Alex Meade Bikeworks LLC Disc Brake Mounting Fixtures Instructions and Things to Know

Latest Revision Feb, 2022

The Alex Meade Bikeworks LLC disc brake mounting fixtures are designed to match the mounting specifications given in the 2020-2021 Shimano Product Technical Information document used by frame manufacturers. It is the responsibility of the framebuilder to ensure all selected components will function as needed. New axle standards and dropout configurations are developed regularly and need to be checked by the framebuilder for compatibility. Please read and understand these instructions to avoid expensive mistakes!

These fixtures work with Alex Meade Bikeworks LLC dummy axles, which are made from precision-ground 3⁄4" round material, which measure 0.7490" - 0.7495". Please understand that I don't know the manufacturing tolerances of any other dummy axles. In any case, I cannot guarantee or even suggest other 3⁄4" dummy axles will fit. There are simply too many possible variables, and no supplier of dummy axles publishes their manufacturing tolerances.

I cannot stress highly enough to lightly tack the brake mounts in place and check proper fit with a wheel and brake caliper before completely welding/brazing the brake mounts. Assume nothing and check everything! There are many standards, and many parts that don't adhere to any published standards. The Shimano specifications and drawings used to design this fixturing system are on the following pages, so please refer to these.

In the rear, the base plate is intended to butt against the innermost (toward the center of the bike) face of the dropout. For Q/R style dropouts, there's generally no possibility of confusion, as the axle face is the innermost face. For 12mm E-thru, the Shimano flat mount specifications are based on the innermost face of the dropout being 3.5mm inboard of the axle mating face, so the fixture base plate can butt against the innermost face of the dropout if the recess for the axle is 3.5mm deep. If the dropout recess isn't 3.5mm deep, correct accordingly by moving the base plate inboard on the dummy axle. There are no published Shimano specifications for thru axle rear post mount or IS mount, and there are many dropouts on the market. Assume nothing and check everything!

In the front, there are more variations. For Q/R dropouts, the fixture should butt against the axle mating face of the dropout. The Shimano spec for front flat mount with 12mm E-thru axle also requires the fixture butt against the axle mating face. There's no Shimano spec for front flat mount 15mm thru axle. For IS and post front 15mm thru axle, the reference surface is the innermost (closest to the center of the bike) surface of the dropout, not the axle mating face, so the fixture base plate should butt against the innermost surface. All of the above scenarios require no spacer bars. The spacer bars are used in cases where either the dropouts don't conform to the Shimano specs, or the fixture base plate cannot butt against the correct surface of the dropout. Measure the gap between the base plate and the correct surface and use the spacer bars or other spacers to create a gap between the base plate and the adapter equal to the measured gap.

Again, I cannot stress highly enough not to trust that all components are compatible and not to trust this fixture will correctly account for every possible dropout and axle configuration. Measure everything and compare to the Shimano specs below to calculate correct location, then tack lightly, install a wheel and brake caliper and check for proper function, then finish welding or brazing. Failure to do this can result in expensive mistakes and unhappy customers.

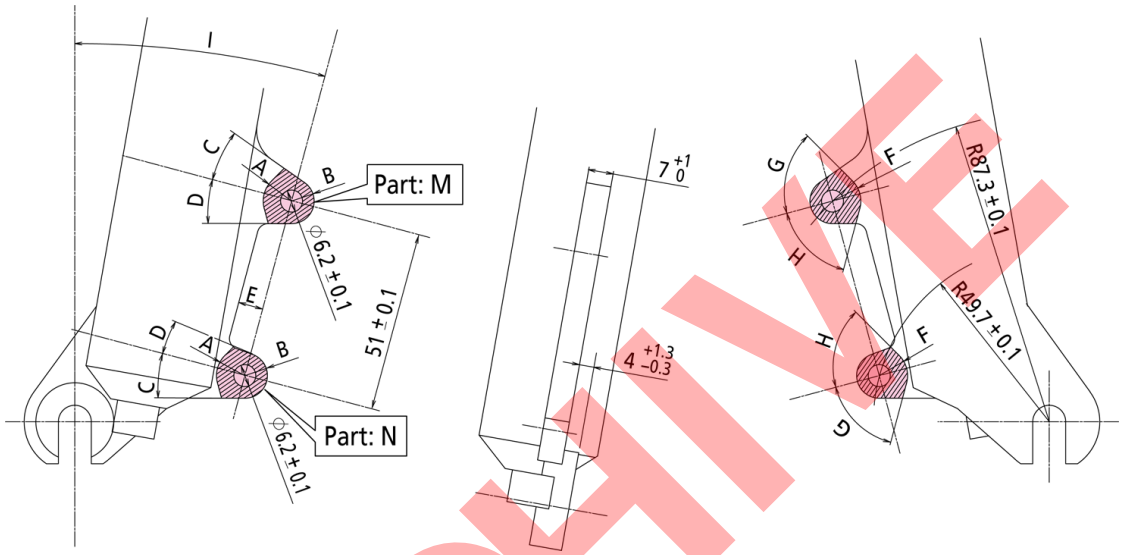
02/21/2022

Front disc brake mount dimensions C-068

SHIMANO disc brakes are designed to fit the frame and front fork as shown below. (the dimensions shown below are same as the international standard disc brake mount.) The following mount dimensions (A - H) are recommended for each model.

QR type C-069

For international standard mount

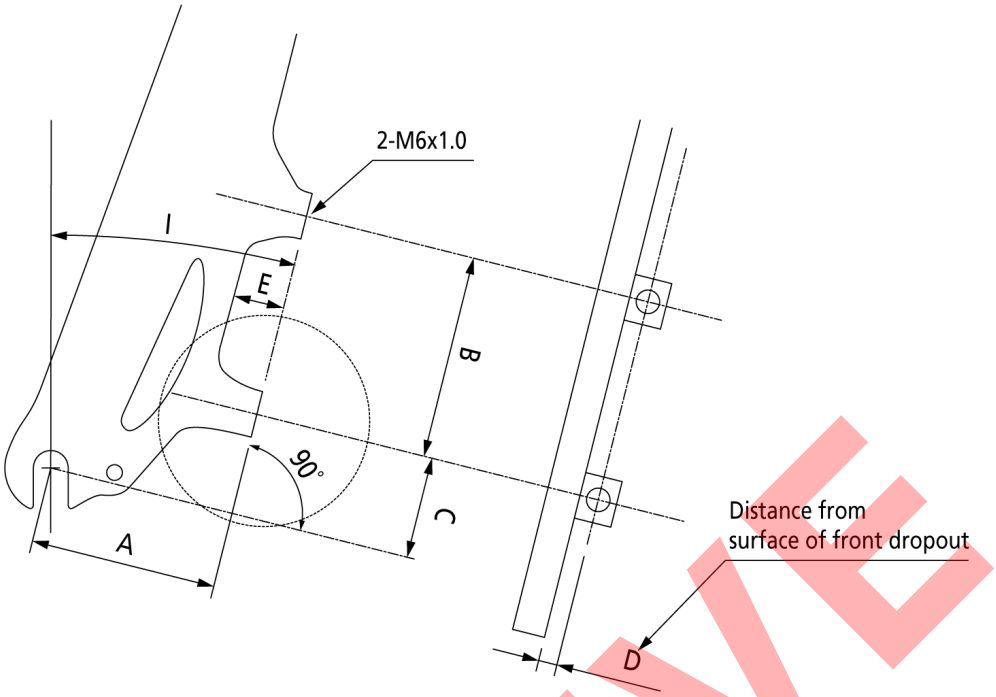


NOTE

- Part M and N need to be flat surface.
- Please refer to C-077 for angle I.

