1000 69	0250 86	0500 82	0900 109	1300 114
0350 51	0550 65	1250 84	0400 77	0750 106	065 0760 075 100	1500 118
	0600 62	1800 81			0900 109	1800 125
	0650 67	1400 87	055 0350 050 70	060 0550 060 82	1100 100	070 1500 120 115
	0700 67	2800 103	0450 90	0700 86	065 1100 100 95	1800 123
	0750 67		0550 76	0800 89	1200 100	2000 128
	0900 79			0900 100	1300 103	2200 135
	1000 86	050 0150 025 65	055 0550 060 76	060 0750 075 90	1500 109	2400 145
		0250 68	0650 79	1100 102	1800 119	2800 155
			0750 84			
			0760 96			

Ball Screw Covers

PART NO. X W V Z	PART NO. X W V Z	PART NO. X W V Z	PART NO. X W V Z	PART NO. X W V Z	PART NO. X W V Z	PART NO. X W V Z
070 2000 150 130 2400 142 2800 155 3000 161	085 0530 060 131 085 0750 100 107 1050 125	090 2400 200 141 2700 144 3000 169 3250 166 3500 169	105 0125 035 131 105 0400 075 128 0650 135	115 2200 250 163 3550 174	130 0200 050 166 130 2800 200 192 2900 208	165 0750 100 228 170 0300 200 201 1450 211
070 3250 200 144 3500 155	090 0700 020 112 090 0150 025 112 090 0200 035 115	090 2700 250 160 3000 144 3500 150	110 0250 060 131 0350 135 0450 139	120 0250 060 143 0350 147 0450 149	135 0750 100 169 135 0350 120 157 1250 163	175 1150 250 218 180 0300 075 223 0400 227
070 0150 035 100 0250 109	090 0150 050 112 0250 109 0350 112	095 1450 200 125 095 4000 250 173	110 0350 075 132 0450 137 0600 144	120 0650 100 142 0750 145 0900 150	140 0150 075 157 0250 163 0500 173	180 1500 200 227 2200 270
075 0250 050 89 0350 108 0450 114	090 0350 060 115 0450 120	100 0150 050 111 0400 136	110 0600 100 130 0750 135 0900 140	120 0900 120 150 1100 154 1300 158 2050 189	140 0800 100 182 140 2000 150 192 140 2000 200 176 2800 239	185 0400 075 228 190 0500 075 246 200 0500 100 239
075 0550 060 103 0650 105 0700 107 0750 110	090 0450 075 119 0550 120 0650 125 0750 130	100 0250 075 125 0350 128 0450 131 0600 130 0800 138	110 1100 120 140 1300 151	120 1300 150 156 1500 160 1800 168 2400 176	145 0600 075 179 145 1000 100 182 145 0900 150 169 145 1300 200 182	205 0900 150 252 210 1400 200 265 220 1100 150 316 220 1600 250 300 230 0450 120 249 240 0950 250 296 255 1300 200 331 285 1250 260 341 335 1400 260 408
075 0600 075 106 0750 109 0900 112	090 0600 100 123 0750 117 0900 119 1000 123 1100 126 1200 125 1300 132 1800 162 2000 174	100 0600 100 131 0900 135 1000 135 1370 141 1500 146 1800 162	110 1200 200 146 2000 144 2400 158 2600 167 2800 171	120 2200 200 162 2400 168 2600 174	155 0450 100 184 160 0900 100 189 160 1750 150 214 165 0200 050 198 165 0300 075 192 0500 216	
075 0900 100 108 1100 108 1200 124 1300 114 1500 127 1700 126	090 1300 120 125 1500 130 1800 138 2000 144	100 1100 120 132 1300 136 1650 157 1800 163 2400 163	115 0150 050 131 115 0450 100 144 0600 150 0900 157 1000 165 1370 179 1800 195	125 0250 060 142 125 0350 075 145 125 0450 100 153 0600 161 0900 166 1200 171	150 1400 200 185 155 0450 100 184 160 0900 100 189 160 1750 150 214 165 0200 050 198 165 0300 075 192 0500 216	
075 1500 120 115 1800 119 2000 128 2200 133	090 1000 150 122 1300 119 1500 131 2000 135 2300 154 2400 156 2800 162 3000 166	100 1500 150 144 1800 150 2000 160 2500 163 2900 166	115 1500 120 157 115 1800 150 166 2400 176 3650 211	125 0700 120 155 0900 163 125 0700 150 163 1400 179 2100 185		Consult Your Representative For Additional Sizes To Meet Your Requirements
075 2000 150 136 2400 142 2800 150 3050 147	090 1000 150 122 1300 119 1500 131 2000 135 2300 154 2400 156 2800 162 3000 166	100 2800 200 155 3000 161 4000 191	115 2300 200 169 3400 192	125 2100 200 185 125 1200 250 163		



Way Wipers Guide Way Protections



Centry Covers Imperial sizes

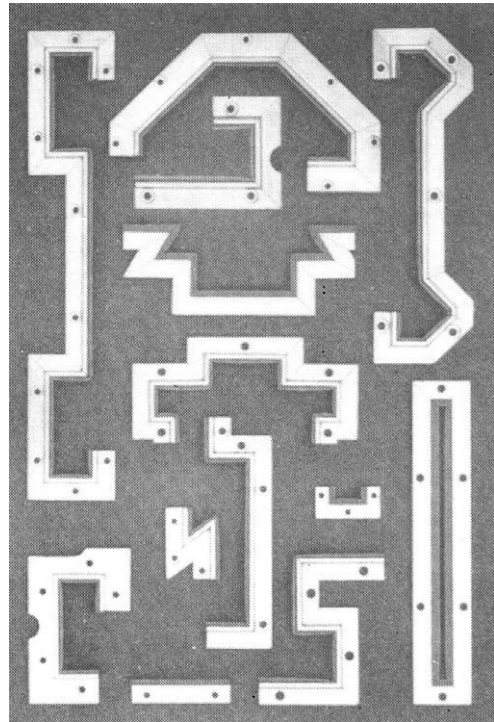
Cat. No.	X		W		V		Z	
	ins	mm	ins	mm	ins	mm	ins	mm
052	1/2	12.7	2	50.8	1/2	12.7	3/16	20.5
054	3/4	19.05	4	101.6	1/2	12.7	1	25.4
0756	3/4	19.05	6	152.4	3/4	19.05	1 1/8	30
0758	3/4	19.05	8	203.2	3/4	19.05	1 1/4	32
07510	3/4	19.05	10	254	3/4	19.05	1 3/8	35
14	1	25.4	4	101.6	3/4	19.05	1 1/2	36.5
16	1	25.4	6	152.4	3/4	19.05	1 1/2	38
18	1	25.4	8	203.2	3/4	19.05	1 1/2	43
110	1	25.4	10	254	1	25.4	1 3/4	44.5
156	1 1/8	28.575	6	152.4	1 1/8	28.575	1 3/4	44.5
1510	1 1/8	28.575	10	254	1 1/8	28.575	2 1/8	52
1514	1 1/4	31.75	14	355.6	1 1/8	34.925	2 1/8	52
26	1 1/2	38.10	6	152.4	1 1/2	38.10	2 1/8	54
210	1 1/2	38.10	10	254	1 1/2	38.10	2 1/4	57
214	1 1/2	38.10	14	355.6	2	50.8	2 1/4	57
218	1 1/2	38.10	18	457.2	2	50.8	2 3/8	60
224	1 1/2	38.10	24	609.6	2	50.8	2 1/2	63.5
230	1 1/2	38.10	30	762	2	50.8	2 5/8	67
256	2 1/4	57.15	6	152.4	1 3/8	34.925	2 3/8	73
2510	2 1/4	57.15	10	254	1 3/8	34.925	3 1/8	79.5
2514	2	50.8	14	355.6	2	50.8	2 3/8	73
2518	2 1/4	57.15	18	457.2	2	50.8	2 3/8	73
2524	2 1/4	57.15	24	609.6	2 1/2	63.5	2 3/4	70
2530	2 1/4	57.15	30	762	2 1/2	63.5	2 3/4	73
2536	2 1/4	57.15	36	914.4	3	76.2	2 3/4	70
2548	2 1/4	57.15	48	1219.2	3	76.2	3 3/8	86
2560	2 1/4	57.15	60	1524	4	101.6	3 1/2	89
2572	2 1/4	57.15	72	1828.8	4	101.6	3 3/4	95
36	2 1/2	63.5	6	152.4	1 3/8	34.925	3 3/8	86
310	2 1/2	63.5	10	254	1 3/8	34.925	2 3/8	86
314	2 1/2	63.5	14	355.6	2	50.8	3 3/8	86
318	2 1/2	63.5	18	457.2	2	50.8	3 3/8	92
324	2 1/2	63.5	24	609.6	2 1/2	63.5	3 3/8	95
330	2 1/2	63.5	30	762	2 1/2	63.5	3 3/8	98.5
336	2 1/2	63.5	36	914.4	3	76.2	3 3/8	92
348	2 1/2	63.5	48	1219.2	4	101.6	3 3/8	90.5
360	2 1/2	63.5	60	1524	4	101.6	3 3/8	98.5
372	2 1/2	63.5	72	1828.8	4	101.6	4 3/8	106
356	3	76.2	6	152.4	13/8	34.925	4	101.5
3510	3	76.2	10	254	13/8	34.925	4 3/8	109.5
3514	3	76.2	14	355.6	2	50.8	4 3/8	109.5
3518	3	76.2	18	457.2	2	50.8	4 3/8	109.5
3524	2 1/2	63.5	24	609.6	2 1/2	63.5	3 3/8	97
3530	2 1/2	63.5	30	762	3	76.2	4	111
3536	2 1/2	63.5	36	914.4	3	76.2	4 3/8	111
3548	2 1/2	63.5	48	1219.2	4	101.6	4	111
3560	2 1/2	63.5	60	1524	4	101.6	4 3/8	111
3572	2 1/2	63.5	72	1828.8	4	101.6	4 3/8	111
410	3 1/2	90	10	254	2	50	4 1/2	114.5
414	3 1/4	82.55	14	355.6	2	50.8	4 1/2	114.5
424	3	76.2	24	609.6	3	76.2	4 1/4	108
430	3	76.2	30	762	3	76.2	4 3/8	111
436	3	76.2	36	914.4	4	101.6	4 3/8	111
448	3	76.2	48	1219.2	4	101.6	5	127
460	3	76.2	60	1524	4	101.6	5 3/8	130
4510	3 1/2	88.9	10	254	2	50.8	4 3/8	120.5
4518	3 1/2	88.9	18	457.2	3	76.2	4 3/8	120.5
4524	3 1/2	88.9	24	609.6	4	101.6	4 3/8	120.5
4536	3 1/2	88.9	36	914.4	4	101.6	4 3/8	120.5
56	4 1/2	114.3	6	152.4	2	50.8	5 1/4	133
510	4	101.6	10	254	3	76.2	5	127
514	4	101.6	14	355.6	3	76.2	5 1/8	133
518	4	101.6	18	457.2	3	76.2	5 1/4	133
524	4	101.6	24	609.6	4	101.6	5 3/8	137
536	4	101.6	36	914.4	4	101.6	5 3/8	137
5510	5	127	10	254	2 1/2	63.5	5 3/8	149
5514	5	127	14	355.6	3	76.2	5 3/8	149
5518	4 1/2	114.3	18	457.2	4	101.6	5 3/8	149
5524	4 1/2	114.3	24	609.6	4	101.6	6	152.5
5536	4 1/2	114.3	36	914.4	4	101.6	6 3/4	159
66	5 1/2	139.7	6	152.4	3	76.2	6 1/4	159
610	5 1/2	139.7	10	254	3	76.2	6 1/4	159
614	5	127	14	355.6	3	76.2	6 3/8	157
618	5	127	18	457.2	4	101.6	6 3/8	157
624	5	127	24	609.6	4	101.6	6 1/2	165

Way Wipers

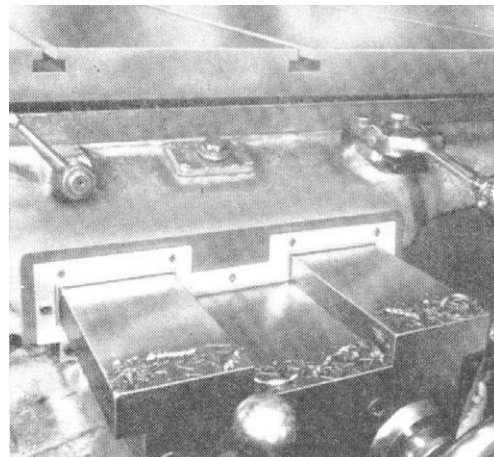
SHINSUNG slideway wipers have been developed in cooperation with the leading machine-tool builders for the protection of slide and guide ways against dirt and for the preservation of machine accuracy. SHINSUNG slideway wipers meet the high demands of machine builders, both for conventional and hydrostatic lubrication systems.

Type Ranges BA and BAS

This wiper range programme offers the following benefits :



- **Solid aluminium casing**
No distortion of the wiper lip on fitting to machine.
- **Varying heights of casing**
Can be used to replace all other types on the market.
- **Fixing holes located only in aluminium casing**
 - No countersunk holes required.
 - To fit wipers up to M6 screws are needed.
- **Easily replaceable wiper lip**
 - Only in case of straight parts.
- **Sealing of the wiper backface**
 - The special design of the wiper lip has a bead on its backface ensuring a water/oilproof seal between the wiper and machine fitting face.
- **It is possible for customers to make up their own wipers.**
- **Fabricated wipers**
 - Wipers can be made to your drawings.
 - For this we need:
details of max. available space, the precise slideway dimensions, and the positioning of the fixing holes in relation to the slideway.
 - Wipers of similar types can be used in combination.



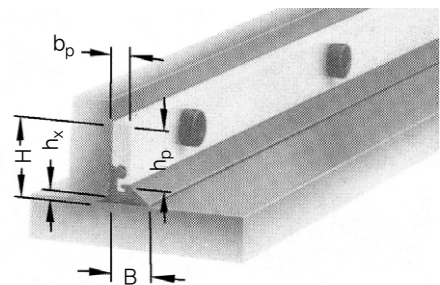
Technical data of the wiper lip

- Material : Polyurethane
- Resilient with high abrasion resistance
- Will operate effectively in ambient temperatures of up to +100
- High flexibility in temperatures of up to -40 (No material embrittlement)
- Resistant to oil, grease, emulsions and watery
- Limited resistance to Alkali, Amine, Acid and Petrol
- High hydrolysis resistance as well as outstanding resistance to Oxygen, Ozone und UV rays

Fixing Instruction

- A flat surface installation space ($\geq H - h_{x \max}$) is necessary, otherwise an additional fixing plate is required.
- BA type wipers are primarily used for restricted fitting conditions or where a telescopic cover, a folded cover or an armoured apron provides the main protection.

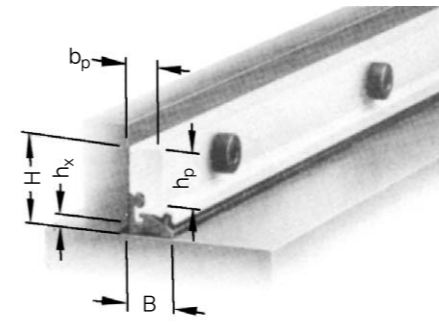
Type Range BA



Type	Fitted dimension H	h _p	h _{x max}	B	b _p
BA 18	17,5	13,0	3,5	7,5	4,5
BA 25	23,5	19,0	3,5	7,5	4,5

Standard length : 1,000mm

Type Range BAS



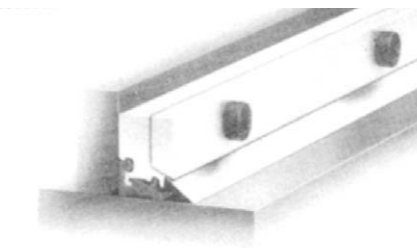
The aluminium casing for the BAS type range incorporates an additional protection of the lip. These wipers are preferred where direct contact with chips is involved. (Not hot chips)

Dimensional Table Dimensions in mm

Type	Fitted dimension H	h _p	h _{x max}	B	b _p
BAS 18	17,5	11,4	3,5	10	7
BAS 25	23,5	17,4	3,5	10	7
BAS 40	39,5	33,4	3,5	10	7

Standard length : 1,000mm

Pre Wiping



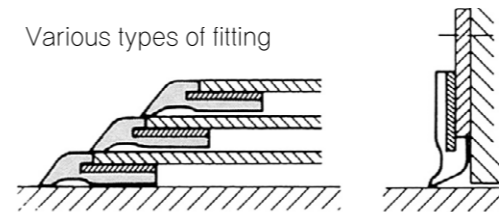
To protect the wiper lip from hot chips and to clean the slideway of rust and solid dirt the wipers must be fitted with an additional flexible protective lip (made from rust free spring steel or CUS alloy).

This protective strip and the associated clamping piece are fitted to the machine by means of the wiper fixing screws.

For straight way wipers with suitable fixing hole arrangements (hole distances ≤ 80 mm) the clamping piece is not required.

Type Range MA

Various types of fitting

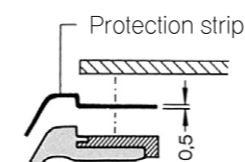


MA type wipers mainly operate square to the slideway on telescopic covers providing a wiping and also a pulling element to open the boxes. Where there is insufficient room for BA/BAS type wipers the MA type can be fitted vertically for use as a slideway wiper.

Steel plate vulcanized with high abrasion resistant polyurethane wiper lip.

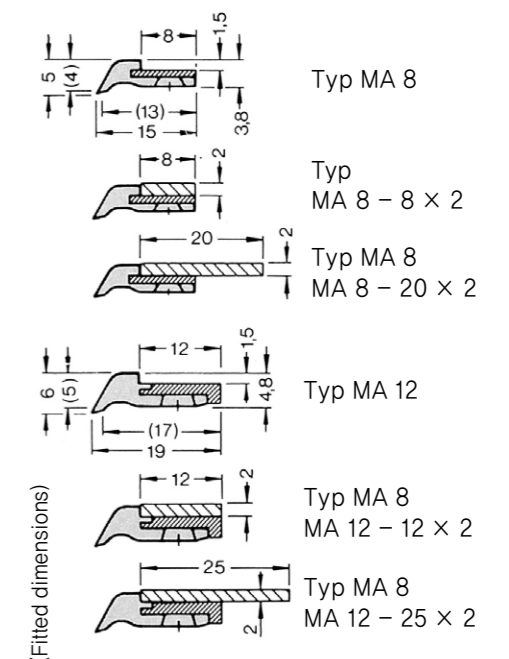
Resistant against mineral oils and coolants. Standard length: 500mm

Wipers in the MA range with fixing plate can also be made according to your drawings.

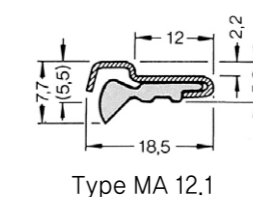


In addition, this wiper can also be protected from hot chips with a stainless steel protection strip, however in this case the wiper can only be fitted square to the slideway!

Specification :



Pulling Wiper



with exchangeable lip
Standard lengths: 3000mm (can also be supplied in divisible lengths)
This wiper can only be fitted square to the slideway.

Way Wipers

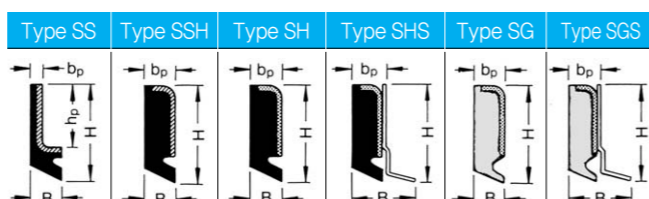
■ Type Rnage S

Type S wipers are available as strip material(standard length:3000mm). This range comprises of a metal carrier plate on which is vulcanized a sharp edge wiper lip of highest quality.

