

nsb Chain - Clean Room type

» General information

Item	Value
Material	CPS-Amid(PA6+GF), RoHs
Noise level	30dB(DIN EN 61672-1)
Speed	5m/s
Acceleration	15m/s ²
Temperature	-30°C ~+130°C
Special production	ESD, UV, Customized color
Certificate	CE, IPA, ATEX(Ex), TUV

» Calculation table

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

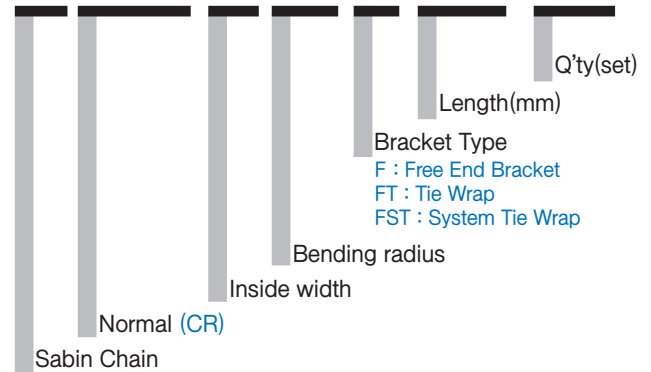
» Dimension table

nsb Chain CR Type	Pitch	Bending Radius (R)	Weight kg/m	Speed m/s	Temperature °C	Size				Frame style	Section - composition
						A	B	C	D		
nsb 020CR	20	28,38,48	0,32 0,35	5	-30 ~ +130	34 54	22	20 40	15		
nsb 022CR	22	35, 45, 75, 100, 120	0,43 0,47 0,55 0,67 0,69	5	-30 ~ +130	30 41 51 61 81 91	29	16 27 37 47 67 77	22		
nsb 028CR	28	50, 70, 90, 120, 150	0,90 0,98 1,02 1,12 1,27 1,41 1,59 1,74 1,84	5	-30 ~ +130	55 70 75 95 120 145 170 195 220	38	35 50 55 75 100 125 150 175 200	26		
nsb 035CR	35	75, 100, 125, 150, 200	1,00 1,06 1,09 1,17 1,29 1,39 1,53 1,65 1,73	5	-30 ~ +130	55 70 75 95 120 145 170 195 220	52	35 50 55 75 100 125 150 175 200	40		
nsb 045CR	45	75, 100, 120, 140, 200, 250, 300	2,59 2,74 2,90 3,11 3,23 3,31 3,41 3,48 3,90 4,18 4,64 4,76 5,32	5	-30 ~ +130	80 105 130 155 170 180 195 205 220 230 270 280 330	70	50 75 100 125 140 150 165 175 190 200 240 250 300	49		
nsb 060CR	60	125, 140, 190, 220, 270, 390	3,56 3,66 3,97 4,16 4,33 4,52 4,64 4,98 5,06 5,48 6,09 6,66	5	-30 ~ +130	115 140 165 190 215 230 240 280 290 340 390 440	82	75 100 125 150 175 190 200 240 250 300 350 400	56		
nsb 075CR	75	180, 200, 250, 300, 350, 400, 500	5,37 5,57 5,72 5,82 6,01 6,26 6,68 7,11 7,22 7,80 7,94 8,67 9,43 10,01 10,41 11,88 12,17	5	-30 ~ +130	115 140 155 165 190 215 240 280 290 330 340 390 440 490 540 590 640	108	75 100 115 125 150 175 200 240 250 290 300 350 400 450 500 550 600	78		

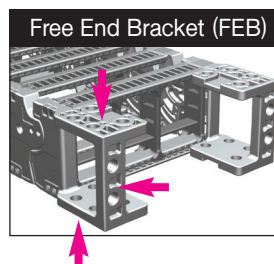
(Dimensions in mm)

» Ordering

nsb 020CR, 20, R48 / F - 600L : 10ST



» Bracket type

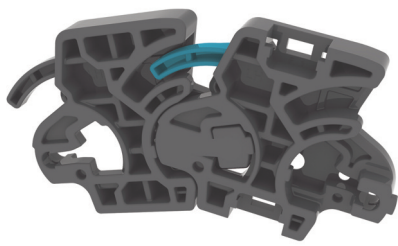


► IPA Test result

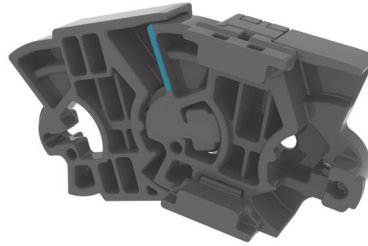
- nsb 020CR,20,R48 : ISO Class1
- nsb 045CR,75,R75 : ISO Class1
- nsb 035CR,55,R75 : ISO Class2

» Characteristics of nsb Chain Cleanroom

- Low Noise due to innovative design of side band.



nsb CR type



nsb N type

As it's designed differently compared to Normal type that has more friction space when assembled. It means that CR type has less friction space each other when assembled, thus, it makes low noise during operation.

- The Quietest Cable Chain in the world.

Unsatisfied with only our own internal testing, we sent our cable chain to the experts at the TUV testing facility in Germany and let them decide. The result was 30db noise level. The quietest ever recorded. It is the patented techniques CPS spends so much time perfecting this astounding accomplishment possible.

30dB NOISE TEST LEVEL

3 Measurement Procedure

3.1 Fundamentals

- Date and time of measurement: March 15th 2007
- Environmental conditions:
 - Temperature: 21 °C (indoor, air conditioned)
 - Background noise level: $L_{Aeq, 20dB(A)}$ air condition off during measurements (no correction was made for the influence of background noise (see Annex 2, 5, 6, 8))
 - Environmental correction K_{cor} : $K_{cor} = 0dB$

Test sample & position of measuring points

Measurement results

Reference documents

All measurement results in detail are compiled in Annex 2 (p. 5). The summary below describes the evaluation of the measurements according to 2000/14/EC (1) and the guidelines (Annex 1) to this directive (2).

- Arithmetic mean of the L_{Aeq} (at 1.5 m (as measured)): 33.1 dB
- Peak sound level (measured): 67.1 dB
- Peak sound level (directed): 62.6 dB
- Estimated compliance level L_{Aeq} : 1.0 dB
- Total standard deviation S_t : 1.3 dB
- Confidence level: 95%
- Quantity of samples: 5
- Coverage factor (see EN Annex A to part 4, table A.1): 2.152
- Corrected value (K = 2.5 (coverage factor)): 2.8
- Guaranteed sound pressure level L_{Aeq} (at 1.5 m): 30.6 dB

Figure 2 shows the guaranteed sound pressure level L_{Aeq} for frequencies from 50 Hz to 10 kHz (10 octaves). The values for each frequency band are calculated as given above.

(1) DIRECTIVE 2000/14/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 May 2000 on the approximation of the laws of the Member States relating to the noise emitted by the environment in respect to air vehicles.

(2) Position paper on guidelines for the application of the European Parliament and Council Directive 2000/14/EC on the approximation of the laws of the Member States relating to the noise emitted by the environment in respect to air vehicles, 20th October 2001

(3) DIN EN ISO 2404:2003 (ISO 1141 : 1998), Acoustics - Determination of sound power level of noise sources using sound pressure - Engineering method in an essentially free field (reference point, November 1999)

(4) DIN EN ISO 9614:2007 (ISO 3745 : 1996), Acoustics - Determination of sound power level of machinery and equipment, Part 1: Specification, October 2007

(5) DIN EN ISO 9613-1:2003 (ISO 9613 : 2003), Acoustics - Sound level reduction - Part 1: Specification, October 2003

- Low Dust Cable Chain.

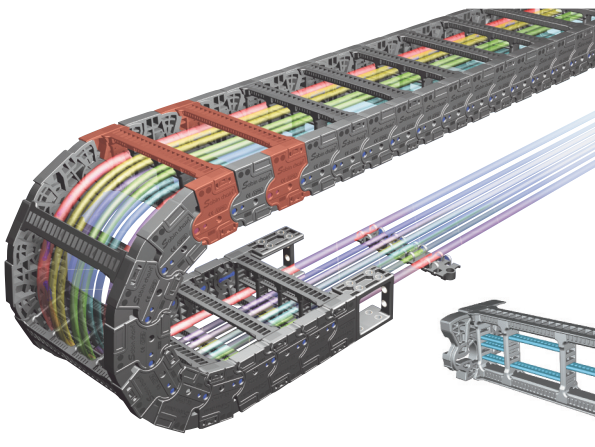
Sabin Chain was given ISO CLASS1 clean room certification according to the Germany IPA Dust Collection Test (VDI 2083 CLASS 1 / DIN EN 14644-1 ISO CLASS 1) It is qualified to be used in semiconductor production lines on automation machine tools and machines requiring quiet and quick applications.

IPA DUST TEST CLASS 1

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

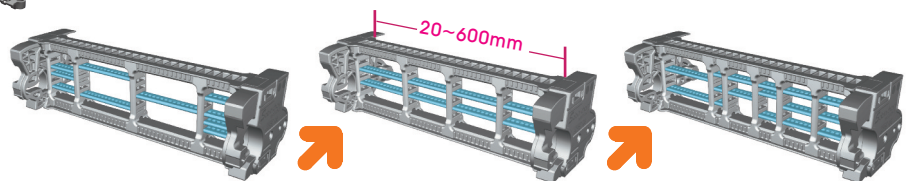
- Clean room environment**
 - Air speed (0.45 m/s)
 - Temperature (+5°C)
 - Humidity (45%)
- Test equipment**
 - Fraunhofer IPA Test machine
- Measurement Skill**
 - To checking the dust dimension of $>0.2\mu m$, $>0.3\mu m$, $>0.5\mu m$, use LPSA210 TYPE machine made by PMS.
- Test operation and analysis**
 - Operated by the guideline of VDI 2083 Part8

- Section composition method

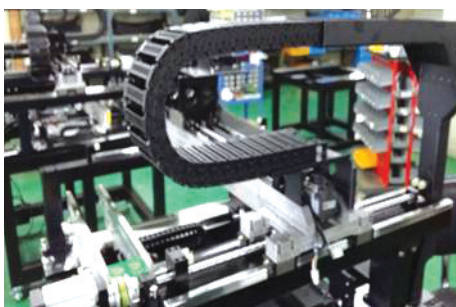


You should make section composition every second frames to make sure long lifetime of cables by preventing from twisting and lost of cables inside. (It's strongly recommended for customers who want to use for long time). It's basic issue and one of the most important factors showing long lifetime of cables.

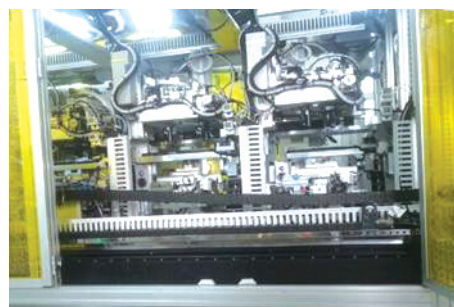
You can make suitable section composition by using our diverse our dividers and separators that can be modified from 20mm ~ 600mm.



» Application of nsb Chain Clean Room type



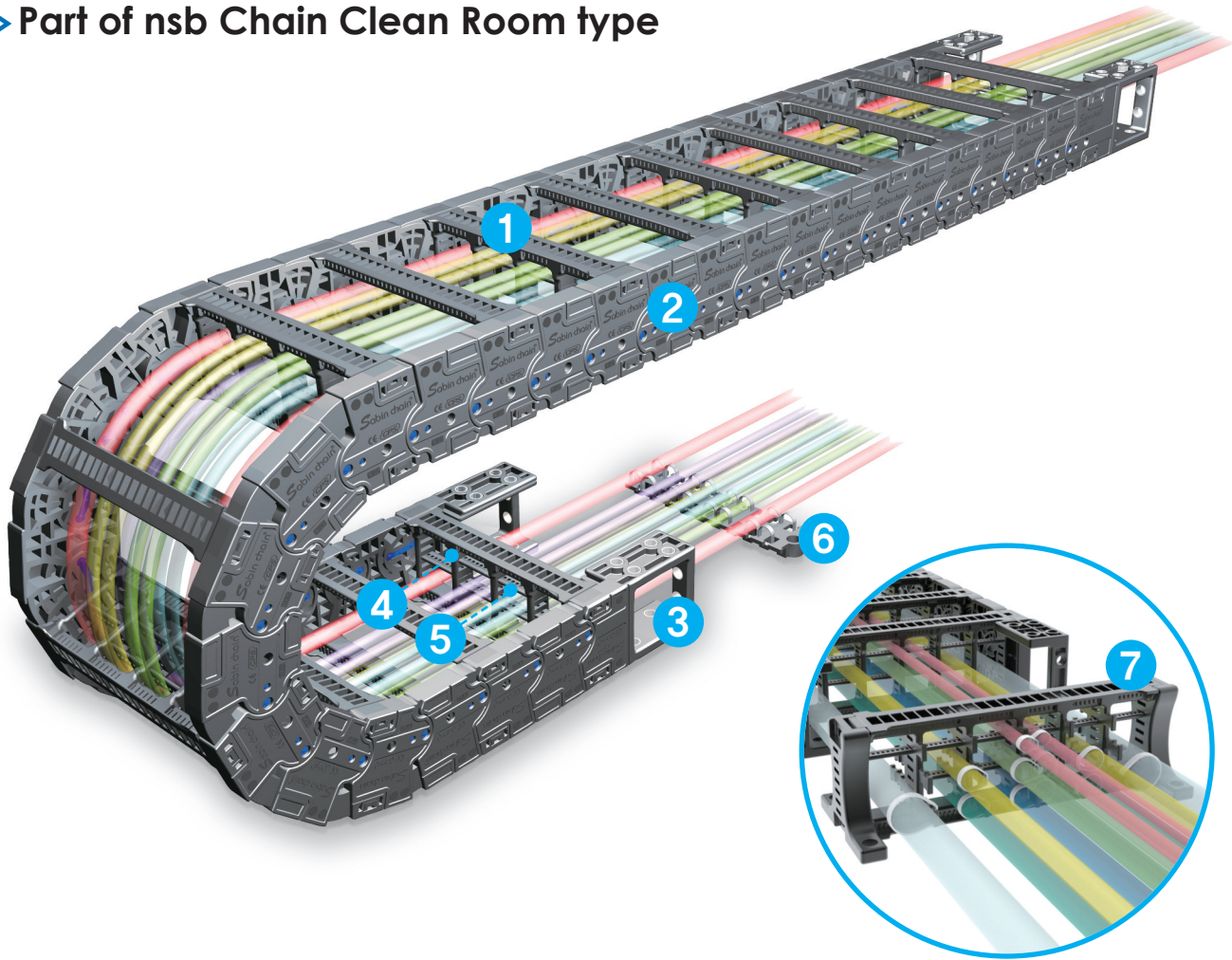
▶ **NSB 022CR** Application: Testing machine for Lead application
Location: Korea



▶ **NSB 035CR**
Application: LCD Cleaner Line
Location: Korea

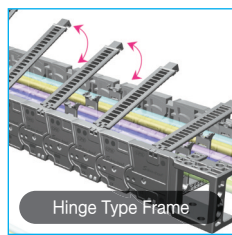
nsb Chain - Clean Room type

» Part of nsb Chain Clean Room type



1 Frame (FR)

Hinged-type frame, open one side, supports connection of both side of side band and have tongue and groove system plate to secure the position of the divider on the frame.

