

# SHIMANO

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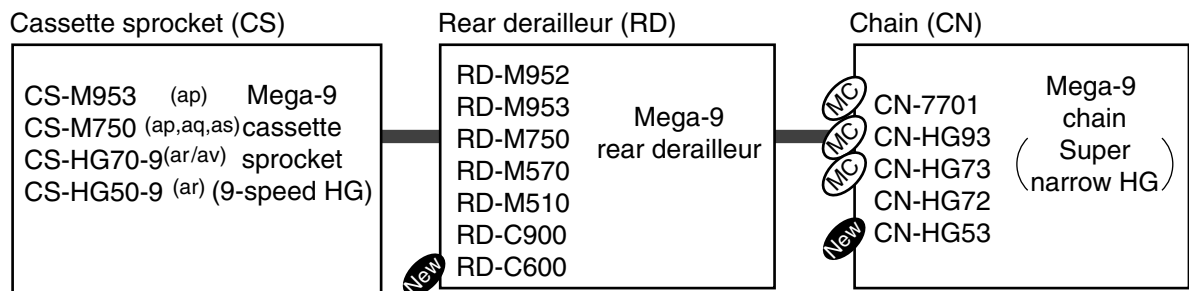
**J-6 FD-C900 & RD-C900 cable route for down route**

# A. Drivetrain interchangeability

## A-1 Rear drivetrain interchangeability

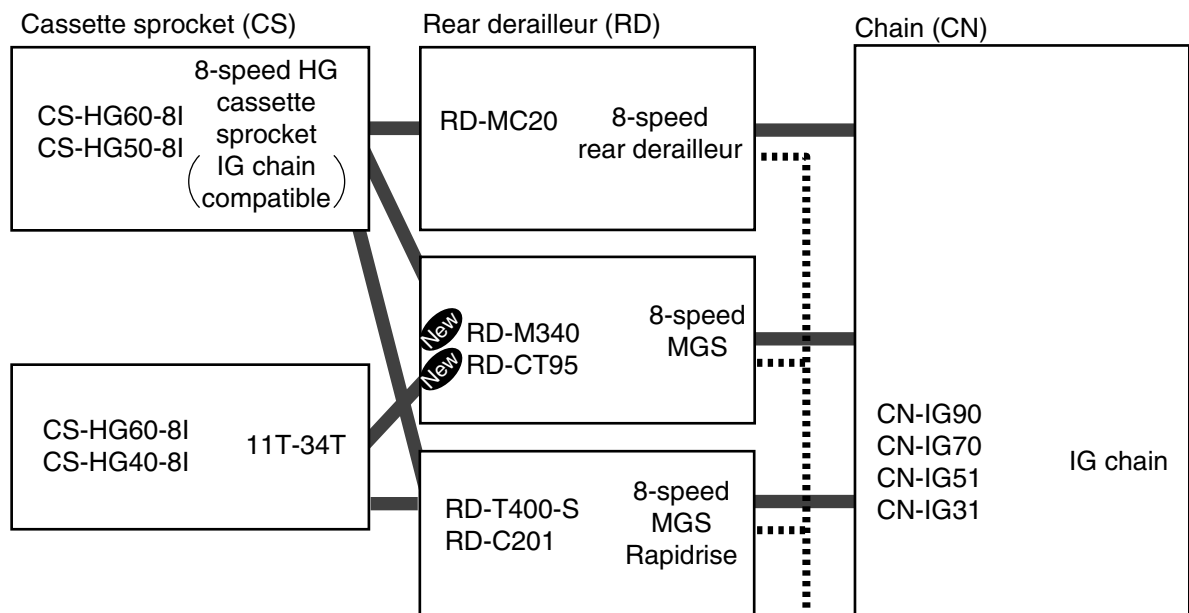
- When using components of different series together, be aware of the points given below.  
“New” is shown if it is a new product and “MC” is given if only minor changes have been made.

### Mega-9 Drivetrain (9-speed HG)



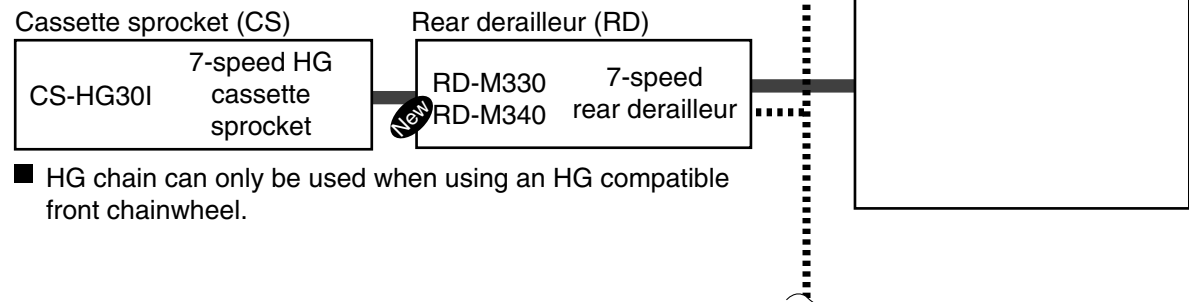
- The rear derailleur for the Mega-9 drivetrain can also be used for 7 and 8 speed drivetrains.
  - There may be cases where you cannot use RD-C900/C600.

### 8-Speed HG



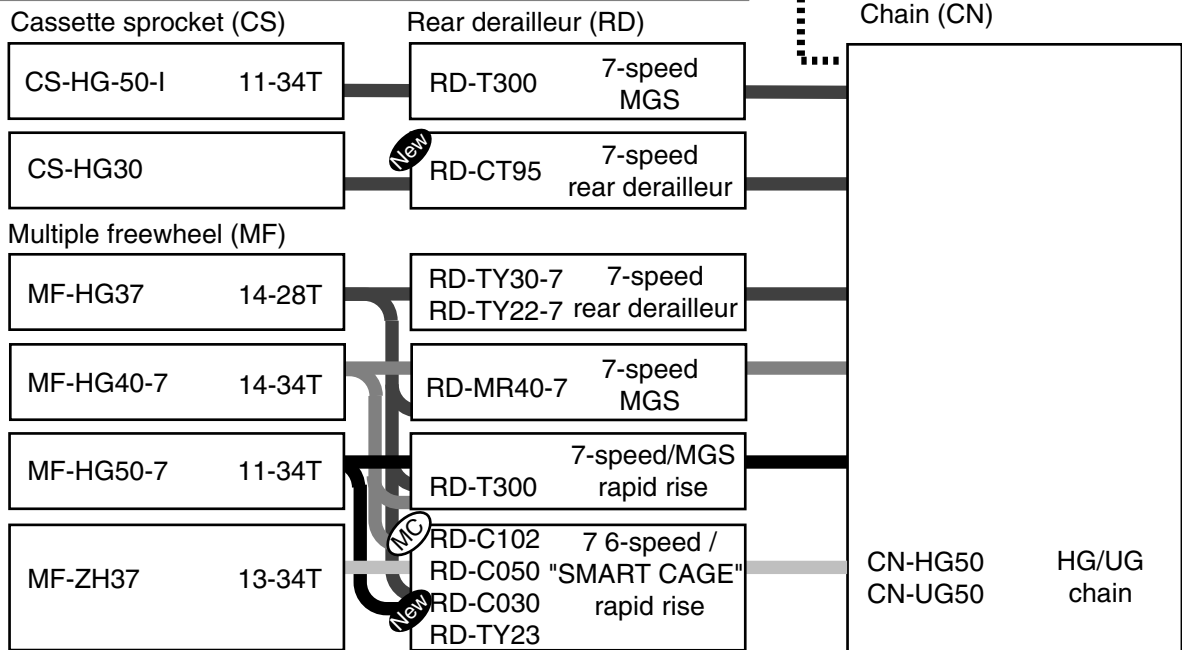
- The rear derailleur for 8-speed can also be used for 7-speed drivetrain.

### 7-speed HG

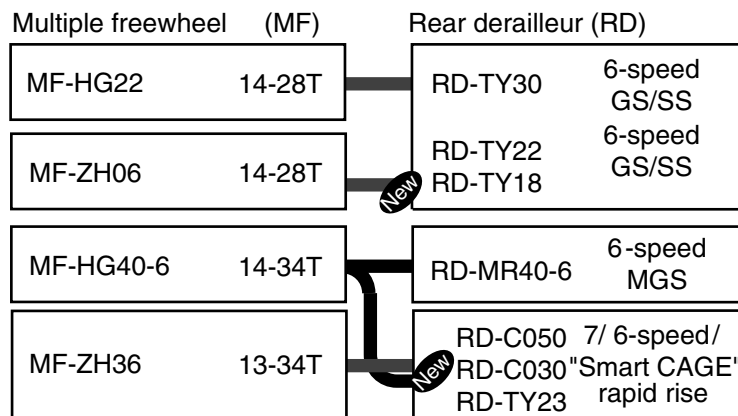


- HG chain can only be used when using an HG compatible front chainwheel.

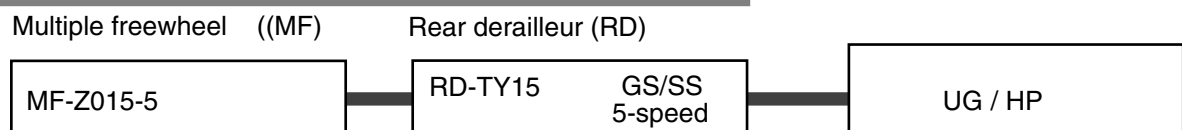
## 7-speed HG/ZH



## 6-speed HG/ZH

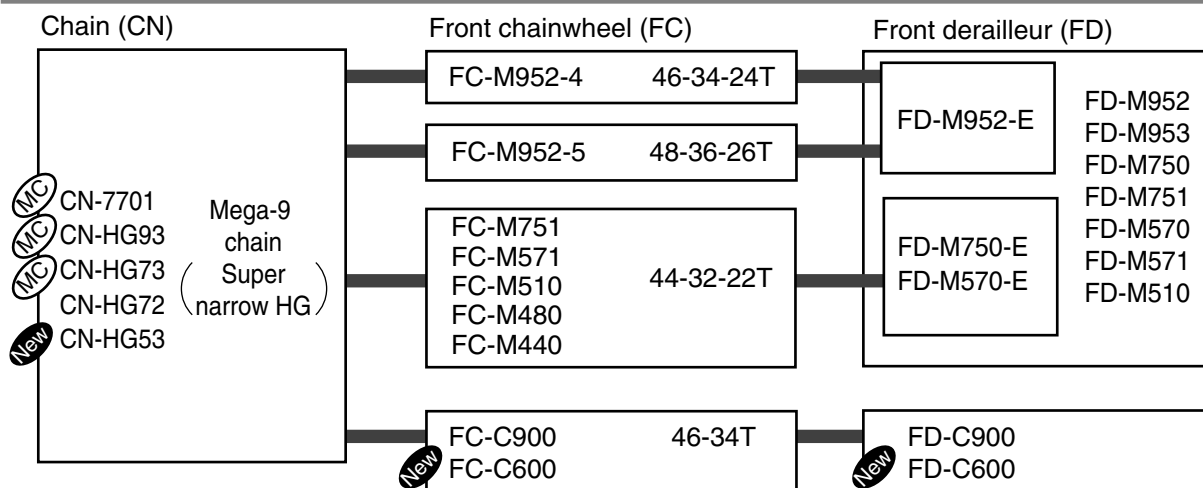


## 5-speed UG

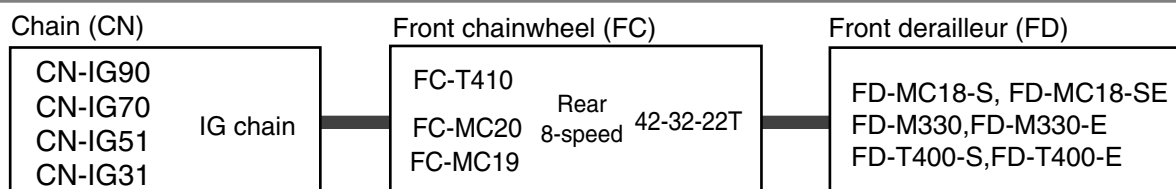


## A-2 Front drivetrain interchangeability (MTB front SIS)

### Mega-9 drivetrain (9-speed HG)

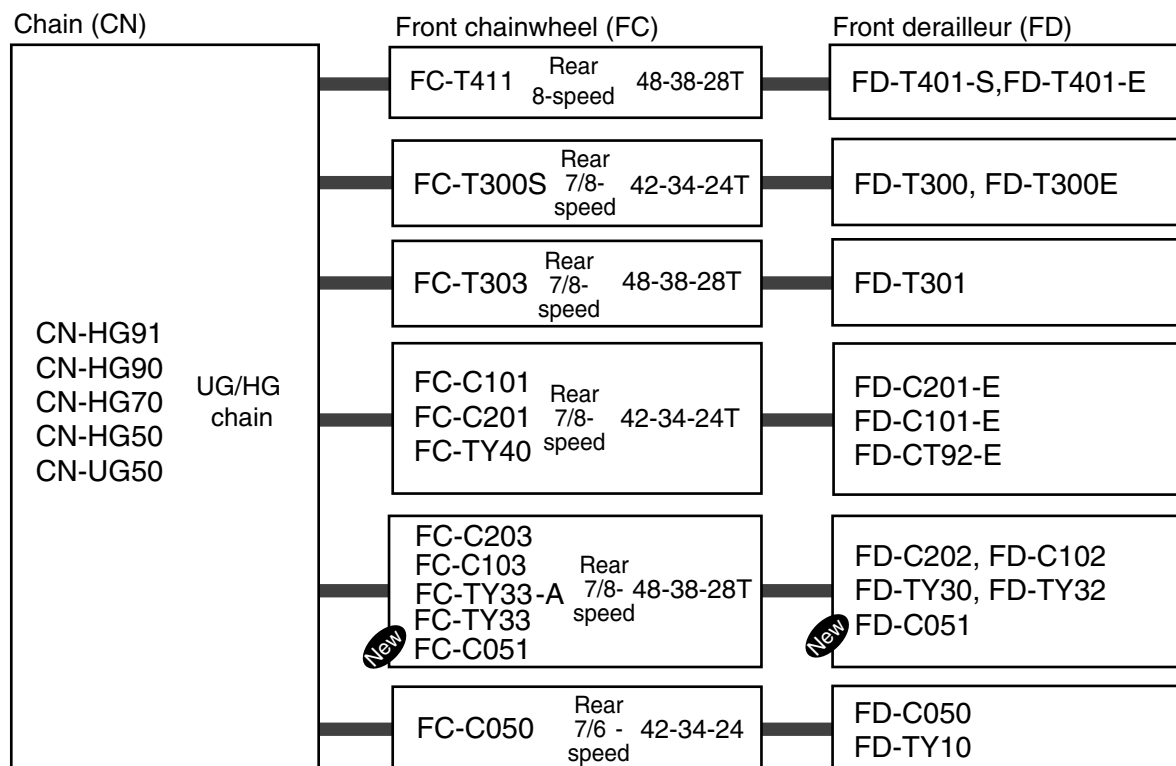


### IG triple (8 and 7-speed)



■ When using the front derailleur designed for a 7-speed system on an 8-speed system, the front derailleur plate may interfere with the chain even if it's installed correctly.

### HG triple (8 and 7-speed)



■ When using the front derailleur designed for a 7-speed system on an 8-speed system, the front derailleur plate may interfere with the chain even if it's installed correctly.

## A-3 Front derailleur and front chainwheel

■ The allowable combinations of front derailleurs and rear derailleurs depends on the difference in the number of teeth of the gears and the shape of the front derailleur plate.

● If the conditions given below are not satisfied, then the desired shiftability may not be obtained.

FCW (top gear) - (low gear)  $\leq$  FD (top and low capacity)

FCW (top gear) - (middle gear)  $\geq$  FD (minimum difference in teeth number between top and middle)

Front derailleurs and the number of teeth for corresponding front chainwheels are given in the chart below.

### ■ Front derailleur specifications

	Mega-9 drivetrain			FD-T400-S FD-T400-E FD-MC18 FD-MC18-E FD-M330 FD-M330-E	FD-T401-S FD-T401-E FD-T301 FD-C202 FD-C102	FD-T300 FD-T300-E FD-C201-E FD-C101-E FD-C050 FD-TY10 FD-CT92-E	FD-TY32 FD-TY30 FD-C051
	FD-M952 FD-M952-E	FD-M750-E FD-M570-E	FD-M953 FD-M750 FD-M751 FD-M570 FD-M571 FD-M510				
<b>Top gear teeth number</b>	48T/46T	44T	48T/46T/44T	42T	48T	42T	48T
<b>Top-Middle min. teeth difference</b>	12T	12T	12T	10T	10T	8T	10T
<b>Capacity</b>	22T	22T	22T	20T	20T	18T	22T

### ■ Front chainwheel specifications


	Mega-9 drivetrain			For IG chain	For HG chain	For HG chain	For HG chain
	FC-M952-4	FC-M952-5	FC-M751 FC-M571 FC-M510 FC-M480 FC-M440	FC-T410 FC-MC20 FC-MC19 FC-M330	FC-T300S FC-CT93 FC-TY40 FC-C201 FC-C101 FC-C050	FC-T411	FC-T303 FC-TY33 FC-TY33A FC-C203 FC-C103 FC-C051
<b>Top gear</b>	46T	48T	44T	42T	42T	48T	48T
<b>Middle gear</b>	34T	36T	32T	32T	34T	38T	38T
<b>Low gear</b>	24T	26T	22T	22T	24T	28T	28T

NOTE: When using the front derailleur designed for a 7-speed system on an 8-speed system, the front derailleur plate may interfere with the chain even if its installed correctly.

## A-4 Front derailleur and chain line

The Shimano line-up for front derailleurs and the chainlines they support are given in the chart below.

