PIX®

USER'S GUIDE V-BELTS

We Do "CARE"

Commitment • Ability • Reliability • Efficiency

Corporate Office & Works (J-7, Hingna, MIDC)

PIX Europe Limited, U. K.

PIX Germany GmbH, Germany

PIX-Flexequip Hydraulics Limited, Northern Ireland

PIX Middle East FZC, UAE

PIX South America Ltd., Brasil

PIX Hydraulics & Transmissions (Hangzhou) Ltd. China

Contents

Profile

PIX TRANSMISSIONS LIMITED, is engaged into the manufacturing of an extensive range of world class quality Industrial V-Belts, Automotive Belts, Steel Wire Braided Hydraulic Hoses, Hose Assemblies & End Fittings to suit various power drive needs.

PIX manufacture belts in Wrap, Cut Edge, Ribbed or Poly Belts, Synchronous Belts & Application Specific constructions. They are manufactured at Its state-of-the-art facilities at Nagpur and Bazargaon. Its both the facilities are designed to include all sophisticated manufacturing and testing facilities under one roof and confirms to the stringent ISO/TS 16949:2002, ISO 14001 & OHSAS 18001 standards.

All its products are known for their efficiency, reliability and trouble free operation, and they can perform even in most adverse conditions.

PIX V-belts and Hoses are suitable for Industrial and Automotive applications and the end users of its products belong to cement industries, power corporations, steel industries, oil companies, mining and other engineering industries.

PIX's stress on consistency in quality has qualified it as a trusted and reliable manufacturer of V-belts and Hoses not only in India but in overseas market also.

Certifications

ATEX Certification
IBExU Institut für Sicherheitstechnik GmbH
Directive 94/9/EC
Test Report No. : IB-03-4-934
Ex II 2GD c IIB X

Free set concept

PIX's innovative concept of Free Set V-belts gives the advantages of having -

- No length code
- Low variation in length tolerance
- Less centre adjustment
- Low stretch
- Low variation in elongation within a set of belts
- Uniform power transmission
- Longer life
- Reduced maintenance periodicity
- Less inventory

PIX FREE SET BELT TENSIONING

PIX Free Set V-belts are specially constructed to arrest variation in the length as a result there is exceptionally low variation in the length.

You just have to Install the belts on the drive, apply sufficient tension, run the belts under full load condition for 24 hours, stop the drive and re-tension, if necessary.

All PIX Free Set belts are produced in the given tolerance range. However belts normally shrink when stored for a longer duration, the shrinkage factor depends on the climatic conditions, but the belts would resume their original length once fitted and run for some time.

The shrinkage factor does not affect the life of the belts.

Free set concept

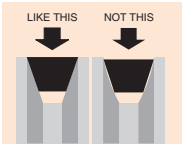
Length Tolerance Chart

Nominal Length	Length Tolerance (mm)
Up to 1905 mm (75 inches)	± 1
Beyond 1905 mm (75 inches) Up to 3150 mm (124 inches)	± 2
Beyond 3150 mm (124 inches) Up to 5004 mm (197 inches)	± 3
Beyond 5004 mm (197 inches) Up to 8992 mm (354 inches)	± 4
Beyond 8992 mm (354 inches) Up to 16002 mm (630 inches)	± 6

Installation

INSTALLATION PROCEDURE FOR V-BELTS

1. Check Pulleys
Before installation, check the pulleys for wear and for the presence of any foreign material. Worn out pulleys must be replaced to ensure good contact between the pulley and the belt.
Worn out pulleys, if not replaced may lead to the following problems-



- Early failure of the belt
- Belt may tend to slip off from the pulley groove
- Reduction in power transmission capacity
- Lead to excessive vibrations, especially when the sides of the pulley are damaged

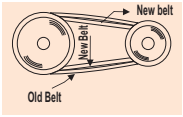
Always check the following before installation

- Check the pulley groove for its correctness with the help of pulley gauges.
- The pulley groove surface area should be smooth and free of burrs, rough surface may lead to an unwanted abrasion of the belts, reducing its life.

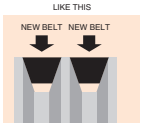
Installation

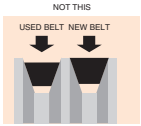
2. Checking pulley groove, key and the shaft :
Before replacing worn-out belts, it is a must to check the fitting of the pulley with the shaft. If there is any gap or play between the two, replace the worn-out component immediately. Make sure that the pulley is properly fitted with the shaft, improper fitting leads into jerks resulting into earlier failure of the drive.

3. Do not mix old / new belts :
Do not use newly purchased belt with the old belt on the same drive. This may lead into-



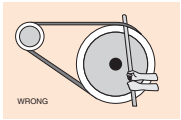
- Non uniform tensioning
- Reduction in power transfer
- Reduced working life of the new belts
- Slippage of the old belts





Always use a set with all new belts from the same manufacturer.