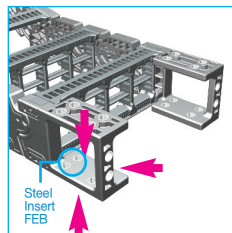


2 Side Band (SB)

It's part of cable chain that each side band's connected by holding band.

3 FREE END BRACKET (FEB)

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



4 Divider (DV-S, M, R, T)

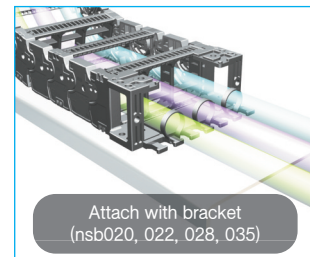
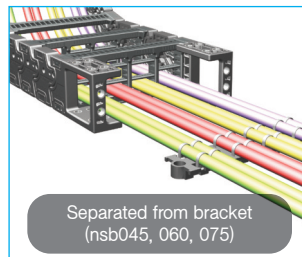
A unit that divides inserted cables horizontally.

5 Separators (SP)

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

6 Tie wrap (TW)

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

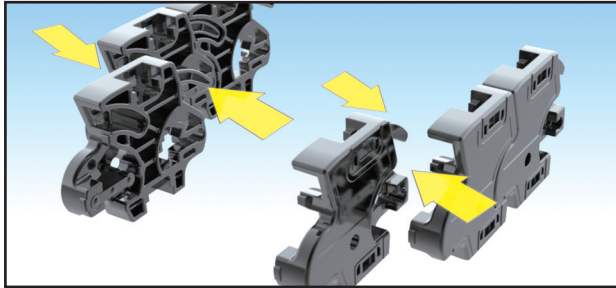


7 System tie wrap (STW)

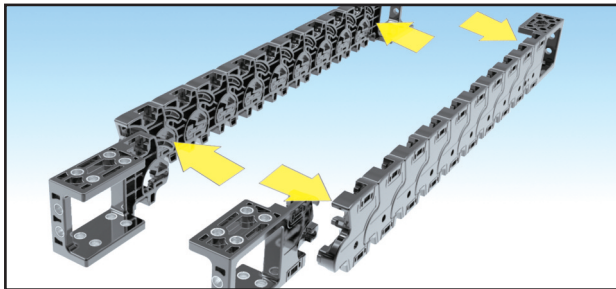
System-Tie Wrap has to be assembled on fixing and moving point of bracket and can be assembled without any tie wrap plate. This tie wrap is used to stay the cables on several floors prevent the cables from being twisting and it can also be assemble without any tools or bolt. This tie wrap has two types,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

» Assembly procedure of nsb Chain room Type

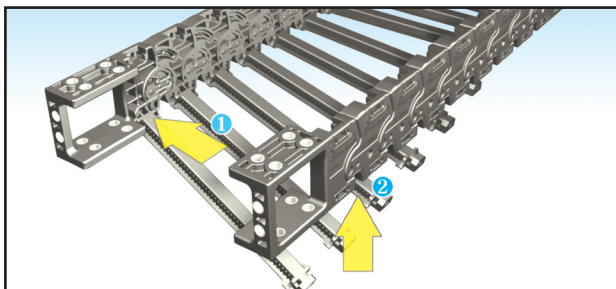
The assembling process of CR-Type of New Sabin Chain is like below and users must use rubber hammer with careful combination of Divider and Separator.



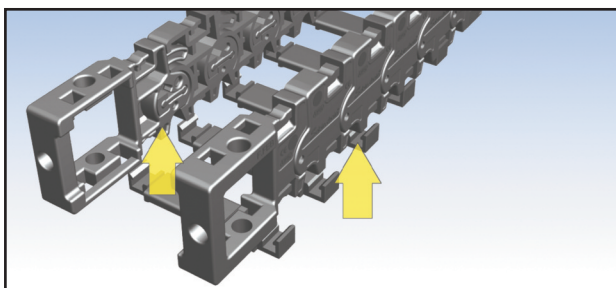
1 Connect each side band as many as you need.



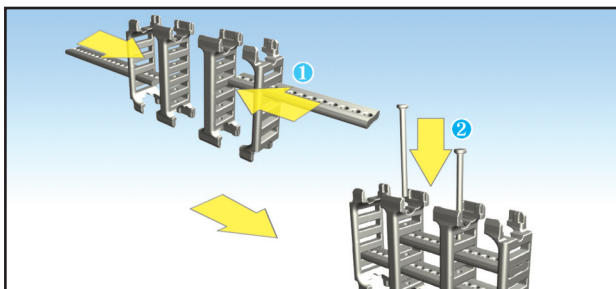
2 Assemble the end brackets on both ends.



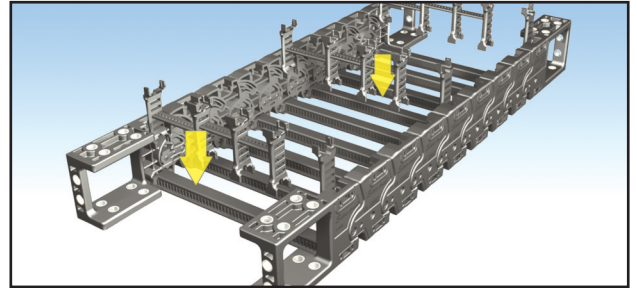
3 Attach frames to one side groove on the frames, then the other side.



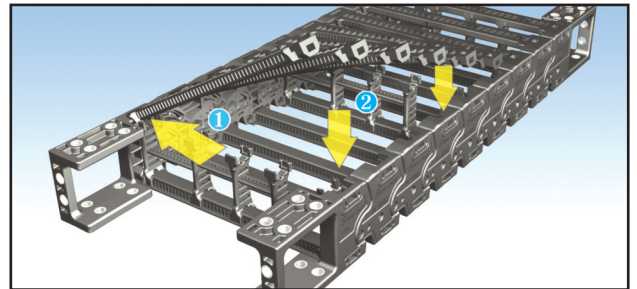
3-1 For nsb020CR and nsb022CR, they are not Hinge Type for method to connect frames, but Hook Type on both sides.



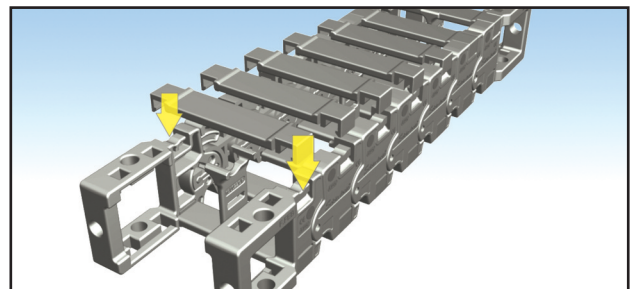
4 For nsb045, 060 and 075, connect the pin of separator in hole of divider after inserting separator in hole of divider. For nsb028 and nsb035, separator fixing pins are not used.



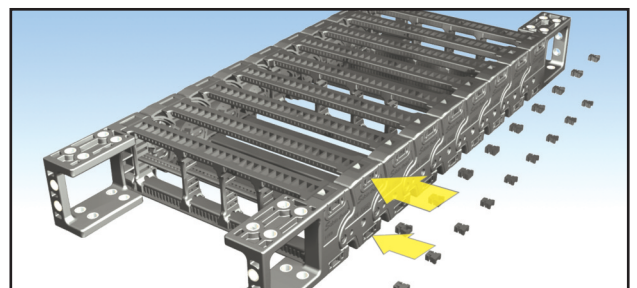
5 Fix the separator and divider patterns to the bottom-side frames as needed.



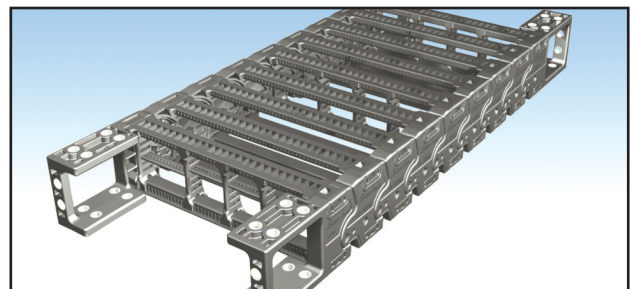
6 Attach frames to one side groove on the frames, then the other side.



6-1 For nsb020CR and nsb022CR, they are not Hinge Type for method to connect frames, but Hook Type on both sides.



7 Insert frame pins to secure the frames and complete carrier. (nsb045, 060, 075 are applied with frame pin, and nsb028, 035 are Hinge Type or Hook Type without frame pin.)



8 Complete to assemble New Sabin CR-Type, Sabin Chain.

nsb Chain - Clean Room type

» Part list of nsb Chain Clean Room type

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

Model	Classification	Part number	Description
nsb020CR	SIDE BAND	nsb-SB020CR,R*(LH) nsb-SB020CR,R*(RH)	Left side band of nsb020CR Right side band of nsb020CR
	FRAME	sb-FR018CR,20 sb-FR018CR,40	Frame, 20mm Frame, 40mm
	FREE END BRACKET	nsb-FEB020CR	End bracket of nsb020CR
	DIVIDER	sb-DV018CR	Normal divider, clean room type
	TIE WRAP	sb-TW018CR,20 sb-TW018CR,40	Tie wrap for end bracket to fix cables, 20mm Tie wrap for end bracket to fix cables, 40mm

Model	Classification	Part number	Description
nsb022CR	SIDE BAND	nsb-SB022CR,R*(LH) nsb-SB022CR,R*(RH)	Left side band of nsb022CR Right side band of nsb022CR
	FRAME	sb-FR020CR,16 S-FR033/020CR,27 S-FR033/020CR,37 S-FR033/020CR,47 S-FR033/020CR,67 S-FR033/020CR,77	Frame, 16mm Frame, 27mm Frame, 37mm Frame, 47mm Frame, 67mm Frame, 77mm
	FREE END BRACKET	nsb-FEB022CR	End bracket of nsb022CR
	DIVIDER	sb-DV020CR	Normal divider, cleanroom type
	TIE WRAP	sb-TW020CR,16 S-TW033/020CR,27 S-TW033/020CR,37 S-TW033/020CR,47 S-TW033/020CR,67 S-TW033/020CR,77	Tie wrap for end bracket to fix cables, 16mm Tie wrap for end bracket to fix cables, 27mm Tie wrap for end bracket to fix cables, 37mm Tie wrap for end bracket to fix cables, 47mm Tie wrap for end bracket to fix cables, 67mm Tie wrap for end bracket to fix cables, 77mm

Model	Classification	Part number	Description
nsb028CR	SIDE BAND	nsb-SB028CR,R*(LH) nsb-SB028CR,R*(RH)	Left side band of nsb028CR Right side band of nsb028CR
	FRAME	sb-FR/M,35 sb-FR/M,50 sb-FR/M,55 sb-FR/M,75 sb-FR/M,100 sb-FR/M,125 sb-FR/M,150 sb-FR/M,175 sb-FR/M,200	Frame, 35mm Frame, 50mm Frame, 55mm Frame, 75mm Frame, 100mm Frame, 125mm Frame, 150mm Frame, 175mm Frame, 200mm
	FREE END BRACKET	nsb-FEB028CR	End bracket of nsb028CR
	DIVIDER	sb-DV028/M sb-DV028/S	Normal divider To fix separstors at the both side section
	SEPARATOR	S-SP/M,35 S-SP/M,50 S-SP/M,75 S-SP/M,100 S-SP/M,125 S-SP/M,150 S-SP/M,175 S-SP/M,200	Separator, 35mm Separator, 50mm Separator, 75mm Separator, 100mm Separator, 125mm Separator, 150mm Separator, 175mm Separator, 200mm
	TIE WRAP	S-TW036/025CR,35 S-TW036/025CR,55 S-TW036/025CR,75 S-TW036/025CR,100 S-TW036/025CR,125	Tie wrap for end bracket to fix cables, 35mm Tie wrap for end bracket to fix cables, 55mm Tie wrap for end bracket to fix cables, 75mm Tie wrap for end bracket to fix cables, 100mm Tie wrap for end bracket to fix cables, 125mm
	SYSTEM TIE WRAP	sb-DV028/W S-TWEB028	Divider for fixing cables at end bracket System tie wrap to arrange for cables right after moving bracket or fixing bracket

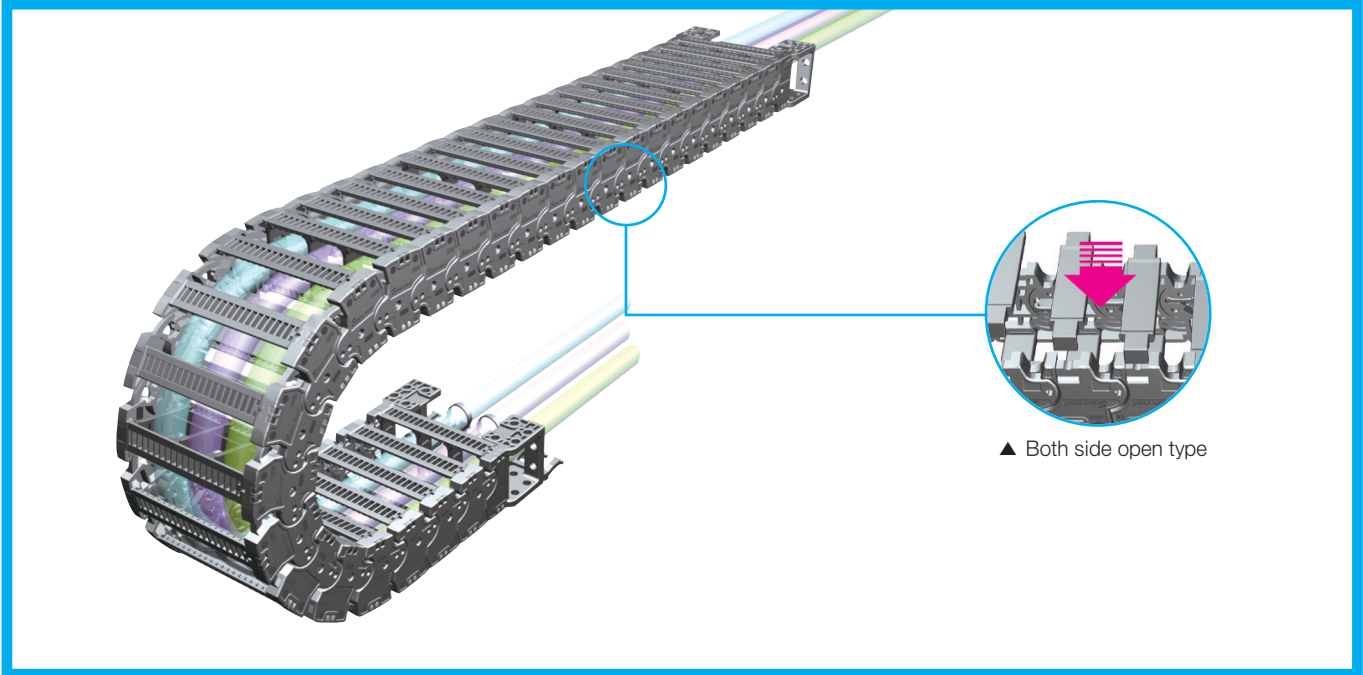
Model	Classification	Part number	Description
nsb035CR	SIDE BAND	nsb-SB035CR,R*(LH) nsb-SB035CR,R*(RH)	Left side band of nsb035CR Right side band of nsb035CR
	FRAME	sb-FR/M,35 sb-FR/M,50 sb-FR/M,55 sb-FR/M,75 sb-FR/M,100 sb-FR/M,125 sb-FR/M,150 sb-FR/M,175 sb-FR/M,200	Frame, 35mm Frame, 50mm Frame, 55mm Frame, 75mm Frame, 100mm Frame, 125mm Frame, 150mm Frame, 175mm Frame, 200mm
	FREE END BRACKET	nsb-FEB035CR	End bracket of nsb035CR
	DIVIDER	sb-DV035/M sb-DV035/S	Normal divider To fix separstors at the both side section
	SEPARATOR	S-SP/M,35 S-SP/M,50 S-SP/M,75 S-SP/M,100 S-SP/M,125 S-SP/M,150 S-SP/M,175 S-SP/M,200	Separator, 35mm Separator, 50mm Separator, 75mm Separator, 100mm Separator, 125mm Separator, 150mm Separator, 175mm Separator, 200mm
	TIE WRAP	S-TW036/025CR,50 S-TW036/025CR,75 S-TW036/025CR,100 S-TW036/025CR,125 S-TW036/025CR,150 S-TW036/025CR,175 S-TW036/025CR,200	Tie wrap for end bracket to fix cables, 50mm Tie wrap for end bracket to fix cables, 75mm Tie wrap for end bracket to fix cables, 100mm Tie wrap for end bracket to fix cables, 125mm Tie wrap for end bracket to fix cables, 150mm Tie wrap for end bracket to fix cables, 175mm Tie wrap for end bracket to fix cables, 200mm
	SYSTEM TIE WRAP	sb-DV035/W S-TWEB035	Divider for fixing cables at end bracket System tie wrap to arrange for cables right after moving bracket or fixing bracket