### ■ Front derailleur and chain line (MTB)

		Ø28.6 (S)	Ø31.8 (M)	Ø34.9 (L)
<b>XTR</b>	FD-M 952 FD-M 952-E FD-M 953	<div>47.5/50 mm</div> <p>For the E-type (BB mounting front derailleur): 47.5 mm (shell width of 68 mm) 50 mm (shell width of 73 mm)</p> <p>When using the FD-MC18E with a seat tube of diameter 34.9 mm (L) the chainstay angle should be between 66 and 69</p>		
<b>DEORE XT</b>	FD-M750 FD-M 750-E FD-M 751			
<b>DEORE LX</b>	FD-M570 FD-M 570-E FD-M 571			
<b>DEORE</b>	FD-M510			
<b>ALIVIO</b>	FD-MC18-S FD-MC18-SE			
<b>ACERA</b>	FD-M 330 FD-M 330-E	47.5/50 mm <b>For the E-type (BB mounting front derailleur):</b> 47.5 mm (shell width of 68 mm) 50 mm (shell width of 73 mm)		_____
<b>C-series</b>	FD-C900, FD-C600 	52.5mm (shell width of 68mm)		
	FD-C101-E FD-C102 FD-C201-E FD-C050	With seat tube of diameter 34.9 mm (L), the chainstay angle should be between 66 and 69 <b>For the E-type (BB mounting front derailleur):</b> 47.5 mm (shell width of 68 mm) 50 mm (shell width of 73 mm)		
	FD-C102	<b>For the E-type (BB mounting front derailleur):</b> 47.5 mm (shell width of 68 mm) 50 mm (shell width of 73 mm)		73mm shell width/ 66 and 69
	FD-C202			_____
<b>NEXAVE</b>	FD-T400-S, FD-T400-E FD-T401-S, FD-T401-E	<b>For the E-type (BB mounting front derailleur):</b> 47.5 mm (shell width of 68 mm) 50 mm (shell width of 73 mm)		
	FD-T300, FD-T300E, FD-T301	47.5 mm (shell width 68 mm), 50 mm (shell width 73 mm)		_____

Shimano front derailleurs, with the exception of some of the Tourney class, support chain lines of 47.5 and 50mm. The Tourney front derailleurs and corresponding chain lines are given in the chart below.



### ■ Front derailleur and chain line (Tourney)

		Ø28.6 (S)	Ø31.8 (M)	Ø34.9 (L)
Tourney 30 Tourney 40	<div>New</div> FD-TY18 FD-TY30	47.5/50mm (down pull only)		
	FD-TY32 FD-TY32A	47.5/50 mm		
Tourney 22	FD-TY22GS			
	FD-TY22SS	47.5/50mm (down pull only)		
Tourney15	FD-TY15GS	47.5/50mm (down pull only)		
	FD-TY15SS	43.5/45mm (down pull only)		
Tourney 05	FD-TY05	45mm (down pull only)		
	FD-TY10	47.5/50 mm		



## A-5 Front chainwheel, bottom bracket, and chain line

■ In order to use SIS to its full extent, the required correct chain line, along with the front chainwheel and bottom bracket required to obtain that, are given in the chart below.

Series	Front chainwheel model number	Chain line			
		47.5mm		50mm	
		Model no.	Axle mark	Model No.	Axle mark
<b>XTR</b>	FC-M952-4arm FC-M952-5arm	BB-M952 BB-M950	112.5MM Axle mark	BB-M952 BB-M950	116MM Axle mark
<b>Deore-XT</b> <b>Deore-LX</b>	FC-M751 FC-M571	BB-ES70	113MM Axle mark	BB-ES70	118MM Axle mark
<b>Deore</b>	FC-M510 FC-M480 FC-M440	BB-UN72(-E) BB-UN52(-E) BB-UN40(-E) BB-LP28(-E) BB-ES50(-E)	MM110	BB-UN72(-E) BB-UN52(-E) BB-UN40(-E) BB-LP28(-E) BB-ES50(-E)	LL113
	FC-M510-K	BB-ES50-K	121MM	—	—
<b>NEXAVE</b>	FC-T410 FC-T411	BB-UN40-K	117.5MM Axle mark	—	—
	 FC-C900 FC-C600	BB-C900 (axle length 121mm/Chain line 52.5mm) BB-UN40-K (axle length 117.5mm/Chain line 52.5mm)			
	FC-T300-S FC-T303	BB-CT92(-E)	YL116	BB-CT92(-E)	ZL121
<b>Alivio</b>	FC-MC20 FC-MC19	BB-UN72(-E) BB-UN52(-E)	MM110	BB-UN72(-E) BB-UN52(-E)	LL113
<b>Acera</b>	FC-M330	BB-UN40(-E) BB-LP28(-E)		BB-UN40(-E) BB-LP28(-E)	
<b>C-series</b>	FC-C101/201 FC-C103/203	BB-CT92	YL116	BB-CT92	ZL121
<b>Tourney</b>	FC-TY40				
<b>C-series</b>	 FC-C051 FC-C050	BB-TY30	D-NL (122.5mm)	—	—
<b>Tourney</b>	FC-TY33A FC-TY33				

### ■ Front chainwheels from Shimano Italy

FC Model number	BB Model No. / Axle length(type)	Chain ring	Chain line	
FC-M510-K	BB-UN40-K/117.5mm	44-32-22T	47.5+t mm	Chain case stay thickness(t) 0<t<2.5(mm)
FC-TS70		44-32-22T	46.5+t mm	Chain case stay thickness(t) 1.5<t<3.5(mm)
FC-TS51				
FC-TS38	BB-CT92/YL116	48-38-28T	47.5+t mm	Chain case stay thickness(t) 0<t<2.5(mm)
FC-TS31		42-34-24T		

NOTE: "t" is thickness of chain case stay.

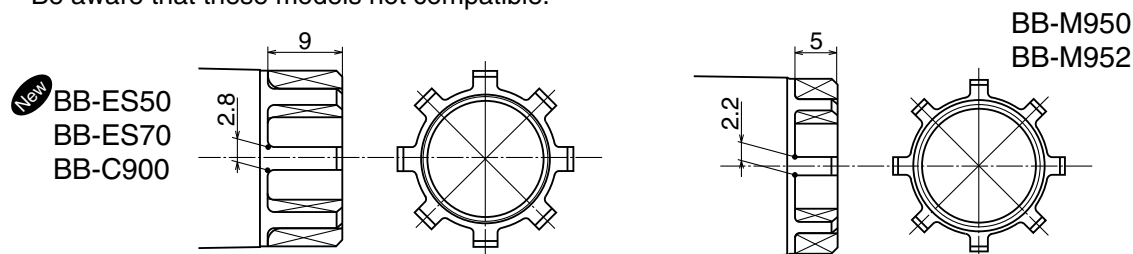
\*BB-UN40-K must be FOR CHAIN CASE type. ( Use BB-UN40-K.)

\*BB-CT92 must be FOR CHAIN CASE type. ABBCT92B16C :For band type FD

ABBCT92EB16C :ForBB- mount type FD

## A-6 BB-ES70 dimensions

- The dimensions of the eight serrations on the BB-ES70 for the Deore-XT/LX are shown below. The dimensions for BB-ES70/C900 are different to those for BB-M950/ 952. Be aware that these models not compatible.



## A-7 Chain, chainring and cassette sprocket interchangeability

The allowable combinations for the Shimano MTB chain (CN), chainrings (FC), and cassette sprockets (CS) are given in the chart below. Three chains are available in order to match the type of drivetrain. Select the combination you desire after checking the chart below.

FC /CS	Mega-9		IG		HG	
	Cassette sprocket	Front chainwheel	Cassette sprocket	Front chainwheel	Cassette sprocket	Front chainwheel
	Chain					
	CS-M953 CS-M750 CS-HG70-9 CS-HG50-9	FC-M952 FC-M751 FC-M571 FC-M510 FC-M480 FC-M440 FC-C900	CS-IG60	FC-T410 FC-MC20 FC-MC19 FC-M 330	CS-M950 CS-M737-I CS-HG70-8I CS-HG40-8I CS-HG60-I CS-HG50-8I CS-HG50-I CS-HG30-I	FC-T411 FC-T300-S FC-T303 FC-CT93 FC-C101 FC-C103 FC-C201 FC-C203 FC-TY33-A FC-TY33 FC-TY40 FC-C050 FC-C051
<b>Mega-9 Super Narrow chain</b> CN-7701 CN-HG93 CN-HG73 CN-HG53	Good	Good	No good	No good	No good	No good
<b>IG Chain (Note 2)</b> CN-IG90 CN-IG70 CN-IG51 CN-IG31	No good	No good	Good	Good	Good (Note 1)	No good poor performance
<b>HG Chain</b> CN-7401 CN-HG91 CN-HG90 CN-HG70 CN-HG50 CN-UG50	No good	No good	No good Poor performance	No good Will not work	Good	Good

Note 1: When used together with the HG cassette sprocket CS-M737/HG70-8, the adjustable range is very narrow and requires great care.

Note 2: The IG chain cannot be used with the Altus class rear derailleurs.

# B. Drivetrain (MTB)

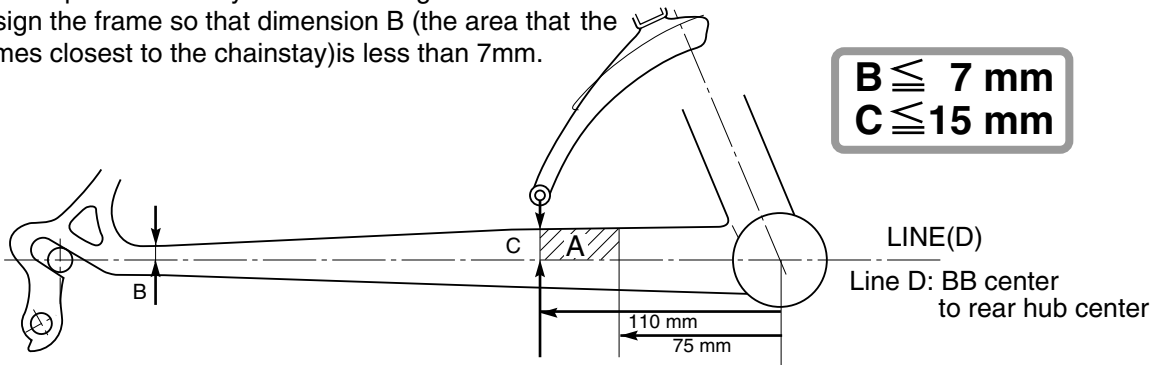
## B-1 Chainstay dimensions

### Dimension “C”

- In order to keep the front derailleur plate from touching the chainstay, design the frame at area A (cross hatching section in diagram below) so that the dimension C (distance from centerline D to top edge of the chainstay) is 15 mm or less.

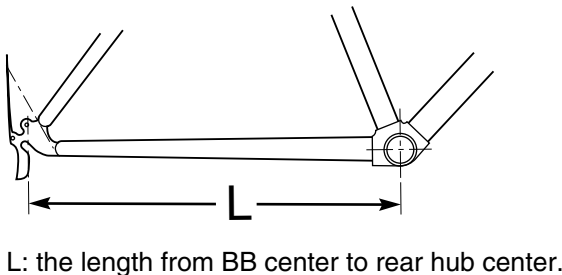
### Dimension “B”

- In order to keep the chainstay from interfering with the chain, design the frame so that dimension B (the area that the chain comes closest to the chainstay) is less than 7mm.



### Chainstay length “L”

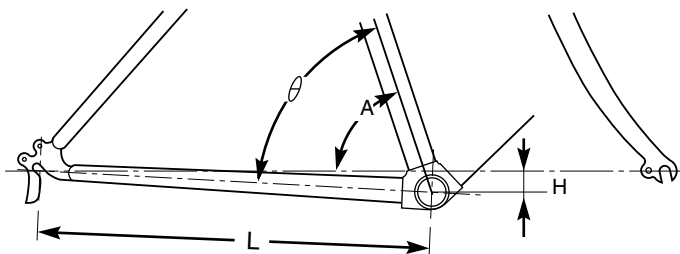
- The Shimano MTB shifting system is designed on the chainstay dimensions given below. (When using frames that do not meet these dimensions, be sure to confirm that the system operates without problems.)



Bicycle type	Speed	Dimension “L”
MTB, Hybrid	6,7,8 and 9-speed (rear)	420mm min.
Tourney 22	Triple (FCW)	430mm min.
	Double (FCW)	400mm min.

### Chainstay angle “ $\theta$ ”

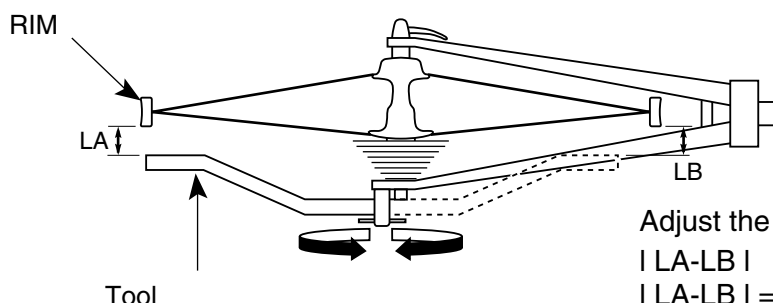
- In order for the front SIS shifting system to function properly, set the chainstay angle  $\theta$  within the range supported by the front derailleur. (The chainstay angle  $\theta$  supported by each front derailleur is listed in the ‘99 mode specifications handbook.)



## B-2 Dropout end dimensions

### B-2-1 Dropout end dimensions

Rear drop out parallelism is set in relation to the frame centerline. To measure the parallelism of the dropout, use the tool . Attach the rear drop out so that the absolute value of  $|LA-LB|$  is less than 10mm.



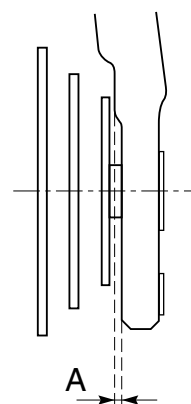
Adjust the dropout so that  
 $|LA-LB| < 10 \text{ mm}$   
 $|LA-LB| = 0 \text{ mm}$  is optimum setting

### B-2-2 Clearance between the smallest sprocket and dropout

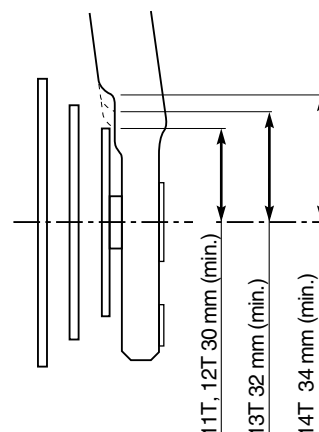
- Set the distance between the smallest sprocket (top gear) and the rear dropout as explained below.

The top gear position of CS-7700, CS-6500 (9-speed), CS-M953, CS-M750, and CS-HG70-9 is the same as current 8-speed HG cassette sprockets.

	Dimension "A"
8 and 9-speed	1.3 mm (max.)
7-speed	2.2 mm (max.)



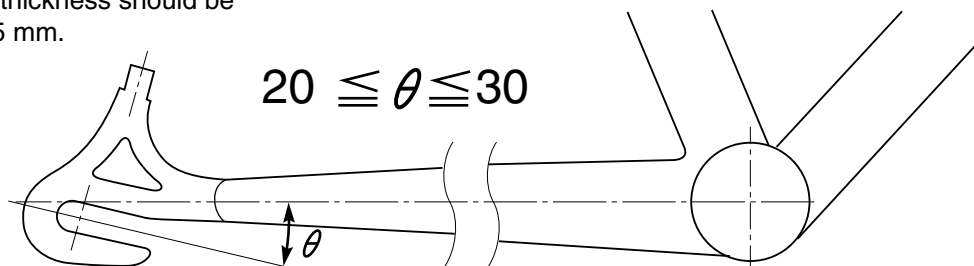
- These dimensions must be maintained to prevent contact between the seatstay and smallest sprocket (top gear), and the chainstay and the chain when the chain is on the smallest sprocket. (The dimensions will differ depending on the number of teeth on the smallest sprocket.)



### B-2-3 Dropout configuration

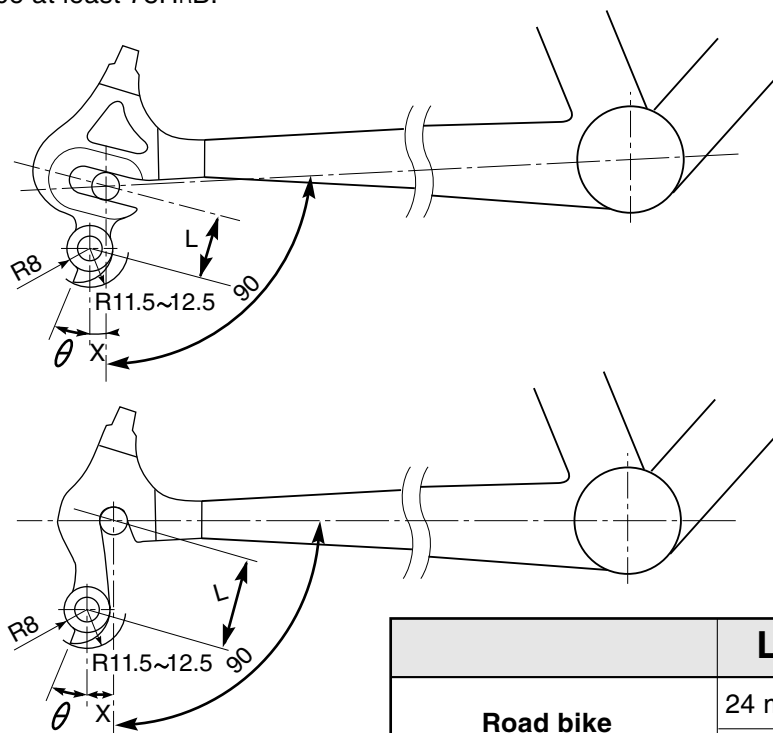
#### No derailleur mount

- In order to maintain optimum SIS shifting performance, set angle  $\theta$  to between 20 and 30 . Dropout thickness should be between 4 mm and 5 mm.



## Integral derailleur mount

- In order to maintain optimum SIS shifting performance, set angle  $\theta$  as shown below. Dropout hardness should be at least 78HRB.



