〔IV〕 Banfle Scram · Banflex

1. Product Introduction

Features

Banfle Scram Features

■No Vibrations, for Stable Transmission

Belts are composed of two or three wedges, so vibrations are uncommon. Thus, transmission will be stable and belts are not likely to tilt horizontally or slip off their pulleys, which may occur when vibrations are present.

■Ideally Suited for Level Installation and Operations

Because the belts are linked together, there is no friction between belts and they will not slip off of their pulleys. Thus, even with level installation, there will be no need to use any special pulleys (pulleys with deep grooves, etc).

Common Features of the Banfle Scram and Banflex

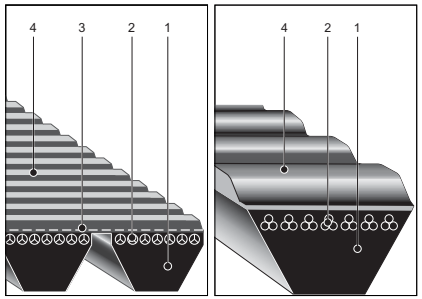
■High-Speed, Smooth Transmission

Due to high precision in the belt's profile dimensions and length, there is no chance of discrepancies in the levelness of the belt on the pulley, thus realizing high-speed and smooth transmission resembling that obtained with flat belts.
The maximum velocity for traditional V-belts is 30～40m/s, but the Banfle scram's designed velocity can reach peaks as high 60m/s.

■Light, Miniaturized Design

Pulleys with smaller diameters can be used, to realize a higher speed ratio, creating a light and miniaturized transmission system. For example, the dual-grade deceleration equipment required when using V-belts can be changed to single-grade deceleration.

Structure



(1) Lower section of rubber
- Outstanding resistance to wear. Composed of polyurethane rubber, which has a high friction factor and outstanding ability to deal with compression-related stress.
- A 60° belt angle which distributes loads evenly.

(2) Tensile members
Polyester cord, with strong resistance to tension and bending fatigue, and minimal permanent elongation.

(3) Reinforced canvas
Polyamide fibers horizontally reinforce the product's rigidity, and guarantee smooth operations.

(4) Rib backing
A special rib structure that can cut down on the force required for bending.
Note)
- When using multiple Banflex products, please be sure to use Scram types.
- So as to fully realize the belt's dynamic functions, a lubricant has been added to the belt. When changes occur, such as a change in the temperature of the working environment, this additive will separate out onto the belt's surface, bearing a whitish tint, or will appear as a liquid. It is meant to moisturize the surface of the belt. After a designated period of time, it will be reabsorbed by the belt. This is a completely normal process, and nothing to worry about.

Belt Sets

Standard Banfle Scrams have 2 or 3 wedges. When there are more than 4 suspended wedges, please use corresponding sets with 2 or 3 wedges, in accordance with Table 1.

Table 1 Belt Sets

Number of suspended wedges	Sets	Number of suspended wedges	Sets
2	2	7	2+3+2
3	3	8	3+2+3
4	2+2	9	3+3+3
5	2+3	10	2+3+3+2
6	3+3	12	3+3+3+3

Matching Sets
When using a number of belts in one set, please make sure that matching sets are used. Equip with belts that are within the range of acceptable lengths from Product Table 1−1.

Table 1－1

Permitted range of discrepancies in belt lengths when using more than one belt (matching limit)	
Nominal outer perimeter	Range of permitted deviations in length (mm)
180～500	0.25
515～1000	0.50
1030～1500	0.75
1550～2300	1.00

Standard Banfle Scram Lengths

Belt Labeling Methods

7－5MS 1000
- 1000: Nominal length (1000mm)
- 5MS: Belt type (5MS type)
- 7: Number of suspended wedges (sets 2＋3＋2)