Anti loosen method	Model No.	Dimension							
		Min. A (mm)	Max. B (mm)	Max. C	Max. D	Min. E (mm)	Min. F (mm)	Min. G	Min. H
Wiring type	BR-M9100	8.0	Part M: 6.5 Part N: 8.0	45°	45°	0	6.0	90°	95°
	BR-M9120					2.0			
Cap type	BR-M8100	8.0	Part M: 6.5 Part N: 8.0	45°	45°	0	6.0	90°	95°
	BR-M8120					2.0			
	BR-M8000					0			
	BR-M8020					2.0			
	BR-M7100					0			
	BR-M7120					2.0			
	BR-M6100					0			
	BR-M6120					2.0			
	BR-M6000					0			
	BR-M820					2.0			
	BR-M375					1.5			
	BR-MT500					1.0			
	BR-MT520					2.0			
	BR-MT400					1.0			
	BR-MT410					1.0			
	BR-MT420					2.0			
	BR-MT200					1.0			
	BR-TX805					1.5			
	BR-RS785					0			
	BR-R317					1.5			
	BR-S7000					0			

For post mount



Anti loosen method	Model No.	Dimension				
		A (mm)	B (mm)	C (mm)	D (mm)	Min. E (mm)
Wiring type	BR-M9100*	140 mm (SS): 47.5 ± 0.1 160 mm (S): 55.9 ± 0.1 180 mm (M): 64.0 ± 0.1	140 mm (SS): 74.2 ± 0.1 160 mm (S): 74.2 ± 0.1 180 mm (M): 74.2 ± 0.1	140 mm (SS): 1.7 ± 0.1 160 mm (S): 6.8 ± 0.1 180 mm (M): 12.4 ± 0.1	140 mm (SS): 0.94+0.3 - 1.3 160 mm (S): 0.94+0.3 - 1.3 180 mm (M): 0.94+0.3 - 1.3	10.5
	BR-M9120	140 mm (SS): 47.5 ± 0.1 160 mm (S): 55.9 ± 0.1 180 mm (M): 64.0 ± 0.1 203 mm (L): 73.9 ± 0.1	140 mm (SS): 74.2 ± 0.1 160 mm (S): 74.2 ± 0.1 180 mm (M): 74.2 ± 0.1 203 mm (L): 74.2 ± 0.1	140 mm (SS): 1.7 ± 0.1 160 mm (S): 6.8 ± 0.1 180 mm (M): 12.4 ± 0.1 203 mm (L): 18.8 ± 0.1	140 mm (SS): 0.94+0.3 - 1.3 160 mm (S): 0.94+0.3 - 1.3 180 mm (M): 0.94+0.3 - 1.3 203 mm (L): 0.94+0.3 - 1.3	11.5
Cap type	BR-M8100					10.5
	BR-M8120					11.5
	BR-M8000					10.0
	BR-M8020					11.5
	BR-M7100					10.5
	BR-M7120					11.5
	BR-M6100					10.0
	BR-M6120					11.5
	BR-M6000					10.0
	BR-M820					11.5
	BR-MT520					11.5
	BR-MT410					11.5
	BR-MT420					11.5
	BR-RS785					10.0
	BR-S7000					10.0
	BR-M375*	140 mm (SS): 47.5 ± 0.1 160 mm (S): 55.9 ± 0.1 180 mm (M): 64.0 ± 0.1	140 mm (SS): 74.2 ± 0.1 160 mm (S): 74.2 ± 0.1 180 mm (M): 74.2 ± 0.1	140 mm (SS): 1.7 ± 0.1 160 mm (S): 6.8 ± 0.1 180 mm (M): 12.4 ± 0.1	140 mm (SS): 0.94+0.3 - 1.3 160 mm (S): 0.94+0.3 - 1.3 180 mm (M): 0.94+0.3 - 1.3	11.0
	BR-MT500*					11.5
	BR-MT400*					11.5
	BR-MT200*					11.5
	BR-TX805*					11.0
	BR-R317**	140 mm (SS): 47.5 ± 0.1 160 mm (S): 55.9 ± 0.1	140 mm (SS): 74.2 ± 0.1 160 mm (S): 74.2 ± 0.1	140 mm (SS): 1.7 ± 0.1 160 mm (S): 6.8 ± 0.1	140 mm (SS): 0.94+0.3 - 1.3 160 mm (S): 0.94+0.3 - 1.3	11.0

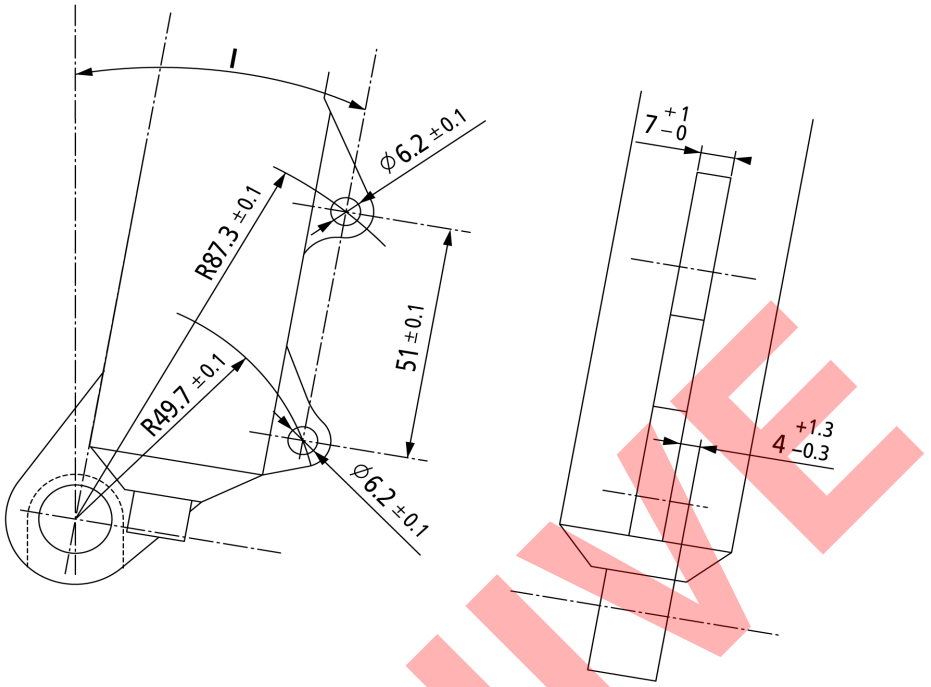
* Not compatible with L (203 mm) size disc brake rotors.

