



Engineered to Keep Your Business Running

SSV TM100 - SSV TM215 DRUM MOTORS

4.0" to 8.5" diameter • 0.11 to 7.5 hp

SANITARY DRUM MOTORS

$$\text{BELT PULL (BP)} = (F0 + F1 + F2)$$

Roller Bed Conveyor

$$F0 = 0.04 (2P + Q) L$$

$$F1 = 0.04 \times R \times L$$

$$F2 = R \times H$$

Slider Bed Conveyor

$$F0 = 1.1 \times P \times L \times C$$

$$F1 = 1.1 \times R \times L \times C$$

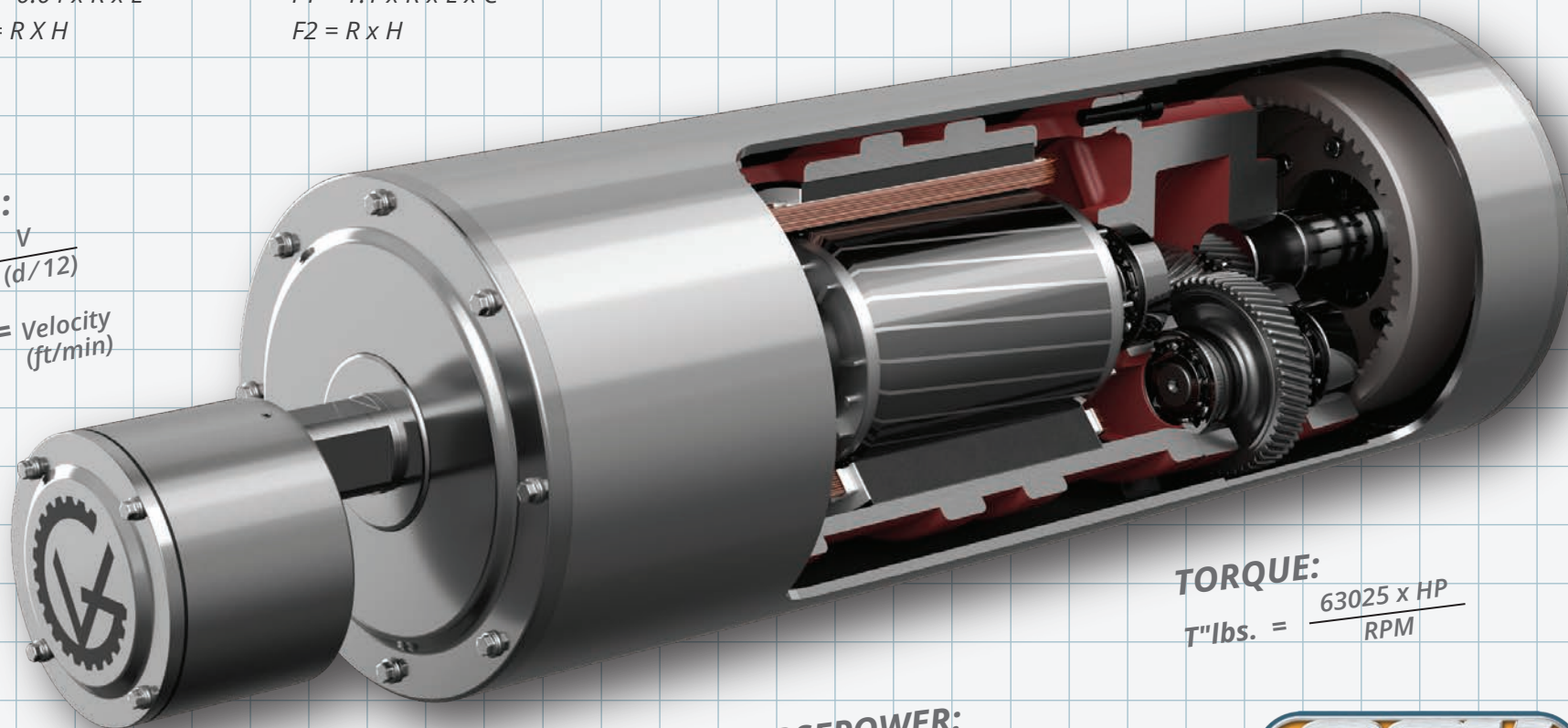
$$F2 = R \times H$$

- Dimensions & Specifications
- Electric Motor Full Load AMP Chart
- Drum Motor Design Features
- Energy & Cost Savings Analysis

RPM:

$$= \frac{V}{\pi (d/12)}$$

V = Velocity
(ft/min)



TORQUE:

$$T''\text{lbs.} = \frac{63025 \times \text{HP}}{\text{RPM}}$$

HORSEPOWER:

$$\text{HP} = \frac{T''\text{lbs.} \times \text{RPM}}{63025}$$



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SSV Drum Motor Series

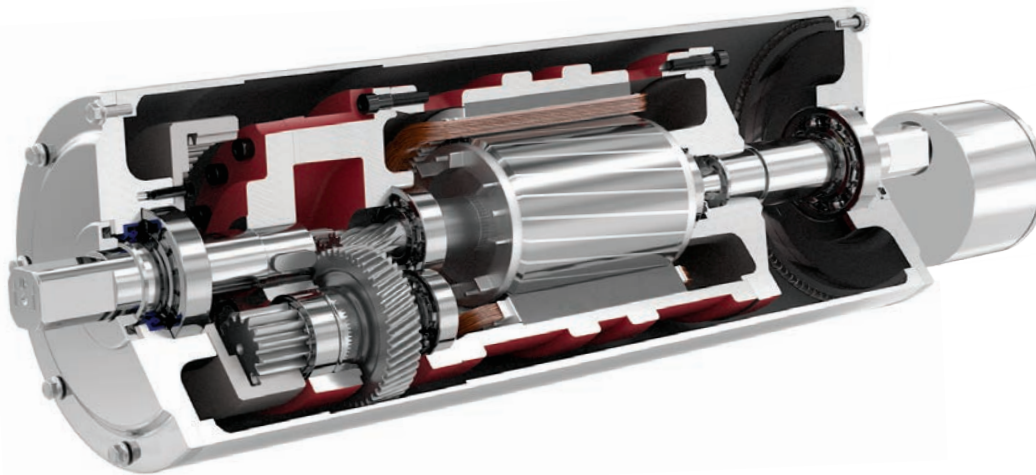
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The drum motor is a single component conveyor drive. The electric motor and the gear reducer fit inside the conveyor head roller, hermetically sealed and bathed in oil. All vital components of the drum motor are housed inside the drum, increasing operator safety and eliminating yearly maintenance that is typically required on external motor/gearbox drive arrangement.

The all 316 stainless steel USDA approved drum motor, with an IP69K sealing system, is designed to withstand high pressure wash down up to 3,000 psi with sanitizing cleaning detergents. The completely sealed drum motor is ideal for meat and poultry, food and pharmaceutical conveyor systems operating in demanding sanitary applications.

SSV Sanitary Drum Motors are engineered to drive modular, monolithic thermoplastic cleated and wire conveyor belts, where hygiene and food safety is of the utmost importance. Available in all standard and non-standard voltages, wide range of diameter sizes, belt speeds, horsepower and face widths.



INCREASE OPERATOR SAFETY

The drum motor has no external moving components that present safety hazards; such as motor, gearbox, chains, chain guard and pillow block bearings, typical of conventional conveyor drives. The drum motor with the electric motor, gear reducer and bearings located inside the drum, is protected from the plant's operational environment, increasing operator safety.

ENHANCE SPACE UTILIZATION

Low profile of the drum motor results in a streamline appearance and allows to fit more belt conveyor into less floor or overhead space. Allows higher density and multiple applications.

REDUCE MAINTENANCE & DOWNTIME

The hermetically sealed drum motor does not require regular maintenance, only a recommended oil change every 50,000 hours of operation.

LOWER ENERGY COSTS

Van der Graaf drum motors operate at 96% mechanical efficiency. The motor and gear reducer are in-line, sealed inside the drum, resulting in lower operating cost compared to conventional drives. The higher efficiency of the internal drive can result in energy savings of up to 30% over conventional exposed-drive conveyors. (Refer to Energy and Cost Savings Analysis - page 18)

REDUCE NOISE LEVELS

Our gears are manufactured using high quality alloy steel, cut and honed to AGMA/ DIN 6 standards, reducing noise to minimal decibel levels which exceeds OSHA requirements for noise.