Model	Classification	Part number	Description
nsb045CR	SIDE BAND	nsb-SB045CR,R*(LH) nsb-SB045CR,R*(RH)	Left side band of nsb045CR Right side band of nsb045CR
	FRAME PIN	S-FP/S1	Frame pin
	FRAME	sb-FR045.50	Frame, 50mm
		sb-FR045.75	Frame, 75mm
		sb-FR045.100	Frame, 100mm
		sb-FR045.125	Frame, 125mm
		sb-FR045.140	Frame, 140mm
		sb-FR045.150	Frame, 150mm
		sb-FR045.165	Frame, 165mm
		sb-FR045.175	Frame, 175mm
sb-FR045.190		Frame, 190mm	
sb-FR045.200		Frame, 200mm	
sb-FR045.240	Frame, 240mm		
sb-FR045.250	Frame, 250mm		
sb-FR045.300	Frame, 300mm		
FREE END BRACKET	nsb-FEB045CR sb-FEB/WH045	End bracket of nsb045CR Steel washer for end bracket	
DIVIDER	sb-DV045/M	Normal divider	
	sb-DV045/S	To fix separstors at the both side section	
	sb-DV045/T	T divider	
	sb-DV045/TP	T divider pin	
SEPARATOR	sb-SP/400,400 SP-PIN045	Separator, 400mm Separator pin to fix	
TIE WRAP	S-TW50	Tie wrap for end bracket to fix cables, 50mm	
	S-TW75	Tie wrap for end bracket to fix cables, 75mm	
	S-TW100	Tie wrap for end bracket to fix cables, 100mm	
	S-TW125	Tie wrap for end bracket to fix cables, 125mm	
	S-TW150	Tie wrap for end bracket to fix cables, 150mm	
SYSTEM TIE WRAP	sb-DV045/W S-TWEB045	Divider for fixing cables at end bracket System tie wrap to arrange for cables right after moving bracket or fixing bracket	

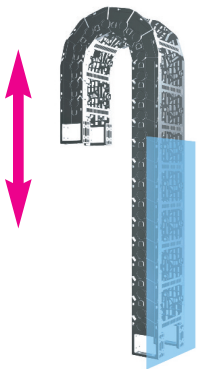
Model	Classification	Part number	Description
nsb060CR	SIDE BAND	nsb-SB060CR,R*(LH) nsb-SB060CR,R*(RH)	Left side band of nsb060CR Right side band of nsb060CR
	FRAME PIN	S-FP/S1	Frame pin
	FRAME	sb-FR060.75	Frame, 75mm
		sb-FR060.100	Frame, 100mm
		sb-FR060.125	Frame, 125mm
		sb-FR060.150	Frame, 150mm
		sb-FR060.175	Frame, 175mm
		sb-FR060.190	Frame, 190mm
		sb-FR060.200	Frame, 200mm
		sb-FR060.230	Frame, 230mm
sb-FR060.250		Frame, 250mm	
sb-FR060.300		Frame, 300mm	
sb-FR060.350	Frame, 350mm		
sb-FR060.400	Frame, 400mm		
FREE END BRACKET	nsb-FEB060CR sb-FEB/WH060	End bracket of nsb060CR Steel washer for end bracket	
DIVIDER	sb-DV060/M	Normal divider	
	sb-DV060/S	To fix separstors at the both side section	
	sb-DV060/R	Roller divider to reduce friction with cables, Clean room type	
	sb-DV060/T	T divider	
sb-DV060/TP	T divider pin		
SEPARATOR	sb-SP/400,400 SP-PIN060	Separator, 400mm Separator pin to fix	
TIE WRAP	S-TW50	Tie wrap for end bracket to fix cables, 50mm	
	S-TW75	Tie wrap for end bracket to fix cables, 75mm	
	S-TW100	Tie wrap for end bracket to fix cables, 100mm	
	S-TW125	Tie wrap for end bracket to fix cables, 125mm	
	S-TW150	Tie wrap for end bracket to fix cables, 150mm	
SYSTEM TIE WRAP	sb-DV060/W S-TWEB060	Divider for fixing cables at end bracket System tie wrap to arrange for cables right after moving bracket or fixing bracket	

Model	Classification	Part number	Description
nsb075CR	SIDE BAND	nsb-SB075CR,R*(LH) nsb-SB075CR,R*(RH)	Left side band of nsb075CR Right side band of nsb075CR
	FRAME PIN	S-FP/S2	Frame pin
	FRAME	sb-FR075/100.75	Frame, 75mm
		sb-FR075/100.100	Frame, 100mm
		sb-FR075/100.115	Frame, 115mm
		sb-FR075/100.125	Frame, 125mm
		sb-FR075/100.150	Frame, 150mm
		sb-FR075/100.175	Frame, 175mm
		sb-FR075/100.200	Frame, 200mm
		sb-FR075/100.240	Frame, 240mm
sb-FR075/100.250		Frame, 250mm	
sb-FR075/100.290		Frame, 290mm	
sb-FR075/100.300	Frame, 300mm		
sb-FR075/100.350	Frame, 350mm		
sb-FR075/100.400	Frame, 400mm		
sb-FR075/100.450	Frame, 450mm		
sb-FR075/100.500	Frame, 500mm		
sb-FR075/100.550	Frame, 550mm		
sb-FR075/100.600	Frame, 600mm		
FREE END BRACKET	nsb-FEB075CR sb-FEB/WH075	End bracket of nsb075CR Steel washer for end bracket	
DIVIDER	sb-DV075/M	Normal divider	
	sb-DV075/S	To fix separstors at the both side section	
	sb-DV075/R	Roller divider to reduce friction with cables, Clean room type	
	sb-DV075/T	T divider	
sb-DV075/TP	T divider pin		
SEPARATOR	sb-SP/400,400 SP-PIN075	Separator, 400mm Separator pin to fix	
TIE WRAP	S-TW50	Tie wrap for end bracket to fix cables, 50mm	
	S-TW75	Tie wrap for end bracket to fix cables, 75mm	
	S-TW100	Tie wrap for end bracket to fix cables, 100mm	
	S-TW125	Tie wrap for end bracket to fix cables, 125mm	
	S-TW150	Tie wrap for end bracket to fix cables, 150mm	
SYSTEM TIE WRAP	sb-DV075/W S-TWEB075	Divider for fixing cables at end bracket System tie wrap to arrange for cables right after moving bracket or fixing bracket	

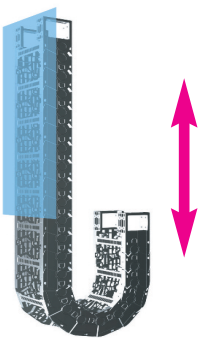
nsb 020CR



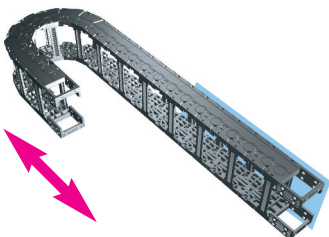
▲ Both side open type



Vertical with curve above



Vertical with curve below



Horizontal application mounted on its side

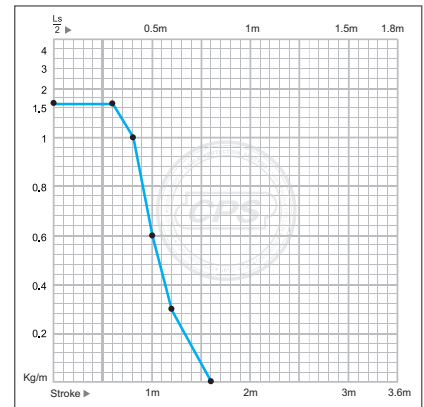
» Calculation of the chain length

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

» Other installation length

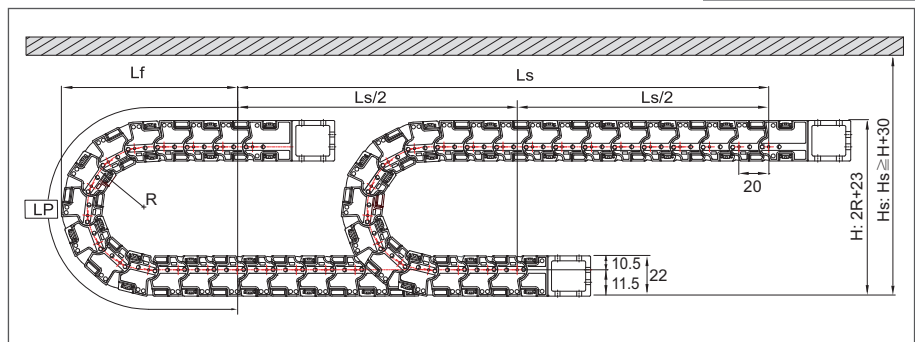
Vertical curve above = max 1.0m
 Vertical curve below = max 5m
 Side Mounted, Unsupported = max 0.5m

» Load diagrams self-supporting length



» Layout of the chain

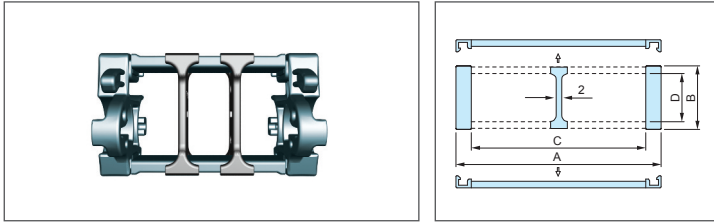
Ls: Stroke Hs: Safe Space



Bending Radius (R)	Lp Loop Length	Lf Loof Projection	H Moving Height
28	162	76	79
38	202	90	99
48	242	105	119

(Dimensions in mm)

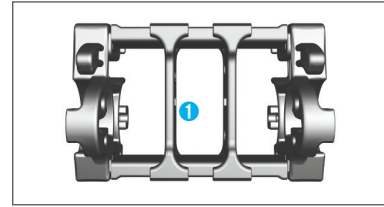
» Chain cross section



Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
nsb 020CR	34	22	20	15	0,32
	54		40		0,35

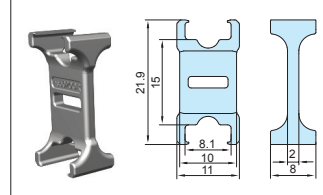
(Dimensions in mm)

» Dividers(DV)



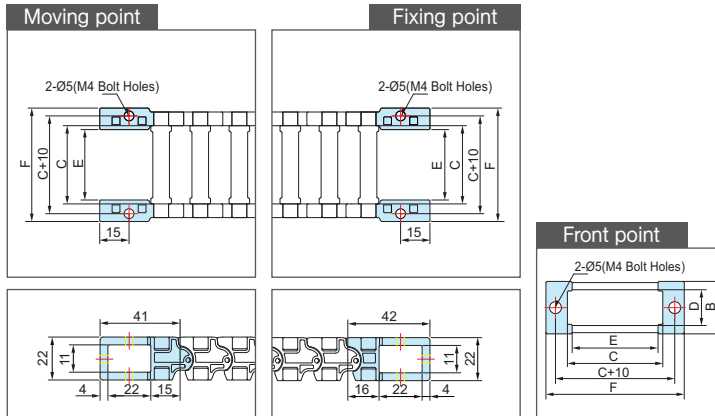
Assemble divider every third links.