** Not compatible with L (203 mm) size and M (180 mm) size disc brake rotors.

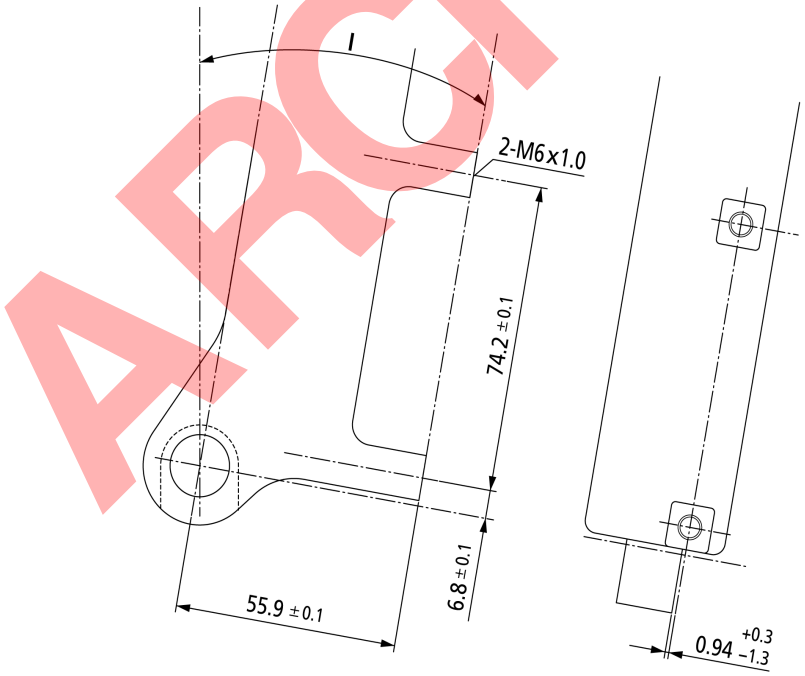
15 mm E-THRU type C-070

O.L.D.100mm, 110mm

For international standard mount



For post mount

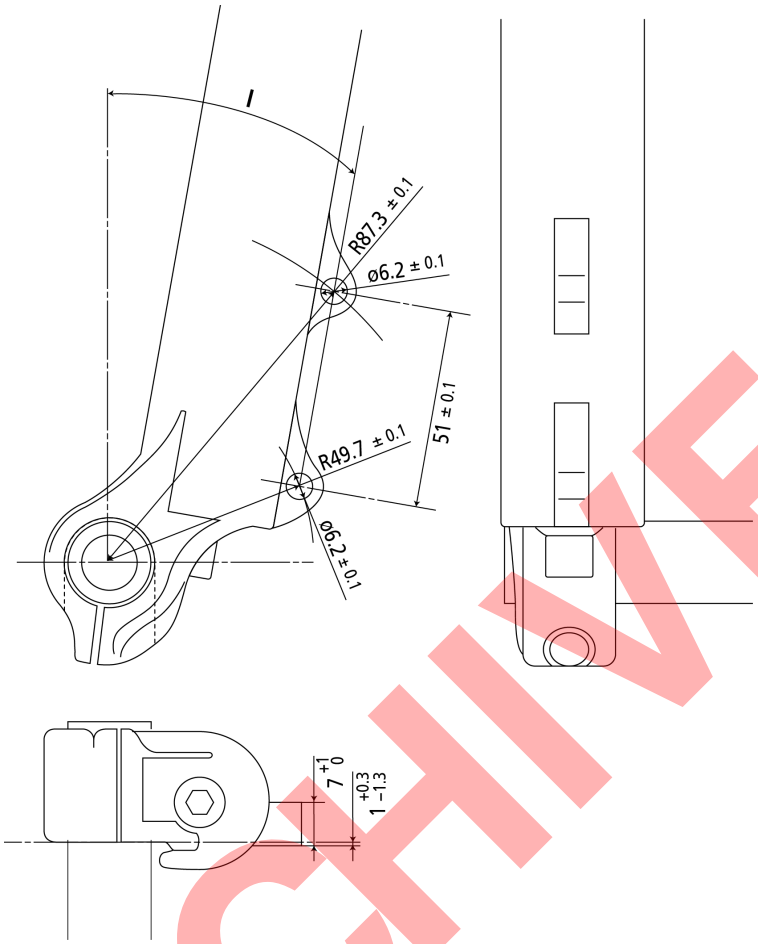


NOTE

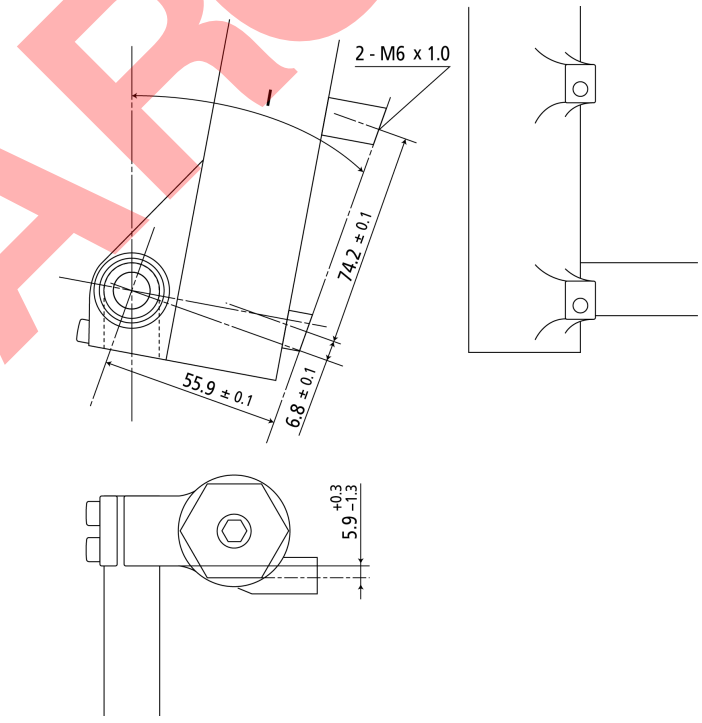
Please refer to C-077 for angle I.

20 mm thru axle type C-071

For international standard mount

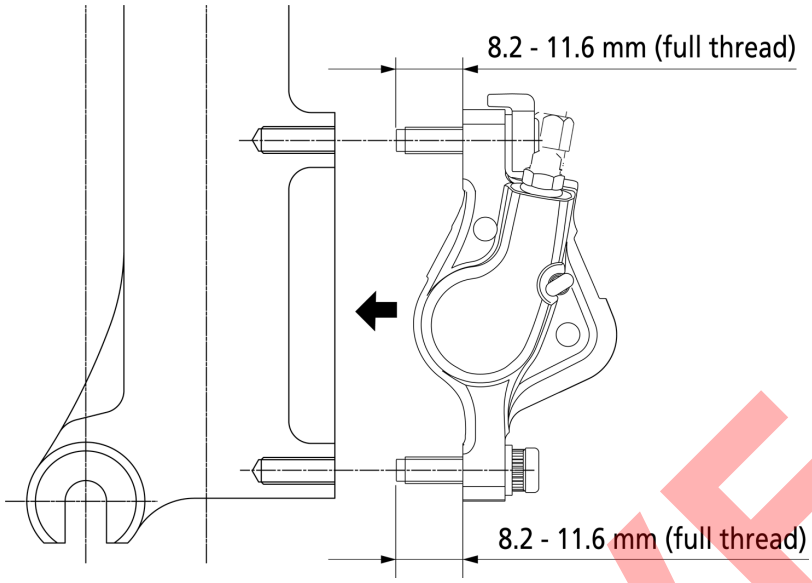


For post mount



Fixing bolt length for post mount

C-072

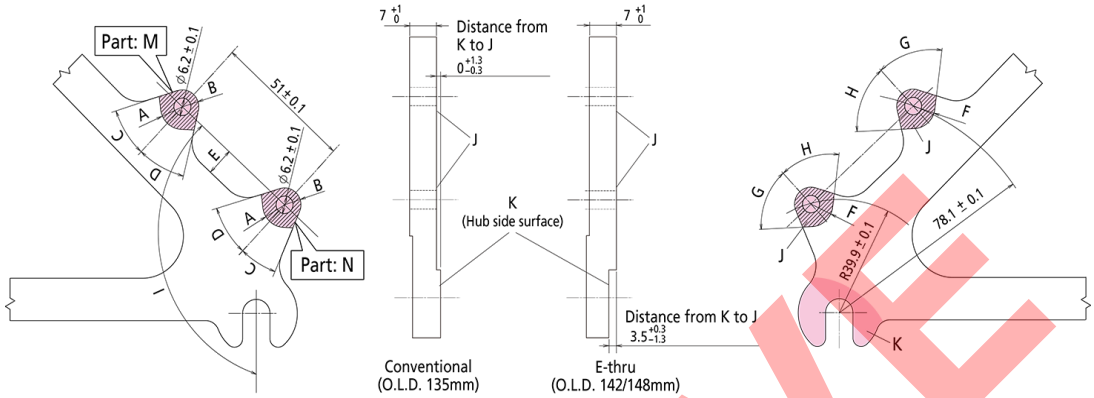


Rear disc brake mount dimensions C-073

SHIMANO disc brakes are designed to fit the frame as shown below. (the dimensions shown below are same as the international standard disc brake mount.) The following mount dimensions (A - I) are recommended for each model.

For international standard mount C-074

Seat stay type



NOTE

- Part M and N need to be flat surface.
- Please refer to C-077 for angle I.

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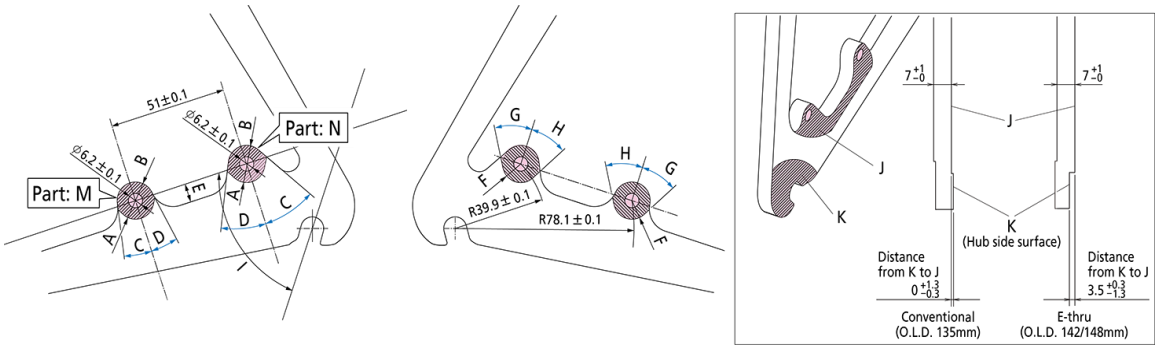
Anti loosen method	Model No.	Dimension							
		Min. A (mm)	Max. B (mm)	Max. C	Max. D	Min. E (mm)	Min. F (mm)	Min. G	Min. H
Wiring type	BR-M9100	8.0	Part M: 6.5 Part N: 8.0	45°	45°	-5.0	6.0	90°	95°
	BR-M9120					-3.0			
Cap type	BR-M8100	8.0	Part M: 6.5 Part N: 8.0	45°	45°	-5.5	6.0	90°	95°
	BR-M8120					-3.0			
	BR-M8000					-5.0			
	BR-M8020					-3.0			
	BR-M7100					-5.5			
	BR-M7120					-3.0			
	BR-M6100					-6.5			
	BR-M6120					-3.0			
	BR-M6000					-6.5			
	BR-M820					-3.0			
	BR-M375					-3.5			
	BR-MT500					-4.0			
	BR-MT520					-3.0			
	BR-MT400					-4.0			
	BR-MT410					-4.0			
	BR-MT420					-3.0			
	BR-MT200					-4.0			
	BR-TX805					-3.5			
	BR-RS785					-5.0			
	BR-R317					-3.5			
	BR-S7000					-6.5			

