

【Operation Guide】

BELT Design Program

Timing Belt

Thank you for using our belt design program.
If you have any questions, please contact us.
*Go to the homepage by clicking "Help" in each tab.

MITSUBOSHI BELTING LTD.

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Detailed design procedures and notes are included in the program flow.

Please prepare the conditions of use

1. Program flow



Conditions [Application data]

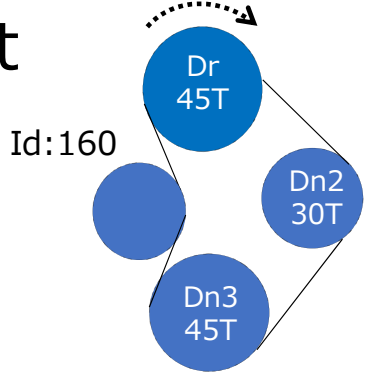
Application	Equipment and Applications	Textile machinery, Spinning frame
Belt	Type	Single
	Spec.	Giga Torque GX
	Profile	G14M
Load	Type of motor	Induction motors
	Motor load	100kW
	Dr pulley rev.	1500rpm
Frequency of use	Running Time	10h/Day

Request for Belt Design Application data sheet

Customer's Name											
OEM/Replacement											
Purpose											
Model Name											
Drawing	available	not available	availability: yes/no (Date)								
Specification of Belt											
Belt Size											
Number of Belts	pcs.										
Annual Quantity	pcs./year										
Operating Conditions	Type of Prime Mover	Power		kW		rpm	maximum torque				
	Speed	Drive		rpm	Driven		rpm				
	Pitch Diameter of Pulley	Drive		mm/teeth	Driven		mm/teeth				
	Center Distance		±		mm	Speed ratio					
	Operational hours per day			hrs./day	Idle Pulley						
Other Special Conditions											
Ambient Conditions											

Extract conditions

Layout



X-Y Coordinate system
(Clockwise at the base of Dr position)

Dr : 0,0
 →Dn2 : 200,-200
 →Dn3 : 0.-400
 →Id : -150,-200

Other Information	
Information for designing	
Information for price	

1. Program flow

Start screen



MITSUBOSHI Language (言語) ● Japanese (日本語) ○ English (英語)

BELT Design Program

- V-belt
- Timing Belt**
- RIBSTAR™ G**
V-ribbed Belt
- FREESPAN™ Belt**
Long-Span TPU Timing Belt

[Area of the machine to install the belt] (ベルト入手地域)

- Japan
- Europe
- North America
- Other

JIS

[Unit of measurement] (単位)

- mm ↔ ● in
- N ↔ ● lb

Start

※In other area, choose a corresponding industrial standard.
※FREESPAN Belt: Japanese customers: Please select "Japan"
Customers in other areas: Please select "Other"

設計検討プログラムの内容はお断りなく変更する場合があります。(Contents of belt design program are subject to change without notice.)

1. Program flow



Input tab

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Produ

Type: Single
 Spec.: Giga Torque GX
 Profile: G14M

*Input drive pulley into No.1 and others follow clockwise.
 Rotation: Clockwise

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Fitch dia. mm	Arc of contact	Meshing	Span length mm
1	0.00	0.00	Inside	45					
2	200.00	-200.00	Inside	30					
3	0.00	-400.00	Inside	45					
4	-150.00	-200.00	Outside						
5			Inside						

Service factor: 2.0 Reference

Load input method: Actual load Rated power

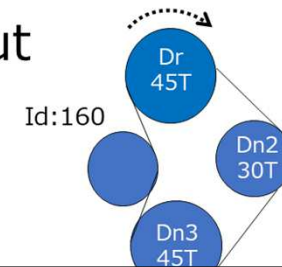
Transmission Power: kW

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm		1500.0					
Use rate %							
Velocity m/s							
No.							
1	<input checked="" type="checkbox"/>	100.00					
2	<input checked="" type="checkbox"/>						
3	<input checked="" type="checkbox"/>						
4	<input type="checkbox"/>						
5	<input type="checkbox"/>						

Conditions [Application data]

Application	Equipment and Applications	Textile machinery, Spinning frame
Belt	Type	Single
	Spec.	Giga Torque GX
	Profile	G14M
Load	Type of motor	Induction motors
	Motor load	100kW
	Dr pulley rev.	1500rpm
Frequency of use	Running Time	10h/Day

Layout



X-Y Coordinate system
 (Clockwise at the base of Dr position)

- Dr : 0,0
- Dn2 : 200,-200
- Dn3 : 0,-400
- Id : -150,-200

Detailed procedures & notes 3-2),3):P.16~18

Clear

Calculation =>

1. Program flow

Input tab



Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

MITSUBISHI

Type: Single
 Spec: Giga Torque GX
 Profile: G14M
 *Input drive pulley into No.1 and others follow clockwise.
 Rotation: Clockwise

Manual

Layout

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Pitch dia. mm	Arc of contact	Meshing	Span length mm	O.D. mm
1	0.00	0.00	Inside	45						
2	200.00	-200.00	Inside	30						
3	0.00	-400.00	Inside	45						
4	-150.00	-200.00	Outside		160.00					
5			Inside							

Service factor: 2.0 Reference

Load input method: Actual load Rated power

Transmission Power: kW

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm		1500.0					
Use rate %							
Velocity m/s							
No.		100.00					
	1	<input checked="" type="checkbox"/>					
	2	<input checked="" type="checkbox"/>					
	3	<input checked="" type="checkbox"/>					
	4	<input type="checkbox"/>					
	5	<input type="checkbox"/>					

Draw Layout *Le

Layout is drawn

Detailed procedures & notes 3-2),3):P.16~18

Clear Calculation =>

1. Program flow

Input tab



Timing Belt Design Program

MITSUBOSHI

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

Type: Single
 Spec.: Giga Torque GX
 Profile: G14M

*Input drive pulley into No.1 and others follow clockwise.
 Rotation: Clockwise

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Fitch dia. mm	Arc of contact	Meshing	Span L mm
1	0.00	0.00	Inside	45					
2	200.00	-200.00	Inside	30					
3	0.00	-400.00	Inside	45					
4	-150.00	-200.00	Outside		160.00				
5			Inside						

Service factor: 2.0 Reference

Load input method: Actual load Rated power

Transmission Power: kW

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm		1500.0					
Use rate %							
Velocity m/s							
No.							
1	<input checked="" type="checkbox"/>	100.00					
2	<input checked="" type="checkbox"/>						
3	<input checked="" type="checkbox"/>						
4	<input type="checkbox"/>						
5	<input type="checkbox"/>						

Conditions [Application data]

Application	Equipment and Applications	Textile machinery, Spinning frame
Belt	Type	Single
	Spec.	Giga Torque GX
	Profile	G14M
Load	Type of motor	Induction motors
	Motor load	100kW
	Dr pulley rev.	1500rpm
Frequency of use	Running Time	10h/Day

Layout

X-Y Coordinate system
 (Clockwise at the base of Dr position)

Dr : 0,0
 →Dn2 : 200,-200
 →Dn3 : 0,-400
 →Id : -150,-200

👉 Detailed procedures & notes 3-4):P.19-20

1. Program flow

Input tab



Timing Belt Design Prog

Input Recommendation Adjustments Results Products Info:Be

Type: Single
 Spec.: Giga Torque GX
 Profile: G14M

*Input drive pulley into No.1 and others follow clockwise.
 Rotation: Clockwise

Layout

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Pitch dia. mm	Arc of contact	Meshing	Span
1	0.00	0.00	Inside	45					
2	200.00	-200.00	Inside	30					
3	0.00	-400.00	Inside	45					
4	-150.00	-200.00	Outside		160.00				
5			Inside						

Service factor: 2.0

Load input method: Actual load Rated power

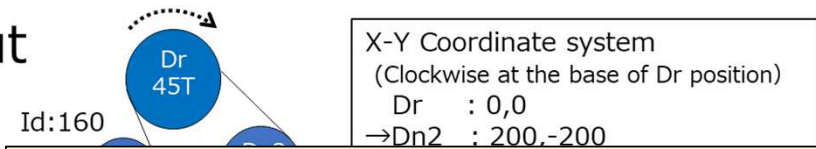
Transmission Power: kW

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm		1500.0					
Use rate %							
Velocity m/s							
No.		100.00					
	1	<input checked="" type="checkbox"/>					
	2	<input checked="" type="checkbox"/>					
	3	<input checked="" type="checkbox"/>					
	4	<input type="checkbox"/>					
	5	<input type="checkbox"/>					

Conditions [Application data]

Application	Equipment and Applications	Textile machinery, Spinning frame
Belt	Type	Single
	Spec.	Giga Torque GX
	Profile	G14M
Load	Type of motor	Induction motors
	Motor load	100kW
	Dr pulley rev.	1500rpm
Frequency of use	Running Time	10h/Day

Layout



Detailed procedures & notes 3-5),6):P.21-23

Clear Calculation =>

Recommendation tab

1. Program flow



Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pu

- Select a favorable condition by clicking the table.
 - Data of Adjustments and Details will be changed to the selected condition.
 - Go to Adjustments or Details using a tab or a button.
 - Click the heading of the table to change order.

