

# TECHNICAL PRESENTATION FOR



10-11-2017



**SHIMANO**

# **SHIMANO STEPS E6000 AND E8000**



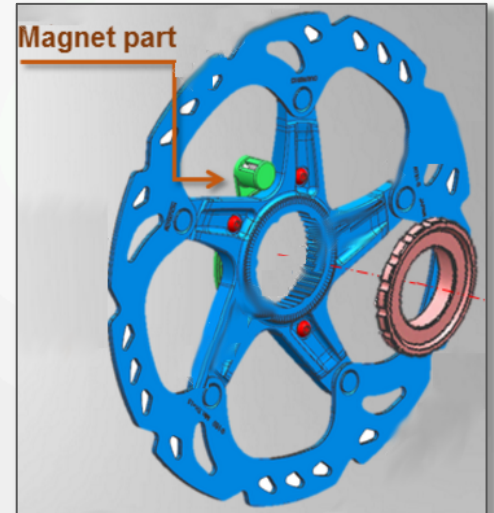
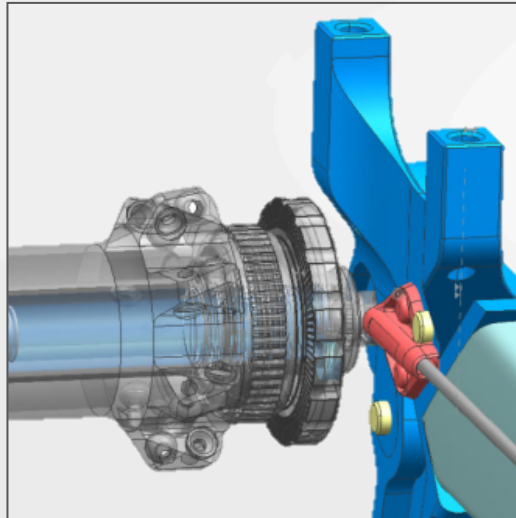
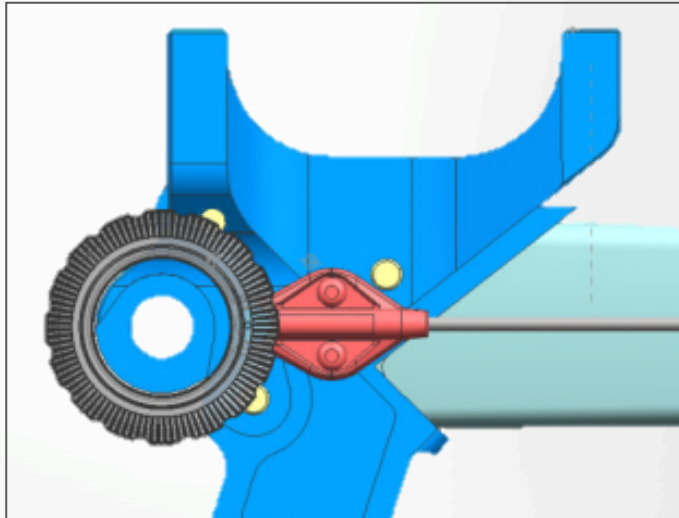


# SPEED SENSOR SM-DUE11

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- ▶ New designed rear dropout needed  
Upgrade at older bikes not possible
- ▶ Compatible with E6000 and E8000



# 20 MPH FIRMWARE VERSION

For north american market

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- ▶ OEM has possibility to choose 25 km/h or 20 mph
- ▶ This will be available with E-tube 3.3
- ▶ For DU-E8000
- ▶ For DU-E6002 / E6012





# NEW LIGHT ON/OFF OPERATION

Firmware update

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- ▶ More simple “LIGHT ON/OFF” Operation
- ▶ This will be available with E-tube 3.3
- ▶ For DU-E8000
- ▶ For DU-E6002 / E6012

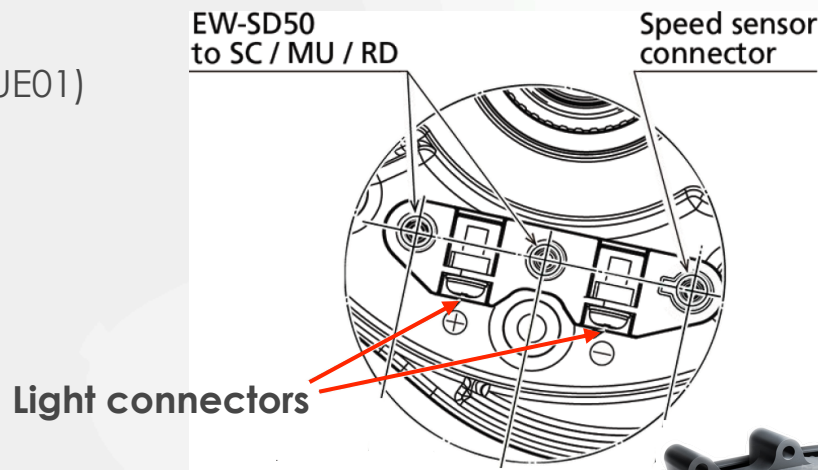
	Current operation	New operation
Light ON/OFF status, when bike is switched on	Always off	Keep latest status

# DRIVE UNIT DU-E6002, DU-E6012

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- ▶ Direct assembly of light cable (without SM-DUE01)
  - Power supply of light: max 2000 mA
- ▶ Reduction of firmware update time.
- ▶ Light OFFROAD setting also available for IHG
- ▶ Possibility for DI2 RD.
- ▶ OEM can choose between 25km/h setting and 20 mph by E-tube project



Note: speed sensor SM-DUE10 is not included in OEM packaging



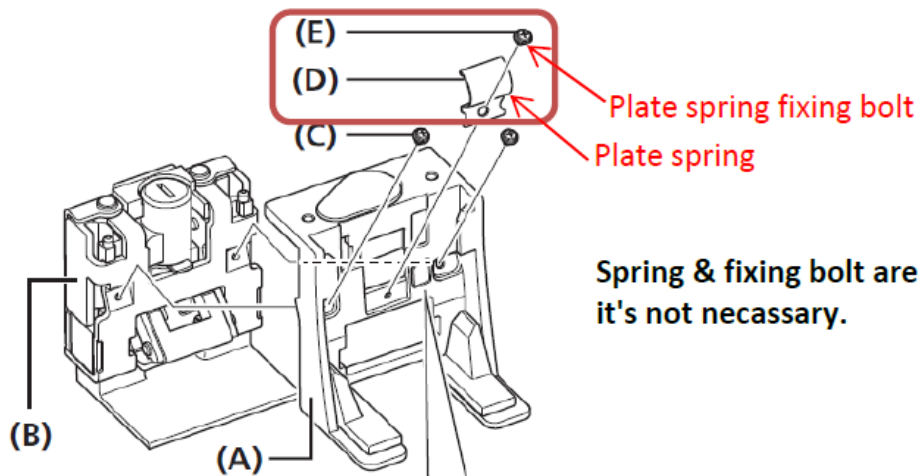
- ▶ Phenomenon:
  - SOC on SC-6010 declines linear from 100% to around 30% .
  - Then it can jump suddenly to 10% (example)
- ▶ Solution: Firmware update in July 2017
- ▶ Improves also SC-E8000

## FW 3.3.3 FOR E6000 SERIES

- ▶ This is the latest firmware for E6000 series
- ▶ Added compatibility with 500 Wh battery
- ▶ SOC on the battery indicator is shown, even when the bike is switched on
- ▶ Improved process for switching on;
  - Sometimes it happened, that it is not possible to switch on the bike.
  - Then it was necessary, to remove the battery and install it again.
  - This bug is improved.