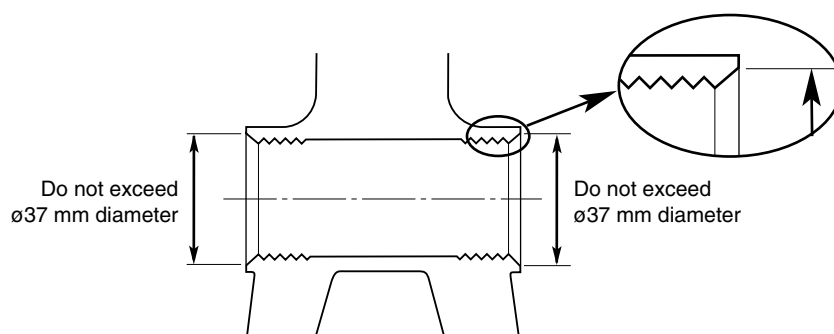
$H_{RB} \geq 78$   
 7 mm  $t$  8 mm  
 (t) is thickness of dropout

	L	X	Angle $\theta$
<b>Road bike recommendation</b>	24 mm	4 mm to 10 mm	30° to 35°
	26 mm	6 mm to 10 mm	30° to 35°
<b>MTB recommendation</b>	28 mm	6 mm to 10 mm	25° to 30°
	30 mm	7.5 mm to 10 mm	25° to 30°

Note: If a dropout that does not conform to the dimensions above is used, optimum SIS shifting performance may not be obtained.

## B-3 Bottom bracket design

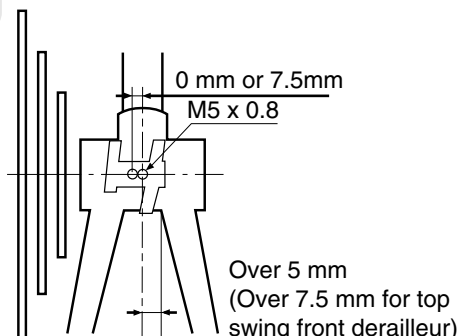
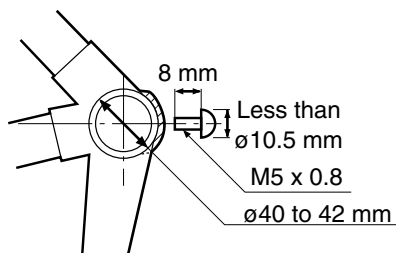
- The inside diameter of the bottom bracket face chamfer should not be over 37 mm for Shimano sealed cartridge type bottom brackets. If this dimension is exceeded, there is a possibility that the bottom bracket cartridge may over-insert and skew the chain line.



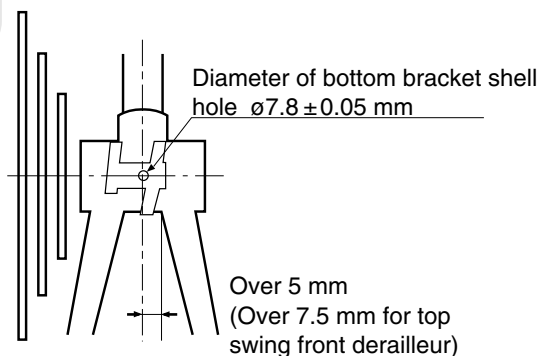
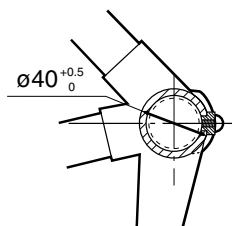
## B-4 BB cable guides installation dimensions & positions

● BB cable guides (SM-SP17M, SP18M, SP17T, BT18, and BT17) use a special material that provide good cable efficiency making full use of the performance of SIS and the advanced light action.

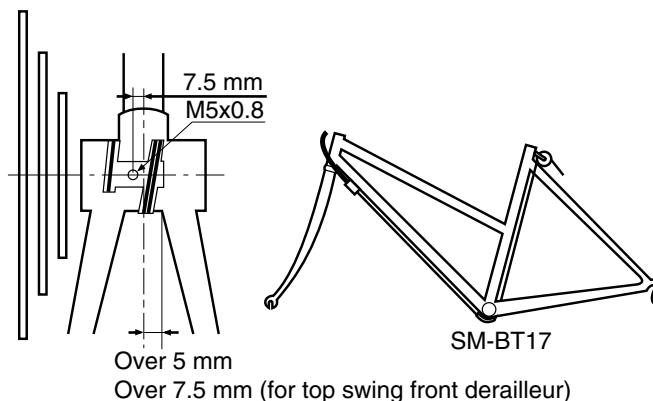
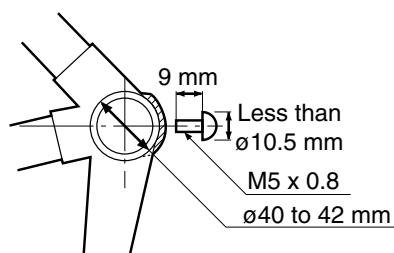
### SM-SP17M, SP18M (screw on type)



### SM-SP17T, SP18T (snap on type) (Requires $\varnothing 7.8$ mm hole in BB shell.)

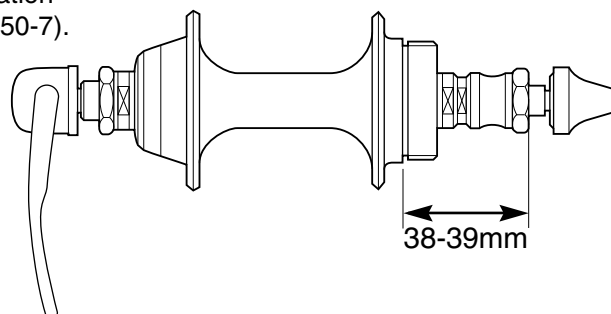


### SM-BT17, BT18 (screw on type for mixte frames)



## B-5 Rear hub dimensions

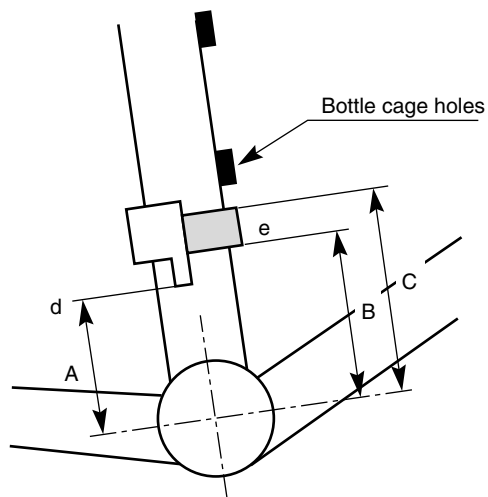
● Be sure to observe the dimensions shown in the illustration when assembling 7-speed multiple freewheels (MF-HG50-7).



## B-6 Frame dimensions for Shimano front derailleurs

### ■ B-6-1 Front derailleur clamp band position

- The clamp band for the front derailleur is secured on the seat tube at the location marked “e.”
- Make sure that the seat tube at “e” where the band is secured is circular. Do not place the bottle cage holes, etc. in this vicinity “e” where they may interfere with the clamp band.



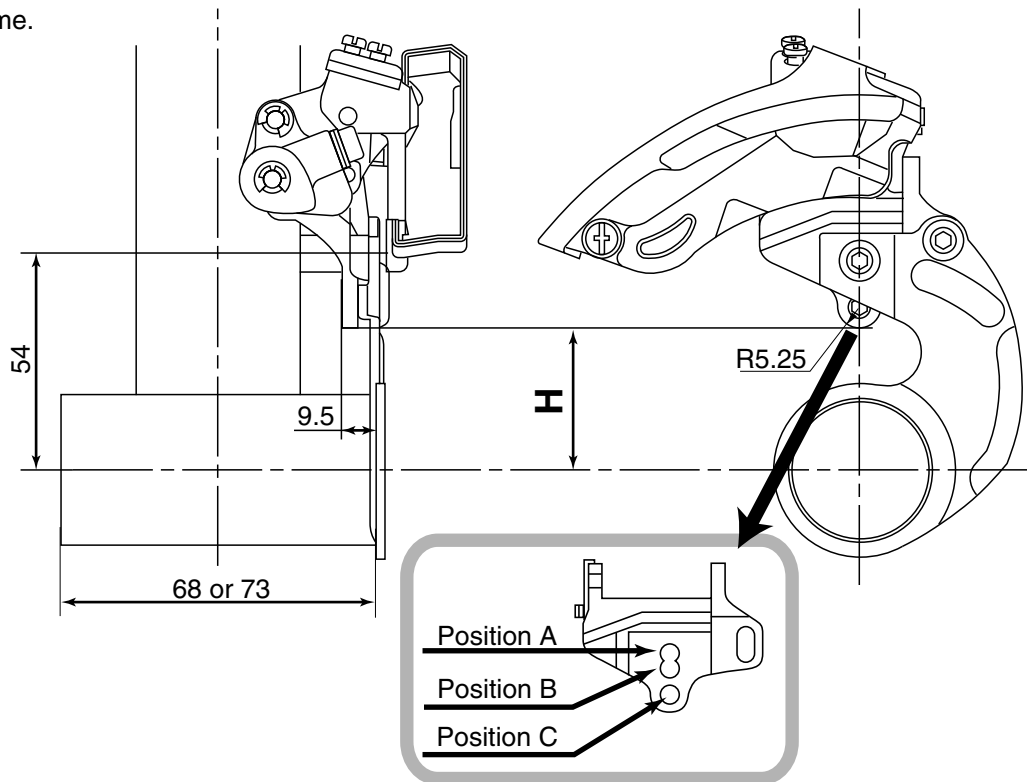
Series	Model no.	FD type	Front gear	A	B	C
XTR	FD-M952	Top swing link (for Mega-9 drivetrain)	FC-M952-4 46-34-24T	—	59mm	95mm
	FD-M953	Conventional (for Mega-9 drivetrain)	FC-M952-5 48-36-26T		125mm	162mm
Deore-XT Deore-LX Deore	FD-M751 FD-M571		FC-M751 FC-M571	105mm	111mm	150mm
	FD-M750 FD-M570 FD-M510	Top swing link (for Mega-9 drivetrain)	FC-M510 FC-M480 FC-M440 44-32-22T	—	51mm	90mm
ALIVIO	FD-MC18-S	Top swing link	FC-MC18		58mm	92mm
Acera	FD-M330		FC-M330		45mm	70mm
Nexave	FD-T300		FC-T300-S		47mm	77mm
	FD-T301		FC-T303		50mm	80mm
	FD-T400-S		FC-T410		58mm	92mm
	FD-T401-S		FC-T411		63mm	102mm
C-series	FD-C202 FD-C102		FC-C203 FC-C103	53mm	54mm	90mm
	NEW FD-C050		FC-C050	45mm	45mm	67mm
	NEW FD-C051		FC-C051	53mm	54mm	90mm
Tourney	FD-TY32		FC-TY30 FC-TY30-A	53mm	54mm	90mm
	FD-TY22GS		—	53mm	54mm	90mm
	FD-TY22SS		—	65mm	66mm	100mm

NOTE: For the FD-TY22, dimensions may change depending on the front chain wheel and chain line. This dimension shown is with a front chainwheel of 48 teeth.

# B-7 BB mount front derailleur dimension

■ Shimano has changed a dimension of following E-type BB mount front derailleurs.  
(FD-M750-E/M739-E/M570-E/M567-E/MC36-E/MC34-E/T400-E/T401-E)

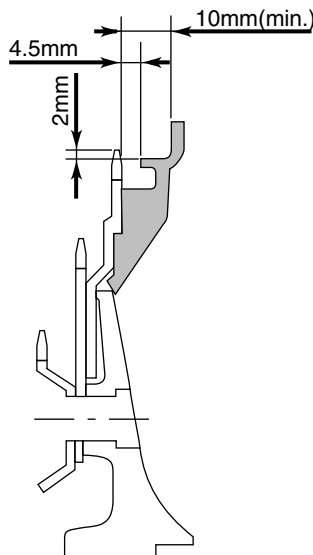
The new dimensions are as shown below. Please make sure that there is no interference with the frame.



	Outer chain ring teeth	Position	Dimension H
FD-M750-E, M570-E	44T	A	35mm
FD-M739-E, M567-E	42T		
FD-MC36-E, MC34-E	44T	B	39mm
FD-T400-E			
FD-T401-E	48T	C	48mm

# B-8 Chain guard dimension for top-swing front derailleur

■ When using a non-Shimano chain guard in combination with a Shimano top-swing front derailleur, make sure that the chain guard meets the specifications shown below in order to avoid interference with the derailleur operation.





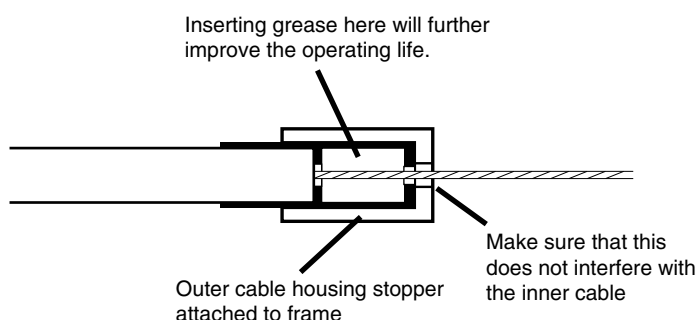
# C. Cables

In order to take full advantage of high performance of Shimano components, the Shimano cable system is designed to be highly efficient and durable. (When using Shimano cable systems, take the following points into account.)

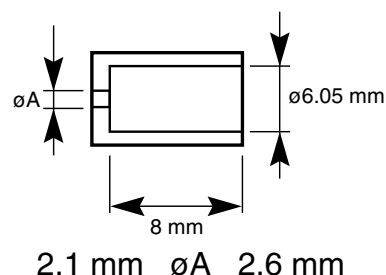
## C-1 Brake cable system

- To improve efficiency and prolong the life of the brake cables, use a cable housing of the construction shown below. When designing the outer cable housing stop, make sure that the diameter of the hole for the inner cable ( $\phi A$ ) is of the correct dimension so that it does not interfere with the inner cable.

### (W-type brake cable)



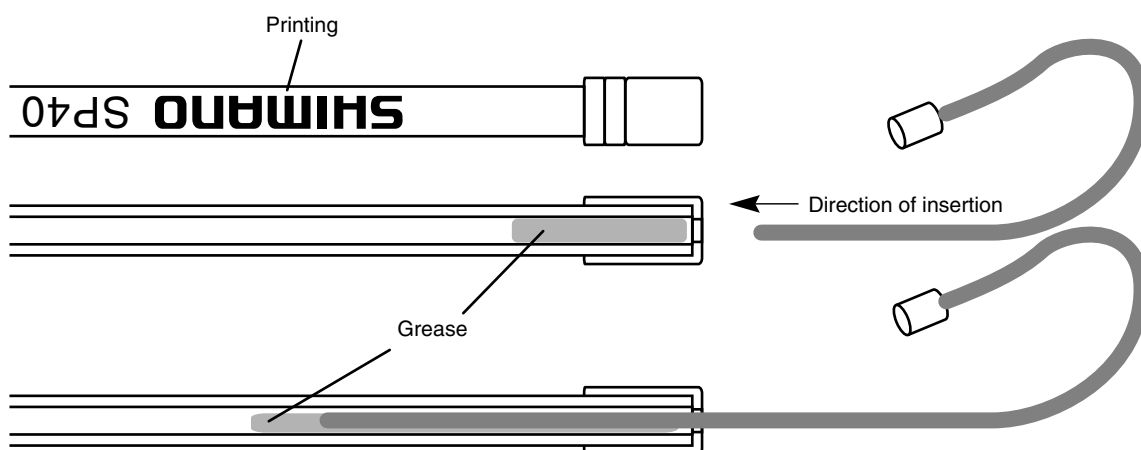
### Recommended dimensions for outer cable housing stop at frame



## C-2 Shifting cable system

### ■ C-2-1 Shifting cable system assembly (inner cable direction)

- To ensure that Shimano cable function efficiently for a long time, grease is injected into the outer cable.
- When inserting the inner cable, insert it into the end with "SHIMANO" printed on it in order to properly make use of the inserted grease.



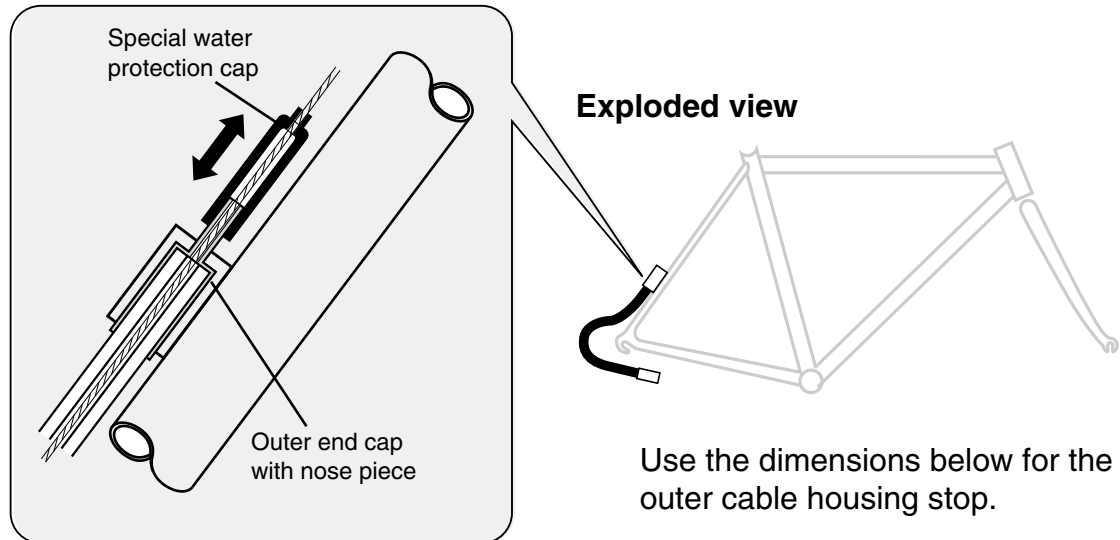
#### Note:

If you insert the inner cable from the other end, the grease will all be pushed out of the outer cable and render useless. So be sure to insert the cable as shown above.