4. Installing belts :
Never use lever to install the belt, it may lead into the breakage of the cord line. Using of lever invariably develops permanent

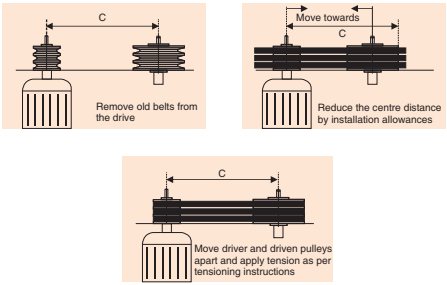


Installation

twists leading into its turning into the pulley while running. Install belt by reducing the centre distance between the pulleys, reduce the distance to the extent where the belts can be installed easily. It is a must to provide installation and take-up allowance to the drives (Refer Table 1-4)

There should be a provision for adjusting the centre distance so that it can be varied sufficiently for easy installation.

INSTALLATION



INSTALLATION & TAKE-UP ALLOWANCES

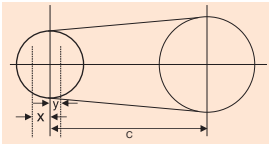


Table : 1
PIX CLASSICAL V-BELTS

Pitch Length (mm)	Minimum Take-up Allowance x (mm)	Installation Allowance y (mm)								
		8	Z/ZX	A/AX	B/BX	20	C/CX	25	D	E
200	5	-	-	-	-	-	-	-	-	-
>200 ≤ 250	5	-	-	-	-	-	-	-	-	-
>250 ≤ 315	5	10	10	-	-	-	-	-	-	-
>315 ≤ 670	10	10	10	10	10	-	-	-	-	-
>670 ≤ 1000	15	10	15	15	15	-	-	-	-	-
>1000 ≤ 1250	20	15	15	15	15	20	20	-	-	-
>1250 ≤ 1800	25	15	20	20	20	20	25	25	-	-
>1800 ≤ 2240	25	20	20	20	20	25	25	30	35	-
>2240 ≤ 3000	35	-	20	20	20	25	30	30	35	40
>3000 ≤ 4000	45	-	20	20	20	25	30	30	35	40
>4000 ≤ 5000	55	-	20	20	20	30	30	30	35	40
>5000 ≤ 6300	70	-	-	20	25	35	35	35	40	45
>6300 ≤ 8000	85	-	-	20	25	40	40	40	45	50
>8000 ≤ 10000	110	-	-	25	25	40	45	45	45	50
>10000 ≤ 12500	135	-	-	-	30	40	45	45	50	55
>12500 ≤ 15000	150	-	-	-	40	50	55	55	60	65
>15000 ≤ 18000	190	-	-	-	40	50	55	55	60	65

Table : 2
PIX WEDGE BELTS

Pitch Length (mm)	Minimum Take-up Allowance x (mm)	Installation Allowance y (mm)			
		SPZ / XPZ	SPA / XPA	SPB / XPB	SPC / XPC
487 ≤ 670	10	10	10	-	-
>670 ≤ 1000	15	15	15	-	-
>1000 ≤ 1250	20	15	15	-	-
>1250 ≤ 1800	25	20	20	20	-
>1800 ≤ 2240	25	20	20	20	25
>2240 ≤ 3000	35	20	20	20	30
>3000 ≤ 4000	45	20	20	20	30
>4000 ≤ 5000	55	20	20	25	30
>5000 ≤ 6300	70	25	25	30	35
>6300 ≤ 8000	85	25	25	35	40
>8000 ≤ 10000	110	30	30	35	45
>10000 ≤ 12500	135	-	-	35	45
>12500 ≤ 15000	150	-	-	45	55
>15000 ≤ 18000	190	-	-	45	55

Table : 3
PIX NARROW BELTS

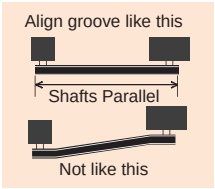
Length Designation	Outside Length (mm)	Minimum Take-up Allowance x (mm)	Installation Allowance y (mm)		
			3V/3VX	5V/5VX	8V
>265 ≤ 400	>673 ≤ 1016	15	15	-	-
>400 ≤ 475	>1016 ≤ 1206	20	15	-	-
>475 ≤ 710	>1206 ≤ 1803	25	20	20	-
>710 ≤ 850	>1803 ≤ 2159	25	20	20	-
>850 ≤ 1180	>2159 ≤ 2997	35	20	20	40
>1180 ≤ 1600	>2997 ≤ 4064	45	20	20	40
>1600 ≤ 2000	>4064 ≤ 5080	55	20	25	40
>2000 ≤ 2500	>5080 ≤ 6350	70	-	30	45
>2500 ≤ 3150	>6350 ≤ 8001	85	-	35	45
>3150 ≤ 4000	>8001 ≤ 10160	110	-	35	50
>4000 ≤ 5000	>10160 ≤ 12700	135	-	35	50
>5000 ≤ 6000	>12700 ≤ 15240	150	-	45	60
>6000 ≤ 7100	>15240 ≤ 18034	190	-	45	60

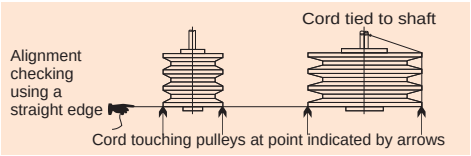
Table : 4
PIX BANDED BELTS

Pitch Length (mm)	Minimum Take-up Allowance x (mm)	Installation Allowance y (mm)			
		A/HA	B/HB	C/HC	D/HD
1200 ≤ 1800	25	30	35	-	-
>1800 ≤ 2240	25	30	35	-	-
>2240 ≤ 3000	35	30	35	50	85
>3000 ≤ 4000	45	30	35	50	85
>4000 ≤ 5000	55	30	40	55	90
>5000 ≤ 6300	70	35	45	60	90
>6300 ≤ 8000	85	45	55	65	100
>8000 ≤ 10000	110	45	55	65	100
>10000 ≤ 12500	135	50	60	75	100
>12500 ≤ 15000	150	60	70	85	110
>15000 ≤ 18000	190	70	85	95	125

Installation

5. Checking Alignment :
Proper alignment of pulleys is vital to attain better performance. Use following method to check the alignment of pulleys.





