

Selection Method

1 Calculate the required tangential force

◆ Formula for the Required Tangential Force

$$\text{Required Tangential Force (N)} = 9.8 \text{ (Constant Value)} \times \text{Object (kg)} \times \text{Rolling Friction Coefficient}$$

◆ Rolling Friction Coefficient Table

Wood	Metal	Cardboard	Plastic	Rubber Lining
0.02~0.05	0.01~0.02	0.05~0.1	0.02~0.04	0.1

⚠ Above values vary depending on roller pitch or condition of roller surface, etc.

Sample Calculation When carrying a cardboard box of weight 40 (kg):

⚠ From the above Rolling Friction Coefficient Table, maximum friction coefficient for cardboard is 0.10.

$$\text{Required Tangential Force} = 9.8 \times 40(\text{kg}) \times 0.10 = 39.2(\text{N})$$

* Rolling friction coefficient depends on the material of the object. Refer to the table above.

2 Select the model provisionally

Provisionally select the model that matches the speed from the specification table on the next page.

Example When carrying the objects at the speed of 20m/min, MOR57-(Length)-20.

3 Determine the number of required rollers

Determine the number of required rollers considering the following 2 elements.

- Motor Roller Tangential Force (Start-up or at Rated Output)
- Carried Weight and Roller Allowable Static Load (Please see the standards table "Roller Strength (N)" on the next page.)

◆ Calculating the required tangential force

$$\text{Carrying Capability (N)} = \text{Starting Tangential Force of the Motor Roller (N)} \times 0.9 \text{ (Constant Value)}$$

◆ Determine the number of required rollers

$$\text{The Number of Required Rollers} = \text{Required Tangential Force (N)} / \text{Carrying Capability (N)}$$

Sample Calculation Required tangential force for carrying is 39.2 (N) from the sample calculation above.

For MOR57-(Length)-20:

- Carrying capability is 55 (N) (Starting Tangential Force) x 0.9 = 49.5 (N).
- The Number of Required Rollers is 39.2(N) (Required Tangential Force) / 49.5(N) (Carrying Capability) = 0.79 (pcs.)→One roller is capable

4 Determine the length of the rollers

- From the size of the bottom surface (length and width) of the object

Sample Calculation When the length of the bottom surface is 300mm and the width is 400mm:

- The width of the object is 400mm + Margin 100mm = 500mm.

It follows that in this case, the part numbers should be MOR57-500-20.

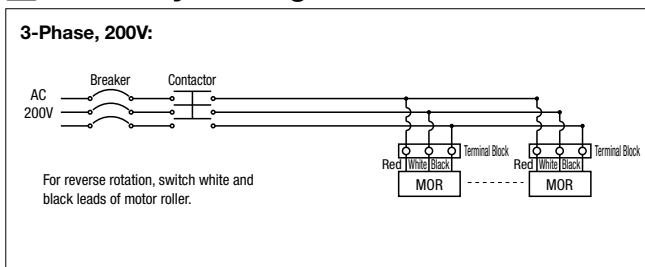
Caution in Selection

- The calculated value using carrying tangential force gives the minimum value for required tangential force needed to carry the work. Transfer capability could vary depending on roller level differences, carried object bottom surface shape (conditions), material and motor roller speed, etc. Please use more rollers depending on usage conditions and considering safety.
- If rated speed is important, use rated tangential force for calculation.
- When motor rollers are loaded at all times, use rated tangential force in calculating for selection.
- The object is assumed to start from on the motor rollers.

Features

- Built-in motor and gear enable space savings for driving mechanisms.
- Requires no maintenance such as lubrication.
- Use of multiple Motor Integrated Rollers prevents manufacturing line stoppage due to one roller failure.

Circuit Layout Diagram



- If the motor rotates in a direction other than originally desired, switch two of the three power leads.
- Normal / reverse rotation can be changed by a switch.
- When red, white and black wires are connected in the identical manner, the rollers will all rotate in the same direction.

⚠ Conveyor Rollers with a built-in motor and a reducer.

MOR

Included for D38, 42.7

For D57

⚠ Operating Temperature: 0 ~ 40°C (Humidity 15 ~ 85%)

⚠ Dimension in () is for D38, 42.7 and 57.

