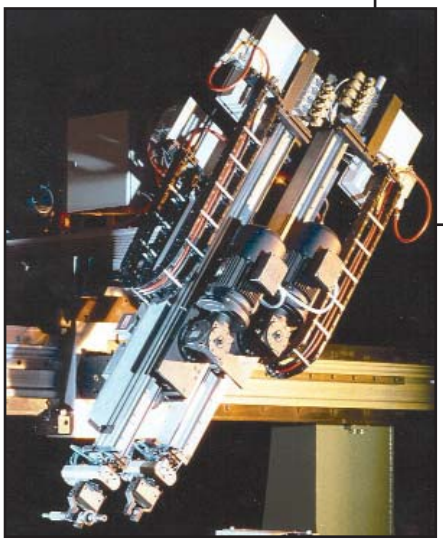
LAPP GROUP

LAPP USA

Guide to Design and Selection of Cable Management & Track



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APPLICATION

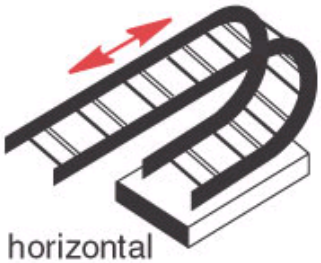
- Know the requirements & the limitations of equipment
- Design and Selection of cable management products & accessories
- Installation Variations: Which fits the best?

CABLE TRACK MOVEMENT VARIATIONS

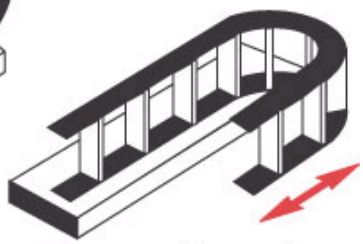
Know the requirements & limitation of Equipment

hanging vertically

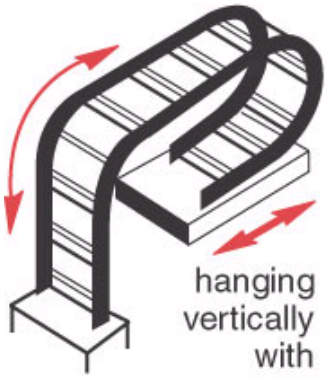
standing vertically



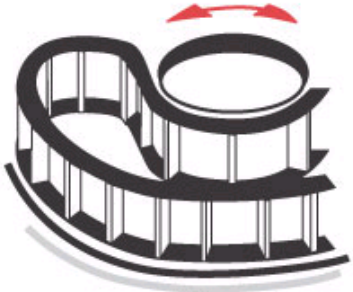
horizontal (standard)



side mount/operating



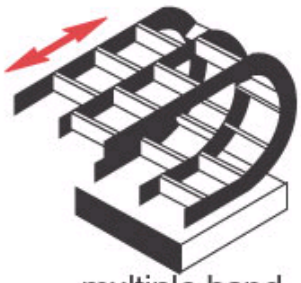
hanging vertically with bearing bolts



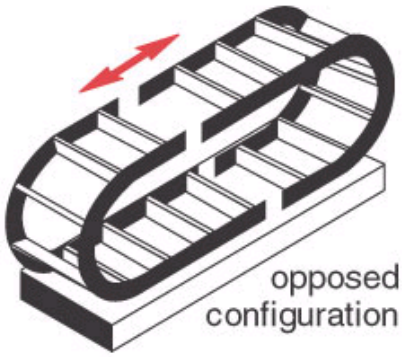
rotated by 90° circular side mount

multiple axis (combined horizontal/vertical)

nested configuration



multiple band configuation



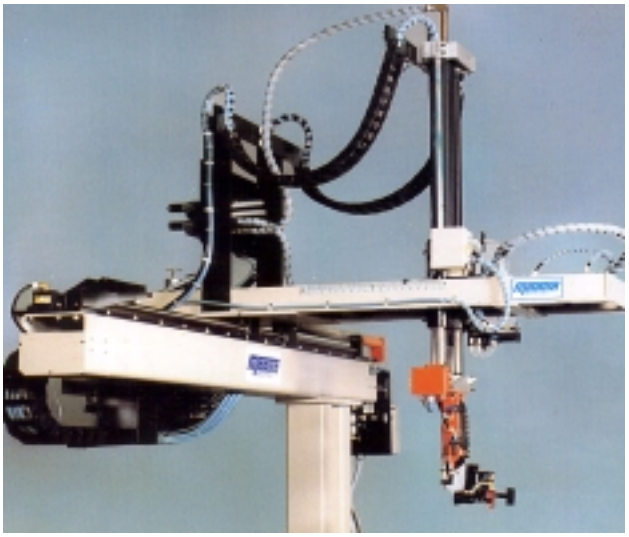
opposed configuration

VARIOUS TYPES OF CABLE TRACKS

- **Plastic** (Nylon)
  * Chemical * Cheaper * Flexible and not as rigid *Lighter in weight
- **Metal (**Zinc Plated Steel**)**
  * Needs less support * Operating higher temperature * Durable in harsh environment

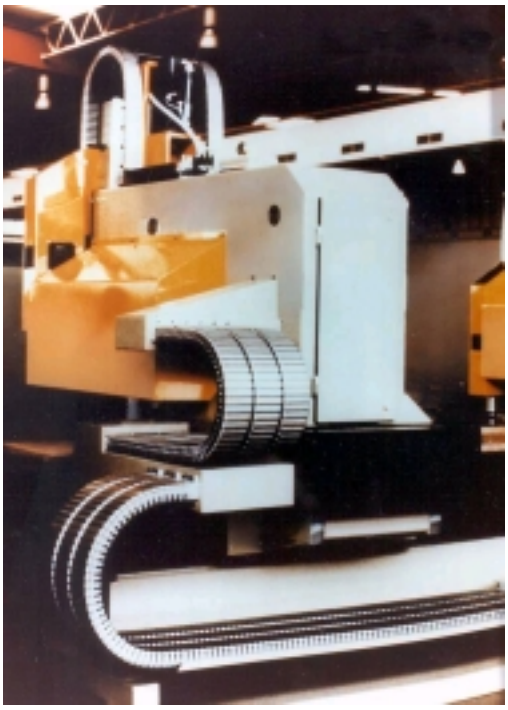
PLASTIC CABLE TRACK

Nylon: Chemical Resistant, Cheaper, Flexible, Lighter in weight



METAL CABLE TRACK

Zinc Plated Steel: Needs less support, higher operating temperature, durable in harsh environment



TYPES OF ACCESSORIES

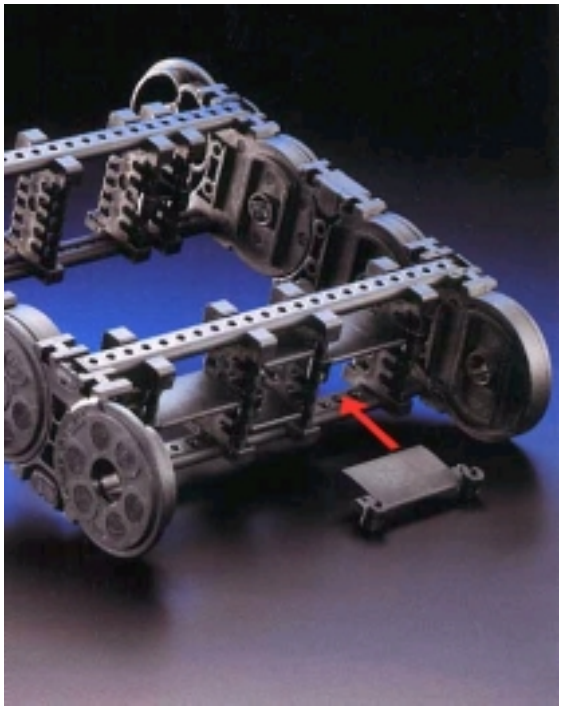
- Divider: Nylon: Verticals (more common) & Horizontal
- Brackets: Nylon (one or two piece) , Metals (two pieces)
- Standard Frame Stay:
  - Nylon –Standard, In/Out Hinges
  - Cover Strip
  - RL/RV - Twist In/Out Aluminum Bar
  - RS – Bolted Aluminum
  - RM – Heavy duty bolted on aluminum bar

Products we offer

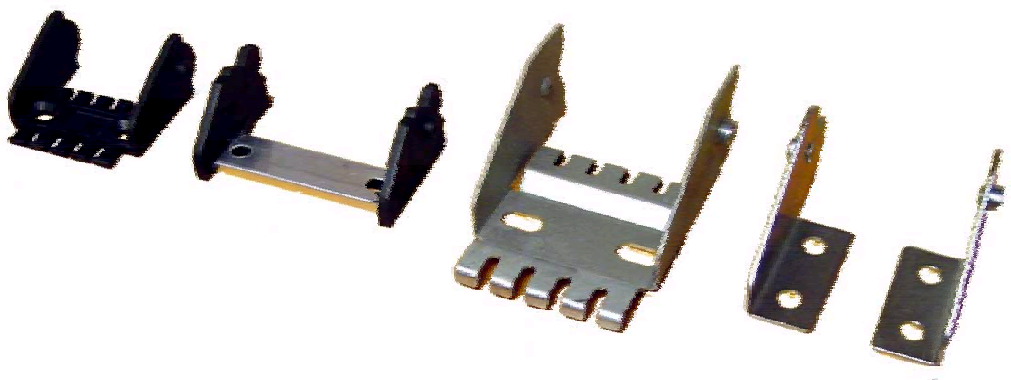
Versa Trax, Plastitrak
Plastitrak Model 32
Varitrak, 650K, 900K
Available in the industry
Available in the industry

- Metal Guide Channels - for support & guides of the track, available in the industry - too costly