● Available Types :

- Type SS – Carrier plate in steel
wiper lip made from synthetic rubber
- Type SSH – material as Type SS
- Type SH – carrier plate in brass
wiper lip made from synthetic rubber
- Type SHS – material as Type SH, however with bronze
protection strip
- Type SG – Carrier plate in brass, wiper lip polyurethane
- Type SGS – material as Type SG, however with bronze
protection strip

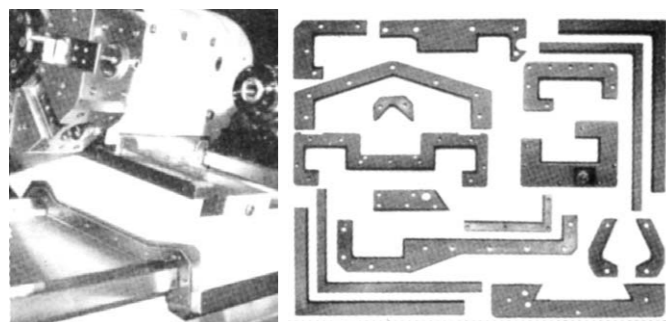
● Way Wipers cross sections and dimensions



Dimensions in mm

Type	Heights		Heights		T° admissible
	H	hp	B	bp	
SS-0	18,0	12,7	5,0	2,0	120°C
SS-4	30,0	23,5	6,0	2,6	
SS-6	40,0	33,4	6,0	2,6	
SSH-0	18,0	–	5,0	5,0	120°C
SSH-3	25,0	–	6,0	6,0	
SH-0	18,0	–	5,0	5,0	
SH-3	25,0	–	6,0	6,0	120°C
SHS-0	18,0	–	10,0	5,2	
SHS-3	25,0	–	10,0	6,2	
SG-0	18,0	–	5,0	5,0	80°C
SG-3	25,0	–	6,0	6,0	
SGS-0	18,0	–	10,0	5,2	
SGS-3	25,0	–	10,0	6,2	80°C

■ Cast Wipers for Series – production

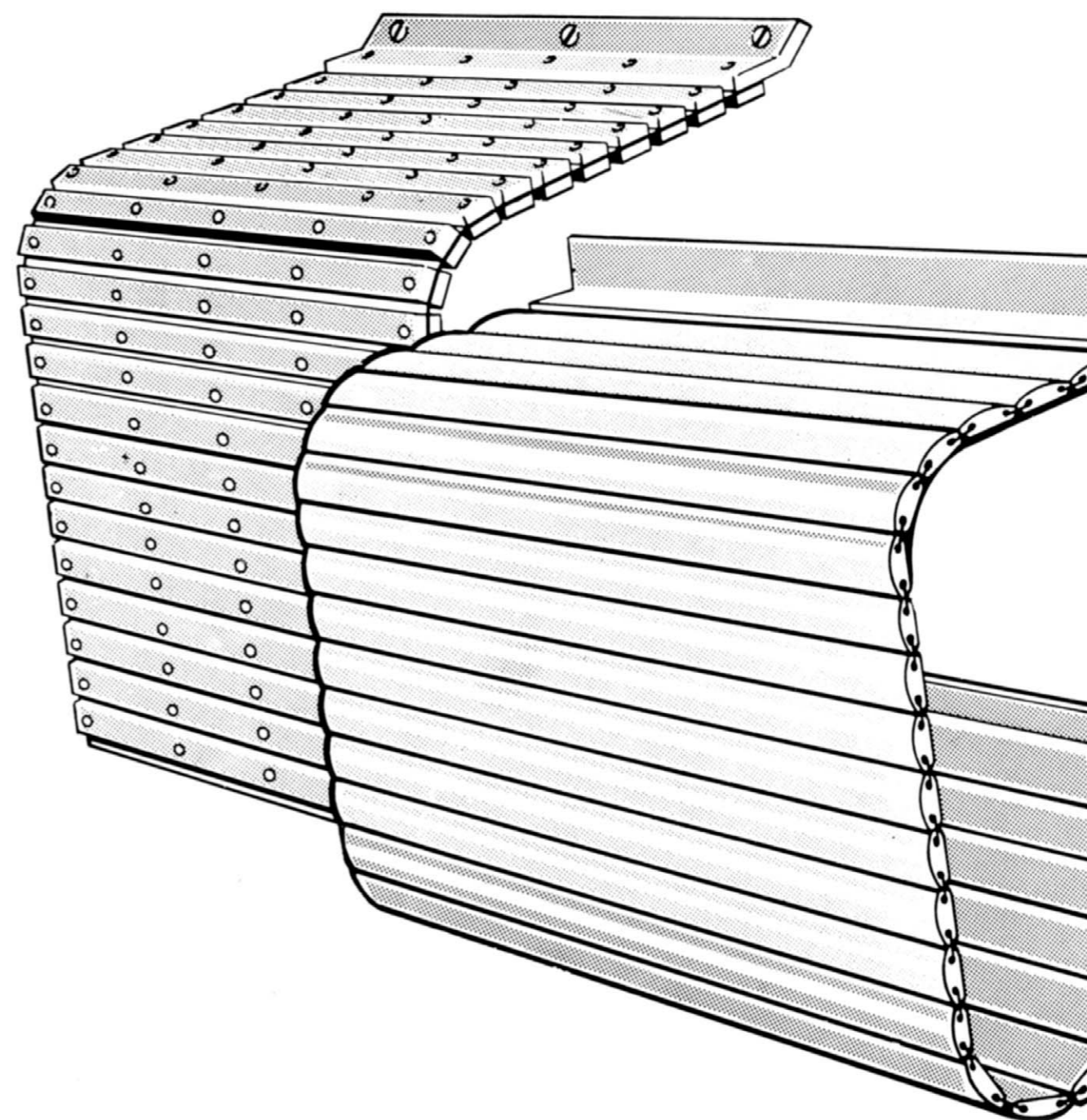


The complete wipers are specially manufactured to your requirements synthetic rubber with a backing plate. Complicated profiles for series-production can be supplied economically and to tight tolerances.



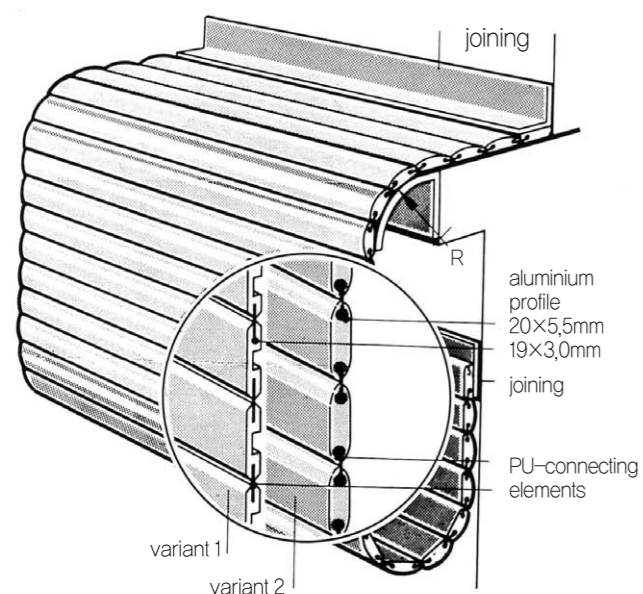
Link Apron Covers

Guide Way Protections

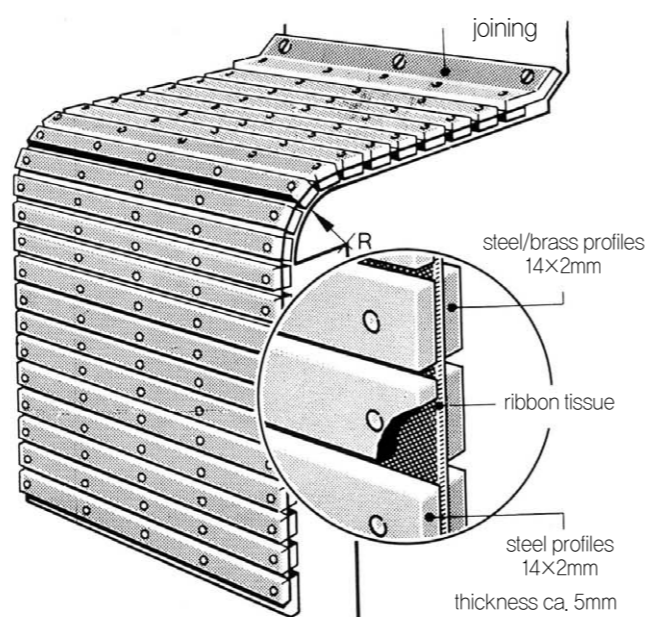


Link Apron Cover

SHINSUNG aluminium link apron covers



SHINSUNG steel/steel and steel/brass link apron covers



If telescoping covers can't be used for protection of guide ways due to limited mounting possibility, we commend the application of apron covers, which can be executed in accordance with the condition of applications in steel/steel, steel/brass or aluminium segments. The SHINSUNG apron covers can slide directly on the guide ways and can hang down without extra guide at the end of the guide ways, screwed up or rolled up, if necessary.

- **Advantage of SHINSUNG apron covers:**
 - small space requirement
 - simple mounting
 - perfect protection against hot chips and industrial coolants and lubricants
 - short delivery time

※The SHINSUNG apron covers proffers additionally the advantage of non corrosion, favourable weight and application with lateral displacement too.

■ Bult-on aluminium apron covers

The aluminium apron covers are made with single segments, which are provided with slits on both side and fitted with appropriate Polyurethan joints. The Polyurethan joints are fitted tightly in the slits of the aluminium segments, becoming to a form-closed unity.

The aluminium apron covers are extremely resisting as the field which might be damaged by hot chips, industrial coolants and lubricants, or other negative influences is reduced to aluminium.

■ Manufacturing Dimensions:

Aluminium apron covers can be manufactured in two variants,
min. roll radius R : variant 1 = 25mm
variant 2 = 50mm

Length/Width : as per customer requirement

Fastening : Standard final segment

Bracket

Flange or

as per customer requirement

■ Bult-on aluminium apron covers

On a high tensile strength coated ribbon tissue are riveted steel/steel, steel/brass flat profiles to a form-closed unity.

A special coating on the upper side of the ribbon tissue allows the application of this apron covers also in the immediate proximity of hot chips.

■ Manufacturing Dimensions:

Aluminium apron covers can be manufactured in two variants,
min. roll radius R : variant 1 = 25mm
variant 2 = 50mm

Length/Width : as per customer requirement

Fastening : Standard final segment

Bracket

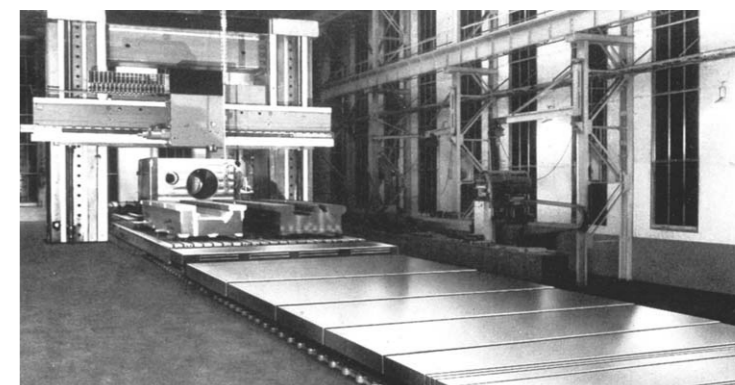
Flange or

as per customer requirement

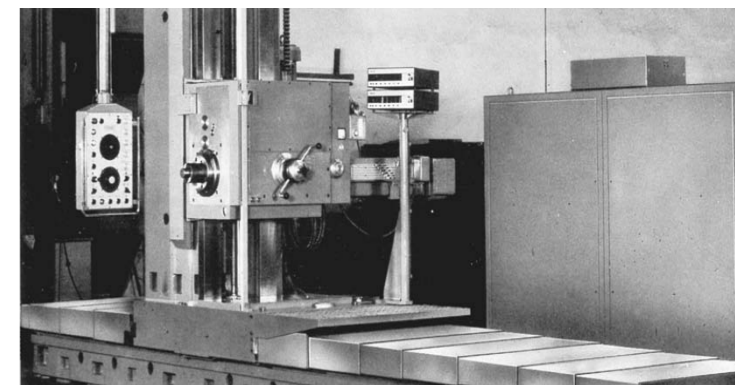


Telescopic Covers

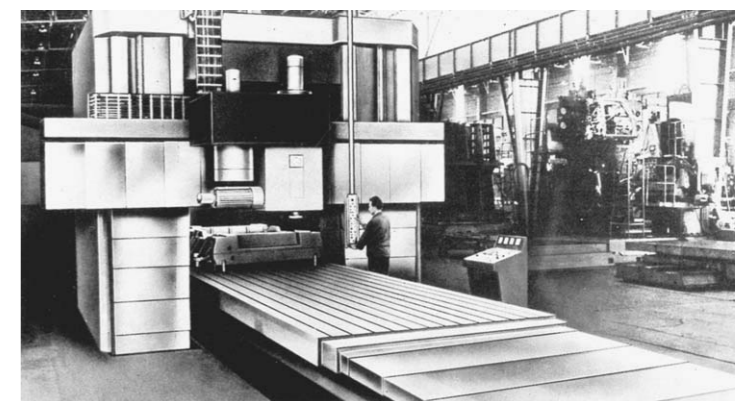
Guide Way Protections



Telescopic Covers for guideways on a milling machine



Telescopic Covers for guideways on plate boring machine



Telescopic Covers for guideways on cross slide and uprights of a milling machine

THE TELESCOPE COVER

The use of the telescope cover has become very important in coping with the rapid increase in technology and automation of the machine tool industry in recent years.

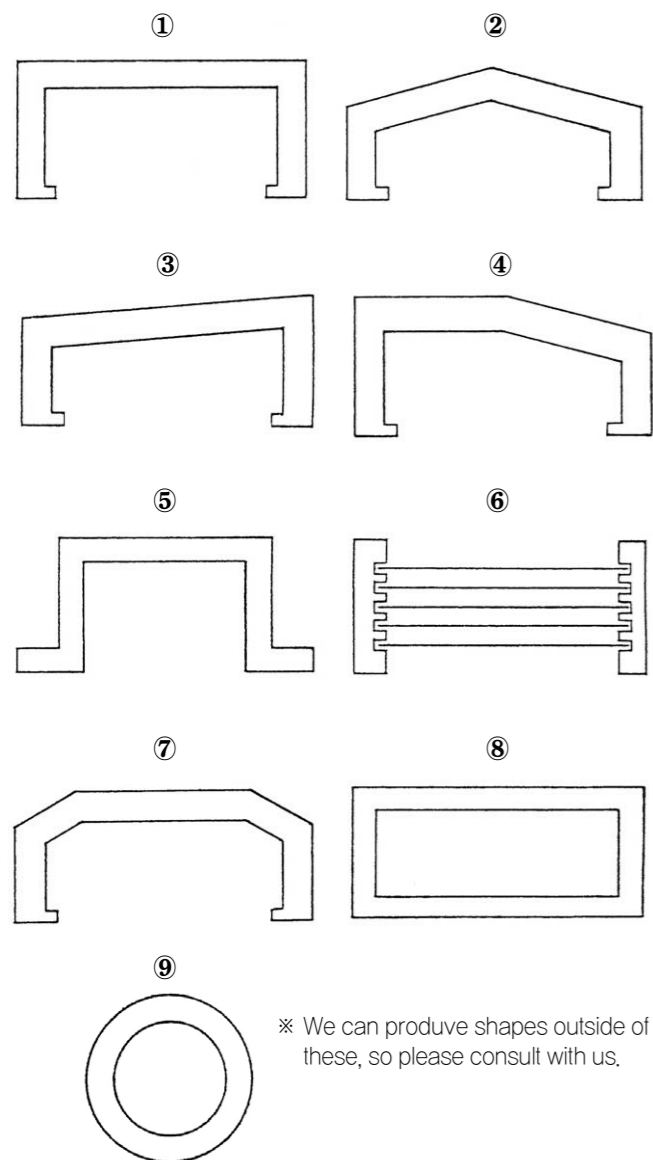
This rapid development requires such things as rational business practices, expanded productivity, and good factory management. SHINSUNG has for a long time been cooperating with various machine tool makers to improve our products. The telescope cover is a result of this. This telescope cover has, with the use of advanced technology, been produced to conform to many types of machines.

Below is a detailed explanation of the telescope cover.

1. SPECIAL FEATURES :

- We will produce to fit any machine.
- 2. APPROVED SPEED :** We produce on the premise of 10m to 12m. If you need to go over this, we will consult with you directly.
- 3. MATERIALS :** We produce in both iron and stainless steel.
- 4. FINISHED SURFACE :** Buff, black finish and zinc plating.

Below are the different shapes of the telescope cover.



■ Struction

1. COVER BOX

We use a special kind of steel plate for the cover box. There are 4 standards for the thickness of the plate: 1.2mm, 1.6mm, 2.3mm and 3.2mm. The thickness is decided based on the cover measurements and the necessary intensity.

2. WIPER

This special wiper is used on the cover but it can also be used on the side according to the design. (made of polyurethane) The heat resistance of the wiper is the standard 40 degrees to 100 degrees celsius. It is also durable enough to protect against water and oil. We can also make the telescope cover without wipers.

3. WIPER COVER

We can install a steel cover on the wiper in case you need to protect the wiper form high temperature industrial dust.

4. ROLL UP STRUCTURE

In principle, both ends of the cover roll up. This is the so called box of each of the covers can match perfectly. This can also put tension on the wiper accurately. Of course, we can design a cover which goes up step by step. In order to avoid the cover itself lifting up, each wiper should be suppressed by adequate tension.

5. NON SKID PLATE

There are many advantages in putting a non stick plate to the cover box. For example, there is a column inside which is in the foothold. We have introduced this as a place for tools.

6 & 7. THE SUPPORT ROLLERS GUIDE SHOE

In the small size and medium size cover, we use a synthetic resin guide shoe. In the big size covers, in order to reduce the friction resistance, the roller itself uses a ball bearing roller. (7) When the guide system uses a roller and when the metal of movable parts isn't strong, to provide a special support rail parallel to the movable part.

8. SUSPENDED METAL FITTINGS

With the heavy cover, there is a removable suspended fitting, it is easy to use.

9. INSPECTION HOLE

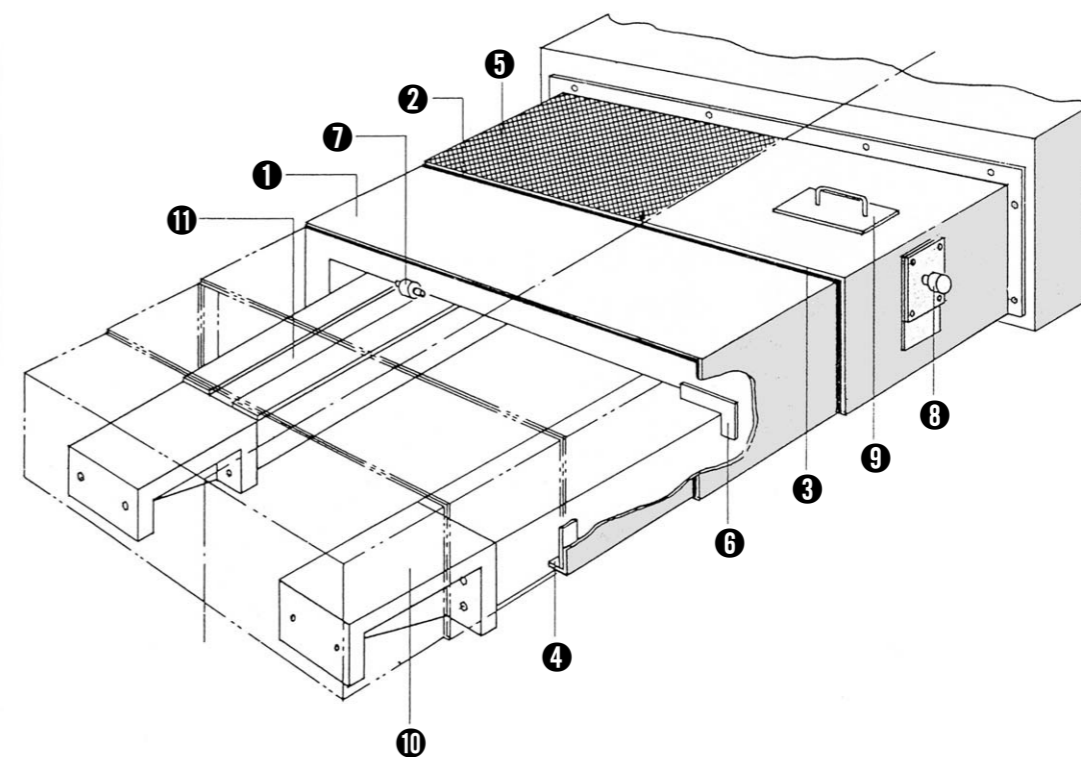
An inspection hole has been put on the top of the box in order to inspect the parts which are necessary for, the maintance, such as the spindle and the movable part etc. Please be careful because will be longer than you expented. If you hole or make it transparent.

10. BRACKET

For the movable part to move, when there is no margin to move because of the design of the machine tool, we use the bracket in the diagram. The point is a bracker joint that does not restrict the movement of the cover.

11. SUPPORT RAIL

When the movable part is not strong enough, you need a supprot rail accompany the roller guide.