- Plate spring has been removed



**Spring & fixing bolt are not in the product any more because it's not necessary.**

# BATTERY STORAGE CHARACTERISTICS

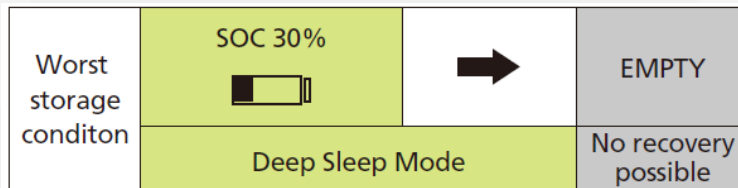
Revised table for 504 WH

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## Deep sleep mode:

■ BT-E6001 / BT-E8010 / BT-E8020 (504Wh)

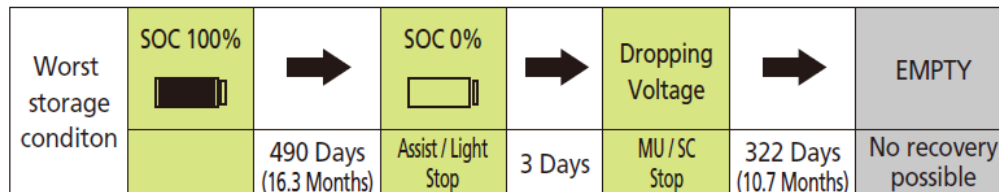


100 Months / 8.3 Years (504Wh)

100% recharging is possible / connect to charger

## Sleep mode:

■ BT-E6001 / BT-E8010 / BT-E8020 (504Wh)



815 Days / 27 Months / 2.2 Years



100% recharging is possible / connect to charger



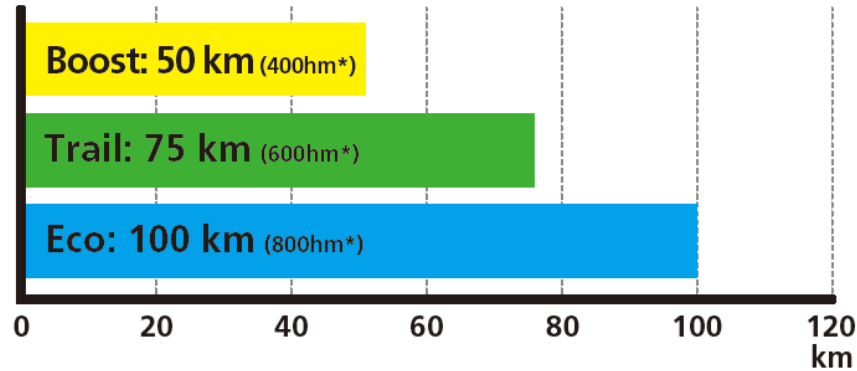
# EXPLANATION OF RANGE IN THE DISPLAY

- ▶ After switching on fully charged STEPS E6000, the range overview is like this:

RANGE	
HIGH	61 km
NORM	77 km
ECO	97 km

- ▶ Range is calculated by SOC, actual energy consumption and energy consumption several kilometers in the past
- ▶ If actual energy consumption is **higher** than energy consumption in the past  
     Range decreases
- ▶ If actual energy consumption is **lower** than energy consumption in the past  
     Range increases
- ▶ STEPS cannot foresee, if there will be a mountain 10 km ahead.

## RIDING DISTANCE (INCLUDING CLIMBING)



Based on company's new test results:

- Combined weight (rider + bicycle): 100kg
- Battery: 504Wh

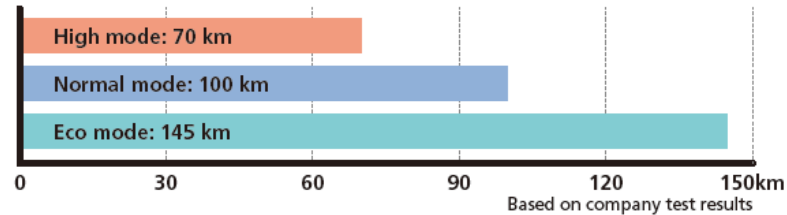
\* height meters: climbing distance (positive altitude)

Data only represents an indication for the actual riding distance. The actual range can vary depending on usage and rider profile, riding conditions and battery life.

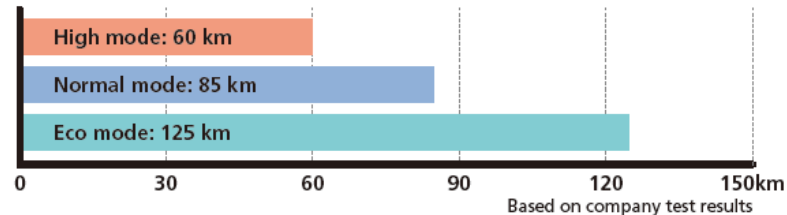
## OPTIMIZED BATTERY DESIGN

The small-size, light-weight SHIMANO STEPS system also contributes to battery performance. SHIMANO tests show that fully-charged batteries allow travel distances of 70 km in High Mode, 100 km in Normal Mode, and 145 km in Eco Mode. The SHIMANO STEPS system has a longer range of assistance compared to competitor models, which is made possible by considering the capacity of the battery to achieve low power consumption per km.

### <504Wh battery>



### <418Wh battery>



# TOTAL DISTANCE IN USER REPORT

- ▶ In the user report for E8000 series, there is no total distance
- ▶ This will be improved in Etube 3.3.0

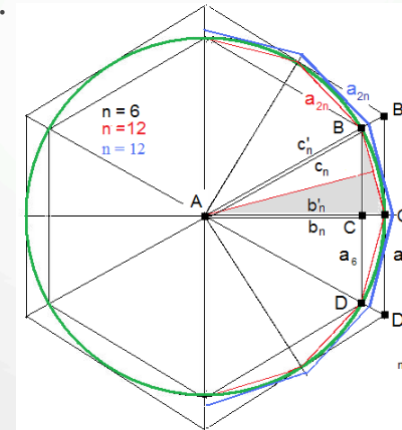
## Drive Unit

### Component information

Unit information	
Unit name	DU-E XXXX
Firmware version	X.X.X
Log information	
Tyre circumference	XXXX mm
Gear shifting type	
Method	Electrical
Maximum number of gears	8gears
Number of teeth of front gear	38T
Number of teeth of rear gear	16T
Light connection	Yes
Drive unit installation angle	0°
Start mode	5gears
Automatic gear shifting function	Invalid
Automatic gear shifting adjustment	-13
Total distance	12.813.732m

# MANIPULATION OF TIRE CIRCUMFERENCE

- ▶ OEM is responsible to enter the correct tire circumference in STEPS
- ▶ Ebikes at production must have the correct tire circumference
- ▶ Of course this is affecting a test according to EN 15194
- ▶ Please advise OEM about consequences of wrong tire circumference.