Part Number	Type	D	L selection	Nominal Speed	Unit Price		
					L300	L400	L500
MOR		38	300	10			
		42.7	400	15			
		57	500	20			

⚠ For orders larger than indicated quantity, please request a quotation.

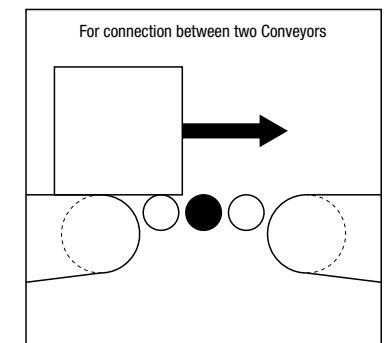
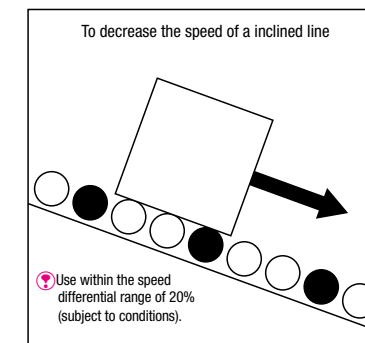
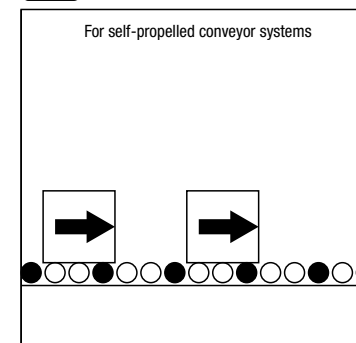
D	Nominal Velocity	Power Supply	Rated Current	d	G	W	F	Speed (m/min)		Tangential Force (N)				Torque (N·cm)				Roller Strength (N)		
								50Hz	60Hz	50Hz		60Hz		50Hz		60Hz		L300	L400	L500
										Rating	Starting	Rating	Starting	Rating	Starting	Rating	Starting			
38	10	Three-Phase 200V 50/60Hz Input 16/12W	0.055/0.050 (A)	12	18	8	16	10.4	13.1	16.7	37.3	12.4	31.3	31.8	70.9	23.6	59.6	343	294	294
	14.2							16.1	12.3	39.6	9.2	30.9	23.3	75.3	17.5	58.7				
	22.2							25.2	7.8	25.3	5.8	19.7	14.9	48.0	11.1	37.4				
42.7	10	Three-Phase 200V 50/60Hz Input 18/17W	0.065/0.062 (A)	12	18	8	16	12.3	14.0	14.2	30.7	14.2	23.4	30.3	65.5	30.3	50.1	490	441	392
	18.2							20.7	9.6	20.8	9.6	15.9	20.5	44.4	20.5	33.9				
	24.8							28.3	7.0	15.2	7.0	11.6	15.0	32.5	15.0	24.8				
57	10	Three-Phase 200V 50/60Hz Input 33/27W	0.120/0.100 (A)	15	15	23	23	11.2	13.3	44.5	83.1	37.0	78.4	126.8	236.8	105.4	223.4	980	980	784
	12.4							14.8	40.2	75.1	33.5	67.6	114.5	214.1	95.4	192.6				
	17.0							20.2	29.4	55.0	24.5	49.5	83.7	156.7	69.8	141.0				

kgf=Nx0.101972

- ⚠ Voltage fluctuation is allowed up to ±3% for 50Hz. (Up to ±5% allowed for 60Hz)
- ⚠ In case 50Hz is applied at ±5% of voltage variation, the torque value becomes approx. 40% lower than the values shown in the table above.
- ⚠ Indicated speed applies for rated power. Also rotational velocity and torque change when load is light or excessive.
- ⚠ Roller strengths may vary depending on applied shock loads, load weights, materials. Be sure to provide ample margin. (Recommendations: 1/2 ~ 1/3 of the chart values)

Ordering Example: Part Number - L - Nominal Velocity
MOR38 - 300 - 10

Example



Conveyor Rollers

Core Material Type / Urethane Lined Type

Conveyor Rollers / Sprocket Integrated Rollers / Plastic Conveyor Rollers

Shaft & Roller Sets

For Motor Integrated Rollers, see P.1162. For dedicated shafts, see P.1165. For Shaft & Roller Sets, see the next page.