SSV SANITARY DRUM MOTORS - FEATURES & OPTIONS



The USDA approved, SSV Sanitary Drum motors are a bolt-on design, constructed of 316 stainless steel for corrosion prevention, enhancing stringent hygienic and sanitary standards..

ELECTRIC MOTORS

All Van der Graaf high efficiency electric motors are manufactured to inverter duty standards, are fully reversible and can be supplied in all standard and non-standard voltages and frequencies for three phase or single phase applications.

All material used for the electric motor windings meet Class F standards (155°C). The optional Class H standards (180°C) is required for applications with ambient temperature of 125°F and higher.

All Van der Graaf electric motors are encapsulated by **Vacuum Pressure Impregnation (VPI)** process. This state-of-the-art method is the highest industry standards for electric motor encapsulation. The VPI process increases the longevity of the electric motor and substantially reduces electric motor failures.

GV THERMAL (GVTHERM) OVERLOAD PROTECTION

Thermal overload protectors are devices embedded into the motor windings. When temperature within the motor exceeds the rated temperature, the GVTHERM will trip, causing an open circuit between the respective GVTHERM leads.

NON-STANDARD LENGTH / EXTRA LONG FACE WIDTH

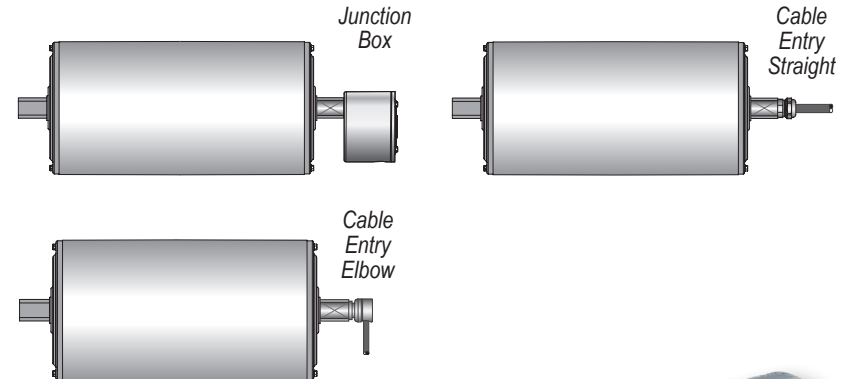
Please contact your Van der Graaf technical representative for details.

LAGGING

Van der Graaf offers a complete line of blue or white nitrile rubber and white urethane USDA, FDA approved food grade lagging. Bonded to the drum using hot vulcanized method, the seamless lagging provides traction in standard and wet applications. Available in standard or custom thicknesses, with smooth, chevron/herringbone or diamond patterns.

ELECTRICAL POWER CONNECTION

Junction Box or Cable Entry power hook-up is available as standard.



DRUM PROFILES

Crowns

To help track the belt more effectively, the shell of all Van der Graaf drum motors are machined to convex crown 0.7% of the diameter as standard. Other profiles such as trapezoidal or flat face are also available.

V-Grooves

A variety of industry standard V-grooves are-machined into the shell of the drum motor for optimal tracking. Single or multiple v-groove locations are available on all Van der Graaf drum motors.

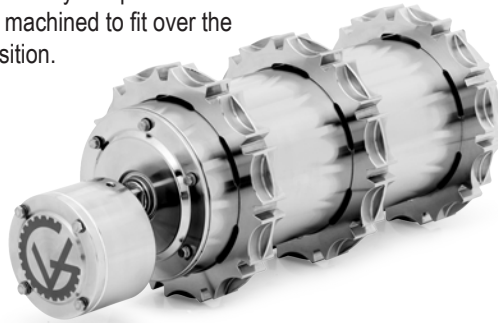


FOR MODULAR, WIRE MESH AND MONOLITHIC THERMOPLASTIC CONVEYOR BELT PROFILES

Van der Graaf offers sprocketed drum motors and drum motors with belt profiles machined directly on to the stainless steel drum, designed in accordance with most major belt manufacturers specifications.

Sprocketed Drum Motors

Available with all 316 stainless steel or nylon sprockets for most major conveyor belt profiles, machined to fit over the drum motor; floating or fixed to position.

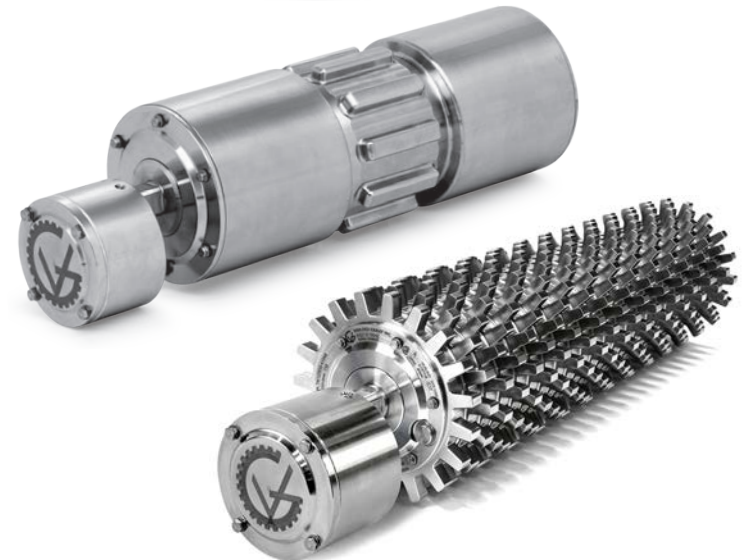
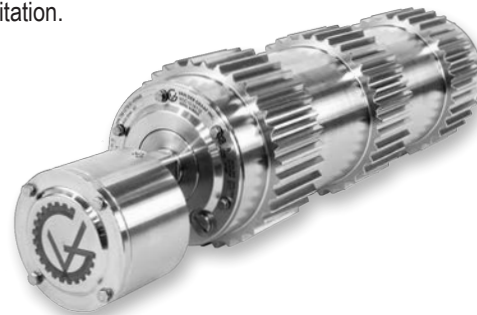


Continuous Profiled Drum Motors

The drum motor with a continuous profile has the belt profile machined directly on to the 316 stainless steel drum, designed in accordance with most major belt manufacturers specifications, to drive modular, wire mesh and monolithic thermoplastic conveyor belts without the use of sprockets. The continuous profiled drum motor, does not have crevices for food by-product to get trapped, reduces conveyor-cleaning time and eliminates areas for bacteria to harbor, contributing to a higher level of sanitation.

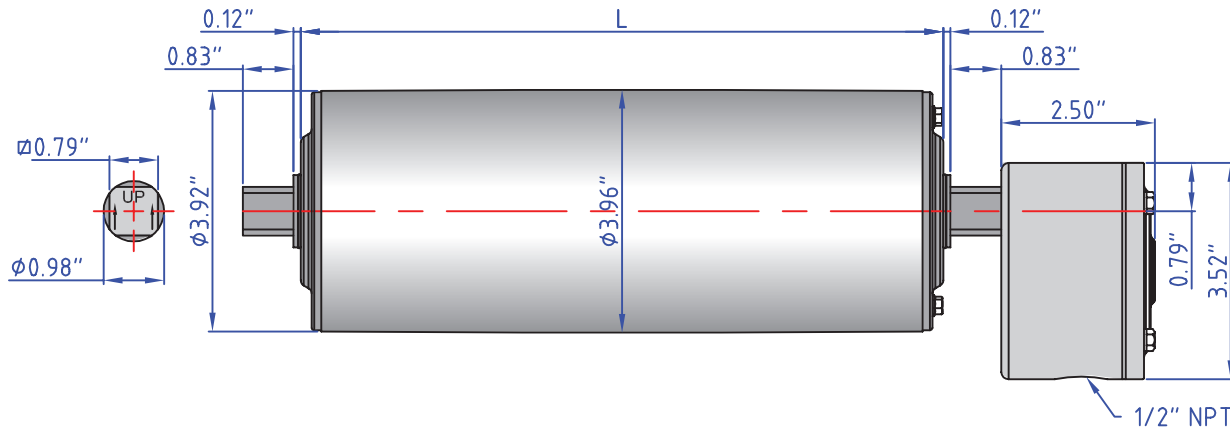


Continuous Profiles



SSV TM100 SERIES DIMENSIONS (4.0" diameter)