PLASTIC DIVIDERS: HORIZONTAL & VERTICAL



METAL & PLASTIC BRACKETS

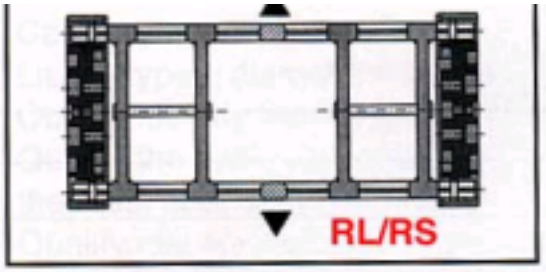


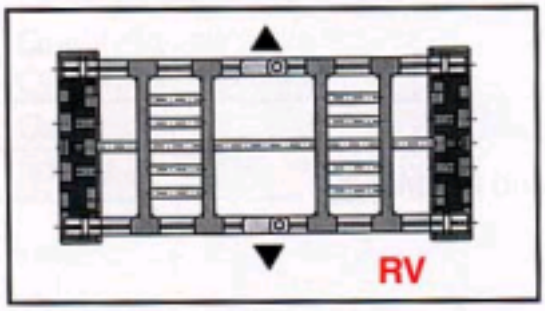
TYPES OF ACCESSORIES

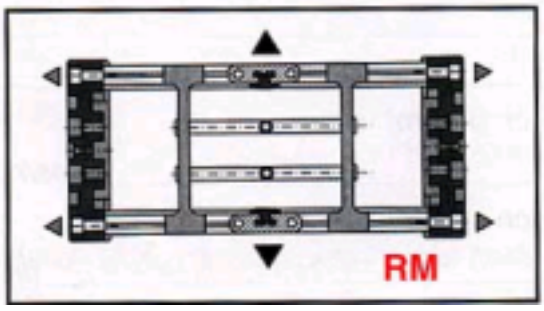
FRAME STAY

Nylon- In/ Out Hinges

Cover Strip- Plastic







RL/RV- Twist in/ Out Aluminum Bar

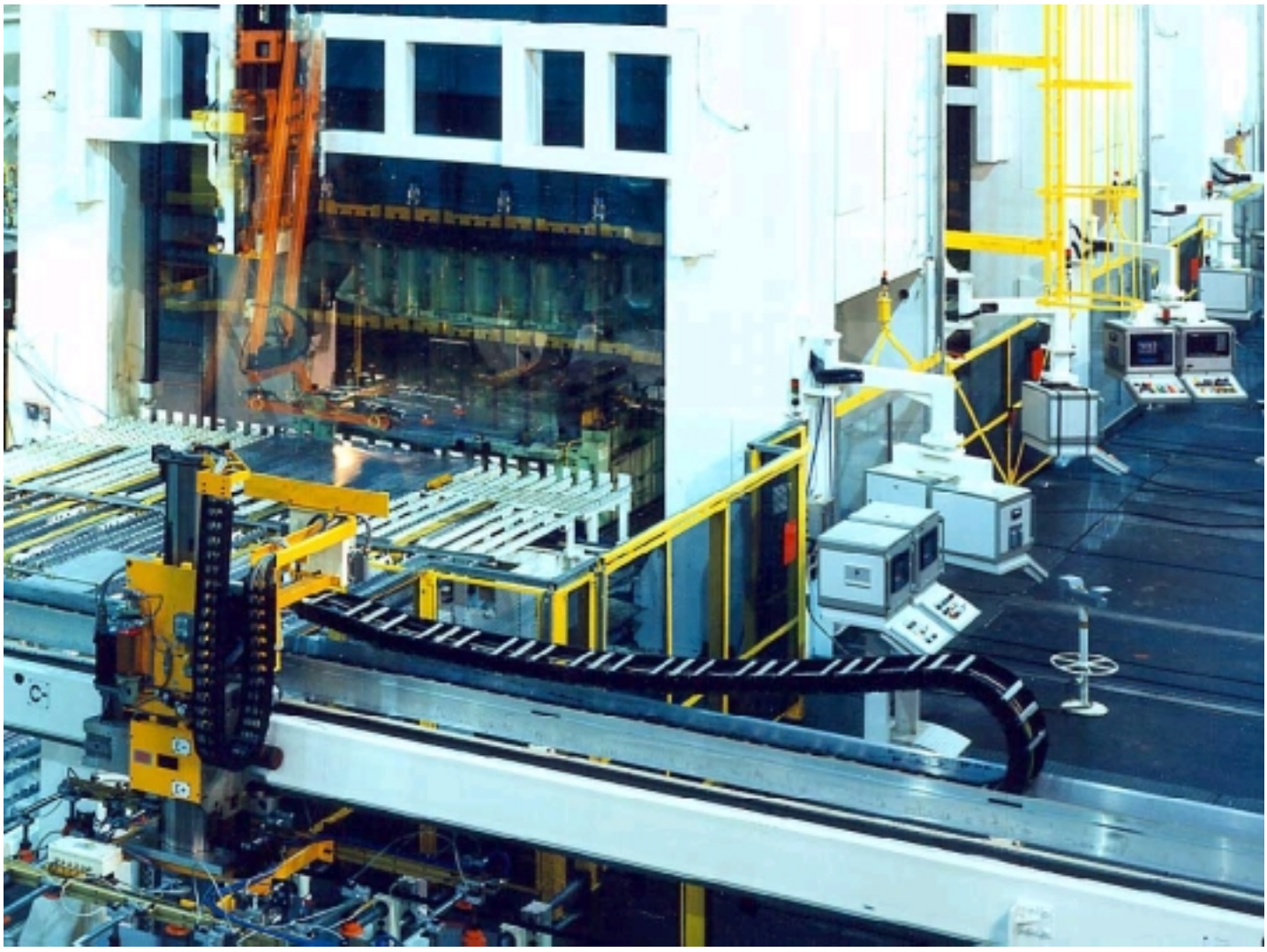
RS- Bolted Aluminum Bar

RM- Heavy Duty Bolted Aluminum Bar

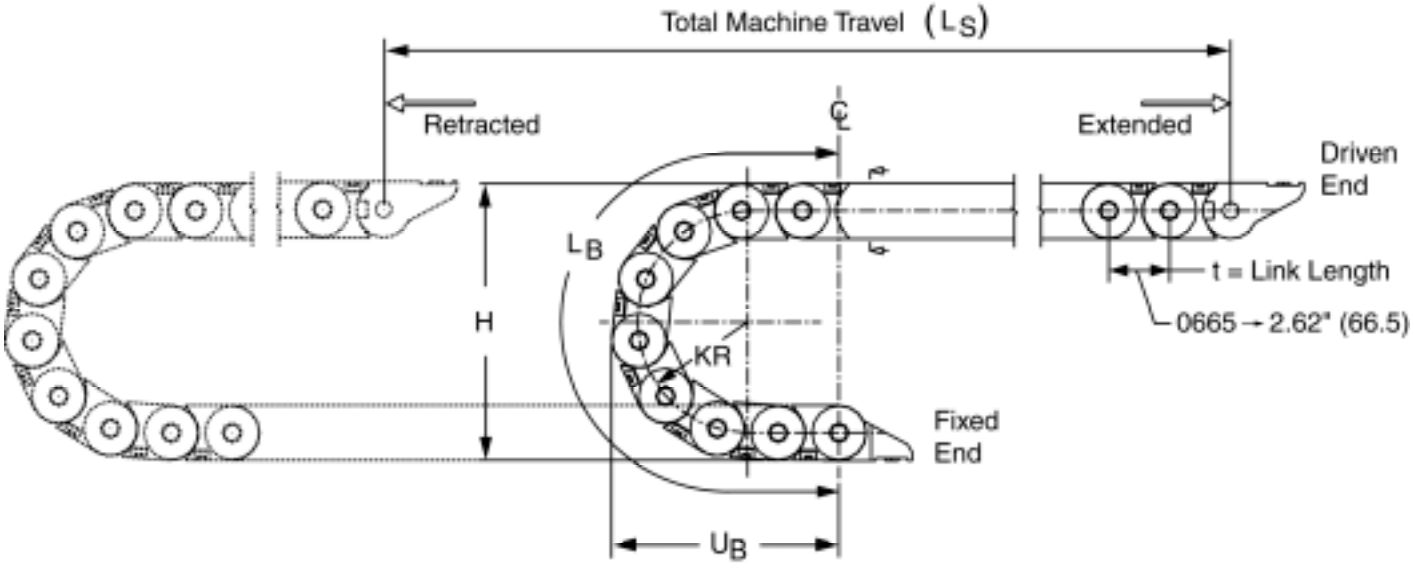
TYPES OF ACCESSORIES

METAL GUIDE CHANNELS

Supports and guides the cable track

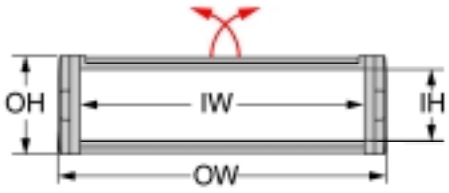


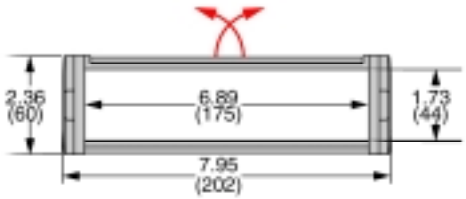
FUNDAMENTALS & ABBREVIATIONS



L_S = Total Travel Length
L_B = Loop Length
KR = Bend Radius
H = Mounting Height
U_B = Depot

For Example - 0665.030.175

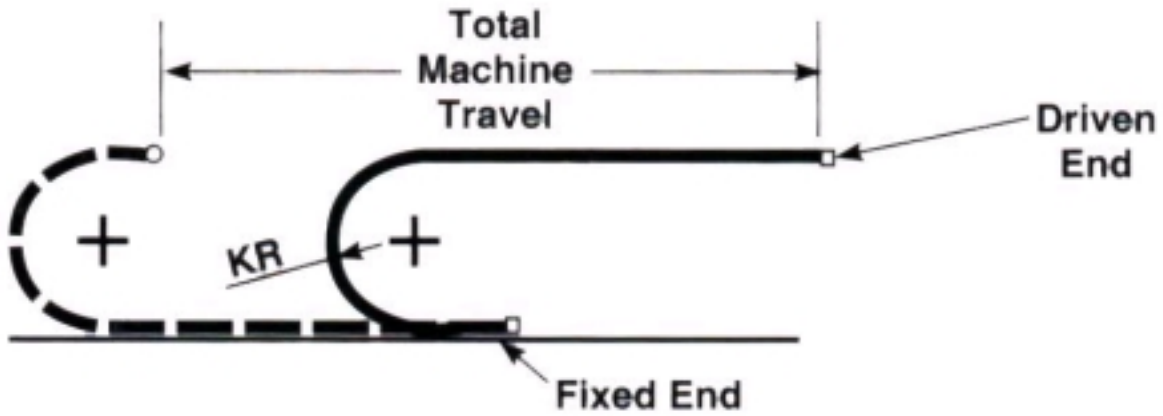




IW = Inside Width
OW = Outside Width
IH = Inside Height
OH = Outside Height
KR = Bend Radius
H = Mounting Height

DETERMINE THE AMOUNT OF TRACK NEEDED

- Determine the travel length & type of mount center or off center
- Determine the fixed and moving motion & Type of movement



Formulas:

Center Mounting (**CM**): **CM** = (Ls / 2) + Lb # of links = CM / t

Off-Center Mounting (**OCM**): **OCM** = (Ls / 2) + Off-center + Lb # of links = OCM / t

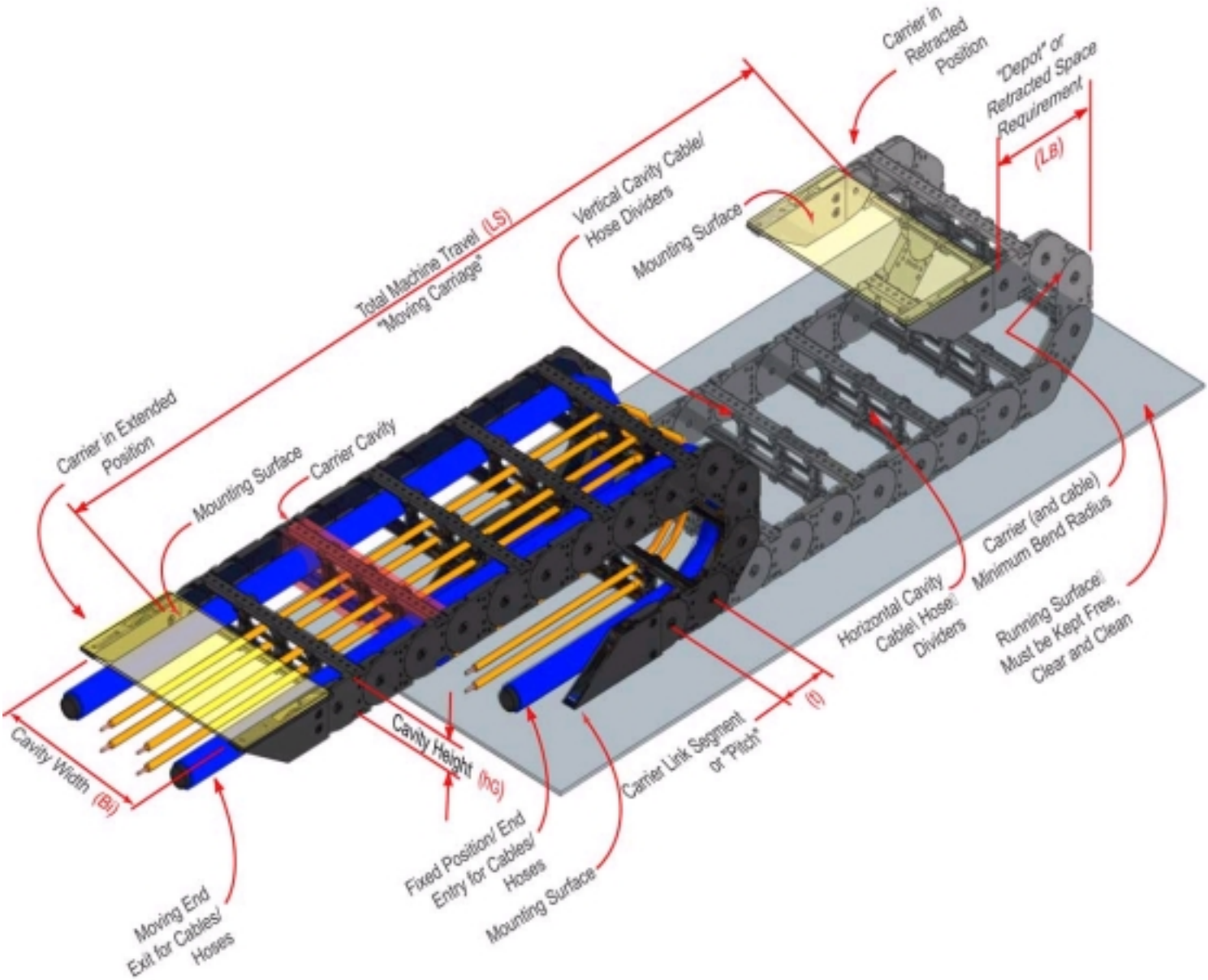
DETERMINE THE PROPER CARRIER TYPE AND SIZE