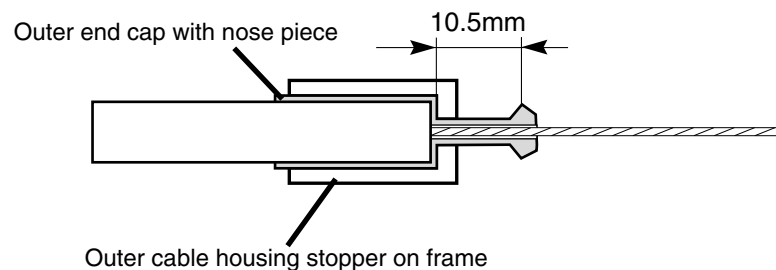
## ■ C-2-2 Cable system assembly (for top route)

■ In the case of top routing for the rear-side cable, there is a chance that rainwater or mud may get inside the cable. To prevent this, install outer end cap w/ nose piece and a special water protection cap as shown below.

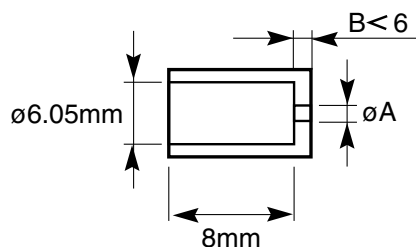
- This special water protection cap is in the line-up for XTR, Deore-XT, LX, Deore components.  
(With the XTR line-up, the special water protection cap is installed at every outer stop position.)



■ Set the  $\varnothing A$  dimension for the outer cable housing stop for the shifting cable to between 2.1 mm and 2.6 mm. The  $\varnothing A$  hole must be concentric with the  $\varnothing 6.05$  hole.

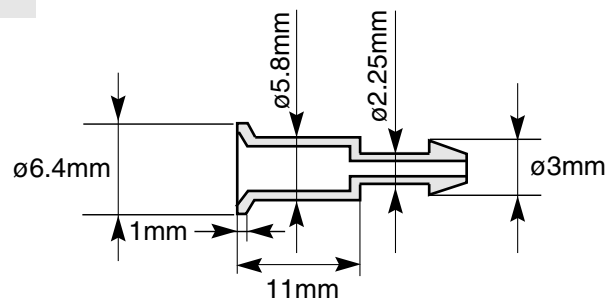


### Outer cable housing stopper dimensions




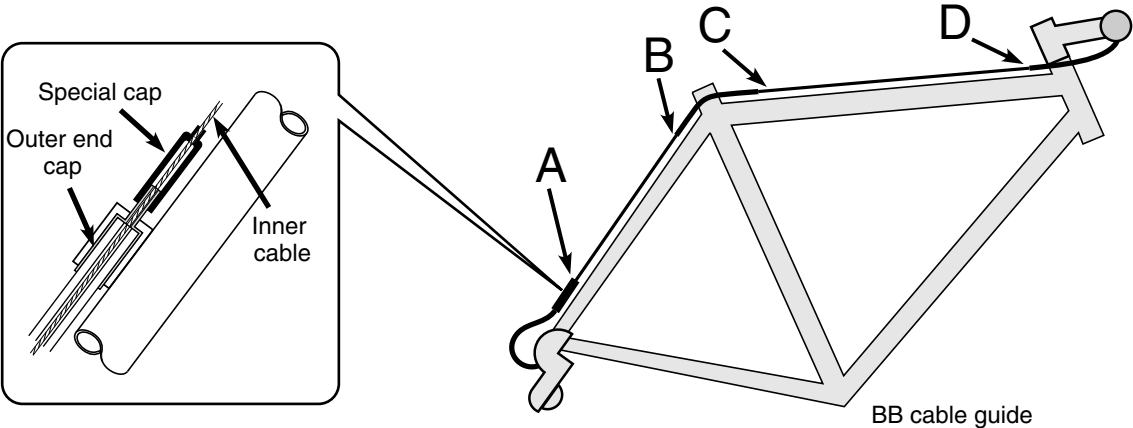
$$2.25\text{mm} \leq \varnothing A \leq 2.6\text{mm}$$

$$B \leq 6\text{mm}$$



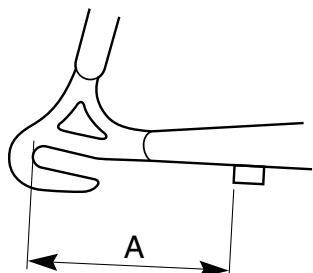
■ C-2-3 Cable combination chart

Feature  Series	Outer casing				Outer end cap seal	Special cap	Inner cable	BB cable guide
	Outer cable dia.	Outer cap dia.	SP-SIS	With grease				
XTR	ø4 (mm)	ø6 (mm)	SIS-SP		Sealed cap	All outer end (A,B,C,D)	Stainless (Special coated)	SM-SP17
Deore-XT						Rear derailleur outer end only (A)	Stainless	
Deore-LX								
Deore					T300:steel cap		C900,T400 :steel cap	SM-SP17 or SM-SP18
NEXAVE								
Alivio					Standard	Unneeded	Steel (Stainless option)	SM-SP18
Acera								
C201								
C101/C102								
C050			SIS					

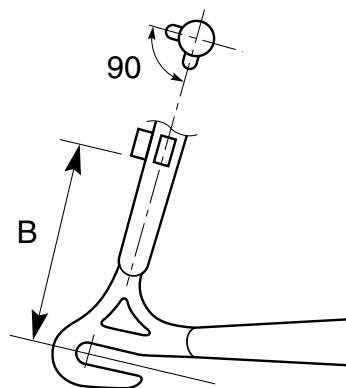


## C-3 Rear derailleur outer cable length and cable stop position

### ■ C-3-1 Pressed rear dropouts (no derailleur hangers)



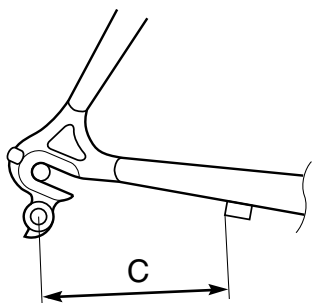
Dimension A	80 mm	90 mm	100 mm
Outer cable length	280 mm	300 mm	320 mm
RD-C101/C102/C050	140 mm	150 mm	160 mm



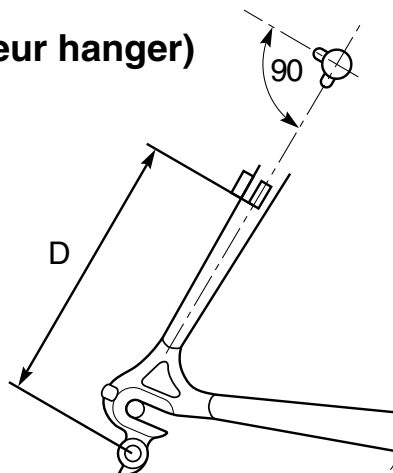
Dimension B	105 mm	120 mm	135 mm
Outer cable length	280 mm	300 mm	320 mm
RD-C101/C102/C050	140 mm	160 mm	170 mm

**NEW** • Use the standard length for RD-C030.

### ■ C-3-2 Forged rear dropouts (with derailleur hanger)



Dimension C	90 mm	100 mm	110 mm
Outer cable length	280 mm	300 mm	320 mm
RD-C201/C101/C102/C050/	160 mm	170 mm	180 mm



Dimension D	140 mm	155 mm	170 mm
Outer cable length	280 mm	300 mm	320 mm
RD-C201/C101/C102/C050	160 mm	180 mm	190 mm

**NEW** • Use the standard length for RD-C030.

### ■ C-3-3 Forged rear end with roller guide rear derailleur (with derailleur hanger)

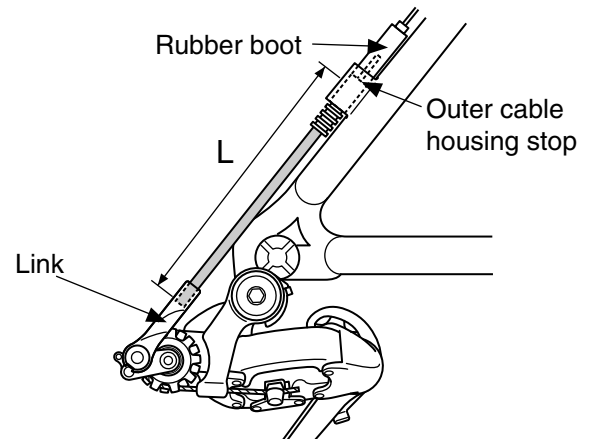
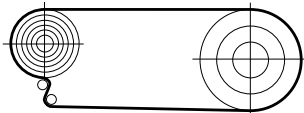
- When using a RD-M951 or RD-T400 roller guide rear derailleur, take the following precautions.
- Make sure that the outer cable does not hit the carrier rack or mud guard stays. Doing so may effect the shifting performance.
- Have the outer cable length as given in the diagrams below.

## ■ Set the length of the outer cable as shown below.

### ● Top route

(The chain is on the largest gear for both the front and rear sprockets)  
As shown in the diagram, add 5mm to the distance from outer cable housing stop to the link for the length of the outer cable.

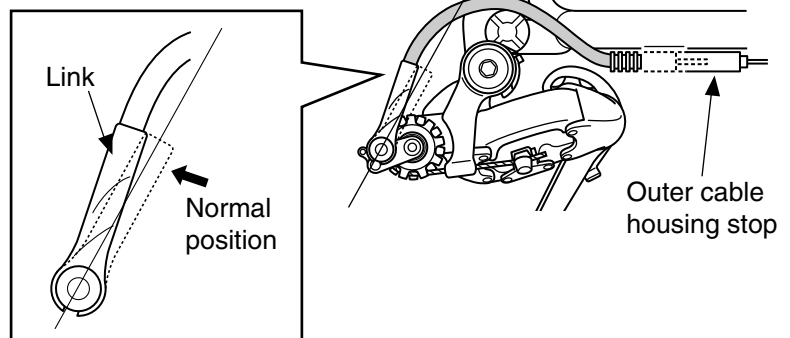
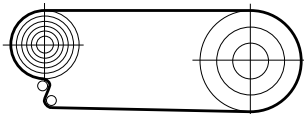
Chain position



### ● Bottom route

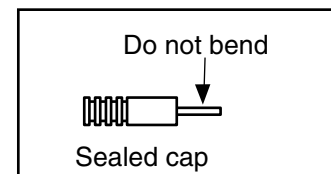
(The chain is on the largest gear for both the front and rear sprockets)  
Set the link position slightly before its normal orientation.

Chain position



### ● Regarding the sealed cap and rubber boot

Install the shield cap and rubber boot to the outer cable housing stop on the frame.



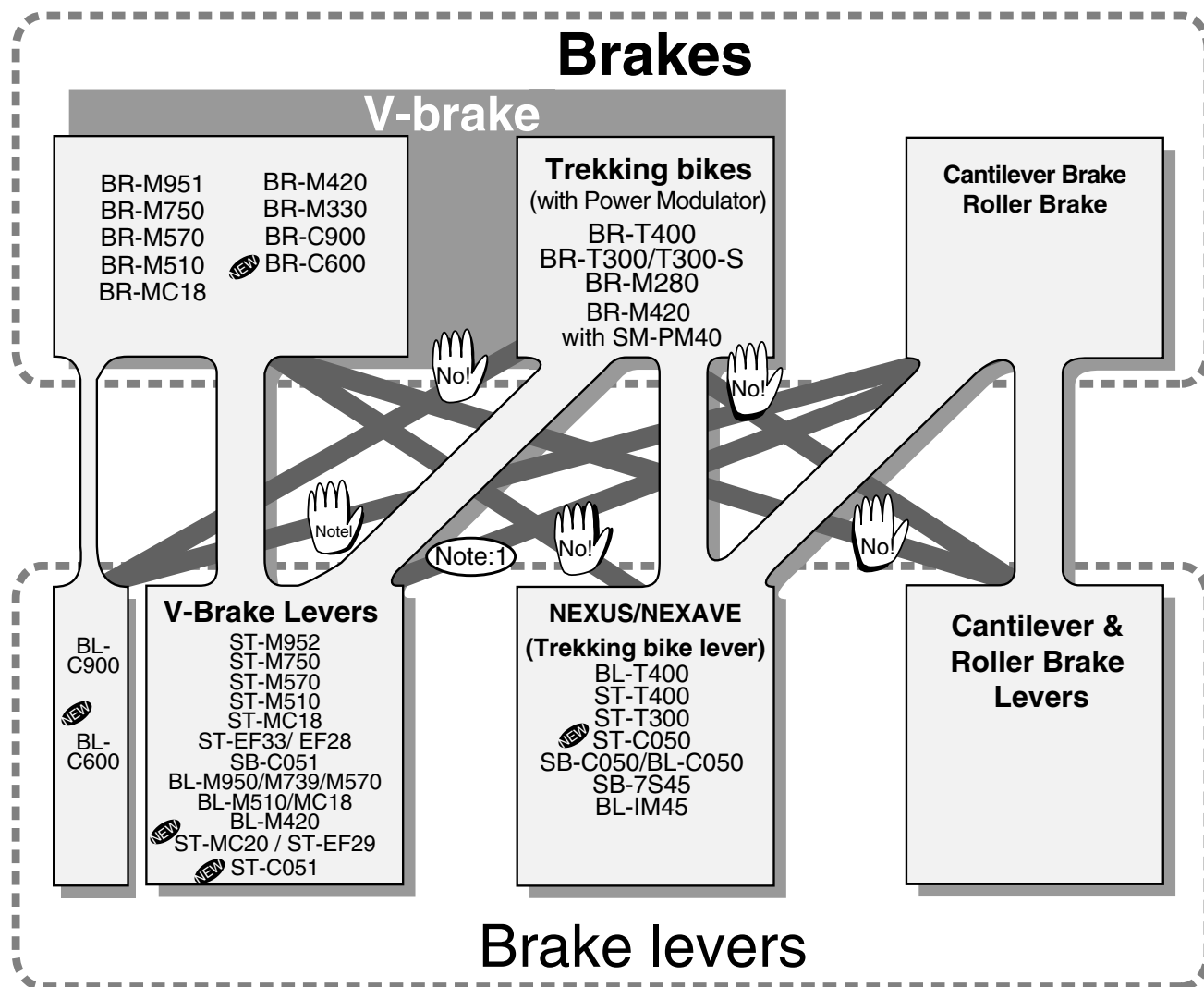
# D. Brakes

( V-Brake / Roller Brake / Canti Brake )

## D-1 Interchangeability between brake systems

■ Depending on the brake and brake lever combination to be used, the relationship between the input at the brake lever and the actual braking force output at the wheels is very easily affected.

- Be very careful when combining a brake and brake lever. Incorrect combinations can cause accidents or insufficient braking forces due to improper cable strokes. Be sure to carefully consult the chart below and select the brake and the matching brake lever.



The “NO!” symbols indicate combinations that should not be used under any circumstances.

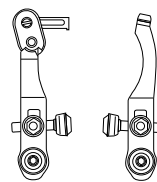
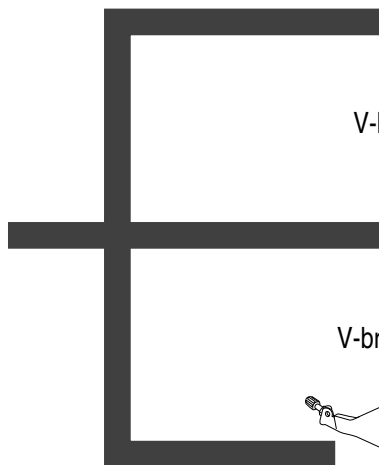
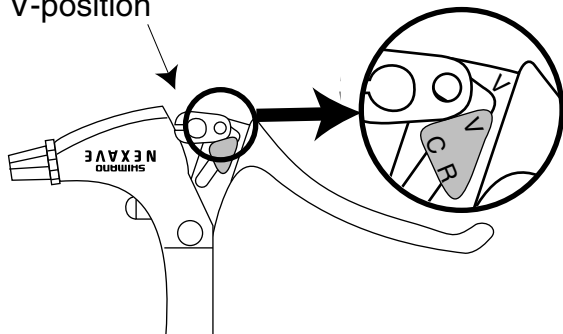
Note 1: This combination will not provide the sufficient amount of braking force.

NEW

- ST-T400/BL-T400/ST-T300/ST-C050/SB-7S45/BL-IM45 brake levers are equipped with a switch to change between the V-brake with modulator mode (BR-T400, BR-T300 and BR-M420-P) and the cantilever or roller brake mode.

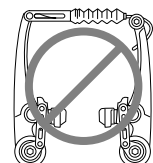
## ■ For V-brake (with power modulator) mode

V-position



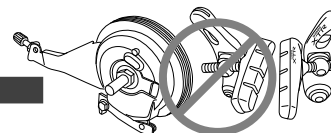
O.K.

V-brake with power modulator



Not  
O.K.

V-brake without power modulator

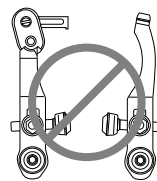
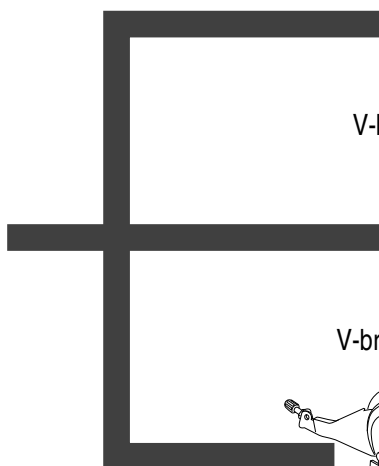
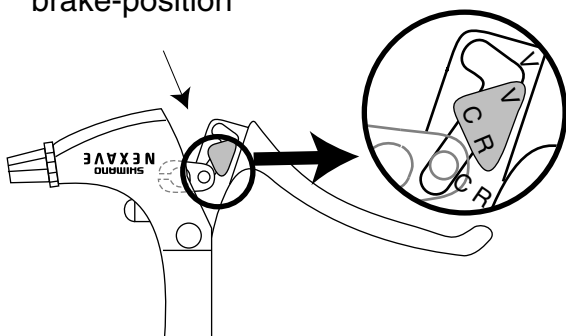


Not  
O.K.

