



Flat Belt System
HFD

Hyper Flat Drive System

Energy Saving No. 1



2014

Energy Conservation Award
Products and business model department
Organizer: General Energy Conservation Center, Japan

CONCEPT

At Bando we recognized the excellent qualities of the Flat Belt and we refined those qualities resulting in a next generation Flat Belt with further improved transmission capability.

Also we developed a meandering control and prevention device that autonomously controls the belt running position.

By combining that device with an auto-tensioner technology we overcame the belt side tracking and tension problems.

We hope that you will use our next generation energy saving power transmission product for your machines and applications.



FEATURES

An operation with ideal tension and improved transmission efficiency leads to energy saving and CO₂ reduction.

Maintenance free is possible due to the longer service life and tension control by the auto-tensioner.

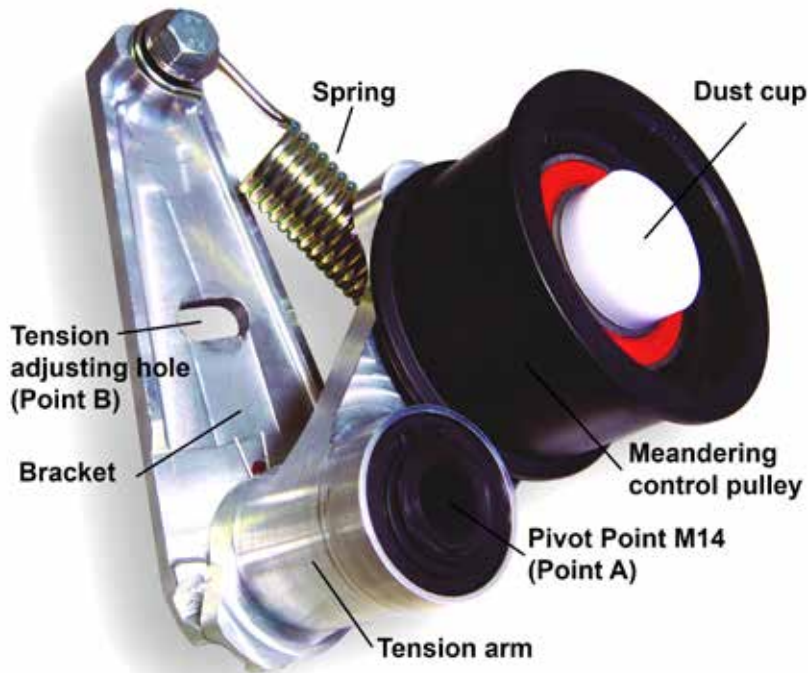
Because of the thin belt construction the bending distortion is very low.

Compact layouts are possible because reverse bending has no influence on the durability.



STRUCTURE

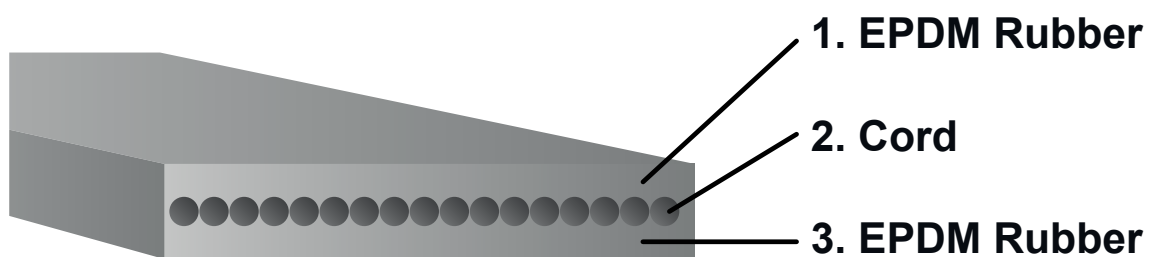
The Flat Belt is constructed of long approved EPDM rubber. Bando has made full use of the cord design technology to create a very efficient power transmission belt.