*Please ensure that no interference between pulleys or belts is interfering, please change the layout.

Specification	Tooth profile	Tooth pitch mm	Calculated No. of teeth	Belt length mm	Cal. belt width mm
Giga Torque GX	G14M	14.000	110.90	1,552.63	50.25

Go to Adjustments => Go to Details =>

Conditions [Application data]

Application	Equipment and Applications	Textile machinery, Spinning frame
Belt	Type	Single
	Spec.	Giga Torque GX
	Profile	G14M
Load	Type of motor	Induction motors
	Motor load	100kW
	Dr pulley rev.	1500rpm
Frequency of use	Running Time	10h/Day

👉 Detailed procedures & notes 4:P.24

Normal procedure

Confirmation of estimated results



Adjustment tab

1. Program flow



Timing Belt Design Program

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Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

Target tooth number: 112

Calculated tooth number: 110.90

Calculated belt length mm: 1552.63

Make even

Linear movement
 Pulley No.: 2
 Direction: 0.00

Rotational movement
 Rotation: Clockwise
 Pulley No.:
 X coord. of arm pivot mm:
 Y coord. of arm pivot mm:
 Arm length : L mm:

Spring calculation
 Distance between spring and arm pivot : s mm:
 Belt tension N:
 Angle between arm and tension force:
 Angle between arm and spring force:
 Force by belt tension N:
 Spring force N:

Right angle pull force

Adjust Undo Reset

Go to Details =>

*Please ensure that no interference between pulleys or belts. If interfering, please change the layout.

Linear movement
- Pulleys can be moved by (Drag and Drop).
- Adjust the "Target tooth number" by Adjustment button (required to enter)

Spring calculation
- Click on the Idler Pulley to change spring angle.
- Click on the "Right angle pull force" button to apply.

Detailed procedures & notes
5:P.25-28

1. Program flow

Adjustment tab



Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

MITSUBOSHI

Target tooth number: 112

Calculated tooth number: 112.00

Calculated belt length mm: 1568.00

Even!!

Products list: (90T), (93T), G14M1344GX(96T), G14M1400GX(100T), G14M1568GX(112T), G14M1610GX(115T)

Linear movement: Pulley No. 2, Direction 0.00

Rotational movement: Rotation Clockwise, Pulley No., X coord. of arm pivot mm, Y coord. of arm pivot mm, Arm length: L mm

Spring calculation: Distance between spring and arm pivot: s mm, Belt tension N, Angle between arm and tension force, Angle between arm and spring force, Force by belt tension N, Spring force N

Right angle pull force

Adjust Undo Reset

Go to Details =>

*Please ensure that no interference between pulleys or belts. If interfering, please change the layout.

Linear movement: Pulleys can be moved by (Drag and Drop). Adjust the "Target tooth number" by Adjustment button (require to enter

Detailed procedures & notes 5:P.25-28

Spring calculation: Click on the Idler Pulley to change spring angle. Click on the "Right angle pull force" button to apply.

1. Program flow

Results tab



Timing Belt Design Program

Input Recommendation Adjustments **Results** Products Info:Belt Products Info:Pulley Layout Design

MITSUBISHI

Type: Single
Spec: Giga Torque GX
Profile: G14M
Rotation: Clockwise

Layout: *Please ensure that no interference between pulleys or belts. If interfering, please change the layout.

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Fitch dia. mm	Arc of contact	Meshing	Span length mm	O.D. mm
1	0.00	0.00	Inside	45		200.54	149.87	18.73	289.65	291.57
2	212.16	-200.00	Inside	30		133.69	80.22	6.68	289.65	291.57
3	0.00	-400.00	Inside	45		200.54	149.87	18.73	170.98	250.00
4	-150.00	-200.00	Outside							
5										

Any belt width can be set

Check result

Specification Giga Torque GX
Belt size 600G14M1568GX
Belt width 60.00 mm
Belt length 1568.00 mm
Min initial tension 2460 N
Max initial tension 3331 N

Create PDF

		D1	D2	D3	D4
Revolution	rpm	1500.0	2250.0	1500.0	1831.5
Trans. power	kW	100.00			
Design power	kW	200.00			
Required width	mm	44.09	50.25	44.09	0.00
Deflection len					
Deflection loa					
Frequency					
Shaft load					

Service factor 2.0
Safety factor 2.39

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev.	rpm	1500.0					
Use rate	%						
Velocity	m/s	15.75					
No.		100.00					
		2					
		3					
		4					
		5					

Detailed procedures & notes 6:P.29

1. Program flow

Results tab



Timing Belt Design Program

Input Recommendation Adjustments **Results** Products Info:Belt Products Info:Pulley Layout Design

MITSUBOSHI

Type: Single
 Spec.: Giga Torque GX
 Profile: G14M
 Rotation: Clockwise

Layout

*Please ensure that no interference between pulleys or belts. If interfering, please change the layout.

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia.	Fitch dia.	Arc of Meshing	Span length	O.D.
1	0.00	0.00	Inside	45					
2	212.16	-200.00	Inside	30					
3	0.00	-400.00	Inside	45					
4	-150.00	-200.00	Outside						
5									

Output setting dialog box:

Paper size: Letter size
 Language: English
 Customer: XYZ Ltd.
 Title: Design study for Textile Machine
 Doc. number: 12345678

Buttons: Back, Clear, Create PDF

Service factor: 2.0
 Safety factor: 2.39
 Transmission Power [kW]:

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm		1500.0					
Use rate %							
Velocity m/s		15.75					
No. 1	<input checked="" type="checkbox"/>	100.00					
No. 2	<input checked="" type="checkbox"/>						
No. 3	<input checked="" type="checkbox"/>						
No. 4	<input type="checkbox"/>						
No. 5	<input type="checkbox"/>						

Giga Torque GX
 00G14M1568GX
 60.00 mm
 1568.00 mm
 2460 N
 Max. initial tension 3331 N

Table:

		D1	D2	D3	D4
Revolution rpm		1500.0	2250.0	1500.0	1831.5
Trans. power kW		100.00			
Design power kW		200.00			
Required width mm		44.09	50.25	44.09	0.00
Deflection length					
Deflection load					
Frequency					
Shaft load					

Diagram showing 4 pulleys (1, 2, 3, 4) connected by a belt.

Service factor: 2.0
 Safety factor: 2.39
 Transmission Power [kW]:

Buttons: Create PDF

Detailed procedures & notes
 6:P.30

pdf.

1. Program flow



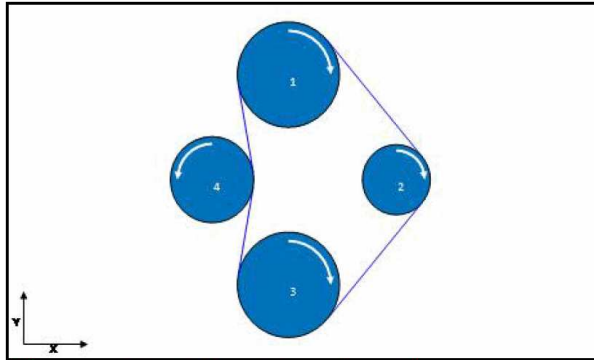
XYZ Ltd.

Design study for Textile Machine

DocNo. 12345678
 Date 29-Jun-22
 Signature _____
 Signature _____

Summary

Specification Giga Torque GX
 Profile G14M
 Belt size 600G14M1568GX
 Belt width 60.00 mm
 Belt length 1568.00 mm
 Number of teeth 112
 Safety factor 2.39
 Min. initial tension 2460 N
 Max. initial tension 3331 N



*Please ensure that no interference between pulleys or belts.
 If interfering, please change the layout.

Availability

Rubber	available
Urethane	Not available

For functionally and durability confirmation, please evaluate with actual model to be installed.