Core Material Type	Material		Surface Treatment	Bearing	Urethane Lined Type	Material		Hardness	Bearing	
	Core	Wheel				Core	Wheel			
HRO	STKM	Steel	Trivalent Chromate Plating	Pressed-in Bearings	HROU	STKM	Steel	Shore A90	Pressed-in Bearings	
HROC			Hard Chrome Plating		HROH					Urethane (Natural Color)
HROB (Silent Type)			Trivalent Chromate Plating		HROH					Urethane (Natural Color)
HROA	Aluminum	Steel	Clear Anodize	Pressed-in Bearings	HROBU (Silent Type)	STKM	Steel	Shore A50	Standard Bearing	
HROS	SUS304	SUS304	-	Pressed-in Bearings	HROSU	SUS304	SUS304	Shore A90	Pressed-in Bearings	

*1. HROB and HROBU : $d_{-0.008}^{+0.015}$ *2. Collar part of HROB and HROBU is plastic (Nylon 6).

Part Number Type	No.	L Selection	G Selection	D	a	d	(d1)	t	* Roller Strength for Reference (N)						
									L113	L163	L213	L263	L313	L413	L513
HRO Urethane Lined Type	19			19.1	5	6.2	(9)	1.2	618	573	530	436	343	294	206
	*22			22.2	3.5	6.2	(9)	1.2	618	573	530	436	343	294	206
	28			28.6	3.5	8.2	(12)	1.2	1236	1148	1059	873	687	588	412
	38			38.1	5.5	12.2	(16)	1.2	1342	1342	1342	1132	922	785	588
	*42			42.7	5	12.2	(16)	1.4	1667	1628	1589	1310	1030	883	745
HROC	22	113		22.2	3.5	6.2	(9)	1.2	618	573	530	436	343	-	-
	28	163		28.6	3.5	8.2	(12)	1.2	1236	1148	1059	873	687	-	-
	38	213		38.1	5.5	12.2	(16)	1.2	1342	1342	1342	1132	922	-	-
	42	263		42.7	5	12.2	(16)	1.4	1667	1628	1589	1310	1030	883	745
	57	313		57.2	6.5	12.2	(18)	1.4	2354	2206	2059	1912	1765	1471	1157
HROB Urethane Lined Type	19	113	3	19.1	6	6	(8)	1.2	775	721	667	549	431	373	-
	28	163	4	28.6	6.5	8	(10)	1.2	1549	1436	1323	1093	863	745	520
	38	213	5	38.1	6.5	12	(18)	2.3	2206	2040	1875	1673	1471	1226	1040
	42	263		42.7	5	12	(18)	2.3	2942	2687	2432	2319	2206	1844	1451
	57	313		57.2	6.5	12	(18)	1.4	2942	2687	2432	2319	2206	1844	1451
HROA	19			19.0	5	8.1	(13)	1.6	705	705	705	583	460	-	-
	28			28.6	6.5	12.2	(17)	1.6	784	735	686	637	588	-	-
	38			38.1	5	8.1	(13)	1.6	705	705	705	583	460	-	-
	42			42.7	6.5	12.2	(17)	1.6	784	735	686	637	588	-	-
	57			57.2	6.5	12.2	(17)	1.6	784	735	686	637	588	-	-
HROS Urethane Lined Type	19			19.0	5	6.2	(10)	1.2	432	403	373	309	245	196	147
	28			28.6	5.5	8.2	(12)	1.6	617	573	529	436	343	-	-
	38			38.1	3.5	8.2	(16)	1.0	883	836	790	684	579	490	373
	42			42.7	6.5	12.2	(18)	1.5	1324	1250	1177	1128	1079	883	687
	57			57.2	6.5	12.2	(18)	1.5	1324	1250	1177	1128	1079	883	687

HROB and HROBU are excellent in quiet operation and durability as standard bearings are used. For No.19 and No.28 of HROB and HROBU, hubs are replaced with collars. Sizes with * (No.22, No.42, No.50) are available for HRO only.