- Determine the minimum bend radius of the components inside the track .
  Choose a track that is slightly larger than minimum bend radius:
- Rule of thumb: The **cable** manufacturer will assign minimum radius.
  For **hoses** it should be 5 x diameter, **hydraulic** lines: 7.5 x diameter, confirm with customer
- **Width** clearances for **cable** inside the cable track is **10**%, for **hoses** is **20%**
- **Height** clearance for **cable & hoses** is approx. **20**%
- Distribute the weight inside the track and put the heavy components on the outside
- Calculate the weight of components inside the track
- Check Travel length for unsupported length (optional)
- Select the proper carrier type and size for the application

RULES FOR DIVIDERS

- Use when there is more than 3 conductors
- Separate the cables and hoses inside the cavity so they can move independently
- Every customer may have their own preferences on dividers, Ask the question?
- Every other link

DESIGN & FUNDAMENTALS OF CABLE TRACK



OLFLEX® Cable Track

Nylon Cable Track for Industrial Applications

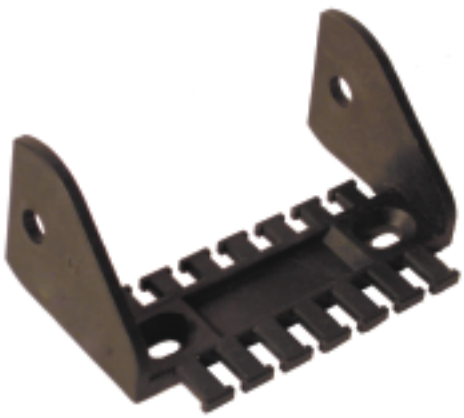
OLFLEX® Cable Tracks are designed to maintain cable alignment in continuous-flexing applications. With proper cable selection and installation (See Page 678), OLFLEX® Cable Tracks increase the life of cable and hoses by protecting them from mechanical wear and stress. The tracks are simple to assemble and install, reducing downtime, and greatly improving machine operation and appearance. OLFLEX® Cable Track is resistant to oils, gasoline, and coolants. Custom designs are readily available.

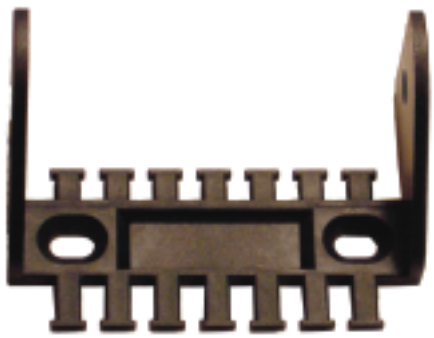
These modular tracks are designed to offer the maximum usable internal dimensions with the smallest overall envelope, assuring compact and efficient space utilization and unparalleled application flexibility.

Features

- Glass Fiber/ Reinforced Nylon 6 Material
- Hinged Top for Easy Installation
- Integral Strain Relief on the Brackets

- Wide Range of Bend Radii (.79” to 11.81”)
- Wide Range for the Inside Width (.24” to 9.84”)





OLFLEX® Cable Track

Nylon Cable Track for Industrial Applications

Model 13

Inside Height (IH): .39”
Outside Height (OH): .49”
Links Length: 0.51”
Links/ ft: 24

Part Number	Inside Width (IW) inches	Outside Width (OW) inches	Mounting Height inches	Loop Length inches	Mounting Bracket* Moving End	Mounting Bracket* Stationary End
Bend Radius- 0.79”						
132408	.24	.48	2.1	3.5	300SR	301SR
133908	.39	.63	2.1	3.5	302SR	303SR
135908	.59	.83	2.1	3.5	304SR	305SR
137908	.79	1.03	2.1	3.5	306SR	307SR
Bend Radius- 1.10”						
132411	.24	.48	2.7	4.5	300SR	301SR
133911	.39	.63	2.7	4.5	302SR	303SR
135911	.59	.83	2.7	4.5	304SR	305SR
137911	.79	1.03	2.7	4.5	306SR	307SR
Bend Radius- 1.46”						
132415	.24	.48	3.5	5.6	300SR	301SR
133915	.39	.63	3.5	5.6	302SR	303SR
135915	.59	.83	3.5	5.6	304SR	305SR
137915	.79	1.03	3.5	5.6	306SR	307SR

* Mounting brackets are sold in pairs (one moving end and one stationary end).

Model 32

Inside Height (IH): 0.75”
Outside Height (OH): 1.06”
Links Length: 1.26”
Links/ ft: 9.5

Part Number	Inside Width (IW) inches	Outside Width (OW) inches	Mounting Height inches	Loop Length inches	Mounting Bracket* Moving End	Mounting Bracket* Stationary End
Bend Radius- 1.46”						
320715C	.75	1.18	3.9	7.2	320SR	321SR
320915C	.94	1.37	3.9	7.2	322SR	323SR
320915*	.94	1.37	3.9	7.2	322SR	323SR
321115C	1.14	1.57	3.9	7.2	324SR	325SR
321515C	1.46	1.89	3.9	7.2	326SR	327SR
Bend Radius-1.85”						
320719C	.75	1.18	4.7	8.4	320SR	321SR
320919C	.94	1.37	4.7	8.4	322SR	323SR
321119C	1.14	1.57	4.7	8.4	324SR	325SR
321519C	1.46	1.89	4.7	8.4	326SR	327SR
Bend Radius- 3.03”						
320730C	.75	1.18	7.1	12.1	320SR	321SR
320930C	.94	1.37	7.1	12.1	322SR	323SR
320930*	.94	1.37	7.1	12.1	322SR	323SR
321130C	1.14	1.57	7.1	12.1	324SR	325SR
321530C	1.46	1.89	7.1	12.1	326SR	327SR

* Mounting brackets are sold in pairs (one moving end and one stationary end).

** These models have a cover strip versus completely enclosed.

OLFLEX® Cable Track

Nylon Cable Track for Industrial Applications

Model 45

Inside Height (IH): 0.94”
Outside Height (OH): 1.57”
Links Length: 1.77”
Links/ ft: 6.8

Part Number	Inside Width (IW) inches	Outside Width (OW) inches	Mounting Height inches	Loop Length inches	Mounting Bracket* Moving End	Mounting Bracket* Stationary End	Divider
Bend Radius- 2.05”							
451520	1.5	2.1	5.7	10.0	890SR	900SR	720
452320	2.3	2.9	5.7	10.0	968SR	969SR	720
453120	3.1	3.7	5.7	10.0	993SR	994SR	720
454120	4.1	4.7	5.7	10.0	130SR	131SR	720
Bend Radius- 3.70”							
451537	1.5	2.1	9.0	15.2	890SR	900SR	720
452337	2.3	2.9	9.0	15.2	968SR	969SR	720
453137	3.1	3.7	9.0	15.2	993SR	994SR	720
454137	4.1	4.7	9.0	15.2	130SR	131SR	720
Bend Radius- 4.92”							
451549	1.5	2.1	11.5	19.0	890SR	900SR	720
452349	2.3	2.9	11.5	19.0	968SR	969SR	720
453149	3.1	3.7	11.5	19.0	993SR	994SR	720
454149	4.1	4.7	11.5	19.0	130SR	131SR	720
Bend Radius- 5.91”							
451559	1.5	2.1	13.4	22.1	890SR	900SR	720
452359	2.3	2.9	13.4	22.1	968SR	969SR	720
453159	3.1	3.7	13.4	22.1	993SR	994SR	720
454159	4.1	4.7	13.4	22.1	130SR	131SR	720

* Mounting brackets are sold in pairs (one moving end and one stationary end).

Model 625

Inside Height (IH): 1.65”
Outside Height (OH): 2.44”
Links Length: 2.46”
Links/ ft: 4.9

Part Number	Inside Width (IW) inches	Outside Width (OW) inches	Mounting Height inches	Loop Length inches	Mounting Bracket* Moving End	Mounting Bracket* Stationary End	Divider
Bend Radius- 3.54”							
6252635	2.6	3.70	9.3	16.1	624SR	625SR	784
6254235	4.2	5.40	9.3	16.1	644SR	645SR	784
6254935	4.9	6.00	9.3	16.1	654SR	655SR	784
6255935	5.9	7.00	9.3	16.1	664SR	665SR	784
6256635	6.6	7.80	9.3	16.1	674SR	675SR	784
Bend Radius- 4.92”							
6252649	2.6	3.70	12.1	20.4	624SR	625SR	784
6254249	4.2	5.40	12.1	20.4	644SR	645SR	784
6254949	4.9	6.00	12.1	20.4	654SR	655SR	784
6255949	5.9	7.00	12.1	20.4	664SR	665SR	784
6256649	6.6	7.80	12.1		674SR	675SR	784
Bend Radius- 7.87”							
6252679	2.6	3.70	18.0	29.7	624SR	625SR	784
6254279	4.2	5.40	18.0	29.7	644SR	645SR	784
6254979	4.9	6.00	18.0	29.7	654SR	655SR	784
6255979	5.9	7.00	18.0	29.7	664SR	665SR	784
6256679	6.6	7.80	18.0	29.7	674SR	675SR	784
Bend Radius- 11.81							
6252612	2.6	3.70	25.9	42.1	624SR	625SR	784
6254212	4.2	5.40	25.9	42.1	644SR	645SR	784
6254912	4.9	6.00	25.9	42.1	654SR	655SR	784
6255912	5.9	7.00	25.9	42.1	664SR	665SR	784
6256612	6.6	7.80	25.9	42.1	674SR	675SR	784

* Mounting brackets are sold in pairs (one moving end and one stationary end).

OLFLEX® Smooth Track

Smoother Flexing Track for Longer Self-Supporting Lengths

OLFLEX® Smooth Track has a new sideband link cable carrier design that dramatically increase the rigidity and unsupported lengths over standard plastic cable carriers. It allows for a smoother flexing track. This unique design has an available snap-in partitioning system to insure proper separation of cables and/ or hoses and reduce wear. The mounting brackets are supplied with an integral strain relief plate.