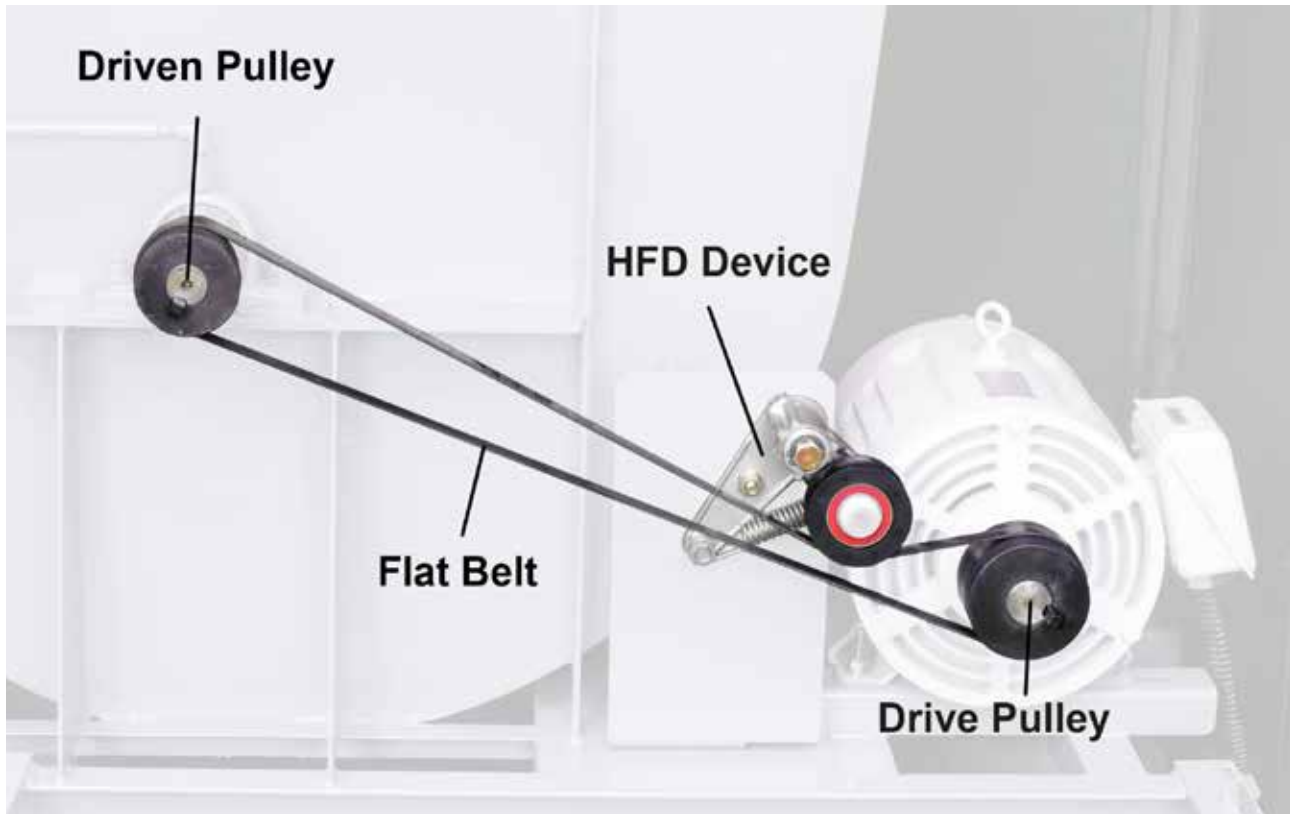
By installing the automatic tension and the meandering device an autonomous control system for the flat belt and pulley is realized. Thereby a maintenance free system is created.

The tension pulley is fixed in Point A (Pivot Point) and the requested tension adjustment can be done by the elongated hole in Point B. After the positions A and B are fixed, the device can operate as a self-control tension and meandering system.