Chainstay type



NOTE

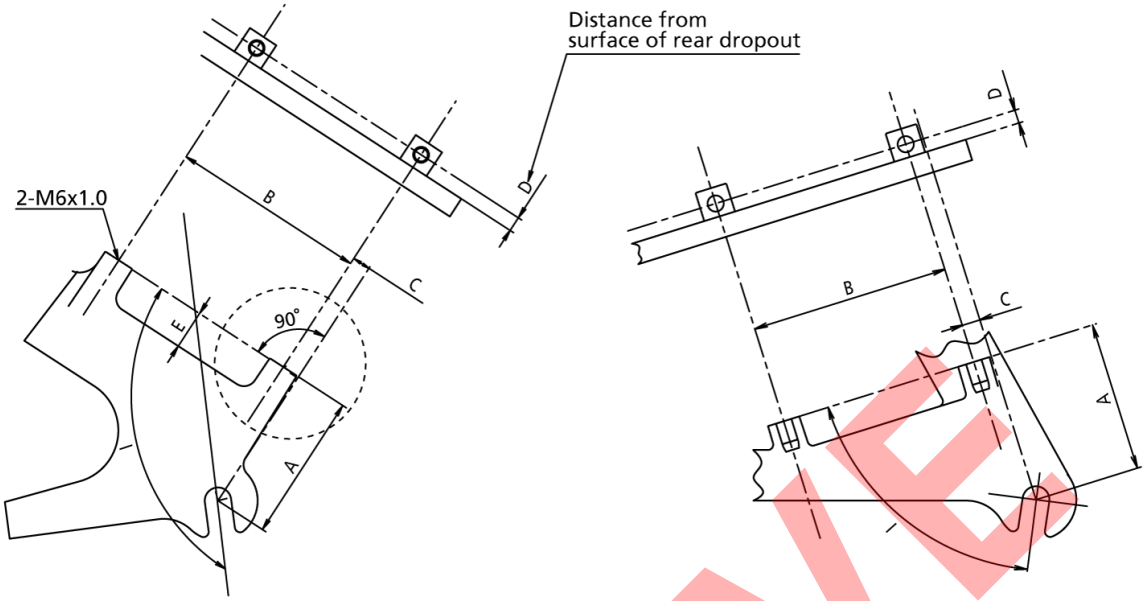
- Part M and N need to be flat surface.
- Please refer to C-077 for angle I.

1

Anti loosen method	Model No.	Dimension							
		Min. A (mm)	Max. B (mm)	Max. C	Max. D	Min. E (mm)	Min. F (mm)	Min. G	Min. H
Wiring type	BR-M9100	8.0	Part M: 6.5 Part N: 8.0	45°	45°	-1.0	6.0	90°	95°
	BR-M9120					-3.0			
Cap type	BR-M8100	8.0	Part M: 6.5 Part N: 8.0	45°	45°	-5.5	6.0	90°	95°
	BR-M8120					-3.0			
	BR-M8000					-5.0			
	BR-M8020					-3.0			
	BR-M7100					-5.5			
	BR-M7120					-3.0			
	BR-M6100					-6.5			
	BR-M6120					-3.0			
	BR-M6000					-6.5			
	BR-M820					-3.0			
	BR-M375					-3.5			
	BR-MT500					-4.0			
	BR-MT520					-3.0			
	BR-MT400					-4.0			
	BR-MT410					-4.0			
	BR-MT420					-3.0			
	BR-MT200					-4.0			
	BR-TX805					-3.5			
	BR-RS785					-5.0			
	BR-R317					-3.5			
	BR-S7000					-6.5			

For post mount C-075

Seat stay type without adapter



NOTE

Please refer to C-077 for angle I.

Dimensions of rear post mount of disc brake caliper

⚠1

Anti loosen method	Model No.	Dimension						
		A (mm)	B (mm)	C (mm)	D (mm) O.L.D. 135, 150 mm straight and BMX type	D (mm) O.L.D. 142 mm E-THRU type	D (mm) O.L.D. 148 mm E-THRU type	Min. E (mm)
Wiring type	BR-M9100*	140 mm (SS): 47.5 ± 0.1 160 mm (S): 55.9 ± 0.1 180 mm (M): 64.0 ± 0.1	140 mm (SS): 74.2 ± 0.1 160 mm (S): 74.2 ± 0.1 180 mm (M): 74.2 ± 0.1	140 mm (SS): 1.7 ± 0.1 160 mm (S): 6.8 ± 0.1 180 mm (M): 12.4 ± 0.1	140 mm (SS): 5.7 +0.3 - 1.3 160 mm (S): 5.7 +0.3 - 1.3 180 mm (M): 5.7 +0.3 - 1.3	140 mm (SS): 9.2 +0.3 - 1.3 160 mm (S): 9.2 +0.3 - 1.3 180 mm (M): 9.2 +0.3 - 1.3	140 mm (SS): 9.2 +0.3 - 1.3 160 mm (S): 9.2 +0.3 - 1.3 180 mm (M): 9.2 +0.3 - 1.3	10.5
	BR-M9120							11.5
Cap type	BR-M8100							10.0
	BR-M8120							11.5
	BR-M8000							10.0
	BR-M8020							11.5
	BR-M7100							10.0
	BR-M7120							11.5
	BR-M6100	140 mm (SS): 47.5 ± 0.1 160 mm (S): 55.9 ± 0.1 180 mm (M): 64.0 ± 0.1 203 mm (L): 73.9 ± 0.1	140 mm (SS): 74.2 ± 0.1 160 mm (S): 74.2 ± 0.1 180 mm (M): 74.2 ± 0.1 203 mm (L): 74.2 ± 0.1	140 mm (SS): 1.7 ± 0.1 160 mm (S): 6.8 ± 0.1 180 mm (M): 12.4 ± 0.1 203 mm (L): 18.8 ± 0.1	140 mm (SS): 5.7 +0.3 - 1.3 160 mm (S): 5.7 +0.3 - 1.3 180 mm (M): 5.7 +0.3 - 1.3 203 mm (L): 5.7 +0.3 - 1.3	140 mm (SS): 9.2 +0.3 - 1.3 160 mm (S): 9.2 +0.3 - 1.3 180 mm (M): 9.2 +0.3 - 1.3 203 mm (L): 9.2 +0.3 - 1.3	140 mm (SS): 9.2 +0.3 - 1.3 160 mm (S): 9.2 +0.3 - 1.3 180 mm (M): 9.2 +0.3 - 1.3 203 mm (L): 9.2 +0.3 - 1.3	9.0
	BR-M6120							11.5
	BR-M6000							9.0
	BR-M820							11.5
	BR-M375							11.0
	BR-MT500							11.5
	BR-MT520							11.5
	BR-MT400							11.5
	BR-MT410							11.5
	BR-MT420							11.5
	BR-MT200							11.0
	BR-TX805							11.0
	BR-RS785							10.0
	BR-R317							11.0
	BR-S7000							9

* Not compatible with L (203 mm) size disc brake rotors.

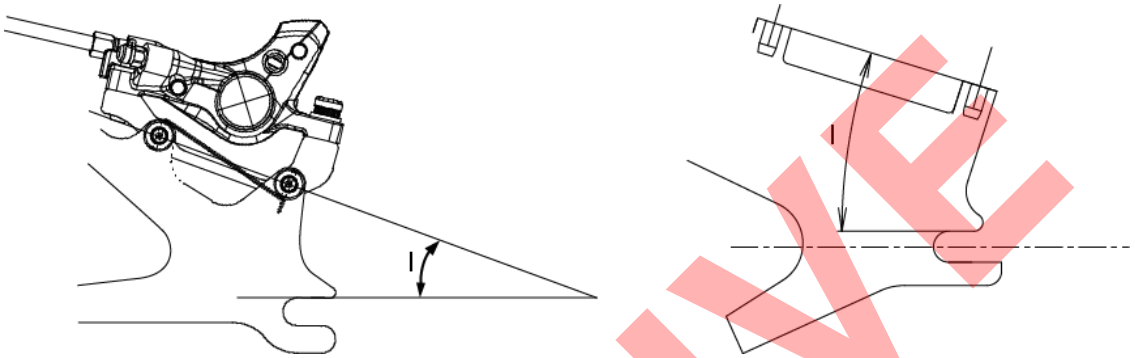
Angle of front/rear dropout (angle I)

Please refer to C-068, C-069, C-070, C-071, C-072, C-073, C-074, C-075 for definition of angle I.