Features:

- Longer unsupported lengths
- Smoother flexing
- More durable hinge for longer flex life
- Hinged top for easy installation

Model 345

Inside Height (IH): 0.79”
Outside Height (OH): 1.10”
Links Length: 1.36”
Links/ ft: 8.8

	Inside Width (IW) inches	Outside Width (OW) inches	Mounting Height inches	Loop Length inches	Mounting Bracket* Moving End	Mounting Bracket* Stationary End	Divider
Bend Radius- 1.50”							
3451015	.98	1.50	4.1	7.5	404SR	405SR	560
3451515	1.50	2.01	4.1	7.5	406SR	407SR	560
3452015	1.97	2.48	4.1	7.5	408SR	409SR	560
3452615	2.56	3.07	4.1	7.5	410SR	411SR	560
Bend Radius- 1.97”							
3451020	.98	1.50	5.0	9.0	404SR	405SR	560
3451520	1.50	2.01	5.0	9.0	406SR	407SR	560
3452020	1.97	2.48	5.0	9.0	408SR	409SR	560
3452620	2.56	3.07	5.0	9.0	410SR	411SR	560
Bend Radius- 2.95”							
3451030	.98	1.50	7.0	12.0	404SR	405SR	560
3451530	1.50	2.01	7.0	12.0	406SR	407SR	560
3452030	1.97	2.48	7.0	12.0	408SR	409SR	560
3452630	2.56	3.07	7.0	12.0	410SR	411SR	560
Bend Radius- 3.94”							
3451040	.98	1.50	9.0	15.1	404SR	405SR	560
3451540	1.50	2.01	9.0	15.1	406SR	407SR	560
3452040	1.97	2.48	9.0	15.1	408SR	409SR	560
3452640	2.56	3.07	9.0	15.1	410SR	411SR	560
Bend Radius- 4.92”							
3451050	.98	1.50	10.9	18.2	404SR	405SR	560
3451550	1.50	2.01	10.9	18.2	406SR	407SR	560
3452050	1.97	2.48	10.9	18.2	408SR	409SR	560
3452650	2.56	3.07	10.9	18.2	410SR	411SR	560
Bend Radius- 5.91”							
3451060	.98	1.50	12.9	21.3	404SR	405SR	560
3451560	1.50	2.01	12.9	21.3	406SR	407SR	560
3452060	1.97	2.48	12.9	21.3	408SR	409SR	560
3452660	2.56	3.07	12.9	21.3	410SR	411SR	560

* Mounting brackets are sold in pairs (one moving end and one stationary end).

OLFLEX® Smooth Track

Smoother Flexing Track for Longer Self-Supporting Lengths

Model 455

Inside Height (IH): 1.02”
Outside Height (OH): 1.42”
Links Length: 1.79”
Links/ ft: 7.0

Part Number	Inside Width (IW) inches	Outside Width (OW) inches	Mounting Height inches	Loop Length inches	Mounting Bracket* Moving End	Mounting Bracket* Stationary End	Divider
Bend Radius- 2.05”							
4551520	1.50	2.20	5.5	10.0	422SR	423SR	561
4552320	2.28	2.99	5.5	10.0	424SR	425SR	561
4553020	3.07	3.78	5.5	10.0	426SR	427SR	561
4554020	4.05	4.76	5.5	10.0	428SR	429SR	561
4555120	5.12	5.83	5.5	10.0	430SR	431SR	561
Bend Radius- 2.56”							
4551525	1.50	2.20	6.6	11.7	422SR	423SR	561
4552325	2.28	2.99	6.6	11.7	424SR	425SR	561
4553025	3.07	3.78	6.6	11.7	426SR	427SR	561
4554025	4.05	4.76	6.6	11.7	428SR	429SR	561
4555125	5.12	5.83	6.6	11.7	430SR	431SR	561
Bend Radius- 3.74”							
4551537	1.50	2.20	8.9	15.4	422SR	423SR	561
4552337	2.28	2.99	8.9	15.4	424SR	425SR	561
4553037	3.07	3.78	8.9	15.4	426SR	427SR	561
4554037	4.05	4.76	8.9	15.4	428SR	429SR	561
4555137	5.12	5.83	8.9	15.4	430SR	431SR	561
Bend Radius- 4.92”							
4551550	1.50	2.20	11.3	19.1	422SR	423SR	561
4552350	2.28	2.99	11.3	19.1	424SR	425SR	561
4553050	3.07	3.78	11.3	19.1	426SR	427SR	561
4554050	4.05	4.76	11.3	19.1	428SR	429SR	561
4555150	5.12	5.83	11.3	19.1	430SR	431SR	561
Bend Radius-5.91”							
4551560	1.50	2.20	13.3	22.2	422SR	423SR	561
4552360	2.28	2.99	13.3	22.2	424SR	425SR	561
4553060	3.07	3.78	13.3	22.2	426SR	427SR	561
4554060	4.05	4.76	13.3	22.2	428SR	429SR	561
4555160	5.12	5.83	13.3	22.2	430SR	431SR	561
Bend Radius- 7.09”							
4551570	1.50	2.20	15.6	25.9	422SR	423SR	561
4552370	2.28	2.99	15.6	25.9	424SR	425SR	561
4553070	3.07	3.78	15.6	25.9	426SR	427SR	561
4554070	4.05	4.76	15.6	25.9	428SR	429SR	561
4555170	5.12	5.83	15.6	25.9	430SR	431SR	561
Bend Radius- 7.87”							
4551579	1.50	2.20	17.2	28.4	422SR	423SR	561
4552379	2.28	2.99	17.2	28.4	424SR	425SR	561
4553079	3.07	3.78	17.2	28.4	426SR	427SR	561
4554079	4.05	4.76	17.2	28.4	428SR	429SR	561
4555179	5.12	5.83	17.2	28.4	430SR	431SR	561
Bend Radius- 8.86”							
4551589	1.50	2.20	19.2	31.5	422SR	423SR	561
4552389	2.28	2.99	19.2	31.5	424SR	425SR	561
4553089	3.07	3.78	19.2	31.5	426SR	427SR	561
4554089	4.05	4.76	19.2	31.5	428SR	429SR	561
4555189	5.12	5.83	19.2	31.5	430SR	431SR	561

* Mounting brackets are sold in pairs (one moving end and one stationary end).

OLFLEX® Smooth Track

Smoother Flexing Track for Longer Self-Supporting Lengths

Model 555

Inside Height (IH): 1.50”
Outside Height (OH): 1.97”
Links Length: 2.19”
Links/ ft: 5.5

Part Number	Inside Width (IW) inches	Outside Width (OW) inches	Mounting Height inches	Loop Length inches	Mounting Bracket* Moving End	Mounting Bracket* Stationary End	Divider
Bend Radius- 2.48”							
5552025	1.97	2.84	7.0	12.2	440SR	441SR	564
5553025	2.95	3.82	7.0	12.2	442SR	443SR	564
5554025	3.94	4.81	7.0	12.2	444SR	445SR	564
5555025	4.92	5.79	7.0	12.2	446SR	447SR	564
5556025	5.91	6.78	7.0	12.2	448SR	449SR	564
Bend Radius- 3.15”							
5552031	1.97	2.84	8.3	14.3	440SR	441SR	564
5553031	2.95	3.82	8.3	14.3	442SR	443SR	564
5554031	3.94	4.81	8.3	14.3	444SR	445SR	564
5555031	4.92	5.79	8.3	14.3	446SR	447SR	564
5556031	5.91	6.78	8.3	14.3	448SR	449SR	564
Bend Radius- 3.94”							
5552040	1.97	2.84	9.9	16.8	440SR	441SR	564
5553040	2.95	3.82	9.9	16.8	442SR	443SR	564
5554040	3.94	4.81	9.9	16.8	444SR	445SR	564
5555040	4.92	5.79	9.9	16.8	446SR	447SR	564
5556040	5.91	6.78	9.9	16.8	448SR	449SR	564
Bend Radius- 4.92”							
5552050	1.97	2.84	11.9	19.9	440SR	441SR	564
5553050	2.95	3.82	11.9	19.9	442SR	443SR	564
5554050	3.94	4.81	11.9	19.9	444SR	445SR	564
5555050	4.92	5.79	11.9	19.9	446SR	447SR	564
5556050	5.91	6.78	11.9	19.9	448SR	449SR	564
Bend Radius- 6.30”							
5552063	1.97	2.84	14.6	24.2	440SR	441SR	564
5553063	2.95	3.82	14.6	24.2	442SR	443SR	564
5554063	3.94	4.81	14.6	24.2	444SR	445SR	564
5555063	4.92	5.79	14.6	24.2	446SR	447SR	564
5556063	5.91	6.78	14.6	24.2	448SR	449SR	564
Bend Radius- 7.87”							
5552079	1.97	2.84	17.8	29.2	440SR	441SR	564
5553079	2.95	3.82	17.8	29.2	442SR	443SR	564
5554079	3.94	4.81	17.8	29.2	444SR	445SR	564
5555079	4.92	5.79	17.8	29.2	446SR	447SR	564
5556079	5.91	6.78	17.8	29.2	448SR	449SR	564
Bend Radius- 9.06”							
5552090	1.97	2.84	20.1	32.9	440SR	441SR	564
5553090	2.95	3.82	20.1	32.9	442SR	443SR	564
5554090	3.94	4.81	20.1	32.9	444SR	445SR	564
5555090	4.92	5.79	20.1	32.9	446SR	447SR	564
5556090	5.91	6.78	20.1	32.9	448SR	449SR	564

* Mounting brackets are sold in pairs (one moving end and one stationary end).

OLFLEX® Smooth Track

Smoother Flexing Track for Longer Self-Supporting Lengths

Model 665

Inside Height (IH): 1.73”
Outside Height (OH): 2.36”
Links Length: 2.62”
Links/ ft: 4.6