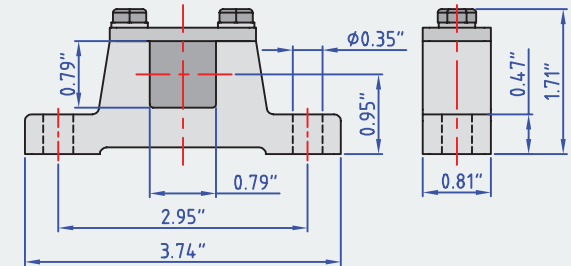
SSV TM100B25 Drum Motor (matching Idler KT100B25**)



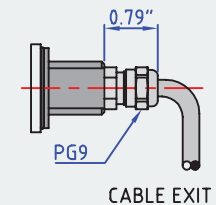
Standard drum motor face widths* (L) in inches:

10.24	10.83	12.20	14.17	16.14	18.11	20.08	22.05	24.02
25.98	27.95	29.92	31.89	33.86	35.83	37.80	39.76	41.73
43.70	45.67							

Bracket AB 20



Optional Cable Type



*Some face widths are not available in all horsepower. For minimum available face widths refer to page 16.

**Idler dimensions are identical to the drum motor with no junction box.

SSV TM100 SERIES SPECIFICATIONS (4.0" diameter)



0.25 HP

V (ft/min) M/G	409 4/S2	327 4/S2	291 4/S2	258 4/S2	227 4/S2	199 4/S2	177 4/PL2	157 4/PL2	149 4/PL2	132 4/PL2	111 4/PL2	106 4/PL2	93 4/PL2	83 4/PL2	69 4/PL2
Belt Pull (lbs)	20	25	28	32	36	41	47	52	55	63	74	78	88	100	119
Drum RPM	397	317	282	250	220	193	172	152	145	128	108	103	90	81	67

V (ft/min) M/G	56 4/PL2	44 4/PL3	37 4/PL3	33 4/PL3	27 4/PL3	23 4/PL3	20 4/PL3	17 4/PL3	14 4/PL3						
Belt Pull (lbs)	148	189	225	253	274	274	274	274	274						
Drum RPM	54	43	36	32	26	22	19	17	14						

0.16 HP

V (ft/min) M/G	258 4/S2	227 4/S2	199 4/S2	177 4/PL2	157 4/PL2	149 4/PL2	132 4/PL2	111 4/PL2	106 4/PL2	93 4/PL2	83 4/PL2	69 4/PL2	56 4/PL2	44 4/PL3	37 4/PL3
Belt Pull (lbs)	20	23	27	30	34	35	40	48	50	57	64	76	94	121	144
Drum RPM	250	220	193	172	152	145	128	108	103	90	81	67	54	43	36

V (ft/min) M/G	33 4/PL3	27 4/PL3	23 4/PL3	20 4/PL3	17 4/PL3	14 4/PL3									
Belt Pull (lbs)	162	193	230	259	274	274									
Drum RPM	32	26	22	19	17	14									

0.16 HP

V (ft/min) M/G	305 6/S2	273 6/S2	218 6/S2	194 6/S2	172 6/S2	152 6/S2	105 6/PL2	99 6/PL2	88 6/PL2	74 6/PL2	71 6/PL2	62 6/PL2	55 6/PL2	46 6/PL2	37 6/PL2
Belt Pull (lbs)	17	19	24	27	31	35	50	53	60	71	74	85	96	114	142
Drum RPM	296	265	212	188	167	148	102	96	85	72	69	60	53	45	36

V (ft/min) M/G	29 6/PL3	24 6/PL3	22 6/PL3	18 6/PL3	15 6/PL3	13 6/PL3	11 6/PL3	9 6/PL3							
Belt Pull (lbs)	181	216	243	274	274	274	274	274							
Drum RPM	28	23	21	17	15	13	11	9							

0.14 HP

V (ft/min) M/G	258 4/S2	227 4/S2	199 4/S2	177 4/PL2	157 4/PL2	149 4/PL2	132 4/PL2	111 4/PL2	106 4/PL2	93 4/PL2	83 4/PL2	69 4/PL2	56 4/PL2	44 4/PL3	37 4/PL3
Belt Pull (lbs)	18	20	23	26	29	31	35	42	42	50	56	67	83	106	126
Drum RPM	250	220	193	172	152	145	128	108	103	90	81	67	54	43	36

V (ft/min) M/G	33 4/PL3	27 4/PL3	23 4/PL3	20 4/PL3	17 4/PL3	14 4/PL3									
Belt Pull (lbs)	142	169	201	227	271	274									
Drum RPM	32	26	22	19	17	14									

V = Belt Speed (ft/min)

M/G = Motor/Gear Reducer Configuration (at rated horsepower)

High Speed
Low Torque



Low Speed
High Torque

SSV TM100 SERIES SPECIFICATIONS (4.0" diameter)



0.11 HP

V (ft/min) M/G	194 6/S2	172 6/S2	151 6/S2	118 6/PL2	105 6/PL2	99 6/PL2	88 6/PL2	74 6/PL2	71 6/PL2	62 6/PL2	55 6/PL2	46 6/PL2	37 6/PL2	29 6/PL3	24 6/PL3
Belt Pull (lbs)	19	21	24	31	35	36	41	49	51	58	66	79	97	125	148
Drum RPM	188	167	147	115	102	96	85	72	69	60	53	45	36	28	23
V (ft/min) M/G	22 6/PL3	18 6/PL3	15 6/PL3	13 6/PL3	11 6/PL3	9 6/PL3									
Belt Pull (lbs)	167	200	237	267	274	274									
Drum RPM	21	17	15	13	11	9									

V = Belt Speed (ft/min)

M/G = Motor/Gear Reducer Configuration (at rated horsepower)

High Speed
Low Torque

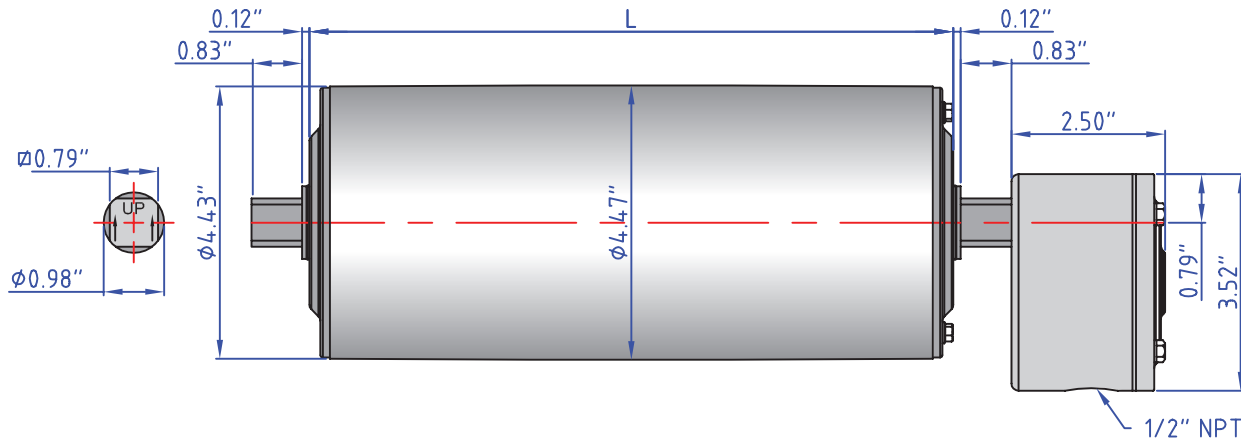


Low Speed
High Torque

SSV TM113 SERIES DIMENSIONS (4.5" diameter)



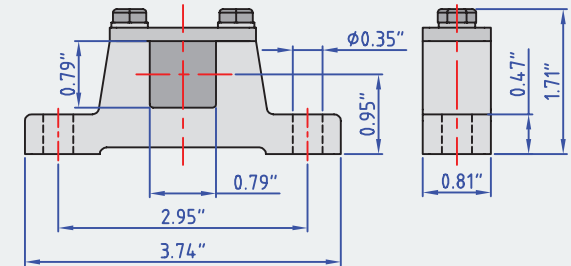
SSV TM113B25 Drum Motor (matching Idler KT113B25**)



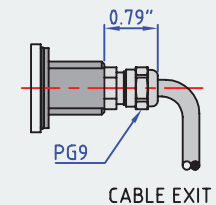
Standard drum motor face widths* (L) in inches:

10.24	10.83	12.20	14.17	16.14	18.11	20.08	22.05	24.02
25.98	27.95	29.92	31.89	33.86	35.83	37.80	39.76	41.73
43.70	45.67							

Bracket AB 20



Optional Cable Type



*Some face widths are not available in all horsepower. For minimum available face widths refer to page 16.