FLAT BELT STRUCTURE



INSTALLED EXAMPLES



PRODUCT RANGE

Flat belt length unit (mm)

600	630	670	710	750	800
850	900	950	1000	1060	1120
1180	1250	1320	1400	1500	1600
1700	1800	1900	2000	2120	2210
2360	2500	2650	2800	3000	

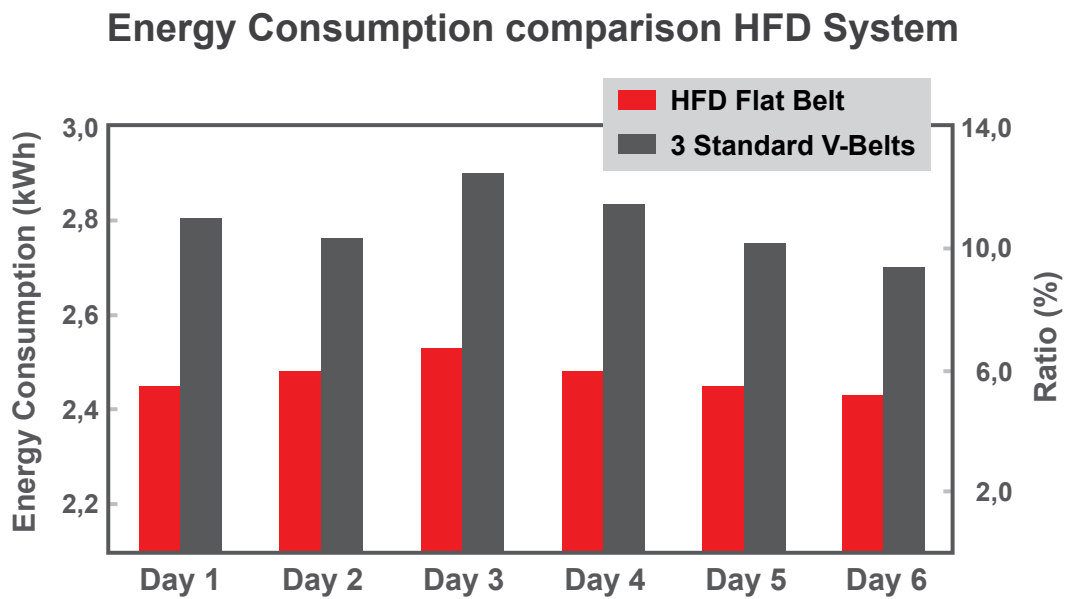
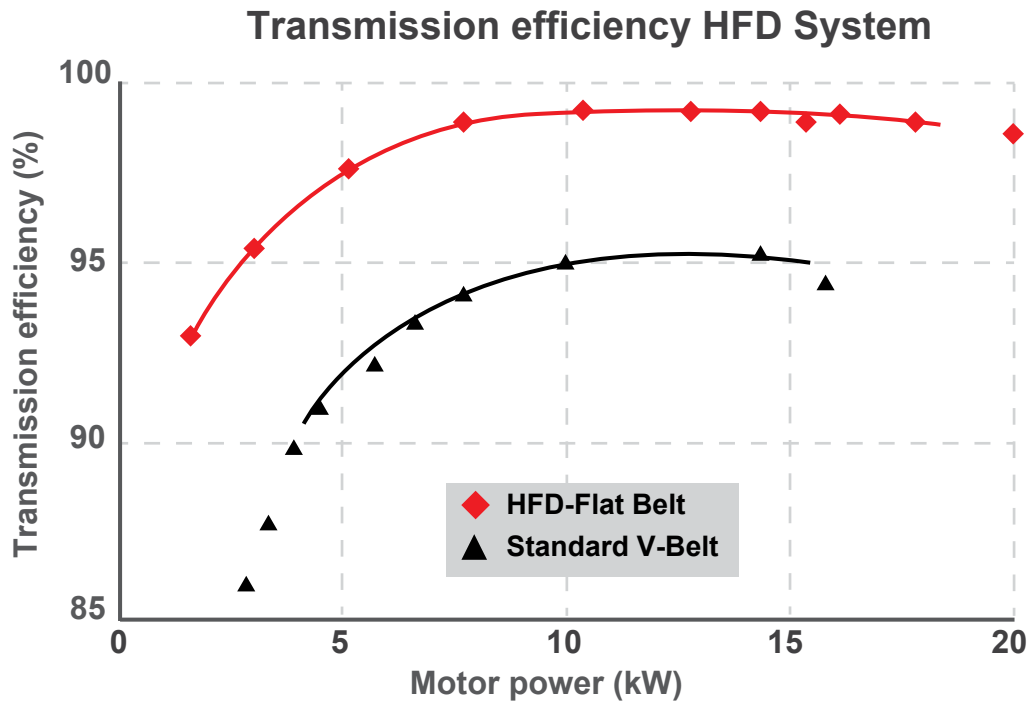
Standard belt width: 10 mm, 15 mm, 20 mm (further specification available on request)