Roller brake/canti brake

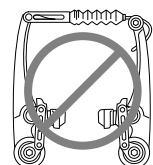
## ■ For Canti /Roller-brake.

Canti/roller(C R)  
brake-position



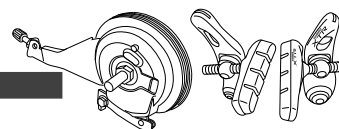
Not  
O.K.

V-brake with power modulator



Not  
O.K.

V-brake without power modulator



O.K.

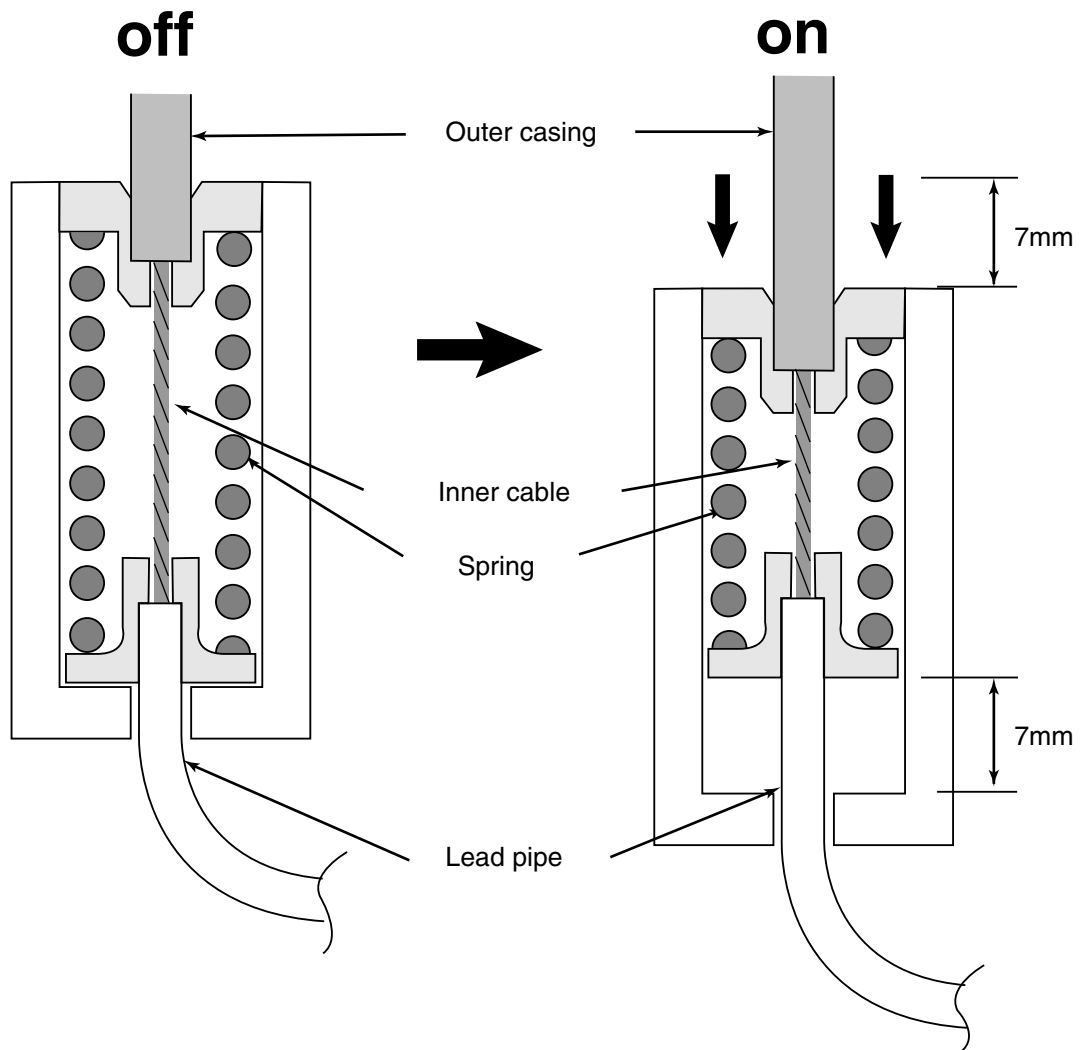
Roller brake/ Canti brake

### WARNING:

If the mode is not matched to the type of brake being used, this could result in inadequate or excessive braking power. Please proceed with caution when selecting the correct mode for the corresponding brake.

## ■ D-1-2 Power modulator SM-PM40

- On braking, 7mm of the outer cable is drawn into the SM-PM40 power modulator. Adjust to make allowance for this length of outer cable.





## D-2 Brake shoe

### ■ Brake/Shoe line-up

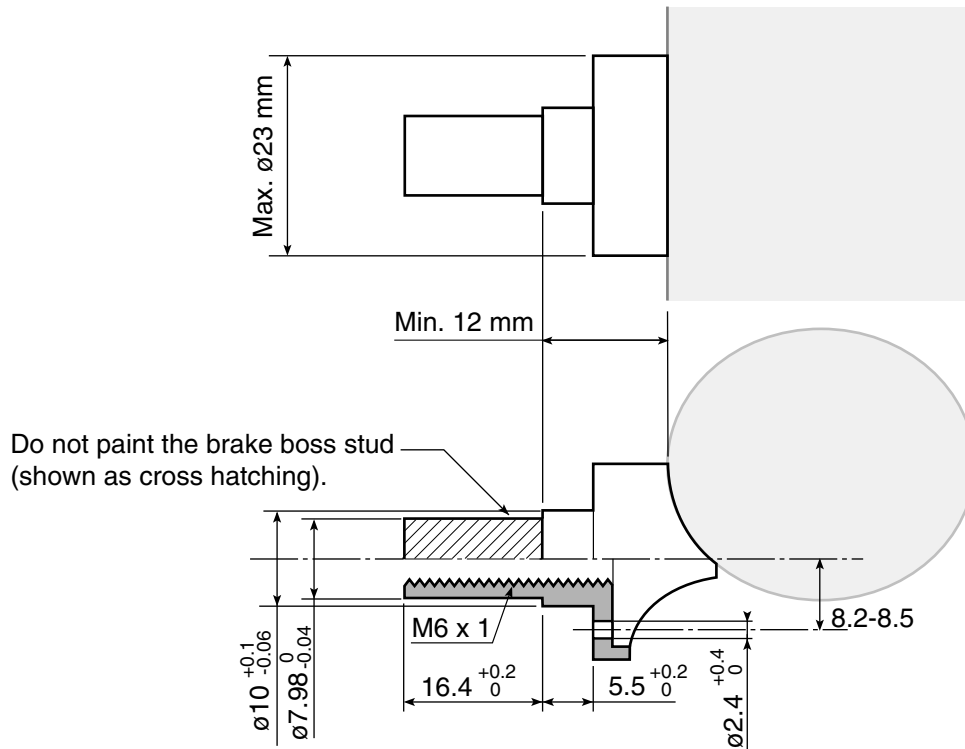
	M70R2	Ceramic	M70T3	M70T4	M70W	M65T3	M65T4	S70C	S70T	S65T
BR-M951	Standard	Option	—	—	—	—	—	—	—	—
BR-M950	Standard	Option	—	—	—	—	—	—	—	—
BR-M750	Option	Option	Low noise	Option	—	—	—	Standard	—	—
BR-M739	Option	Option	Low noise	Option	—	—	—	Standard	—	—
BR-M570	—	—	Option	Option	—	—	—	—	Standard	—
BR-C900	—	—	—	—	Standard	—	—	—	—	—
NEW BR-C600	—	—	—	—	Standard	—	—	—	—	—
BR-M510	Option	—	Option	Option	—	—	—	Option	Standard	—
BR-MC18	—	—	Option	Option	—	—	—	—	Standard	—
BR-M330	—	—	Option	Option	—	—	—	—	—	Standard
BR-M420	—	—	—	—	—	Option	Option	—	—	Standard
BR-T300	—	—	Option	Option	—	—	—	—	Standard	—
BR-CT91	Standard shoe is "CONVENTIONAL TYPE". M55T M-system shoe is optional choice.									

### ■ Shoe characteristics

	Cartridge shoe	M-system	Length	Threaded shoe post	Brake shoe characteristics
M70R2	○	○	70mm	○	A race shoe that performs well in dry and wet conditions, and is also highly resistant to wear. may give off noise.
Ceramic	○	—	70mm	○	
M70T3	—	○	70mm	○	Performs especially well in wet conditions and may pass DIN standards. Gives off less noise, but the pad is heavier, faster rim wear, and tends to fade.
M65T3	—	○	65mm	○	
M70T4	—	○	70mm	○	Only for side wall machined rims. Performs especially well in wet conditions and may pass DIN standard. Tend to be low noise, low rim wear and fade.
M70W	—	○	70mm	○	
M65T4	—	○	65mm	○	
S70C	○	—	70mm	○	Performs well in dry conditions and tends to be low noise. Wears in muddy conditions.
S70T	—	—	70mm	○	
S65T	—	—	65mm	○	

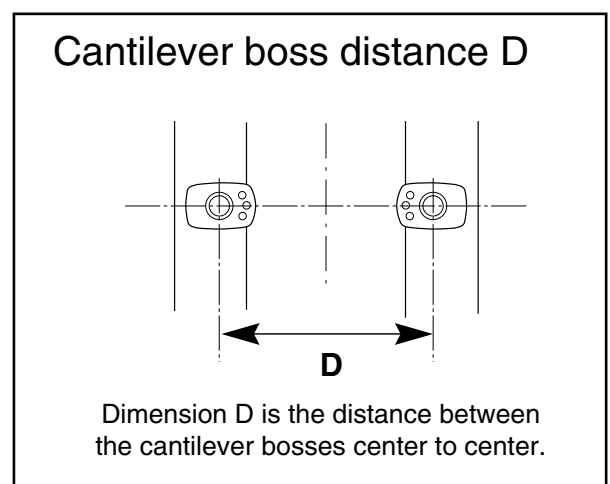
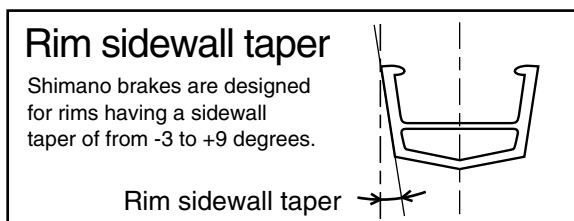
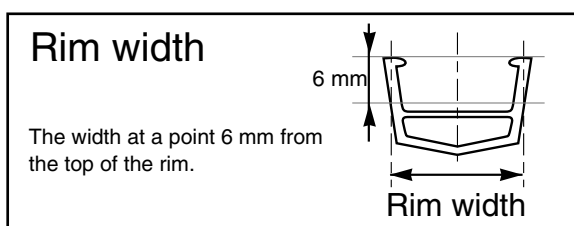
## D-3 Boss dimensions for Shimano brakes

- The Shimano brakes (V-brake and cantilevers) are designed for use with brake bosses having the dimensions shown below. If Shimano brakes are used with bosses that do not meet the dimensions given below, the braking performance may be adversely effected.



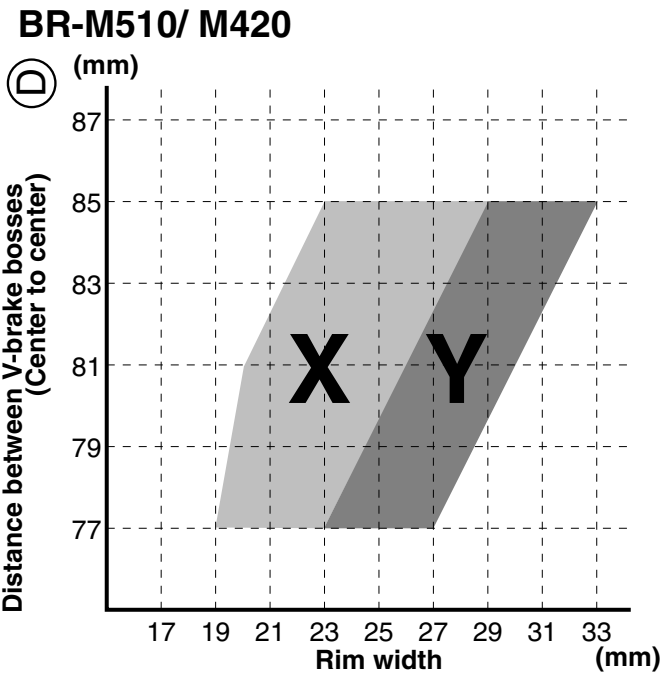
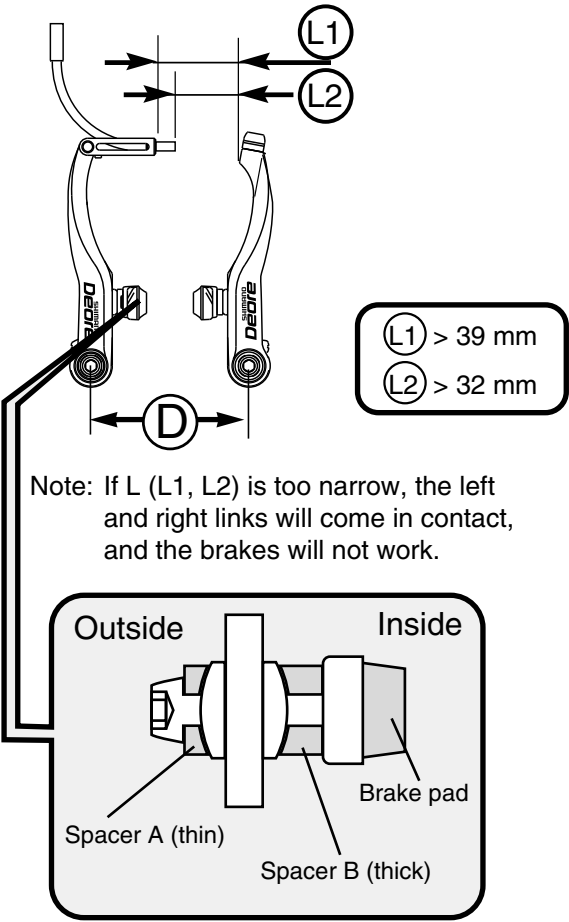
## D-4 Distance between brake bosses

- Dimension D between brake bosses may change depending on rim width. Position the cantilever bosses as shown in the graphs in sections D-4-1.( page 48 )



■ **D-4-1 Distance between V-brake bosses (for BR-M510, BR-M420)**

■ As with normal cantilever brakes, the Shimano V-brake is designed for installation on frames with a 80 mm distance between bosses (center to center). Please refer to the graph for suitable rim width and boss distance combinations. If the brakes are used in conditions outside what is recommended, the brake performance may be adversely affected.



**Note:**

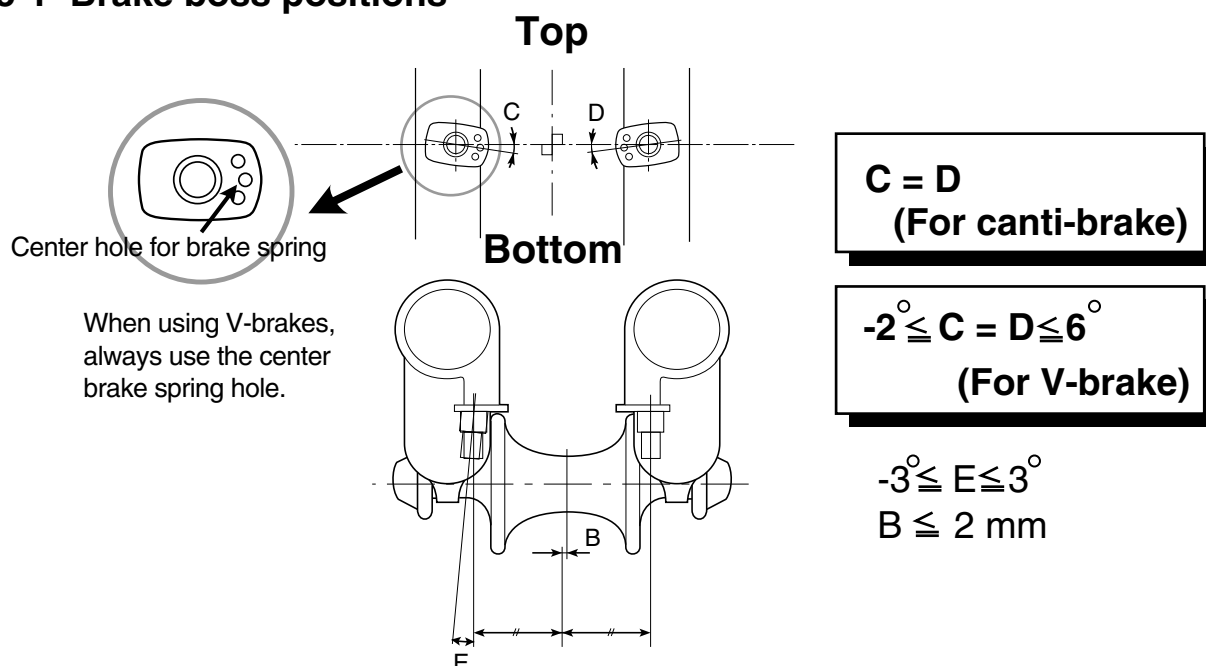
- Some rim width and boss combinations may require the reversal of A and B spacers in order to obtain the required L1 and L2 dimensions.
- If the L dimensions of the frame are too large, interference may be created between the riders legs and the brakes.
- To specify optimum set up and obtain the required minimum dimension L, refer to the graph above and the table below relating to boss distance, rim width, and spacer positioning.