**Idler dimensions are identical to the drum motor with no junction box.

SSV TM113 SERIES SPECIFICATIONS (4.5" diameter)



0.75 HP

V (ft/min) M/G	1039 2/S2	945 2/S2	756 2/S2	661 2/S2	591 2/S2	520 2/S2	449 2/S2
Belt Pull (lbs)	22	24	31	35	39	45	50
Drum RPM	1211	1100	880	770	688	605	523

0.5 HP

V (ft/min) M/G	1039 2/PL2	945 2/S2	756 2/S2	661 2/S2	591 2/S2
Belt Pull (lbs)	15	17	21	23	26
Drum RPM	1211	1100	880	770	688

0.5 HP

V (ft/min) M/G	520 4/S2	472 4/S2	378 4/S2	331 4/S2	295 4/S2	260 4/S2	224 4/S2	201 4/PL2	177 4/S2	165 4/PL2	154 4/PL2	142 4/S2	130 4/PL2	118 4/PL2	106 4/PL2
Belt Pull (lbs)	30	33	41	47	52	60	69	75	88	91	98	109	116	127	141
Drum RPM	605	550	440	385	344	303	261	234	206	193	179	165	151	138	124
V (ft/min) M/G	94 4/PL2	80 4/PL2	64 4/PL2												
Belt Pull (lbs)	161	187	215												
Drum RPM	110	94	74												

0.34 HP

V (ft/min) M/G	1039 2/S2	945 2/S2	756 2/S2	661 2/S2	591 2/S2
Belt Pull (lbs)	10	11	14	16	18
Drum RPM	1211	1100	880	770	688

0.34 HP

V (ft/min) M/G	520 4/S2	472 4/S2	378 4/S2	331 4/S2	295 4/S2	260 4/S2	224 4/S2	201 4/PL2	177 4/PL2	165 4/PL2	154 4/PL2	130 4/PL2	118 4/PL2	106 4/PL2	94 4/PL2
Belt Pull (lbs)	21	22	28	32	36	40	47	50	57	62	66	79	86	95	108
Drum RPM	605	550	440	385	344	303	261	234	206	193	179	151	138	124	110
V (ft/min) M/G	80 4/PL2	64 4/PL2													
Belt Pull (lbs)	126	159													
Drum RPM	94	74													

V = Belt Speed (ft/min)

M/G = Motor/Gear Reducer Configuration (at rated horsepower)

High Speed
Low Torque



Low Speed
High Torque

SSV TM113 SERIES SPECIFICATIONS (4.5" diameter)



0.34 HP

V (ft/min) M/G	236 6/S2	213 6/S2	189 6/S2	165 6/S2	142 6/S2	118 6/S2	94 6/S2	69 6/PL2	59 6/PL2	50 6/PL2	40 6/PL2
Belt Pull (lbs)	45	50	55	64	74	89	111	149	172	205	215
Drum RPM	275	248	220	193	165	138	110	80	69	58	47

0.25 HP

V (ft/min) M/G	378 4/S2	331 4/S2	295 4/S2	260 4/S2	224 4/S2	201 4/PL2	177 4/PL2	165 4/PL2	154 4/PL2	130 4/PL2	118 4/PL2	106 4/PL2	94 4/PL2	80 4/PL2	64 4/PL2
Belt Pull (lbs)	20	22	25	29	34	36	41	44	48	56	62	69	78	91	115
Drum RPM	440	385	344	303	261	234	206	193	179	151	138	124	110	94	74
V (ft/min) M/G	47 4/PL3	43 4/PL3	38 4/PL3	31 4/PL3	26 4/PL3										
Belt Pull (lbs)	148	165	185	215	215										
Drum RPM	55	50	44	36	30										

0.25 HP

V (ft/min) M/G	213 6/S2	189 6/S2	165 6/S2	142 6/S2	59 6/PL2	50 6/PL2	40 6/PL2
Belt Pull (lbs)	36	40	46	53	123	148	182
Drum RPM	248	220	193	165	69	58	47

0.16 HP

V (ft/min) M/G	260 4/S2	224 4/S2	201 4/PL2	177 4/PL2	165 4/PL2	154 4/PL2	130 4/PL2	118 4/PL2	106 4/PL2	94 4/PL2	80 4/PL2	64 4/PL2	43 4/PL3	26 4/PL3	17 4/PL3
Belt Pull (lbs)	20	22	24	27	30	32	37	41	46	51	61	77	109	180	215
Drum RPM	303	261	234	206	193	179	151	138	124	110	94	74	50	30	19

V = Belt Speed (ft/min)

M/G = Motor/Gear Reducer Configuration (at rated horsepower)

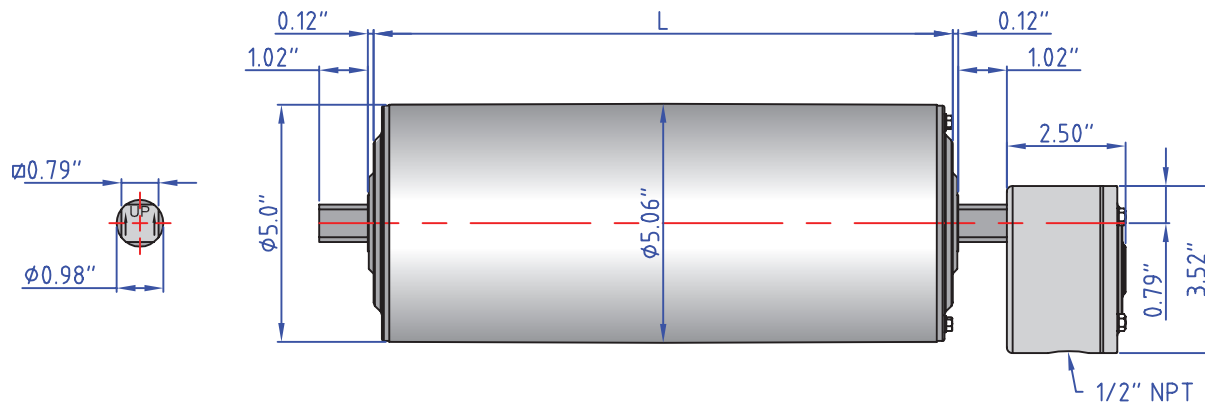
High Speed
Low Torque



Low Speed
High Torque

SSV TM127 SERIES DIMENSIONS (5.0" diameter)

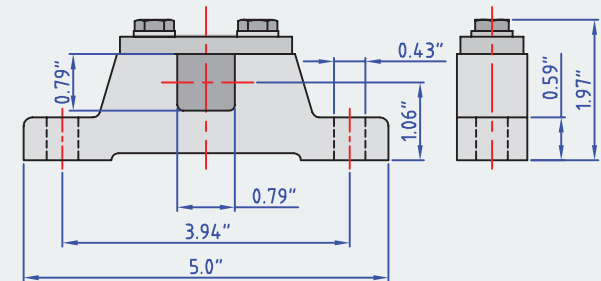
SSV TM127B25 Drum Motor (matching Idler KT127B25**)



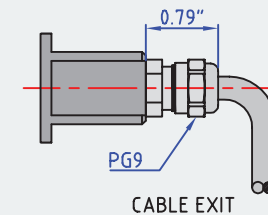
Standard drum motor face widths* (L) in inches:

10.83	11.81	13.78	15.75	17.72	19.69	21.65	23.62	25.59
27.56	29.53	31.50	33.46	35.43	37.40	39.37	41.34	43.31
45.28	47.24							

Bracket AB 25



Optional Cable Type



*Some face widths are not available in all horsepower. For minimum available face widths refer to page 16.