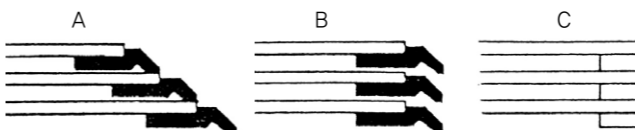


■ COST AND DESIGN OF THE TELESCOPE COVER

(please consult with us from beginning)

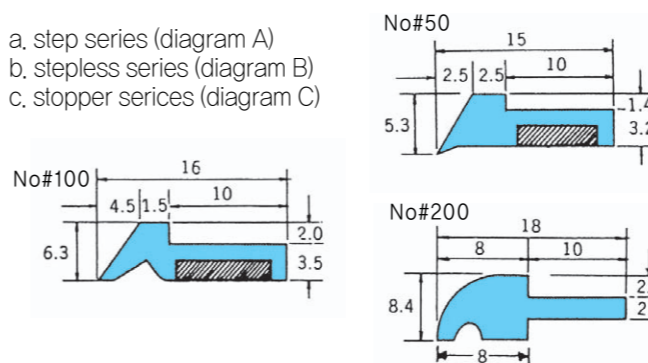
We think an important point for the machine tool maker is how small the telescope cover becomes when it contracts. Looking from the point of view of the cost of the cover, it is better for the box unit to be bigger and there be less units than for the cover to be made up of a lot of small box units. This will lower the cost. So please consult with us from the early stage of your plan in order to have the most cost effective design.

When you need to design the minimum size cover, you have to make it very small. So it is difficult for each part to have balance. Therefore our company adopts a rail guide system.



■ THE SHAPES OF THE COVER WHEN CONTRACTING

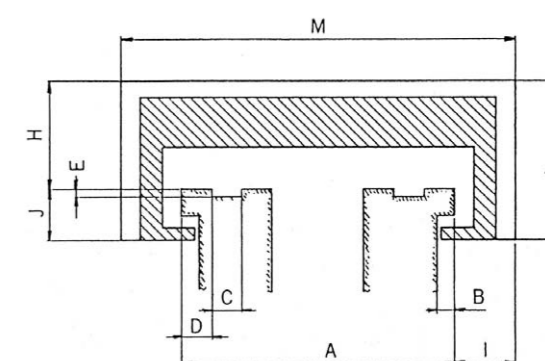
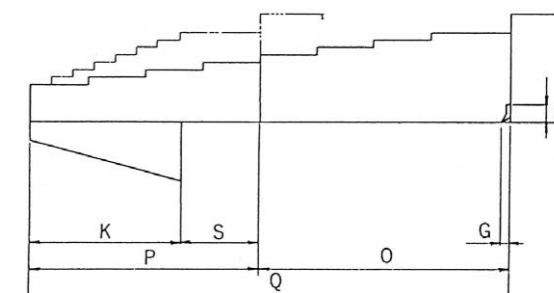
- a. step series (diagram A)
- b. stepless series (diagram B)
- c. stopper series (diagram C)



■ How to attach and repair

In case of attaching COVER, be sure to attach in a state contracted(Min) by optional deciding. STEEL SLIDE COVER should be cleaned once a week at least and oil is supplied.

■ Matter to be clarified at order time.



GUIDE WAY MEASUREMENTS

• Guide way width	Amm
• Tail end measurement	Bmm
• Width of guide slot	Cmm
• The guide slot from the side of the guide	Dmm
• Depth of guide slot E	mm
• Height of wiper F	mm
• Depth of wiper G	mm

TELESCOPE MEASUREMENTS

• Height of the movable part	Hmm under mm
• Side measurement of the movable part	Imm up to
• under side	Jmm up to
• Width of the cover	Mmm under
• Overhang of the cover	Kmm
• Stroke	Omm
• Smallest contraction point	Pmm
• Length of cover	Lmm
• Biggest contraction point	Qmm
• Stopping distance of the table	Smm

THE SURFACE MATERIAL(please choose one)

- Buff
- Black stain
- Zinc plating

CONDITIONS

Speed m seconds/m minutes Position(horizontal vertical perpendicular). Frequency hours/days (if there are obstructions such as the, limit switch, please inform us)

SPECIAL WANTS

- TELESCOPE COVER : Please tell us the number corresponding to the shape on page one. NUMBER
- POSITION OF THE ROLLER : Leave it up to us or let us know yourself.
- OTHER

Square-shaped Bellows

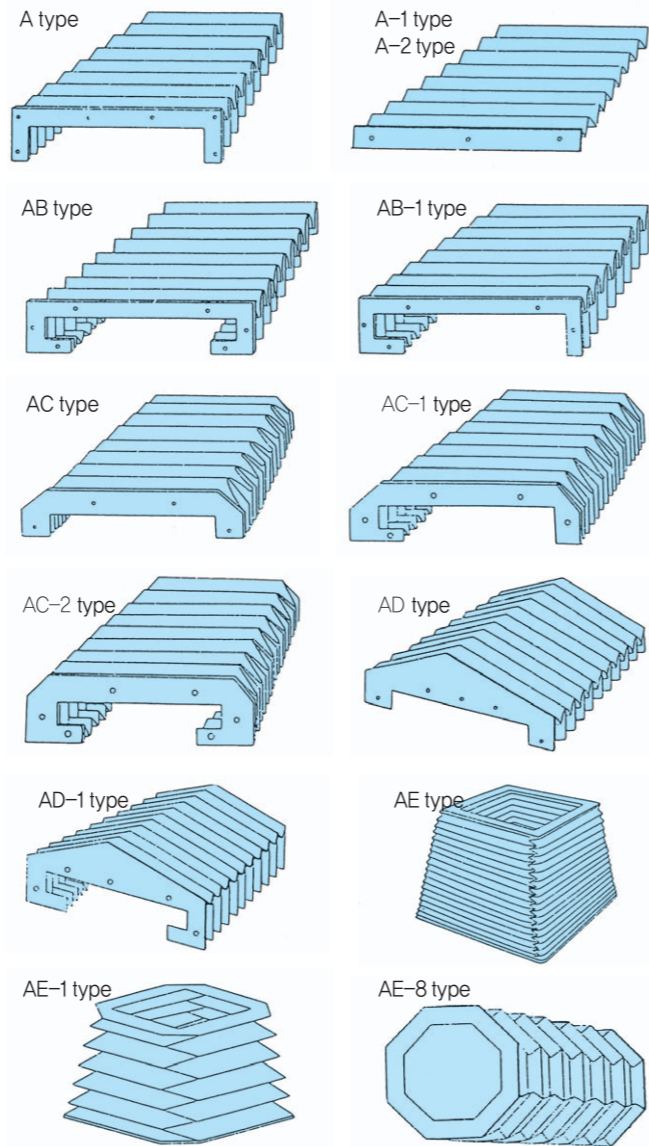
Characteristics

- Possible to manufacture any shape.
- Material quality is simple to any use.
- Anti-stagnant, anti-abrasion and durability are excellent.
- Transporting fee is small due to light weight, so this is economical.

Test Analysis of NTP Sheet

Heat-resisting Test		Bending Test		Oil-resisting Test
Machine	Lathe	Testing M/C	Bending Testing M/C	To dissolve ASTM No.1 in container for testing and put SHEET, and conduct deposition of 48 hours.
Cuttings	Bar steel(SS41)	Bending degree	180°C	
CHIP Momnet temperature	700°C	Frequency of bending	80,000times	
Distnace	160mm	Time	1year	
Time	120sec			
Nothing abnormal		Nothing abnormal		Nothing abnormal

Type of square-shaped Bellows



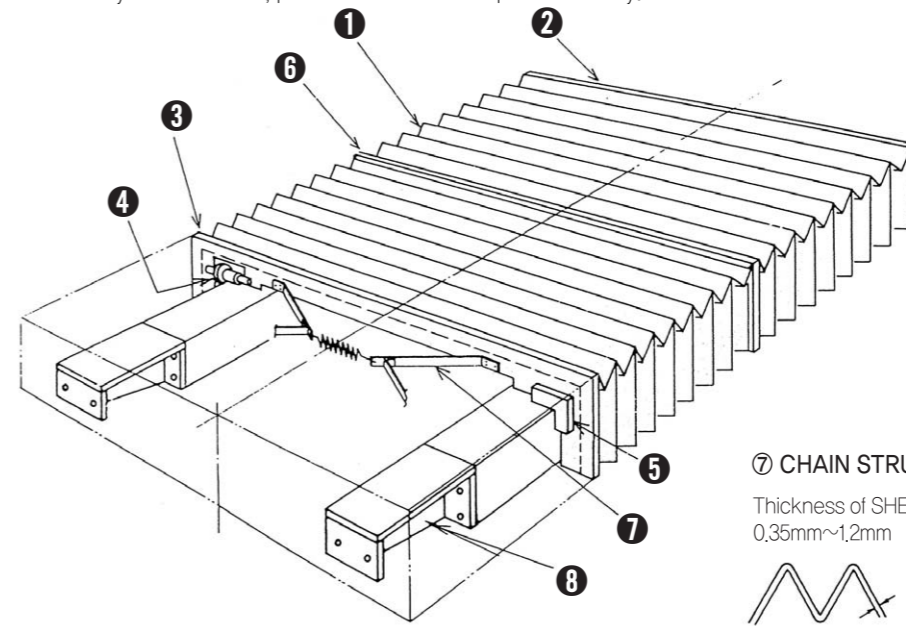
* Any type outside of the above can be manufactured, so contact us for negotiation!

Major material quality

As material used for body of square-shaped bellows, there is NTP Sheet. NTP is the best sheet with excellent intensity, including heat-resisting, oil-resistings, weather-resisting, anti-abrasion and crookedness as mechanical material of Bellows. Special care/attention should be given to similar type on appearance, and it is necessary to bear in mind that the difference of value is big. Indifference for material quality would drop the quality of product.

Structure:

1. Bellows body is used. The thickness of Sheet is respectively 0.6mm, 0.7mm, 0.9mm and 1.2mm as standard ones, and for selection of SHEET, it is decided by bellows width, pitch standard and required intensity.



2. END PLATE

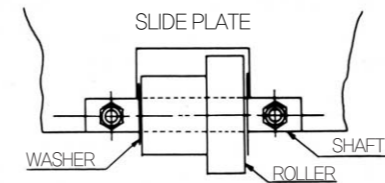
Steel plate is used and thickness of steel plate is 1.2mm, 1.6mm, 2.3mm and 3.2mm as standard types.

3. Intermediate Support Plate(Slide Plate)

Using steel plate, strong vinyl chloride and veneer board and keeping the body of Bellows from touching directly the SLIDE surgance and for convenience of manufacture, it also include connecting role of bellows body by setting each SLIDE PLATE to Bellows number 7~10.

4. ROLLER

ROLLER is fixed to SLIDE part so that Bellow can reciprocate smoothly. Mainly Nylon resin is used as material. The shape can be changeable according to type in addition to the picture seen.



5. SLIDE SHOE

In small and middle-typed BELLOWS, SLIDE SHOE consisted of brass(BSP) or synthetic resin is used instead of ROLLER

6. SEATPLATE

It functions as connecting BELLOWS body to intermediate supprot plate.

7. CHAIN TOOL

Please refer to the following item.

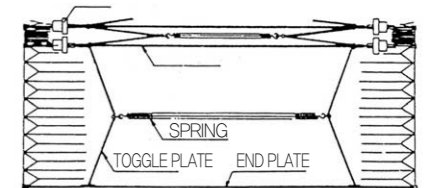
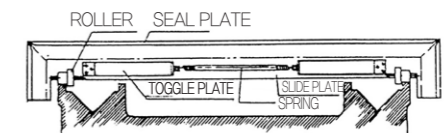
8. BRACKET

When BELLOWS is shrinked, like the picture, BRACKET is set, if there is nos spare on SLIDE surface of machine tool. This time, it is important to establish that connecting point between SLIDE surface and BRACKET would not restrict the reciprocation of BELLOWS.

Chain Tool

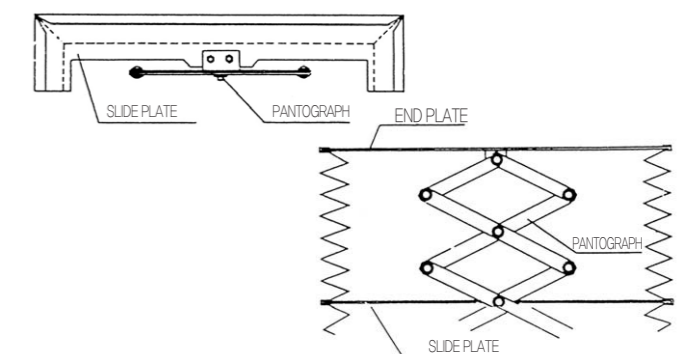
This is mainly installed to which stroke of bellow is long or to which bellows width is broad, helping Bellow have smooth reciprocation.

1. TOGGLE method



2. PANTGRAPH method (applied to machine with speed under 6m/sec)

This method is not limited to BED purpose of horizontal use and it is also installed to CLOSS RASIL use upon necessary.



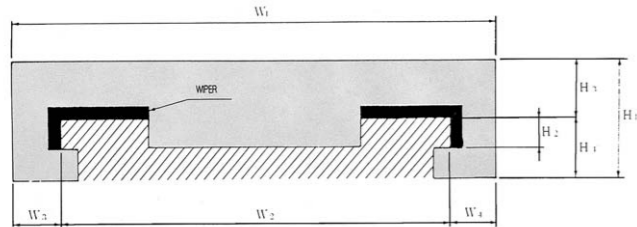
3. Other method :

There are BELT method, Limited TAPE method, etc.

Outline Design Standard of BELLOWS

1. How to decide PITCH of BELLOWS

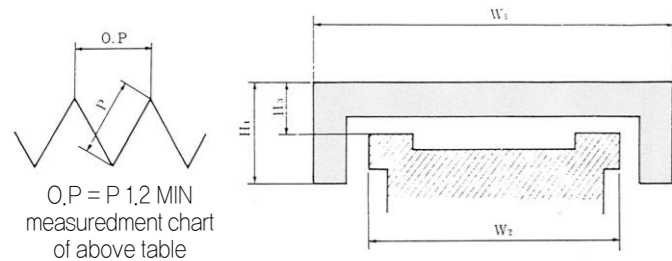
Considering SPACE to install such as Roller and TOGGLE PLATE, etc. in limited measurement of H3, W3, W4 in the picture or PANTOGRAPH, etc. the remained SPACE becomes PITCH of BELLOWS, provided, however, that you should avoid SPACE occupied by Wiper, such case where there is Wiper at both sides of table. Please pay attention to this point.



2. BELLOWS width and pitch

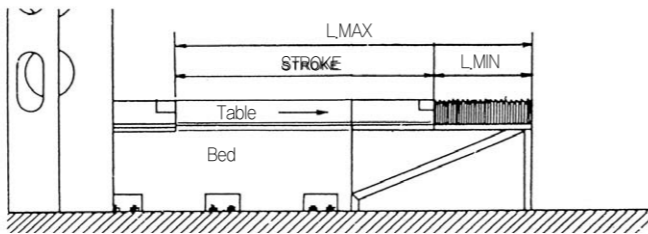
If we refer to P bank of the attached table after Pitch of Bellows is decided, there is L, MIN standard for necessary STROKE.

Height to Mt. from gully	Open Pitch between Mt and Mt.	Bellows width W1	Width of SLIDE surface W2	Standard when it is shrinked at the least	
				Extended contractor speed under 10m/min	Extended & contractor speed under 10m/min
15	15~18	200	W1-50		
20	20~24	300	W1-60	1/3ST	
25	25~30	400	W1-70	1/4ST	
30	30~36	500	W1-90	1/4.5ST	
35	35~42	600	W1-100	1/5.5ST	
40	40~48	800	(110) W1-150	1/6.5ST	1/4.3
45	45~54	1000	(120) W1-160	1/7.5ST	1/5.3
50	50~60	1200	(130) W1-170	1/8.3ST	1/6.3
55	55~66	1400	(140) W1-180	1/9.3ST	1/7.3
60	60~72	1600	(150) W1-190	1/10.3ST	1/8.3
65	65~78	1800	(160) W1-200	1/11.3ST	1/9.3
70	77~84	2000	(170) W1-210	1/12.3ST	1/10.3



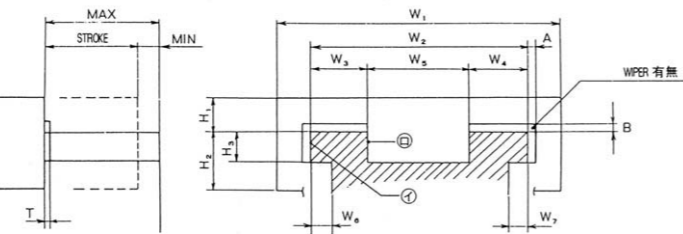
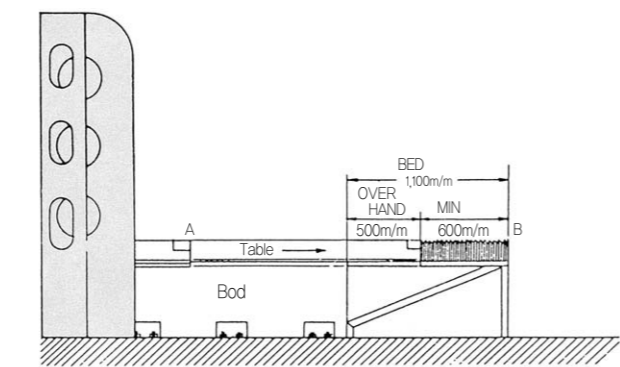
3. L.MAX(Developed length of Bellows)

Like the picture, L.MAX of Bellows becomes L.MIN of STROKE + BELLOWS of TABLE, AS for L.MAX, please think of Open Pitch=Mt. number. This time, L.MIN is important element along with L.MAX for Bellows. It may be proper to catch L.MIN as the least, if possible, there is a limit by pitch of bellows. Such case where SPACE of L.MIN is limited, L.MIN of Bellows can be reduced if we reduce Mt. number while making pitch bigger. L.MIN of Bellows has a small difference according to PITCH, but you may take it as about 60mm of 10Mt.



4. Example of Take-up

- When MIN of Bellows(length when shrinked) is 600m/m and OVERHANG of TABLE is 500m/m, BELLOWS is taken up and 600m/m=1, 100m/m, that is, BED extension of 1,100m/m should be done.
- Take-up plate of BELLOWS taken up to A part and B part Bellows body should be fully made horizon with SLIDE surface of BED, you should be mindful of this.



BED Dimension

Table Width	W1 mm	W2 mm	W3 mm
	W4 mm	W5 mm	W6 mm
	W7 mm	H1 mm	H2 mm
	H3 mm	A mm	B mm
Finish degree	イ	□	
	MAX mm	BRACKET (Yes. No)	
	STROKE mm		
	Width of Wiper T mm		
	When shrinked to the least MIN mm	BRACKET mm	

Condition

Speed	m/min · mm/sec	Position(Horizon, vertical, slant)
Frequency	Time/day	Heat-resisting environment °C

Oil-resisting, water-proofing(necessary, yes, no) Degree(in details) Besides, such case where there are obstacles such as limit switch, etc. please indicate the position correctly.

How to order

BELLOWS type (See catalogue page 84)
Roller position: please indicate the position at option or when designated.

Cylinder-type BELLOWS

Shape

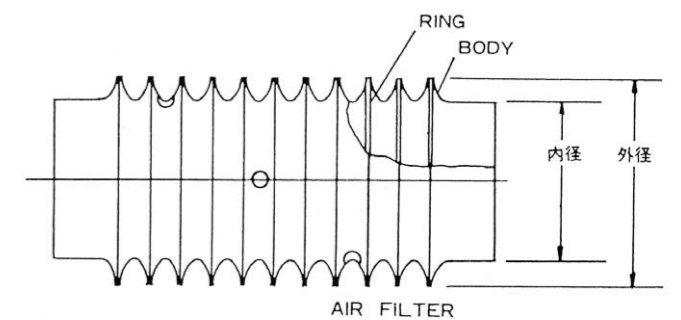


Major Materials

Nylon Tarpaulin is mainly used to cylinder-type BELLOWS, as coating and processing vinyl chloride resin to both sides of Nylon fiber. With respect to water-resisting degree, tension-resisting, tensile elasticity, tensile strength, it is excellent, while the heat-resisting is about 60°C and such case where BELLOWS requires of heat-resisting, separately NTP sheet is used.

Structure

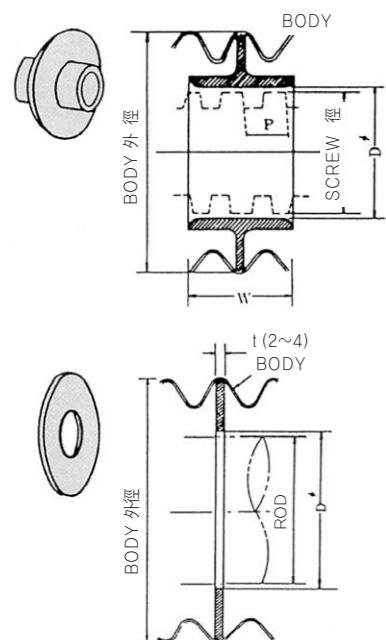
Constituted with Nylon Tarpaulin and steel line(SWP). By using tension-resisting of Tarpaulin, steel line RING is inserted for manufacturing and the line diameter of RING becomes thicker, as the outer diameter of BELLOWS becomes larger, Available scope of manufacturing.