Spacer A position	Spacer B position	Graph area
Outside	Inside	X area
Inside	Outside	Y area

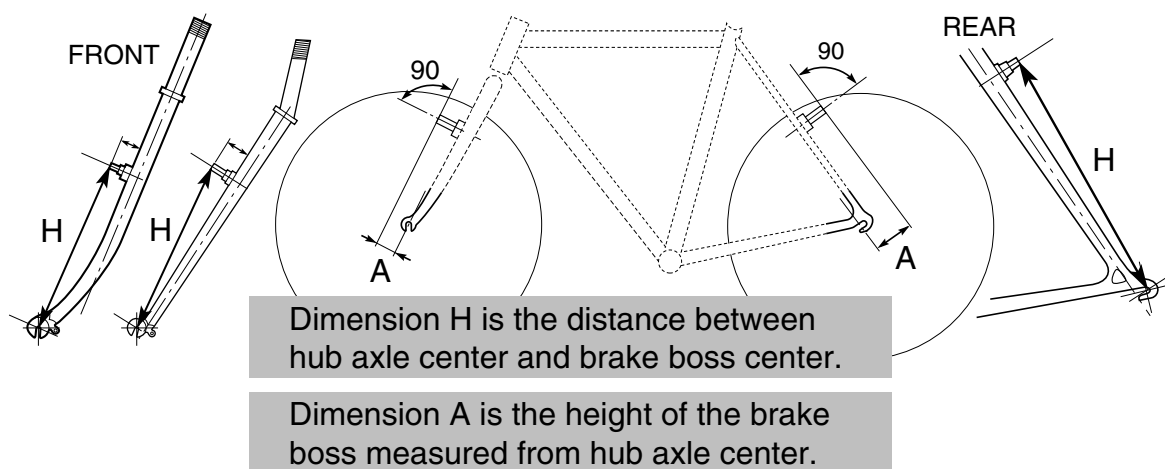
## D-5. Cantilever boss positioning

- Cantilever bosses for use with Shimano brakes should be positioned within the ranges shown in the diagrams below. Notice that there is a slight difference in installation between normal cantilever brakes and V-Brakes.

### ■ D-5-1 Brake boss positions



### ■ D-5-2 Frame mounting height for brake bosses



ISO 5775 #559 (Old marking 26-inch)

$H = 253.5 \pm 1 \text{ mm}$       -8 mm    A    70 mm

ISO 5775 #622 (Old marking 700C, 28-inch)

$H = 283 \pm 1 \text{ mm}$       -8 mm    A    70 mm

ISO 5775 #630 (Old marking 27-inch)

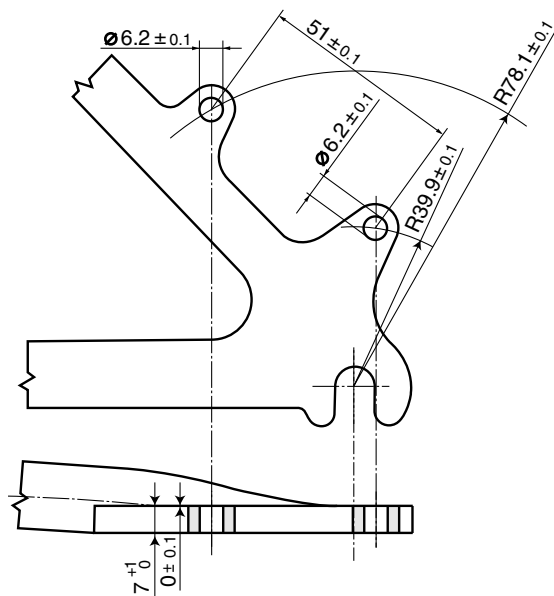
$H = 286 \pm 1 \text{ mm}$       -8 mm    A    70 mm

## D-6 Disc brake

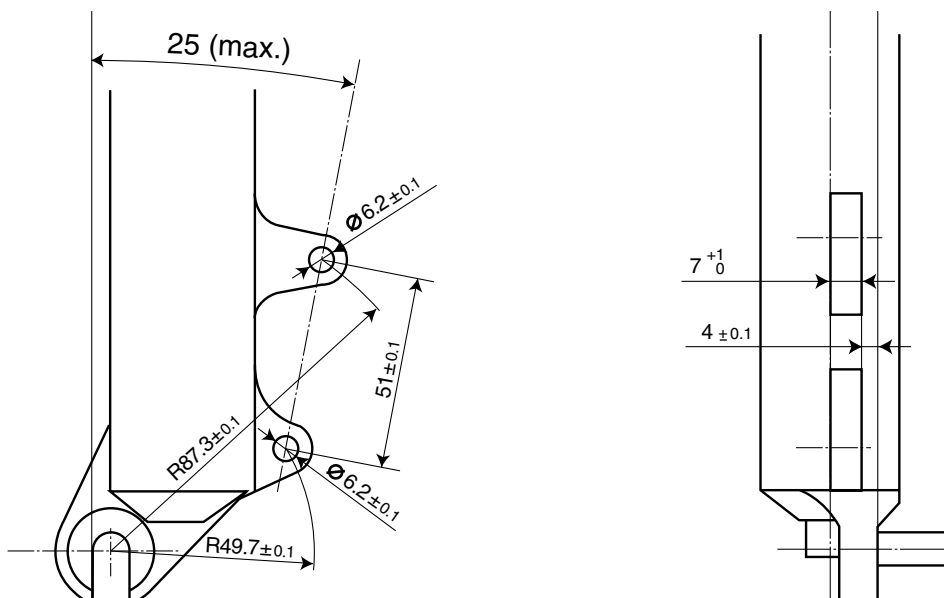
### ■ D-6-1-1 Disc brake mount dimensions

- Shimano disc brake is designed to fit the frame and front fork as shown below.  
(The dimensions shown below are as same as the International Standard disc brake mount.)

#### Rear frame dimensions

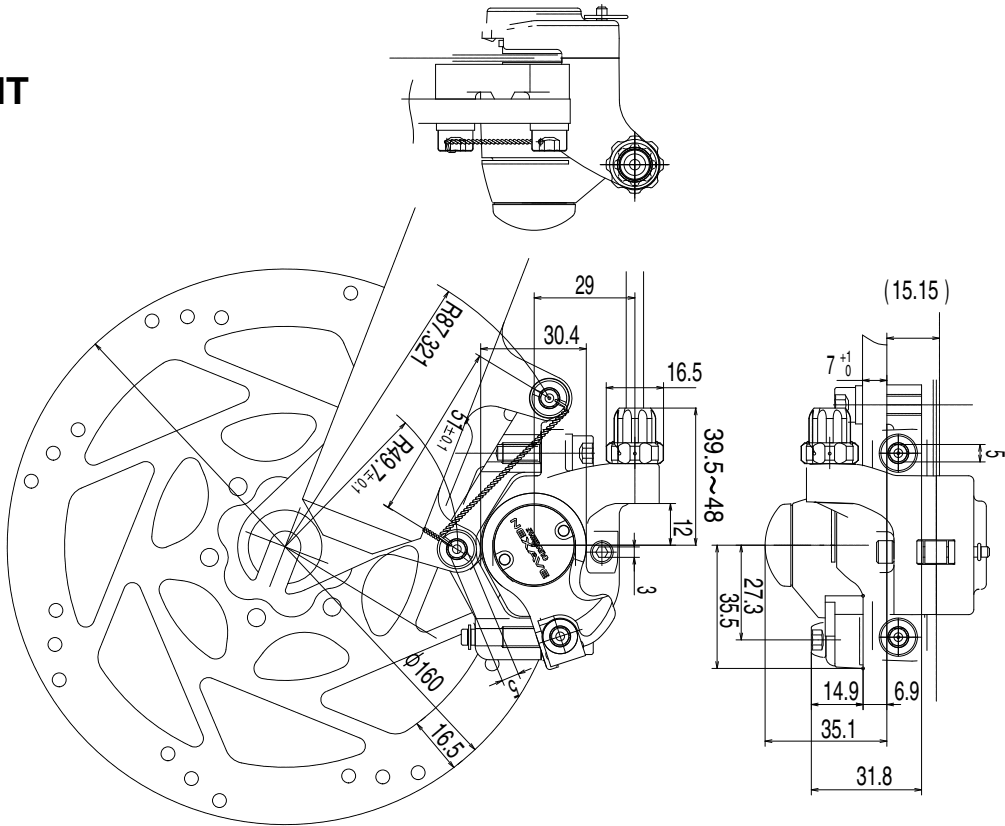


#### Front fork dimensions

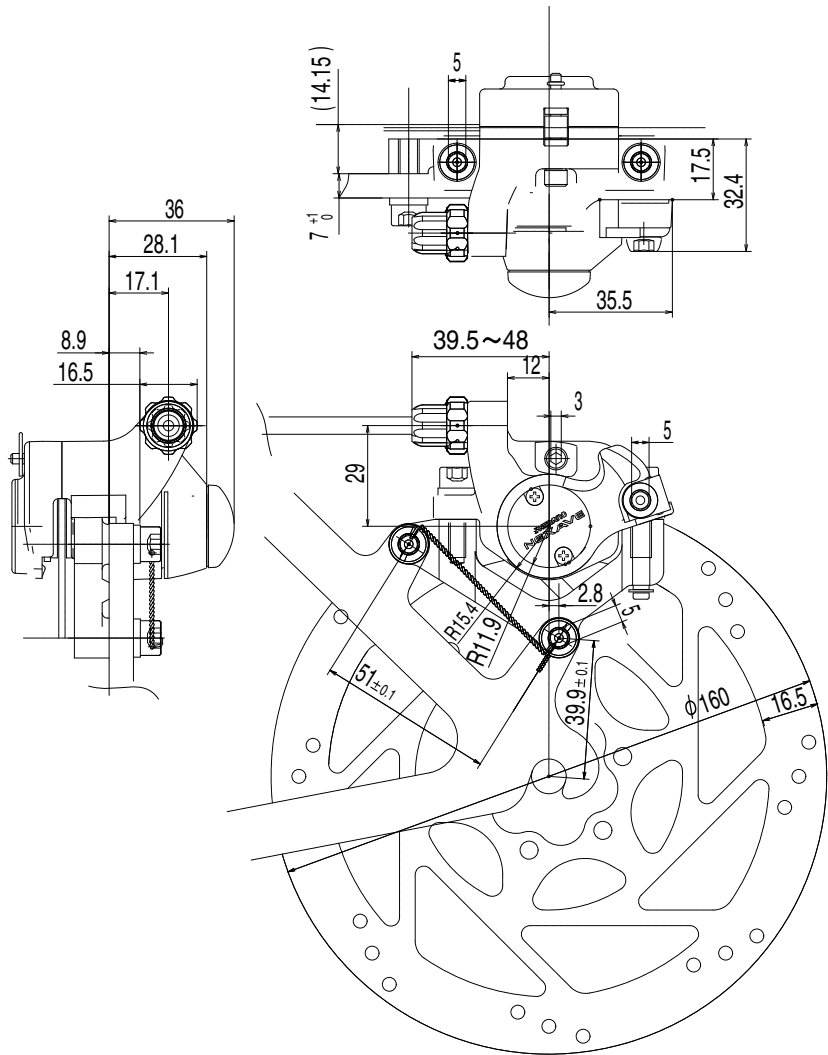


■ D-6-1-2 Disc Brake dimensions ( BR-C601 )

FRONT

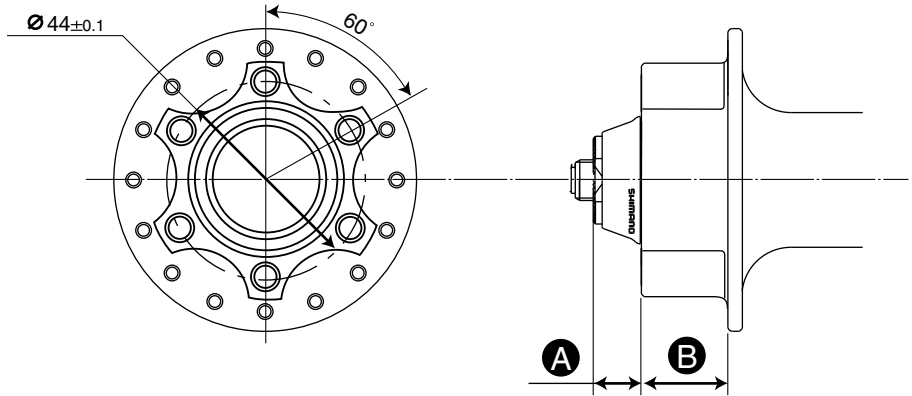


REAR



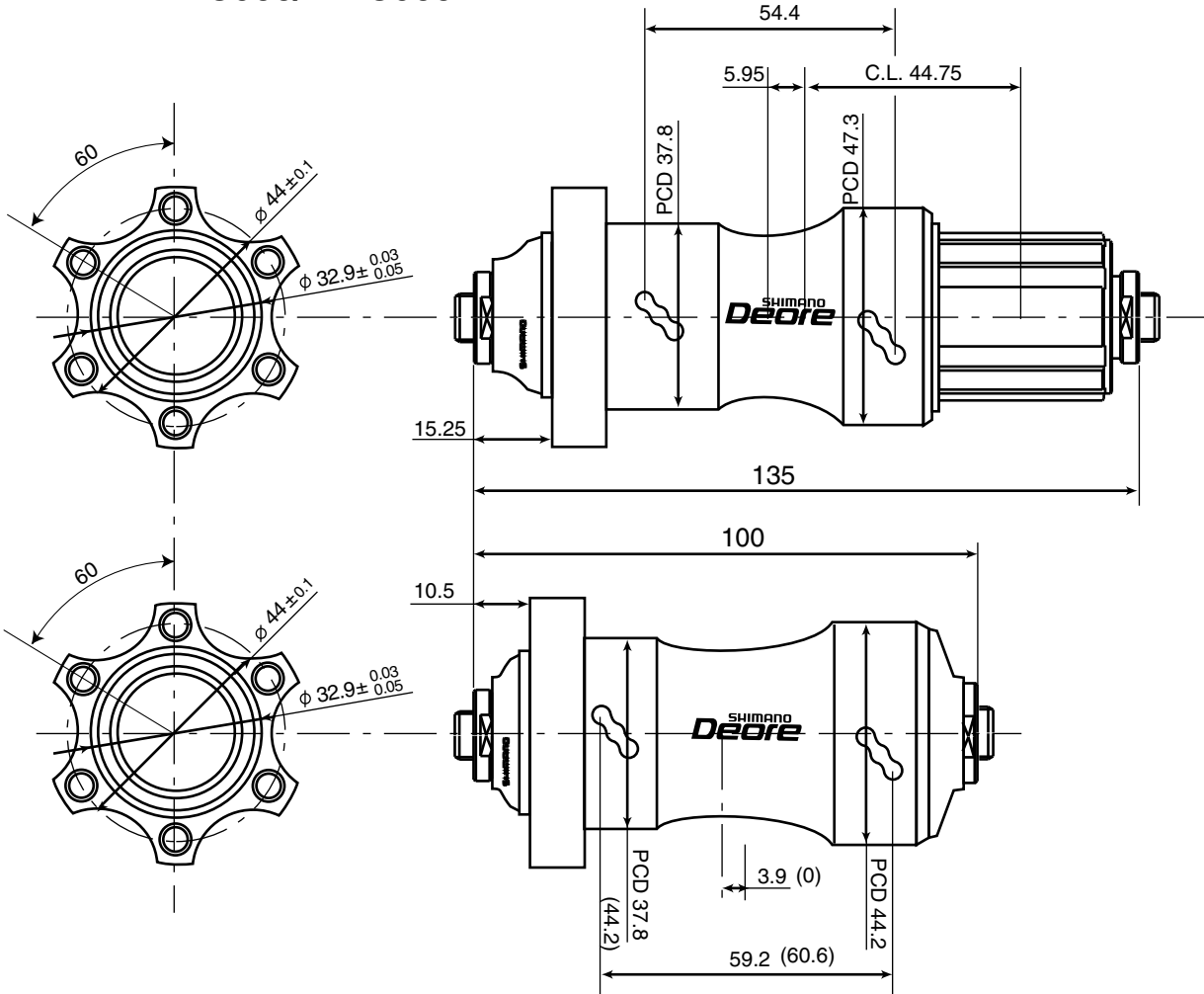
## ■ D-6- 2 Hub dimensions for Shimano disc brake

- Shimano disc is able to mount to the hubs with following dimensions.Following required dimensions are as same as Hayes disc brake.



	Dimension A	Dimension B	
Front	10.5±0.1	M755	M755/M756
		15.1	15.3
Rear	15.25±0.1	16.7	16.9

## ■ D-6-3 HB-M555/FH-M555 Hub dimensions HB-C901/FH-C901 HB-C900/FH-C900



( )=HB-C900

## D-7 Disc brake lever compatibility

### ■ D-7-1 Chart showing combinations of Shimano disc brakes

- Shimano disc brakes, lever and caliper are linked by the oil line, and it is filled with brake oil at the time of shipment. When ordering, select the best combination to suit the size of your frame, the shape of the handle bars, the size, and the side, left or right, of the brake lever.

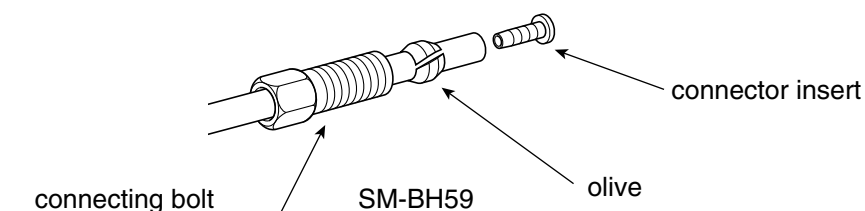
#### ● These are the combinations of Shimano disc brakes.