Part Number	Inside Width (IW) inches	Outside Width (OW) inches	Mounting Height inches	Loop Length inches	Mounting Bracket* Moving End	Mounting Bracket* Stationary End	Divider
Bend Radius-2.95”							
6652030	1.97	3.03	8.3	14.6	460SR	461SR	567
6653030	2.95	4.01	8.3	14.6	462SR	463SR	567
6654030	3.94	5.00	8.3	14.6	464SR	465SR	567
6655030	4.92	5.98	8.3	14.6	466SR	467SR	567
6656030	5.91	6.97	8.3	14.6	468SR	469SR	567
6656930	6.89	7.95	8.3	14.6	470SR	471SR	567
6657930	7.87	8.93	8.3	14.6	472SR	473SR	567
6658930	8.86	9.92	8.3	14.6	474SR	475SR	567
6659930	9.84	10.90	8.3	14.6	478SR	479SR	567
Bend Radius- 3.94”							
6652040	1.97	3.03	10.3	17.7	460SR	461SR	567
6653040	2.95	4.01	10.3	17.7	462SR	463SR	567
6654040	3.94	5.00	10.3	17.7	464SR	465SR	567
6655040	4.92	5.98	10.3	17.7	466SR	467SR	567
6656040	5.91	6.97	10.3	17.7	468SR	469SR	567
6656940	6.89	7.95	10.3	17.7	470SR	471SR	567
6657940	7.87	8.93	10.3	17.7	472SR	473SR	567
6658940	8.86	9.92	10.3	17.7	474SR	475SR	567
6659940	9.84	10.90	10.3	17.7	478SR	479SR	567
Bend Radius- 4.72”							
6652047	1.97	3.03	11.9	20.1	460SR	461SR	567
6653047	2.95	4.01	11.9	20.1	462SR	463SR	567
6654047	3.94	5.00	11.9	20.1	464SR	465SR	567
6655047	4.92	5.98	11.9	20.1	466SR	467SR	567
6656047	5.91	6.97	11.9	20.1	468SR	469SR	567
6656947	6.89	7.95	11.9	20.1	470SR	471SR	567
6657947	7.87	8.93	11.9	20.1	472SR	473SR	567
6658947	8.86	9.92	11.9	20.1	474SR	475SR	567
6659947	9.84	10.90	11.9	20.1	478SR	479SR	567
Bend Radius- 5.51”							
6652055	1.97	3.03	13.4	22.6	460SR	461SR	567
6653055	2.95	4.01	13.4	22.6	462SR	463SR	567
6654055	3.94	5.00	13.4	22.6	464SR	465SR	567
6655055	4.92	5.98	13.4	22.6	466SR	467SR	567
6656055	5.91	6.97	13.4	22.6	468SR	469SR	567
6656955	6.89	7.95	13.4	22.6	470SR	471SR	567
6657955	7.87	8.93	13.4	22.6	472SR	473SR	567
6658955	8.86	9.92	13.4	22.6	474SR	475SR	567
6659959	9.84	10.90	13.4	22.6	478SR	479SR	567
Bend Radius- 7.87”							
6652079	1.97	3.03	18.2	30.0	460SR	461SR	567
6653079	2.95	4.01	18.2	30.0	462SR	463SR	567
6654079	3.94	5.00	18.2	30.0	464SR	465SR	567
6655079	4.92	5.98	18.2	30.0	466SR	467SR	567
6656079	5.91	6.97	18.2	30.0	468SR	469SR	567
6656979	6.89	7.95	18.2	30.0	470SR	471SR	567
6657979	7.87	8.93	18.2	30.0	472SR	473SR	567
6658979	8.86	9.92	18.2	30.0	474SR	475SR	567
6659979	9.84	10.90	18.2	30.0	478SR	479SR	567

* Mounting brackets are sold in pairs (one moving end and one stationary end).

OLFLEX® Smooth Track

Smoother Flexing Track for Longer Self-Supporting Lengths

Model 665

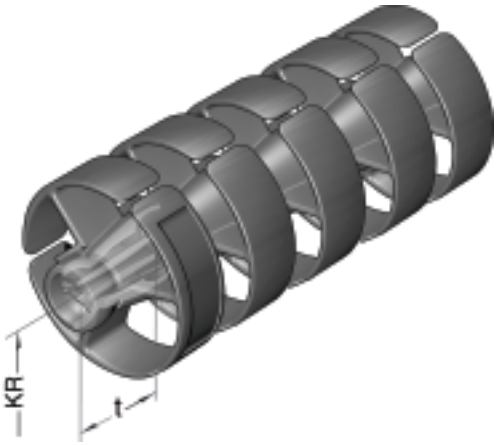
	Inside Width (IW) inches	Outside Width (OW) inches	Mounting Height inches	Loop Length inches	Mounting Bracket* Moving End	Mounting Bracket* Stationary End	Divider
Bend Radius- 9.84”							
6652099	1.97	3.03	22.1	36.2	460SR	461SR	567
6653099	2.95	4.01	22.1	36.2	462SR	463SR	567
6654099	3.94	5.00	22.1	36.2	464SR	465SR	567
6655099	4.92	5.98	22.1	36.2	466SR	467SR	567
6656099	5.91	6.97	22.1	36.2	468SR	469SR	567
6656999	6.89	7.95	22.1	36.2	470SR	471SR	567
6657999	7.87	8.93	22.1	36.2	472SR	473SR	567
6658999	8.86	9.92	22.1	36.2	474SR	475SR	567
6659999	9.84	10.90	22.1	36.2	478SR	479SR	567
Bend Radius- 11.8”							
6652011	1.97	3.03	26.0	42.4	460SR	461SR	567
6653011	2.95	4.01	26.0	42.4	462SR	463SR	567
6654011	3.94	5.00	26.0	42.4	464SR	465SR	567
6655011	4.92	5.98	26.0	42.4	466SR	467SR	567
6656011	5.91	6.97	26.0	42.4	468SR	469SR	567
6656911	6.89	7.95	26.0	42.4	470SR	471SR	567
6657911	7.87	8.93	26.0	42.4	472SR	473SR	567
6658911	8.86	9.92	26.0	42.4	474SR	475SR	567
6659911	9.84	10.90	26.0	42.4	478SR	479SR	567

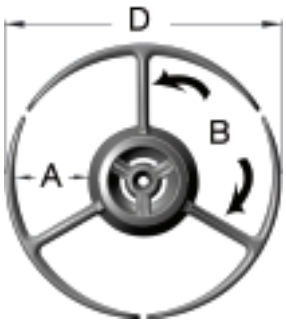
* Mounting brackets are sold in pairs (one moving end and one stationary end).

OLFLEX® Robot 900 Track

Robotic Cable Track for Torsion Applications

OLFLEX® Robot 900 Track is designed for 3D movement with a torsion capability of 215° to 450°. OLFLEX® Robot 900 Track has a split entry design for easy cable installation and replacement. It also has three compartments allowing for seperation of your cables and hoses for optimum performance.



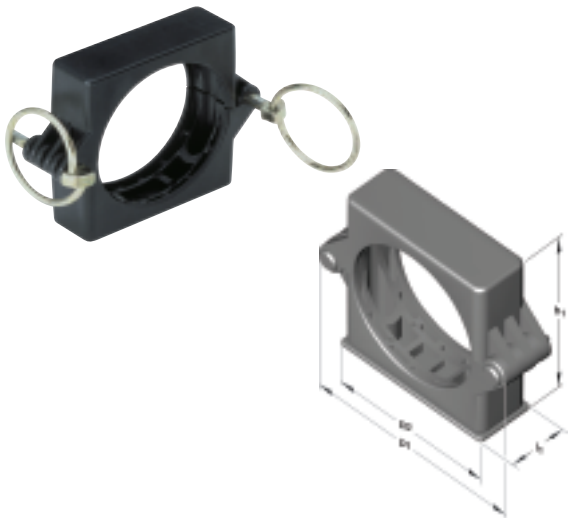


Part Number	Bend Radius	Cable Hose Diameter inches	Cavity (3 sections per link) Height (A) inches	Cavity (3 sections per link) Length (B) inches	Outside Dimensions Width (D) inches	Outside Dimensions Link (t) inches	Torsion (1m length)
R04031	3.14	.079 - .334	.394	1.06	1.57	.846	450°
R05645	4.53	.079 - .433	.551	1.54	2.21	1.26	300°
R07557	5.71	.118 - .709	.866	2.05	2.95	1.57	215°
R08569	6.89	.118 - .787	.945	2.13	3.35	1.57	215°
R10077	7.68	.118 - 1.063	1.22	2.52	3.94	1.57	215°

Components

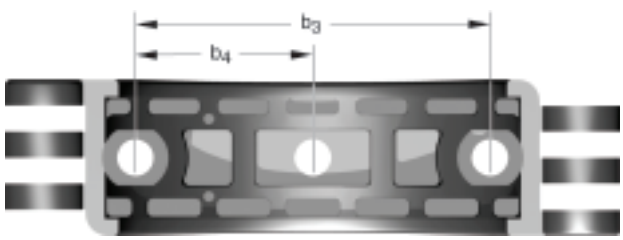
Track Part Number	Bracket	Metal Shim Bolt*	Steel Wire	Rubber Bumper with Tie Wrap	Strain Relief	Protective Sheath Heat	Protective Sheath Dirt	Tightening Chuck
R04031	260410	260420	60583	na	60658	60801	60806	260430
R05645	260510	260520	60584	na	60657	60802	60807	260530
R07557	260110	260220	60580	260120	60659	60803	60808	260230
R08569	260210	260220	60580	260240	60659	60804	60809	260230
R10077	260310	260220	60581	260340	60659	60805	60810	260330

*2 pieces are required per track of the metal shim bolt



Mounting Bracket

Part Number	260410	260510	260110	260210	260310
h1	2.13	2.76	3.39	4.13	4.72
l1	.59	.87	1.10	1.18	1.26
b1	3.23	3.39	4.33	5.24	5.91
b2	1.97	2.48	3.23	3.78	4.41
b3	1.42	1.89	2.52	2.84	2.76
b4	.71	.95	1.26	1.42	1.38



OLFLEX® Robot 900 Track

Robotic Cable Track for Torsion Applications

Shim Bolt

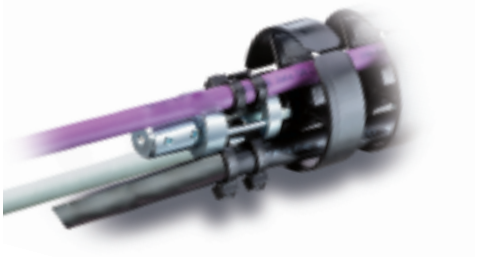
The shim bolt is needed to set the tension on the steel wire. Two pieces are required per track.

Steel Wire

The steel wire is run through the spine of the track for strength. It is sold per foot.

Rubber Bumper with Tie Wrap

The Rubber Bumper can be used to protect the track against impact with machinery. Tie wrap them with the the links that come in contact with the robot for protection.

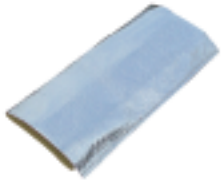


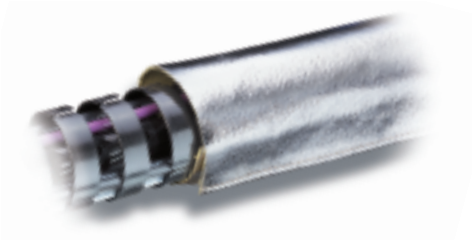
Strain Relief

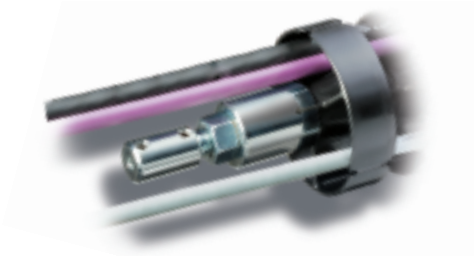
The strain relief is designed for installation at the end of the track. The cables and hoses can be secured with tie wraps on the spokes. (can not be used with the tightening chuck

Protective Sheaths

The heat sheath is a textile wrap with Aluminum coating to withstand weld flash and sparks. The dirt sheath is a layered polyester that withstands cutting and hydraulic oils and dust particles.







Tightening Chuck

The tightening chuck is ideal for setting the desired tension on the steel wire spine. It cannot be used with the strain relief.