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# SHIMANO STEPS

## Warnings and Errors





## Difference between warning and error

### ▶ Warning:

- Disappears, when it is solved
- Starts with a „W“



### ▶ Error:

- Displayed on the complete screen
- Starts with „E“ in complete screen
- Switch the battery off and on  
Or: remove battery and install again

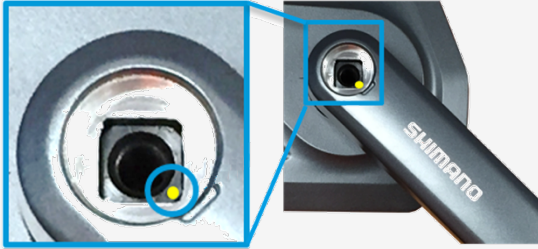


# WARNINGS AND ERRORS AT SHIMANO STEPS

**If warning or error doesn't disappear**

Contact local distributor

Code	Reason	Possible effect	To do
<b>W010</b>	The temperature of the drive unit is high	Low assistance	Switch assist to OFF Let Drive Unit cool down
<b>W011</b>	No speed signal available	Low speed Low assistance	Check for correct installation of speed sensor and spoke magnet

Code	Reason	Possible effect	To do
<b>W012</b>	Crank installed in wrong position	Bad shifting performance for DI2 gear shifting	Install crank in correct position Switch off and on 
<b>W013</b>	The initialization of the torque sensor failed	Power assistance might be lower than usual	Remove your foot from the pedal Check chain tension If necessary: Reduce chain tension Switch off and on battery

Code	Reason	Possible effect	To do
<b>W030</b>	More than one assist switches are connected	Gear shift not available	Run switch mode setting in E-tube Change assist switch to gear shifting switch
<b>W032</b>	A DI2 rear derailleur is installed instead of a mechanical rear derailleur	Walk assist might be low	Correct the OEM setting for rear derailleur

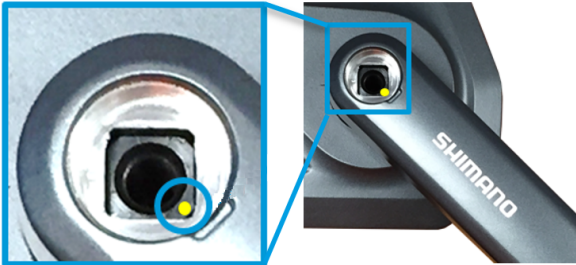
Code	Reason	Possible effect	To do
<b>E010</b>	System error	No assistance	Switch off and on battery Run error check in E-tube If E-tube says so: <ul style="list-style-type: none"><li>▸ Rewrite Firmware</li><li>▸ Make single unit connection</li></ul>
<b>E011</b>	During operation an error occurred	No assistance	Turn on power again
<b>E012</b>	The initialization of the torque sensor failed	No assistance	Remove your foot from the pedal Check chain tension If necessary: <ul style="list-style-type: none"><li>▸ Reduce chain tension</li><li>▸ Switch off and on battery</li></ul>



Code	Reason	Possible effect	To do
<b>E013</b>	Anomaly in the firmware of drive unit	No assistance	Connect to E-tube and make error check Connect drive unit to battery, switch on battery and make single unit connection in E-tube
<b>E014</b>	Wrong installation of speed sensor	No assistance	Mount the magnet and the speed sensor at its correct position Put the bike in the workstand Switch to fastest gear Turn the crank approximately 2 minutes, until the rear wheel made at least 90 revolutions

Code	Reason	Possible effect	To do
<b>E020</b>	Data communication between battery and drive unit shows error	No assistance	Pull plug of battery cable and reconnect Check battery cable for damage
<b>E021</b>	Battery is not supported	No assistance	Check type of battery Contact producer of Ebike
<b>E022</b>	Battery does not confirm with system standards	No assistance	Check type of battery Contact producer of Ebike

Code	Reason	Possible effect	To do
<b>E030</b>	A setting error was detected	No assistance	Check OEM Preset with E-tube
<b>E031</b>	Wrong chain tension Wrong crank position	No assistance	Adjust chain tension Adjust crank position





Code	Reason	Possible effect	To do
<b>E043</b>	Damaged firmware of display	No assistance	Connect display via single unit connection to E-tube Make error check If available: rewrite Firmware

# ERROR CODES OF THE BATTERY'S LED INDICATOR

If situation doesn't improve



Contact local distributor

# ERROR CODES OF THE BATTERY'S LED INDICATOR

Type of error	Reason	Lighting pattern	To do
System error	Data communication error with the bicycle system	 ● ● ● ● ●	Check all cables
Temperature protection	When temperature of battery is too high, then battery output is turned off	 ● ● ● ● ●	Let the battery cool down

● : No light ● : Lights up  : Flashing



# ERROR CODES OF THE BATTERY'S LED INDICATOR

Type of error	Reason	Lighting pattern	To do
<b>Security authentication error</b>	Not a SHIMANO STEPS drive unit is connected Disconnected cable	 ● ● ● ●	Connect SHIMANO STEPS drive unit and SHIMANO STEPS battery Check the cables
<b>Charging error</b>	Error during charging	 ● ● ● ●	Remove the charger from the battery and press the power button of battery

● : No light ● : Lights up  : Flashing



# ERROR CODES OF THE BATTERY'S LED INDICATOR

Type of error	Reason	Lighting pattern	To do
<b>Battery malfunction</b>	Electrical failure inside the battery	 ● ● ● 	Connect the charger to the battery and then remove the charger Then press the power button