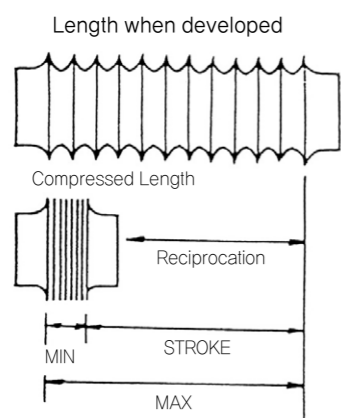
TELESCOPIC Covers

Supporting Stucturerials:

If cylinder BELLOWS grows longer or operated by being installed horizontally, the midways part of BELLOWS hands down, so in order to help smooth operation of BELLOWS, supporting structure like the picture(made from PVC plate and PVC pipe or gun metal) is installed at each proper interval.



Calculation standard of dimension



required by Belows PITCH agreeabel with outside with outside diameter of Belows = Nos of Mt

$$\text{MAX} = \text{MIN} + \text{STROKE}$$

$$\text{MIN} = \text{Pitch} \times \text{thickness of pitch}$$

1. Making the inside diameter of BELLOWS as standard, the inside diameter of BELLOWS is decided giving consideration to CLEARANCE of 8mm rather than SHAFT(ROD) diameter and outside diameter of BELLOWS is decided as bigger than the inside diameter according to chart.

2. Making set-caliber as standard, However, when limited by length of shrinkage(MIN), it becomes bigger that chart PIT(as outside diameter of BELLOWS becomes bigger) and this time, wrinkles happens at gully part of BELLOWS, somewhat appearance of product is bad, but there is no trouble in using.

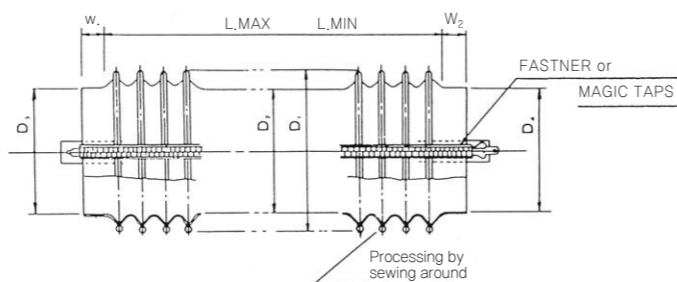
BELLOWS Dimension Standard table

BELLOWS inside diameter	BELLOWS outside diameter	PITCH	Thickness of ne
40	60	9	≅ 2.6mm
80	100	12	
120	145	15	
145	175	18	≅ 2.8mm
190	230	24	≅ 3.2mm
235	280	27	
290	340	30	≅ 3.9mm
380	440	36	
480	550	42	≅ 4.4mm

Open-type BELLOWS

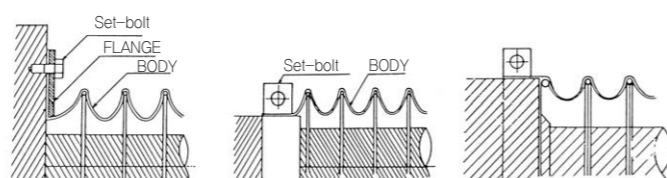


By opening and closing the open-part with FASTNER or MAGIC Tape like picture, not dissolving the already assembled machine, it can easily install BELLOWS. However, be mindful of BELLOWS outside diameter growing bigger compared to general BELLOWS.(and MIN)



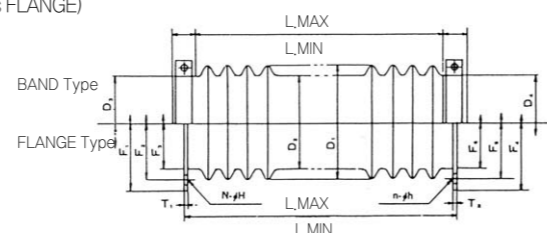
How to install

Both section fo cylined-type BELLOWS can be installed with FLANGE of BAND like picture below.



Matters clarified when ordering

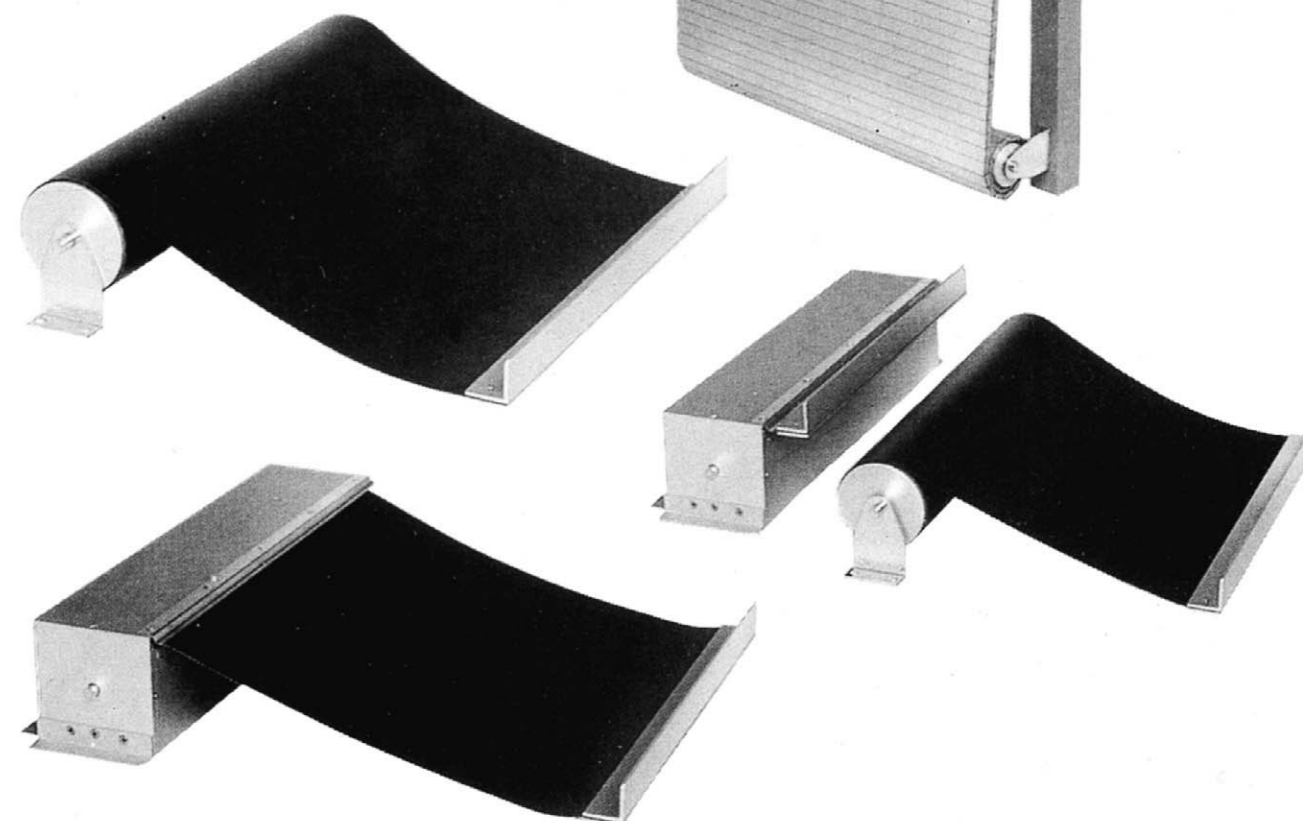
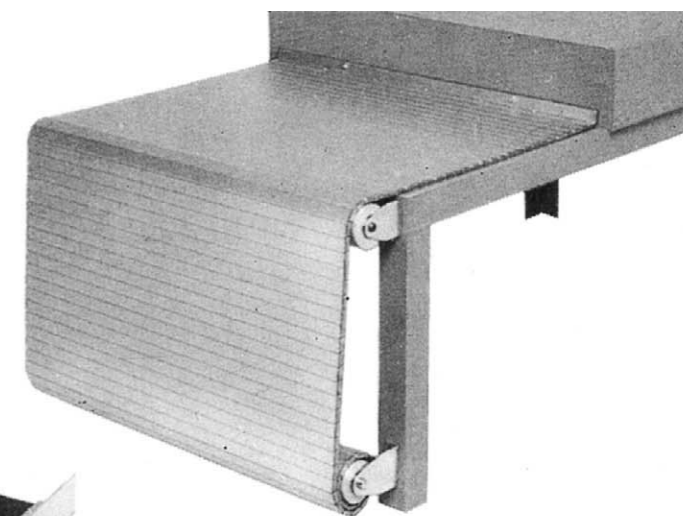
1. L_MIN
2. STROKE
3. SHAFT or ROD diameter
4. Condition of use (heat-resisting, oil-resisting, pressure)
5. Position of use (Horizon, vertical, others)
6. Speed of reciprocation
7. Diameter of the part taken up. (inside & outside diameter of FLANGE when it is FLANGE)



ROLL Covers

Guide Way Protections

Mojor use:
machine tool, industrail machine machine center
part of automation machine



Roll-Away Covers Without Housing

All SHINSUNG roll-away covers are supplied with multiple return springs (patented in various countries) and offer decisive advantages over conventional systems:

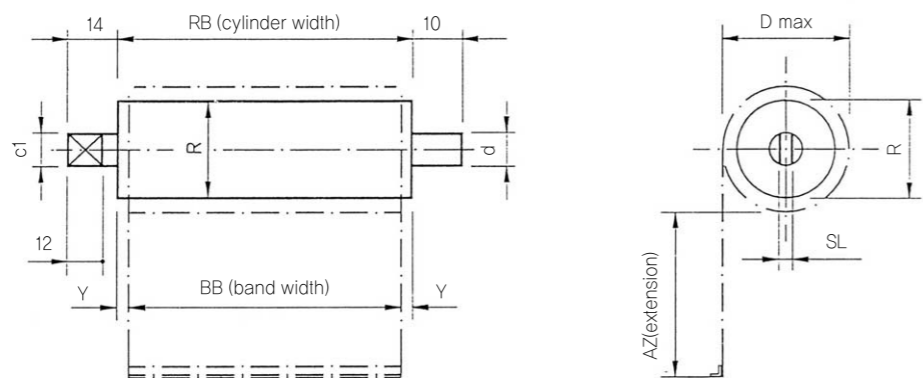
- Reliabel powerful mechanism, tailored to the application on hand
- One million movements guaranteed
- Standard take-up diameter can be reduced, if necessary
- Optimum selection of materials

Roll-away covers without housing—the best value for money

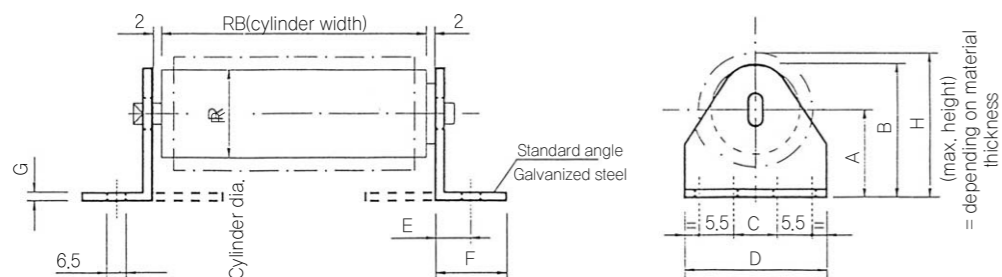
Dimensions of roll-away covers without housing

Type	R 30	R 40	R 50	R 60	R 70	R 80	R 90
BB (Band width) up to (mm)	AZ(max,extension) up to(mm)						
150	300	400	450	500	550	700	750
250	500	600	700	1000	1100	1300	1400
350	650	900	1050	1600	1750	2000	2150
500	800	1200	1350	1900	2050	2350	2500
750	1000	1500	1650	2200	2350	2700	2850
1000	1200	1800	2000	2500	2600	3100	3200
1250	1350	2000	2250	2750	2900	3400	3650
1500	1500	2200	2450	3000	3150	3700	3850

AZ extension up to(mm)	2Y
400	4
600	5
800	6
1200	8
1600	10
2400	14
3000	18
3850	22



Type	d1	SL	d	A	B	C	D	E	F	G	H	R	NO.of standard angle
R 30	10	4	10	33	45	16,5	40	11	18	1,5	59	30	033
R 40	10	4	10	50	62	16,5	40	11	18	1,5	93	40	050
R 50	10	4	10	50	62	16,5	40	11	18	1,5	93	50	050
R 60	10	4	10	50	62	16,5	40	11	18	1,5	93	60	050
R 70	15	6	15	60	72	26,5	50	15	22	2,0	112	70	060
R 80	15	6	15	60	72	26,5	50	15	22	2,0	112	80	060
R 90	15	6	15	60	96	32,5	60	17	26	2,5	151	90	080



Formula for D max.

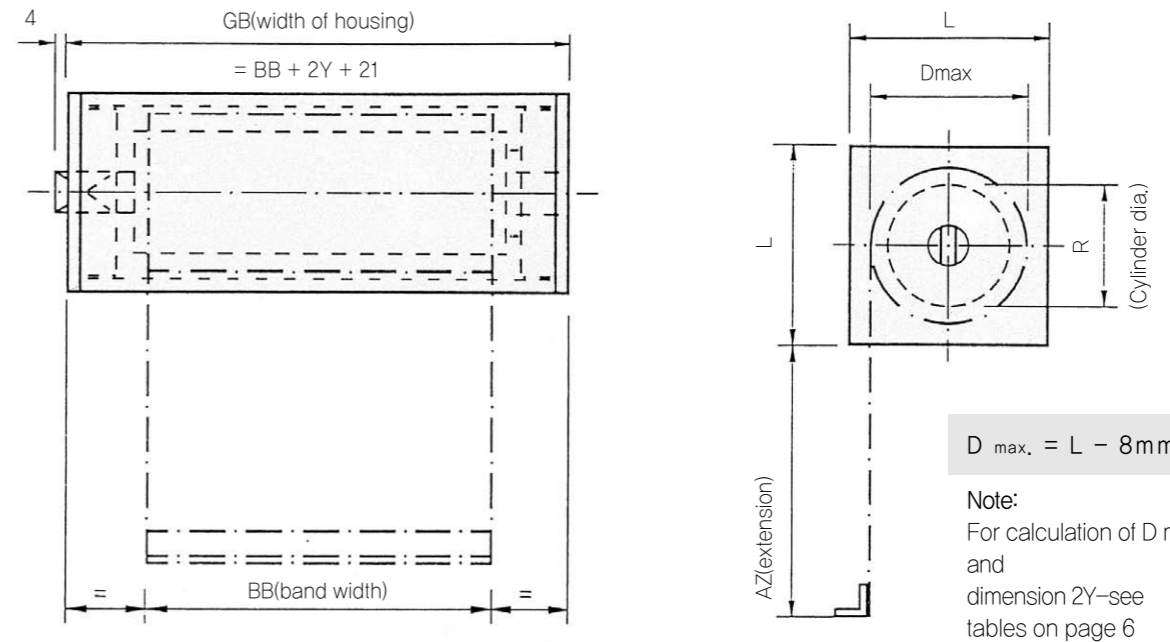
$$D_{max} = 2x \sqrt{\frac{L \times S \times 1,05}{\pi} + r^2}$$

- r = R (cylinder dia.) : 2
- L = AZ + 2Rπ
- s = band thickness (see page 19)

Roll-way Covers With Housing

The versatile, completely enclosed models

The winding mechanism is contained in a suitably dimensioned aluminum or steel housing. Standard equipment includes wipers. To reduce cost, it is advisable to choose the standard sizes given below wherever possible. Special versions can, of course, be made to customer's specifications.



Material : Aluminum, natural color, anodized on request. Larger dimensions or intermediate sizes made of corrosion-proofed steel sheet, painted black. Other colors on request.

Dimensions of standard housings LxL mm :

L x L = 50x50 60x60 70x70 80x80 90x90 100x100 110x110 120x120 130x130 140x140

Dimension of roll-away covers with housing

Type	RG 30		RG 40		RG 50		RG 60		RG 70		RG 80		RG 90	
	BB (band width up to (mm))	AZ	L x L	AZ	L x L	AZ	L x L	AZ	L x L	AZ	L x L	AZ	L x L	AZ
150	300	50x50	400	60x60	450	70x70	500	80x80	550	90x90	700	100x100	750	110x110
250	500	60x60	600	70x70	700	80x80	1000	90x90	1100	110x110	1300	110x110	1400	120x120
350	650	60x60	900	70x70	1050	80x80	1600	100x100	1750	110x110	2000	120x120	2150	130x130
500	800	60x60	1200	80x80	1350	90x90	1900	100x100	2050	110x110	2350	120x120	2500	130x130
750	1000	70x70	1500	80x80	1650	90x90	2200	100x100	2350	110x110	2700	120x120	2850	130x130
1,000	1200	70x70	1800	80x80	2000	90x90	2500	100x100	2600	110x110	3100	130x130	3200	130x130
1,250	1350	70x70	2000	90x90	2250	100x100	2750	110x110	2900	120x120	3400	130x130	3650	140x140
1,500	1500	70x70	2200	90x90	2450	100x100	3000	110x110	3150	120x120	3700	130x130	3850	140x140

* The housing dimensions apply to maximum band thickness. In confined spaces, try to choose thinner material to arrive at a smaller housing. Please call if you need assistance.

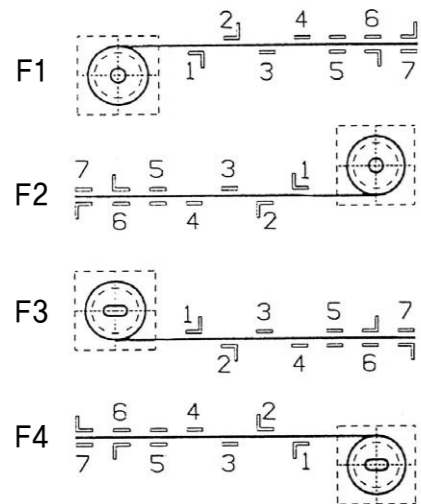
MOUNTING OF ROLL COVERS

Working positions and band mounts

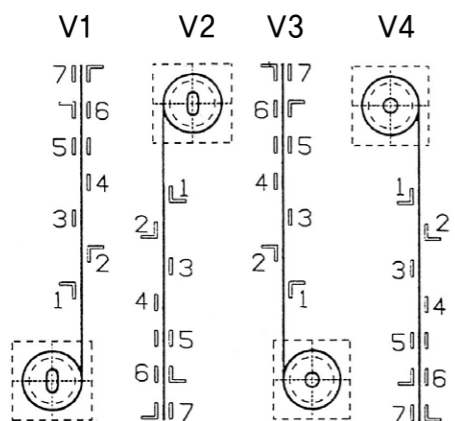
The versions shown below apply to covers with or without a housing. The sketches indicate both the type and position of the band mounts as well as the motion direction of the band and the two shaft ends.

Please state desired version in your inquiry or order.