Layout

No.	X coord. mm	Y coord. mm	Number of teeth	Pitch dia. mm	Arc of contact	Meshing	Span L. mm	C.D. mm
1	0.00	0.00	45	200.54	149.87	18.73	289.65	291.57
2	212.16	-200.00	30	133.69	80.22	6.68	289.65	291.57
3	0.00	-400.00	45	200.54	149.87	18.73	170.98	250.00
4	-150.00	-200.00	0	164.24	-19.96	0.00	170.98	250.00

Details

[Calculated]

Con. 1		Velocity	15.75 m/s		Centrifugal tension	123.54N	
No.	Revolution rpm	T. power kW	D. power kW	Effect. Ten. N	Power rating kW	T.I.M corr. factor	Req. width mm
1	1,500.0	100.00	200.00	6,349.21	272.15	1.0	44.09
2	2,250.0			6,349.21	238.79	1.0	50.25
3	1,500.0			6,349.21	272.15	1.0	44.09
4	1,831.5			0.00	0.00	0.0	0.00

Service factor conditions

Service factor 2.0

Tension

No.	Deflection length mm	Deflection load N	Frequency Hz	Shaft load N
1	-	-	121-141	4752-6432
2	-	-	121-141	3170-4292
3	-	-	206-239	4752-6432
4	-	-	206-239	853-1154

*The value of frequency should be used for only Mitsubishi tension meter.

Adjustments

Target tooth number 112 [Linear movement]
 Pulley No. 2
 Direction 0.00

Please evaluate the functionality and durability of the product on the actual equipment.

2. Tab description

The screenshot shows the 'Timing Belt Design Program' interface. It features a tabbed menu at the top with the following tabs: 'Input', 'Recommendation', 'Adjustments', 'Results', 'Products Info:Belt', 'Products Info:Pulley', and 'Layout Design'. The 'Input' tab is currently selected. Below the tabs, there are several input fields and a button:

- 'Type' dropdown menu with 'Single' selected.
- 'Spec.' dropdown menu with 'Auto' selected.
- 'Profile' dropdown menu with 'Auto' selected.
- 'Rotation' dropdown menu with 'Clockwise' selected.
- A 'Manual' button.
- A note: '*Input drive pulley into No.1 and others follow clockwise.'

Red circles with numbers 1 through 6 are placed above the interface to indicate specific areas of interest. A green circle with the letter 'A' is placed above the 'Layout Design' tab.

• The design study proceeds in the order ①-④.

⑤ : Belt lineup can be checked.

⑥ : Standard pulley (tooth) can be checked.

Ⓐ : Layout design can be performed separately from timing belt design study.

3-1) Input tab : Input procedure

Timing Belt Design Program

Input Recommendation Adjustments Results Products

Type: Single
 Spec: Auto
 Profile: Auto
 *Input drive pulley into No.1 and others follow clockwise.
 Rotation: Clockwise

Layout

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Pitch dia. mm	Arc of contact	Meshing	Span length mm	O.D. mm
1			Inside							
2			Inside							
3			Inside							
4			Inside							
5			Inside							

Service factor: Reference

Load input method: Actual load Rated power

Transmission Power: kW

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm							
Use rate %							
Velocity m/s							
No.							
1	<input type="checkbox"/>						
2	<input type="checkbox"/>						
3	<input type="checkbox"/>						
4	<input type="checkbox"/>						
5	<input type="checkbox"/>						

Click the button 4 to draw a layout diagram.
 Click the button 8 to go to the next tab.



4 Draw Layout *Layout is drawn temporarily.

Clear 8 Calculation =>



3-2) Input tab : Select belt type

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

Type Single
Spec. Giga Torque GX
Profile Auto

*Input drive pulley into No.1 and others follow clockwise.
Rotation Clockwise

Manual

Layout

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Pitch dia. mm	Arc of contact	Meshing	Span length mm	C.D. mm
1			Inside							
2										
3										
4										
5										

Type Single
Spec. Giga Torque GX
Profile Auto

Type(required) :Select Single/Double
Spec. :Select automatic/requested belt type
Profile :Select automatic/requested tooth profile

Service factor Reference

Load input method Actual load Rated power

Transmission Power kW

		With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev.	rpm							
Use rate	%							
Velocity	m/s							
No.	1	<input type="checkbox"/>						
	2	<input type="checkbox"/>						
	3	<input type="checkbox"/>						
	4	<input type="checkbox"/>						
	5	<input type="checkbox"/>						

Clear Calculation =>

3-3) Input tab : Draw layout

<Layout drawing procedure>

- ② Select pulley rotation direction → ③ Input layout conditions
→ ④ Display layout diagram

Input required in the white condition field.

Type: Single
Spec.: Giga Torque GX
Profile: Auto
Rotation: Clockwise

*Input drive pulley into No.1 and others follow clockwise.

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Pitch dia. mm	Arc of contact	Meshing	Span length mm	C.D. mm
1			Inside							
2			Inside							
3			Inside							

Draw Layout *Layout is drawn temporarily.

No. of teeth and pitch diameter cannot be mixed.

- ▶ In case of tooth number input, input number of teeth for all axes.
- ▶ In case of pitch diameter input, input pitch diameter for all the shafts.

3-3) Input tab : Draw layout

Applications: Power transmission

③ Input each coordinate clockwise with the drive pulley as No.1 → ④ Click "Draw Layout" to draw.

Timing Belt Design Program

Input Recommendation Adjustments Results Products

Type: Single
Spec: Giga Torque GX
Profile: G14M

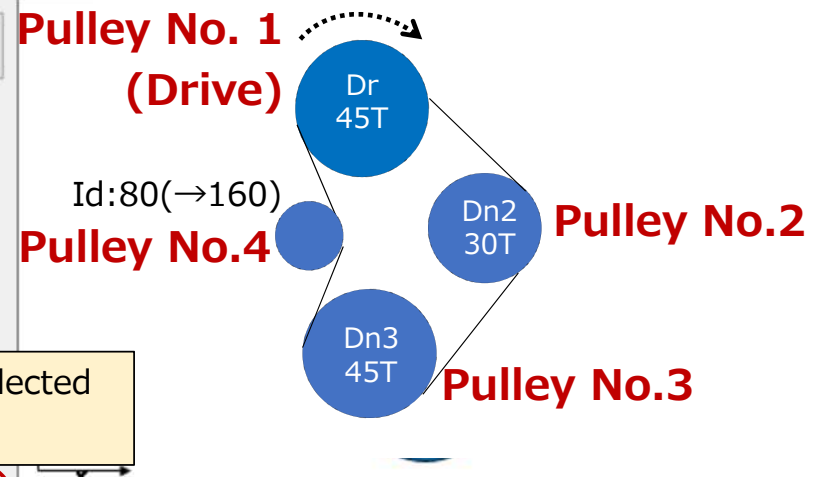
*Input drive pulley into No. 2 and others follow clockwise.
Rotation: Clockwise

Manual

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia.	Pitch dia.	Arc of	Meshing	Span length	G.D.
1	0.00	0.00	Inside	45						
2	200.00	-200.00	Inside	30						
3	0.00	-400.00	Inside	45						
4	-150.00	-200.00	Outside		80.00					
5			Inside							

Coordinate Input Example

← When pulley position "outside" is selected : Input pulley outer diameter.



Layout

No.	X coord mm	Y coord mm	IN/OUT
1	0.00	0.00	Inside
2	200.00	-200.00	Inside
3	0.00	-400.00	Inside
4	-150.00	-200.00	Outside
5			Inside

- Pulley position of each axis can be switched between inside and outside by pressing the "IN/OUT" button.
- No. of teeth or pitch diameter: Input more than the minimum pulley.

Click to switch belt placement (inside/outside against the belt)

④ Draw Layout

*Layout is drawn temporarily.

Idler pulley diameter is too small. Use a pulley of 149.73mm or more in diameter. → Change to 160mm Idler pulley dia.

*When "Auto" tooth profile is selected and the number of pulley teeth is input: The layout overview drawing is displayed with the tooth profile of the smallest tooth pitch.

3-4) Input tab : Service factor

Timing Belt Design Program



Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

Type: Single
Spec.: Giga Torque GX
Profile: G14M
Rotation: Clockwise

*Input drive pulley into No.1 and others follow clockwise.