● : No light ● : Lights up  : Flashing

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**FC-R9100-P**

**Crankset  
with Power Meter**



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# PRODUCT INTRODUCTION

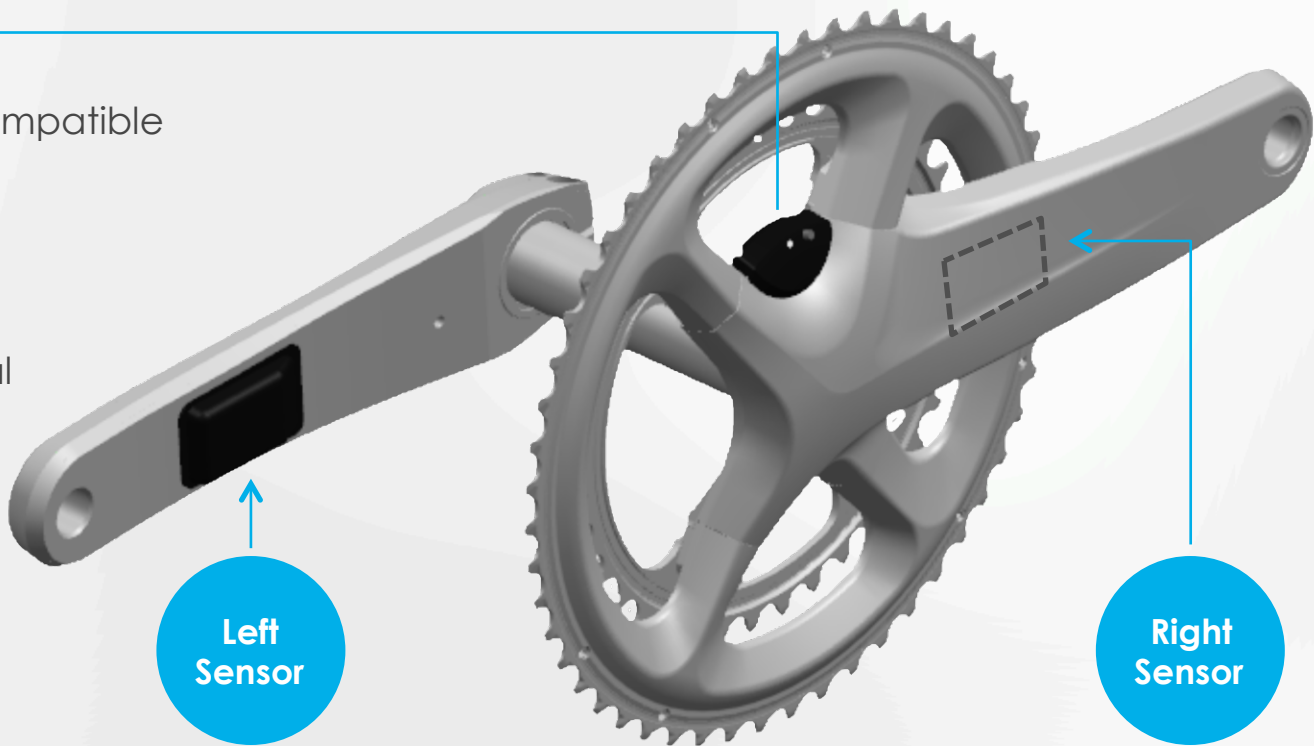
# EXTERNAL STRUCTURE

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## Wireless Unit

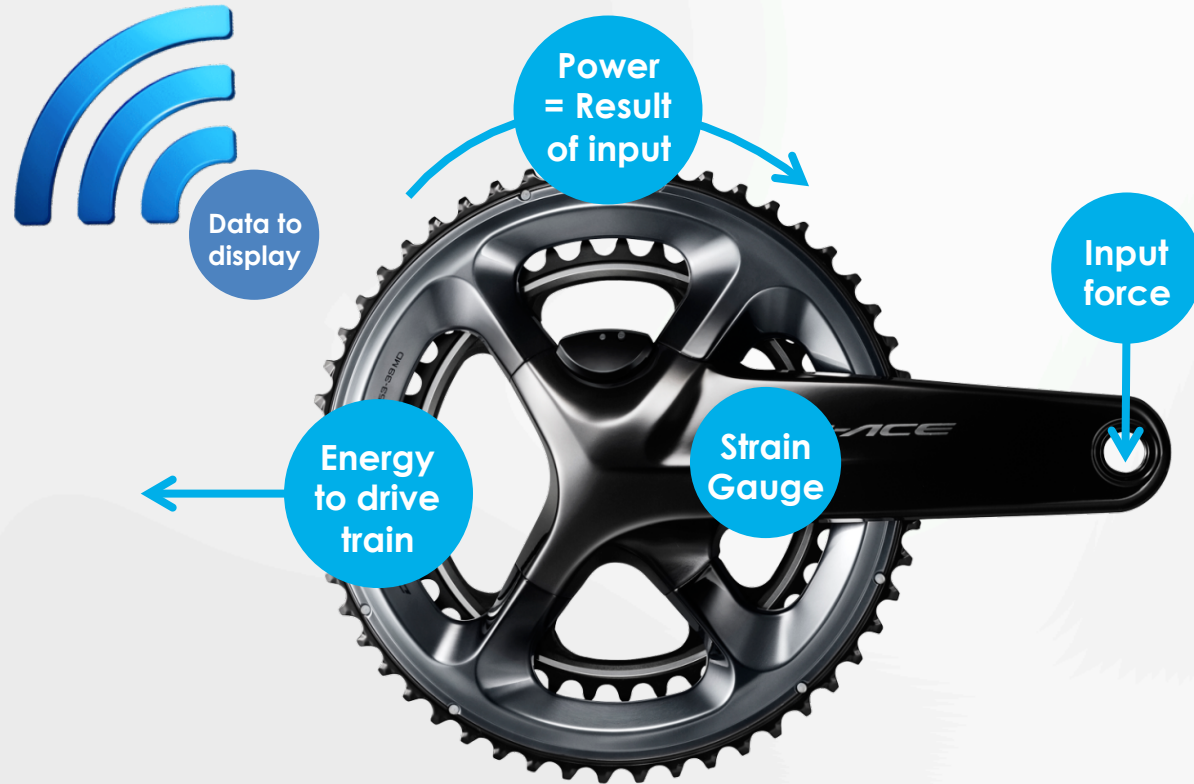
- ▶ ANT+ / Bluetooth® LE compatible
- ▶ LED indicator
- ▶ Calibration switch
- ▶ Battery charging terminal



# BASICS OF POWER MEASUREMENTS

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- ▶ Power is the exact energy transmitted to the drivetrain, and therefore the only indication of human input to the machine excluding external parameters
- ▶ The Force to FC is measured by 2 side continuous crank-arm deflection (strain gauge)

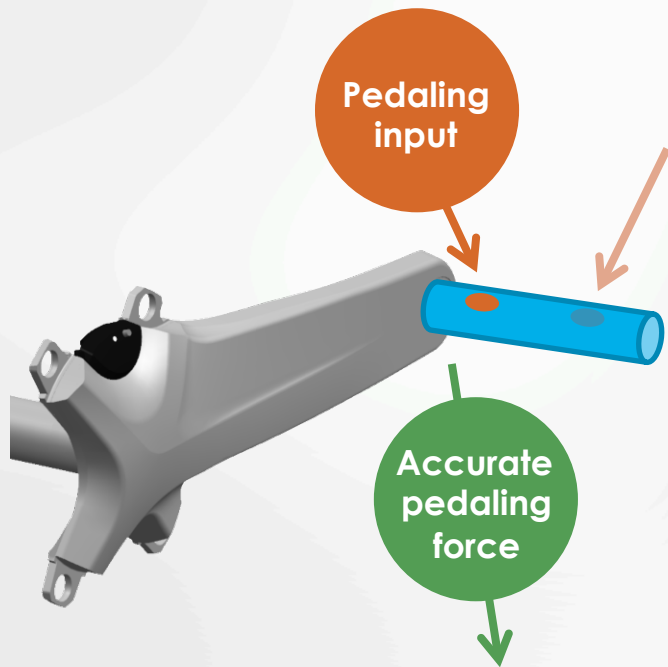
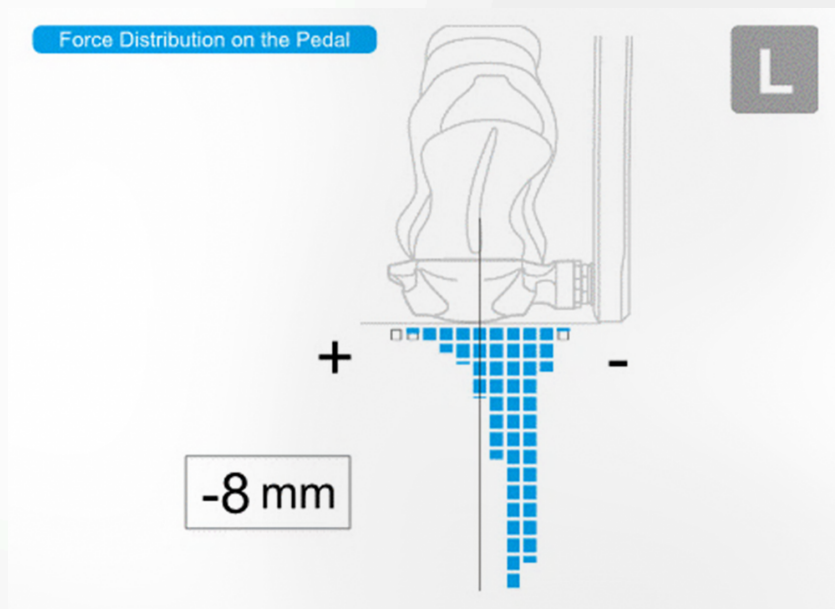


# HIGH ACCURACY

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- ▶ Measure accurate pedaling force, in case of pedaling force was input from various direction



# INTERNAL STRUCTURE

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## Left and Right connector

- ▶ Connecting left and right sensor
- ▶ Waterproof

## Battery

- ▶ Rechargeable
- ▶ Not replaceable

## Left Sensor

## Right Sensor

## Compact case

- ▶ Less interference with frame

Direct response  
is realized by  
both left and  
right side sensor  
connected with  
cable