	Mount Type	Disc Brake Rotor Size	Min. Angle I		Max. Angle I	
			International standard mount	Post mount	International standard mount	Post mount
Front	-	140 - 203 mm	-	-	24° *	17°
Rear	Seat stay type		-	-	201°	197°
	Chainstay type		56°	49°	- **	- **
	BMX rear dropout ***	160 - 203 mm	-	-	24°	17°
		140 mm	-	-	21°	

* Not compatible with 140 mm disc brake roter
** For chainstay type, the max. side does not need to be considered.
*** Angle of BMX rear dropout

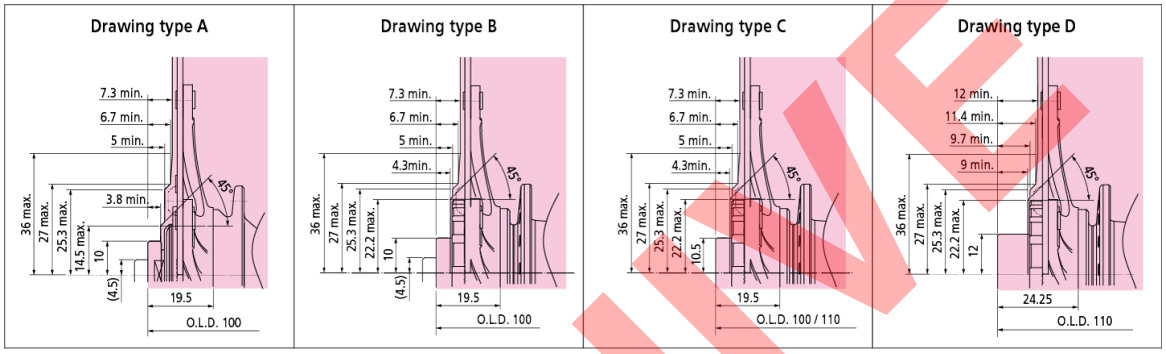
BMX rear dropout



Dimensions of disc brake rotor and hub

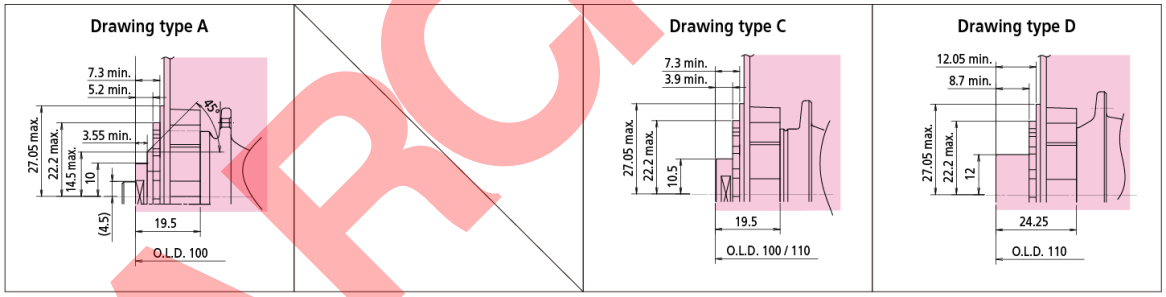
The dimensions of SHIMANO disc brake rotor and hub are shown below.
There are 4 types of dimensions depending on disc brake rotor and hub spec combination.
Please verify that fork dimensions will not cause interference with disc brake rotor and hub.

Fork Type			QR		12 mm E-THRU		15 mm E-THRU (O.L.D.: 100 mm)	15 mm E-THRU (O.L.D.: 110 mm)	20 mm E-THRU (O.L.D.: 110 mm)
Hub spec.	Axle diameter		QR (9)	QR (9)	12		15	15	20
	Thru axle		-	-	✓		✓	✓	✓
	O.L.D.		100	100	100		100	110	110
Rotor spec. (fixation)	6-bolt		✓	-	-		✓	✓	✓
	CENTER LOCK	Internal serration	✓	-	✓	-	-	-	-
		Internal & External serration (SM-RT30/SM-RT10 type)	-	✓	-	✓	✓	✓	✓
		External serration	-	✓	-	✓	✓	✓	✓
Drawing type			A	B	A	C	C	C	D



: Disc brake rotor / hub product area from hub fixing position

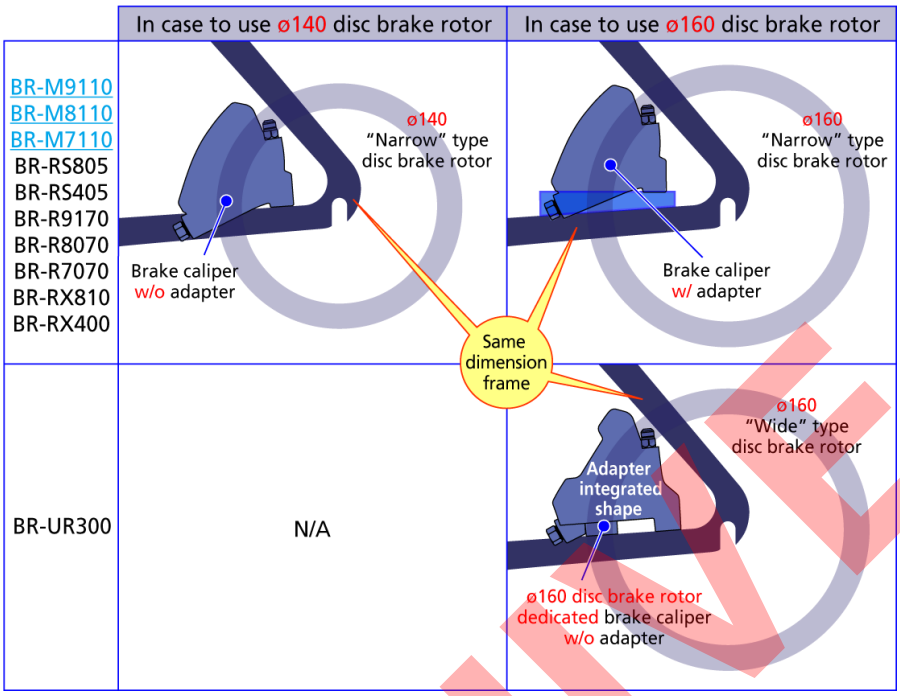
SM-RTAD05



: Disc brake rotor / hub product area from hub fixing position

Frame adaption of rear brake caliper

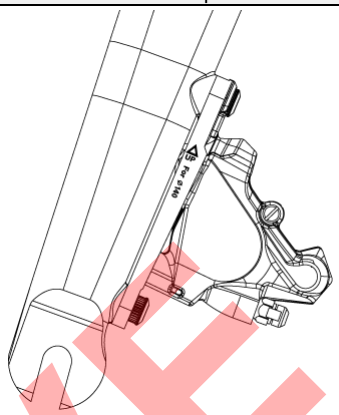
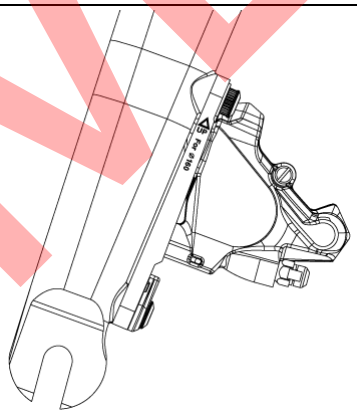
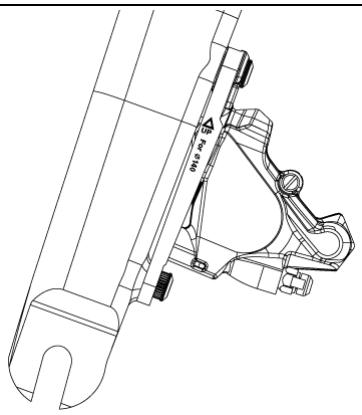
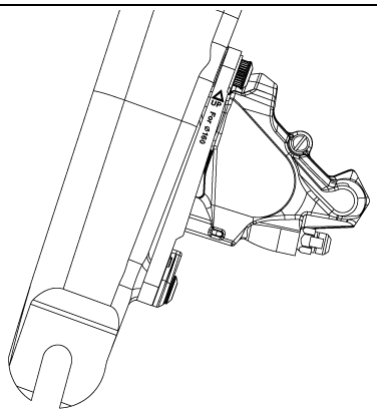
All combinations of disc brake rotors and brake calipers compatible with one frame (rear triangle) dimension.