Example # 1

Known: Components: 3 – Cables 1 - .550” PVC Tube (.500” Inside Diameter)
Type of Mounting: **Center** Travel Length (**Ls**): 8 feet, convert feet into inches: 8’x12 = 96”

Item #	Part Number	Quantity (#)	Nominal Diameter	Min. Radius Factor	Min. Radius	Clearances Factor - Min.	Min. Clearance	Weight (Lbs./ft)
1	26254	1	.594”	7.5 x cable diameter	4.45”	1.10 %	.653”	.27
2	6001	1	.475”	14 x cable diameter	6.65”	1.10 %	.522”	.14
3	891407	1	.602”	7.5 x cable diameter	4.50”	1.10 %	.662”	.22
4	PVC Tube	1	.550”	5 x tube diameter	2.75”	1.20 %	.660”	.20
5	Dividers – Vert.	1	.100”				.100”	
						Total:	**2.597”**	.83 lbs./ft

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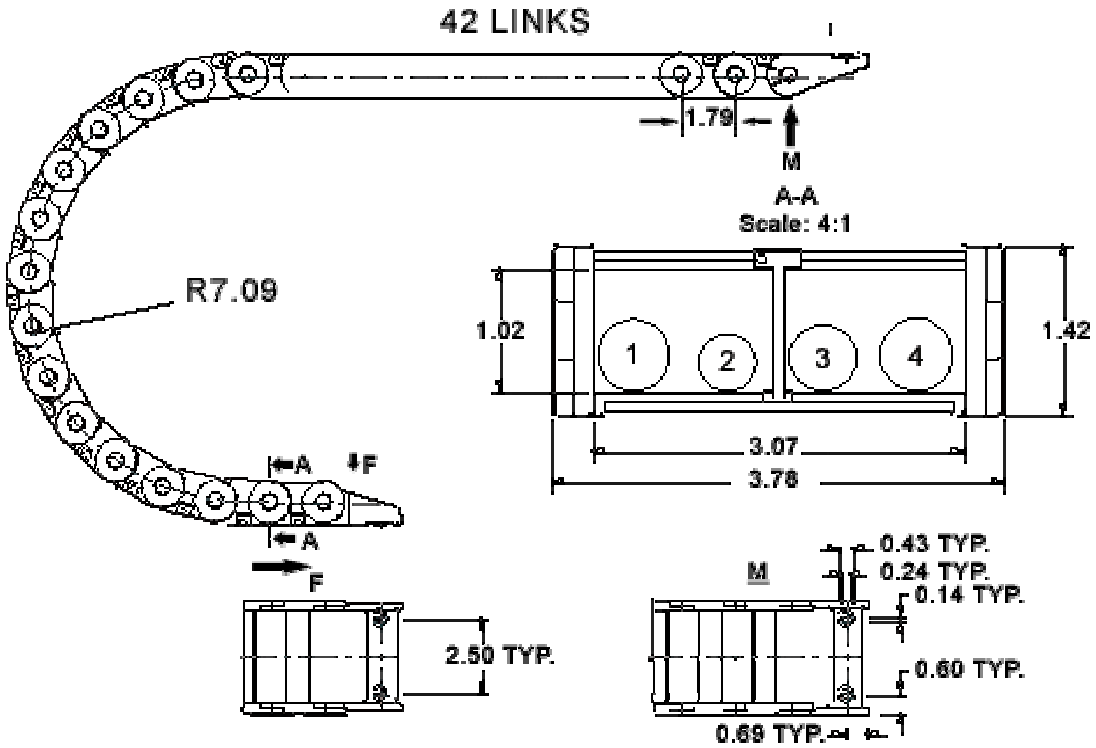
Inside Height (20% Max.): .602” x 1.20 % = .**722**”
Min Radius: 6.65” Min. Clearance: 2.597” Weight: .83 lbs/ft Track chosen: 455.30.078.709
Inside Width: 3.07” Outside Width: 3.78” Inside Height: 1.02” Outside Height: 1.42” Bend Radius: 7.09”

Center Mounting (CM): Formula **CM = (Ls / 2) + Lb (Loop Length)** = (96”/ 2) + 25.87” = 73.87” **# of links = CM / t (Link Length)** = 73.87”/ 1.79” = 41.26 (round up) = 42 links

Order Track Part Number: 455.30.078.709 x 42 links + 1 set (brackets) + 21 dividers vert.



Example # 2

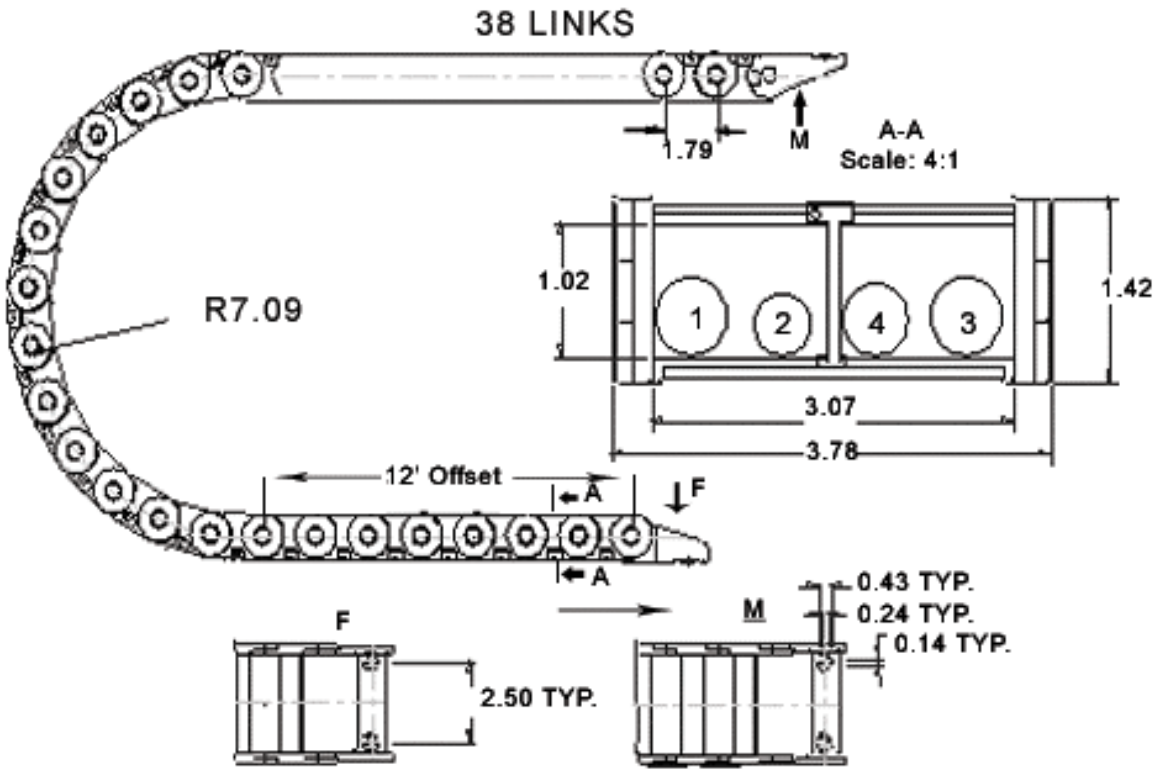
Known: Components: 3 – Cables 1 - .550” PVC Tube (.500” Inside Diameter)
Type of Mounting**: Off-Center**, 12” Travel Length **(Ls)**: 5 feet, convert feet into inches: 5’x 12 = 60”

Item #	Part Number	Quantity (#)	Nominal Diameter	Min. Radius Factor	Min. Radius	Clearances Factor - Min.	Min. Clearance	Weight (Lbs./ft)
1	26254	1	.594”	7.5 x cable diameter	4.45”	1.10 %	.653”	.27
2	6001	1	.475”	14 x cable diameter	6.65”	1.10 %	.522”	.14
3	891407	1	.602”	7.5 x cable diameter	4.50”	1.10 %	.662”	.22
4	PVC Tube	1	.550”	5 x tube diameter	2.75”	1.20 %	.660”	.20
5	Dividers – Vert.	1	.100”				.100”	
						Total:	**2.597”**	.83 lbs./ft

Inside Height (20% Max.): .602” x 1.20 % = **.722**”
Min Radius: 6.65” Min. Clearance: 2.597” Weight: .83 lbs/ft Track chosen: 455.30.078.709
Inside Width: 3.07” Outside Width: 3.78” Inside Height: 1.02” Outside Height: 1.42” Bend Radius: 7.09”

Off-Center Mounting (OCM): **OCM = (Ls / 2) + Off-center + Lb (Loop Length)** **# of links = OCM / t (Link Length)**
Formula = (60”/ 2) + 12” + 25.87” = 67.87” / 1.79”
= 67.87” = 37.91 (round up) = 38 links

Order Track Part Number: 455.30.078.709 x 38 links + 1 set (brackets) + 19 dividers vert.



Example # 3

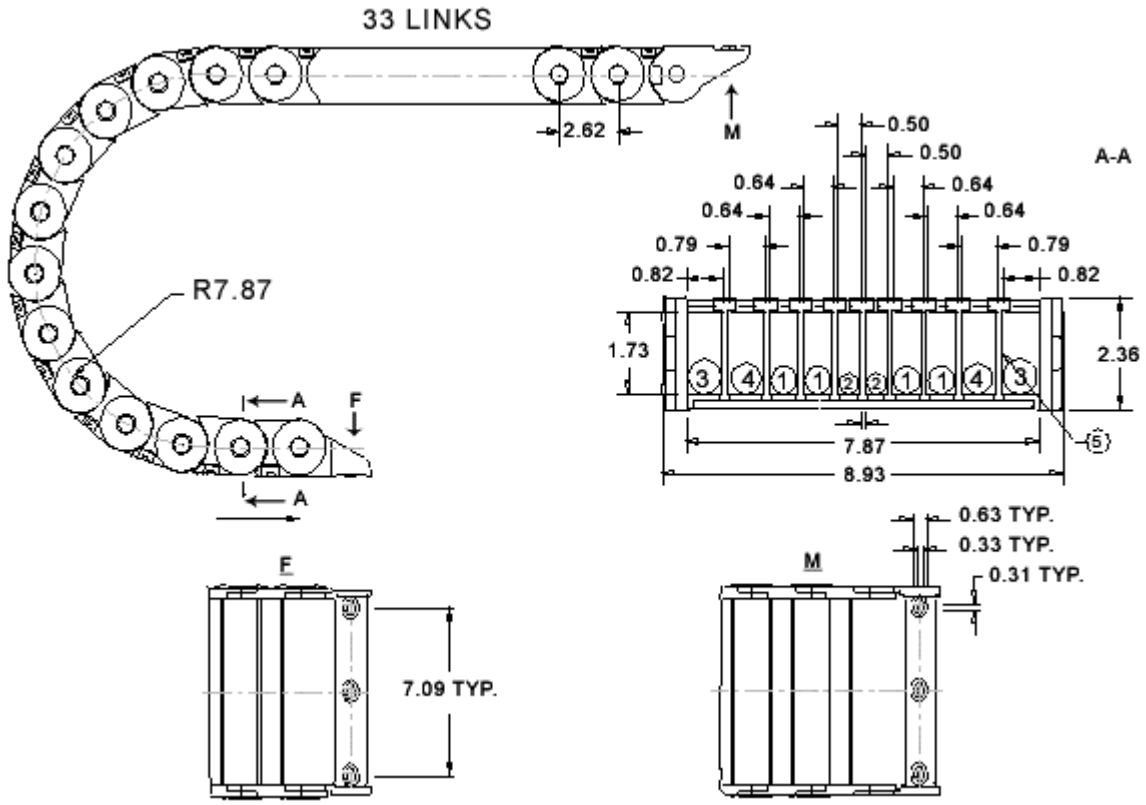
Known: Components: 8 - Cables 2 - .650” Air lines
Type of Mounting: **Center** Travel Length **(Ls)**: 9 feet, convert feet into inches: 9’x 12 = 108”

Item #	Part Number	Quantity (#)	Nominal Diameter	Min. Radius Factor	Min. Radius	Clearances Factor - Min.	Min. Clearance x #	Weight (Lbs./ft) x #
1	27567	4	.571”	5 x cable diameter	2.85”	1.10 %	.628 x 4 = 2.512”	.20 x 4 = .80
2	891805CY	2	.441”	10 x cable diameter	4.41”	1.10 %	.485 x 2 = .970”	.13 x 2 = .26
3	890804	2	**.736”**	7.5 x cable diameter	**5.52”**	1.10 %	.809 x 2 = 1.619”	.48 x 2 = .96
4	Air lines	2	.650”	5 x air line diameter	3.25”	1.20 %	.780 x 2 = 1.560”	.50 x 2 = 1.0
5	Dividers – Vert.	9	.120”				.120 x 9 = 1.080”	
						Total:	**7.741”**	3.02 lbs./ft

Inside Height (20% Max.): .736” x 1.20 % = .883”
Min Radius: 5.52” Min. Clearance: 7.741” Weight: 3.02 lbs/ft Track chosen: 655.30.200.787
Inside Width: 7.87” Outside Width: 8.93” Inside Height: 1.73” Outside Height: 2.36” Bend Radius: 7.87”

Center Mounting (CM): **CM = (Ls / 2) + Lb (Loop Length)** **# of links = CM / t (Link Length)**
Formula = (108”/ 2) + 30” = 84” = 84” / 2.62” = 32.06 (round up) = 33 links

Order Track Part Number: 655.30.200.787 x 33 links + 1 set (bracket) + 153 dividers vert.