6. Re-tensioning
Proper tensioning is required to achieve maximum output from the drive. For any new installation belt tension should be checked for the first two days of the operation and it should be re-tensioned if required.

7. Drive Guard
Once the installation is done, the drive should be covered with appropriate drive guard.

Preventive maintenance

PREVENTIVE MAINTENANCE

Accessibility to the drive
It is imperative to maintain safe access to the drive. The drive area should be kept free from clutter, debris or any obstruction. Floor surface should be clean and free from oil or grease.

Drive Guards
The drive should always be guarded properly. Drive guard should be designed properly to -

- Enclose the drive completely
- Facilitate proper ventilation
- Offer easy access to the inspection doors
- Easy replacement
- Protect the drive from environmental damages

Inspection planning for preventive maintenance
Periodic inspection of drive is suggested as a part of preventive maintenance. Look & listen for anything unusual. A perfectly designed drive will always function smoothly and quietly.

Inspect the guard for vibrations if any, tighten it with the base if it is loose. Avoid accumulation of dust and grime on the belt guard as it will block the ventilation, leading into the rise in temperature and premature failure of the belt.

Elevated temperature do affect the efficiency of the

Preventive maintenance

belts. A rise of 20°C in the ambient temperature above 60°C will reduce the belt life by 50%.

Prevent dripping of oil or grease on to the drive or the belt, this is very common if the bearings are lubricated excessively. If it continues for a prolonged period, it will lead into the swelling of the belt resulting into premature failure.

Frequency of inspection
Certain factors are to be considered before deciding upon the frequency of inspection, they are -

- Operating speed of the drive
- Operating cycle of the drive
- Criticality of the the drive
- Temperature extremities
- Environmental factors

If the drive is exposed to any of the above condition, the drive should be inspected periodically at shorter intervals.

To help the maintenance person to prepare his maintenance schedule, following guidelines can prove to be very helpful.

Critical drives
A quick visual & hearing inspection may be planned once a week.

Preventive maintenance

Normal drives
A quick visual & hearing inspection can be done once a month.

Complete inspection
Complete inspection should be carried out to check the entire drive every three months.

INSPECTION

Checklist for the inspection of drive

- Electrical supply to the motor should be switched off before going ahead with the inspection.
- Remove the belt guard, inspect for any damages & clean it.
- Check the belt if it is damaged for any external reason, rectify it before placing new belts.
- Check the pulley it should not be worn-out, also check the bearings, lubricate them.
- Always use installation and take-up allowance.
- Never use lever or iron bar to install the belts.
- Install belts in sequential order. Rotate pulley for at least two revolutions after installing each belt, this is called as bedding of belts and helps the belt to set in the pulley groove, once done check for correct pulley alignment.

Preventive maintenance

- Tension the belts as per PIX norms.
- Re-tension the belts after an initial run of 24-48 hours.
- Put the drive guard in place.
- Resume electrical supply, restart the drive, look & listen for anything unusual.

Clothing

Never wear aprons or clothes which are too long or of lose fitting & neck-ties in the vicinity of belt drive, the sleeves should also be rolled up to avoid any accident.

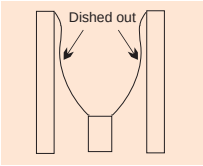
Use hand-gloves while inspecting the sheaves as sometimes the pulleys are worn out or having sharp edges.

Belt inspection

Check the belts for wear-out.

Pulley inspection

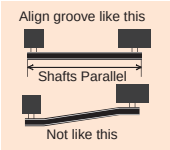
Inspect the sheaves for burrs, sharp edges, wear-out (eg. dish out) alignment.



Preventive maintenance

Alignment

Alignment can be checked by using a string pulled across the face of the pulleys. Misalignment can be seen in the form of a gap between the string and the pulley face.

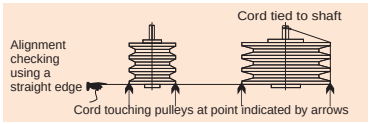


Probable causes of misalignment

Factors primarily contributing to misalignment are -

- Motor shafts and driven machine shafts are not parallel to each other.
- Pulleys are not properly located on the shafts.
- Pulleys are tilted due to improper mounting.

As a general rule, the tolerance permissible for misalignment is 1^{o} maximum. The greater the misalignment more are the chances of the belt instability, increased belt wear & belt turn over.



Preventive maintenance

Belt guard inspection
Check the belt guard for protruding parts or sharp edges if any. Check for proper ventilation. Clean if it is dirty.

Inspection of drive components
Check the bearings for proper lubrication. Check the motor mounts for proper fitment & firmness. Keep the take up rails free from any foreign obstacles.