Layout

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Fitch dia. mm	Arc of contact
1	0.00	0.00	Inside	45			
2	200.00	-20					
3	0.00	-40					
4	-150.00	-20					
5			Inside				

Service Factor Calculation

1. Application

- Display equipment/Movie projector/Measuring equipment/Medical equipment
- Sweeper/Sewing machines
- Office equipment: Facsimile, Typewriter, Calculator, Copy machine
- Automatic equipment: Money changer, Ticket vending machine, Ticket gate, Banking machine
- Packing machines
- Washing machine
- Woodworking equipment
- Lathe, Band saw

2. Driving unit

- Motors that can output rated power such as induction motors
 - DC motor(Shunt)
 - 2 or higher cylinder engine
- Motor that can output more than the rated power, such as servo motors
 - DC motor(Series coil)
 - 1-cylinder engine

Select the factors from the below lists.
If the application machine is not found in the table, select the similar torque machinery.

rpm of the largest pulley)

1.00 - 1.24
1.25 - 1.74
1.75 - 2.49

Machine tools: Cement, Semi-liquid; Drilling machine, Lathe, Screw cutting machine, Planers; Grinder, Milling machine, Shaping machine, Boring machines; (except pulper)

Paper machinery: Pulper, Beater

Compressors: Centrifugal; Rotary; Reciprocating

Textile machinery: Warming machine, Winder; Spinning frame, Twisting machine, Pirm winders

Injection molding machines

Industrial robots

Rubber equipment: Calendar, Mill, Extruder

Extrusion pump/Washers and cleaners

Hoists/Elevators

Generators/Exciters

Fans/Blowers: Centrifugal, Attraction, Exhaust; Mine fans, Roots blower

Centrifuges/Hammer mills

Clay machinery: Bricks, Viscosity mills

Belt tight side, outside of belt

Service factor: []

Back Clear Set

• ⑤ Overload factor (required): Manual input or selected by "service factor reference input"

⑤

Service factor [] Reference

"Set" to return to the original input tab

3-4) Input tab : Service factor reference input

Service Factor Calculation



1. Application

- Display equipment/Movie projector/Measuring equipment/Medical equipment
- Sweeper/Sealer
- Office equipment
- Automatic equipment
- Packing machinery
- Washing machinery
- Woodworking machinery
- Conveyors
 - Light duty
 - Coal, Ore, Sand
 - Apron, Pan, Bucket, Elevator
 - Flight, Screw
- Vibration screen
- Agitators
 - Liquid
 - Cement, Semi-liquid
- Machine tools
 - Drilling machine, Lathe, Screw cutting machine, Planers
 - Grinder, Milling machine, Shaping machine, Boring machines
- Paper machinery
 - (except pulper)
 - Pulper, Beater
- Compressors
 - Centrifugal
 - Rotary
 - Reciprocating
- Textile machinery
 - Winding machine, Winder
 - Spinning frame, Twisting machine, Pin winders
- Injection molding machines
- Industrial robots
- Rubber equipment
 - Calendar, Mill, Extruder
- Extraction pump/Washers and cleaners
- Hoists/Elevators
- Generators/Exciters
- Fans/Blowers
 - Centrifugal, Attraction, Exhaust
 - Mine fans, Roots blower
- Centrifuges/Hammer mills
- Clay machinery
 - Bricks, Viscosity mills

1. Select the machine to be used
*If there is no applicable machine, select a similar machine.

Select the factors from the below lists.
If the application machine is not found in the table, select the similar torque machinery.

2. Driving unit

- Motors that can output rated power such as induction motors
 - DC motor(Shunt)
 - 2 or higher cylinder engine
- Motor that can output more than the rated power, such as servo motors
 - DC motor(Series coil)
 - 1-cylinder engine

2. Select driving unit (motor)

3. Running time

- Periodic - 5hrs/day
- Normal - 12hrs/day
- Continuous - 24hrs/day

3. Select operating hrs/day

4. Speed ratio (rpm of the smallest pulley / rpm of the largest pulley)

- 1.00 - 1.24
- 1.25 - 1.74
- 1.75 - 2.49
- 2.50 - 3.49
- 3.50 and over

4. Select speed ratio

*Rotation ratio=number of large pulley teeth/number of small pulley teeth

5. Number of idlers

- Belt slack side, inside of belt
- Belt slack side, outside of belt
- Belt tight side, inside of belt
- Belt tight side, outside of belt

5. Select the number of idlers

No idlers: No need to check
Forward/reverse operation: All are counted on the "belt tight side".

Service factor

"Set"

Back

Clear

Set

3-5) Input tab : Transmission power unit selection

Timing Belt Design Program

MITSUBISHI

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

Type: Single
 Spec: Giga Torque GX
 Profile: G14M
 *Input drive pulley into No.1 and others follow clockwise.
 Rotation: Clockwise

Manual

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Fitch dia. mm	Arc of contact	Meshing	Span length mm	C.D. mm
1	0.00	0.00	Inside	45						
2	200.00	-200.00	Inside	30						
3	0.00	100.00	Inside	45						
4										
5										

Layout

Draw Layout *Layout is drawn temporarily.

Service factor: Reference

Load input method: Actual load Rated power

Transmission Power: kW

6 Select motor load/actual load in design method
 → 6 Select the unit of load

- kW
- W
- HP
- PS
- Nm
- Ncm
- lb-in
- lb-ft

3-6) Input tab : Input conditions

Load input method: Rated (motor) load

⑦ Input conditions → ⑧ Press "Calculation" to go to the next tab.

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley

Type: Single
 Spec: Giga Torque GX
 Profile: G14M

*Input drive pulley into No.1 and others follow clockwise.
 Rotation: Clockwise

Layout

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Fitch dia. mm	Arc of contact	Meshing	Span le mm
1	0.00	0.00	Inside	45					
2	200.00	-200.00	Inside	30					

- Axis No. 1: Load shaft
- If no load is applied by the idler, remove from "With load" column.

Conditions [Application data]

Application	Equipment and Applications	Textile machinery, Spinning frame
Belt	Type	Single
	Spec.	Giga Torque GX
	Profile	G14M
Load	Type of motor	Induction motors
	Motor load	100kW
	Actual load	Dn2=15kW, Dn3=75kW
	Dr pulley rev.	1500rpm
Frequency of use	Running Time	10h/Day

Service factor: 2.0 Reference

Load input method: Actual load **Rated power**

Transmission Power: kW

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm	7	1500.0					
Use rate							
Velocity m/s							
No.		100.00					
		<input checked="" type="checkbox"/>					
		<input checked="" type="checkbox"/>					
		<input type="checkbox"/>					
		<input type="checkbox"/>					

*When using servo motors, design study at maximum torque.

Clear **8** Calculation =>

3-6) Input tab : Input conditions

Load input method: Actual load

⑦ Input conditions → ⑧ Press "Calculation" to go to the next tab.

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley

Type: Single
 Spec: Giga Torque GX
 Profile: G14M
 *Input drive pulley into No.1 and others follow clockwise.
 Rotation: Clockwise

Layout

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Pitch dia. mm	Arc of contact	Meshing	Span length mm
1	0.00	0.00	Inside	45					
2	200.00	-200.00	Inside	30					
3	0.00	-400.00	Inside	45					
4	-150.00	-200.00	Outside		160.00				
5			Inside						

Service factor: 2.0 Reference

Load input method: Actual load Rated power

Transmission Power: kW

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm		1500.0					
Use rate %							
Velocity m/s							
No.							
1		100.00					
2		15.00					
3		85.00					
4							
5							

Conditions [Application data]

Application	Equipment and Applications	Textile machinery, Spinning frame
Belt	Type	Single
	Spec.	Giga Torque GX
	Profile	G14M
Load	Type of motor	Induction motors
	Motor load	100kW
	Actual load	Dn2=15kW, Dn3=75kW
	Dr pulley rev.	1500rpm
Frequency of use	Running Time	10h/Day

- Enter the actual load on the load axis.
- Input "0" for idler.

7

8

Clear Re-enter

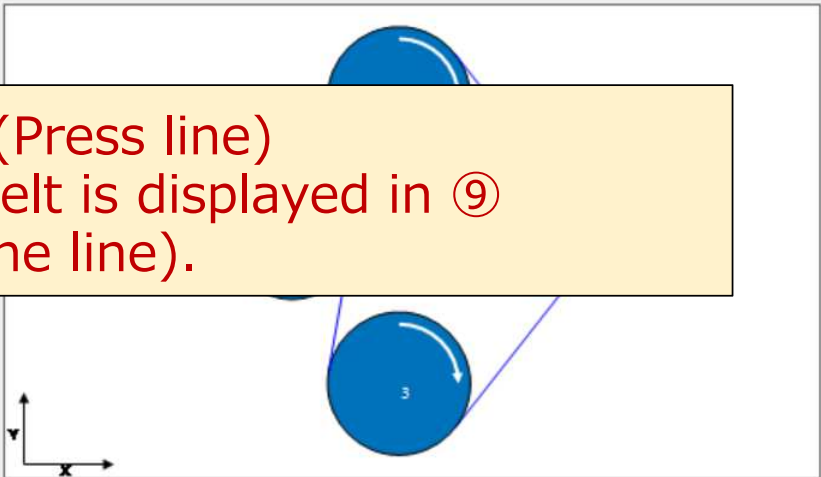
4. Recommendation tab (Belt selection list)



Tooth Profile "Auto" : ⑨ Select a belt from the list. (Press line)
 Tooth Profile "Auto/Specified" : Only the specified belt is displayed in ⑨ (no need to press the line).