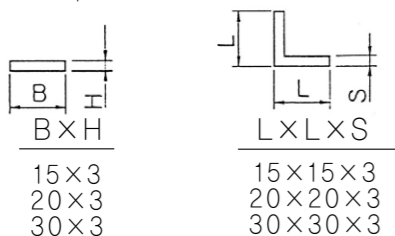
Horizontal and frontal position



Vertical position TICAL

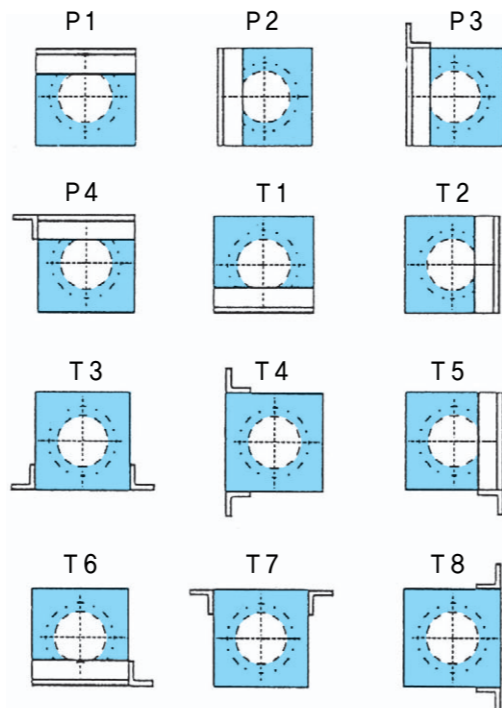


Band mount—end piece or angle
Material : Aluminum(steel on request)



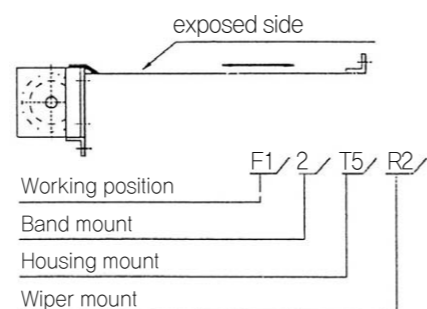
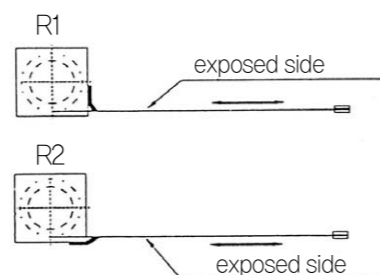
Housing mounts

Please indicate desired type of mount in your inquiry or order. Mounting angles 15x15x3mm to 50x50x5mm (depending on size of cover)

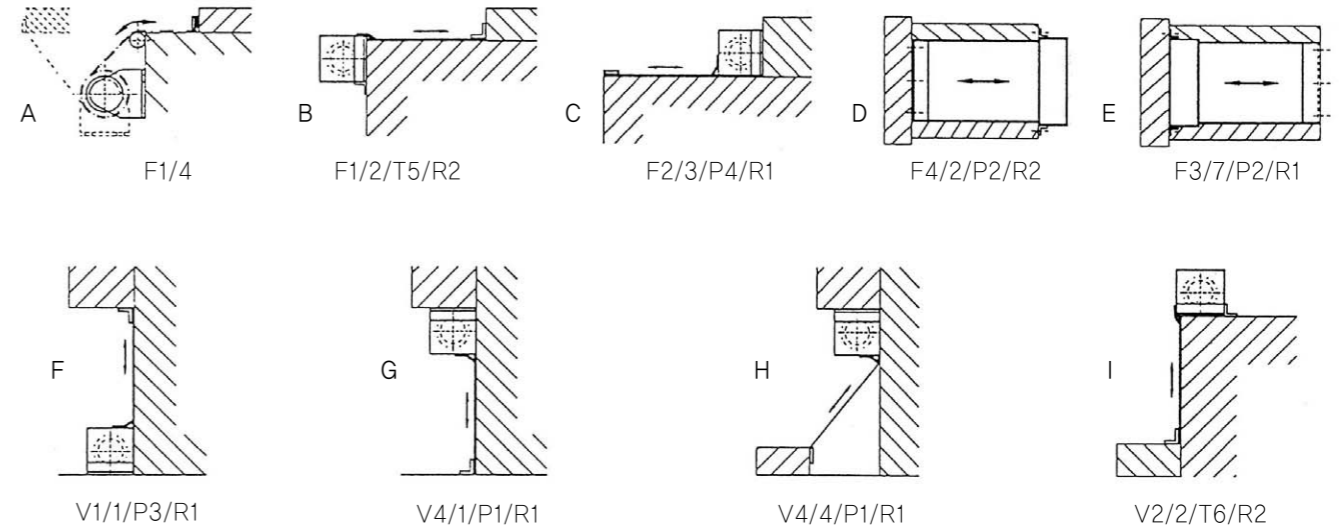


Wipers

Wipers are mounted on exposed side of cover band; on either side, if desired.



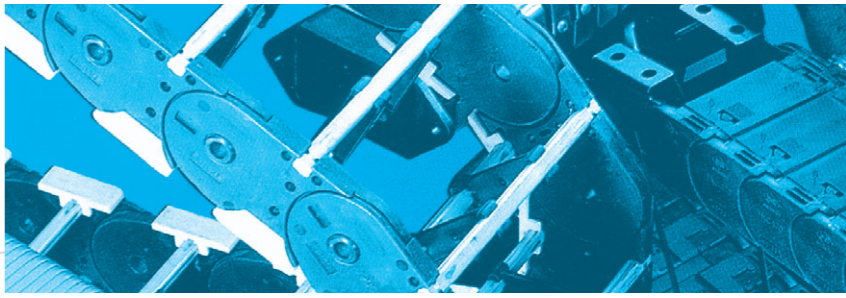
EXAMPLES



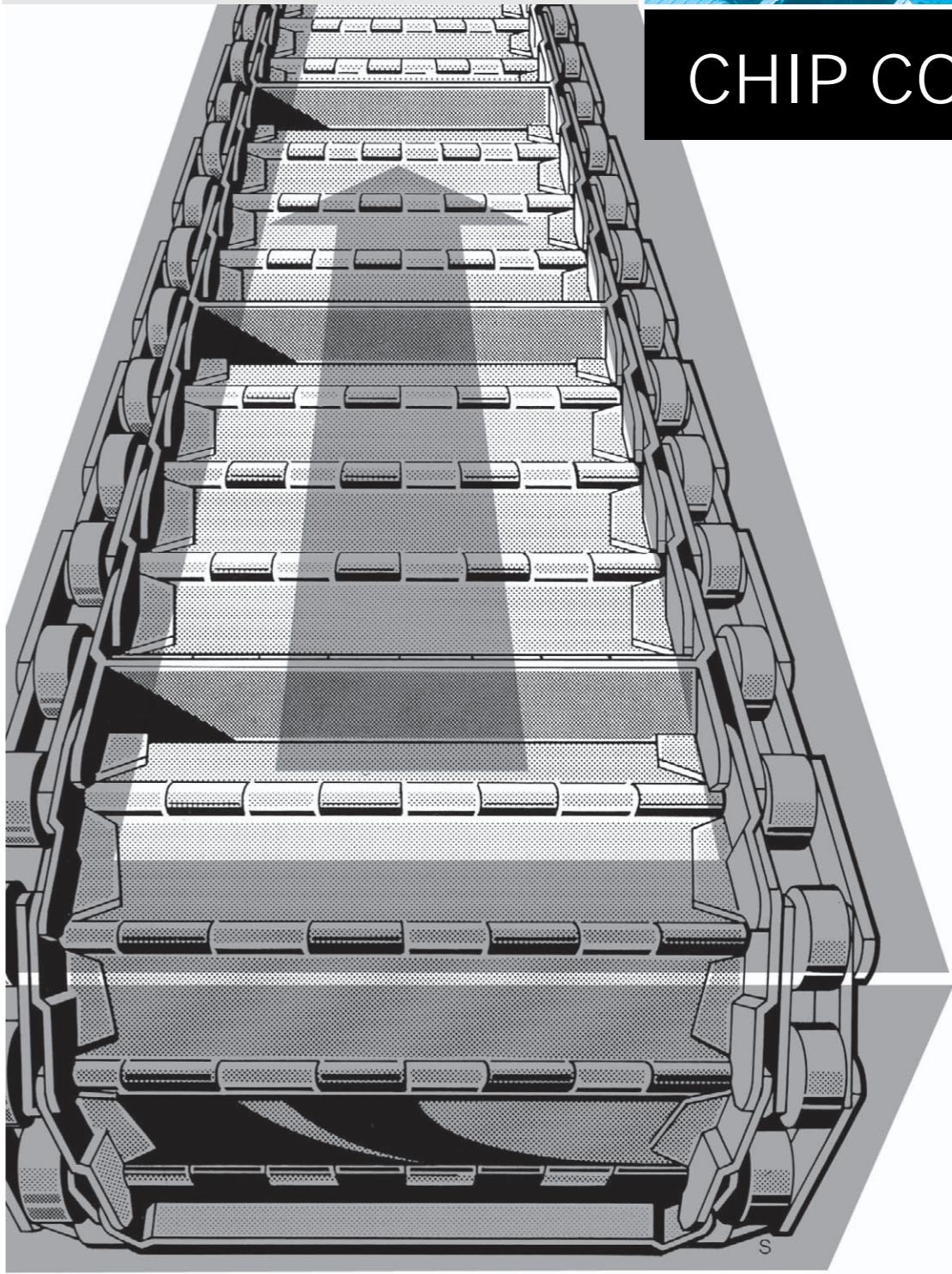
Materials List for Roll-Away Covers and Bellows

Material NO.	Description of material			Material thickness (mm)	Temperature-resistant		Material properties	Roll-away covers		Round bellows				
	Top-coated (exposed side with)	Base material	Bottomcoated with		briefly °C	continuously min(°C) max(°C)		without housing	with housing					
Mat.01	Neoprene	Polyamid	Neoprene	0,30	+250	- 20	+120	Excellent weathering and ozone resistance, good resistance to mineral oil, coolants, grease and water	●	●	○	●	●	
Mat.02	Neoprene	Polyester	Hypalon	0,50	+250	- 20	+120	Specially well suited for high and low temperatures, resistant to oil and light.	●	●	○	●	●	
Mat.03	Neoprene+Hypalon	Polyester	Neoprene,Hypalon	0,60	+250	- 20	+120		●	●	○	●	●	
Mat.04	Neoprene	Polyester	Hypalon	0,80	+250	- 20	+120		●	●	○	●	○	
Mat.06	Neoprene	Polyester	Hypalon	1,30	+250	- 20	+120		●	●	○	●	○	
Mat.07	Hypalon	Kevlar	Hypalon	1,15	+350	- 20	+180		●	●	○	●	○	
Mat.08	Neoprene+NBR	Polyester	Neoprene+NBR	0,40	+200	- 20	+120		Same as above, but also approved for food	●	●	○	●	●
Mat.09	Silicone	Fiber glass	Neoprene	0,50	+350	- 60	+250		●	●	○	●	○	
Mat.09/1	PVC	Fiber glass	PVC	0,50	+100	- 30	+70		●	●	○	●	○	
Mat.09/2	Neoprene	Fiber glass	Neoprene	0,60	+250	- 60	+120		○	●	○	○	○	
Mat.10	Teflon			0,50	+500	- 200	+260		●	●	○	●	○	
Mat.11	Aluminum-coated carbon-fiber fabric			0,70	+2500	- 100	+260	Resistant to petroleum-based oil and grease; highly resistant to abrasion, tension and tear propagation	●	●	○	●	○	
Mat.11/1	Aluminum-coated fiberglass fabric			1,20	+600	- 30	+250	●	●	○	●	○		
Mat.12	Stainless steel *			0,20	+1200	- 250	+400	○	●	○	○	○		
Mat.13	Stainless steel *			0,30	+1200	- 250	+400	○	●	○	○	○		
Mat.14	Stainless steel *			0,40	+1200	- 250	+400	○	●	○	○	○		
Mat.15	Polyurethane	Polyester	Polyurethane	0,25	+200	- 30	+150	Resistant to petroleum-based oil and grease; highly resistant to abrasion, tension and tear propagation	●	●	○	●	○	
Mat.15/1	Polyurethane	Polyester	Polyurethane	0,35	+200	- 30	+150		●	●	○	●	○	
Mat.16/1	Polyurethane	Polyester	Polyurethane	0,80	+200	- 30	+150		●	●	○	●	○	
Mat.16/2	Polyurethane	Polyester	Polyester	1,40	+200	- 30	+150	Suited for acidic media.	●	●	○	●	○	
Mat.17	PVC	Polyester	PVC	0,36	+100	- 30	+70		●	●	○	●	○	
Mat.18	PVC	Polyester	PVC	0,70	+100	- 30	+70		●	●	○	●	○	
Mat.19	PVC	Polyester	PVC	0,50	+100	- 30	+70		●	●	○	●	○	
Mat.20	PVC	Polyester	PVC	0,25	+100	- 30	+70	●	●	○	●	○		

● Suitable ○ Unsuitable



CHIP CONVEYOR



CONVEYOR SYSTEMS

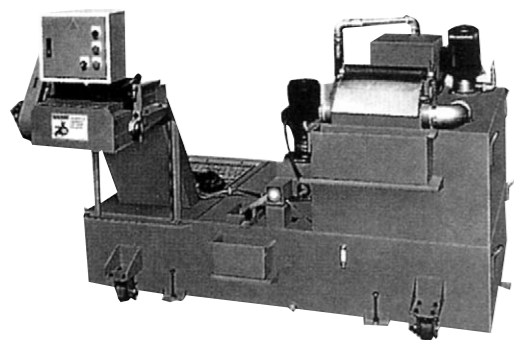


Intelligent Conveying Systems

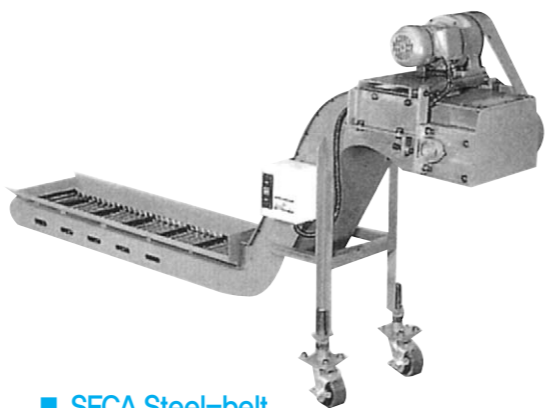
We provide complete specialized services from technique, consulting and design to manufacture.

Our outstandingly convenient conveying systems are available in various models to meet all your chip conveyance needs.

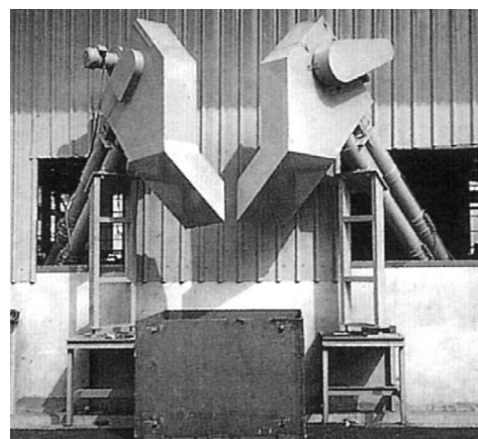
CHIP CONVEYORS



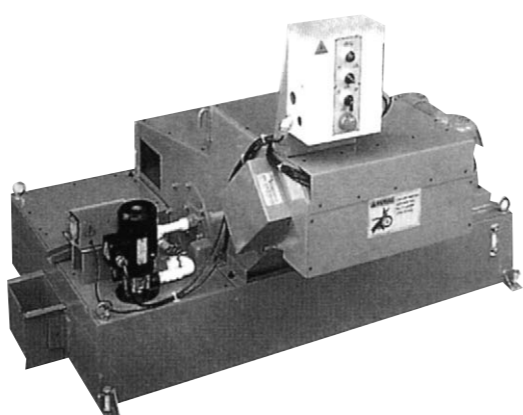
■ **SFCE Scraper-Type**
– for fine chip conveyance



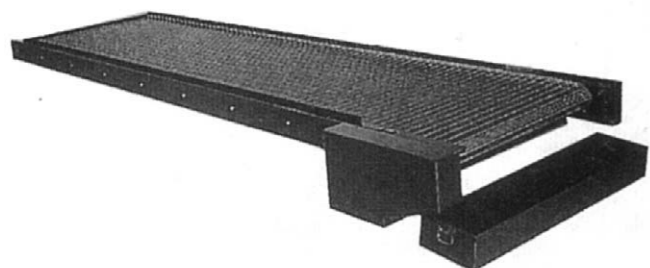
■ **SFCA Steel-belt**
– chip conveyors for common working machines



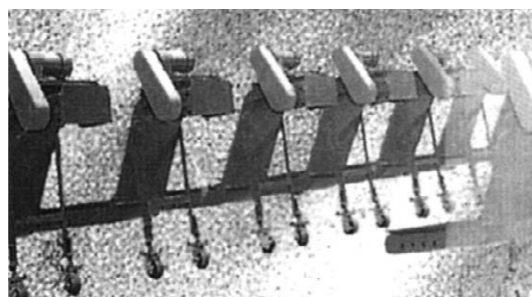
■ **SFCG pipe conveyor**



■ **SFCK Aluminum chip conveyor**
– for conveying aluminum chips and fine chips, this unit can also separate fine chips from cutting fluid.



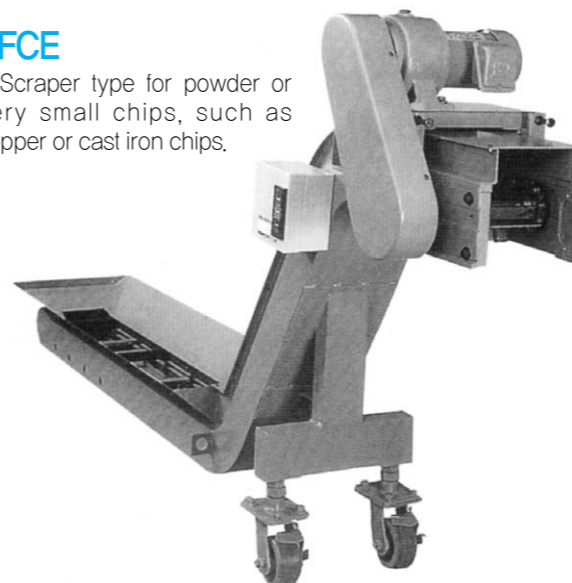
■ **SFCH To be used for laser processing machines**



■ **SFCA Steel-belt**
– chip conveyors for common working machines

SFCE

– Scraper type for powder or very small chips, such as copper or cast iron chips.



SFCD

– Belt pitch 50,8mm, for aluminum or silicon plate chips.



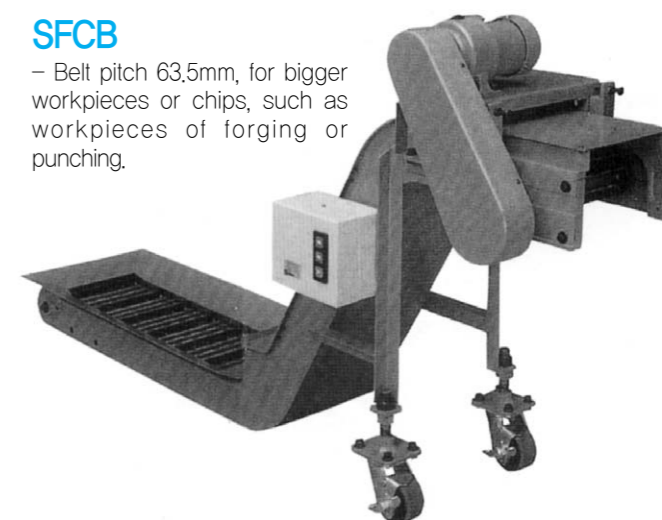
SFCA

– Belt pitch 31,75mm for general machine tools chip removal, such as CNC lathe or machining centers.



SFCB

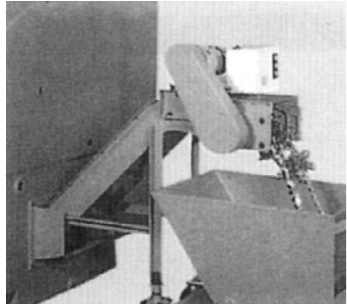
– Belt pitch 63,5mm, for bigger workpieces or chips, such as workpieces of forging or punching.



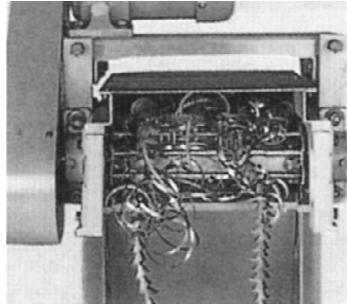
SFCH

– For widest workpieces, such as workpieces of laser cutting.

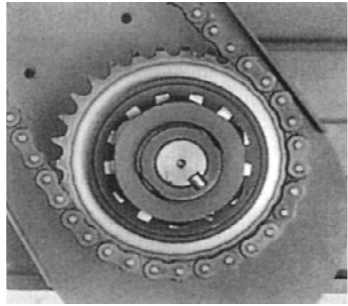




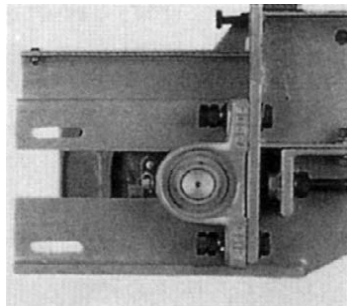
• Compact design, high stiffness reliability and easy installation, which can serve even the most compact and smallest machine tools.



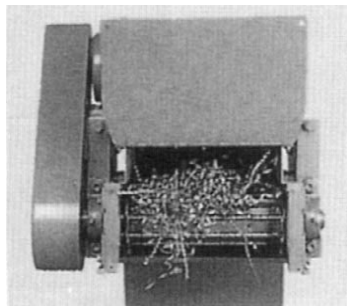
Can remove various metal chips smoothly from the machine bed without manual labor and interruption of the production process. High transportation volume and low energy consumption.



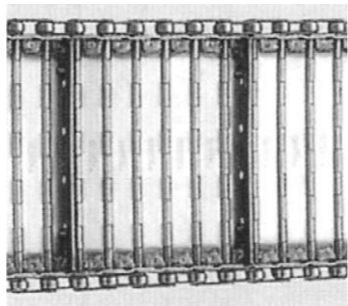
Preset torque clutch will prevent any damage in the event of overload or a jam.



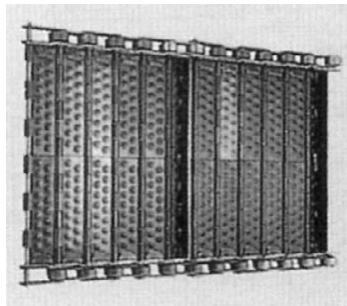
• Having take-up device for adjusting belt tension to keep running smoothly.