Flat mount

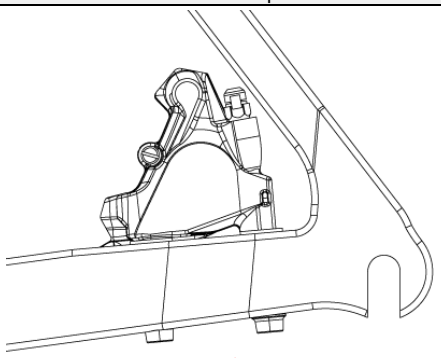
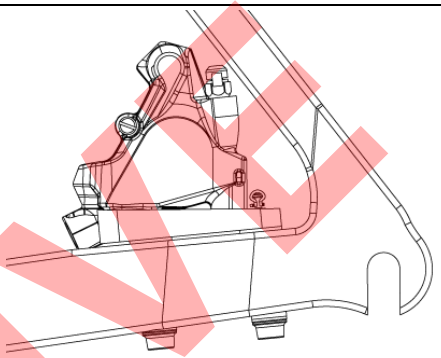
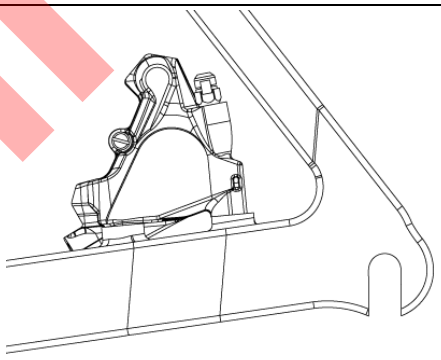
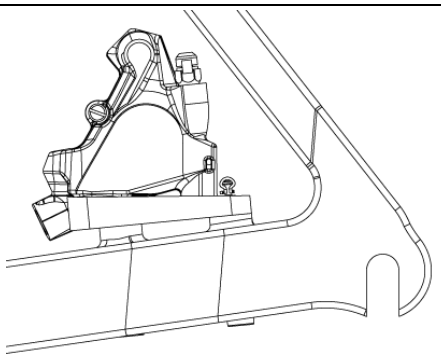
Flat mount installation type C-607

Front

Dimension type	Disc brake rotor size	Installation of flat mount disc brake caliper	
F140/160	140 mm *	w/ mount bracket (For ø140 mm)	
	160 mm	w/ mount bracket *** (For ø160 mm)	
F160/180	160 mm *	w/ mount bracket (For ø140 mm)	
	180 mm	w/ mount bracket *** (For ø160 mm)	

* Not adapted with BR-UR300
*** No need bracket or adapter for BR-UR300

Rear

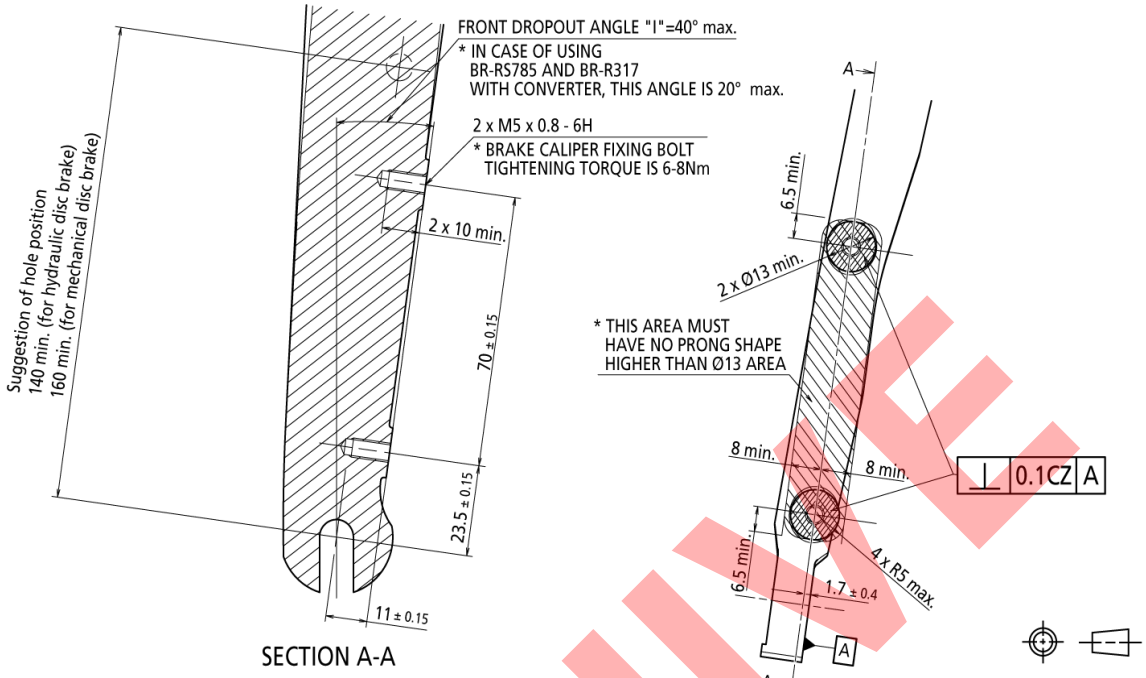
Dimension type	Disc brake rotor size	Installation of flat mount disc brake caliper	
R140/160	140 mm *	Direct mount	
	160 mm	w/ adapter *** (ISMMAR160DDA)	
R160/180	160 mm *	Direct mount	
	180 mm **	w/ adapter *** (ISMMAR160DDA)	

* Not adapted with BR-UR300
** Not adapted with BR-R9170
*** No need bracket or adapter for BR-UR300

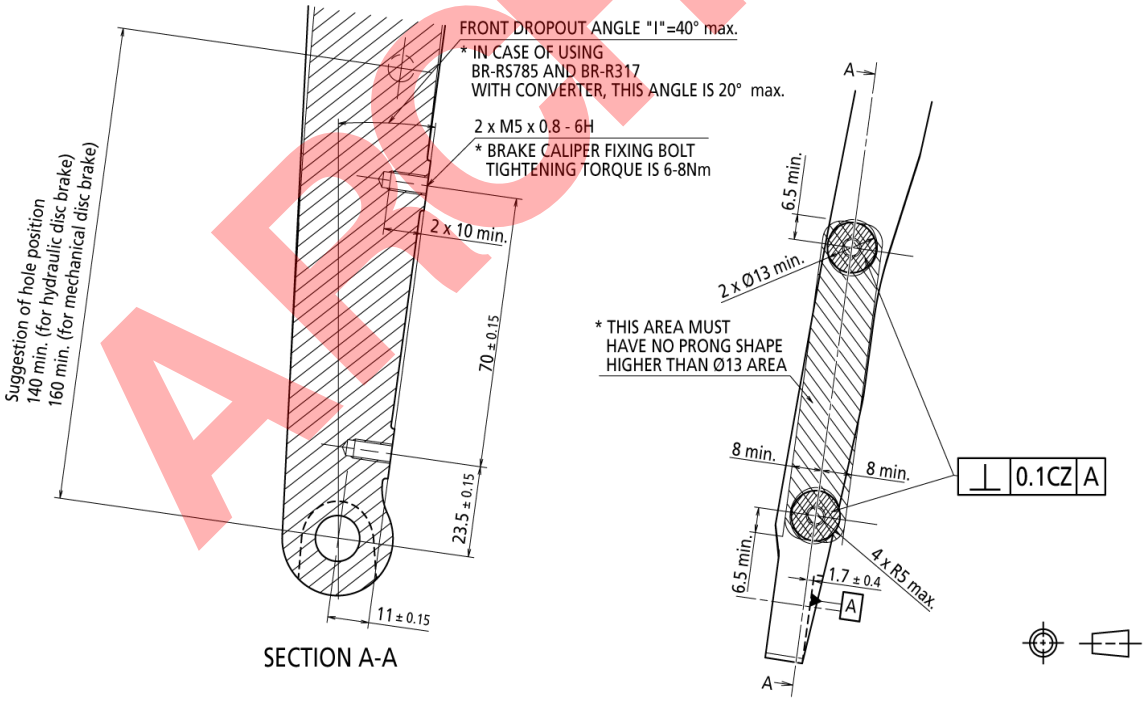
Front mount dimensions for F140/160 (for ø140/160 mm disc brake rotor)