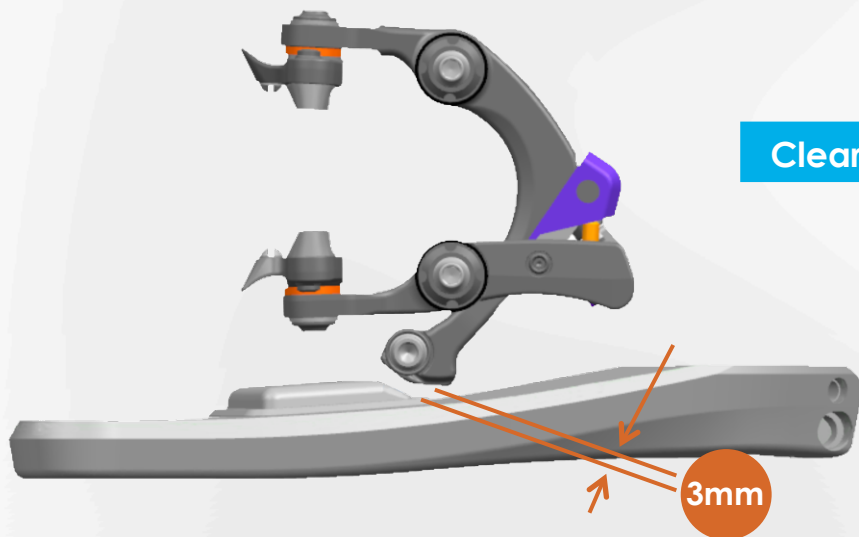
# CLEARANCE WITH FRAME

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**Enough clearance with our direct mount brake caliper by low profile sensor units**

- ▶ Chainstay length: 405 mm
- ▶ Rim width: 28 mm



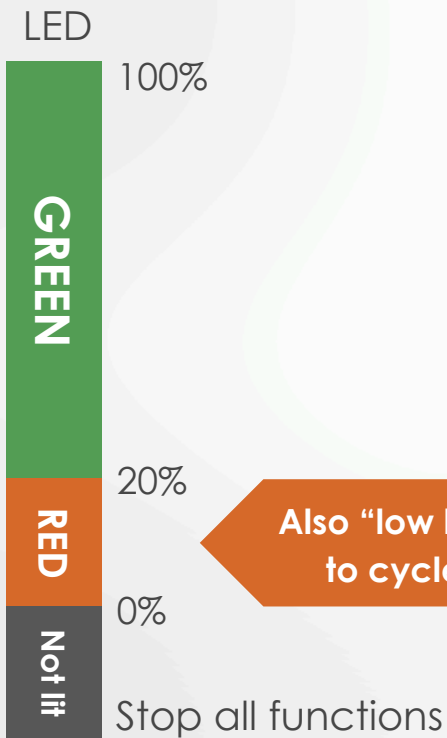
Clearance with frame



# CHECKING REMAINING BATTERY LEVEL

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Press the  
button on the  
control unit and  
check the state  
of the LED

Also "low level warning"  
to cycle computer

## HOLLOWTECH II Crankset with Power Meter (2x11-speed)

- ▶ No Extra Installation
  - Integrated design
    - › Reliable electric system
    - › Waterproof for all riding situations
  - Easy maintenance
    - › Integrated rechargeable Lithium ion battery (300 or more hour continuous operation)
    - › Easily change chainrings without affecting power measurement



## HOLLOWTECH II Crankset with Power Meter (2x11-speed)

- ▶ Quick response and stress free operation
  - Start measurement quickly
  - Simple zero offset calibration
- ▶ Direct response
  - Both left and right side connected with cable
  - Magnet based cadence



Bluetooth

## HOLLOWTECH II Crankset with Power Meter (2x11-speed)

- ▶ High Accuracy
  - Accurate data collection
    - ›  $\pm 2\%$  (\*1: 300w, 90rpm) 1 accuracy of strain gage measured power in full-range
    - › Stable power measurement
  - Active temperature compensation
    - › Own developed strain gauge
    - › Software compensate automatically



## HOLLOWTECH II Crankset with Power Meter (2x11-speed)

- ▶ Crank arm length:
  - 170, 172.5, 175 mm (w/ chainrings)
  - 165, 167.5, 170, 172.5, 175, 177.5, 180 mm (w/o chainrings)
- ▶ Weight:
  - + 70g from FC-R9100
  - 691g (170 mm, 53-39T, w/o bottom bracket)



## HOLLOWTECH II Crankset with Power Meter (2x11-speed)

- ▶ ANT+ wireless transmission information
  - Power [W]
  - Left / right power balance [%]
  - Torque effectiveness [%]
    - › 100% stands for no backpedaling resistance
  - Pedal smoothness [%]
    - › Average power / Max. power, in one rotation
  - Cadence [rpm]
  - Battery level





# EXTENSIBILITY

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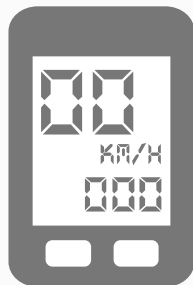
# FC-R9100-P EXTENSIBILITY

**DURA-ACE**

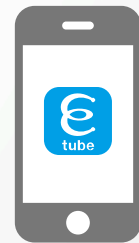
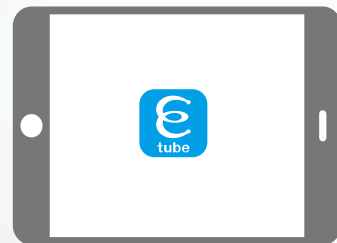
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## ANT+ / Bluetooth® LE communication capabilities

Wireless transmission info  
to 3<sup>rd</sup> party display



Wireless firmware update system  
setting by tablet & smartphone



# E-TUBE SOFTWARE IMAGES

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- ▶ Update firmware
- ▶ Take quick look of power and cadence info
- ▶ Zero offset calibration within App
- ▶ Battery level indication



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# OVERVIEW OF SMALL PARTS

# FC-R9100-P SMALL PARTS

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Right crank set



Spindle cap



Left crank  
installation ring



Outer cap



TL-FC40



Left crank



Magnet cover



Magnet



Double-sided  
tape



Magnet  
setting tool



Charging  
cable 1.5m

***DURA-ACE***

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# INSTALLATION

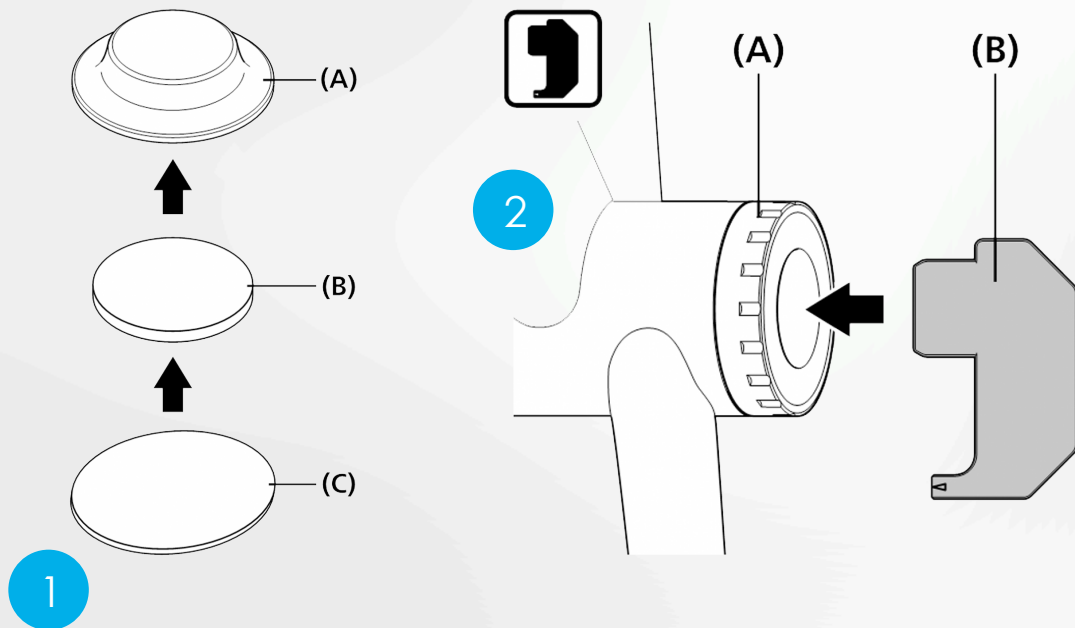
# ATTACHING THE MAGNET (1/2)