Example # 4

Known: Components: 8 – Cables 2 - .650” Air lines

Type of Mounting: **Center** Travel Length **(Ls)**: 9 feet, convert feet into inches: 9’x 12 = 108”

Item #	Part Number	Quantity (#)	Nominal Diameter	Min. Radius Factor	Min. Radius	Clearances Factor - Min.	Min. Clearance	Weight (Lbs./ft) x #
1	27567	4	.571”	5 x cable diameter	2.85”	1.10 %	.628”	.20 x 4 = .80
2	891805CY	2	.441”	10 x cable diameter	4.41”	1.10 %	.485”	.13 x 2 = .26
3	890804	2	.736”	7.5 x cable diameter	5.52”	1.10 %	.809”	.48 x 2 = .96
4	Air lines	2	.650”	5 x air line diameter	3.25”	1.20 %	.780”	.50 x 2 = 1.0
E&F	Dividers-Horz.	5	.160”				.120”	
G	Dividers-Vert.	6	.310”				.310”	
						Total:	**See Below**	3.02 lbs./ft

Min. Clearance: **Vertical =** (1.2 x #1) + (1.2 x #4) + Horz. Divider
= (1.2 x .571”) + (1.2 x .650”) + .160”
= 1.625 ”

Horizontal = (1 x #1) + (2 x #3) + (2 x #4) + (6 * Vert. Divider)
= (1 x .628”) + (2 x .809”) + (2 x .780”) + (6* .31)
= .628” + 1.618” + 1.560” + 1.86” = 5.66”

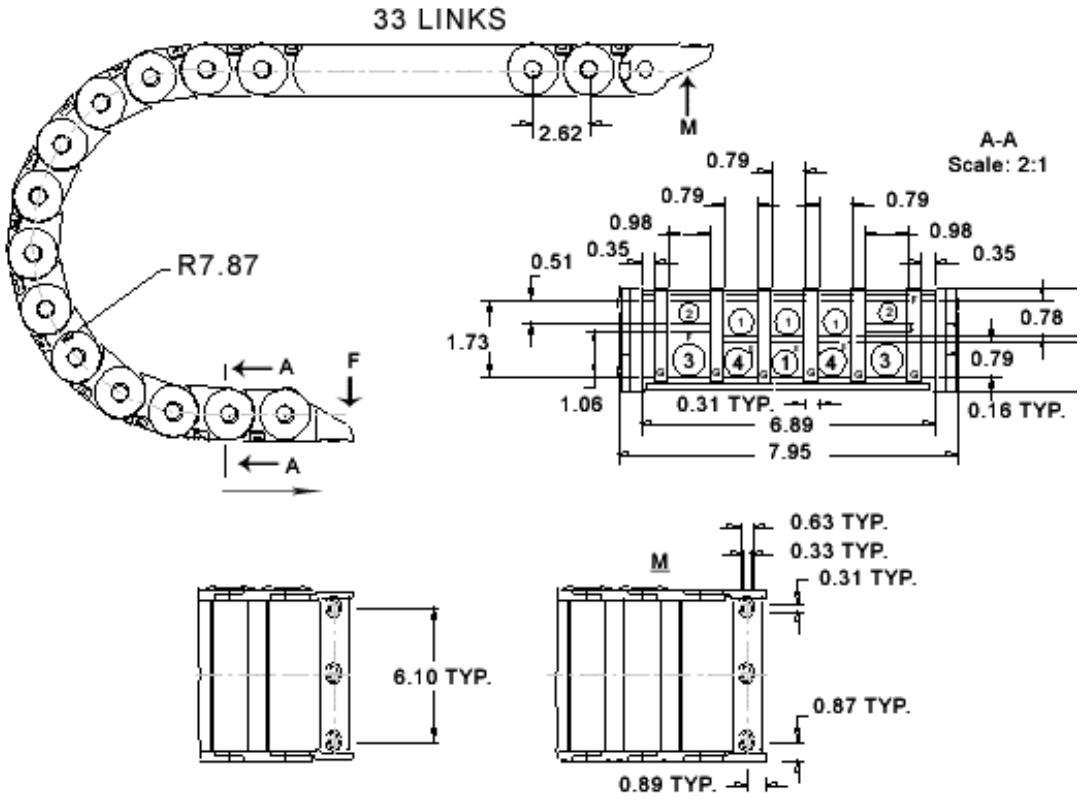
Min. Radius: 5.52” Weight: 3.02 lbs/ft Track chosen: 655.30.175.787

Inside Width: 6.89” Outside Width: 7.95” Inside Height: 1.73” Outside Height: 2.36” Bend Radius: 7.87”

Center Mounting (CM): **CM = (Ls / 2) + Lb (Loop Length)** **# of links = CM / t (Link Length)**

Formula = (108”/ 2) + 30” = 84” = 84” / 2.62” = 32.06 (round up) = 33 links

Order Track Part Number: 655.30.175.787 x 33 links + 1 set (brackets) + 85 dividers-horz.+ 102 dividers-vert



Example # 5

Known: Components: 10 – Cables 2 - .725” Hydraulic lines 1 - .600” Air lines
Type of Mounting: **Off-Center**, 36” Travel Length **(Ls)**: 10 feet, convert feet into inches: 10’x 12 = 120”

Item #	Part Number	Quantity (#)	Nominal Diameter	Min. Radius Factor	Min. Radius	Clearances Factor - Min.	Min. Clearance x #	Weight (Lbs./ft) x #
1	3022134	2	.709”	7.5 x cable Dia.	5.31”	1.10 %	.779 x 2 = 1.558”	.31 x 2 = .62
2	891604	3	**.362”**	7.5 x cable Dia.	2.75”	1.10 %	.398 x 3 = 1.194”	.01 x 3 = .03
3	27579	2	.524”	5 x cable Dia.	2.62”	1.10 %	.576 x 2 = 1.152”	.19 x 2 = .38
4	Blue Cable	3	.713”	12 x cable Dia.	8.55”	1.10 %	.784 x 3 = 2.352”	.38 x 3 = 1.14
5	Air lines	1	.600”	5 x air line Dia.	3.00”	1.20 %	.720 x 1 = .720”	.50 x 1 = .50
6	Hydraulic lines	2	.725”	7.5 x hydraulic Dia.	5.62”	1.20 %	.870 x 2 = 1.740”	.90 x 2 = 1.80
7	Dividers - Vert.	9	.120”				.120 x 9 = 1.08”	
8	Dividers-Horz.	1	.160”					
						Total:	**9.796”**	4.47 lbs./ft

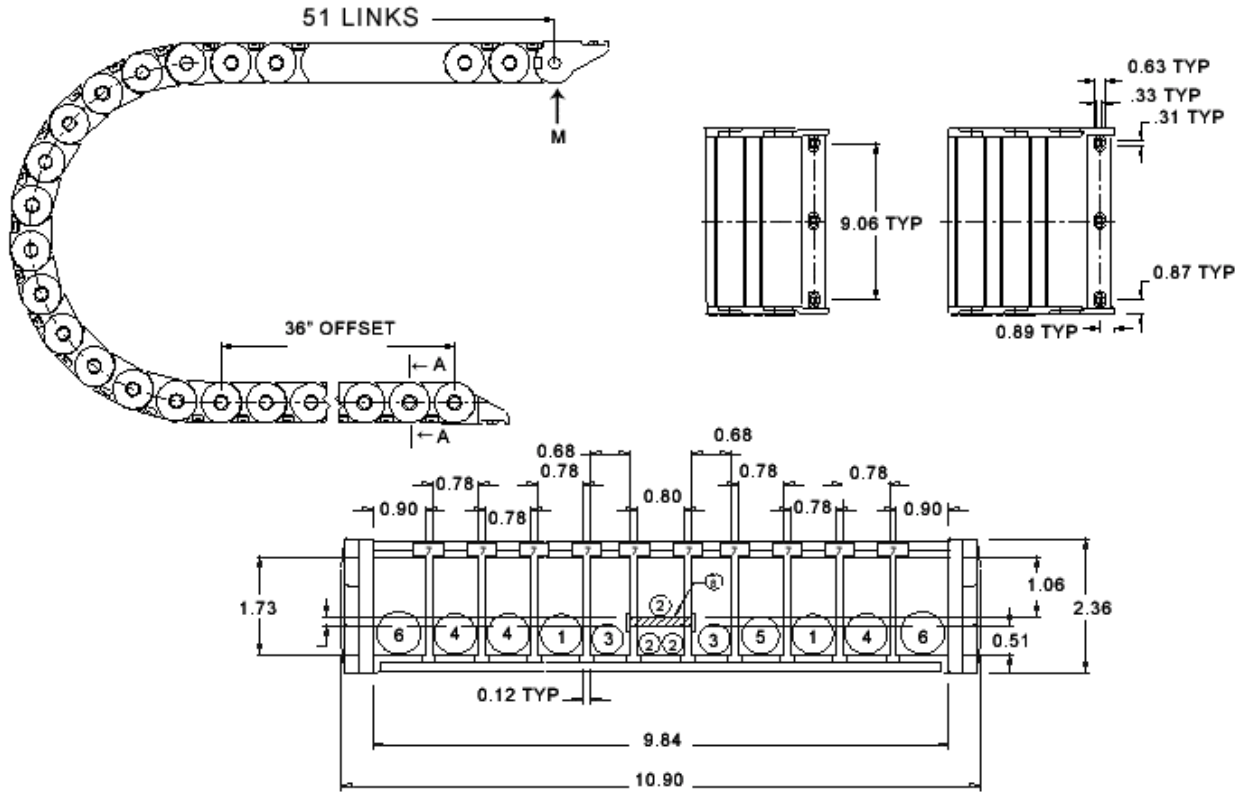
Min. Clearance: **Vertical**: **=** 2 Elements * (1.2 x #2) + Horz. Divider
= 2 * (1.20% x .362”) + .160”= **1.028**”

Min Radius: 8.55” Min. Clearance: 9.796” Weight: 4.47 lbs./ft Track chosen: 665.30.250.984
Inside Width: 9.84” Outside Width: 10.9” Inside Height: 1.73” Outside Height: 2.36” Bend Radius: 9.84”

Off-Center Mounting (OCM): **OCM = (Ls / 2) + Off-center + Lb (Loop Length)** **# of links = OCM / t (Link Length)**

Formula = (120”/ 2) + 36” + 36.18” = 132.18” / 2.62”
= 132.18” = 50.45 (round up) = 51 links

Order Track Part Number: 655.30.250.984 x 51 links + 1 set (brackets) + 26 dividers-horz.+ 234 dividers-vert.