**Idler dimensions are identical to the drum motor with no junction box.

SSV TM127 SERIES SPECIFICATIONS (5.0" diameter)



1.5 HP

V (ft/min) M/G	316 4/S2	237 4/S2	201 4/S2	124 4/S2
Belt Pull (lbs)	156	207	244	396
Drum RPM	243	182	155	95

1.0 HP

V (ft/min) M/G	646 2/S2	484 2/S2	411 2/S2	316 4/S2	237 4/S2	201 4/S2	147 4/S2	124 4/S2	110 4/S2	73 4/PL2	58 4/PL2	49 4/PL2	38 4/PL2
Belt Pull (lbs)	51	68	80	104	138	163	223	264	298	449	565	669	767
Drum RPM	497	372	316	243	182	155	113	95	85	56	45	38	29

0.75 HP

V (ft/min) M/G	651 2/S2	488 2/S2	414 2/S2	328 4/S2	246 4/S2	209 4/S2	152 4/S2	134 4/S3	114 4/S2	97 4/S2	87 6/S2	74 6/S2	62 4/S3	56 4/S3	50 4/PL2
Belt Pull (lbs)	38	50	59	75	100	118	162	183	216	253	282	332	366	408	491
Drum RPM	501	375	318	252	189	161	117	103	88	75	67	57	48	43	38
V (ft/min) M/G	40 4/PL2														
Belt Pull (lbs)	614														
Drum RPM	31														

0.5 HP

V (ft/min) M/G	321 4/S2	241 4/S2	205 4/S2	149 4/S2	131 4/S2	98 4/S2	83 4/S2	64 6/S2	54 4/S3	41 4/S3	33 6/PL2	26 6/PL2
Belt Pull (lbs)	51	68	80	110	125	167	197	256	303	400	496	630
Drum RPM	247	185	158	115	101	75	64	49	42	32	25	20

0.34 HP

V (ft/min) M/G	322 4/S2	241 4/S2	205 4/S2	149 4/S2	131 4/S2	99 4/S2	84 4/S2	61 4/S3	54 4/S3	41 4/S3
Belt Pull (lbs)	35	46	54	75	85	113	133	183	206	272
Drum RPM	248	185	158	115	101	76	65	47	42	32

0.25 HP

V (ft/min) M/G	11.1 4/PL3	8.7 4/PL3	7.3 4/PL3	5.8 4/PL3
Belt Pull (lbs)	738	767	767	767
Drum RPM	8.5	6.7	5.6	4.5

V = Belt Speed (ft/min)

M/G = Motor/Gear Reducer Configuration (at rated horsepower)

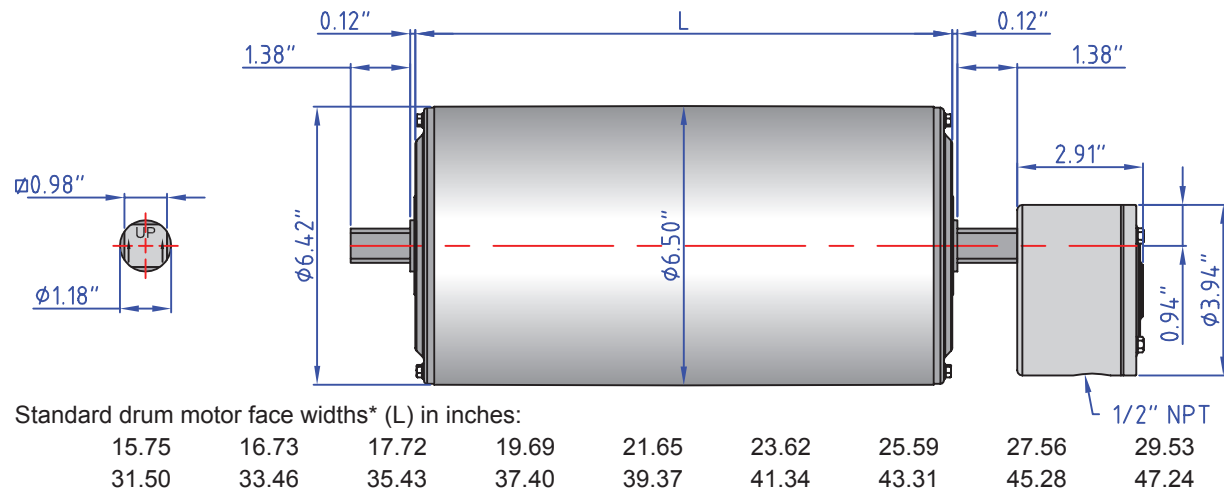
High Speed
Low Torque

2/S2 4/S2 6/S2 2/S3 4/S3 6/S3 2/PL2 4/PL2 6/PL2 2/PL3 4/PL3 6/PL3

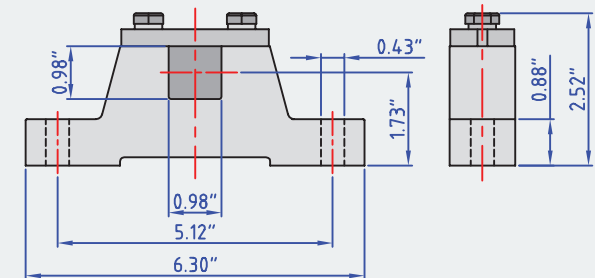
Low Speed
High Torque

SSV TM160 SERIES DIMENSIONS (6.5" diameter)

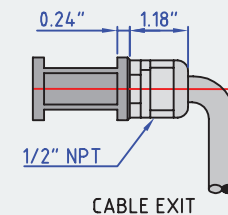
SSV TM160B30 Drum Motor (matching Idler KT160B30**)



Bracket AB 30



Optional Cable Type



*Some face widths are not available in all horsepower. For minimum available face widths refer to page 16.

**Idler dimensions are identical to the drum motor with no junction box.

SSV TM160 SERIES SPECIFICATIONS (6.5" diameter)



3.0 HP

V (ft/min) M/G	945 2/S2	803 2/S2	661 2/S2	614 2/S2	496 2/S2	402 2/S2	331 2/S2	307 2/S2	283 2/S2	272 2/S2	236 2/S2	213 2/S2	201 2/S2	189 2/S2
Belt Pull (lbs)	97	152	139	151	186	230	280	301	325	339	391	434	460	488
Drum RPM	556	472	389	361	292	236	195	181	167	160	139	125	118	111

2.0 HP

V (ft/min) M/G	945 2/S2	803 2/S2	661 2/S2	614 2/S2	591 4/S2	496 4/S2	425 4/S2	402 2/S2	378 4/S2	331 2/S2	307 4/S2	283 2/S2	272 2/S2	260 4/S2	236 2/S2
Belt Pull (lbs)	66	79	95	103	107	127	148	157	166	191	205	223	232	242	266
Drum RPM	556	472	389	361	347	292	250	236	222	195	181	167	160	153	139
V (ft/min) M/G	213 2/S2	201 4/S2	189 4/S2	177 4/S2	165 4/S2	154 4/S2	142 4/S2	130 4/S2	108 2/PL2	87 2/PL2					
Belt Pull (lbs)	296	313	333	355	381	410	444	484	560	560					
Drum RPM	125	118	111	104	97	90	83	76	64	51					

1.5 HP

V (ft/min) M/G	472 4/S2	402 4/S2	331 4/S2	295 4/S2	260 4/S2	201 4/S2	165 4/S2	154 4/S2	142 4/S2	130 4/S2	118 4/S2	106 4/S2	94 4/S2		
Belt Pull (lbs)	98	115	139	156	178	230	280	301	325	355	391	434	489		
Drum RPM	278	236	195	174	153	118	97	90	83	76	69	63	56		

1.0 HP

V (ft/min) M/G	472 4/S2	402 4/S2	331 4/S2	295 4/S2	260 4/S2	201 4/S2	177 4/S2	165 4/S2	154 4/S2	142 4/S2	130 4/S2	118 4/S2	106 4/S2	94 4/S2	80 4/S2
Belt Pull (lbs)	66	79	95	107	122	157	178	191	205	223	242	266	296	333	392
Drum RPM	278	236	195	174	153	118	104	97	90	83	76	69	63	56	47
V (ft/min) M/G	54 4/PL2														
Belt Pull (lbs)	561														
Drum RPM	32														