C-079

QR type



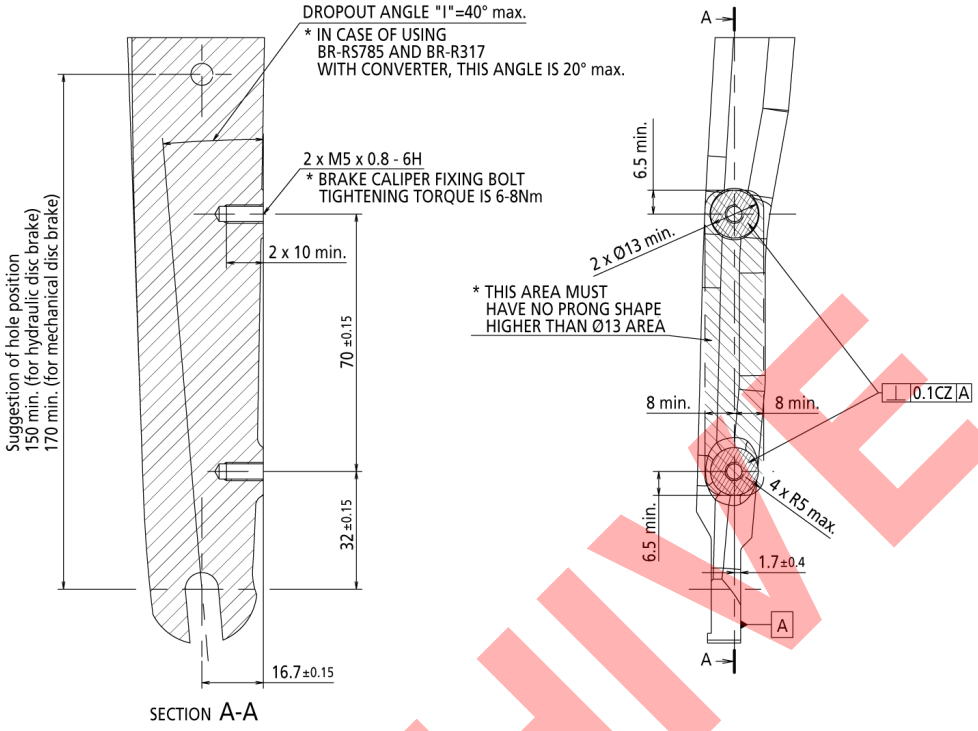
12 mm E-THRU type



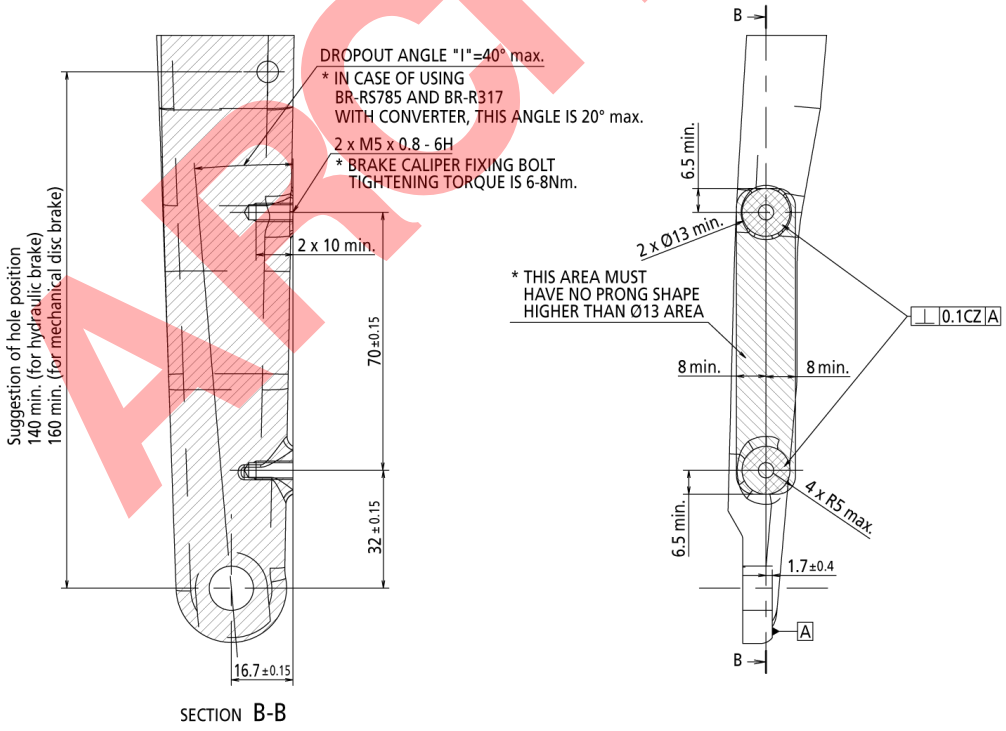
Front mount dimensions for F160/180 (for ø160/180 mm disc brake rotor)

C-598

QR type



12 mm E-THRU type



Compatibility of disc brake caliper and disc brake rotor

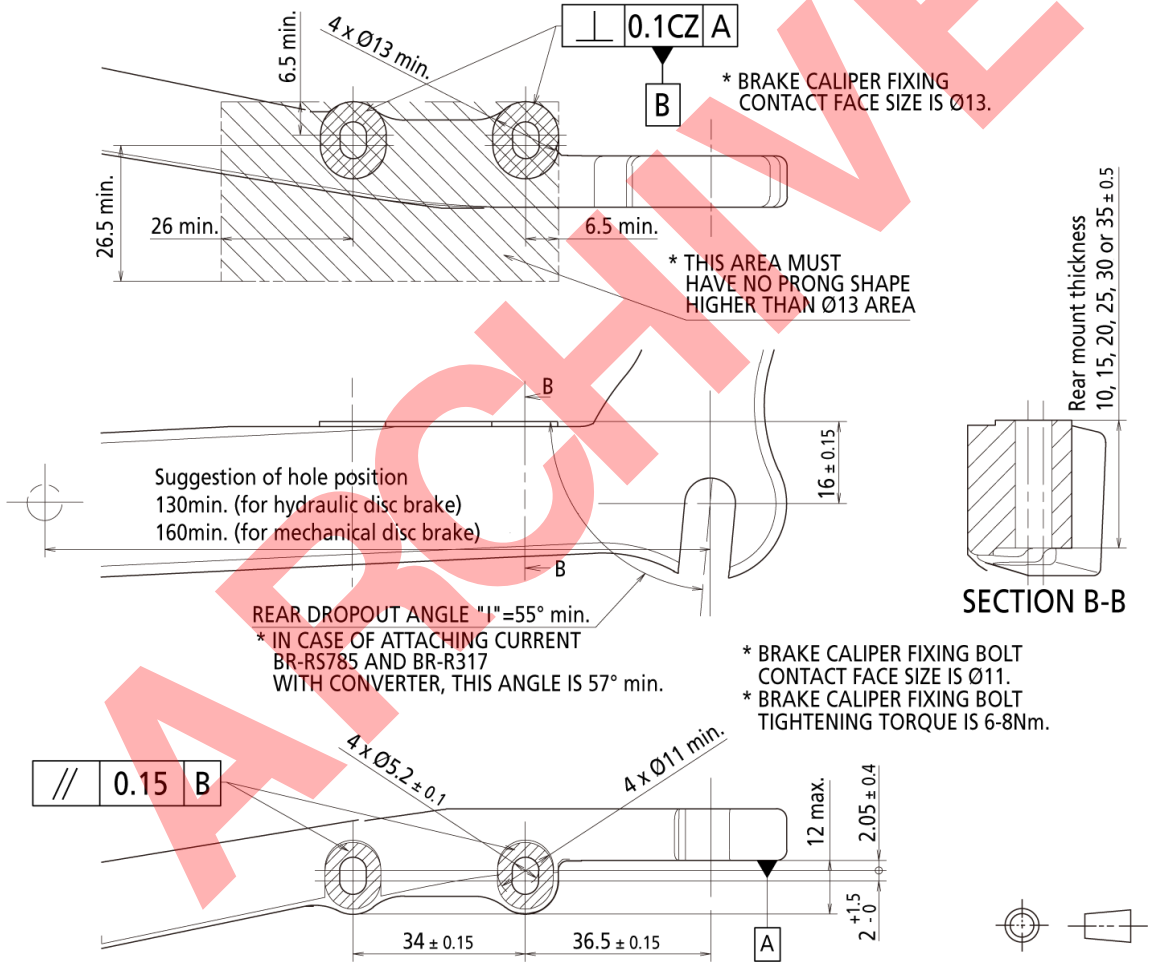
Frame for F160/180	Disc brake rotor	
	ø180 mm front	ø160 mm front
BR-R9170	-	✓
BR-R8070	✓	✓
BR-R7070	✓	✓
BR-4770	✓	✓
BR-RS405	✓	✓
BR-RS305	✓	✓
BR-RX810	✓	✓
BR-RX400	✓	✓
BR-UR300 *	✓	-