Check belt tension
In many cases the drives fail prematurely and doesn't give satisfactory life due to improper tensioning. For efficient running of the drive an optimised belt tension should be maintained as long as the belt is being used.

Optimum belt tension can be defined as minimum tensioning force at which the belt will not slip under full load condition.

Too low belt tension will cause the belts to slip abnormally. On the other hand too high tension will reduce the life of the belt & bearings. Hence optimum belt tension should be maintained on the drive.

Service equipment

PIX Digital Tension Meter

PIX Digital Tension Meter is used for the measurement of belt-tension in a drive. This digital version helps in correct tensioning of the drive resulting into optimum power transmission. It helps in reading the exact value of tension on the belts, thus helping the users to correct the tension, if it is not proper. This equipment works on frequency measurement phenomenon.

Advantages:

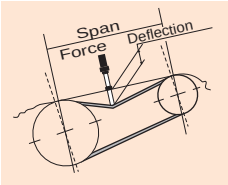
- Non-contact measurement with repeated accuracy
- Large range of measurement from 10Hz to 600Hz
- High level of accuracy
- Evaluation of the quality of measurement results
- Suppression of background noises
- Universal measuring head for convenient measurement
- Detachable measuring sensor for narrow spaces.

Technical Data:

Range of Measurement:	10 - 600 Hz
Measuring Precision:	10 - 400 Hz ± 1% 400 - 600 Hz ± 2% ± 1 digit
Measuring Method:	Non contact acoustic with background noise suppression
Voltage Supply:	2*1, 5V Mignon (LR06) AA
Power Consumption:	< 25mA
Display:	LCD 2 lines of 8 characters
Working Temperature:	0^{0} to $+50^{0}$C
Storage Temperature:	-20 to $+60^{0}$C

Service equipment

SERVICE EQUIPMENT
PIX V-belt Tension Tester
Proper belt tension is vital to derive the best from your drive, it is recommended to check belt tension by measuring the deflection force value (N) with the help of a tension measuring device.



The belt tension in most of the drives can be checked with adequate reliability by means of PIX Tension Tester.

Tension measuring procedure
Measure the span length of the belt in mm (Ref.sketch).

Tie a string / thread on the two pullies along the length of the belts and mark centre of the span on the belt.

Calculate 1.5% of the span (say ‘x’) for belt length less than 1000 mm & 1% of the span for belt length more than 1000 mm. Adjust lower ring on the Tension Tester on mm scale to coincide ‘x’ mm with the lower side of the ring. Adjust lower side of the upper ring at 0.00 N.

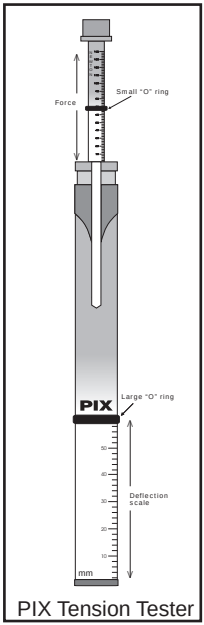
Service equipment

Place Tension Tester at the centre of the belt span. Apply force with the help of Tension Tester perpendicular to the span till the lower surface of the ring touches the string.

Read the deflection force value (N) on the Newton's scale by taking reading at the lower side of the upper ring.

Compare the deflection force value (N) with the values given in the table 'A'. The deflection force value (N) should lie between the minimum and maximum values given in the table 'A'.

Deflection force less than minimum recommended value in the range indicates an under tensioned drive & deflection force higher than maximum recommended value indicates an over-tensioned drive.



PIX Tension Tester

TENSIONING CHART

Table A (CLASSICAL BELTS)

Cross Section	Smaller pulley diameter (mm)	Condition 1 Deflection @ 1.0% if span, length is more than 1000 mm			Condition 2 Deflection@ 1.5% of span, if span length is less than 1000 mm		
		Required deflection force F at the centre of span for belt speed			Required deflection force F at the centre of span for belt speed		
		(0 to 10) m/s range (N)	(10 to 20) m/s range (N)	(20 to 30) m/s range (N)	(0 to 10) m/s range (N)	(10 to 20) m/s range (N)	(20 to 30) m/s range (N)
Z	50-100	4-6	4-5	3-4	5-8	5-7	4-5
	100 & above	6-9	6-7	5-6	8-12	8-9	7-8
A	71-140	8-12	7-10	6-8	11-16	9-13	8-11
	140 & above	12-18	10-14	8-12	16-24	13-19	11-16
B	112-200	16-24	13-19	10-16	21-32	17-25	13-21
	200 & above	24-35	19-29	16-24	32-47	25-39	21-32
C	180-400	31-46	26-38	20-31	41-61	35-51	27-41
	400 & above	46-70	38-58	31-46	61-93	51-77	41-61
D	315-600	62-90	52-76	42-62	83-120	69-101	56-83
	600 & above	90-134	76-115	62-90	120-179	101-153	83-120
E	450-915	108-160	90-137	73-109	144-213	120-183	97-145
	915 & above	160-240	137-205	109-160	213-320	183-273	145-213

TENSIONING CHART

Table A (WEDGE/NARROW BELTS)