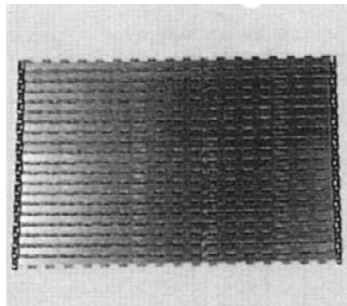
Protection cover fully meets safety directive



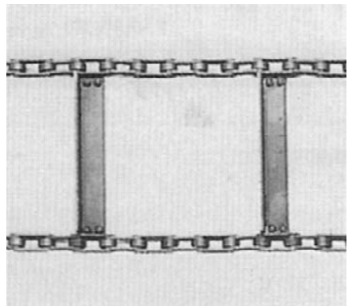
Thick beltplates with welded interlocking sidewings and labyrinthic seals for chain protection.



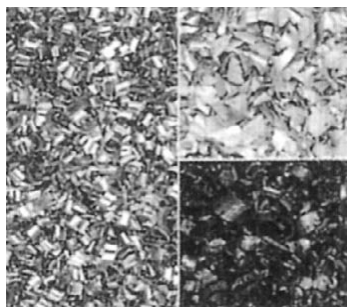
Dimpled Belt.



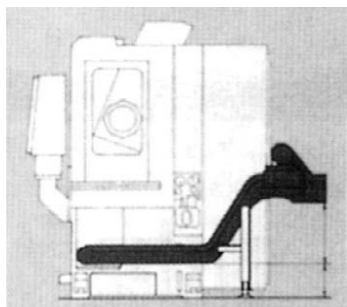
Wider belt may fit customer requirements.



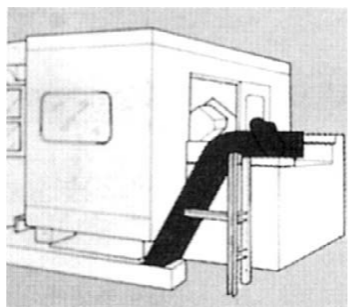
Scraper type belt for transportation of copper, power transportation



Scraper type belt for transportation of copper, aluminum, cast iron chips etc.



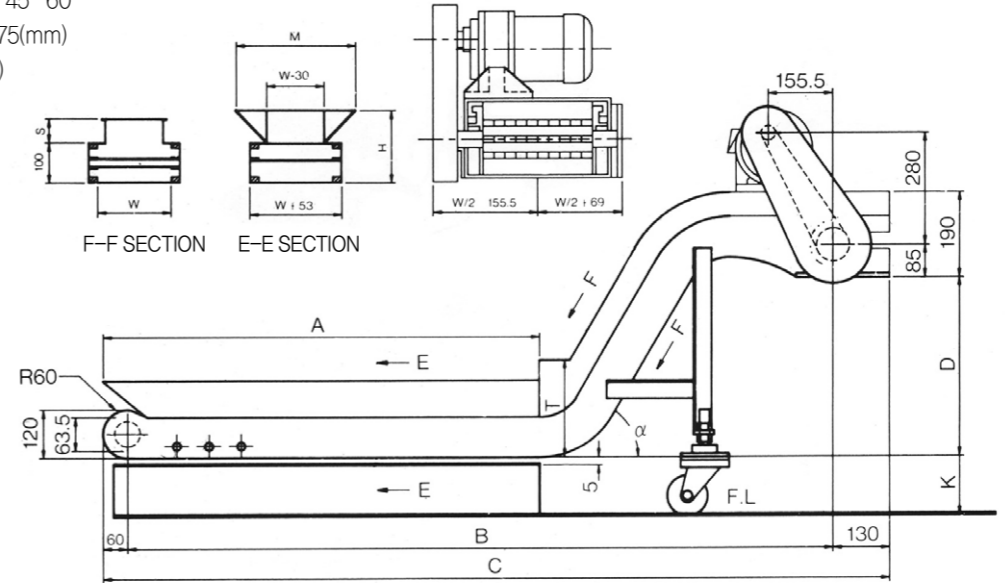
For CNC Lathes



For Machining Centers

CHIP CONVEYOR Dimension standard Table

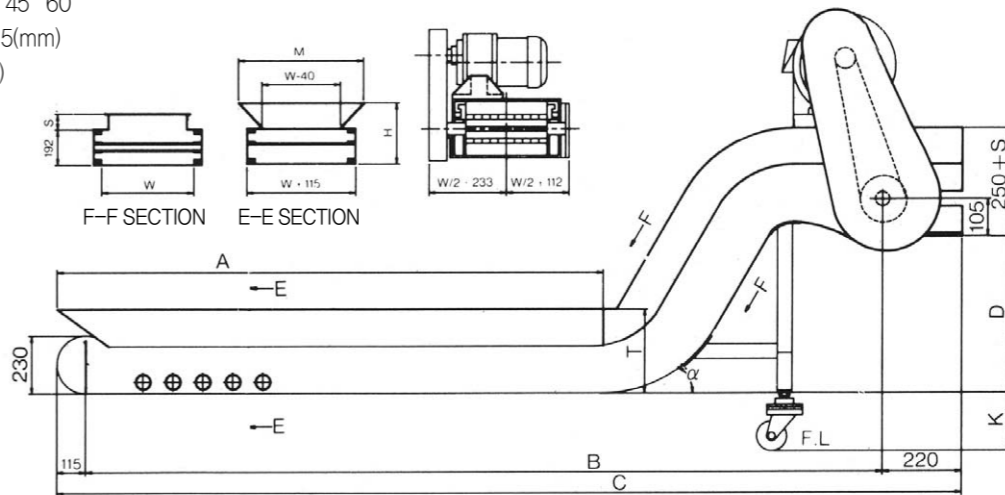
W = 100, 150, 175, 200, 250(mm)
 a = 0° 15° 30° 45° 60°
 Belt pitch = 31,75(mm)
 Frame = 2(mm)



MOTOR TRNASPORT(kg/hr)
220/380V

PARAMETERS MODEL	W	PITCH	A	B	C	D	K	T	α	H	M	S	HP	VOLUME OF TRNASPORT(kg/hr)
SFCA	250	31,75	1080	1810	2000	585	145	160	60	165	260	60	1/4	300

W = 230, 460, 690(mm)
 a = 0° 15° 30° 45° 60°
 Belt pitch = 63,5(mm)
 Frame = 3(mm)



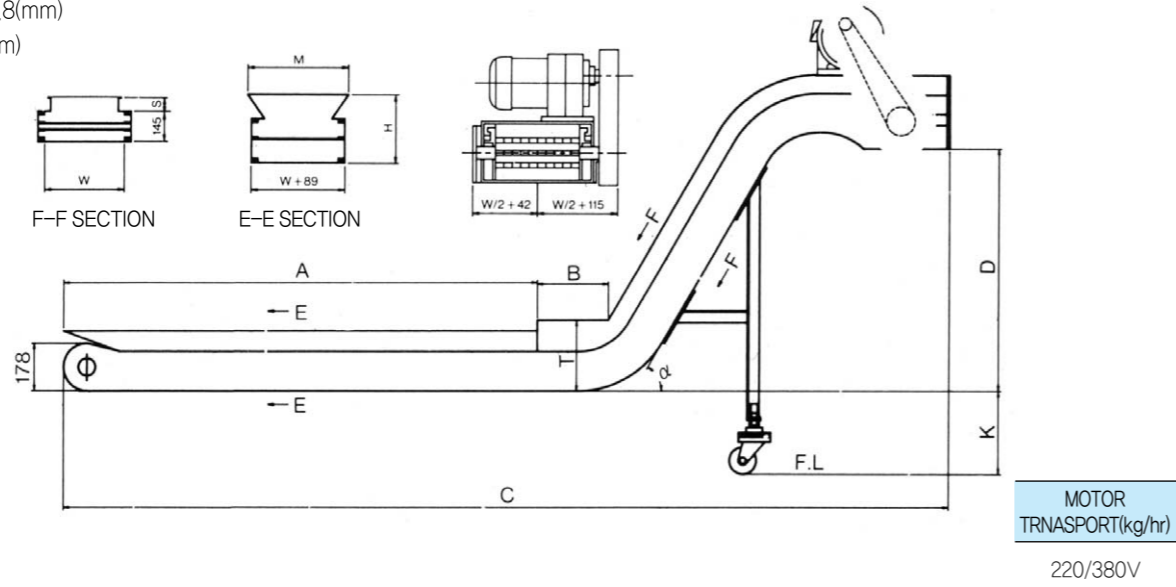
MOTOR TRNASPORT(kg/hr)
220/380V

PARAMETERS MODEL	W	PITCH	A	B	C	D	K	T	α	H	M	S	HP	VOLUME OF TRNASPORT(kg/hr)
SFCB	230	63,5	2980	3161	3496	966	200	215	60	245	615	85	1/4	500

We can also furnish special steelbelt chip conveyors to fit your requirements. Please advise the technical parameters.

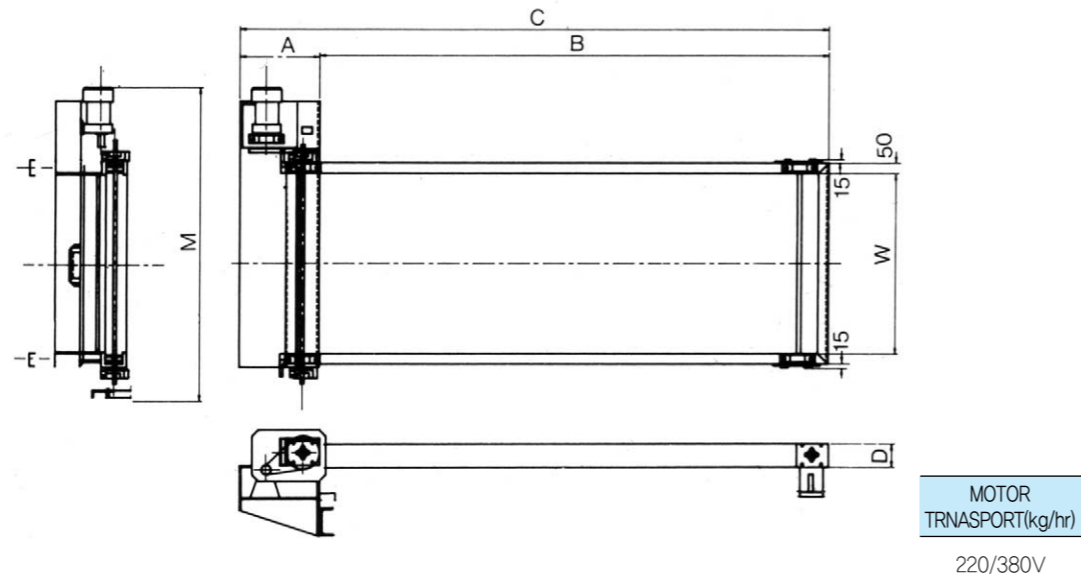
CHIP CONVEYOR Dimension standard Table

W = 240(mm)
 a = 0° 15° 30° 45° 60°
 Belt pitch = 50.8(mm)
 Frame = 2.3(mm)



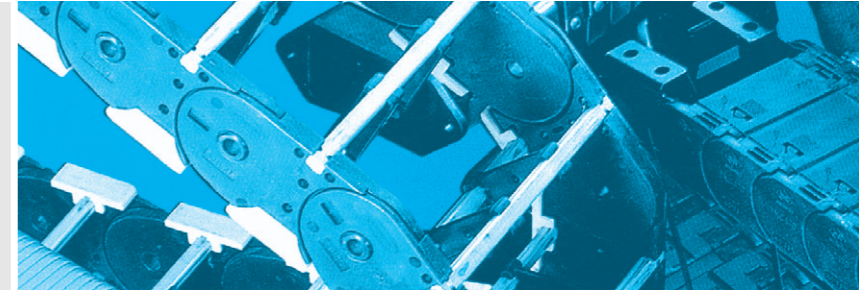
MOTOR
 TRNASPORT(kg/hr)
 220/380V

PARAMETERS MODEL	W	PITCH	A	B	C	D	K	T	α	H	M	S	HP	VOLUME OF TRNASPORT(kg/hr)
SFCD	240	50.8	1813	107	3150	990	300	250	60	280	500	75	1/4	500



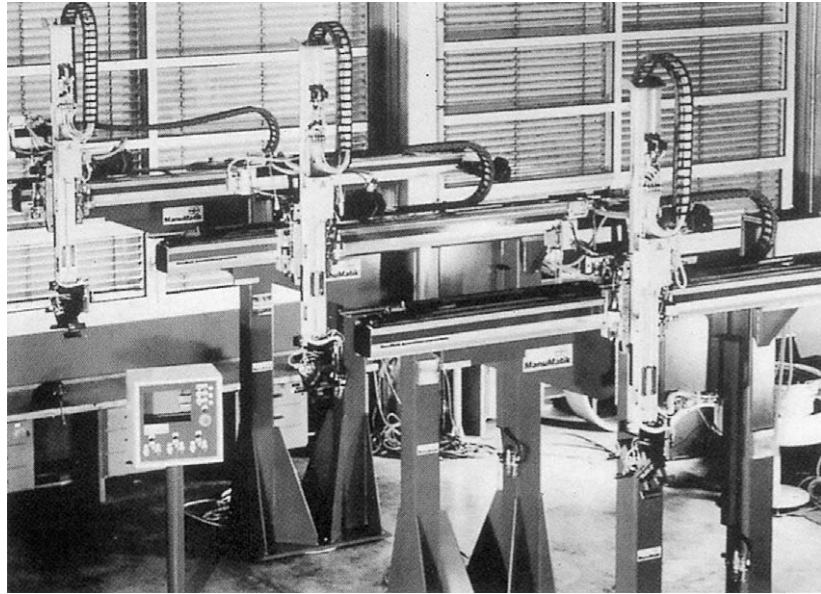
MOTOR
 TRNASPORT(kg/hr)
 220/380V

PARAMETERS MODEL	W	PITCH	A	B	C	D	M	HP	VOLUME OF TRNASPORT(kg/hr)
SFCH	875	31.75	380	2106	2496	100	1075.1	1/4	500

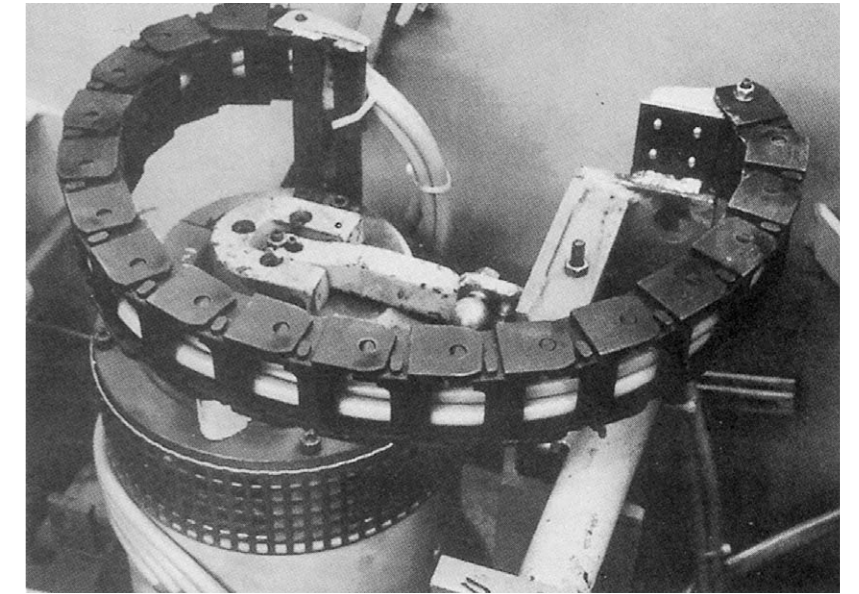


EXAMPLE

We are pleased to present some examples of SHINSUNG Cable carrier system applications.

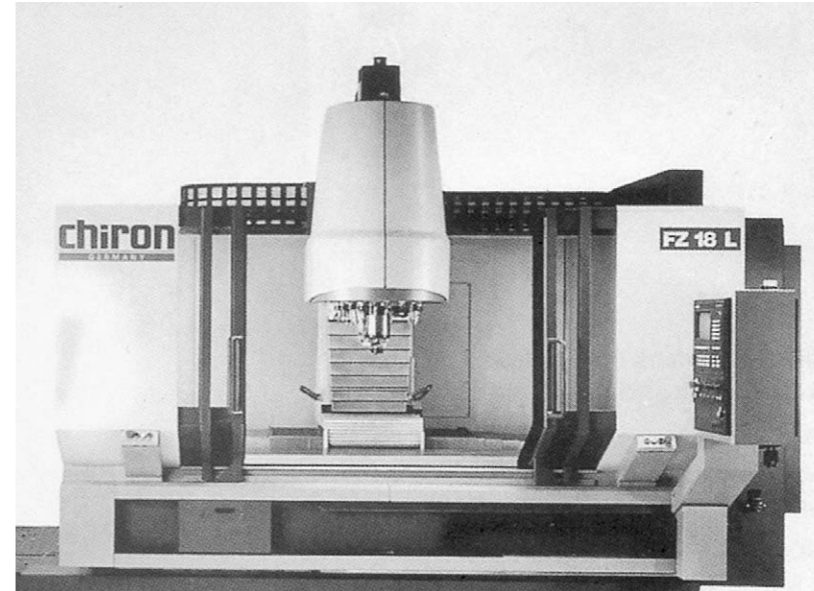
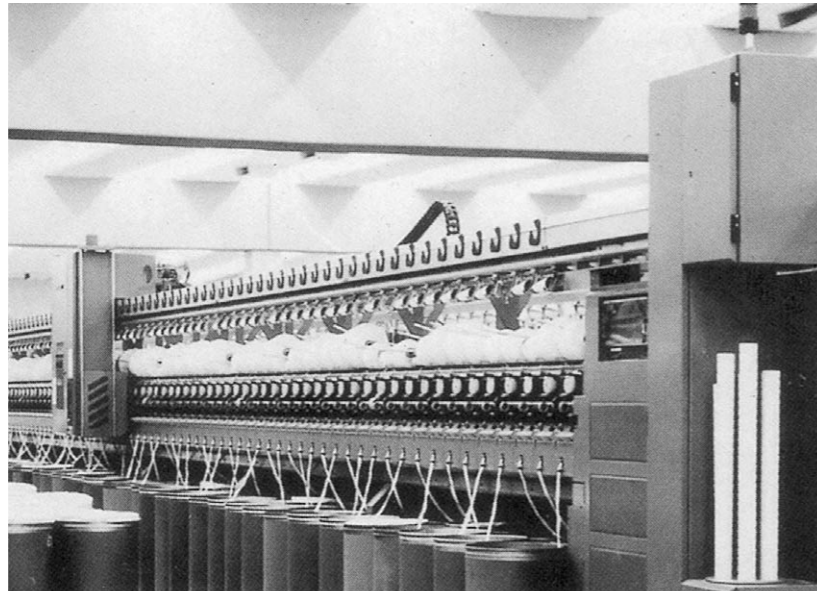


■ Cable Chains : Type SMO-0450
 – Portal robot
 • Installing variants: horizontal self-supporting—with admissible sagging and vertical—upright

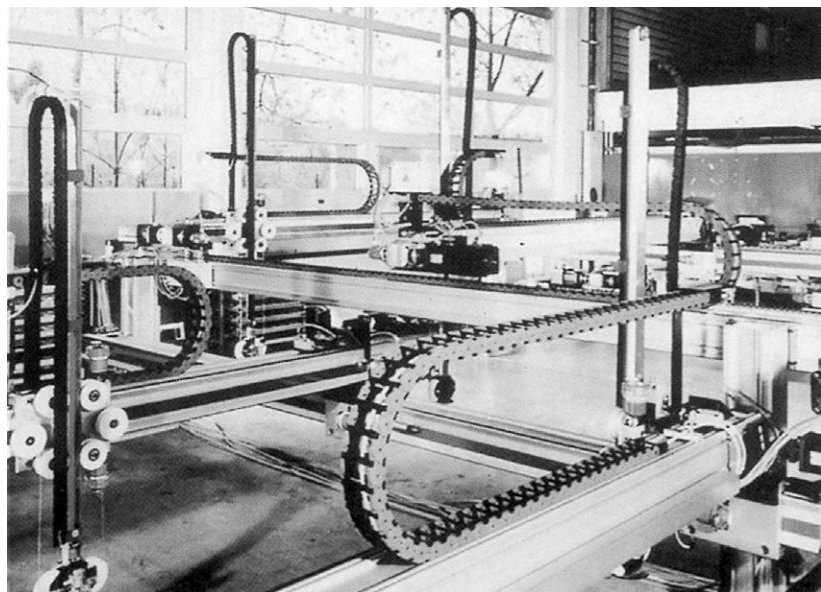


■ Cable Chains : Type SMO-0625
 • Installing variants : horizontal—rotated by 90° – winded up

■ Cable Chains : Type SMO-0450
 – on a rotor spinner
 • Installing variants : horizontal sliding in a guiding channel