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**When using the included magnet positioning tool, install the bottom bracket first**

1. Combine the cover, magnet, and double-sided tape as shown in the illustration
2. Attach the magnet positioning tool to the bottom bracket hole of the right crank

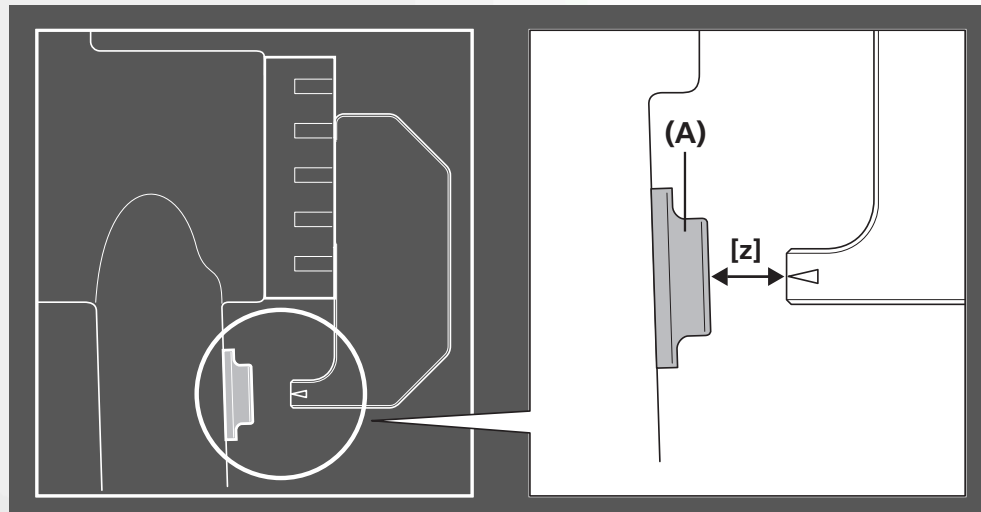


## ATTACHING THE MAGNET (2/2)

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3. Determine the position to attach the magnet
4. Check that the distance [z] between the  $\Delta$  mark on the tool and the surface of the magnet is 5mm or less



Right side of the frame

# INSTALLATION OF THE CRANK (1/7)

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1. Insert the right crank arm unit without removing the spindle cover
2. After assembly of right crank true the BB remove the spindle cap





# INSTALLATION OF THE CRANK (2/7)

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## 3. Insert left crank

- Don't damage the plug and cable
- Don't put grease, oil, dust and chemicals to the connector contact



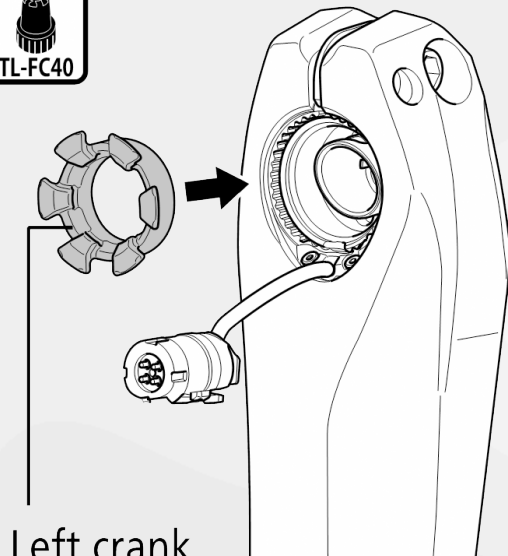
# INSTALLATION OF THE CRANK (3/7)

DURA-ACE

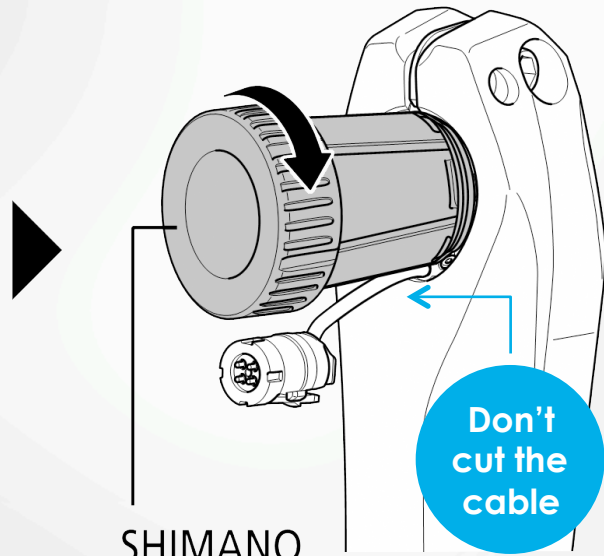
SHIMANO

## 4. Use the Shimano original tool (TL-FC40) to install the left crank installation ring

- Torque is the same with standard crank 0.7-1.5Nm.
- Using TL-FC40 is very important to prevent cutting the cable by the ring.



Left crank  
installation ring



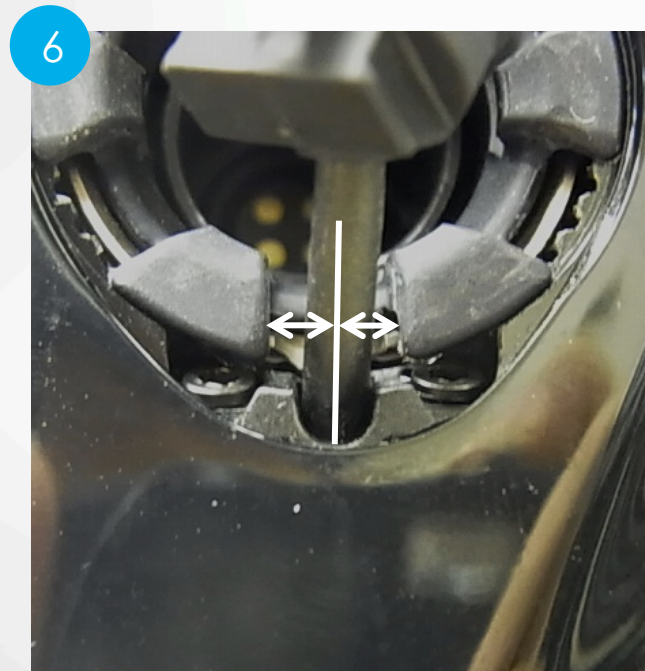
SHIMANO  
original tool (TL-FC40)

# INSTALLATION OF THE CRANK (4/7)

DURA-ACE

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5. Set it at a position where a groove in the tool aligns with the groove in the top of the crank
6. the cable of the connecting terminal will align with the center of a groove in the ring, as shown in illustration