Cross Section	Smaller pulley dia. (mm)	Condition 1 Deflection @ 1.0% if span, length is more than 1000 mm			Condition 2 Deflection@ 1.5% of span, if span length is less than 1000 mm		
		Required deflection force F at the centre of span for belt speed			Required deflection force F at the centre of span for belt speed		
		(0 to 10) m/s range (N)	(10 to 20) m/s range (N)	(20 to 30) m/s range (N)	(0 to 10) m/s range (N)	(10 to 20) m/s range (N)	(20 to 30) m/s range (N)
SPZ/3V	63-95	8-12	7-10	6-9	11-16	9-13	8-12
	95 & above	12-17	10-16	9-14	16-23	13-21	12-19
SPA	90-140	14-20	12-17	10-14	19-27	16-23	13-19
	140 & above	20-31	17-26	14-22	27-41	23-35	19-29
SPB/5V	140-265	25-36	20-32	18-27	33-48	27-43	24-36
	265 & above	36-46	32-41	27-37	48-61	43-55	36-49
SPC	224-355	46-66	38-58	32-52	61-88	51-77	43-69
	355 & above	66-85	58-76	52-70	88-113	77-101	69-93
8V	335-520	81-107	68-90	56-73	108-143	91-120	75-97
	520 & above	107-167	90-140	73-113	143-223	120-187	97-151

TENSIONING CHART

Table A (CUT EDGE CLASSICAL)

Cross Section	Smaller pulley diameter (mm)	Condition 1 Deflection @ 1.0% if span, if span length is more than 1000 mm			Condition 2 Deflection@ 1.5% of span, if span length is less than 1000 mm		
		Required deflection force F at the centre of span for belt speed			Required deflection force F at the centre of span for belt speed		
		(0 to 10) m/s range (N)	(10 to 20) m/s range (N)	(20 to 30) m/s range (N)	(0 to 10) m/s range (N)	(10 to 20) m/s range (N)	(20 to 30) m/s range (N)
ZX	40-100	5-7	5-6	3-5	6-9	6-8	5-6
	100 & above	7-10	7-8	6-7	9-14	9-11	8-9
AX	63-140	9-14	8-12	7-9	12-18	11-15	9-12
	140 & above	14-21	12-16	9-14	18-28	15-21	12-18
BX	90-200	18-28	15-22	12-18	25-37	20-29	15-25
	200 & above	28-40	22-33	18-28	37-54	29-44	25-37
CX	140-400	36-53	30-44	23-36	48-71	40-58	31-48
	400 & above	53-81	44-67	36-53	71-107	58-89	48-71

TENSIONING CHART

Table A (CUT EDGE WEDGE/NARROW)

Cross Section	Smaller pulley diameter (mm)	Condition 1 Deflection @ 1.0% if span, if span length is more than 1000 mm			Condition 2 Deflection@ 1.5% of span, if span length is less than 1000 mm		
		Required deflection force F at the centre of span for belt speed			Required deflection force F at the centre of span for belt speed		
		(0 to 10) m/s range (N)	(10 to 20) m/s range (N)	(20 to 30) m/s range (N)	(0 to 10) m/s range (N)	(10 to 20) m/s range (N)	(20 to 30) m/s range (N)
XPZ	56-95	9-14	8-12	7-10	12-18	11-15	9-14
3VX	95 & above	14-20	12-18	10-16	18-26	15-25	14-21
XPA	71-140	16-23	14-20	12-16	21-31	18-26	15-21
	140 & above	23-36	20-30	16-25	31-48	26-40	21-34
XPB	112-265	29-41	23-37	21-31	38-55	31-49	28-41
	265 & above	41-53	37-47	31-43	55-71	49-63	41-57
XPC	180-355	53-76	44-67	37-60	71-101	58-89	49-80
	355 & above	76-98	67-87	60-81	101-130	89-117	80-107

Service equipment

Important
For new belts the deflection force value (N) should be kept at maximum.

Maximum deflection force value (N) is recommended for pulsating & shock loads.

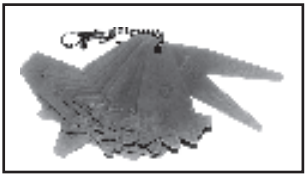
After approximately 24 hours of running check the belt tension and adjust if necessary.

PIX PULLEY GAUGES
PIX Pulley Gauges are specially designed for checking the grooves of various sections.

Groove checking procedure
Identify the pulley gauge to be used according to pulley's section and its diameter.

Check the groove by inserting the gauge. Identify if any clearance is there between the side walls of pulley groove and the gauge.

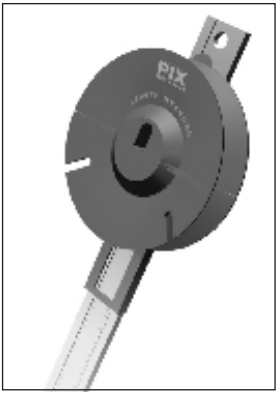
Measure the clearance using Feeler Gauge.



PIX Pulley Gauge

Service equipment

PIX LENGTH FINDER
It is used to check the length of a particular belt or sometimes in used belts the size of the belt is not clearly visible. It can also be used to confirm the size of the belt.



PIX has two types of Length Finders-

- Conventional
- Poly-V

The maximum length which can be measured with these length finders is 120 inches.