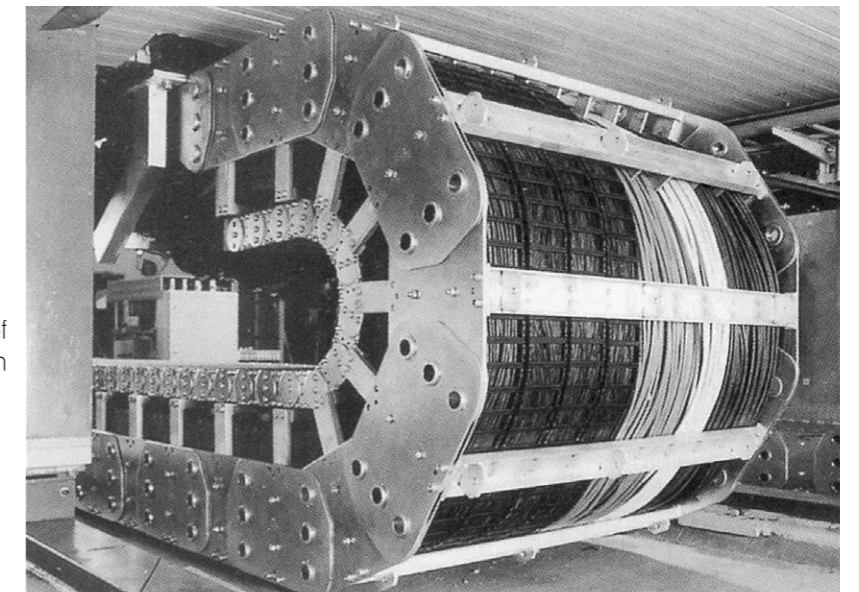


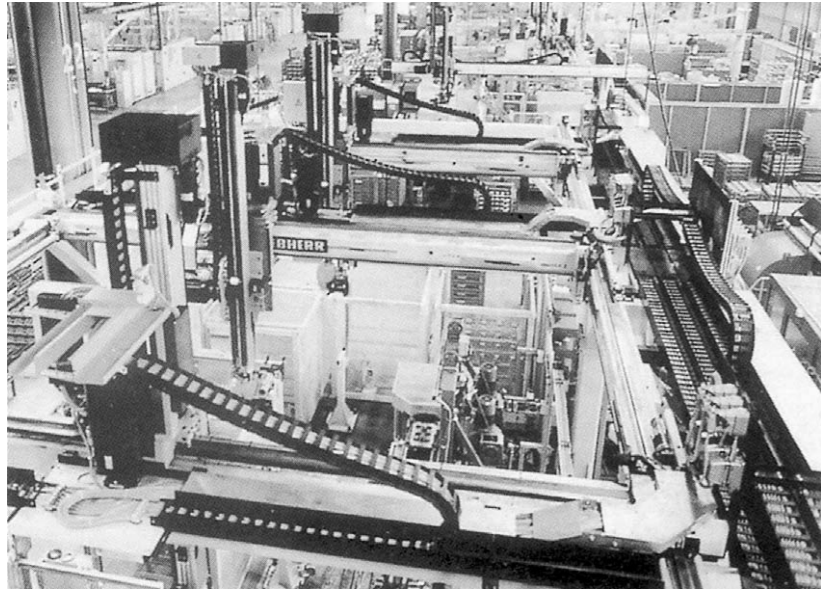
■ Cable Chains : Type SMO-0625
 – on a machining center
 • Installing variant : horizontal rotated by 90°—straight



■ Cable Chains : Type SMO-0450
 – on 3-axes—portal with special Z axis
 • Installing variants: horizontal self-supporting and vertical—upright

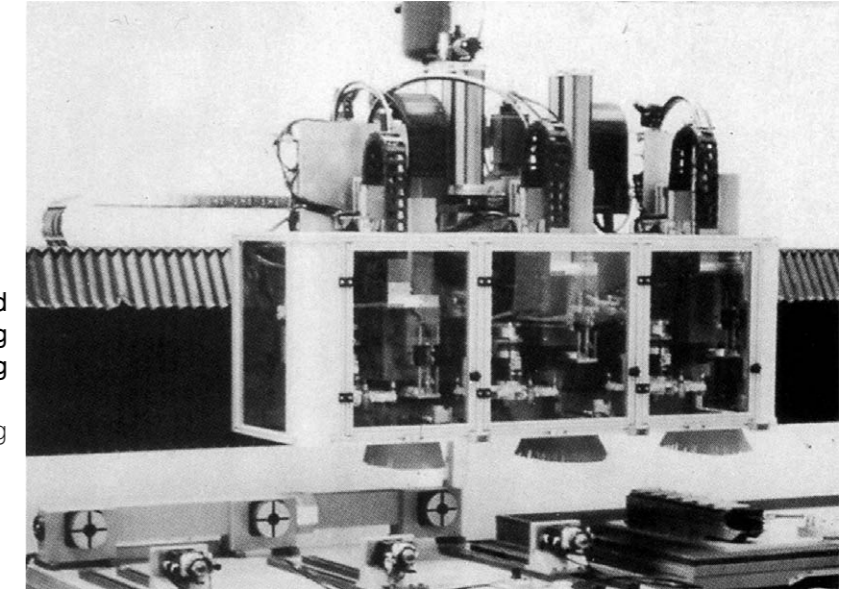
■ Cable Chains : Type SMO-0450
 Type SSC-3200 for the separation of Cable/hoses in a steel cable drag chain type 3200 on a ZEUS detector





■ Cable Chains : Type SMO-0450
Type SMO-0625

- Type SMO-0625 on an automatic
- Installing variants : horizontal sliding in a guiding channel vertical/horizontal-combined and vertical-suspended

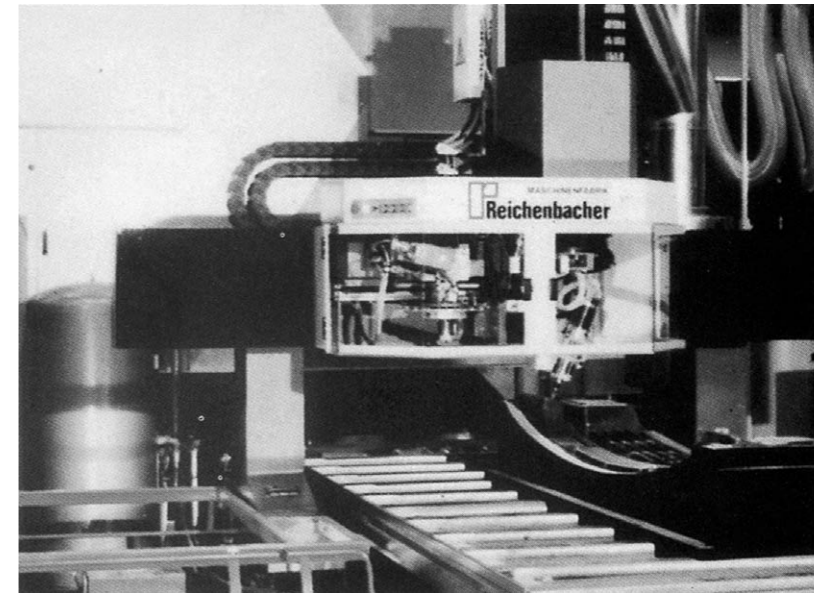


■ Cable Chains : Type SMO-0625

- flexible energy conduits SMO and a steel cable drag chain on a machining center
- Installing variants of cable drag chains vertical-upright
- Installing variant of the steel cable drag chain horizontal-self-supporting

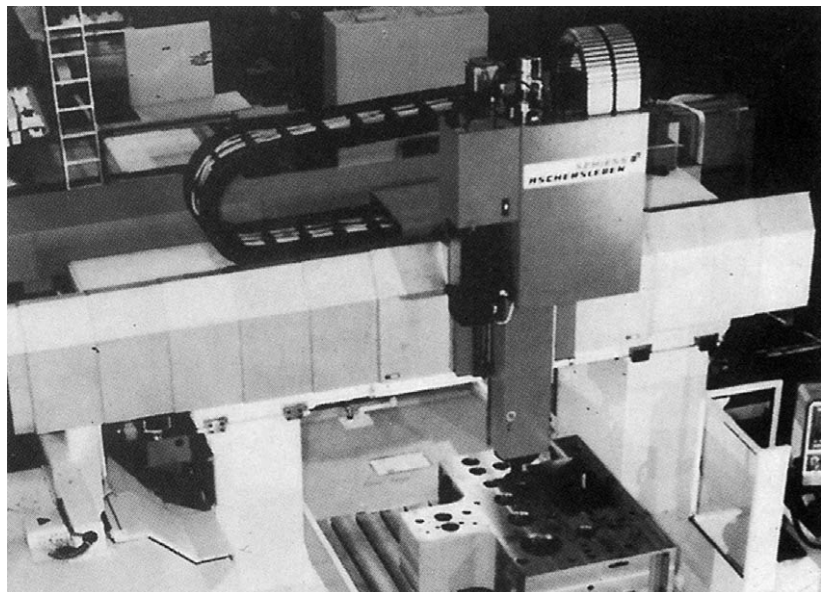
■ Cable Chains : Type SMO-0625

- on a tandem profile milling machine
- Installing variant : horizontal self-supporting running inside each other



■ Cable Chains : Type SMO-0625

- on a five-axes milling machine
- Installing variant : horizontal self-supporting running inside each other and vertical-upright

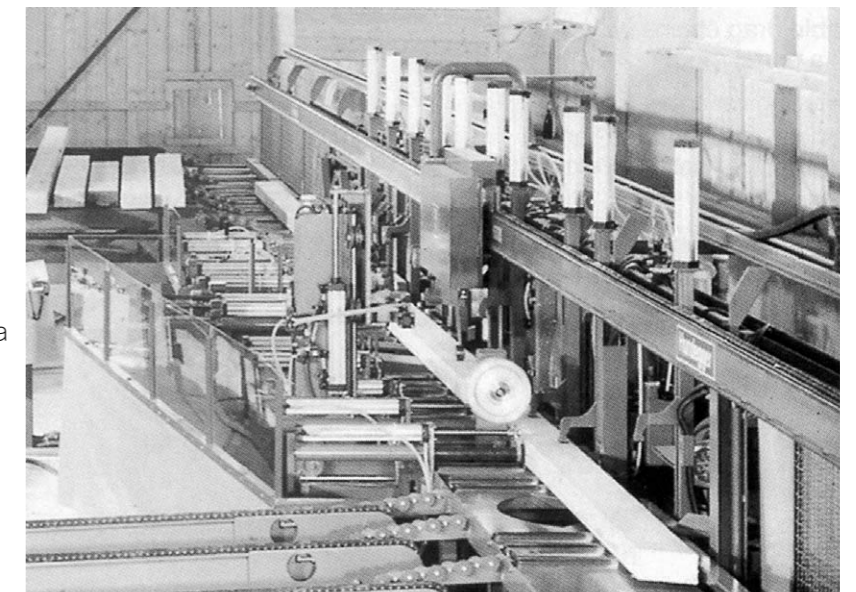


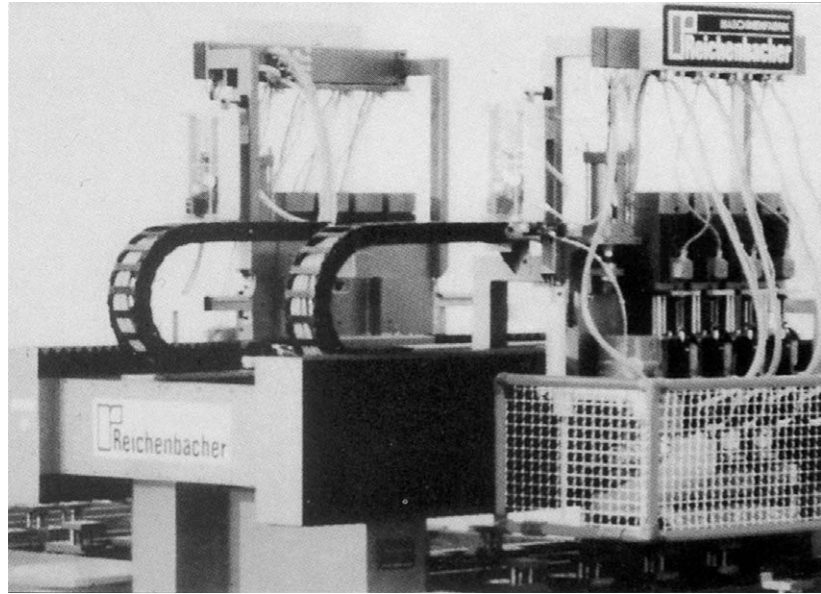
■ Cable Chains : Type SBC-0900 and flexible energy conduits

- SCF on NC milling machine
- Installing variant : Cable drag chains horizontal self-supporting

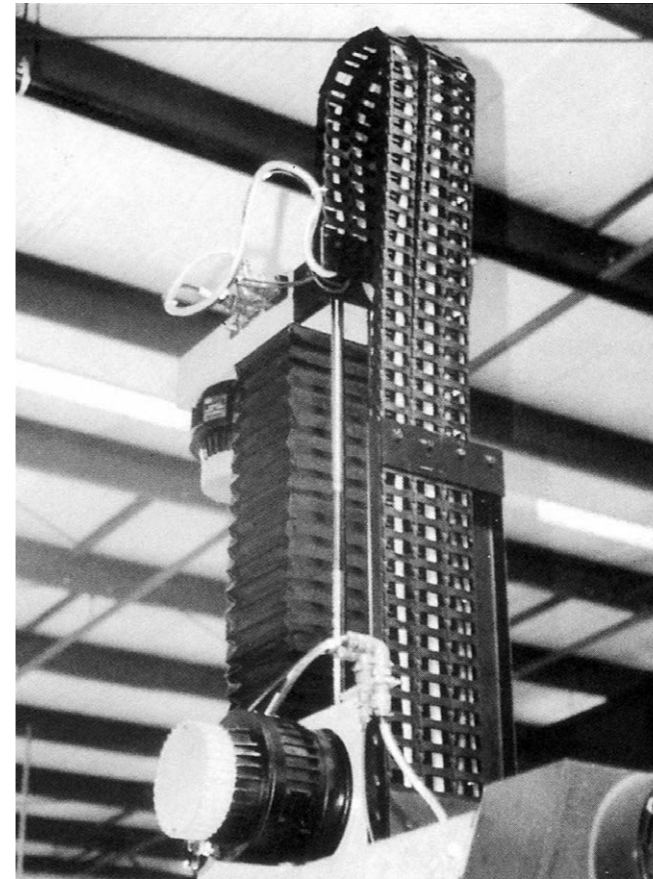
■ Cable Chains : Type SMO-0625

- on a wood working machine
- Installing variants : vertical-sliding in a guiding channel



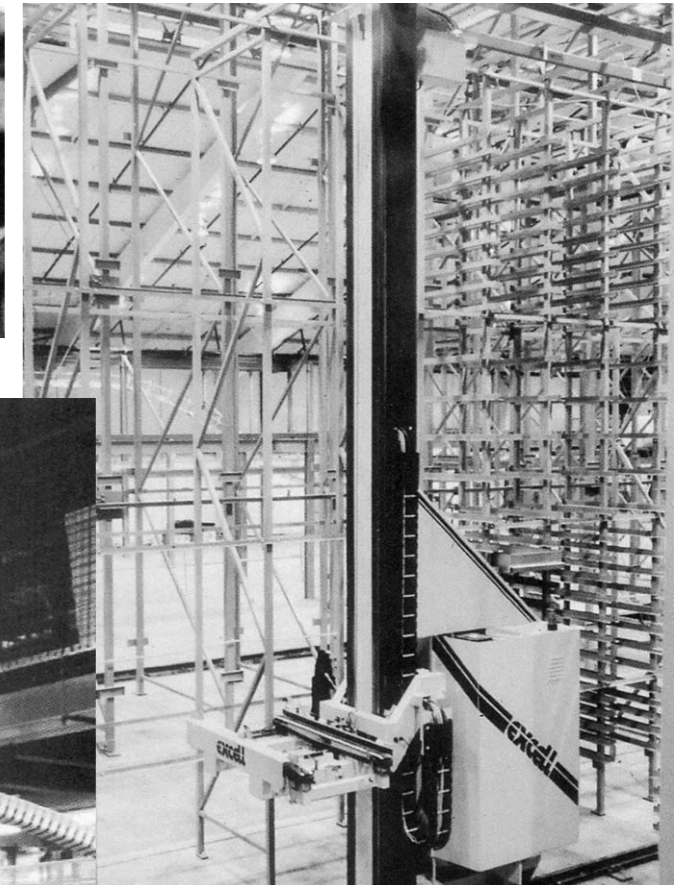
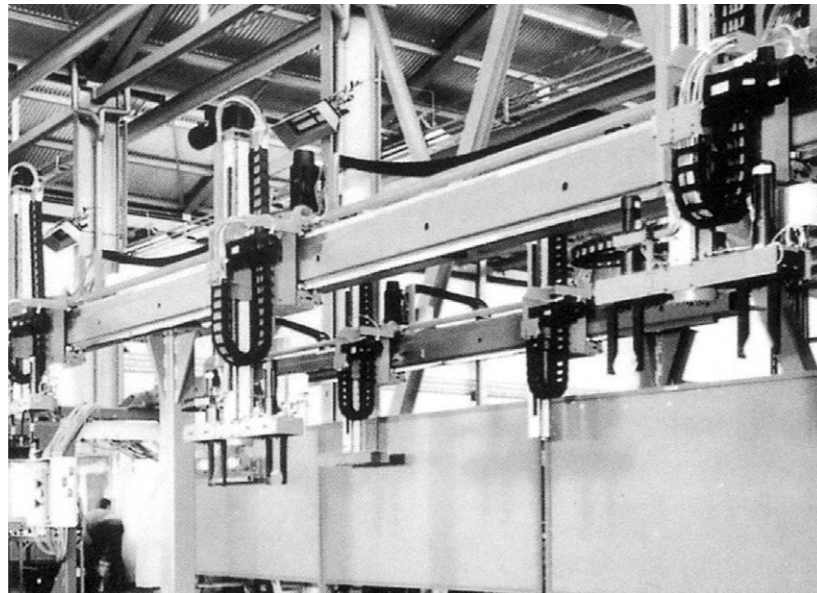


■ Cable Chains : Type SMO-0625
 – on a wood working machine
 • Installing variants : vertical – self – supporting

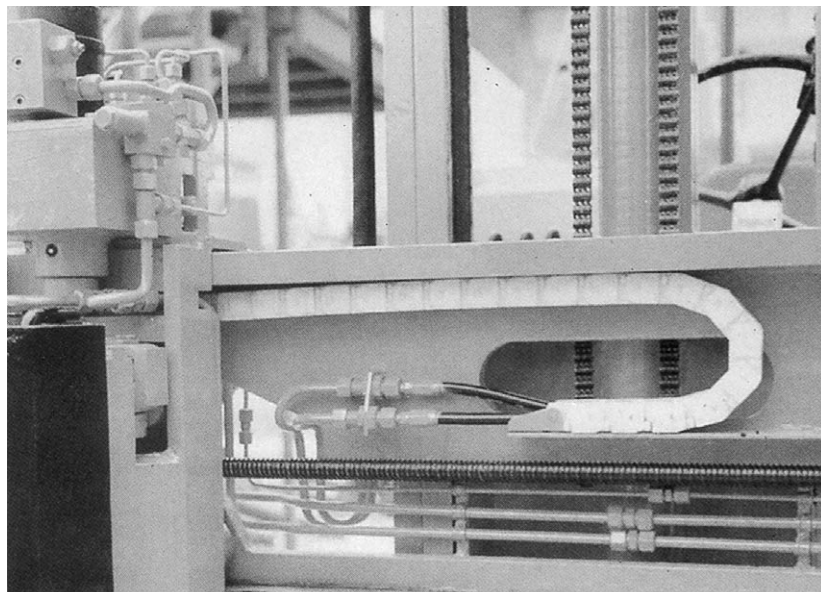


■ Cable Drag Chains:Type SMO-0625
 – on a hanging system
 • Installing variant : vertical-upright running side by side