1 sb-DV018CR



(Dimensions in mm)

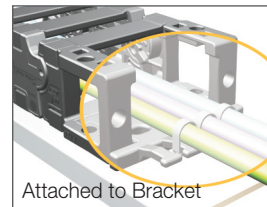
» Free end bracket



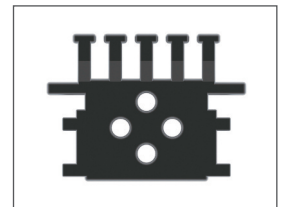
Chain Type	F Width(Outer)	B Height(Outer)	C Frame	D Height(Inner)	E M,EB Bolt hole width	Hole Type
nsb 020CR	38 58	22	20 40	15	16 36	M4 Bolt Holes

(Dimensions in mm)

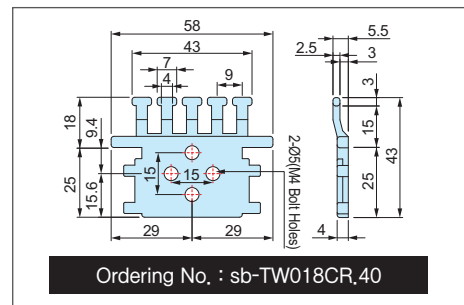
» Tie wrap (TW)



Attached to Bracket



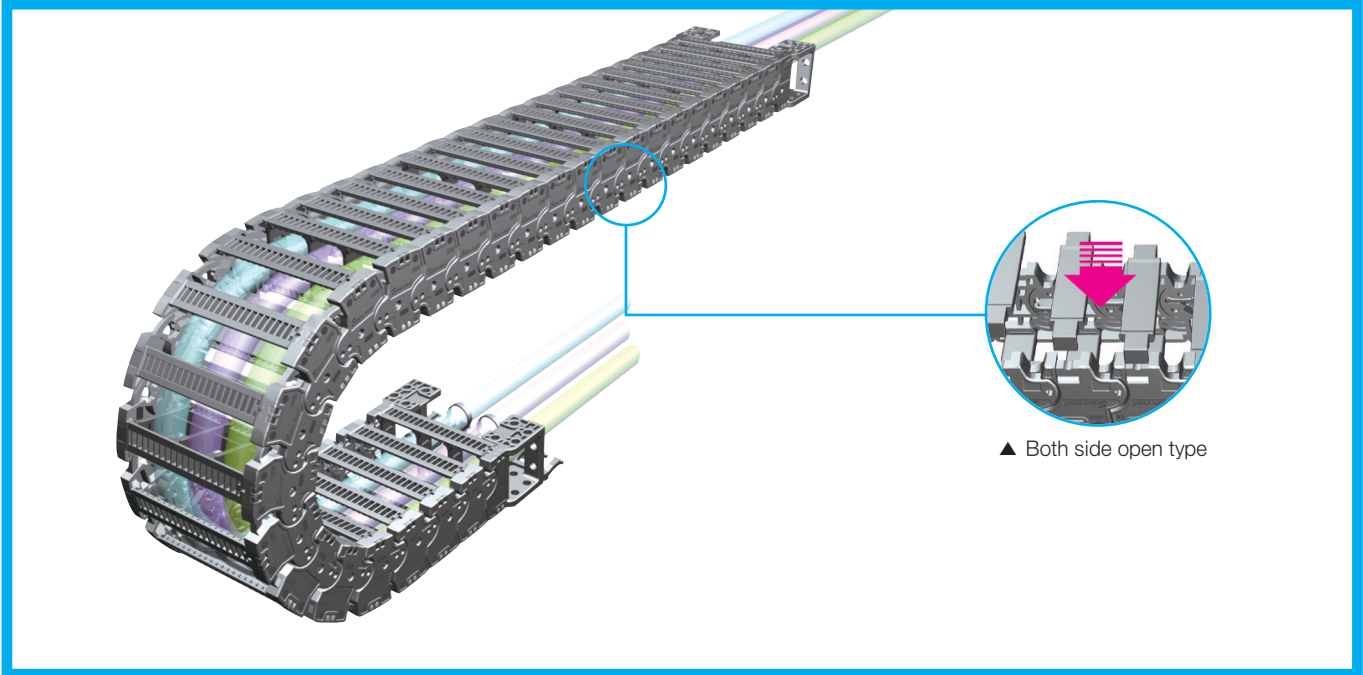
Ordering No. : sb-TW018CR,20



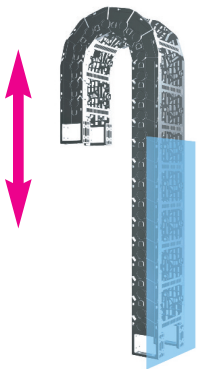
Ordering No. : sb-TW018CR,40

(Dimensions in mm)

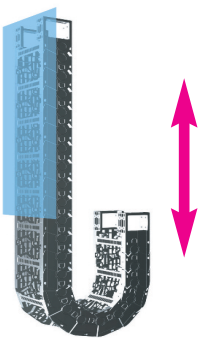
nsb 022CR



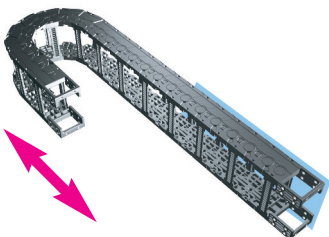
▲ Both side open type



Vertical with curve above



Vertical with curve below



Horizontal application mounted on its side

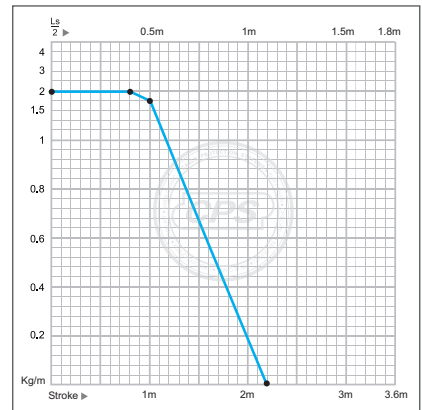
» Calculation of the chain length

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

» Other installation length

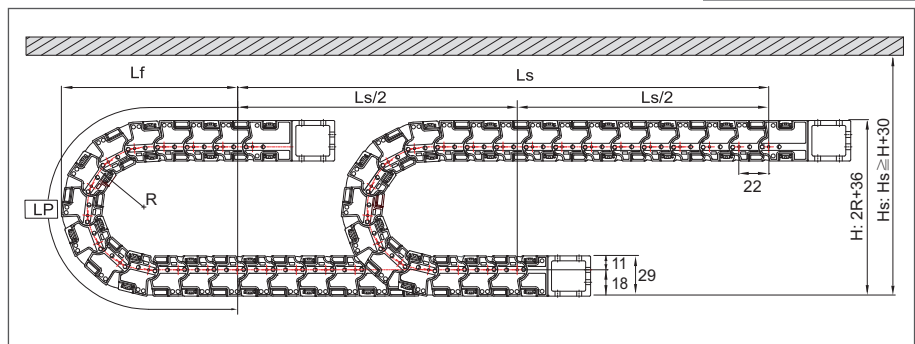
Vertical curve above = max 1.0m
 Vertical curve below = max 5m
 Side Mounted, Unsupported = max 0.5m

» Load diagrams self-supporting length



» Layout of the chain

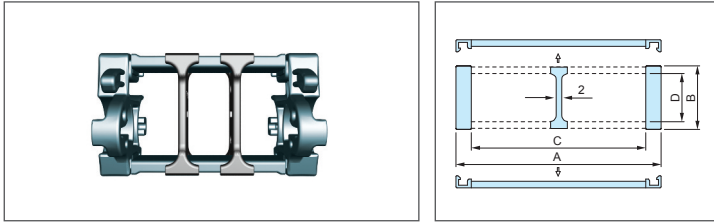
Ls: Stroke Hs: Safe Space



Bending Radius (R)	Lp Loop Length	Lf Loof Projection	H Moving Height
35	222	108	106
45	266	125	126
75	353	152	186
100	441	182	236
120	485	192	276

(Dimensions in mm)

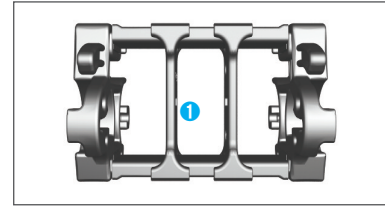
» Chain cross section



Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
nsb 022CR	30	29	16	22	0.43
	41		27		0.47
	51		37		0.51
	61		47		0.55
	81		67		0.67
	91	77	0.69		

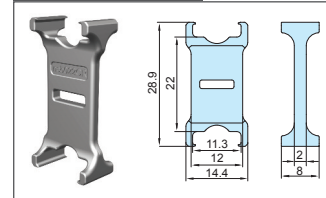
(Dimensions in mm)

» Dividers(DV)



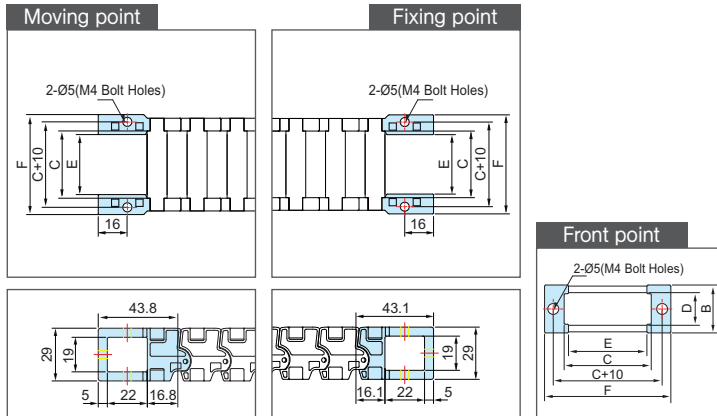
Assemble divider every third links.

1 sb-DV020CR



(Dimensions in mm)

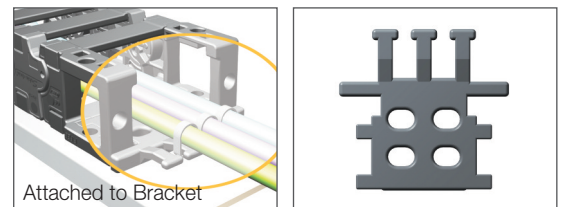
» Free end bracket



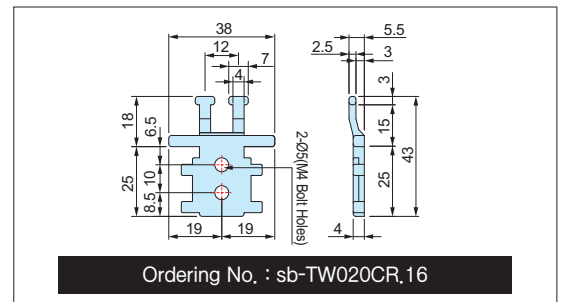
Chain Type	F Width(Outer)	B Height(Outer)	C Frame	D Height(Inner)	E M,EB Bolt hole width	Hole Type
nsb 022CR	34	29	16	22	12	M4 Bolt Holes
	45		27		23	
	55		37		33	
	65		47		43	
	85		67		63	
	95	77	73			

(Dimensions in mm)

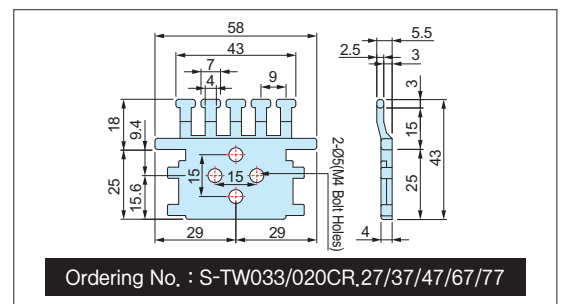
» Tie wrap (TW)



Attached to Bracket



Ordering No. : sb-TW020CR,16

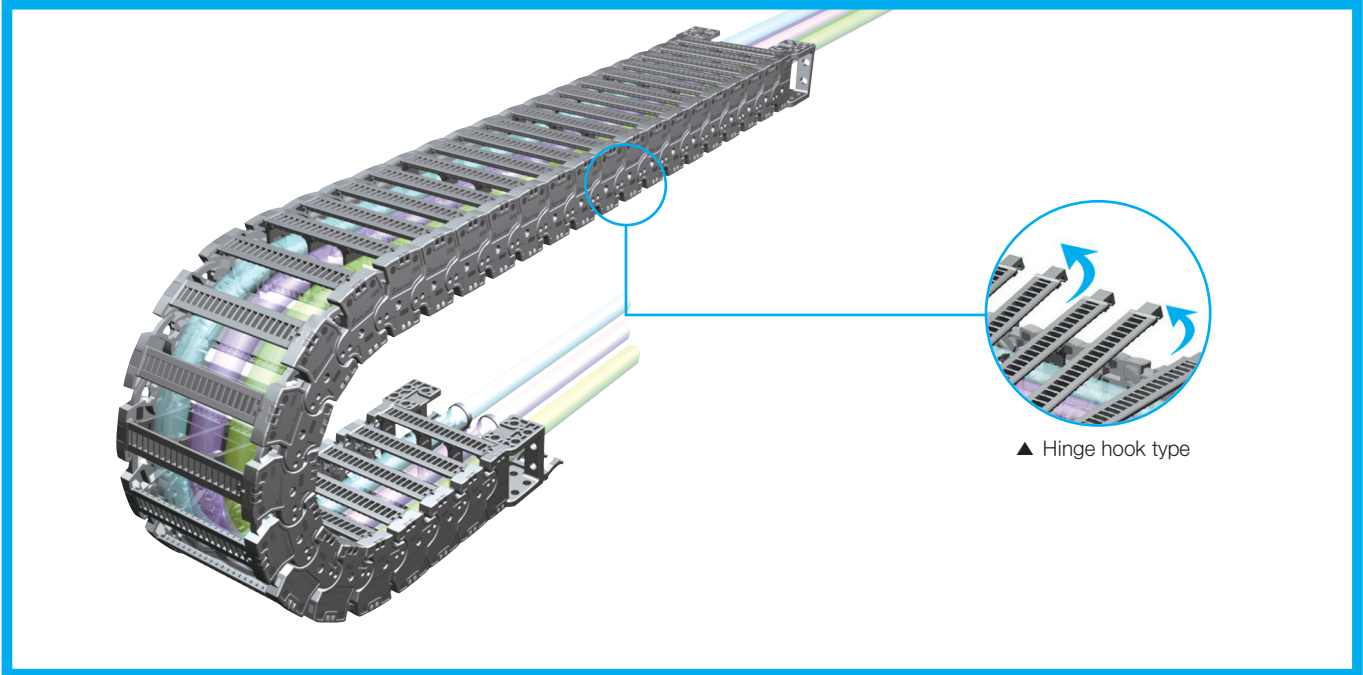


Ordering No. : S-TW033/020CR,27/37/47/67/77

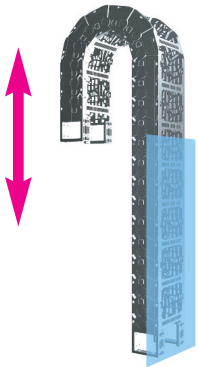
Chain Type	Ordering No.	A	B	C	D
nsb 022CR	sb-TW020CR,16	34	-	10.00	-
	S-TW033/020CR,27	45	27,5	10,20	12
	S-TW033/020CR,37	55	41,0	8,50	22
	S-TW033/020CR,47	65	48,0	10,40	32
	S-TW033/020CR,67	85	68,0	10,00	52
	S-TW033/020CR,77	95	78,0	8,87	62

(Dimensions in mm)