Ordering Example: Part Number - L - G
 HRO38 - 213 - 3
 HROU38 - 213 - 3

Part Number Type	No.	Unit Price						
		L113	L163	L213	L263	L313	L413	L513
HRO	19							
	22							
	28							
	38							
	42							
HROC	22							
	28							
	38							
	42							
	57							
HROB	19							
	28							
	38							
	42							
	57							

For HROG and HROH, the unit prices in the table are to be multiplied by 1.1.

Part Number Type	No.	Unit Price						
		L113	L163	L213	L263	L313	L413	L513
HROA	28							
	38							
	57							
	19							
	38							
HROS	19							
	28							
	38							
	57							
	19							
HROBU	19							
	28							
	38							
	42							
	57							
HROSU	19							
	28							
	38							
	42							
	57							

Alterations Example: Part Number - L - G - (UDC)
 HROU38 - 213 - 3 - UDC

Alteration Code	Spec.
UDC	Changes Urethane Lined Type Shore A90 to Antistatic Urethane. Ordering Code UDC Specific Volume Resistivity $2.1 \times 10^8 \Omega \cdot \text{cm}$ Surface Resistivity $4.0 \times 10^9 \Omega$ (Temperature 30°C / Humidity 60%)

Conveyor Roller Shaft Holder for Aluminum Extrusion HSCX(P. 778)

Use in combination with Roller Shaft (P.1165). Do not let the shaft hubs on the rollers to support the cantilevered loads as this will apply offset loads on the bearings.

Features: Set of Conveyor Rollers and Economical Hollow Tube Rollers

Conveyor Rollers - Shaft & Roller Sets

For shaft diameters: 6, 8, 12 mm. Roller length: L+22±1 mm. Pin diameters: 21.5, 29, 35.8 mm.

Part Number Type	No.	L Selection	D	a	d	(d1)	t	Set Shaft & Pin	* Roller Strength for Reference (N)							Unit Price										
									L113	L163	L213	L263	L313	L413	L513	L113	L163	L213	L263	L313	L413	L513				
HROJS	19	113	19.1	5	6.2	(9)	1.2	For 06	431	318	205	436	343	294	206											
	22	163	22.2	3.5	6.2	(9)	1.2	For 06	431	318	205	436	343	294	206											
	28	213	28.6	3.5	8.2	(12)	1.2	For 08	490	490	490	450	687	588	412											
	38	263	38.1	5.5	12.2	(16)	1.2	For 08	1342	1342	1342	1132	922	785	588											
	42	313	42.7	5	12.2	(16)	1.4	For 08	1667	1628	1589	1310	1030	883	745											
HROJS	50	413	50.8	6.5	12.2	(18)	1.6	For 12	1716	1628	1648	1584	1520	1442	1147											
	57	513	57.2	6.5	12.2	(18)	1.4	For 12	2354	2206	2059	1912	1765	1471	1157											

Ordering Example: Part Number - L
 HROJS38 - 263

Features: Rollers with integrated sprockets for synchronizing.

Roller with Sprocket HROSSP

Material: Pipe: STKM (Trivalent Chromate Plating), Sprocket: S45C, Resin Bushing: Nylon 6 (Blk.).

App. Example: Bearing ① B6001ZZ, Bearing ② B6201ZZ. Sprocket Number of teeth: 10(Dp41.1, Do46). Applicable Chain: CHE40 (P.1535).

Part Number Type	No.	L Selection	D	d	a	b	e	t	Roller Strength (N)					Unit Price 1~4 pc.						
									L100	L200	L300	L400	L500	L100	L200	L300	L400	L500		
HROSSP	38	100	38.1	12	12	14	3.5	2.3	883	809	588	490	417							
	200	400																		
	57	300	57.2	12	12	13	3.5	2.1	883	834	735	539	441							

Ordering Example: Part Number - L
 HROSSP38 - 100

Plastic Conveyor Rollers HRJA

Material: ABS Plastic. Outer Wheel / Inner Wheel: Polyacetal Retainer: Nylon 66, Cover: ABS Plastic, Ball: SUS304.