Data of Adjustments and Details will be changed to the selected condition.
 - Go to Adjustments or Details using a tab or a button.
 - Click the heading of the table to change order.

*Please ensure that no interference between pulleys or belts. If interfering, please change the layout.



Specification	Tooth profile	Tooth pitch mm	Calculated No. of teeth	Belt length mm	Cal. belt width mm	Chosen belt width mm ▲	Dr pulley pitch dia. mm	Velocity m/s
Giga Torque GX	G14M	14.000	110.90	1,552.63	44.09	50.00	200.54	15.75
Mega Torque GG	MTS14M	14.000	111.00	1,552.72	50.53	60.00	200.54	15.75
Mega Torque G2	MTS14M	14.000	111.01	1,552.86	61.45	80.00	200.54	15.75
Mega Torque G	MTGP14M	14.000	110.91	1,552.77	115.01	115.00	200.54	15.75
Mega Torque G	MTS14M	14.000	110.94	1,553.13	106.67	120.00	200.54	15.75

⑩ Proceed to layout adjustment (normal procedure)
 ⑪ Proceed to the result screen (Confirmation of approximate results)



5. Adjustment tab (Linear movement)

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt

A Target tooth number 112

B Calculated tooth number 110.90
Calculated belt length mm 1552.63

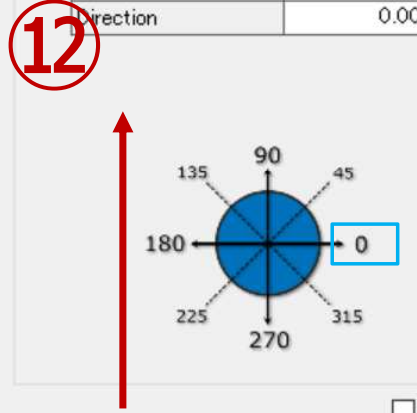
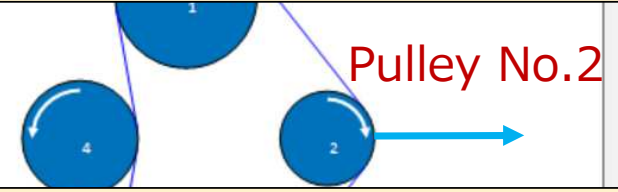
A

Belts list
 G14M1260GX(90T)
 G14M1302GX(93T)
 G14M1344GX(96T)
 G14M1400GX(100T)
 G14M1568GX(112T)
 G14M1610GX(115T)

Linear movement Rotational movement

Pulley No. 2
 Direction 0.00

⑫ Input the pulley No. and direction of movement to adjust to the target tooth number.
 → ⑬ Click "Adjust" to adjust the layout.



Target tooth number(A):

- ▶ Number of integer teeth close to the calculated tooth number (manual input possible)
- ▶ Select a belt from the standard belts list that is close to the calculated belt tooth number (automatic setting)

Calculated tooth number and belt length(B):
 Calculated value from input conditions

Example) Adjust the calculated tooth number of 110.90 teeth to the target 112 teeth.
 → ⑫ Move pulley No. 2 in the direction of 0°.
 Enter "Pulley No.: 2" and "Direction: 0"

Adjust button (required to enter and moving direction).

position.

Adjustment button (required to enter the target tooth number and arm condition).

Spring calculation

- Click on the Idler Pulley to change spring angle.
- Click on the "Right angle pull force" button to apply.

⑬

Adjust Undo Reset

Go to Details =>

5. Adjustment tab (Linear movement)

Screen after adjustment

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

A Target tooth number 112

B Calculated tooth number 112.00
Calculated belt length mm 1568.00

Belts list

- G14M1260GX(90T)
- G14M1302GX(93T)
- G14M1344GX(96T)
- G14M1400GX(100T)
- G14M1568GX(112T)**
- G14M1610GX(115T)

Linear movement
Pulley No. 2
Direction 0.00

Rotational movement
Rotation Clockwise

Match between target and calculated tooth number (A=B)
→ 14 Click "Go to Details" to go to the next tab.

Spring calculation

Distance between spring and arm pivot : s	mm	
Belt tension	N	
Angle between arm and tension force		
Angle between arm and spring force		
Force by belt tension	N	
Spring force	N	

Right angle pull force

Linear movement

- Pulleys can be moved by (Drag and Drop).
- Adjust the "Target tooth number" by Adjustment button (required to enter the target tooth number, moving shaft No., and moving direction).

Rotational movement

- Click on the Idler Pulley to move tension arm position.
- Adjust the "Target tooth number" by Adjustment button (required to enter the target tooth number and arm condition).

Spring calculation

- Click on the Idler Pulley to change spring angle.
- Click on the "Right angle pull force" button to apply.

Adjust **14** Undo Reset

Go to Details =>

5. Adjustment tab (Rotational movement)

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt

A Target tooth number 112

B Calculated tooth number 110.90
Calculated belt length mm 1552.63

A

Belts list

- G14M1260GX(90T)
- G14M1302GX(93T)
- G14M1344GX(96T)
- G14M1400GX(100T)
- G14M1568GX(112T)**
- G14M1610GX(115T)

Linear movement

Rotational movement

Pulley No.

Direction

Rotation Clockwise

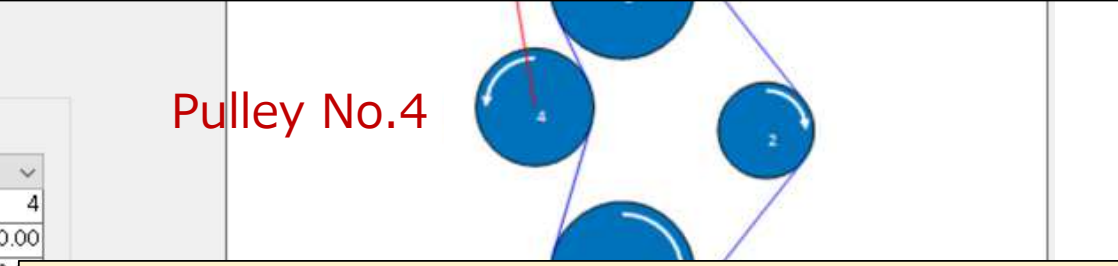
Pulley No. 4

X coord. of arm pivot mm -150.00

Y coord. of arm pivot mm 0.00

Arm length : L mm 170.00

⑫ Input the moving axis and arm information to adjust to the target belt tooth count.
→ ⑬ Click "Adjust" to adjust the layout.



• Target tooth number(A):
• Calculated tooth number and belt length(B):
→ Refer to P25

Example) Adjust the calculated tooth number of 110.90 teeth to the target 112 teeth.
→ ⑫ Input arm information and move axis No. 4.
Enter "Pulley No. 4," "Arm fulcrum coordinates = (-150,0)" and "arm length = 170mm."

- Adjust the "Target tooth number" by Adjustment button (required to enter the target tooth number, moving shaft No., and moving direction).

Rotational movement

- Click on the Idler Pulley to move tension arm position.
- Adjust the "Target tooth number" by Adjustment button (required to enter the target tooth number and arm condition).

Spring calculation

- Click on the Idler Pulley to change spring angle.
- Click on the "Right angle pull force" button to apply.