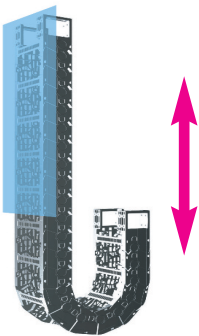
nsb 028CR



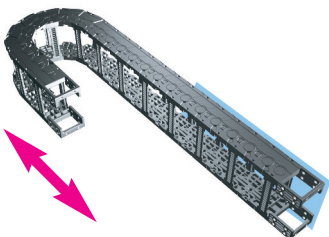
▲ Hinge hook type



Vertical with curve above



Vertical with curve below

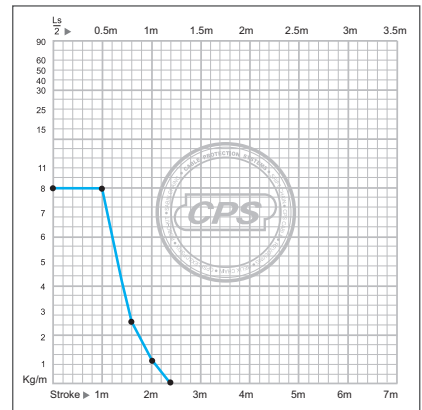


Horizontal application mounted on its side

» Calculation of the chain length

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

» Load diagrams self-supporting length



» Other installation length

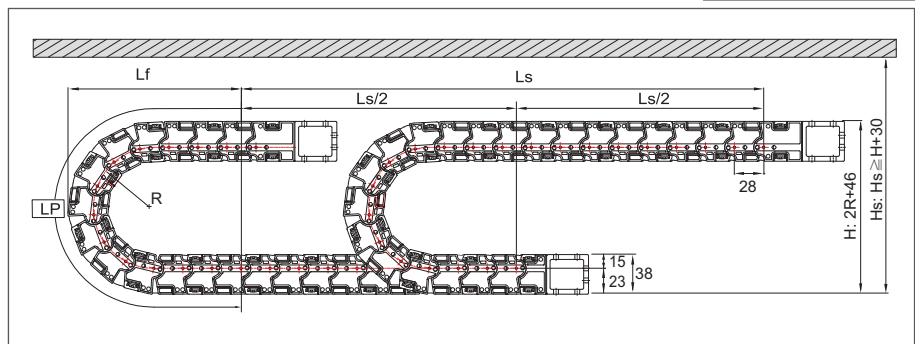
Vertical curve above = max 2.0m

Vertical curve below = max 40m

Side Mounted, Unsupported = max 1.0m

» Layout of the chain

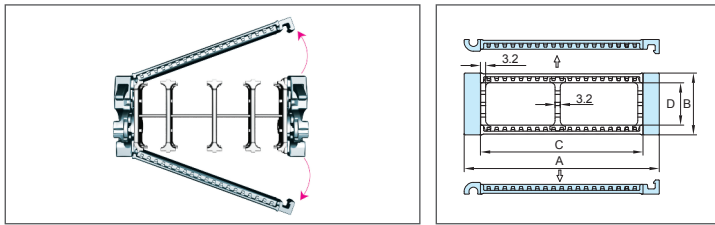
Ls: Stroke Hs: Safe Space



Bending Radius (R)	Lp Loop Length	Lf Loof Projection	H Moving Height
50	311	149	146
70	367	135	186
90	422	182	226
120	533	221	286
150	589	232	346

(Dimensions in mm)

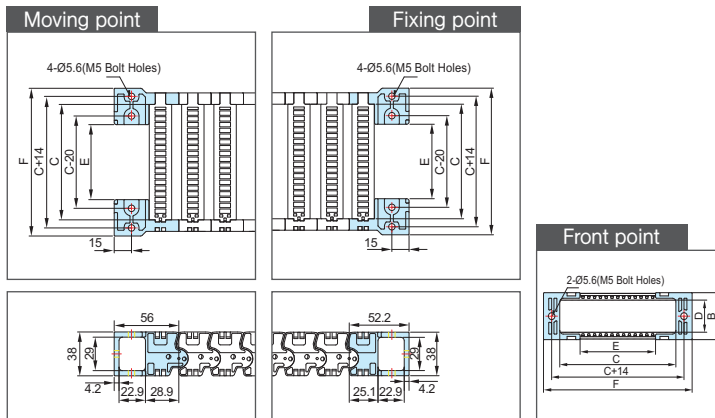
» Chain cross section



Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
nsb 028CR	55	38	35	26	0,90
	70		50		0,98
	75		55		1,02
	95		75		1,12
	120		100		1,27
	145		125		1,41
	170		150		1,59
	220		200		1,84

(Dimensions in mm)

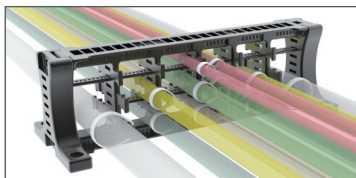
» Free end bracket



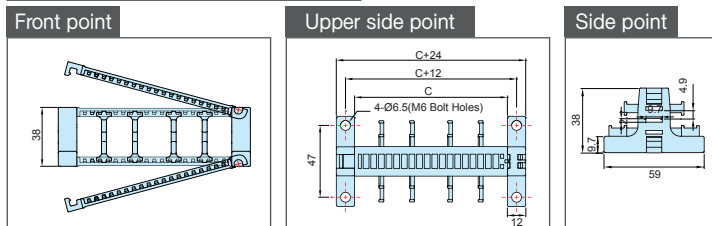
Chain Type	F Width(Outer)	B Height(Outer)	C Frame	D Height(Inner)	E M,EB Bolt hole width	Hole Type
nsb 028CR	63	38	35	26	0	M5 Bolt Holes
	78		50		15	
	83		55		20	
	103		75		40	
	128		100		65	
	153		125		90	
	178		150		115	
	203		175		140	
228	200	165				

(Dimensions in mm)

» System tie wrap (STW)

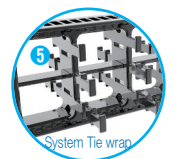
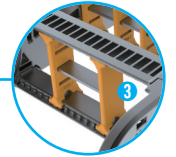
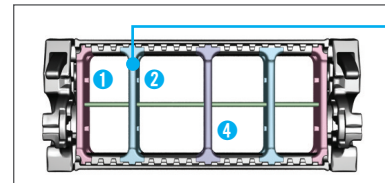


It is a unit to classify each cable for preventing entanglement of cables. It can either be installed to free end bracket or installed separately according its application environment.

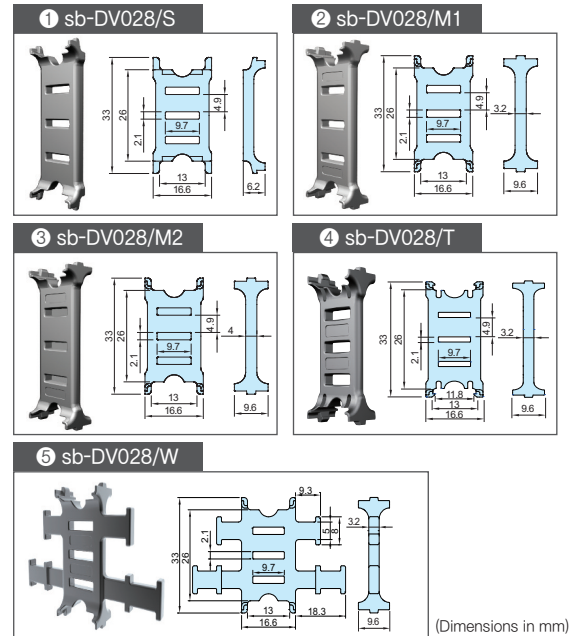


Chain Type	Ordering No.	C Frame	Hole Type
nsb 028CR	S-TW,EB028,35	35	M6 Bolt Holes
	S-TW,EB028,50	50	
	S-TW,EB028,55	55	
	S-TW,EB028,75	75	
	S-TW,EB028,100	100	
	S-TW,EB028,125	125	
	S-TW,EB028,150	150	
	S-TW,EB028,175	175	
	S-TW,EB028,200	200	

» Dividers(DV)

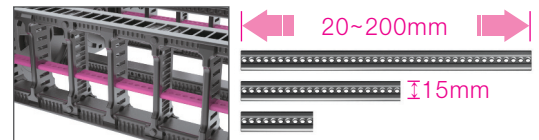


Assemble divider every second frame.
DV.T : Applied to Frame 125~200.
DV.M : Normal Divider.
DV.W : Applicable to System Tie Wrap or FEB.



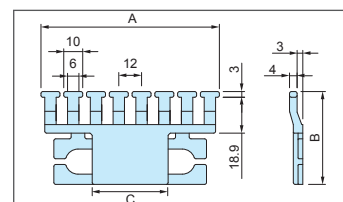
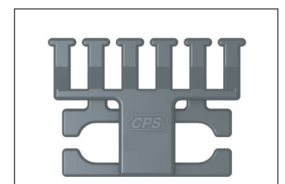
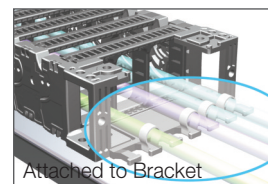
(Dimensions in mm)

» Separators(SP)



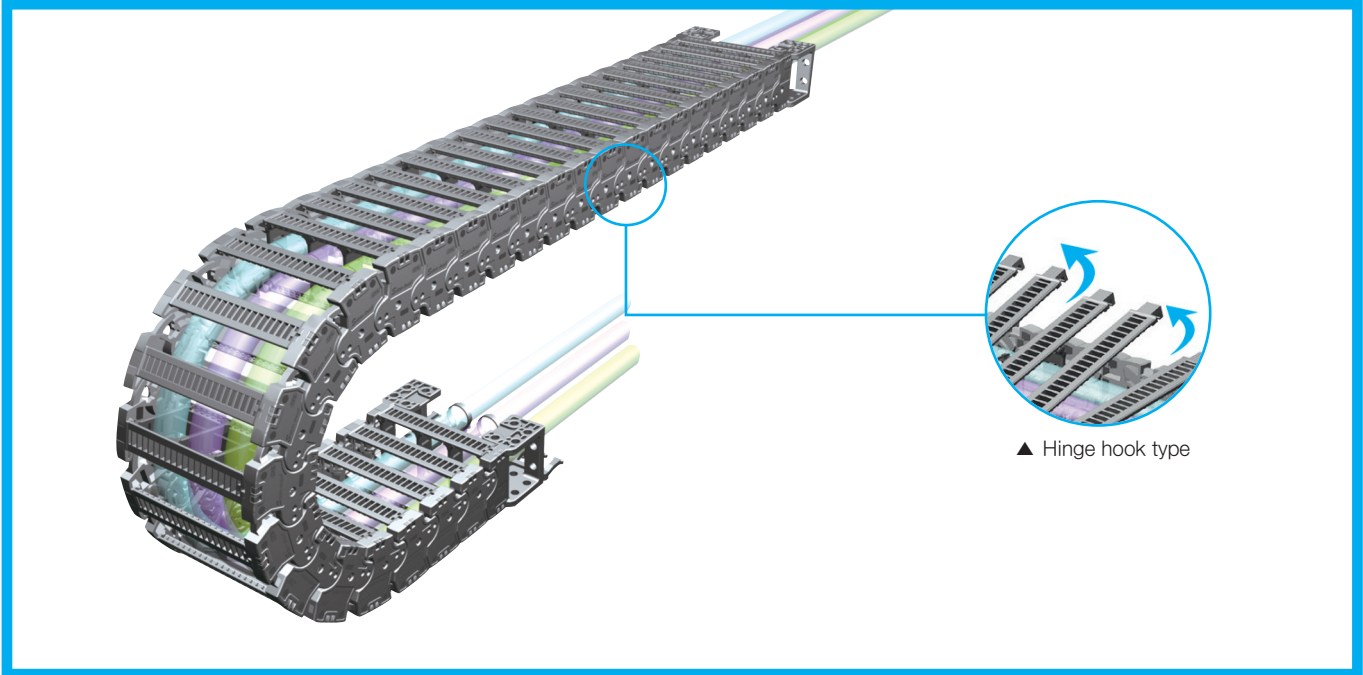
Chain Type	Ordering NO.	Frame
nsb 028CR	S-SP/M,35	35
	S-SP/M,50	50
	S-SP/M,55	55
	S-SP/M,75	75
	S-SP/M,100	100
	S-SP/M,125	125
	S-SP/M,150	150
	S-SP/M,175	175
S-SP/M,200	200	

» Tie wrap (TW)

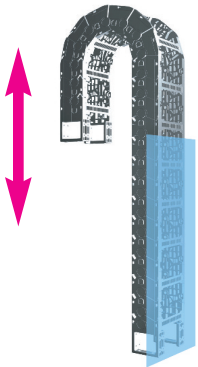


Chain Type	Ordering No.	A	B	C
nsb 028CR	S-TW036/025CR,35	46	35,4	-
	S-TW036/025CR,50	69	48,9	15
	S-TW036/025CR,55	70	48,9	20
	S-TW036/025CR,75	94	48,9	40
	S-TW036/025CR,100	118	48,9	65
	S-TW036/025CR,125	142	48,9	90

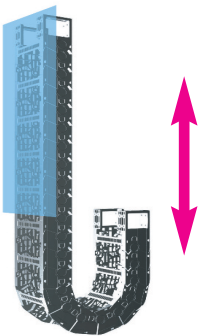
nsb 035CR



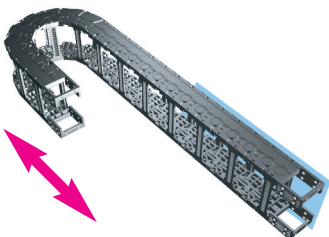
▲ Hinge hook type



Vertical with curve above



Vertical with curve below

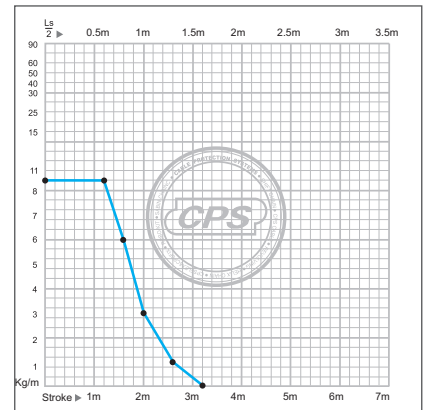


Horizontal application mounted on its side

» Calculation of the chain length

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

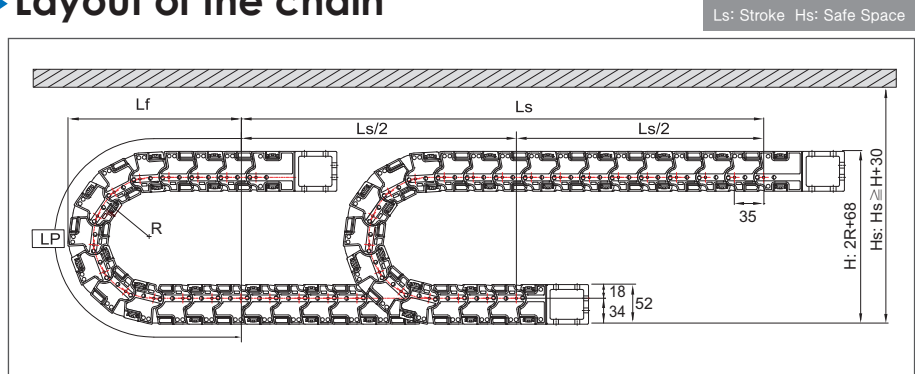
» Load diagrams self-supporting length



» Other installation length

Vertical curve above = max 3.0m
 Vertical curve below = max 50m
 Side Mounted, Unsupported = max 1.0m

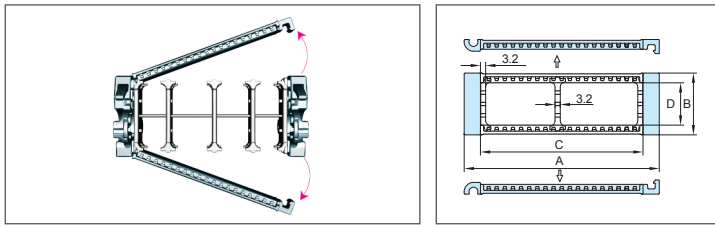
» Layout of the chain



Bending Radius (R)	Lp Loop Length	Lf Loof Projection	H Moving Height
75	471	226	218
100	550	251	268
125	628	276	318
150	706	301	368
200	863	351	468

(Dimensions in mm)