Caliper	Brake Hose				Brake lever	Rotor	Pad
	SM-HOSE	SM-BH61	SM-BH60	SM-BH59			
BR-M755	○	○	○	—	BL-M755	RT75	M03
BR-M555	—	○	○	—	BL-M555	RT60	M01
BR-C901	—	○	○	—	BL-C901		C01
BR-M525	—	—	—	○	BL-M525		Resin Pad

#### ● Length of oil hose (cm)

FOR Front	50,60,70,80,90,100
For Rear	120,130,140,150,160,170

- NOTE: ● Select a length of oil hose so there will still be some leeway when the handle bars are fully turned.
- The oil hose for Shimano disc brakes are made from stainless steel. Take care not to scratch the frame when fitting them.
  - Shimano disc brakes are fully adjusted at the time of shipment. Do not loosen the connector or master cylinder. Also, to maintain the adjusted state, do not squeeze the brake lever.  
Do not remove the material from the brake pads until you have fitted them.
  - Do not use BR-C901 in any combination other than that described above.
  - The Connecting bolt assembly (connecting bolt, olive and connector insert) for the SM-BH59 hose is incompatible with the BR-M755/M555/C901 disk brakes, so do not use them together.

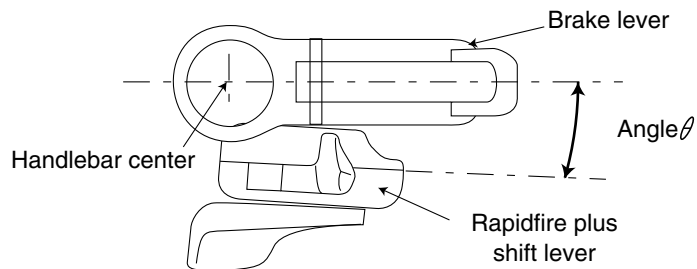


### ■ D-7-2 Shimano cable type disc brake compatibility chart

Caliper	Brake lever	Rotor	Pad
BR-M515	BL-M510	RT60	Resin Pad
New BR-C601	New BL-C600		



### ■ D-7-3 Combinations of disc BL-M755 and shift levers.



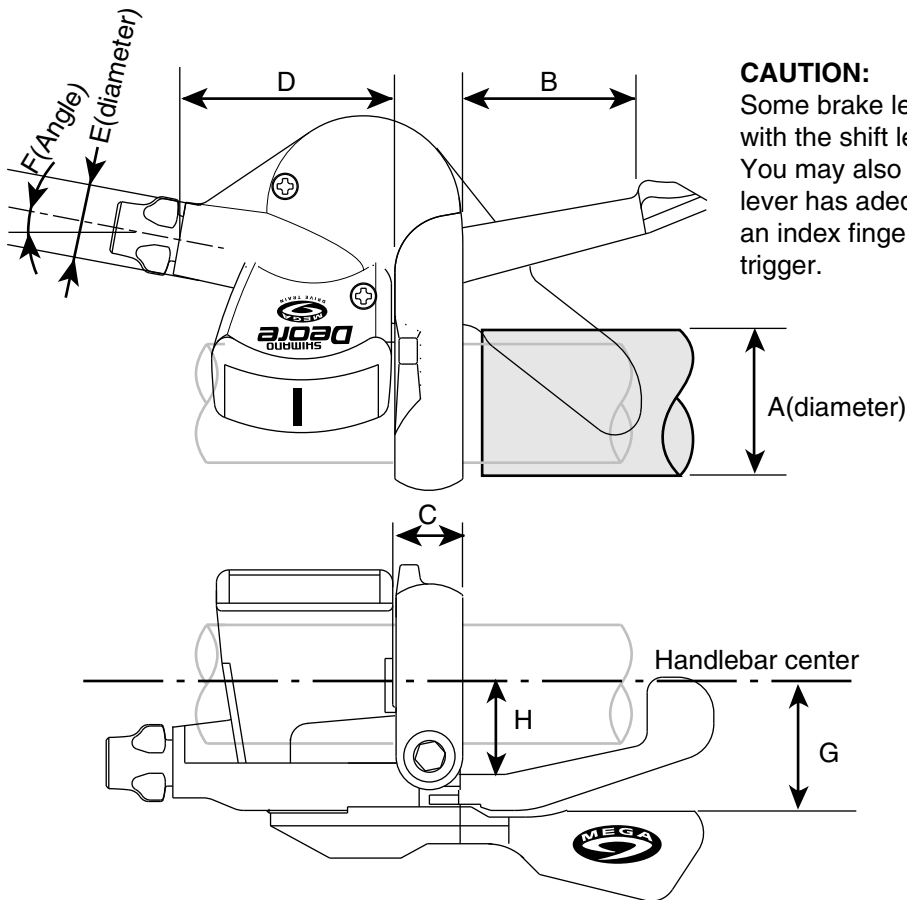
#### • Angle $\theta$ of each combination

Series	Model No.	Speed	With Optical Gear Display	Without Optical Gear Display	With Flight Deck	Note
XTR	SL-M952	9	0 degree	0 degree	4 degree	
	SL-M951	8	15 degree	8 degree	22 degree	
	SL-M950	8	—	8 degree	—	
Deore-XT	SL-M750	9	0 degree	0 degree	4 degree	
	SL-M740	8	15 degree	8 degree	22 degree	
	SL-M739	8	—	8 degree	—	
Deore-LX	SL-M570	9	0 degree	0 degree	4 degree	
	SL-M569	8	2 degree	—	—	Same measurements as SL-MC41/MC40/MC18/MC20
Deore	SL-M510	9	0 degree	—	4 degree	
Alivio	SL-MC38 SL-MC37	7/8	—	2 degree	—	

# E. Shift levers

## E-1 shift lever dimensions

- Please refer to the following dimensions to choose the handlebar and brake lever for Rapidfire-SL, Rapidfire-plus and Tap-fire.



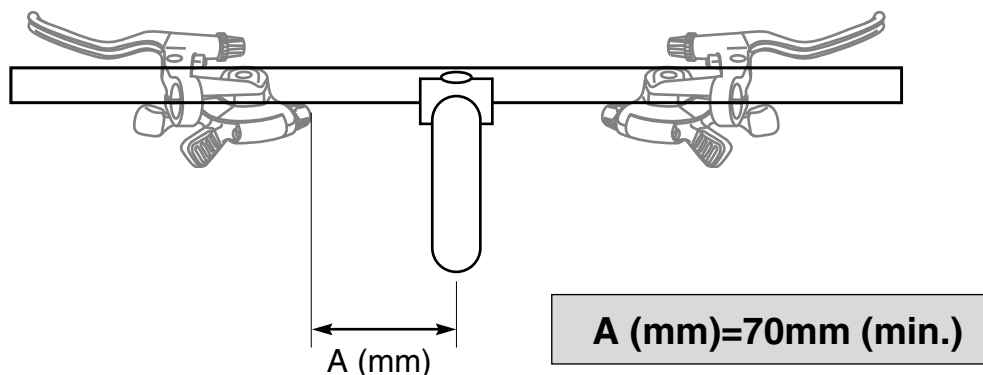
Series	Model Number	A	B	C	D Front/Rear	E	F	G	H
	SL-R440	Ø32 (mm) or less	35 (mm)	13 (mm)	32.8/ 32.2 (mm)	Ø15 (mm)	15°	21.7 (mm)	13.5 (mm)
Deore-LX	SL-M570								
NEXAVE	SL-C900-R New SL-C600-R		—		34 (mm)		30°	30 (mm)	—

\*The thumb lever shape of SL-M570 has been changed for more clearance.

## E-2 Handlebar Installation conditions

- Use a handle bar that allows you to maintain a gap for the outer cable housing stops for the left and right levers as shown below.

- If the dimension A is too narrow, the bend in the cable will be too sharp and the cable efficiency will be reduced resulting in heavier action.



### NOTE:

The length of the shift cable should be long enough to have sufficient slack even when the handlebars are turned all the way to either the left or the right. If the cable is not long enough to have slack when the handlebars are turned all the way one way or the other, then the cable or the shift mechanism may be become damaged during use.

## E-3 The CI-deck

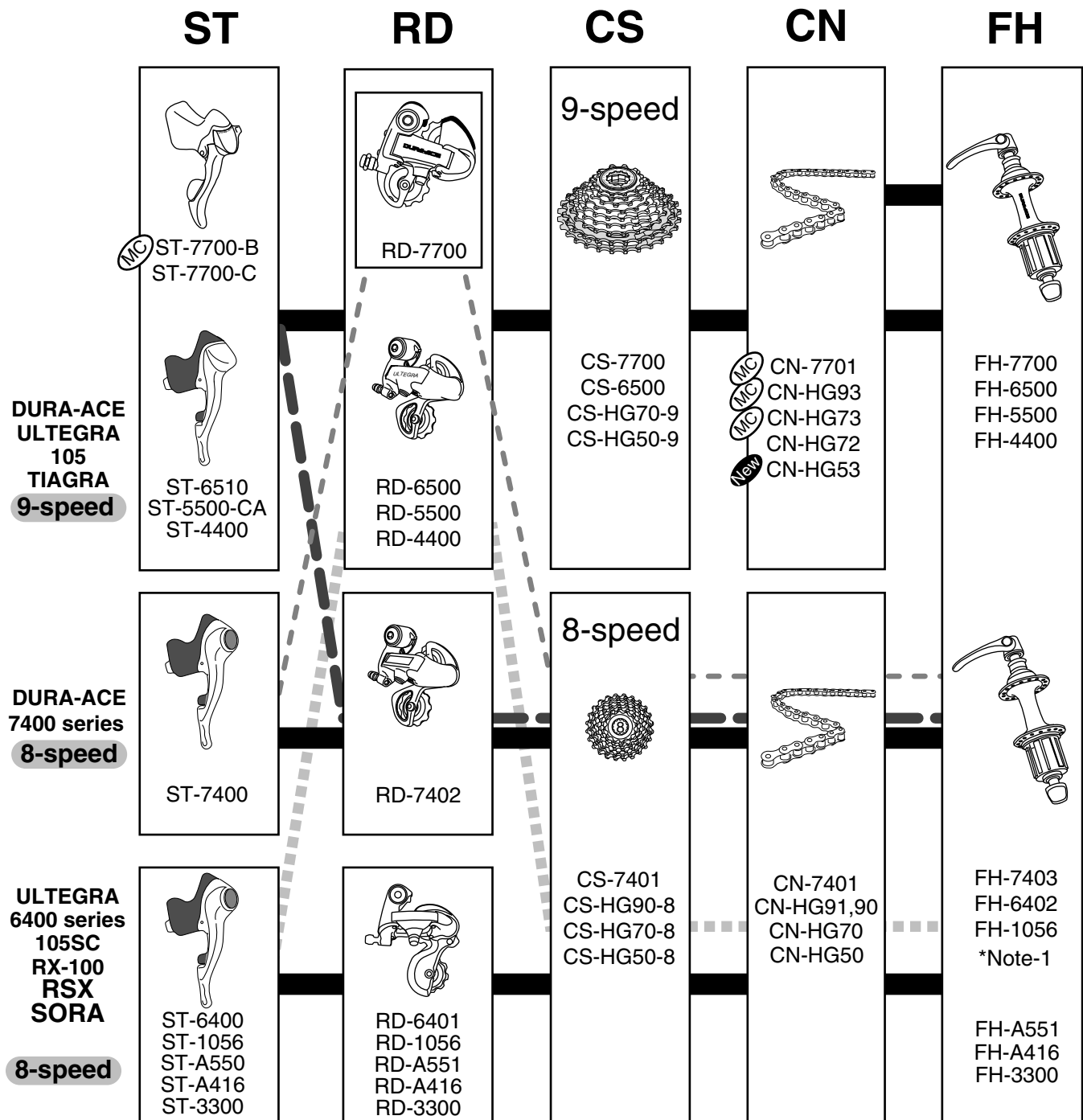
- Shimano has started offering CI-decks that display gear information on the center of the handle bars for C201,C101 and C050 series. Refer to the following to find the correct CI-deck to order.

### ■ E-3-1 CI-Deck combinations

Model number of CI-Deck	Shift lever	Rear derailleur	Use
ID-C050-8R	SB-C050-8R/C051-8R	Rapid Rise	Rear 8-speed
ID-C050-7R	SB-C050-7R/C051-7R		Rear 7-speed
ID-C050-6R	SB-C050-6R/C051-6R		Rear 6-speed
ID-C050-L	SB-C050-L/C051-L		Front triple SIS
ID-C050-LN	SB-C050-LN/C051-LN		Front triple/double friction
ID-C050-LC	—	—	Front single

# F. Road bike components

## F-1 Rear drive train interchangeability

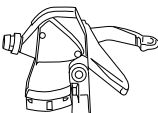



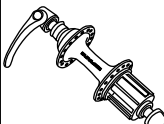
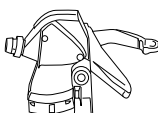





Note-1:

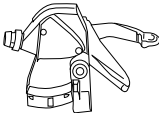



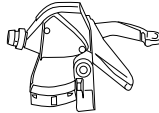



The FH components listed here cannot be used with 11T sprockets

## F-1-2 For Flat handlebar interchangeability


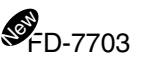



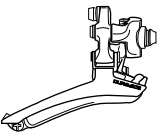



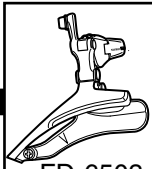
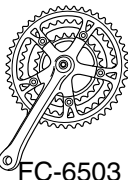






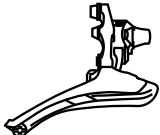


### Rear system

	ST	RD	CS	CN	FH
DURA-ACE ULTEGRA 105 TIAGRA 9-Speed	 SL-R440	 RD-7700 RD-6500 RD-5500 RD-4400	 CS-7700 CS-6500 CS-HG70-9 CS-HG50-9	 MC CN-7701 MC CN-HG93 MC CN-HG73 New CN-HG72 New CN-HG53	 FH-7700 FH-6500 FH-5500 FH-4400 FH-3300
SORA 8-Speed	 SL-R440-8	 RD-3300	 CS-HG50-8	 CN-7401 CN-HG91,90 CN-HG70 CN-HG50	

### Front system

	ST	FD	FC	BB	CN
DURA-ACE ULTEGRA 105 TIAGRA 9-Speed	 SL-R440	 FD-R440	FC-7701 FC-6500 FC-5501 FC-4400	BB-7700 BB-6500 BB-5500 BB-UN72 BB-UN52 BB-UN40	 MC CN-7701 MC CN-HG93 MC CN-HG73 New CN-HG72 New CN-HG53
		 FD-R443	FC-4403 FC-6503 FC-5504	BB-6500 BB-5500	
SORA 8-Speed	 SL-R440	 FD-R440A   FD-R443A	FC-3300  FC-3303	BB-UN72 BB-UN52 BB-UN40	 CN-7401 CN-HG91,90 CN-HG70 CN-HG50

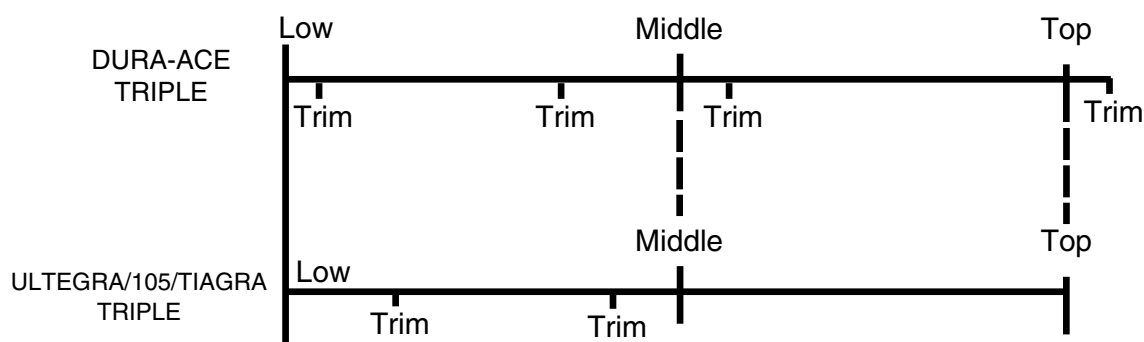
## F-2 Front drive train interchangeability

	ST	FD	FC	BB	CN
<b>DURA-ACE 7700 series</b> <b>Double</b>					
<b>DURA-ACE 7700 series</b> <b>Double</b>	 ST-7700 ST-7700-C	 FD-7700 FD-6500 FD-5500 FD-4400	 FC-7701 FC-6500 FC-5501	*1 BB-7700 BB-6500 BB-5500	
<b>ULTEGRA 6500 series</b> <b>105</b> <b>5500 series</b> <b>TIAGRA</b> <b>Double Triple</b>	 ST-6510 ST-5500-CA ST-4400	 FD-6503 FD-5503 FD-4403	 FC-6503 FC-5504	 *1 BB-7703 BB-6500 BB-5500	 CN-7701  CN-HG93  CN-HG73  CN-HG53
<b>DURA-ACE 7400 series</b> <b>ULTEGRA 6400 series</b> <b>105SC</b> <b>RX-100</b> <b>RSX</b> <b>SORA</b> <b>Double</b>	 ST-7400 ST-6400 ST-1055 ST-A550 ST-A416 ST-3300	 FD-7410 FD-6401 FD-1056 FD-A551 FD-A416 FD-3300	 FC-7410	BB-7410	
<b>105SC</b> <b>RSX</b> <b>SORA</b> <b>Triple</b>	ST-1055-T ST-A417 ST-3303	FD-1057 FD-A417 FD-3304	FC-1057 FC-A417 FC-3303	*2 BB-UN72 BB-UN52 BB-UN40	CN-7401 CN-HG90 CN-HG91 CN-HG70 CN-HG50

\*Notes 1 and 2: Axle length is different

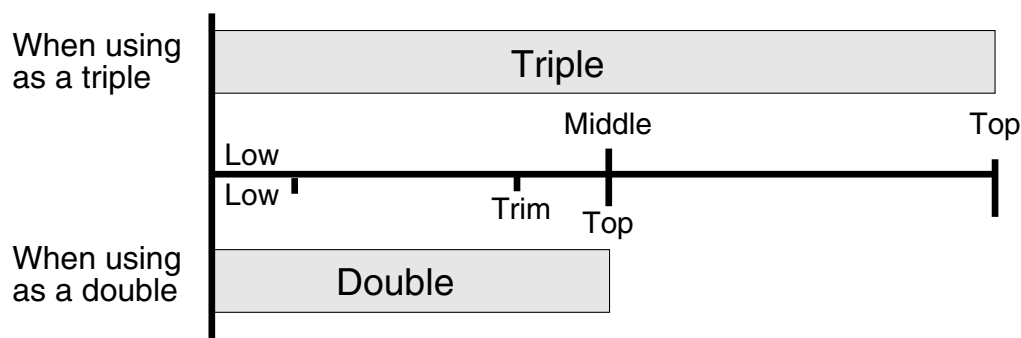
## F-3 DURA-ACE Triple Series

- The DURA-ACE Triple series is designed for optimum use with ST/FD/FC systems. We therefore recommend using the DURA-ACE Triple series with ST/FD/FC systems. (You cannot use with the Ultegra, 105, and Tiagra triple series.)
- The ST-7703 shifting lever for the DURA-ACE triple series is specifically designed for triples, so use ST-7700-B if you are going to use a double.
- When you are going to use the DURA-ACE triple, the setting of the front derailleur should be set to the middle position or top trip position as shown in this diagram.