0.75 HP

V (ft/min) M/G	472 4/S2	402 4/S2	331 4/S2	295 4/S2	260 4/S2	201 4/S2	177 4/S2	165 4/S2	130 4/S2	154 4/S2	118 4/S2	106 4/S2	94 4/S2	80 4/S2	73 4/S2
Belt Pull (lbs)	49	57	70	79	89	115	130	139	178	150	195	217	244	287	315
Drum RPM	278	236	195	174	153	118	104	97	76	90	69	63	56	47	43
V (ft/min) M/G	43 4/PL2														
Belt Pull (lbs)	525														
Drum RPM	25														

V = Belt Speed (ft/min)

M/G = Motor/Gear Reducer Configuration (at rated horsepower)

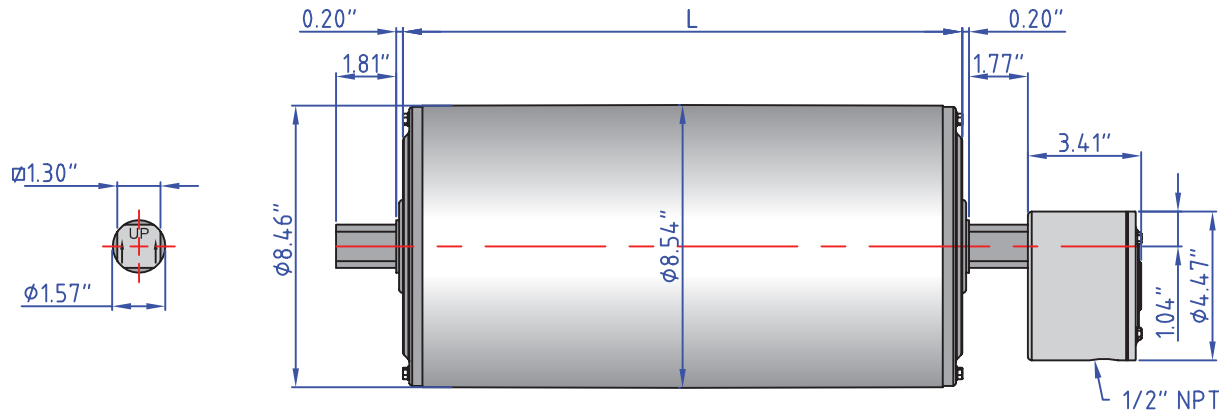
High Speed
Low Torque



Low Speed
High Torque

SSV TM215 SERIES DIMENSIONS (8.5" diameter)

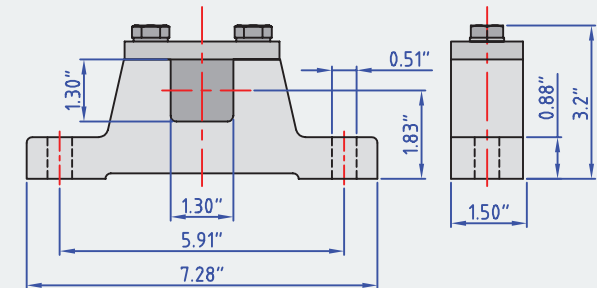
SSV TM215B40 Drum Motor (matching Idler KT215B40**)



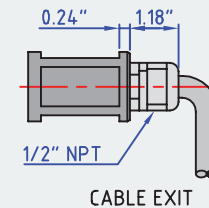
Standard drum motor face widths* (L) in inches:

19.69	21.65	23.62	25.59	27.56	29.53	31.50	33.46	35.43
37.40	39.37	41.34	43.31	45.28	47.24			

Bracket AB 40



Optional Cable Type



*Some face widths are not available in all horsepower. For minimum available face widths refer to page 16.

**Idler dimensions are identical to the drum motor with no junction box.

SSV TM215 SERIES SPECIFICATIONS (8.5" diameter)



7.5 HP

V (ft/min) M/G	1117 2/S2	912 2/S2	821 2/S2	657 2/S2	583 2/S2	547 2/S3	465 2/S2	403 2/S2	358 2/S2	335 2/S2	310 2/S2	255 2/S2	228 2/S3	142 2/PL2	129 2/PL2
Belt Pull (lbs)	198	243	270	337	285	405	476	549	618	662	715	651	972	1559	1714
Drum RPM	504	412	371	297	263	247	210	182	162	151	140	115	103	64	58

5.0 HP

V (ft/min) M/G	1117 2/S2	912 2/S2	821 2/S2	657 2/S2	583 2/S2	547 2/S3	465 2/S2	403 2/S2	358 2/S2	335 2/S2	310 2/S2	275 4/S3	255 2/S2	238 2/S2	234 4/S2
Belt Pull (lbs)	162	198	220	275	310	331	389	449	506	540	584	598	710	760	703
Drum RPM	503	411	370	296	263	246	209	182	161	151	140	124	115	107	105
V (ft/min) M/G	228 2/S3	221 2/S3	202 4/S3	198 2/S3	162 2/S3	142 2/PL2	129 2/PL2	114 4/S3	71 4/PL2	65 4/PL2					
Belt Pull (lbs)	794	819	815	914	1117	1275	1403	1443	2317	2531					
Drum RPM	103	100	91	89	73	64	58	51	32	29					

3.0 HP

V (ft/min) M/G	679 4/S2	559 4/S2	483 4/S2	398 4/S2	325 4/S2	293 4/S2	233 4/S2	234 4/S2	208 4/S2	202 4/S2	166 4/S2	155 4/S2	144 4/S2	128 4/S2	119 4/S2
Belt Pull (lbs)	130	158	183	222	272	302	379	377	425	437	533	569	614	692	741
Drum RPM	307	253	218	180	147	132	105	106	94	91	75	70	65	58	54
V (ft/min) M/G	114 4/S3	99 4/S3	81 4/S3	71 4/PL2	70 4/S3	65 4/PL2	63 4/S3	47 6/PL2	43 6/PL2						
Belt Pull (lbs)	774	893	1087	1241	1254	1365	1412	1887	2075						
Drum RPM	52	45	37	32	32	29	28	21	19						

2.0 HP

V (ft/min) M/G	685 4/S2	564 4/S2	488 2/S2	402 4/S2	376 6/S2	328 4/S2	295 4/S2	236 4/S2	210 4/S2	204 4/S2	197 6/S2	185 4/S2	167 4/S2	157 6/S2	145 4/S2
Belt Pull (lbs)	82	99	115	140	164	171	190	237	267	275	314	304	335	394	386
Drum RPM	309	255	220	181	170	148	133	107	95	92	89	83	76	71	65
V (ft/min) M/G	136 6/S2	129 4/S2	120 4/S2	111 4/S2	104 6/S2	97 6/S2	86 6/S2	77 6/S3	71 4/S3	67 6/S3	55 6/S3	48 6/PL2	47 6/S3	44 6/PL2	
Belt Pull (lbs)	455	435	466	503	592	639	719	805	789	928	1131	1291	1304	1419	
Drum RPM	61	58	54	50	47	44	39	35	32	30	25	22	21	20	

V = Belt Speed (ft/min)

M/G = Motor/Gear Reducer Configuration (at rated horsepower)

High Speed
Low Torque



Low Speed
High Torque

MINIMUM FACE WIDTH (L in inches)