HFD Device: Standard pulley width 30 mm and 40 mm

Flat Pulley: All pulleys in the system should be designed as flat pulleys

Flat Belt System Design: The described setting range is designed for a usage from 2.2 kW until 22.0 kW engines. All terms of use are depending on the layout and the energy saving requirements. For a usage out of the particularized range please contact us and we will design a fit and proper system for you.

HFD SYSTEM TEST RESULTS



Results of an 7.5 kW blower by comparing 3 parallel running V-Belts and one HFD System

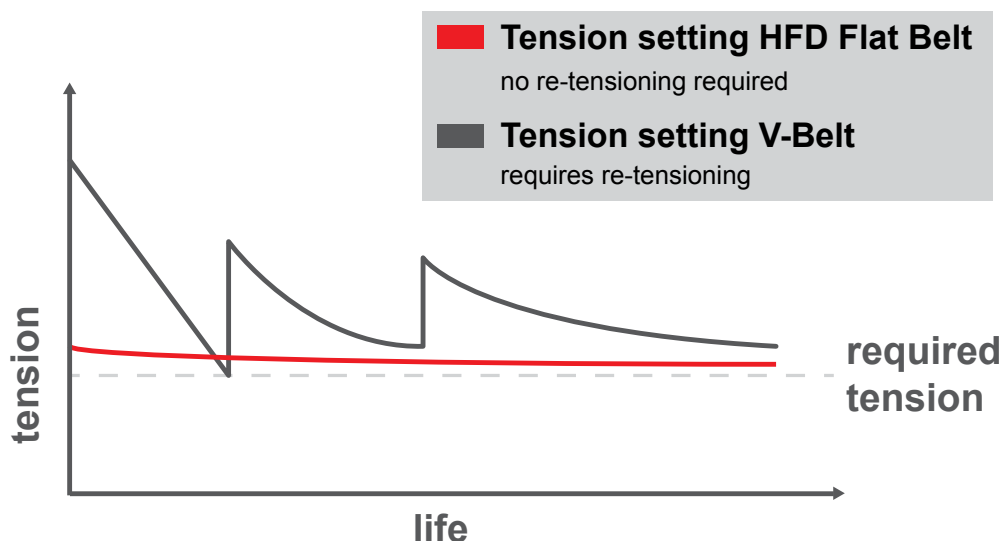
ENERGY SAVINGS & CO₂ REDUCTION

Example Calculation	V -Belt	Bando HFD System	Results
Operation time	24 hours per day → 365 days per year	24 hours per day → 365 days per year	
Energy costs	0.21 € / kWh	0.21 € / kWh	
Energy consumption	16.5 kWh	15.26 kWh	-1.24 kWh
Energy costs total	$16.5 \times 24 \times 365 \times 0.21$ = 30,353 € / year	$15.26 \times 24 \times 365 \times 0.21$ = 28,072 € / year	-2,281 € / year
CO ₂ Reduction *	$0.378 \times 16.5 \times 24 \times 365$ = 54,636 kg / year CO₂	$0.378 \times 15.26 \times 24 \times 365$ = 50,530 kg / year CO₂	-4,106 kg / year

*Note: CO₂ reduction coefficient 0.378 Kg CO₂ / kWh is according to a report of the ministry of Global Environment Bureau dated July 2003.