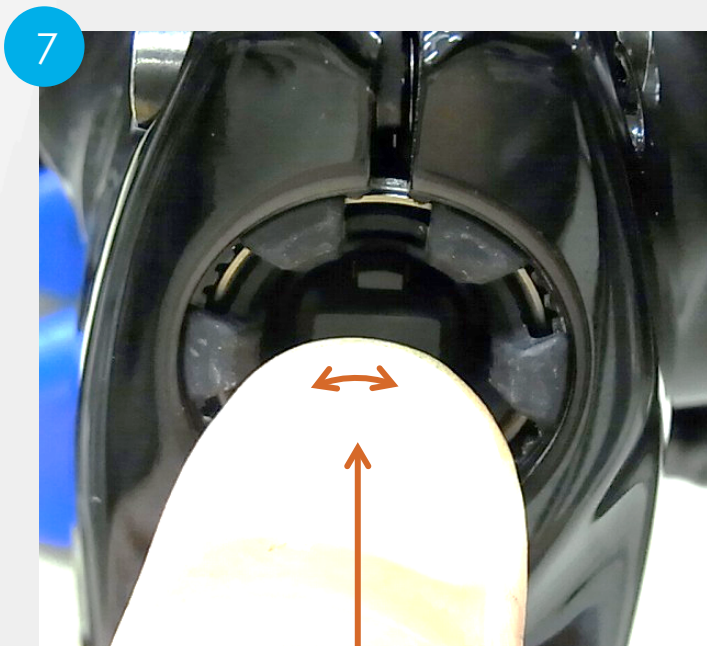


# INSTALLATION OF THE CRANK (5/7)

**DURA-ACE**

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7. Insert the connector so that the side with the lever is on top, as shown in the illustration
8. Push in the connector firmly until it clicks into place

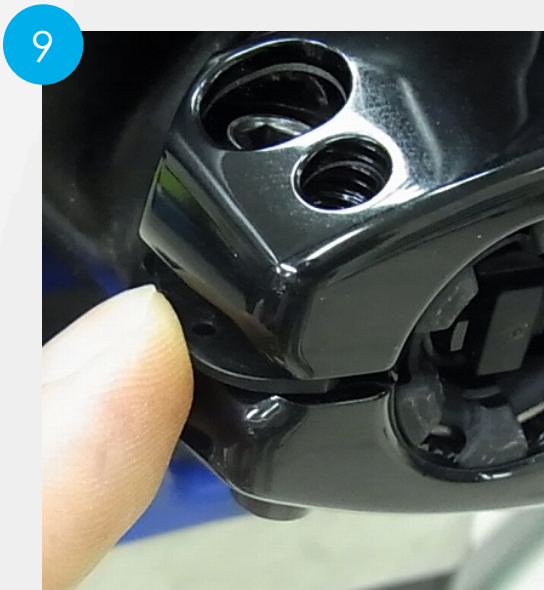


# INSTALLATION OF THE CRANK (6/7)

DURA-ACE

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9. Push in the stopper plate and check that the plate pin is securely in place, and then tighten the bolt of the left crankarm
10. Tighten both bolts equally to the specified tightening torque (12 - 14 Nm)





# INSTALLATION OF THE CRANK (7/7)

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## 11. Attach the outer cap



***DURA-ACE***

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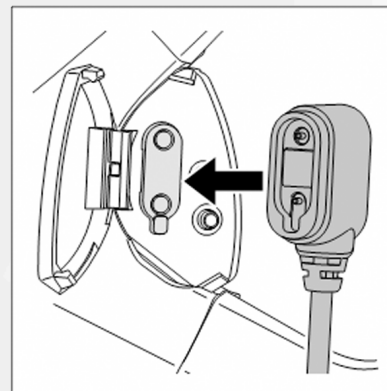
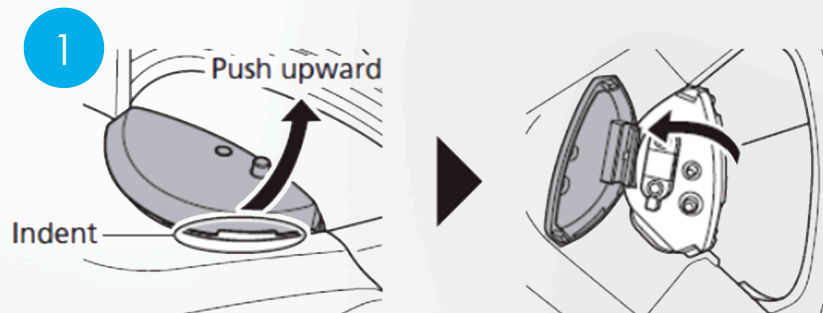
# CHARGING THE BATTERY

# CHARGING PROCEDURES (1/2)

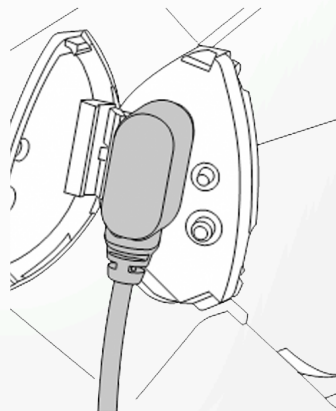
DURA-ACE

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1. Pull at the indent in the control unit to open the cover
2. As shown in the illustration, connect the charging cable so that the indents and protrusions of the charging cable and connection port of the control unit match



2





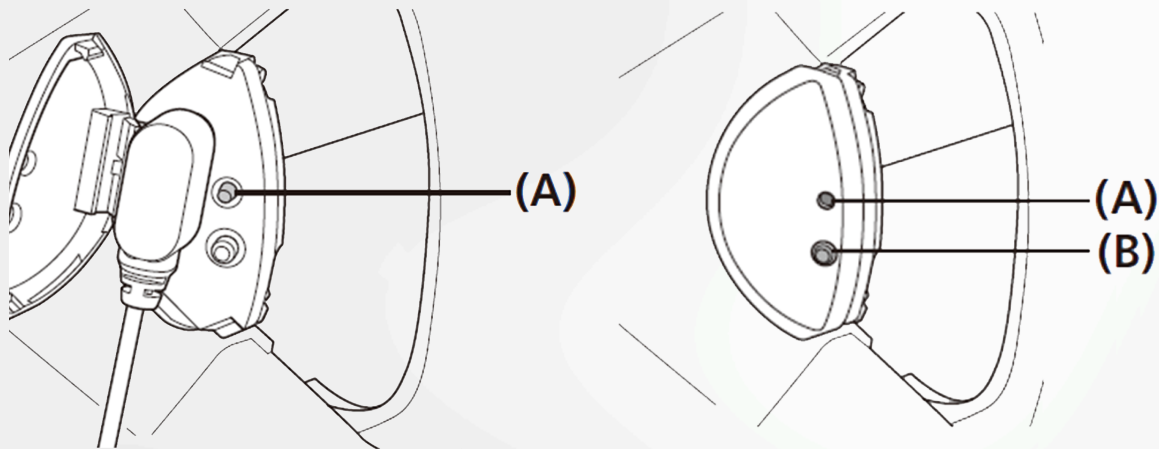
# CHARGING PROCEDURES (2/2)

DURA-ACE

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3. Once charging begins the LED lights up blue
4. Charging is complete when the LED turns off
5. Pull out the cable and then close the cover

- ▶ Checking remaining battery level
  - Press the button on the control unit and check the state of the LED