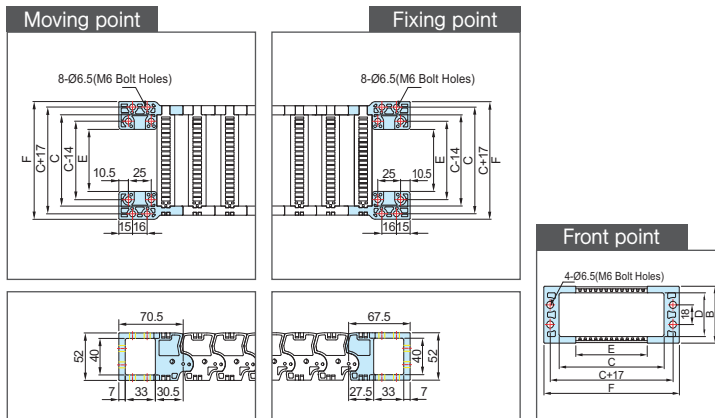
» Chain cross section



Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
nsb 035CR	55	52	35	40	1.00
	70		50		1.06
	75		55		1.09
	95		75		1.17
	120		100		1.29
	145		125		1.39
	170		150		1.53
	220		200		1.73

(Dimensions in mm)

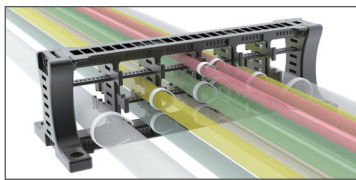
» Free end bracket



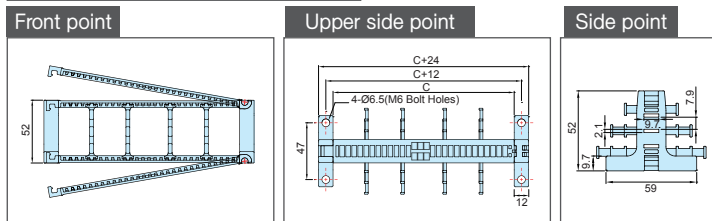
Chain Type	F Width(Outer)	B Height(Outer)	C Frame	D Height(Inner)	E M,EB Bolt hole width	Hole Type
nsb 035CR	64	52	35	40	3	M6 Bolt Holes
	79		50		18	
	84		55		23	
	104		75		43	
	129		100		68	
	154		125		93	
	179		150		118	
	204		175		143	
229	200	168				

(Dimensions in mm)

» System tie wrap (STW)

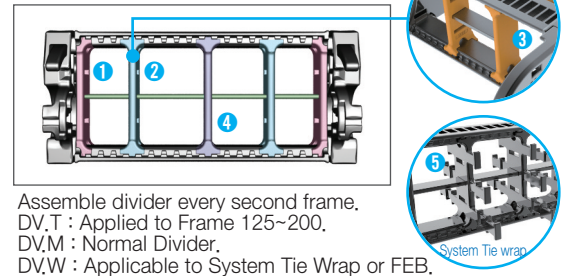


It is a unit to classify each cable for preventing entanglement of cables. It can either be installed to free end bracket or installed separately according its application environment.

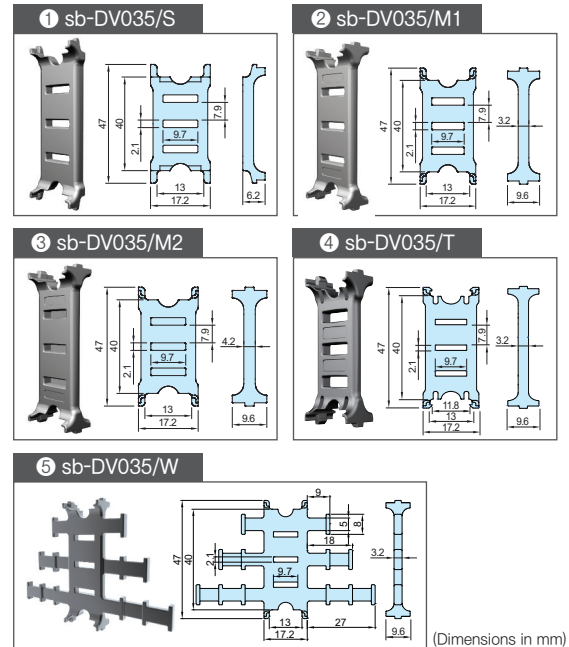


Chain Type	Ordering No.	C Frame	Hole Type
nsb 035CR	S-TW,EB035,35	35	M6 Bolt Holes
	S-TW,EB035,50	50	
	S-TW,EB035,55	55	
	S-TW,EB035,75	75	
	S-TW,EB035,100	100	
	S-TW,EB035,125	125	
	S-TW,EB035,150	150	
	S-TW,EB035,175	175	
	S-TW,EB035,200	200	

» Dividers(DV)

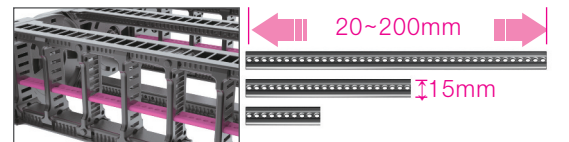


Assemble divider every second frame.
DV.T : Applied to Frame 125~200.
DV.M : Normal Divider.
DV.W : Applicable to System Tie Wrap or FEB.



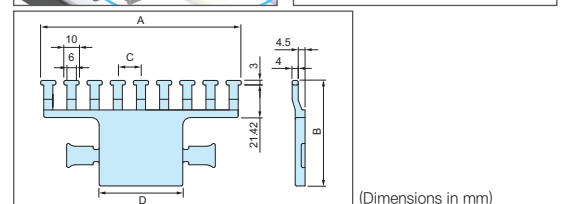
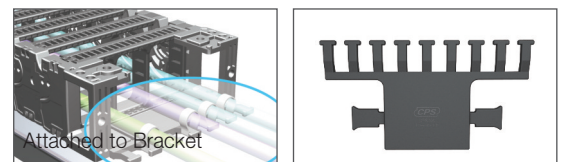
(Dimensions in mm)

» Separators(SP)



Chain Type	Ordering NO.	Frame
nsb 035CR	S-SP/M,35	35
	S-SP/M,50	50
	S-SP/M,55	55
	S-SP/M,75	75
	S-SP/M,100	100
	S-SP/M,125	125
	S-SP/M,150	150
	S-SP/M,175	175
	S-SP/M,200	200

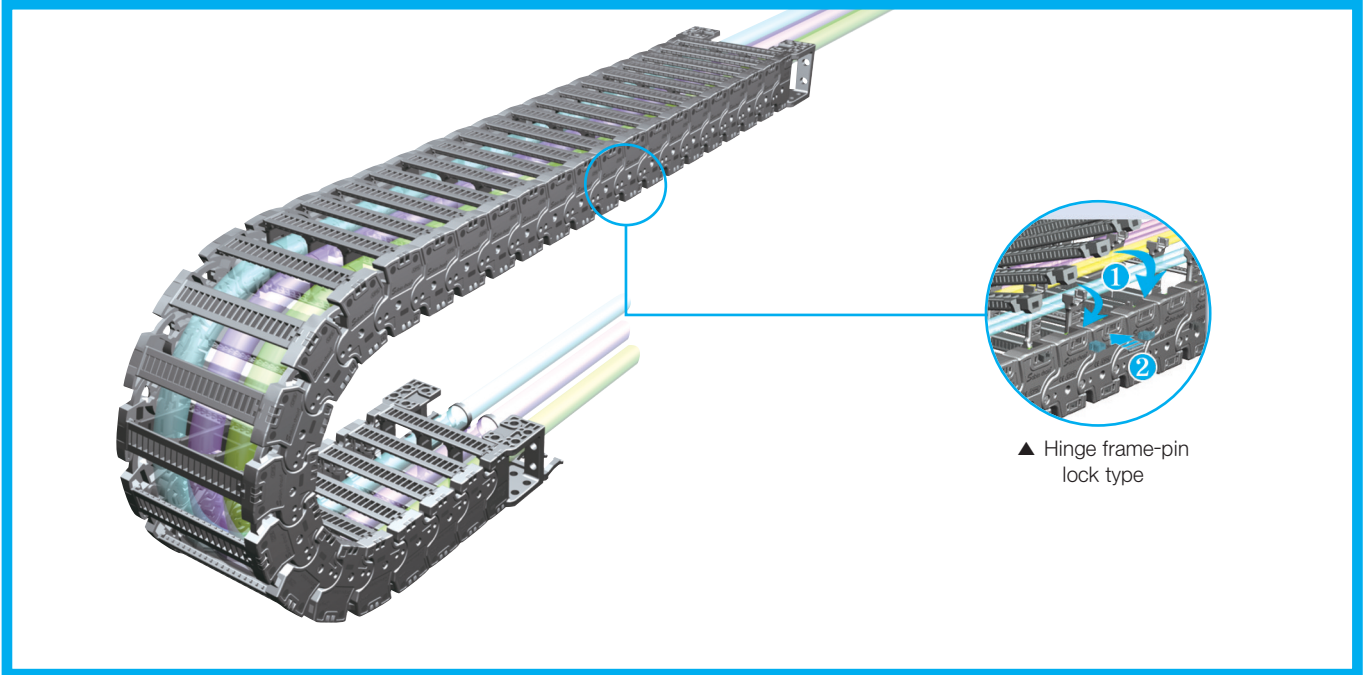
» Tie wrap (TW)



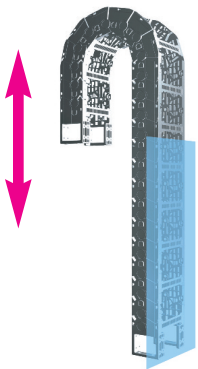
(Dimensions in mm)

Chain Type	Ordering No.	A	B	C	D
nsb 035CR	S-TW050/035N,50	82	64.5	12.00	5
	S-TW050/035N,55	82		12.00	10
	S-TW050/035N,75	107		12.13	30
	S-TW050/035N,100	132		15.25	55
	S-TW050/035N,125	157		14.70	80
	S-TW050/035N,150	182		14.35	105
	S-TW050/035N,175	203		12.31	130
	S-TW050/035N,200	232		13.88	155

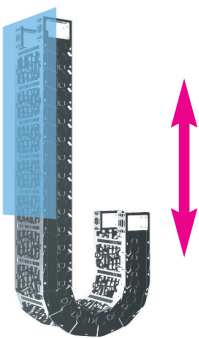
nsb 045CR



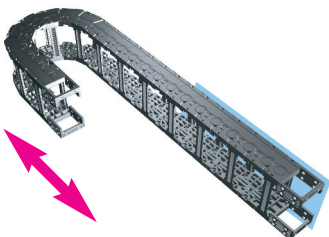
▲ Hinge frame-pin lock type



Vertical with curve above



Vertical with curve below



Horizontal application mounted on its side

» Calculation of the chain length

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

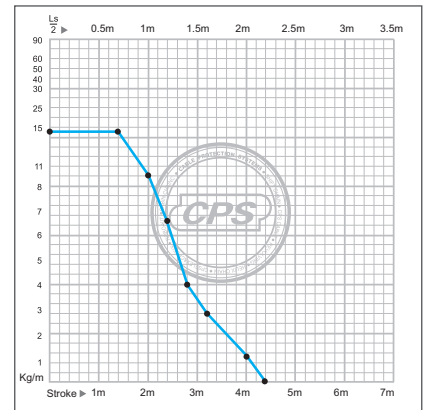
» Other installation length

Vertical curve above = max 6.0m

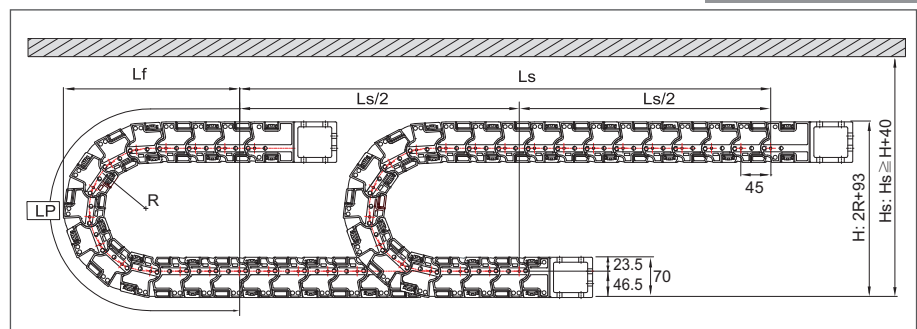
Vertical curve below = max 100m

Side Mounted, Unsupported = max 2.5m

» Load diagrams self-supporting length



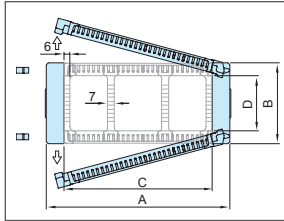
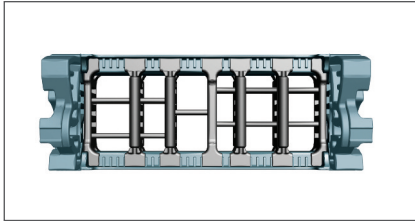
» Layout of the chain



Bending Radius (R)	Lp Loop Length	Lf Loof Projection	H Moving Height
75	587	279	243
100	665	304	293
120	728	324	333
140	791	344	373
200	979	404	493
250	1,136	454	593
300	1,293	504	693

(Dimensions in mm)

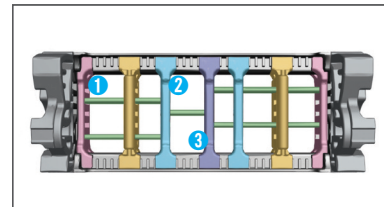
» Chain cross section



Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
nsb 045CR	80	70	50	49	2.59
	105		75		2.74
	130		100		2.90
	155		125		3.11
	170		140		3.23
	180		150		3.31
	195		165		3.41
	205		175		3.48
	220		190		3.90
	230		200		4.18
	270		240		4.64
	280		250		4.76
	330		300		5.32

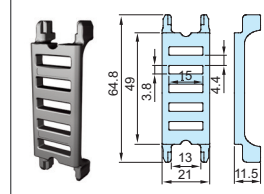
(Dimensions in mm)

» Dividers(DV)

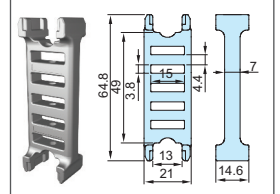


Assemble divider every second frame.
DV,T : Applied to Frame 200~300.
DV,M : Normal Divider.