MAINTENANCE FREE SYSTEM

Maintenance free system due to the long life time of the HFD device.
About 2.5 times longer life time than the classical V-Belt:



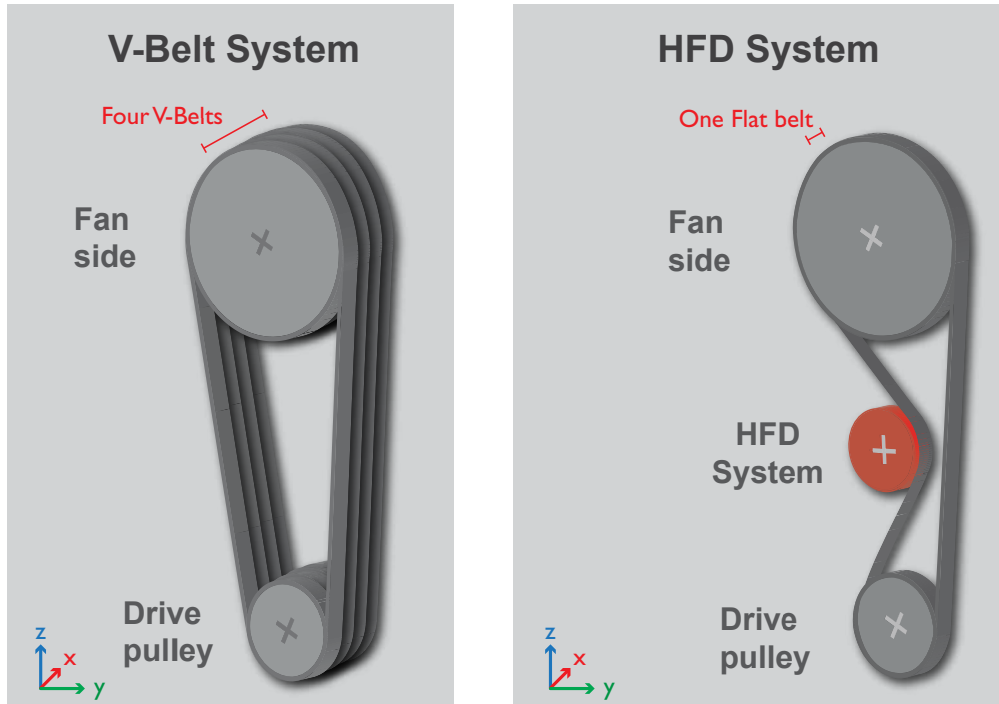
Due to the thin belt construction the influence of bending strain around the pulley is reduced. The belt and pulley contact angle is increased. A reverse bending has no influence to the Flat Belt.

Compared to the classical V-Belt no re-tensioning is needed.
The meandering and tension pulley works as an autonomous self controlled system.

COMPACT LAYOUTS POSSIBLE

Because the HFD System requires only one Flat Belt, compact layouts are possible.

Layout example for industrial blower application



APPLICATION EXAMPLE

Application Example:
Industrial Blower (see table right side, layout as above)

Motor:
18.5 kW (Mitsubishi)

Hz:
50 Hz (4 Pole)

Total electricity savings:
7.27 %

Further suitable applications:
**air conditioner,
 blower,
 compressor,
 robotics,
 ...**

Industrial Blower		V-Belt System	HFD System
Belt Type		V-Belt STD-C	Hyper Flat Belt
Specification		C108	HFDB001-20-2650
Number of belts		4 pieces	1 piece
Ratio		1.7706	1.7766
∅	Drive Pulley	200 mm	165 mm
	Driven Pulley	355 mm	295 mm
Center distance		931 mm	931 mm
Statical axis force		4458 N	1078 N
Belt tension		645 N	607 N



Flat Belt System

Hyper Flat Drive System

INSTRUCTION FOR USAGE

Application for blower and compressor machines with an engine range of **2,2 kW to 22,0 kW**.
For a usage out of the standard range please contact us and we will design a suitable system for you.

Operation temperature standard range: **-10°C to 60°C**

The HFD installation layout is based on the licence agreement in our company.

Please request the confirmation of the Design by Bando. We can also supply an installation guide.

Environmental conditions that should be avoided:

[1] Operating in condensation condition.

[2] Usage in dusty environment.

[3] Usage in wet condition and water contact: Please avoid water contact in the Tensioner Pivot Point and all moving parts.

[4] Avoid the usage in an environment with water or oil. For a usage in environments described in [2] and [3] please use a safety protecting device.

[5] For the HFD-System installation an additional guidance including setting and misalignment analysis is needed.

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