Length measuring procedure

- Place the belt on the upper fixed half of the pulley.
- Slide down the lower half of pulley with the belt along the scale till the belt gets sufficiently stretched.
- The markings at the lower position of bottom half will show the reading in mm/inches.
- Note down the reading and compare it with the size mentioned on the belt.

Min. recommended dia.

MINIMUM DIAMETER RECOMMENDED

Section	Minimum Diameter	Section	Minimum Diameter	Section	Minimum Diameter
8	40	**ZX**	40	**SPC**	224
Z	50	**AX**	63	**3V**	63
A	71	**BX**	90	**5V**	140
B	112	**CX**	140	**8V**	335
C	180	**AA**	80	**XPZ/3VX**	56
D	355	**BB**	125	**XPA**	71
E	500	**CC**	224	**XPB/5VX**	112
19	180	**SPZ**	63	**XPC**	180
20	160	**SPA**	90		
25	250	**SPB**	140		

Storage

STORAGE

Methods of storage

The most common method of storing V-belts is to hang them in crescent shaped pegs or pin racks. Long-length V-belts should be coiled for an easy and distortion free storage.

Variable speed belts are more sensitive to distortion. It is recommended not to hang them on the pegs. They should always be stored on shelves.

Effects of storage

A shelf life of 6 years can be obtained, if proper storing conditions are maintained i.e. temperature not more than 30^{o}C & relative humidity not more than 60%.

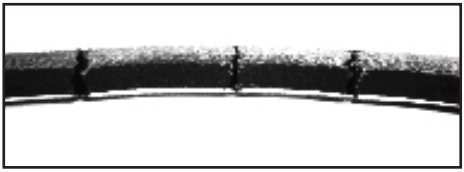
If storage temperature exceeds 30^{o}C, the service expectancy of the belt reduces drastically. Under rough estimates, it is said that for an increase of 8^{o}C above the stipulated temperature, the belt life gets reduced by 50%.

If the drive is to remain out of use for a prolonged period of time, it is suggested that the belt tension should be relaxed.

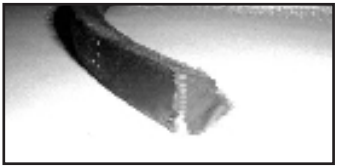
Under no circumstances the belts should be stored at temperatures above 46^{o}C.

Types of failure

V-BELTS



Bottom crack



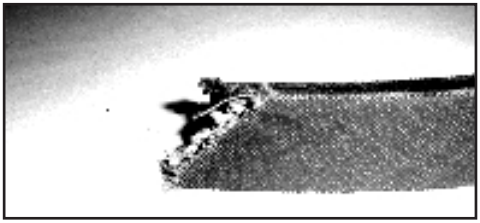
Belt snapped

Shining surface due to high slippage

Stuck up and burnt

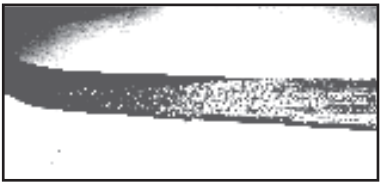
Types of failure

V-BELTS



Belt snapped due to breaking of cord while fitment

Envelope wear (side, bottom & top wear-out)



Belt twisted due to belt turnover in the pulley

Troubleshooting

V-BELTS

Problems	Causes	Remedies
Belt turnover in pulleys	a) Poor drive alignment	a) Re-align
	b) Incorrect pulley groove or excessive wear of pulley groove	b) Renew/replace pulleys
	c) Excessive belt flap	c) Use idler on slack side
	d) Low belt tension	d) Re-tension
	e) Worn out belts	e) Replace with new belts
	f) Ingress of foreign material	f) Use more effective drive guard
Excessive wear	a) Incorrect pulley section	a) Replace pulley
	b) Excessive wear of pulley groove	b) Re-machine pulleys
	c) Poor drive alignment	c) Realign
	d) Pulleys of improper diameter	d) Redesign using correct pulley diameter. Use PIX notched V-Belts
	e) Belt catching on protruding parts	e) Remove protrusion or move drive away
Excessive noise	a) Poor drive alignment	a) Realign
	b) Incorrect belt tension	b) Re-tension
	c) Overloaded drive	c) Check drive details and redesign
	d) Unbalanced pulleys	d) Redesign the drive & balance the pulleys

Troubleshooting

V-BELTS

Problems	*Causes*	*Remedies*
Belt swelling or softening	a) Contamination by oil or other chemicals	a) Protect the drive from contamination, clean pulley grooves with petrol/alcohol before putting new belts. If contamination is unavoidable use PIX AOH Belts.
Excessive wear	a) Worn out badly damaged grooves	a) Re-machine or renew pulleys
	b) Drive with old and new belts together	b) Replace with new set of V-belts
	c) Belts from various manufacturers	c) Use belts from same manufacturer
Belt breaking after fitment	a) Forcing belt over pulley when fitting, damaging cord and cover	a) Reduce drive centre distance to fit belt
	b) Ingress of foreign material	b) Use drive guard
	c) Insufficient belt or wrong section or drive	c) Design the drive & use correct section & number of belts
	d) Drive stalled	d) Ascertain cause and rectify