⑬

Adjust Undo Reset

Go to Details =>

5. Adjustment tab (Rotational movement)

Screen after adjustment

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

A Target tooth number	112
B Calculated tooth number	112.00
Calculated belt length mm	1568.00

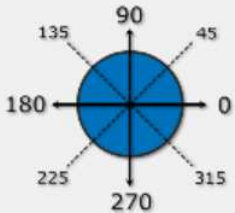
Belts list
G14M1260GX(90T)
G14M1302GX(93T)
G14M1344GX(96T)
G14M1400GX(100T)
G14M1568GX(112T)
G14M1610GX(115T)

Linear movement

Pulley No.	
Direction	

Rotational movement

Rotation	Clockwise
Pulley No.	4
X coord. of arm pivot mm	-150.00



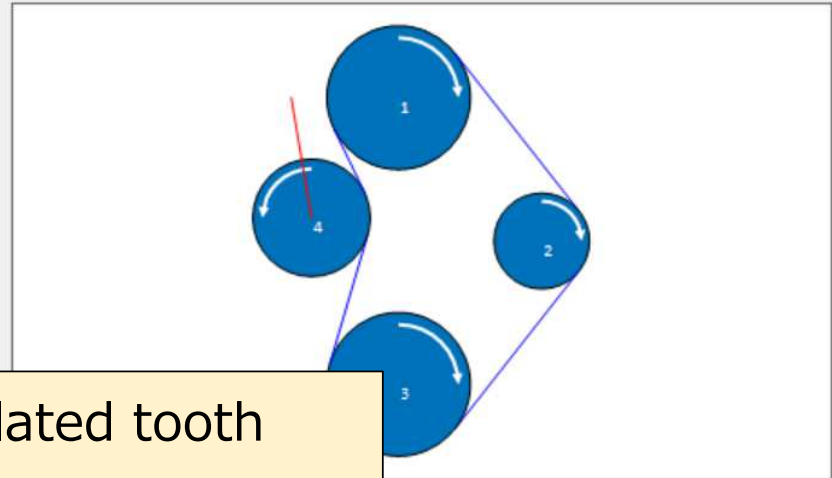
Match between target and calculated tooth number (A=B)
 → ⑭ Click "Go to Details" to go to the next tab.

Spring calculation

Distance between spring and arm pivot : s	mm	
Belt tension	N	
Angle between arm and tension force		
Angle between arm and spring force		
Force by belt tension	N	
Spring force	N	



Right angle pull force



- Pulleys can be moved by (Drag and Drop).
- Adjust the "Target tooth number" by Adjustment button (required to enter the target tooth number, moving shaft No., and moving direction).

Rotational movement

- Click on the Idler Pulley to move tension arm position.
- Adjust the "Target tooth number" by Adjustment button (required to enter the target tooth number and arm condition).

Spring calculation

- Click on the Idler Pulley to change spring angle.
- Click on the "Right angle pull force" button to apply.

Adjust Undo Reset

⑭ Go to Details =>

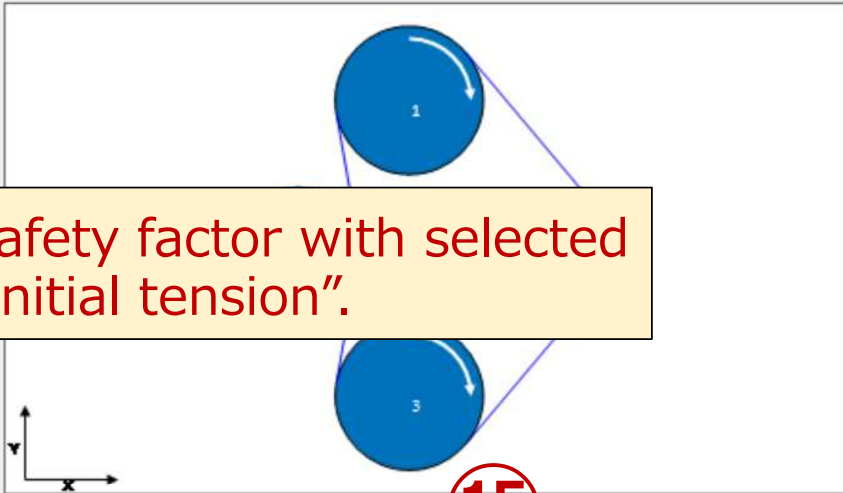
6. Results tab (Selection results)

Output pdf. with selected results P.29
 → 15 Click "Create PDF"

Timing Belt Design Program

Input Recommendation Adjustments **Results** Products Info:Belt Products Info:Pulley Layout Design

Type: Single
 Spec.: Giga Torque GX
 Profile: G14M
 Rotation: Clockwise



Displays "selected belt (automatic)," "safety factor with selected belt (automatic)," and "recommended initial tension".

No.	X coord mm	Y coord mm							
1	0.00	0.00							
2	212.16	-200.00							
3	0.00	-400.00	Inside	45	200.54	149.87	18.73	170.98	250.00
4	-150.00	-200.00	Outside		160.00	164.24	-19.96	0.00	170.98
5									

Calculated
 Initial tension without spring
 Calculated with spring
 Initial tension with spring

Initial tension:

Spring No.:

Width: 60.00 mm 2.36 in

Std width: 20/30/37/40/50/60/68/70/80/90/100 /115/125/130

Calculation

Specification Giga Torque GX

Belt size 600G14M1568GX

Belt width: 60.00 mm

Belt length: 1568.00 mm

Min. initial tension: 2460 N

Max. initial tension: 3331 N

15

Create PDF

Service factor: 2.0

Safety factor: 2.39

Transmission Power [kW]:

*Can be recalculated with any width

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm		1500.0					
Use rate %							
Velocity m/s		15.75					
No. 1	<input checked="" type="checkbox"/>	100.00					
No. 2	<input checked="" type="checkbox"/>						

		D1	D2	D3	D4
Revolution rpm		1500.0	2250.0	1500.0	1831.5
Trans. power kW		100.00			
Design power kW		200.00			
Required width mm		44.09	50.25	44.09	0.00
Deflection length mm		-	-	-	-
Deflection load N		-	-	-	-
Unit load		11-141	121-141	206-239	206-239
Unit load		6432	3170-4292	4752-6432	853-1154

*Click each tab to switch to the selected tab and review.

6. Results tab (pdf. creation)

Timing Belt Design Program



Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

Type: Single
 Spec.: Giga Torque GX
 Profile: G14M

Layout

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth
1	0.00	0.00	Inside	45
2	212.16	-200.00	Inside	30
3	0.00	-400.00	Inside	45
4	-150.00	-200.00	Outside	
5				

Calculated
 Initial tension without spring
 Calculated with spring
 Initial tension with spring

Initial tension
 Spring No.

Service factor: 2.0
 Safety factor: 2.39
 Transmission Power [kW]

	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm		1500.0					
Use rate %							
Velocity m/s		15.75					
No.	1	<input checked="" type="checkbox"/>					
	2	<input checked="" type="checkbox"/>					
	3	<input checked="" type="checkbox"/>					
	4	<input type="checkbox"/>					
	5	<input type="checkbox"/>					

⑮ Click "Create PDF" to display the print preparation screen.
 → ⑯ Select "Paper size", "Language", and enter various conditions.
 → ⑰ Click "Create PDF"

Output setting

Paper size: Letter size
 Language: English
 Customer: XYZ Ltd.
 Title: Design study for Textile Machine
 Doc. number: 12345678

Giga Torque GX
 600G14M1568GX
 60.00 mm
 1568.00 mm
 2460 N
 Max. initial tension 3331 N

		D1	D2	D3	D4
Revolution rpm		1500.0	2250.0	1500.0	1831.5
Trans. power kW		100.00			
Design power kW		200.00			
Required width mm		44.09	50.25	44.09	0.00
Deflection length mm		-	-	-	-
Deflection load N		-	-	-	-
Frequency Hz		121-141	121-141	206-239	206-239
Shaft load N		4752-6432	3170-4292	4752-6432	853-1154

7. Supplementary explanation : Input condition re-entry procedure

Timing Belt Design Program



Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

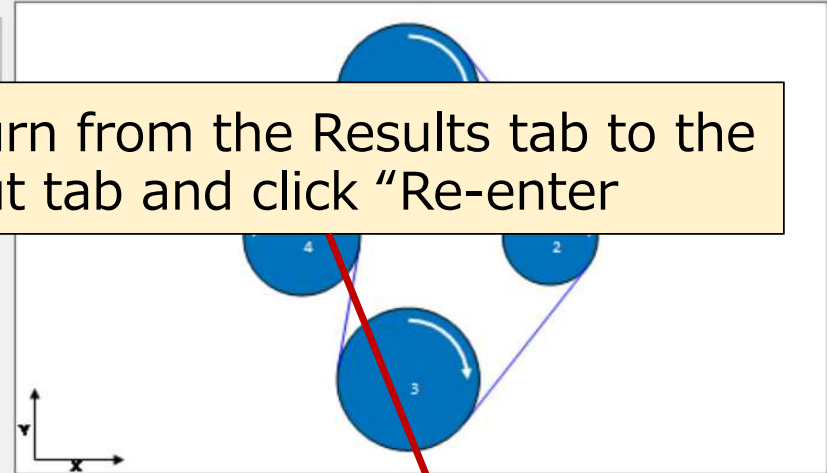
Type: Single
 Spec.: Giga Torque GX
 Profile: G14M
 *Input drive pulley into No.1 and others follow clockwise.
 Rotation: Clockwise

Manual

Return from the Results tab to the Input tab and click "Re-enter"

Layout

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Pitch dia. mm	Arc of contact	Meshing	Span length mm
1	0.00	0.00	Inside	45					
2	200.00	-200.00	Inside	30					
3	0.00	-400.00	Inside	45					
4	-150.00	-200.00	Outside		160.00				
5			Inside						



Draw Layout *Layout is drawn temporarily.