CABLE TRACK FORMAT

Application Information:_____

_____

Type of Mounting**:** Center or Off-Center: Distance: _____" Travel Length **(Ls)**: _____"

Unsupported length: (CM = Ls/2, OCM = Ls) : _____"

Mounting Sketch

	A	B	C	D	E	F	G	H
Item #	Part Number	Quantity	Nominal Diameter	Min. Radius Factor	Min. Radius	Clearances Factor - Min.	Min. Clearance (G * B)	Weight (Lbs./ft) x B
1			"		"		"	
2			"		"		"	
3			"		"		"	
4			"		"		"	
5			"		"		"	
6			"		"		"	
7			"		"		"	
8	Dividers – Vert.		"				"	
						Total:	"	Lbs./ft

Min. Inside Height (Largest Nominal Diameter of C): _____" x 1.20 % = _____"

Min. Radius: _____" (Largest radius of E) Min. Width: _____" (Total of G) Weight: _____Lbs./ft. (Total of H) Track chosen: _____ (Smallest Model / Type chosen)

Cable Track Layout Sketch

(From Catalog Based on Track chosen)

Inside Height: _____" Outside Height: _____" Inside Width: _____" Outside Width: _____" Bend Radius: _____"

Do all the characteristics of the selected track match the application requirements?

Center Mounting Formula (CM): **Calculate Track Length & Links needed**

CM = (Ls / 2) + Lb (Loop Length) **# of links = CM / t (Link Length)**

= _____ = _____

= _____ inches = _____ (round up) = _____ links

Off-Center Mounting Formula (OCM): Calculate Track Length & Links needed

OCM = (Ls / 2) + Off-center + Lb (Loop Length) **# of links = OCM / t (Link Length)**

= _____ = _____

= _____ inches = _____ (round up) = _____ links

# of Dividers: (#of links / 2, rounded up)*(Dividers per link) _____

Order Track Part Number: _____

Comments: _____

_____

Limitation Guide for Unsupported Cable Track

Example: Lapp P/N 891618CY weighs **493 lb./1000 ft.** or **.493 lb/ft.** If there were four cables in a track the weight would be 1.972 lb./ft. If the track has to move 100", go to the left hand column and move down until you find 2 lb/ft. Then follow the column to the right and whatever track allows 100" or more, the end user can use.
Options available: OLFLEX® Smooth 655, OLFLEX® 900K & OLFLEX® 1250 MK

Wt. of Content lb./ft.	Model Type	OLFLEX® 32	OLFLEX® 45	OLFLEX® 625	OLFLEX® Smooth 345	OLFLEX® Smooth 455	OLFLEX® Smooth 555	OLFLEX® Smooth 665	OLFLEX® 650K*	OLFLEX® 900K*	OLFLEX® 1250MK*
	Link Length	**t = 1.26"**	**t = 1.77"**	**t = 2.46"**	**t = 1.36"**	**t = 1.79"**	**t = 2.19"**	**t = 2.62"**	**t = 2.56"**	**t = 3.54"**	**t = 4.92"**
0.25		39"	56"	96"	73"	86"	120"	127"	98"	169"	187"
0.5		35"	49"	91"	65"	78"	113"	123"	97"	168"	184"
0.75		30"	43"	86"	49"	74"	109"	119"	95"	166"	182"
1		19"	39"	81"	43"	68"	104"	115"	93"	164"	180"
1.5			32"	72"	33"	61"	98"	108"	91"	161"	178"
2			21"	63"		49"	88"	100"	89"	158"	156"
2.5				54"		42"	78"	93"	87"	156"	174"
3				45"			74"	88"	86"	153"	172"
3.5				38"			65"	80"	85"	151"	170"
4							59"	73"	84"	148"	168"
5							36"	62"	81"	144"	164"
6								45"	78"	140"	160"
7								39"	74"	136"	156"
8									70"	132"	152"
9									67"	127"	147"
10									63"	122"	143"
11										115"	139"
12										109"	135"
13										104"	131"
14										101"	127"
15										97"	123"
16										94"	119"
17										90"	115"
18										86"	110"
19										83"	106"
20										79"	102"
25											82"
30											61"
33											49"

* Consult your Lapp representative for more information.

Installation Instructions for Cable Track

INSTALLATION INSTRUCTIONS FOR OLFLEX® CABLE IN CABLE TRACK

1. Only OLFLEX®-FD or UNITRONIC®-FD cables should be used in a moving cable track application.

2. When selecting cable for cable track the following criteria must be taken into consideration; environmental conditions such as temperature, chemical influences, indoor or outdoor operation, as well as traveling speed and frequency of operation.

3. The recommended minimum bend radius of the cable should not be exceeded. Refer to the technical data section of this catalog for minimum bend radius for flexing.

4. The cables must be prepared for installation into the cable track without twists, bends or kinks in the cable. Therefore, the cable should always be unwound from the outside layer of the reel or spool. The cable should never be pulled from a coil. Before insertion into the track, it is important that the cable be laid out or hung at least 24 hours prior to installation into the cable track to relax any stresses resulting from transit or storage. If the cable cannot be relaxed, it should be shook out by grasping the cable length at its mid-point and shaking the cable as you move to each end. Then, wrap each end of the cable with masking tape and mark the top of each cable end. **Maintain this alignment throughout installation and clamping.**

5. When placing the cable into the cable track, the track should be laid out flat with the bending direction facing upward, then fitted with the cables in working position. The cables should be laid into the cable track and not weaved between or around other cables. The cables should lay loosely side by side in the track. A minimum clearance of five (5) percent of the cable diameter should be allowed on each side of the cable. When cable is installed in track where spacers are provided, they should be separated from each other.

6. **The cables should not be fixed to the track or tied together in the track.**

7. The weight of the cables must be evenly distributed. Heavier cables should be placed towards the outside of the cable track, while lighter ones should occupy the center of the cable track. When the cable track is side mounted, always place the larger cable towards the outside and the smaller cables toward the inside of the cable track. Cables must not be pulled tight against the inner track curve. Cables must not be pushed tight against the outer track curve.

8. After the cable track is installed, the cables should be cycled through several flexes and observed for freedom of movement. It is important to ensure that cables can move with complete freedom within the bend radius, so that movement of the cables among themselves and with the track is possible.

9. The cables should be clamped into position at both ends of the cable track. Prior to clamping, the alignment marks on the taped ends should be correctly positioned. Do not crush the cables when clamping. The clamping points must be located at a distance of 15 x cable diameter from the end point of the flexing movement. **NOTE: When calculating 15 x cable diameter, it is important to use the diameter of the largest cable in the track.**

Cable Track Questionnaire

Need help selecting your cable carrier?
Complete this form and fax it to your Tech Specialist

Company Name _____ Contact Name _____ Phone Number _____

1. Total length of existing track (if replacing): _____

2. Total distance traveled in one cycle: _____

3. Direction /Orientation of travel, please check one:
___ Horizontal ___ Side Running
___ Vertical ___ Other, please provide sketch

4. Is track center mounted?
(eg. is the fixed end of carrier mounted in the center of travel?) _____

5. If not center mounted, how much off center in inches? _____

6. Type of equipment track is installed on: _____

7. Number of cables and hoses in track: _____

8. Outside diameters (in inches) of each cable and hose: _____

9. Minimum bending radius of cables and hoses: _____

10. Estimated total weight of track contents (lbs/ft, if available): _____

11. Operation speed (feet per second): _____

12. Operation frequency (cycles per minute): _____

13. **Maximum** available mounting **width** (in inches): _____

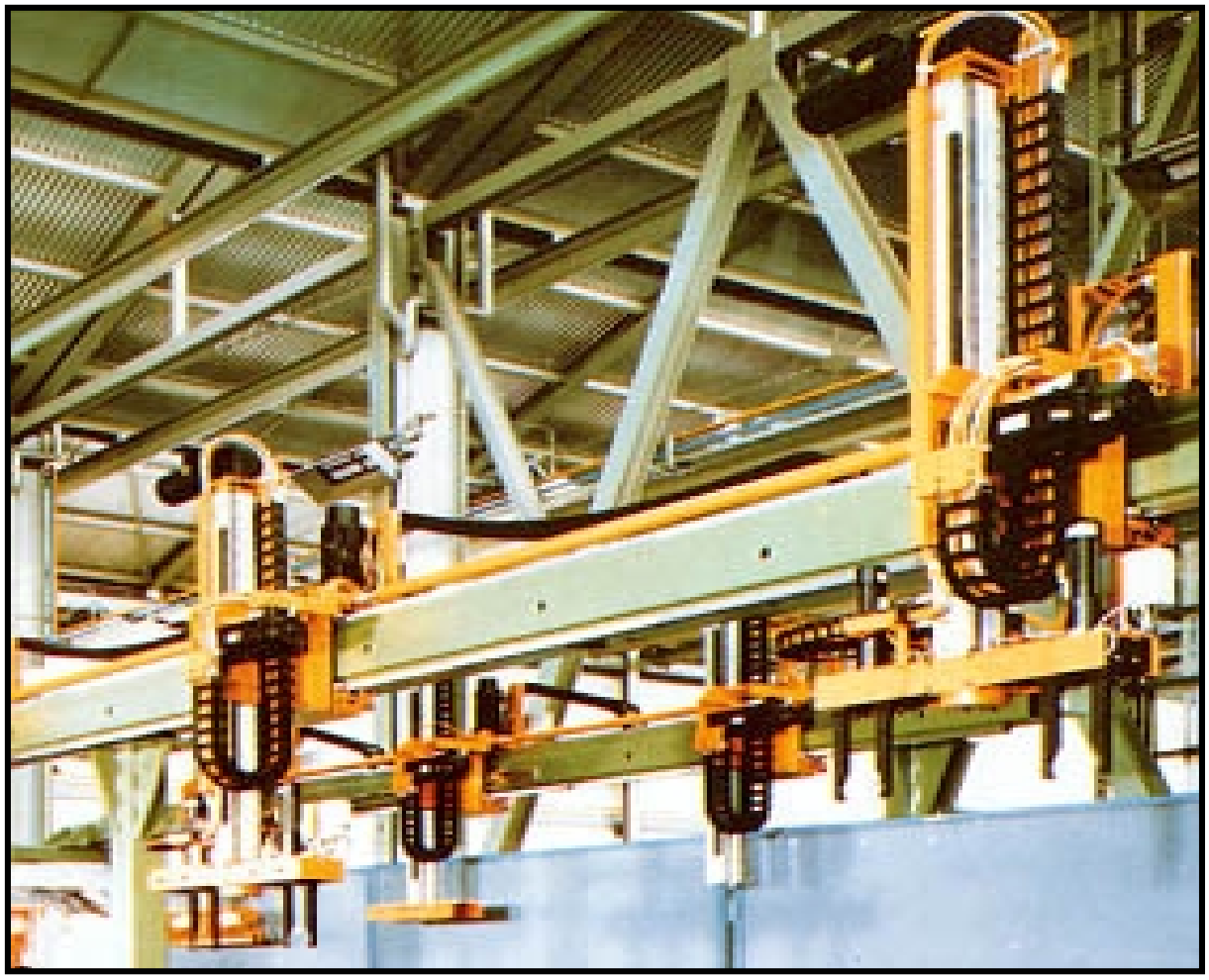
14. **Maximum** available mounting **height** (in inches): _____

15. Environmental data; please check all that apply:
___ Clean, Dry, Indoor
___ Chemical, Wet or Chips
___ High Temperatures (> 150 F)
___ Outdoors*
* Please describe any unusual environmental factor(s): _____

16. Standard mounting bracket orientation is **outside** to **outside**; if other please specify: _____

IMPORTANT
See page 251 for proper cable installation instructions in CableTrack.

See back of catalog for phone and fax information



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