Troubleshooting

V-BELTS

Problems	*Causes*	*Remedies*
Cannot be re-tensioned	a) Insufficient allowance for stretch in drive design	a) Give sufficient allowance for take-up
	b) Excessive stretch caused by insufficient belts or wrong belt for the drive	b) Recalculate drive design and modify
	c) Incorrect belt length	c) Use a shorter belt
	d) Belt from different manufacturers used on the same drive	d) All the belts must be from one manufacturer
Excessive slippage	a) Too low belt tension	a) Increase belt tension
	b) Too small area of contact	b) Increase shaft centre distance
	c) Overloaded drive	c) Redesign belt drive
	d) Worn belt pulley	d) Change to new belt or pulley
Transversal cracking	a) Too small pulleys	a) Use standard size pulley or use PIX notched or Cogged belts
	b) Outside idler pulleys	b) Use inside idler pulley in slack side
	c) Ambient temp. Too high (above 60°C)	c) Ensure good ventilation & protect from direct heat or use PIX AOH Belts

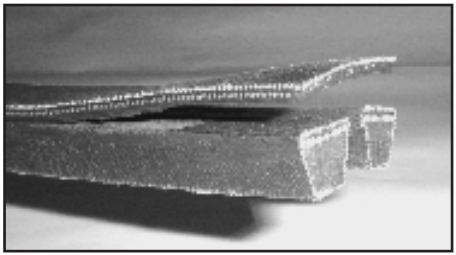
Troubleshooting

V-BELTS

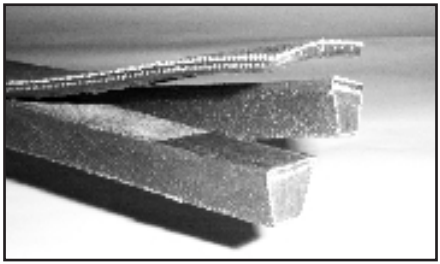
Problems	*Causes*	*Remedies*
Transversal cracking	d) Ambient temperature too low (below 18^{0}C)	d) Maintain proper temperature
	e) Abnormal belt slip	e) Check drive tension & check drive design to ensure correct number of belts
Bottom & side of belt burnt	a) Belt slipping under starting or stalling load	a) Replace belt & tighten drive until the slipping stops
	b) Worn sheaves	b) Replace sheaves
Belts pulled apart (Snapped)	a) Extreme shock-load	a) Remove cause of load
	b) Misaligned drive	b) Check drive alignment
	c) Foreign particle in drive	c) Use drive guard
	d) Belt turnover in pulley	d) Excessive slippage

Types of Failure

BANDED BELTS



Separation of tie due to improper belt setting in the pulley groove.



Belts leaving tie due to improper setting and misalignment.

Troubleshooting

BANDED BELTS

Problems	*Causes*	*Remedies*
Tie band separating	a) Worn sheaves	a) Check sheave grooves & replace with std. groove sheaves
	b) Wrong pitch (e) dimension of pulley grooves	b) Use standard pitch dimension of pulley
One strand riding outside the sheave groove	a) Possible misalignment, lack of tension or foreign object forcing the belt off from the sheave groove	a) Align the drive properly, re-tension and remove any interference from foreign object
Outside belt and adjacent to it have started to separate	a) Belt has jumped one groove forcing outside belt off the sheave	a) Replace the belt and set it properly in aligned grooves
	b) Improper tension or misalignment or foreign object	b) Tension properly
	c)Wrong pitch (e) dim. of pulley grooves	c) Use standard pitch dimension of pulley
All belts separated from the band	a) Riding outside and above sheave grooves	a) Proper maintenance of drives & installation of belts
	b) Too loose contact	b) Adjust shielding
Top tie band frayed or damaged	a) Obstructions interfering with normal operation of the belt	a) Re-align the drive & remove obstructions
Cracks at the bottom of the belts	a) Belt slipping	a) Check belt tension

PIX Ribbed belts

Installation procedure for ribbed belts
Ribbed belts are new generation belts, it is important to follow proper installation procedure to attain the best power-performance ratio. Given below are some of the installation tips which are to be followed strictly while using Ribbed belts.

1. Switch off the main supply before beginning with the installation process.

2. Bring the pulleys close to each other so that the belt can be placed easily.

3. Inspect the pulley grooves for any scores sharp edges, dirt or rust, clean them if required.

4. Ensure proper alignment of pulleys. Make sure that the shafts are also properly aligned.

5. Mount the ribbed belt with zero or no tension. Make sure that the ribs are properly seated in the grooves.

6. Tension the belts as per procedure.

7. Give some running time to the drive so that the belt gets properly seated in the groove.

8. Guard the drive properly.

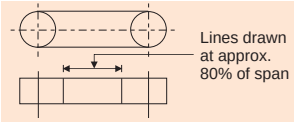
PIX Ribbed belts

Tensioning procedure

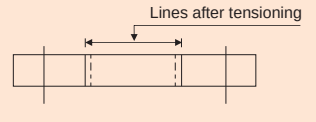
To achieve the best from your ribbed belt drive, it is a must to maintain optimum tension in the drive. Under or over tensioning can cause the ribbed belt to fail prematurely. Following steps should be carried out while tensioning the ribbed belt drive.

1. Fit the belt on the pulleys with no or zero tension.

2. Draw two lines perpendicular across the belt at about 80% of the belt span between the pulleys as shown in the figure. Say for example the lines are placed 1000 mm apart. (A).