SSV TM100																	
HP	0.25			0.16						0.14							
MOTOR/GEAR REDUCER	4/S2	4/PL2	4/PL3	4/S2	4/PL2	4/PL3	6/S2	6/PL2	6/PL3	4/S2	4/PL2	4/PL3					
MINIMUM FACE WIDTH (L)	12.20	12.20	14.17	12.20	12.20	14.17	12.20	12.20	14.17	10.24	10.24	12.20					
SSV TM113																	
HP	0.75	0.5			0.34					0.25							
MOTOR/GEAR REDUCER	2/S2	2/S2	4/S2	4/PL2	2/S2	4/S2	4/PL2	6/S2	6/PL2	4/S2	4/PL2	4/PL3					
MINIMUM FACE WIDTH (L)	12.20	12.20	14.17	14.17	10.24	12.20	12.20	14.17	14.17	12.20	12.20	14.17					
SSV TM127																	
HP	1.5	1.0			0.75				0.5				0.34		0.25		
MOTOR/GEAR REDUCER	4/S2	2/S2	4/S2	4/PL2	2/S2	4/S2	4/S3	4/PL2	6/S2	4/S2	4/S3	4/PL2	4/S2	4/S3	4/PL3		
MINIMUM FACE WIDTH (L)	13.78	12.80	12.80	14.76	12.80	11.81	12.80	13.78	12.80	11.81	12.80	13.78	10.83	11.81	14.76		
SSV TM160																	
HP	3.0	2.0			1.5	1.0		0.75									
MOTOR/GEAR REDUCER	2/S2	2/S2	4/S2	2/PL2	4/S2	4/S2	4/PL2	4/S2	4/PL2								
MINIMUM FACE WIDTH (L)	17.72	15.75	17.72	16.73	15.75	15.75	16.73	15.75	16.73								
SSV TM215																	
HP	7.5			5.0						3.0				2.0			
MOTOR/GEAR REDUCER	2/S2	2/S3	2/PL2	2/S2	2/S3	2/PL2	4/S2	4/S3	4/PL2	4/S2	4/S3	4/PL2	6/PL2	4/S2	6/S2	6/S3	6/PL2
MINIMUM FACE WIDTH (L)	21.65	22.64	23.62	21.65	22.64	23.62	21.65	22.64	23.62	18.70	19.69	23.62	23.62	18.70	21.65	22.64	23.62

ELECTRIC MOTOR FULL LOAD AMP



SSV TM100

RPM	1740			1125												
HP	0.25	0.16	0.14	0.16	0.11											
Full Load Amps at:																
240v	1.16	0.80	0.72	0.80	0.64											
480v	0.58	0.40	0.36	0.40	0.32											
600v	0.45	0.32	0.29	0.36	0.26											

SSV TM113

RPM	3400		1740				1125									
HP	0.5	0.34	0.5	0.34	0.25	0.16	0.25									
Full Load Amps at:																
240v	1.80	1.52	2.00	1.62	1.16	0.72	1.16									
480v	0.90	0.76	1.00	0.81	0.58	0.36	0.58									
600v	0.72	0.60	0.81	0.64	0.40	0.29	0.45									

SSV TM127

RPM	3400			1740					1125							
HP	1.0	0.75	0.5	1.5	1.0	0.75	0.5	0.34	0.75	0.5						
Full Load Amps at:																
240v	4.08	3.24	2.88	4.90	3.16	2.50	2.28	1.80	2.88	2.28						
480v	2.04	1.62	1.44	2.45	1.58	1.25	1.14	0.90	1.44	1.14						
600v	1.62	1.28	1.14	1.96	1.25	1.00	0.91	0.81	1.14	0.90						

SSV TM160

RPM	3400	1740				1125										
HP	3.0	2.0	1.5	1.0	0.75	1.0	0.75	0.5	0.34							
Full Load Amps at:																
240v	8.38	6.10	5.78	4.60	3.66	5.14	3.66	2.88	1.82							
480v	4.19	3.05	2.89	2.30	1.83	2.57	1.83	1.44	0.91							
600v	3.35	2.42	2.30	1.83	1.44	2.04	1.44	1.14	0.76							

SSV TM215

RPM	3400		1740					1125								
HP	7.5	5.5	5.0	4.0	3.0	2.0	1.5	3.0	2.0	1.5	1.0	0.75				
Full Load Amps at:																
240v	20.06	13.96	12.26	10.60	8.25	8.14	5.78	9.26	9.74	7.74	5.78	4.58				
480v	10.03	6.98	6.13	5.30	4.13	4.07	2.89	4.63	4.87	3.87	2.89	2.29				
600v	8.04	5.60	4.95	4.34	3.30	3.24	2.30	3.65	3.87	2.89	2.30	1.83				

SCOPE

This is a comparative analysis concerning the energy consumption of a conventional conveyor with an electric motor, a gear reducer and a chain drive, and a conveyor driven by a Van der Graaf drum motor.

HYPOTHESIS

There will be considered that both conveyors, the conventional conveyor and the conveyor driven by Van der Graaf Drum Motor:

- have the same rated output power,
- operate in the same environmental conditions (temperature, pressure, humidity, altitude),
- supplied power have the same parameters (phase number, line voltage, frequency),
- loaded at the same constant output power, equal by the rated output power, for the whole period of the considered operation time.

CALCULATION

- The conventional conveyor (index C from conventional) operates with a Baldor motor VM3615T, with rated output power 5 hp, (or 3730 W, rated speed 1750 rpm, rated voltage 3 x 460 V, rated frequency 60 Hz), a coupling, a right angle gear reducer with a gear ratio 20, and a chain drive with ratio 1.5. The electric motor has the rated efficiency 85.5%, the coupling has the efficiency 99%, the gear reducer is a worm gear reducer with efficiency of 87% [6.5] and the chain drive has the efficiency 75%. (See page 41, Diagram B)

The total efficiency of the Conventional Conveyor is:

$$\eta_C = 0.855 \times 0.99 \times 0.87 \times 0.75 = 0.552, \text{ or } 55.2\%$$

The input power (index 1 for input and 2 for output) of the conventional conveyor is:

$$P_{1C} = P_{2C} / \eta_C = 3730 / 0.552 = 6757.25 \text{ W} \approx 6.757 \text{ kW}$$

- The conveyor (index M from drum motor) driven by a Van der Graaf Drum Motor is considered. It has the same rated output power as the conventional conveyor, 5 hp or 3730 W and contains an electric motor with rated efficiency 87% and a parallel-shaft gear reducer with efficiency 0.96%. (See page 41, Diagram A)

The total efficiency of the conveyor driven by Van der Graaf Drum Motor is:

$$\eta_M = 0.87 \times 0.96 = 0.835, \text{ or } 83.5\%$$

The input power (1 for input and 2 for output) of the conveyor driven by Van der Graaf drum motor is:

$$P_M = P_{2M} / \eta_M = 3730 / 0.835 = 4467 \text{ W} = 4.467 \text{ kW}$$

- An operation time of both conveyors is determined taking into consideration that both conveyors work 8 hours shift, 2 shifts per day, 5 days per week, and 52 weeks per year, $t = 8 \text{ hours/shift} \times 2 \text{ shift/day} \times 5 \text{ days/week} \times 52 \text{ weeks/year} = 4160 \text{ hours/year}$.

- The electric energy consumed by the conventional conveyor, in the considered operation time, is determined by the product of the input active power and the operation time:

$$P_C = P_{1C} \times t = 6.757 \text{ kW} \times 4160 \text{ hours/year} = 28109.12 \text{ kWh/yr} \approx 28109 \text{ kWh/yr}$$

- The electric energy consumed by the conveyor driven by Van der Graaf Drum Motor, in the considered operation time, is similarly determined:

$$E_M = P_{1M} \times t = 4.467 \text{ kW} \times 4160 \text{ hours/year} = 18583 \text{ kWh/yr}$$

- An average price of the electric energy in USA is considered: $p = 0.08 \text{ USD/kWh}$.

- The cost of the electric energy per year of the conventional conveyor will be calculated as the product between the consumed electric energy in the considered operation time and the specific price of the electric energy:

$$C_C = E_C \times p = 28109 \text{ kWh/yr} \times 0.08 \text{ USD/kWh} = 2248.72 \text{ USD/yr} \approx 2249 \text{ USD/yr}$$

- The cost of the electric energy per year of the conveyor driven by Van der Graaf drum motor will be similarly calculated:

$$C_M = E_M \times p = 18583 \text{ kWh/yr} \times 0.08 \text{ USD/kWh} = 1486.64 \text{ USD/yr} \approx 1487 \text{ USD/yr}$$

- The energy saving per year of the higher efficient conveyor, respectively of the conveyor driven by Van der Graaf drum motor, is determined as a difference between the consumed energy of the conventional conveyor and the consumed energy of the conveyor driven by Van der Graaf drum motor, in the considered operation time of one year period (See page 41, Graph 1)

$$ES = E_C - E_M = 28109 \text{ kWh/yr} - 18583 \text{ kWh/yr} = 9526 \text{ kWh/yr}$$

- The cost saving per year of the higher efficient conveyor, respectively of the conveyor with an der Graaf drum motor, is determined as a difference between the cost of the consumed energy of the conventional conveyor and the cost of the consumed energy of the conveyor drive by Van der Graaf drum motor, in the considered operation time of one year period (See page 41, Graph 2)

$$CS = C_C - C_M = 2249 \text{ USD/yr} - 1487 \text{ USD/yr} = 762 \text{ USD/yr}$$

ENERGY COST SAVINGS WITH CONVEYOR DRIVEN BY VAN DER GRAAF DRUM MOTOR IS 762 USD/YEAR

NOTE: If the cost of energy of the conventional conveyor is considered 100%, than the cost of energy of the conveyor driven by Van der Graaf Drum Motor is 66% and the cost savings with the Van der Graaf Drum Motor is 34%.