Service factor: 2.0 Reference

Load input method: Actual load Rated power

Transmission Power: kW

		With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev.	rpm		1500.0					
Use rate	%							
Velocity	m/s							
No.								
	1	<input checked="" type="checkbox"/>	100.00					
	2	<input checked="" type="checkbox"/>						
	3	<input checked="" type="checkbox"/>						
	4	<input type="checkbox"/>						
	5	<input type="checkbox"/>						

Clear Re-enter

7. Supplementary explanation : Input condition re-entry procedure

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

MITSUBISHI

Type: Single
 Spec: Giga Torque GX
 Profile: G14M

*Input drive pulley into No.1 and others follow clockwise.
 Rotation: Clockwise

Layout

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Pitch dia. mm	Arc of contact	Meshing	Span length mm
1	0.00	0.00	Inside	45					
2	200.00	-200.00	Inside	30					
3	0.00	-400.00	Inside	45					
4	-150.00	-200.00	Outside		160.00				
5			Inside						

Service factor: 2.0 Reference

Load input method: Actual load Rated power

Transmission Power: kW

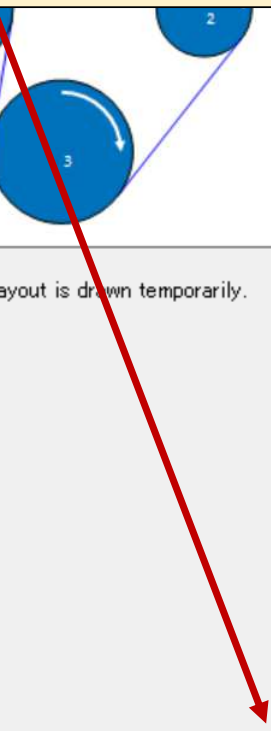
	With load	Con.1	Con.2	Con.3	Con.4	Con.5	Con.6
Dr pulley rev. rpm		1500.0					
Use rate %							
Velocity m/s							
No. 1	<input checked="" type="checkbox"/>	100.00					
2	<input checked="" type="checkbox"/>						
3	<input checked="" type="checkbox"/>						
4	<input type="checkbox"/>						
5	<input type="checkbox"/>						

Diagram showing pulley layout with pulleys 1, 2, 3, 4, 5 and a coordinate system.

Draw Layout *Layout is drawn temporarily.

Clear Calculation =>

After "Re-enter" is clicked, the initial review state is restored.
 *The following steps are repeated.



7. Supplementary explanation : Input condition re-entry procedure

Timing Belt Design Program

Input Recommendation **Adjustments** Results Products Info:Belt Products Info:Pulley Layout Design

MITSUBISHI

Target tooth number: 112

Calculated tooth number: 112.00

Calculated belt length mm: 1568.00

Belts list:

- G14M1190GX(85T)
- G14M1260GX(90T)
- G14M1302GX(93T)
- G14M1344GX(96T)
- G14M1400GX(100T)**
- G14M1568GX(112T)

Linear movement

Rotational movement

Rotation: Clockwise

Pulley No.: 4

X coord. of arm pivot mm: -150.00

Y coord. of arm pivot mm: 0.00

Arm length : L mm: 170.00

Spring calculation

Distance between spring and arm pivot : s mm: 100.00

Belt tension N: 250.00

Angle between arm and tension force: 85.07

Angle between arm and spring force: 90.00

Force by belt tension N: 179.80

Spring force N: 304.52

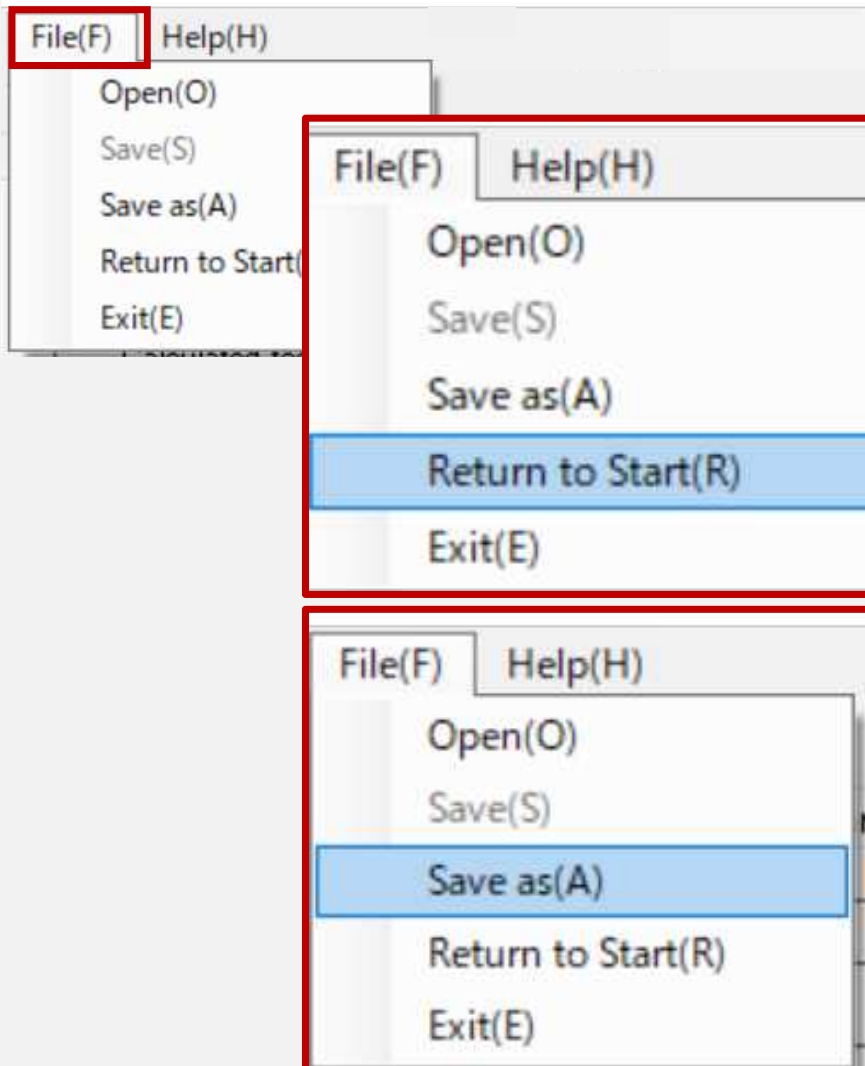
Right angle pull force

*Please ensure that no interference between pulleys or belts. If interfering, please change the layout.

- Enter the target tooth number, select "Rotational movement" as the layout adjustment method, and enter the arm information [Refer to p. 27].
- Select , enter "Distance between spring and arm pivot" and "Belt tension", and click "Right angle pull force".

7. Supplementary explanation :File function

Timing Belt Design Program Mitsubishi Belting Ltd.



- Click "File(F)" on each tab to go to each screen.
*Input conditions are initialized.

- After completing the review, click on the tab "File(F)"→"Save As(A)" to save the file format.

- Re-load by "File(F)" and "Open(O)" in the input tab.
*The application and design method are automatically switched according to the file to be read.

8. Products information : Belt tab

Timing Belt Design Program



Input Recommendation Adjustments Results **Products Info:Belt** Products Info:Pulley Layout Design

Product Line up Timing belt

	Super Torque	Mega Torque G	Mega Torque G II	Mega Torque G II P	Mega Torque G III	Giga Torque GX	Mega Torque EP	Mega Torque EX
Type								
(MT)S3M	○ (D)	○						○
(MT)S5M	○ (D)	○						○
(MT)S8M	○ (D)	○	○		○			
(MT)S14M	○ (D)	○		○	○			
G8M						○		
G14M						○		
GP8M							○	
GP14M							○	

Power Rating
^
^
^

GIGA TORQUE GX
Superior durability and noise reduction

MEGA TORQUE G III
Excellent durability, applicable for standard pulley

MEGA TORQUE G II / G II P
Enhanced operation silence and higher durability

MEGA TORQUE G
Compact design and operating silence

SLIPER TORQUE

Classical Type
JIS, ISO standards

MEGA TORQUE EP
High torque EPDM applicable for HTD™, RPP™ and GT™ pulleys

MEGA TORQUE EX
High-accuracy positioning. High speed drive

⑤ : You can check our belt lineup.