3. Increase the distance between the two lines by 0.5 to 0.75% i.e. by 5 to 7.5 mm for an initial spacing of 1000 mm so that the (A) now become 1007.5 mm.



4. Run the drive under load for about ten minutes.

5. Check the tension (spacing between two lines) & readjust, if necessary.

Troubleshooting

Problems	*Causes*	*Remedies*
Ribbed belts are breaking after a short period of running	a) Force applied on the belts over the pulley during installation	a) Use proper installation techniques
	b) Overloaded drive	b) Redo drive design, check the number of ribs.
	c) Ingress of foreign material	c) Use drive guard
Cuts and splits in the Ribs	a) Pulley diameter too small	a) Redesign using the min. recommended diameter table
	b) Ambient temperature too high	b) Ensure good ventilation
	c) Abnormal belt slip	c) Check drive tension
	d) Contamination by chemicals	d) Protect the drive
Severe belt vibrations	a) Overloaded drive	a) Redesigning of drive may be necessary
	b) Centre distance more than recommended	b) Use an idler on the slack side
	c) High shock load	c) Use an idler on the slack side
	d) Too low belt tension	d) Re-tension the drive
	e) Unbalanced pulleys	e) Balance the pulleys
Cannot be re-tensioned	a) Insufficient allowance for re-tensioning	a) Modify the drive

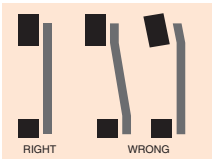
Troubleshooting

Problems	*Causes*	*Solution*
Cannot be re-tensioned	a) Due to excessive stretch caused by overloaded drive	a) Redesign the drive
	b) Incorrect belt length	b) Use a shorter length belt
Excessive wear of ribs	a) Starting torque too high	a) Redesign the drive
	b) Incorrect pulleys	b) Re-machine or replace the pulley
	c) Excessive wear of grooves	c) Re-machine or replace the pulley
	d) Poor drive alignment	d) Realign the pulleys
	e) Smaller than recommended min. pulley diameter	e) Redesign using correct pulleys
	f) Belts catching on protruding parts	f) Remove protrusions
	g) Wrong section of belt for pulleys	g) Go for correct belt
	h) Too low belt tension	h) Re-tension the drive
Excessive Noise	a) Poor drive alignment	a) Realign the pulleys
	b) Incorrect belt tension	b) Re-tension the drive
	c) High shock load	c) Redesign the drive
Belt swelling or softening	a) Contamination by oil grease or chemicals	a) Protect the drive

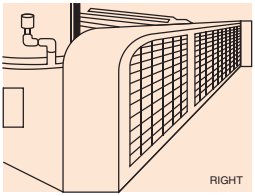
Do’s & dont's

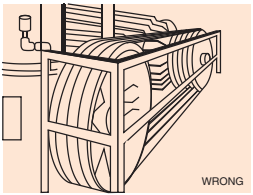
Do's and Don’ts of PIX V-Belts

Ensure perfect alignment of pulleys.



The grooves should be free from burrs, sharp edges, rust, oil and grease. Use proper drive guard to prevent this.

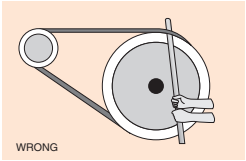




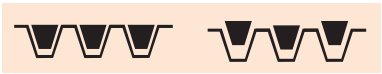
Belts used in the multiple drive should be from the same manufacturer. Do not place used and un-used belts together on the same drive

Do’s & dont's

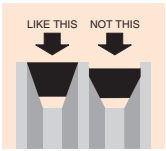
Do not pry or roll V-belts into the pulley grooves, if done so, the belt gets damaged internally. Using drive take-up enables the belt to get easily mounted on pulleys.



In a multiple drive pulley, make sure that the drive is fitted with all the required number of belts to get the best power-perfomance ratio. It is recommended to replace the whole set even though a single belt in the set has failed. Do not lubricate the belts at any stage of its life.



A change in ride out indicates uneven belt wear or worn sheaves. Change belt / sheaves with a new set.



Do’s & dont's

Pulley should be checked for its correctness, whether it is manufactured as per international standards or not and should also be checked for worn out grooves. Bearings should be lubricated periodically.

If the pulley grooves have become too wide, the canvas cover over the belt gets worn out quickly along the lower side walls and if opposite the upper canvas of the belt gets worn out.

V-belt conversion factor

CLASSICAL SECTION

Section	BELT LENGTH FACTOR		
	Lp to La mm	Lp to La mm	Lp to La mm
8	12	19	31
Z/ZX	16	22	38
A/AX	20	30	50
B/BX	26	43	69
20	31	48	79
C/CX	32	56	88
25	39	61	100
D	40	79	119
E	53	92	145

WEDGE SECTION

Section	BELT LENGTH FACTOR		
	Lp to La mm	Li to Lp mm	Li to La mm
SPZ/XPZ	13	37	50
SPA/XPA	18	45	63
SPB/XPB	28	60	88
19	25	69	94
SPC/XPC	30	83	113

NARROW SECTION

Section	BELT LENGTH FACTOR		
	Lp to La mm	Li to Lp mm	Li to La mm
3V/3VX	13	37	50
5V/5VX	25	60	85
8V/8VX	53	92	145