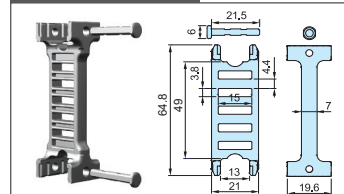
① sb-DV045/S



② sb-DV045/M

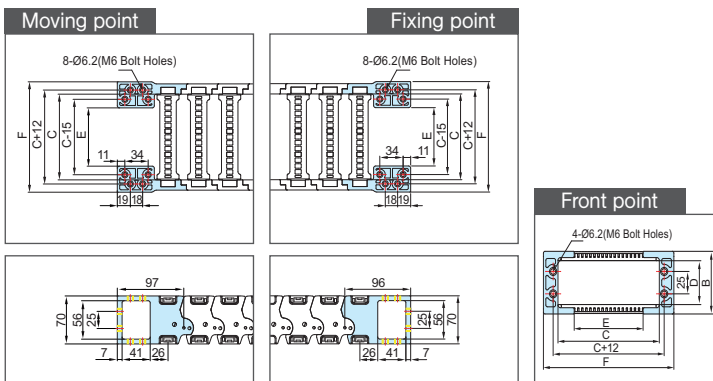


③ sb-DV045/T



(Dimensions in mm)

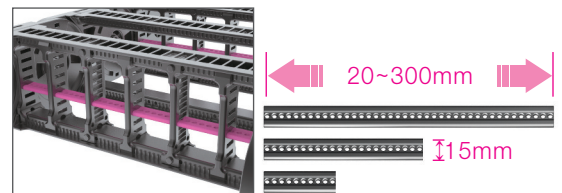
» Free end bracket



Chain Type	F Width(Outer)	B Height(Outer)	C Frame	D Height(Inner)	E MEB Bolt hole width	Hole Type
nsb 045CR	86	70	50	49	10	M6 Bolt Holes
	111		35			
	136		60			
	161		85			
	176		100			
	186		110			
	201		125			
	211		135			
	226		150			
	236		160			
	276		200			
	286		210			
	336		260			

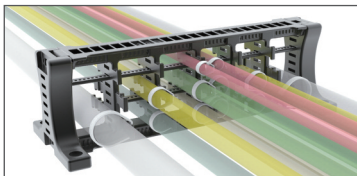
(Dimensions in mm)

» Separators(SP)

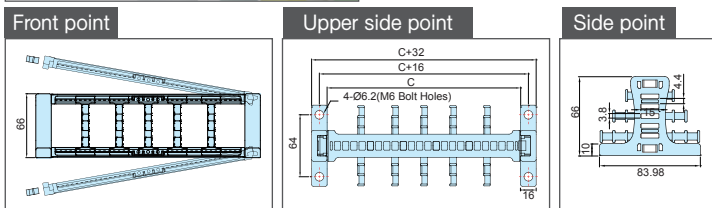


Chain Type	Ordering NO.
nsb 045CR	sb-SP/400,400

» System tie wrap (STW)

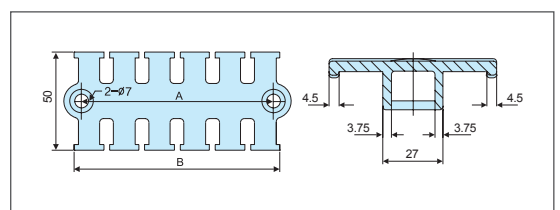
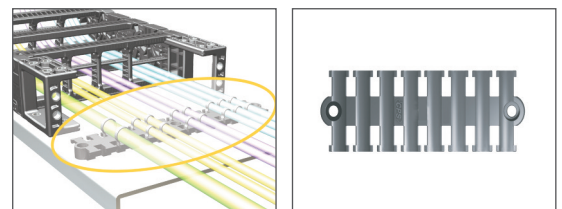


It is a unit to classify each cable for preventing entanglement of cables. It can either be installed to free end bracket or installed separately according its application environment.



Chain Type	Ordering No.	C Frame	Hole Type
nsb 045CR	S-TW,EB045,50	50	M6 Bolt Holes
	S-TW,EB045,75	75	
	S-TW,EB045,100	100	
	S-TW,EB045,125	125	
	S-TW,EB045,140	140	
	S-TW,EB045,150	150	
	S-TW,EB045,165	165	
	S-TW,EB045,175	175	
	S-TW,EB045,190	190	
	S-TW,EB045,200	200	
	S-TW,EB045,240	240	
	S-TW,EB045,250	250	
	S-TW,EB045,300	300	

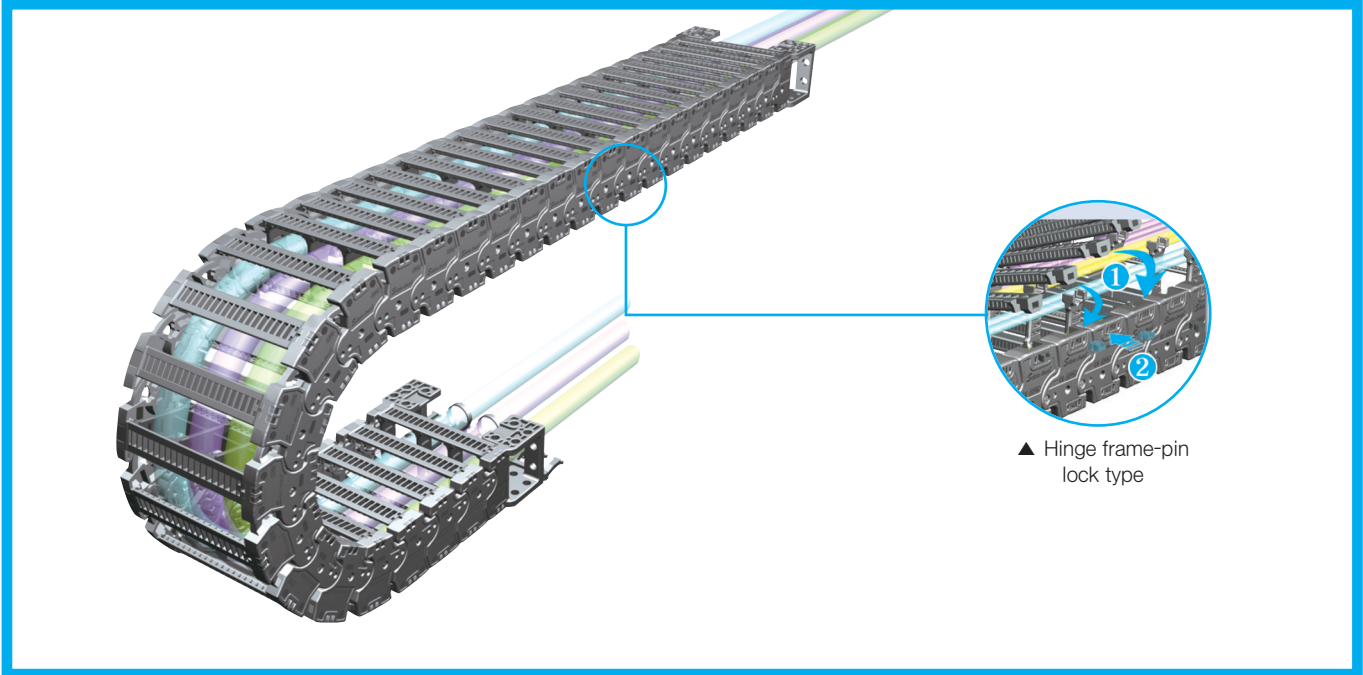
» Tie wrap (TW)



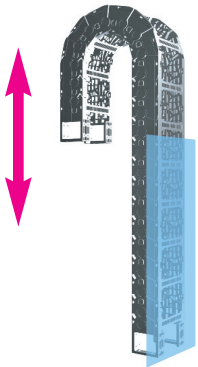
Chain Type	Ordering No.	A	B
nsb 045CR	S-TW50	58	65
	S-TW75	75	82
	S-TW100	98	105
	S-TW125	122	129
	S-TW150	141	148

(Dimensions in mm)

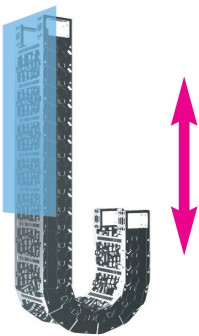
nsb 060CR



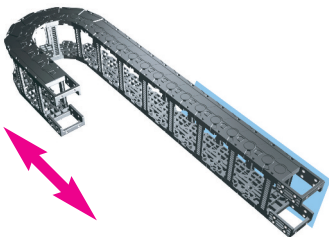
▲ Hinge frame-pin lock type



Vertical with curve above



Vertical with curve below



Horizontal application mounted on its side

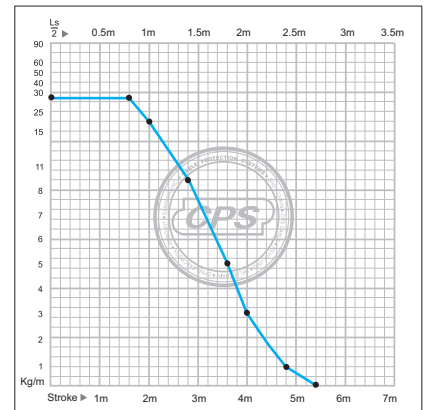
» Calculation of the chain length

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

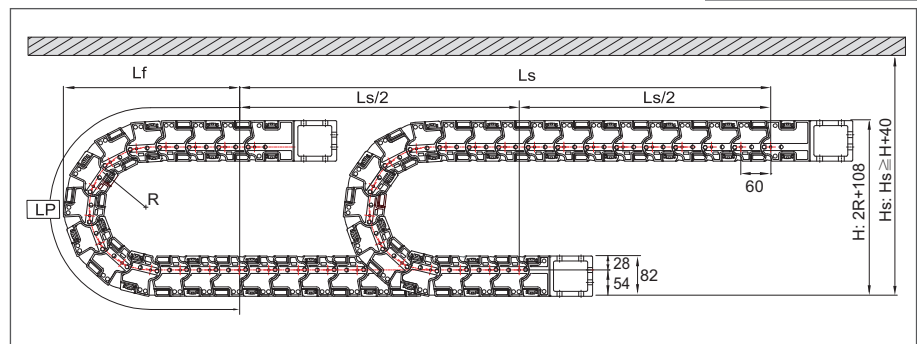
» Other installation length

Vertical curve above = max 6.0m
 Vertical curve below = max 100m
 Side Mounted, Unsupported = max 3.0m

» Load diagrams self-supporting length



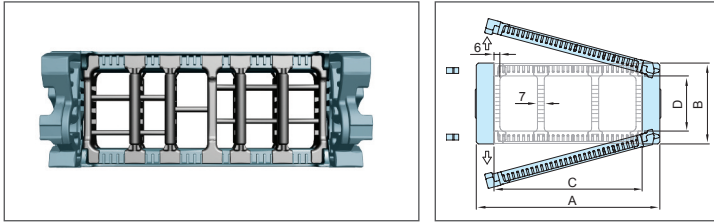
» Layout of the chain



Bending Radius (R)	Lp Loop Length	Lf Loof Projection	H Moving Height
125	854	389	358
140	901	404	388
190	1,058	454	488
220	1,152	484	548
270	1,309	574	648
390	1,686	654	888

(Dimensions in mm)

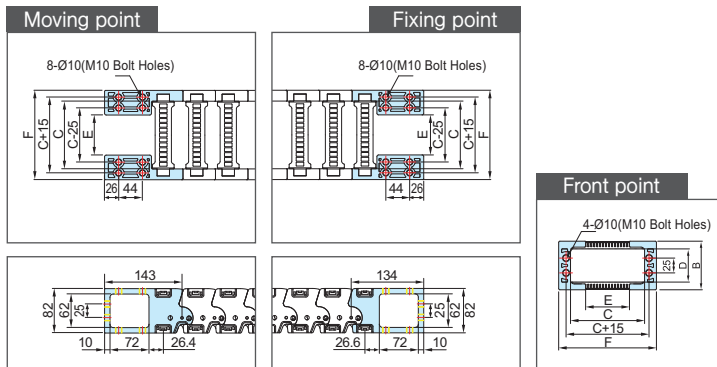
» Chain cross section



Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
nsb 060CR	115	82	75	55	3.56
	140		100		3.66
	165		125		3.97
	190		150		4.16
	215		175		4.33
	230		190		4.52
	240		200		4.64
	270		230		4.90
	280		240		4.98
	290		250		5.06
	340		300		5.48
	390		350		6.09
	440		400		6.66

(Dimensions in mm)

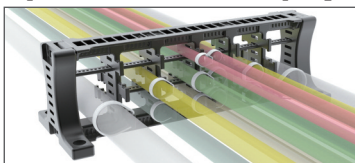
» Free end bracket



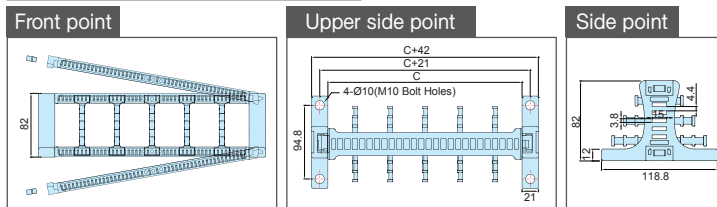
Chain Type	F Width(Outer)	B Height(Outer)	C Frame	D Height(Inner)	E M,EB Bolt hole width	Hole Type
nsb 060CR	115	82	75	55	24	M10 Bolt Holes
	140		100		49	
	165		125		74	
	190		150		99	
	215		175		124	
	230		190		139	
	240		200		149	
	270		230		179	
	280		240		189	
	290		250		199	
	340		300		249	
	390		350		299	
	440		400		349	

(Dimensions in mm)

» System tie wrap (STW)



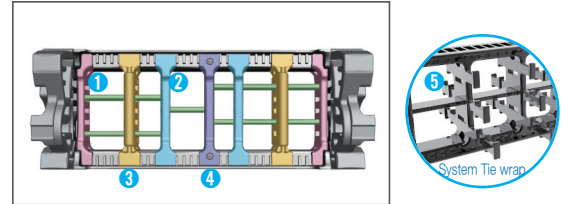
It is a unit to classify each cable for preventing entanglement of cables. It can either be installed to free end bracket or installed separately according its application environment.



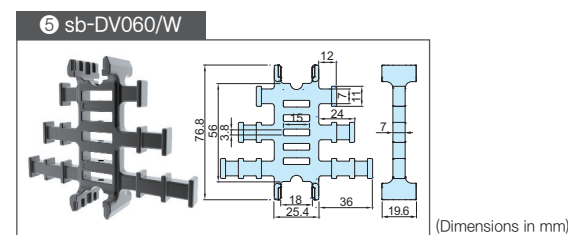
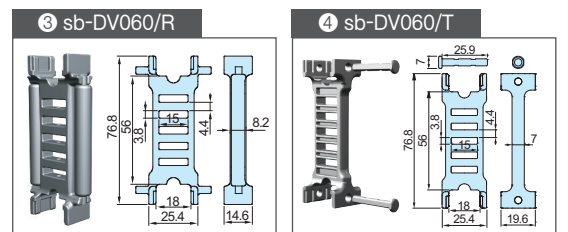
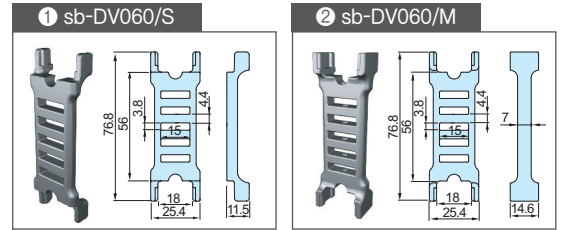
Chain Type	Ordering No.	C Frame	Hole Type
nsb 060CR	S-TW,EB060.75	75	M10 Bolt Holes
	S-TW,EB060.100	100	
	S-TW,EB060.125	125	
	S-TW,EB060.150	150	
	S-TW,EB060.175	175	
	S-TW,EB060.190	190	
	S-TW,EB060.200	200	
	S-TW,EB060.230	230	
	S-TW,EB060.240	240	
	S-TW,EB060.250	250	
	S-TW,EB060.300	300	
	S-TW,EB060.350	350	
	S-TW,EB060.400	400	

(Dimensions in mm)

» Dividers(DV)

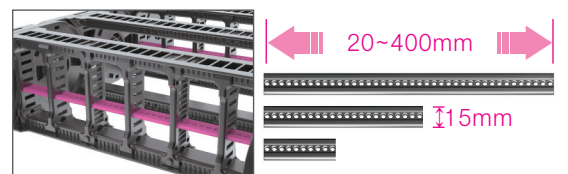


Assemble divider every second frame.
DV.T : Applied to Frame 250~400.
DV.M : Normal Divider.
DV.W : Applicable to System Tie Wrap or FEB.