Diagram A: Conveyor Driven by a Van der Graaf Drum Motor

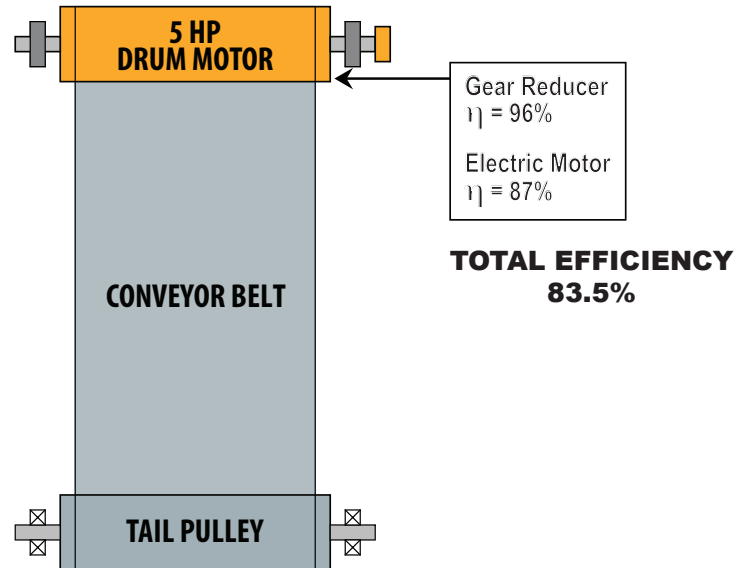
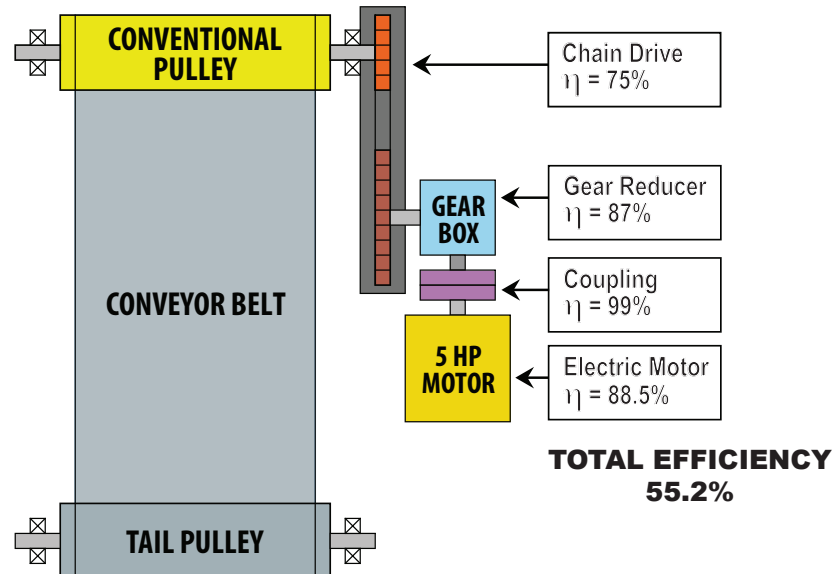
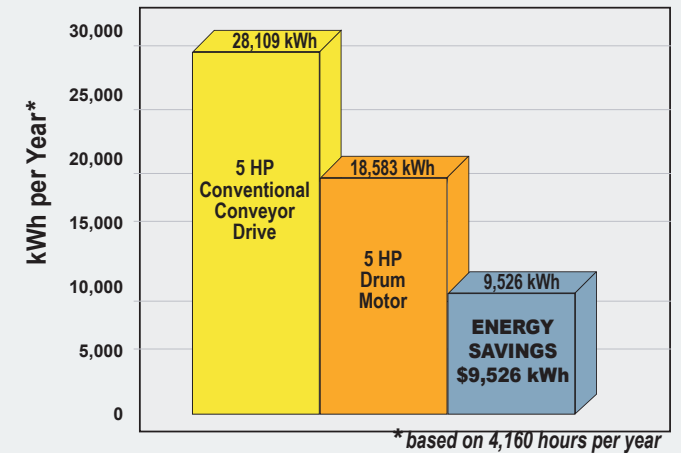


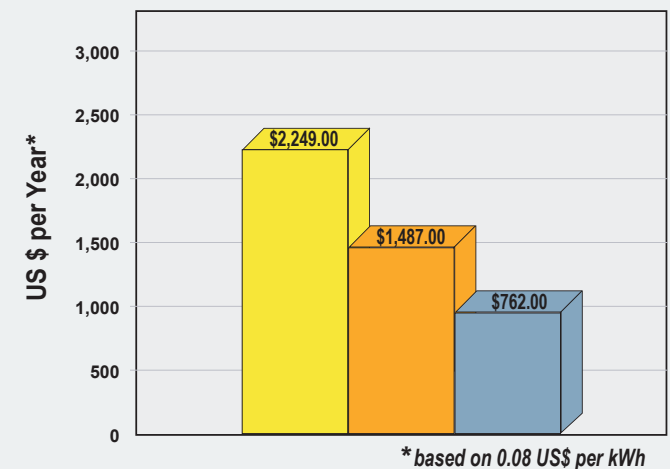
Diagram B: Conveyor Driven by a Conventional Conveyor Drive



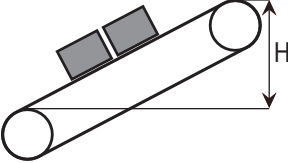
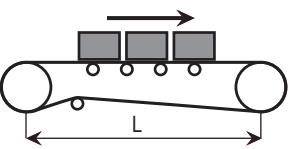
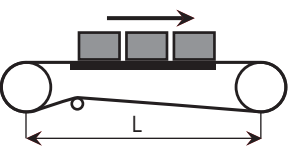
Graph 1: Energy Consumption Comparison



Graph 2: Energy Cost Comparison (@ 0.08 USD/kWh)



BELT PULL CALCULATIONS

Conveying System	F_0	F_1	F_2
	 Force without load	 Force to convey materials horizontally	 Force to convey materials on incline
 Roller bed conveyor	$F_0 = 0.04 (2P + Q) LF$	$F_1 = 0.04 \times R \times LF$	$F_2 = R \times H$
 Slider bed conveyor	$F_0 = 1.1 \times P \times L \times C$	$F_1 = 1.1 \times R \times L \times C$	$F_2 = R \times H$

BELT PULL(BP):

$$BP = (F_0 + F_1 + F_2) \text{ in pounds}$$

F = Force (lbs.)

P = Belt weight (lbs./linear ft.)

Q = Weight of rotating parts in pounds per foot of length of belt conveyor

R = Weight in pounds of conveyed product per foot of belt conveyor length

C = Co-efficient of friction between conveyor belt and top slider bed

L = Center to center length (feet)

H = Height (feet)

CALCULATIONS:

NOTES



NOTES



Canada



USA



Netherlands



Van der Graaf has provided solutions to the material handling industry for over half a century. By making consistent investments in factory automation over the years, Van der Graaf continues as the leading global supplier of conveyor belt drives for a broad range of industries. Whether it's an explosion-proof motor for driving coal mine conveyor belts or sanitary drives in a food processing plant, Van der Graaf has innovative designs to solve application challenges.

Van der Graaf has adhered to a simple principle: design a superior product to meet customer needs in a changing marketplace.

Van der Graaf offers outstanding application engineering and customer service for high quality products and years of low maintenance performance. Our products and people are trusted around the world for reliable performance and personal service