Shape of the Banfle Scram Belt's Profile

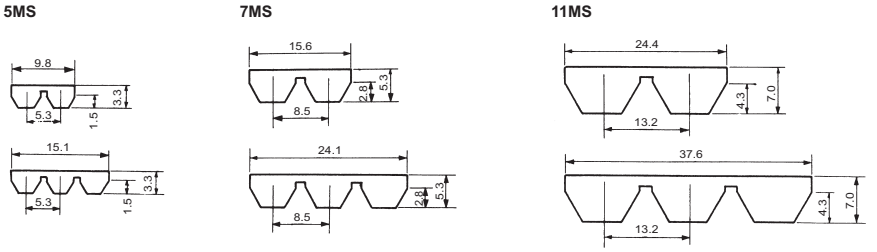


Table 2－① Standard Belt Lengths Unit: mm

5MS				7MS				11MS			
Nominal length	Pitch diameter	Nominal length	Pitch diameter	Nominal length	Pitch diameter	Nominal length	Pitch diameter	Nominal length	Pitch diameter	Nominal length	Pitch diameter
280	277	670	667	500	494	1090	1084	710	701	1280	1271
290	287	690	687	515	509	1120	1114	730	721	1320	1311
300	297	710	707	530	524	1150	1144	750	741	1360	1351
307	304	730	727	545	539	1180	1174	775	766	1400	1391
315	312	750	747	560	554	1220	1214	800	791	1450	1441
325	322	775	772	580	574	1250	1244	825	816	1500	1491
335	332	800	797	600	594	1280	1274	850	841	1550	1541
345	342	825	822	615	609	1320	1314	875	866	1600	1591
355	352	850	847	630	624	1360	1354	900	891	1650	1641
365	362	875	872	650	644	1400	1394	925	916	1700	1691
375	372	900	897	670	664	1450	1444	950	941	1750	1741
387	384	925	922	690	684	1500	1494	975	966	1800	1791
400	397	950	947	710	704	1550	1544	1000	991	1850	1841
412	409	975	972	730	724	1600	1594	1030	1021	1900	1891
425	422	1000	997	750	744	1650	1644	1060	1051	1950	1941
437	434	1030	1027	775	769	1700	1694	1090	1081	2000	1991
450	447	1060	1057	800	794	1750	1744	1120	1111	2060	2051
462	459	1090	1087	825	819	1800	1794	1150	1141	2120	2111
475	472	1120	1117	850	844	1850	1844	1180	1171	2180	2171
487	484	1150	1147	875	869	1900	1894	1220	1211	2240	2231
500	497	1180	1177	900	894	1950	1944	1250	1241	2300	2291
515	512	1220	1217	925	919	2000	1994				
530	527	1250	1247	950	944	2060	2054				
545	542	1280	1277	975	969	2120	2114				
560	557	1320	1317	1000	994	2180	2174				
580	577	1360	1357	1030	1024	2240	2234				
600	597	1400	1397	1060	1054	2300	2294				
615	612	1450	1447								
630	627	1500	1497								
650	647	1850	1847								

Table 3 Tolerated Differences in Belts' Outer Perimeters

Nominal outer perimeter	Permitted differences (mm)
180～307	±2.5
315～615	±4.0
630～1090	±5.0
1120～1500	±6.5
1550～1900	±7.5
1950～2300	±9.0

(Note) When replacing Banflex with a Banfle Scram, the spacing between axles is made smaller (3～5mm for 5M→5MS, 5～6mm for 7M→7MS, 6～8mm for 11M→11 MS). Please take note of this fact.

Standard Banflex Lengths

Belt Labeling Methods

5M - 1000
- Nominal length (1000mm)
- Belt type (5M type)