## F-4 Dual control lever

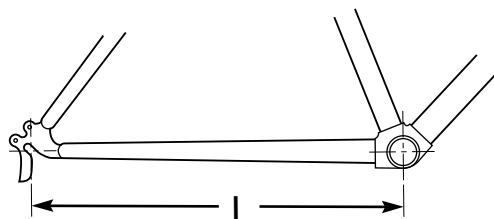
- The dual control lever for the Ultegra, 105, and Tiagra is compatible with both the double (FC-6500, FC-5501, and FC-4400) and triple (FC-6503, FC-5504, and FC-5503) front chain foils.
- If you are going to use it for double, use the low to middle range of ST-6510, ST-5500-CA, ST-4400, SL-R440, and adjust the setting of the front derailleur to the trim position as shown in this diagram.
- If you are going to use it for triple, adjust the setting of the front derailleur to the middle position as shown in this diagram.



## F -5 About Chainstay

### ■ F-4-1 Chainstay length

- All Shimano road components are designed for use with and tested on chainstays that are 405 mm or longer. If the components are used on chainstays that are shorter than 405 mm, the components may not operate properly.



$L = 405 \text{ mm}$

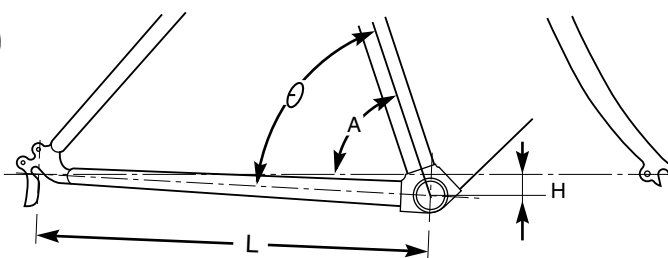
$L$  = The distance from the center of the bottom bracket to the center of the rear hub.

### ■ F-5-2 Chainstay angle “ $\theta$ ”

- In order for the front SIS shifting to function properly, the chainstay angle is of most importance. Design the chainstay angle so that it falls within the allowable range depending on the front derailleur you are using.

(The allowable chainstay angle “ $\theta$ ” for each front derailleur is listed in the 2001 model)

Model No.	Type	Chainstay angle “ $\theta$ ”
FD-7700 FD-6500 FD-5500 FD-4400 FD-3300 FD-R440	Double	61 to 66
FD-6503 FD-5503 FD-4403 FD-3304 FD-R443	Triple	63 to 66



$\theta$  : Chainstay angle  
 $A$  : Seat tube angle  
 $H$  : Hanger drop

$$\theta = A - \sin^{-1} \frac{H}{L}$$

$$H = L \times \sin (A - \theta)$$

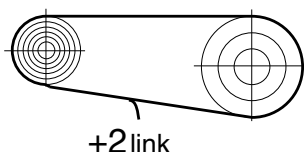
#### ● Length of RD-7700-GS chain

RD-7700-GS chain length is different from past road RDs.

Us the same design as for MTB, TOP x LOW +2 links.

The total capacity can be insufficient if you use the design for past chain lengths.

Chain position



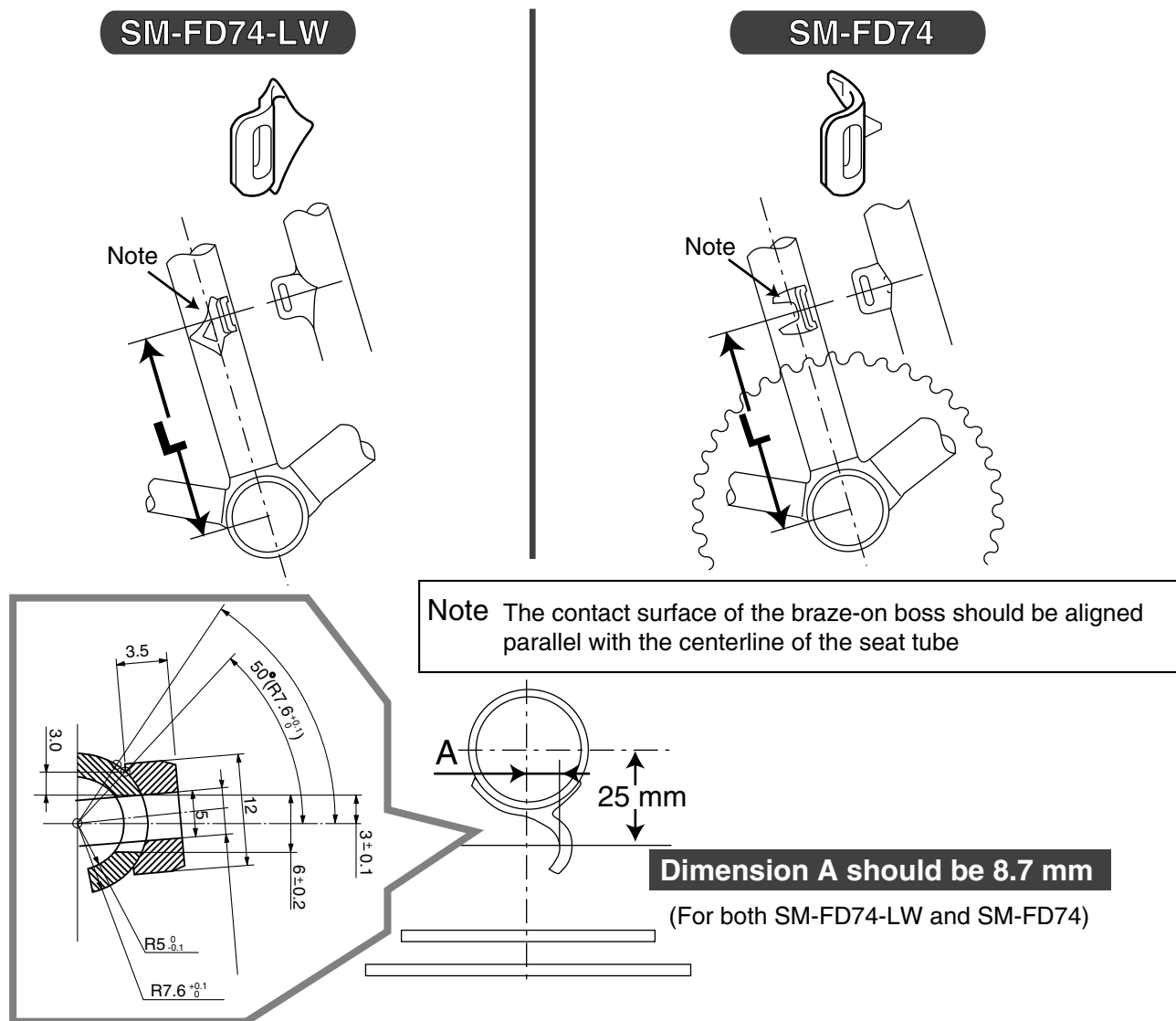


## F-6 Dimension of the brazed-on front derailleur bracket

### ■ F-6-1 Brazed-on front derailleur position

- The position of a brazed-on front derailleur mounting boss has a significant effect on shifting performance. Please refer to the points shown below with regard to the correct positioning of the front derailleur mounting boss.

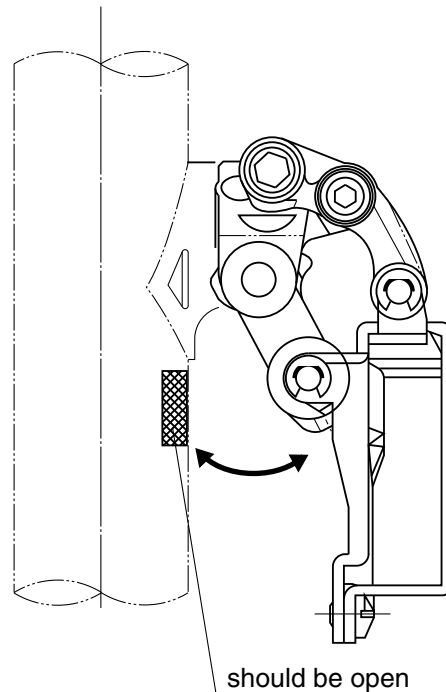
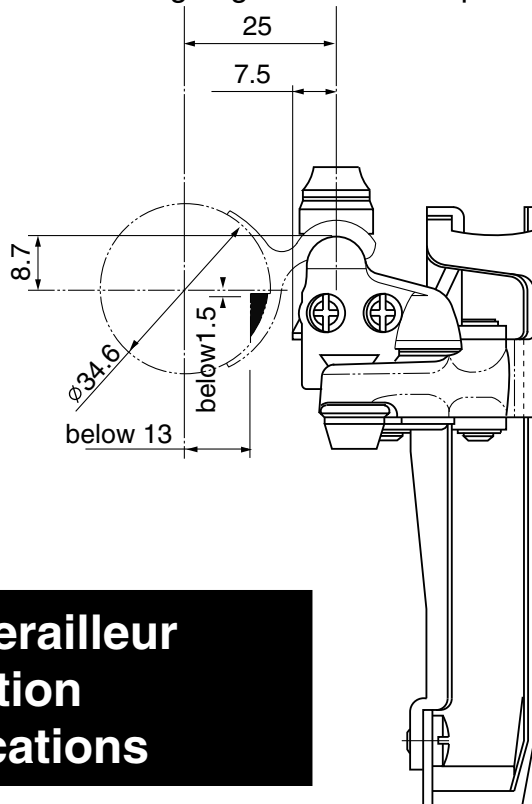
The recommended positions of the mounting bosses for Shimano brazed-on type front derailleurs are shown below. This position will change according to the size of largest chain wheel used on the bike.



Dimension L	Optimum teeth number (add 3-4mm for biopace)	Usable teeth range
140mm	48T	45T, 46T, 47T, 48T, 49T, 50T
142mm	49T	46T, 47T, 48T, 49T, 50T, 51T
144mm	50T	47T, 48T, 49T, 50T, 51T, 52T
146mm	51T	48T, 49T, 50T, 51T, 52T, 53T
148mm	52T	49T, 50T, 51T, 52T, 53T, 54T
150mm	53T	50T, 51T, 52T, 53T, 54T, 55T
152mm	54T	51T, 52T, 53T, 54T, 55T, 56T
154mm	55T	52T, 53T, 54T, 55T, 56T
156mm	56T	53T, 54T, 55T, 56T

### ■ F-6-2 Position of the pedestal for the front derailleur

The front derailleur can be moved within the below dimensions. Do not interfere with these dimensions when designing the frame and pedestal.



## F-7 Front derailleur installation specifications

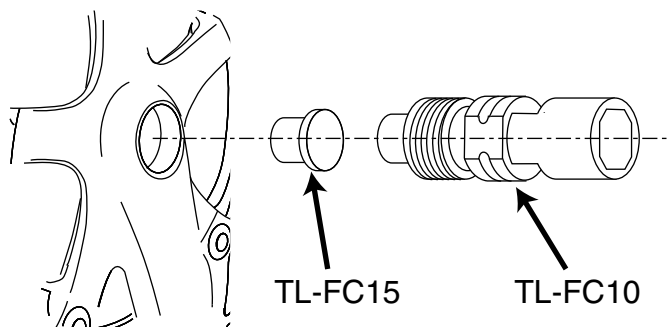
		Band type	Brazed type	Brazed + SM-AD11	Brazed + SM-AD15
Double	S (ø28.6)	○	○	—	—
	M (ø31.8)	○	○	○	—
	L (ø34.9)	—	○	—	○
Triple	S (ø28.6)	○	○	—	—
	M (ø31.8)	○	○	○	—
	L (ø34.9)	—	Note-1	—	Note-1

**Note-1** DURA-ACE can use this condition. When using a brazed front derailleur except FD-7703 with a triple chainring on a road racing bicycle with a seat tube diameter of more than  $\varnothing 31.8$  mm, depending on the various conditions of the frame, the shifting may not function properly. Be sure to check the specifications above if your application meets these conditions.

## F-8 FC-5501, 5504, M571 Replacing the front chainwheel

■ Use the special plug tool (TL-FC15) to remove the crank arm of FC-5501,FC-5504,M571.

1. Turn the crank arm fixing bolt counterclockwise and remove the screw
2. Insert TL-FC15 into the hole of BB-axle.
3. Then, use the cotterless crank arm extractor (TL-FC10) against the plug to remove the front chainwheel same as conventional axle.

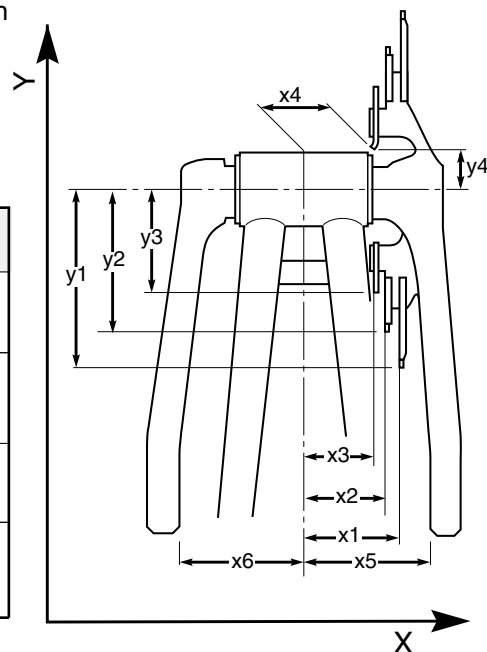


## F-9 Front chainwheel dimensions

- The dimensions of the new chainrings of Dura-ace are shown in the table below. Check these dimensions when designing the frame in order to avoid interference between the chainwheel and chainstay.

### Y dimensions

Series	Model Number	Chain line	y1	y2	y3	y4
DURA-ACE	FC-7701	43.5 mm	109.2	87.0	—	53.5
	<b>New</b> FC-7703 (53Tx39Tx30T)	45 mm	109.2	81.0	63.1	23.0
ULTEGRA 105 TIAGRA SORA	FC-6500/5501 4400/3300	43.5 mm	109.2	87.0	—	53.5
	FC-6503/5504 4403/3303 (52Tx42Tx30T)	45 mm	107.3	86.4	63.1	23.0

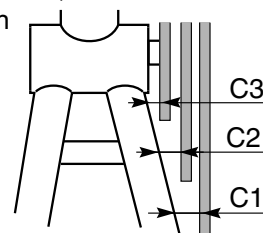


### X dimensions

Series	Model Number	Chain line	x1	x2	x3	x4	x5	x6	
DURA-ACE ULTEGRA 105	FC-7701 6500/5500 (53T x 42T)	43.5 mm	45.4	37.9	—	36.5	57.5	57.5	
	<b>New</b> FC-7703 6503/5503	45 mm	51.5	43.6	35.7	35.7	63.5	60.5	
TIAGRA	FC-4400 (53T x 42T)	43.5 mm	45.4	37.9	—	36.5	58.5	61.0	
	FC-4403 (52Tx42Tx30T)	45 mm	51.5	43.6	35.7	35.7	63.5	61.0	
SORA	FC-3300 (53T x 42T)	43.5 mm	45.5	38.0	—		58.9	61.0	
	FC-3303 (52Tx42Tx30T)	45 mm	52.1	45.6	36.2	36.2	64.7	61.0	

#### Note

If dimensions C1 and C2 (between the chain foil and chain stay) are too narrow, the frame can be scratched if the chain comes off or gets jammed between the inner gear and chain stay.



## F-10 Brake shoe (for road bikes)

### ■ Brake/Shoe line-up

		R55C	R55HC	R55HC for Carbon rim	R55HC for Ceramic rim	M50T	R50T
<b>Dura-ace</b>	<b>BR-7700</b>	Standard	Option	Option	Option	—	—
<b>Ultegra</b>	<b>BR-6500</b>	Standard	Option	Option	Option	—	—
<b>105</b>	<b>BR-5500</b>	Standard	Option	Option	Option	—	—
non-series	<b>BR-600</b>	Standard	Option	Option	Option	—	—
<b>TIAGRA</b>	<b>BR-4400</b>	—	—	—	—	Option	Standard
<b>SORA</b>	<b>BR-3300</b>	—	—	—	—	Option	Standard
non-series	<b>BR-A550-57</b>	—	—	—	—	Option	Standard

### ■ Shoe characteristics

	Cartridge shoe	M-system	Length	Brake shoe characteristics
<b>R55C</b>	○	—	55mm	Performs well in dry conditions and tends to be low noise. Wears in rainy conditions.
<b>R55HC</b>	○	○	55mm	Performs well both in dry and wet conditions. But may give off noise, faster rim wear, and tends to fade.
<b>R55C</b> for Carbon rim	○	—	55mm	For Carbon rim
<b>R55C</b> for Ceramic rim	○	○	55mm	For Ceramic rim only
<b>M50T</b>	—	○	50mm	Performs well in wet conditions. But faster rim wear.
<b>R50T</b>	—	—	50mm	Performs well in dry conditions and tends to be low noise. Wears in rainy conditions.