Part Number Type	No.	L 1mm Increment	D	a	d	(d1)	t	Roller Strength for Reference (N)					Unit Price						
								L113	L213	L313	L413	L513	L50-150	L151-250	L251-350	L351-450	L451-513		
HRJA	20		20.4±0.5		6.1	9.5(±0.2)	1.5(±0.5)	113	105	98	90	83							
	30		30.6±0.5	3.0 _{-0.1}	8.2	14(±0.2)	1.8(±0.5)	162	154	147	139	132							
	50	50-513	50.3±0.5		12.2	17(±0.2)	2.8(±0.5)	314	304	294	289	279							

Ordering Example: Part Number - L
 HRJA20 - 213

Conveyor Roller Shafts / Mini-Rollers for Conveyors

Roller Conveyors - Overview

Conveyor Roller Shafts

Type	Material	Surface Treatment
HRD	S45C Equivalent	Black Oxide
HRDB		Electroless Nickel Plating
HRDM	SUS304	-
HRDS		-

Applicable to Conveyor Rollers and Mini-Rollers on P.1163.

Part Number	L	W	Q	d	l
Type	1mm Increment	Selection			
HRD	60-550	4	4	2.5	11
HRDB		5.8	6	2.5	12
HRDM		10	8	3	13
HRDS					

Ordering Example

Part Number	L	W
HRD D 6 - 135 - 4.5		

Example

Combination of these app. examples can be selected on our website. Details of Selection Procedure P.87

e-Catalog Search Keyword #MA692 Search

* Enter the search keyword in the search box on e-Catalog. The search result will be shown in "Modular Assembler" area.

Unit Price = Body Price + Shape Charge

Part Number	Body Price	Config. Price (Body Price +)
Type	60-200	201-400
HRD	401-550	
HRDB		
HRDM		
HRDS		

Mini-Rollers for Conveyors

Type	Material	Surface Treatment	Bearing
CNMR	Steel	Trivalent Chromate Plating	Machined Bearing
CNMRC		Hard Chrome Plating	
CNMRS	Stainless Steel	-	-

Part Number	B	d	d1	W	Allowable Load (N)	Unit Price				
Type			CNMR, CNMRS			CNMR, CNMRC, CNMRS				
CNMR, CNMRC, CNMRS	20	15	6.1	9.2	10	17	294			
		25	6.1	9.2	10	27	392			
		50	6.2		10	52	490			
		100	6.2		10	102	490			

kgf=Nx0.101972

Use in combination with Conveyor Roller Shafts.

Ordering Example

Part Number	B
CNMRC20 - 50	

Selection Method of Roller Conveyors

- Selection of Roller Width**
Select a roller width according to outer size of conveyed objects.
• Optimum width selection is "Object Width + 50mm or more".
• If the objects to be conveyed are on pallets, it is acceptable for the roller width to be narrower than the bottom surface width of the objects as long as the objects do not come into contact with the conveyor frame.

- Selection of roller pitch, material, and diameter**
Select a roller width according to the bottom surface of conveyed objects as shown below.

Bottom of Conveyed Object	Min. Pitch Required	Material, Diameter
When the conveyed objects have hard bottoms: (Steel, Plastic, etc.)	3 Pitches (4 Rollers)	Select material and outer diameter from Table 1 according to Condition Formula "Table 1 Strength x 4 ≥ Conveyed Object Weight"
When the conveyed objects have soft bottoms: (Cardboard, Rubber, etc.)	5 Pitches (6 Rollers)	Select material and outer diameter from Table 1 according to Condition Formula "Table 1 Strength x 6 ≥ Conveyed Object Weight"