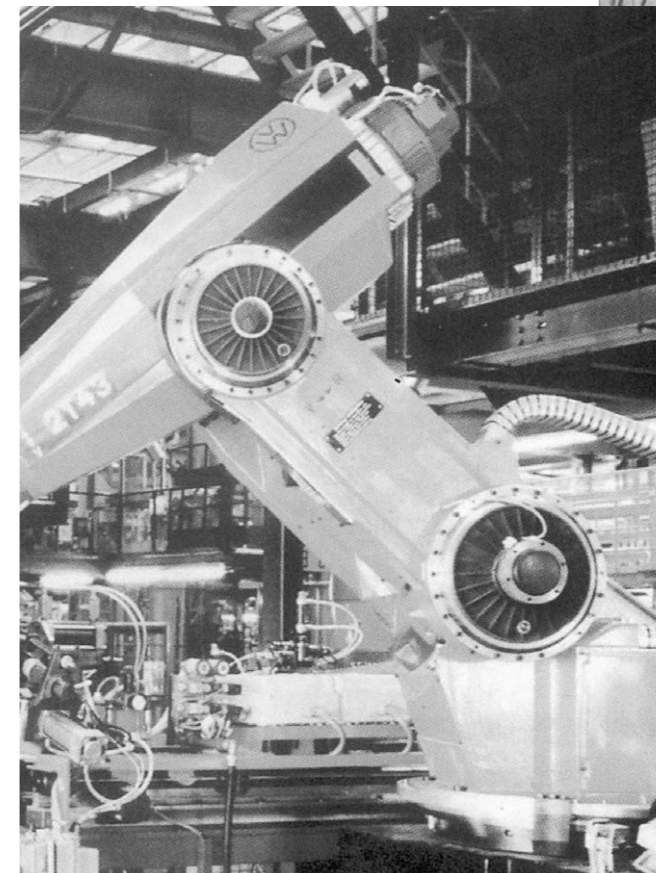
■ Cable Chains : Type SMO-0450,
 Type SMO-0625
 – on a portal robot
 • Installing variant : horizontal-sliding in a guiding channel and vertical-suspended



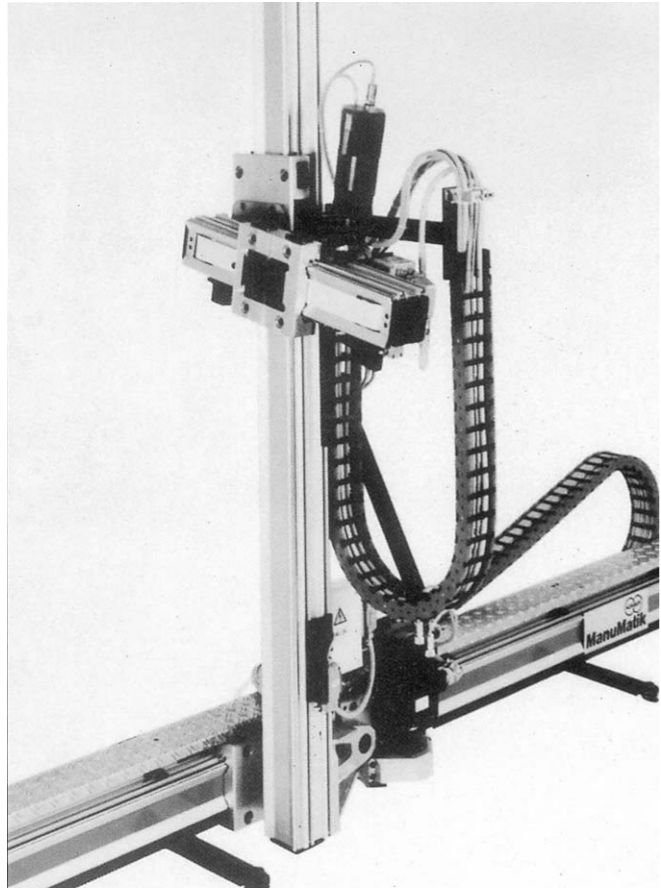
■ Cable Chains : Type SBC-0650
 – on a automatic stocking device
 • Installing variants : ertical-suspended



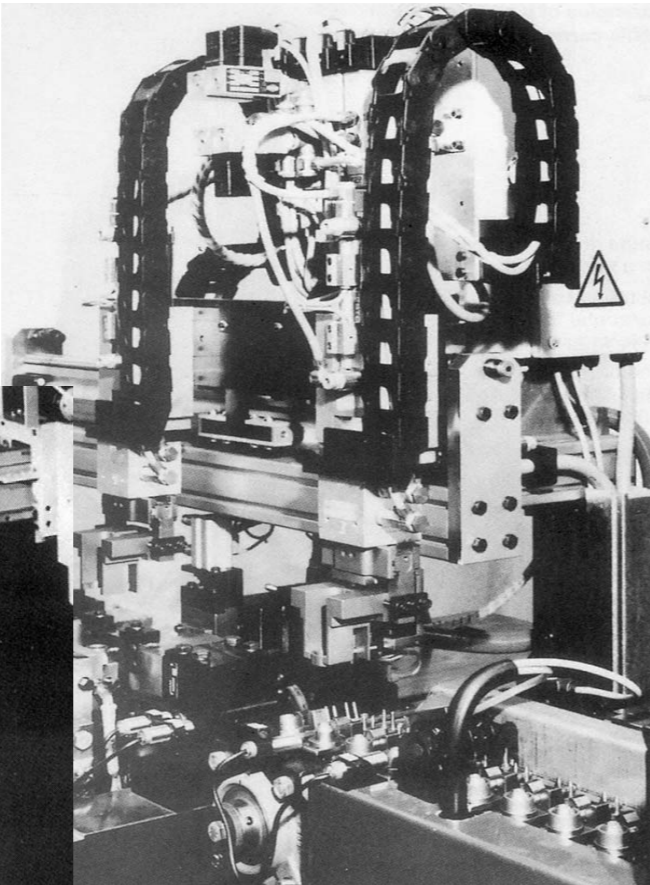
■ Cable Chains:Type SMO-0450
 – on a shelf operating device
 • Installing variant : vertical-self-supporting



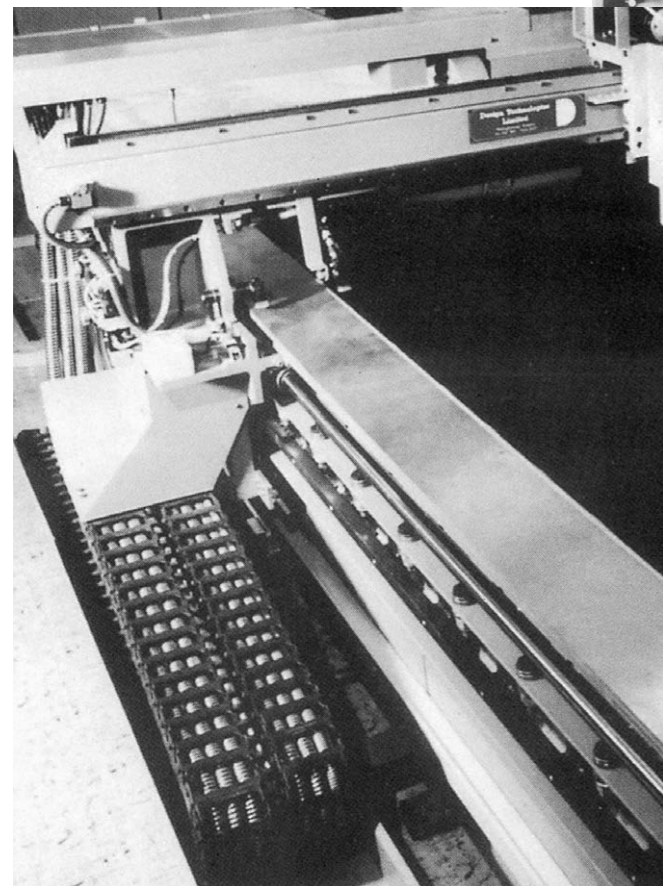
■ Flexible energy conduits SCF
 – on a assembling robot
 • Installing variant : horizontal vertical-combined



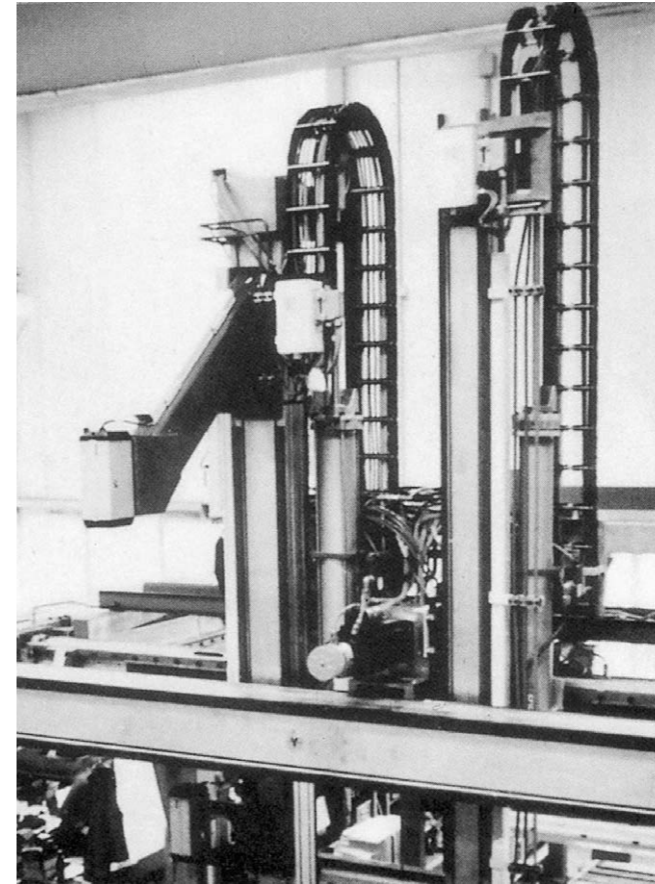
■ Cable Chains : Type SMO-0450
 - on a test plant
 • Installing variants : horizontal sliding in a guiding channel and vertical-suspended



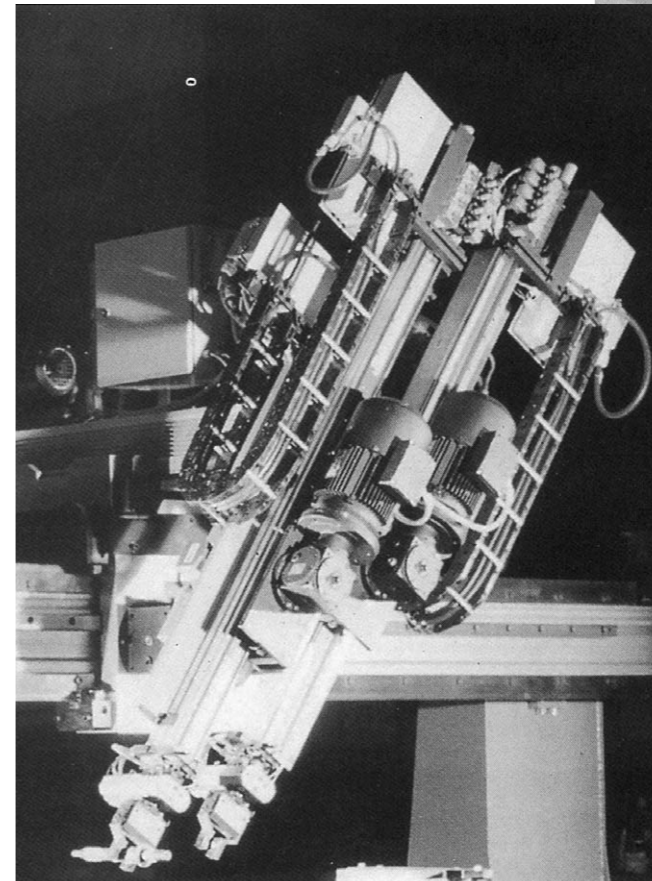
■ Cable Chains : Type SMO-0450
 - on a buckle welding machine for the manufacture of vehicle parts by means of movable transport pliers
 • Installing variant : vertical-upright



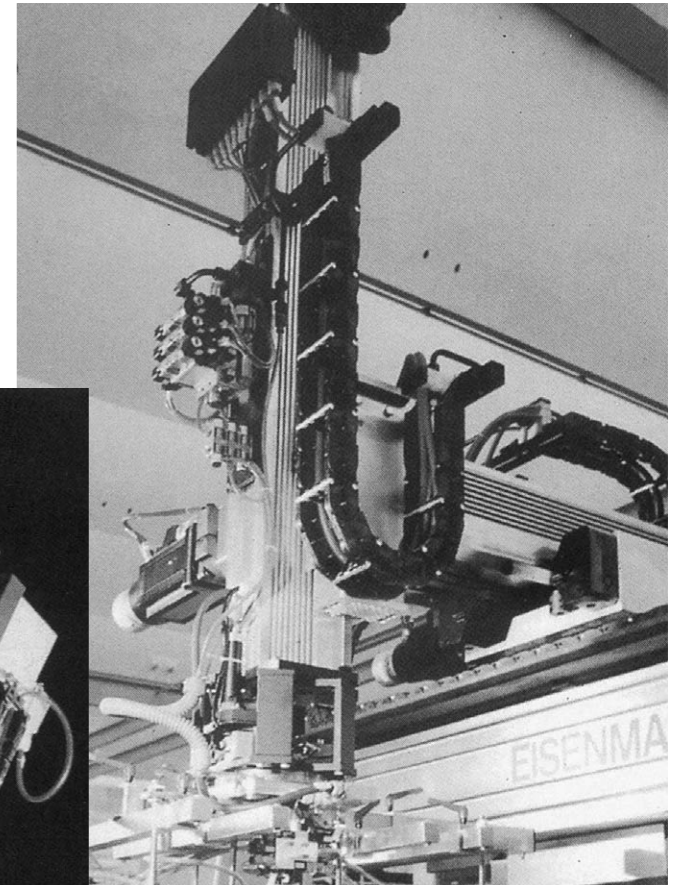
■ Cable Chains : Type SMO-0625
 - on an optical device
 • Installing variant: horizontal self-supporting running side by side



■ Cable Chains:Type SBC-0650
 - on a portal robot
 • Installing variants : upright horizontal



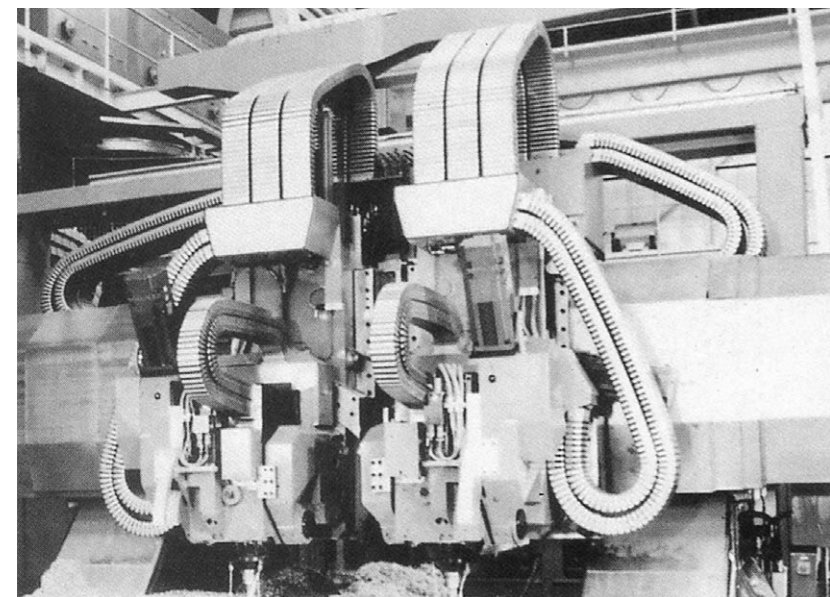
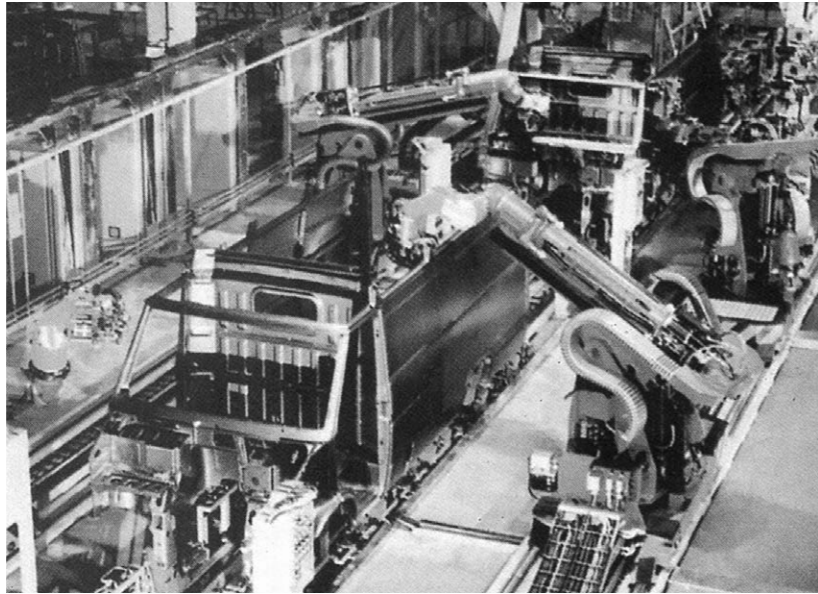
■ Cable Chains : Type SBC-0900
 -on a portal robot
 • Installing variant : vertical-suspended and horizontal self-supporting



■ Cable Chains : Type SBC-650
 - on a portal robot
 • Installing variants : vertical-suspended

■ Flexible energy conduits SCF and plastic cable drag chains on the manufacturing center Tauro system

- Installing variant : SCF in special desing and cable drag chains horizontal-sliding in a guiding channel

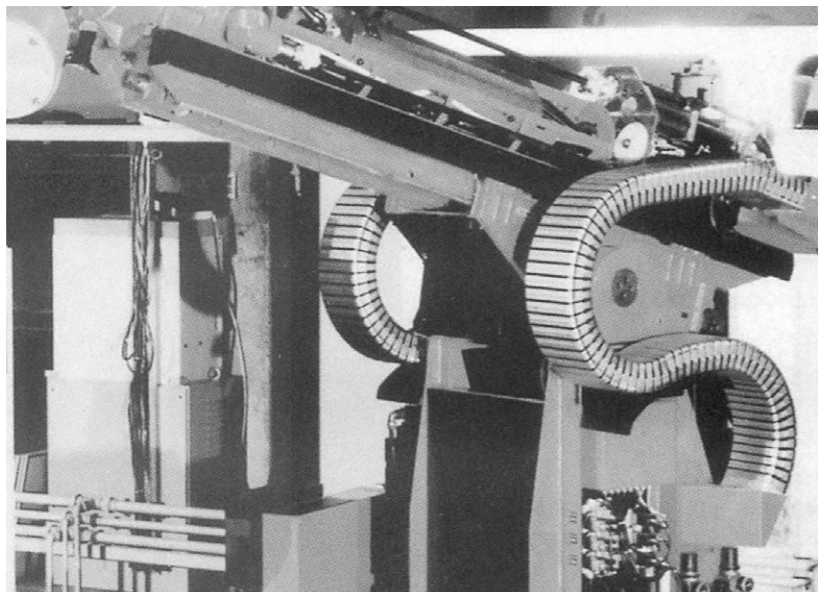


■ Flexible energy conduits SCF and steel cable drag chains on a five axes milling machine

- Installing variant : SCF vertical-upright vertical-suspended and vertical horizontal-combined

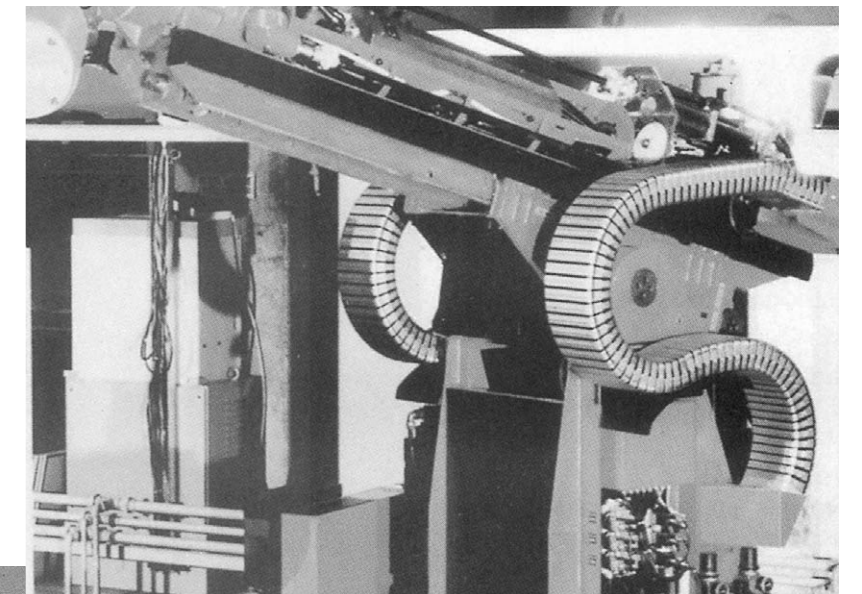
■ Flexible energy conduits SCF on a system robot

- Installing variant : special design horizontal vertical-combined



■ Cable Drag Chains :

- Type SMO-0320 for the energy supply to an operating automatic machine for textile machine Installing variants : horizontal self-supporting-overhanging



■ Flexible energy conduits SCF

- on a full automatical binding tape remover
- Installing variant : horizontal self-supporting and vertical-upright running side by side



■ Flexible energy conduits SCF

- on a five-axes milling machine
- Installing variant : vertical horizontal-combined