Shape of a Banflex Belt Profile

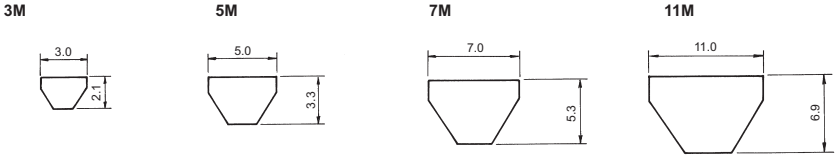


Table 2－② Standard Belt Lengths Unit: mm

3M				5M				7M				11M			
Nominal length	Pitch diameter	Nominal length	Pitch diameter	Nominal length	Pitch diameter	Nominal length	Pitch diameter	Nominal length	Pitch diameter	Nominal length	Pitch diameter	Nominal length	Pitch diameter	Nominal length	Pitch diameter
180	178	437	435	280	278	670	668	500	496	1220	1216	710	703	1750	1743
185	183	450	448	290	288	690	688	515	511	1250	1246	730	723	1800	1793
190	188	462	460	300	298	710	708	530	526	1280	1276	750	743	1850	1843
195	193	475	473	307	305	730	728	545	541	1320	1316	775	768	1900	1893
200	198	487	485	315	313	750	748	560	556	1360	1356	800	793	1950	1943
206	204	500	498	325	323	775	773	580	576	1400	1396	825	818	2000	1993
212	210	515	513	335	333	800	798	600	596	1450	1446	850	843	2060	2053
218	216	530	528	345	343	805		615	611	1500	1496	875	868	2120	2113
224	222	545	543	355	353	825	823	630	626	1550	1546	900	893	2180	2173
230	228	560	558	365	363	850	848	650	646	1600	1596	925	918	2240	2233
236	234	580	578	375	373	875	873	670	666	1650	1646	950	943	2300	2293
243	241	600	598	387	385	900	898	690	686	1700	1696	975	968		
250	248	615	613	400	398	925	923	710	706	1750	1746	1000	993		
258	256	630	628	412	410	950	948	730	726	1800	1796	1030	1023		
265	263	650	648	425	423	975	973	750	746	1850	1846	1060	1053		
272	270	670	668	437	435	1000	998	775	771	1900	1896	1090	1083		
280	278	690	688	450	448	1030	1028	800	796	1950	1946	1120	1113		
290	288	710	708	462	460	1060	1058	825	821	2000	1996	1150	1143		
300	298	730	728	475	473	1090	1088	850	846	2060	2056	1180	1173		
307	305	750	748	487	485	1120	1118	875	871	2120	2116	1220	1213		
315	313			500	498	1150	1148	900	896	2180	2176	1250	1243		
325	323			515	513	1180	1178	925	921	2240	2236	1280	1273		
335	333			518		1220	1218	950	946	2300	2296	1320	1313		
345	343			530	528	1250	1248	975	971			1360	1353		
355	353			545	543	1280	1278	1000	996			1400	1393		
365	363			560	558	1320	1318	1030	1026			1450	1443		
375	373			580	578	1360	1358	1060	1056			1500	1493		
387	385			600	598	1400	1398	1090	1086			1550	1543		
400	398			615	613	1450	1448	1120	1116			1600	1593		
412	410			630	628	1500	1498	1150	1146			1650	1643		
425	423			650	648	1850	1848	1180	1176			1700	1693		

2. Design Methodologies

Step 1. Confirm the Details Necessary for Design

(1) Machine type
(2) Transmission power or prime motor's specified power
(3) Degree of fluctuations in load
(4) Speed ratio $\left(\frac{\text{Small pulley's rotational speed}}{\text{Large pulley's rotational speed}}\right)$
(5) Preliminary spacing between axles
(6) Limits on the pulley's diameter
(7) Work environment (high temperatures, low temperatures, oil, water, dusk, acid, alkali)

Step 2. Calculate the Designed Power

Calculate designed power according to formula 1.

Formula 1

$Pd = Pt \times Ko$

Pd: Designed power (kW)
Pt: Transmission power (kW)
Ko: Load correction factor (Table 1)

Note 1) It would be ideal to use the driven unit's load for transmission power. If this figure is unclear, please use the prime motor's specified power.
Additionally, when using torque or horsepower, please make the conversion to watts or kilowatts using the following formula.

Formula 2

$Pt = \frac{Tr \times n}{9550}$

Pt: Transmission power (kW)
n: Rotational speed (rpm)
Tr: Load torque (N · m)
1PS = 0.7355 (kW)

Table 1 Load Correction Factors (Ko)

Driven unit \ Driving motor	Maximum load no greater than 200%	Maximum load above 200%
	AC motor (Regular torque, cage type Synchronized power) DC motor (shunt motor)	AC motor (high-torque, single-phase, series motor) DC motor (compound, series) Engine, Line Shaft, Clutch
● Fluid mixers ● Air delivery fans ● Exhaust fans ● Centrifugal pumps ● Miniature compressors ● Fans with power below 7.5kW ● Conveyors for light loads	1.2	1.3
● Conveyers for transporting sand or grains ● Mixers, washing machines ● Fans with power above 7.5k ● Engines, rotary pumps ● Line shafts ● Working and printing machinery ● Rotating, vibrating sieves	1.3	1.4
● Brick and tile processing machinery ● Bucket elevators ● Exciters ● Piston pumps, compressors ● Paper-making mills and pulpers ● Compulsory fans ● Sawmills, woodworking machinery ● Textile machinery	1.4	1.5
● Sand pumps ● Crushers ● Mills (Ball, rod, and tube types) ● Hoists ● Calenders and extrusion presses for use with rubber	1.5	1.6