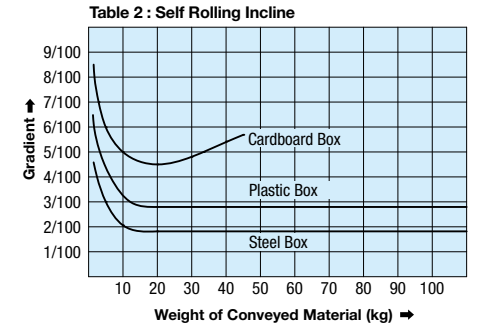
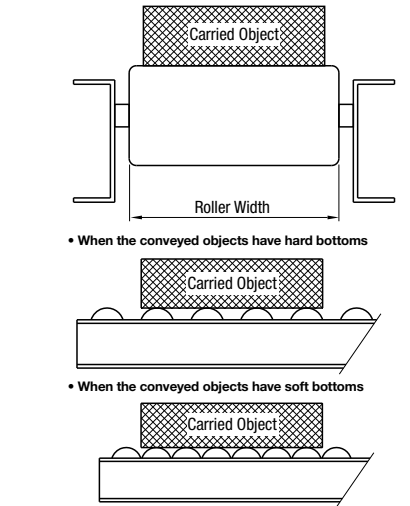
When impact is generated while loading, impact load is 1.5~3 times larger than the usual load. Please select the conveyor with sufficient load capacity.

Table 1 : Strength per Roller

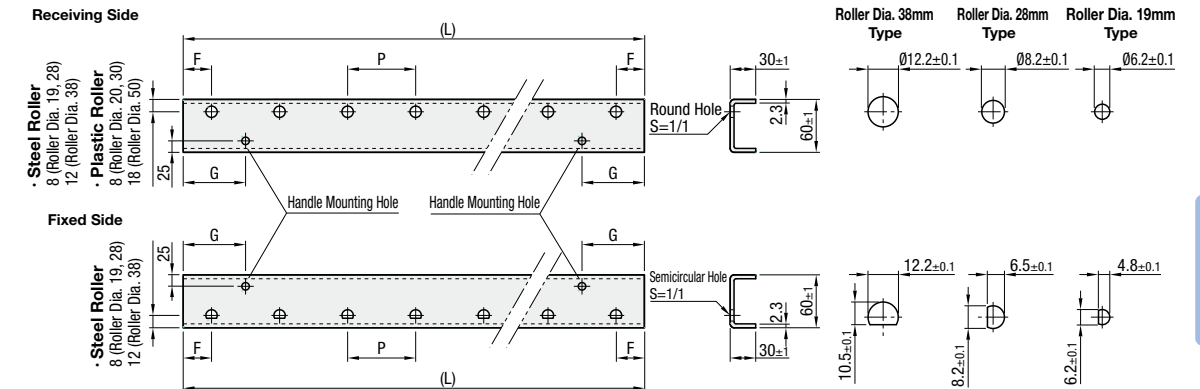
Roller Material	Roller Diameter	Roller Strength (N)				
		W113	W213	W313	W413	W513
Plastic	20mm	113	105	98	90	83
	30mm	162	154	147	139	132
	50mm	314	304	294	289	279
Steel	19.1mm	618	530	343	294	206
	28.6mm	1236	1059	687	588	412
	38.1mm	1342	1342	922	785	588

Conveyed Object Weight and Self Rolling Incline

See Table 2 for the movements of conveyed objects by own weight (self rolling incline) on inclined conveyors.



[Frame Side View]



Resin Roller Conveyor

For Resin Roller Conveyors, the receiving and fixed side holes are round.

Type	ROCOP					
	ROCO		ROCON		ROCOM	
Frame Size	Ø20xP25	Ø30xP40	Ø30xP50	Ø50xP75	Ø50xP100	
(L)	F	G	F	G	F	G
100-199	10	22	37	40	35	97
200-299						
300-399						
400-499						
500-599						
600-699						
700-799						
800-899						
900-1000						
1001-1100						
1101-1200						
1201-1300						

Steel Roller Conveyor

Type	ROCO						ROCOJ					
	ROCO		ROCON		ROCOM		ROCOG		ROCOE		ROCOH	
Frame Size	Ø19xP20		Ø19xP30		Ø28xP30		Ø28xP50		Ø38xP50		Ø38xP100	
(L)	F	G	F	G	F	G	F	G	F	G	F	G
100-199	10	20	20	35	-	-	-	-	-	-	-	-
200-299												
300-399												
400-499												
500-599												
600-699												
700-799												
800-899												
900-1000												
1001-1100												
1101-1200												
1201-1300												

* Holes for Roller Shafts are provided at 50mm pitch on Ø38 x P100 frames.