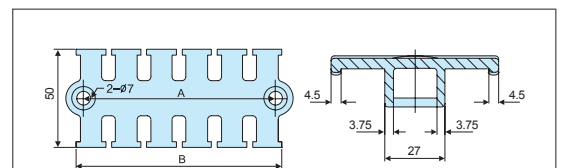
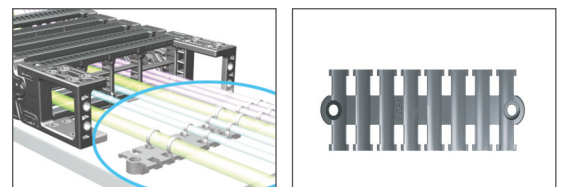
(Dimensions in mm)

» Separators(SP)



Chain Type	Ordering NO.
nsb 060CR	sb-SP/400,400

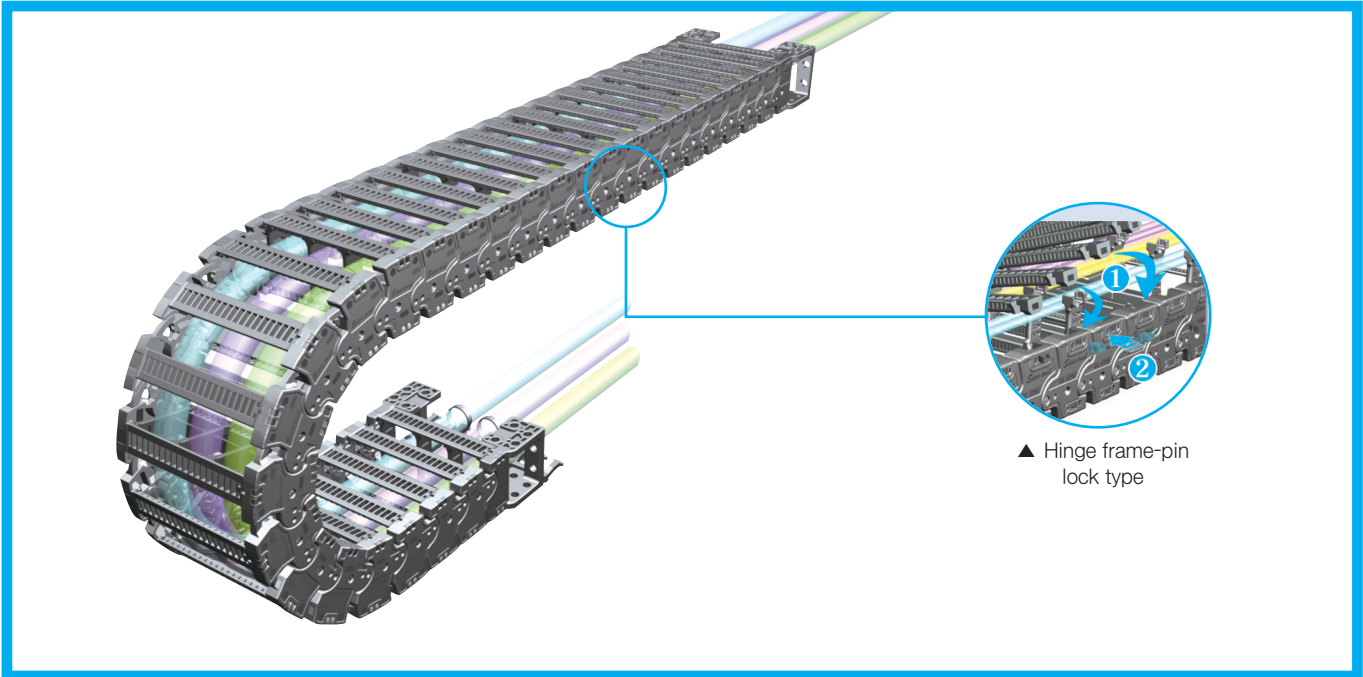
» Tie wrap (TW)



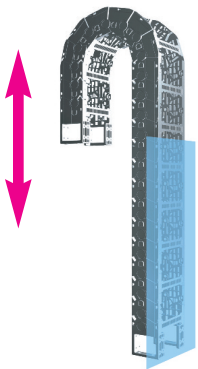
Chain Type	Ordering No.	A	B
nsb 060CR	S-TW50	58	65
	S-TW75	75	82
	S-TW100	98	105
	S-TW125	122	129
	S-TW150	141	148

(Dimensions in mm)

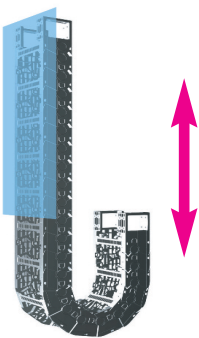
nsb 075CR



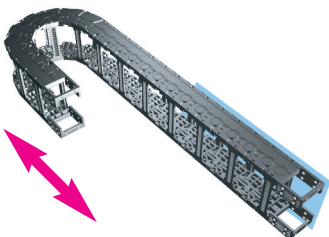
▲ Hinge frame-pin lock type



Vertical with curve above



Vertical with curve below



Horizontal application mounted on its side

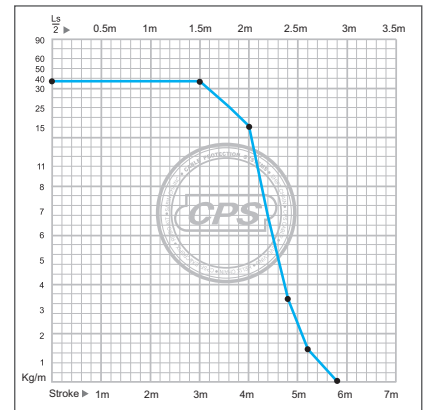
» Calculation of the chain length

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

» Other installation length

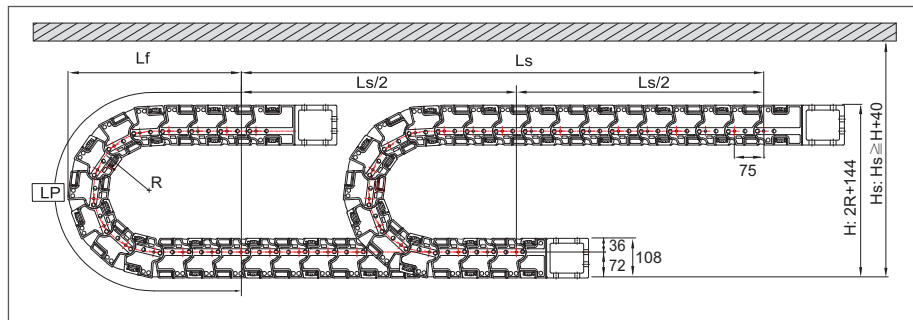
Vertical curve above = max 6.0m
 Vertical curve below = max 100m
 Side Mounted, Unsupported = max 3.0m

» Load diagrams self-supporting length



» Layout of the chain

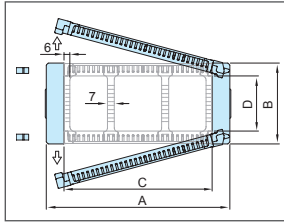
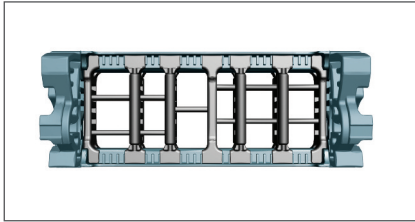
Ls: Stroke Hs: Safe Space



Bending Radius (R)	Lp Loop Length	Lf Loop Projection	H Moving Height
180	1,147	515	504
200	1,210	535	544
250	1,367	585	644
300	1,524	635	744
350	1,681	685	844
400	1,838	735	944
500	2,152	835	1,144

(Dimensions in mm)

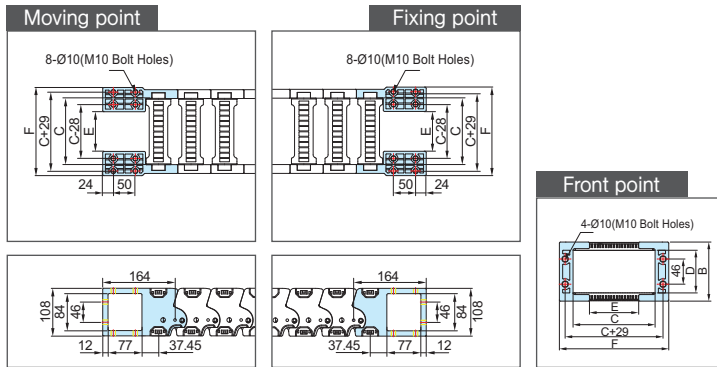
» Chain cross section



Chain Type	A Width (Outer)	B Height (Outer)	C Frame	D Height (Inner)	Weight kg/m
nsb 075CR	115	108	75	78	5.37
	140		100		5.57
	155		115		5.72
	165		125		5.82
	190		150		6.01
	215		175		6.26
	240		200		6.68
	280		240		7.11
	290		250		7.22
	330		290		7.80
	340		300		7.94
	390		350		8.67
	440		400		9.43
	490		450		10.01
	540		500		10.41
	590		550		11.88
640	600	12.17			

(Dimensions in mm)

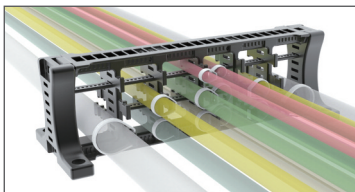
» Free end bracket



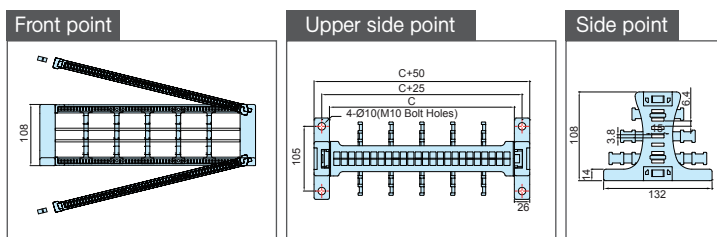
Chain Type	A Width(Outer)	B Height(Outer)	C Frame	D Height(Inner)	E MEB Bolt hole width	Hole Type
nsb 075CR	125	108	75	78	15	M10 Bolt Holes
	150		100		40	
	165		115		55	
	175		125		65	
	200		150		90	
	225		175		115	
	250		200		140	
	290		240		180	
	300		250		190	
	340		290		230	
	350		300		240	
	400		350		290	
	450		400		340	
	500		450		390	
	550		500		440	
	600		550		490	
650	600	540				

(Dimensions in mm)

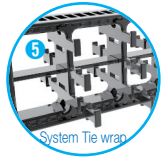
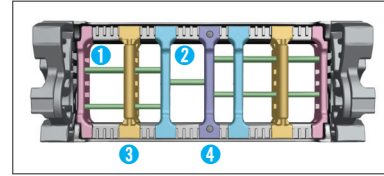
» System tie wrap (STW)



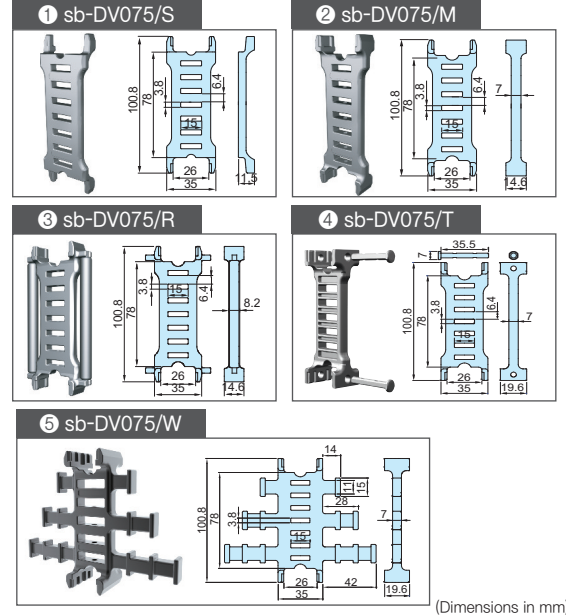
It is a unit to classify each cable for preventing entanglement of cables. It can either be installed to free end bracket or installed separately according its application environment.



» Dividers(DV)

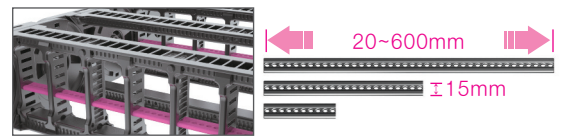


Assemble divider every second frame.
DV.T : Applied to Frame 300~600.
DV.M : Normal Divider.
DV.W : Applicable to System Tie Wrap or FEB.



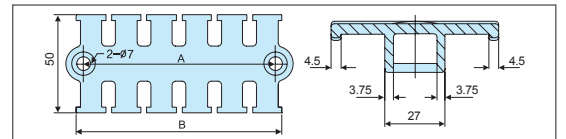
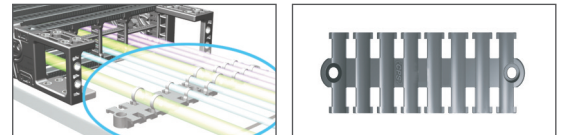
(Dimensions in mm)

» Separators(SP)



Chain Type	Ordering NO.
nsb 075CR	sb-SP/600,600

» Tie wrap (TW)



Chain Type	Ordering No.	A	B
nsb 075CR	S-TW50	58	65
	S-TW75	75	82
	S-TW100	98	105
	S-TW125	122	129
	S-TW150	141	148

Chain Type	Ordering No.	C Frame	Hole Type
nsb 075CR	S-TW,EB075_75	75	M10 Bolt Holes
	S-TW,EB075_100	100	
	S-TW,EB075_115	115	
	S-TW,EB075_125	125	
	S-TW,EB075_150	150	
	S-TW,EB075_175	175	
	S-TW,EB075_200	200	
	S-TW,EB075_240	240	
	S-TW,EB075_250	250	
	S-TW,EB075_290	290	
	S-TW,EB075_300	300	
	S-TW,EB075_350	350	
	S-TW,EB075_400	400	
	S-TW,EB075_450	450	
	S-TW,EB075_500	500	
	S-TW,EB075_550	550	
S-TW,EB075_600	600		