D: Available double side belt
Classical type: (D)MXL / (D)XL / (D)L / (D)H / XH / XXH

HTD™ and GT™ are trademarks or registered trademarks of Gates Corporation.
RPP™ is trademark or registered trademark of Timken Company.

Mega Torque G/GII/GIIP/GIII

- HIGH POWER TRANSMISSION**
A new material is used for the cord to suppress the elongation of the belt and enable high load transmission.
- JUMPING TORQUE**
High jumping torque performance is achieved by using carbon fiber cord.
- REDUCED NOISE**
By using a special material rubber and narrowing the width due to high transmission capacity, noise reduction of 2.2 to 6.0% is achieved under the same usage conditions.










MATERIALS

COMPONENT	MATERIALS			
	HTD	GT	EP	EX
CORD	Carbon Fiber Cord	Carbon Fiber Cord	Carbon Fiber Cord	Carbon Fiber Cord
REINFORCING LAYER	High-strength Rubber	High-strength Rubber	High-strength Rubber	High-strength Rubber
COVER	EPDM	EPDM	EPDM	EPDM

9. Products information : Pulley tab

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt **Products Info:Pulley** Layout

Tooth Profile	Line up	Tooth Profile	SUPER TORQUE
MXL	 MXL		
XH, XXH	 XH, XXH	S3M	 S3M
T5, T10	 T5, T10	S5M	 S5M
G8M	 G8M	S8M	 S8M
G14M	 G14M	S14M	 S14M


[Pulley line up]
Contact us for the details.

Tooth Profile : G14M

No.of Teeth	P.D.(mm)	O.D.(mm)
28	124.78	121.98
30	133.69	130.89
32	142.60	139.80
34	151.52	148.72
36	160.43	157.63
40	178.25	175.45
42	187.17	184.37
44	196.08	193.28
48	213.90	211.10
50	222.82	220.02
56	249.55	246.75
60	267.38	264.58
64	285.21	282.41
72	320.86	318.06
84	374.33	371.53
96	427.81	425.01
120	534.76	531.96
144	641.71	638.91

*Made to order

⑥ : You can check the number of standard pulley teeth.



10. Layout design tab

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley **Layout Design**

Type: Single
 Spec: Super Torque
 Profile: S2M Pulley Input: No. of teeth Belt Size: _____

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Fitch dia. mm	Arc of contact	Meshing	Span length mm	O.D. mm
1										
2										
3										
4										

(A) : Layout design can be performed separately from design studies.

Target tooth number: _____ Belts list: _____

Calculated tooth number: _____
 Calculated belt length mm: _____

Linear movement Rotational movement

Pulley No. _____
 Direction _____

Rotation: Clockwise
 Pulley No. _____
 X coord. of arm pivot mm: _____
 Y coord. of arm pivot mm: _____
 Arm length : L mm: _____

Spring calculation

Distance between spring and arm pivot : s	mm	Angle between arm and tension force	
Belt tension	N	Angle between arm and spring force	
		Force by belt tension	N
		Spring force	N

Right angle pull force

Adjust

Undo

Clear

Create PDF

*Please ensure that no interference between pulleys or belts. If interfering, please change the layout.

Linear movement

- Pulleys can be moved by (Drag and Drop).
- Adjust the "Target tooth number" by Adjustment button (required to enter the target tooth number, moving shaft No., and moving direction).

Rotational movement

- Click on the Idler Pulley to move tension arm position.
- Adjust the "Target tooth number" by Adjustment button (required to enter the target tooth number and arm condition).

Spring calculation

- Click on the Idler Pulley to change spring angle.
- Click on the "Right angle pull force" button to apply.

10. Layout design tab

1 Select Type / Spec./ Profile

Type : Single/Double
 Spec. : Select the belt specification
 Profile : Select the tooth profile

2 Select input method

Select "No. of teeth" or "Pitch diameter"

3 Input layout conditions

Input the following at each pulley.

Set the drive pulley as No.1 and input clockwise!

- Pulley XY coordinate
- Pulley position (select inside or outside)
- No. of teeth or pitch diameter (mm)

4 Click "Adjust"

"Layout diagram", "Calculated tooth number", and "belts list" are displayed.

The screenshot shows the 'Timing Belt Design Program' interface. The 'Layout Design' tab is active. The 'Input' section shows 'Type' set to 'Single', 'Spec.' to 'Super Torque', and 'Profile' to 'S2M'. The 'Adjustments' section has 'Pulley Input' set to 'No. of teeth'. The 'Layout' table is as follows:

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Pitch dia. mm	Arc of contact mm	Meshing	Span length mm	O.D. mm
1	0	0	Inside	20						
2	100	0	Inside	40						
3			Inside							
4			Inside							

The 'Belts list' shows several options, with 'S2M256(132T)' selected. The 'Adjust' button is highlighted in blue. A yellow callout box contains the text: '1-3 Input conditions → 4 Click "Adjust"'. A red arrow points from the 'Adjust' button to the callout box.

10. Layout design tab

⑤ Select belt size

- Select a belt size from the standard belt list and click.
- ⇒ This will be reflected in the target belt tooth count.

⑥ Select and execute movement method

- Same as for layout adjustment during design study. [See p.25-28]
- Select the movement method and press "Move" button.
- * To correct the error, click on "Undo".
- * To erase or review the data, click on "Clear".

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Fitch dia. mm	Arc of contact	Meshing	Span length mm	O.D. mm
1	0.00	0.00	Inside	20		12.78	172.70	9.59	99.80	100.00
2	100.00	0.00	Inside	40		25.46	187.30	20.81	99.80	100.00
3			Inside							
4			Inside							

Target tooth number	130
Calculated tooth number	130.20
Calculated belt length mm	260.41

Belts list

- S2M256(128T)
- S2M258(129T)
- S2M260(130T)
- S2M262(131T)
- S2M264(132T)

Linear movement

Rotational movement

Adjust Undo Clear

Create PDF

⑤⑥ Input conditions

Target tooth number	130
Calculated tooth number	130.20
Calculated belt length mm	260.41

Belts list	
S2M256(128T)	▲
S2M258(129T)	
S2M260(130T)	
S2M262(131T)	
S2M264(132T)	▼

10. Layout design tab

⑦ Create PDF file

Crick "Create PDF"

Timing Belt Design Program

Input Recommendation Adjustments Results Products Info:Belt Products Info:Pulley Layout Design

MITSUBISHI

Type: Single
Spec: Super Torque
Profile: S2M

Pulley Input: No. of teeth: [] Belt Size: No mold available.

No.	X coord mm	Y coord mm	IN/OUT	No. of teeth	Outside dia. mm	Fitch dia. mm	Arc of contact	Meshing	Span length mm	O.D. mm
1	0.00	0.00	Inside	20		12.73	172.70	9.59	99.80	100.00
2	100.00	0.00	Inside	40		25.46	187.30	20.81	99.80	100.00
3			Inside							
4			Inside							

Target tooth number: 130
Calculated tooth number: 130.20
Calculated belt length mm: 260.41

Belts list:
S2M256(128T)
S2M256(129T)
S2M260(130T)
S2M262(131T)
S2M264(132T)

Linear movement
Pulley No.: 2
Direction: 180.00

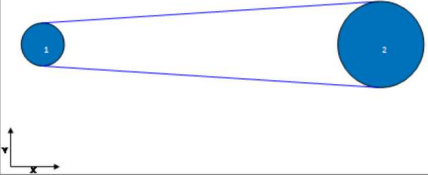
Rotational movement
Rotation: Clockwise
Pulley No.:
X coord. of arm pivot mm:
Y coord. of arm pivot mm:
Arm length: L mm:

Spring calculation
Distance between spring and arm pivot: s mm
Belt tension N
Right angle pull force

Angle between arm and tension force
Angle between arm and spring force
Force by belt tension N
Spring force N

Adjust Undo Clear

Create PDF



*Please ensure that no interference between pulleys or belts. If interference, please change the layout.

Linear movement
- Pulleys can be moved by (Drag and Drop).
- Adjust the "Target tooth number" by Adjustment button (required to enter the target tooth number, moving shaft No., and moving direction).

Rotational movement
- Click on the Idler Pulley to move tension arm position.
- Adjust the "Target tooth number" by Adjustment button (required to enter the target tooth number and arm condition).

Spring calculation
- Click on the Idler Pulley to change spring angle.
- Click on the "Right angle pull force" button to apply.

⑦ Crick "Create PDF"

* Layout calculation results cannot be automatically reflected in the design study (① Input tab). It is necessary to input the coordinates after layout calculation into the Input tab (①) individually.