* No need mount bracket

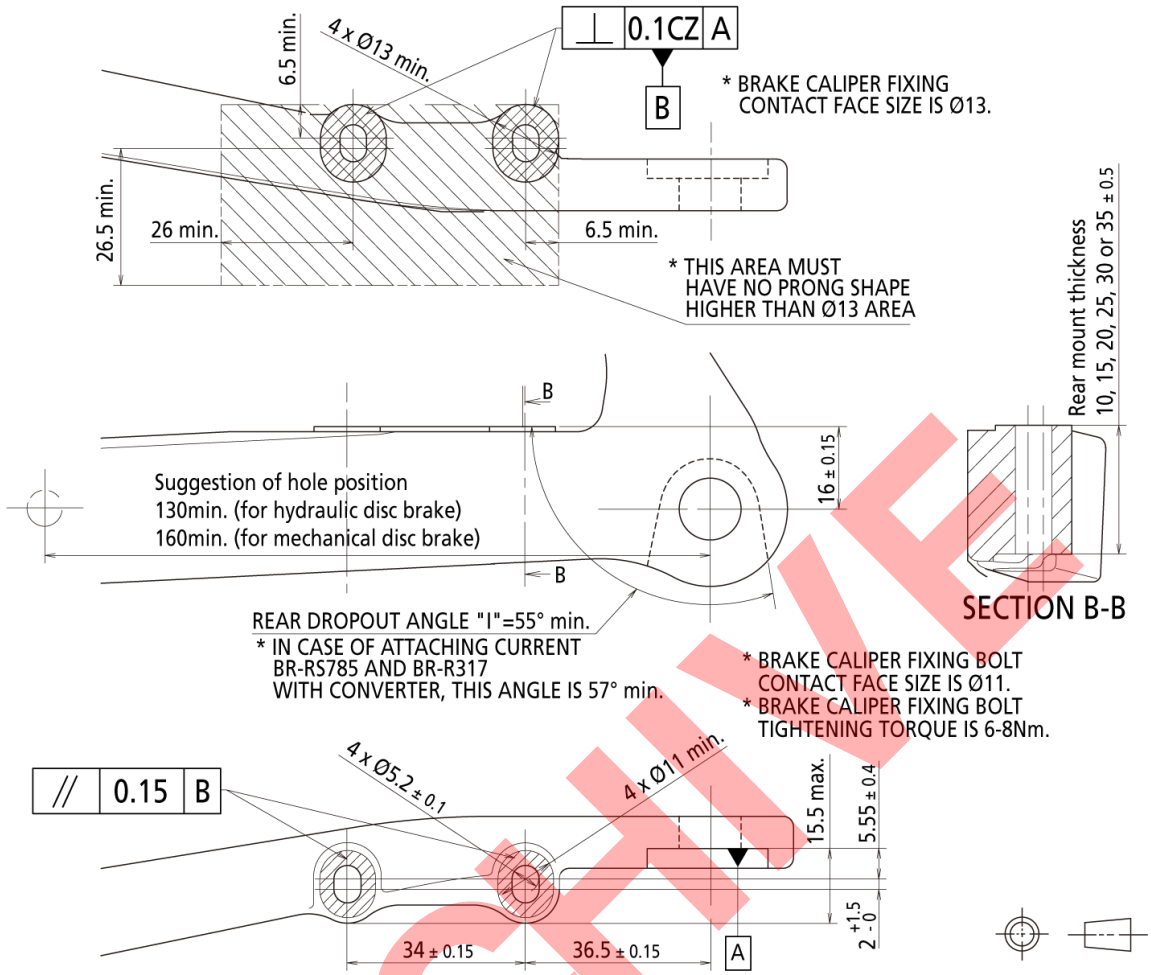
Rear mount dimensions for R140/160 (for ø140/160 mm disc brake rotor)

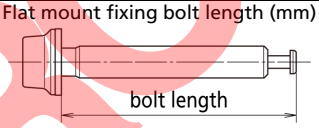
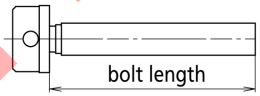
C-080

QR type



12 mm E-THRU type



Rear mount thickness (mm)		10	15	20	25	30	35
Fixing bolt length	Flat mount fixing bolt length (mm) 	23.2	28.2	33.2	38.2	43.2	48.2
	Converter fixing bolt length (mm) 	16.8	28.2	26.8	31.8	36.8	41.8

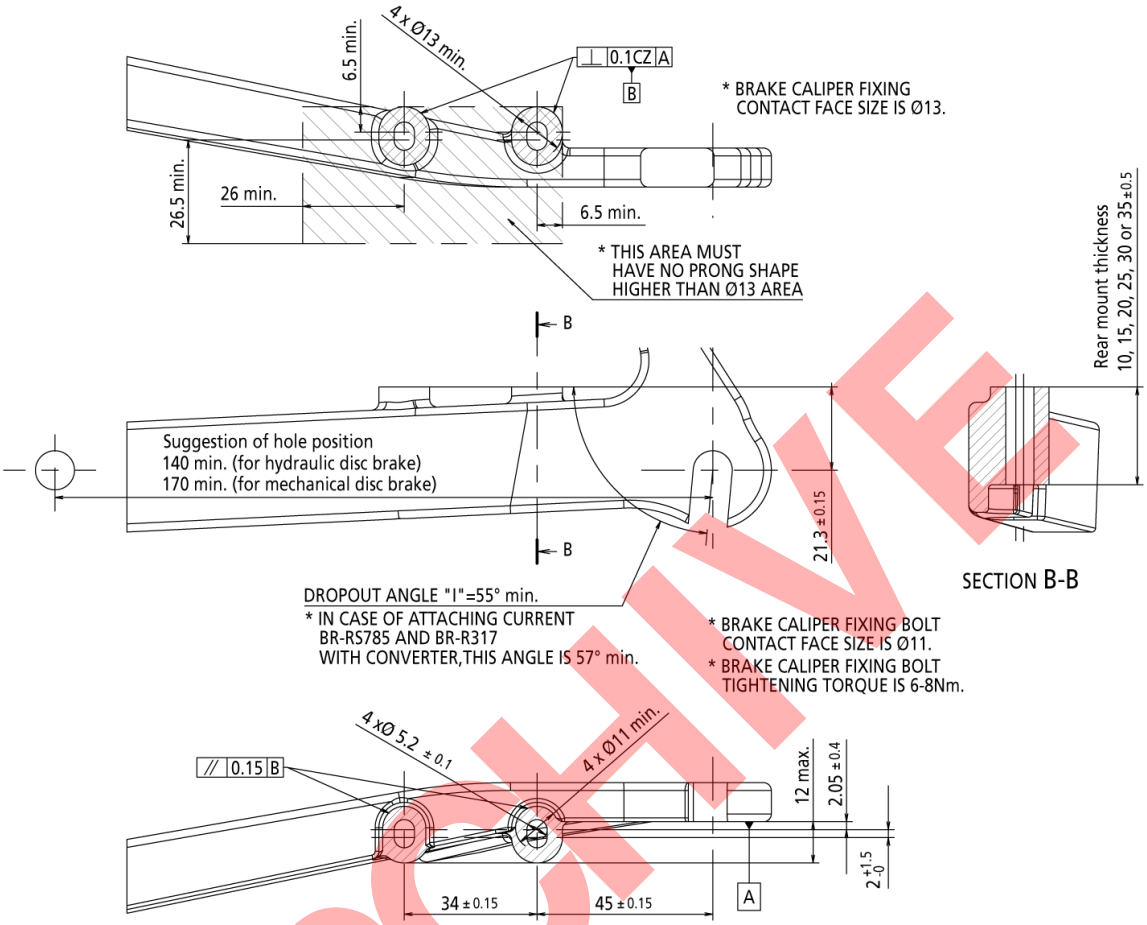
NOTE

Please check in advance with the bicycle manufacturer or supplier in regards to the influence of heat generated by the disc brake on performance and quality, such as the strength of the frame, under actual usage conditions.
The heat generated when braking differs depending on the brake, brake boss, and other factors; however, in tests carried out under conditions set by SHIMANO, it has been confirmed that the temperature of the frame mount reaches up to 120°C.

Rear mount dimensions for R160/180 (for ø160/180 mm disc brake rotor)

C-599

QR type



12 mm E-THRU type