LED	Battery level
Green	20% or more
Red	20% or less
Not lit	0%

***DURA-ACE***

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OPERATION

# ACTIVATION/CONFIRMING ACTIVATION

DURA-ACE

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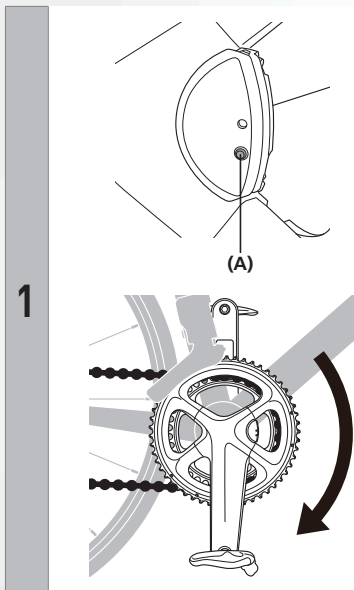
- ▶ There are two methods to wake up the power meter
  - Wake up from magnet sensor by rotating crank two times
  - Push button then check LED battery indicator
- ▶ After wake up, power meter start sending ANT+ wireless signals
- ▶ Without crank rotating for 5 min, the power meter goes to sleep mode automatically
  - The sleep mode means low battery consumption mode

Activation can be confirmed as follows:

2

**When activated by pressing the button on the control unit**  
The LED will light up to indicate the remaining battery level.

**When activated by rotating the crank**  
Cadence and power will display on the screen of the cycle computer.



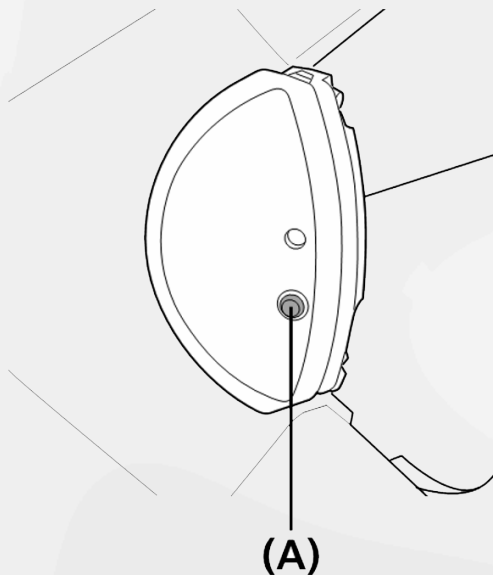
Press the button on the control unit or rotate the crank 2 or more times.

# ANT+ CONNECTION

DURA-ACE

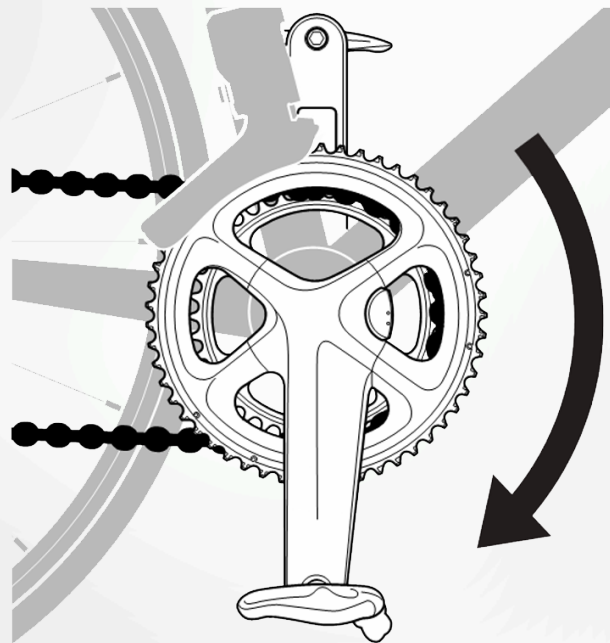
SHIMANO

1. To make a connection, the cycle computer needs to be in connection mode
2. Press the button on the control unit or rotate the crank 2 or more times



(A)

Press the button on the control unit or rotate the crank 2 or more times.



- ▶ Go to ANT+ sensor select mode and enable power sensor
- ▶ Search or input ANT ID manually
- ▶ ANT ID is indicated right crankarm back side



ANT ID

# BLUETOOTH® LE CONNECTION

*DURA-ACE*

SHIMANO

1. Before setting up a connection, turn on Bluetooth® LE on the smartphone/tablet
2. Open E-TUBE PROJECT and set it to listen for Bluetooth® LE signals
3. Press the button on the control unit until remaining battery level is indicated
4. Select the unit name displayed on screen

***DURA-ACE***

**SHIMANO**

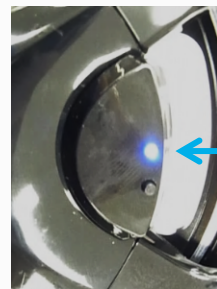
# ZERO OFFSET CALIBRATION

# PERFORMING ZERO OFFSET CALIBRATION

**DURA-ACE**

**SHIMANO**

1. Place the bicycle on level ground
2. Position the crank arm so that it is perpendicular to the ground
3. Press the button on the control unit until the LED lights up blue
4. Once the LED lights up blue, release the button
  - The LED will begin blinking blue and zero offset calibration will complete





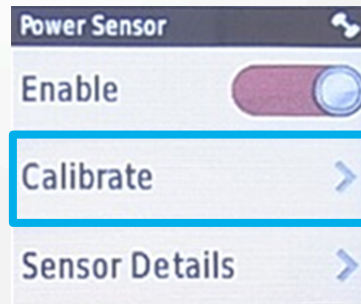
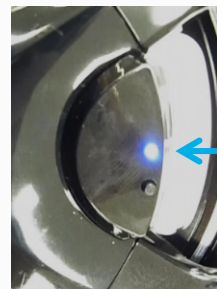
# PERFORMING ZERO OFFSET CALIBRATION

**DURA-ACE**

**SHIMANO**

**You need to do this before your ride when you would like to have accurate power!**

1. Manual through the bottom
2. Through the official E-TUBE App
3. Or through a third party display



***DURA-ACE***

**SHIMANO**

# ROAD DRIVETRAIN

## GENERAL

# 11 SPEED CRANKS

**DURA-ACE**  
**SHIMANO**

All 11 speed road cranks are with:

- ▶ 4-arms
- ▶ P.C.D. of 110mm



# 11 SPEED CRANKS

*DURA-ACE*

SHIMANO

## Chainrings are designed for specific gear combinations only

- ▶ 46 – 36 (Ultegra and RS500 only)
- ▶ 50 – 34
- ▶ 52 – 36
- ▶ 52 – 38 (Dura-Ace FC-9000 only)
- ▶ 53 – 39
- ▶ 54 – 42 (Dura-Ace only)
- ▶ 55 – 42 (Dura-Ace only)

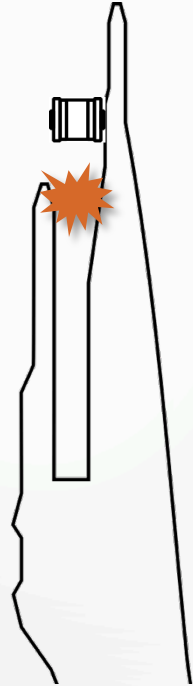


# 11 SPEED CRANKS

**DURA-ACE**

**SHIMANO**

**Chainrings are designed  
for specific gear combinations only**



# 11 SPEED CRANKS

DURA-ACE

SHIMANO

## Almost all chainrings are compatible:

- ▶ Keep correct gear combinations together
- ▶ Chainrings will be different in material or appearance but will be usable

- Chaining teeth combinations: 46-36T/50-34T/52-36T/53-39T
- Bolt circle diameter: 110 mm



FC-9000

ITEM NO.	SHIMANO CODE NO.	DESCRIPTION	INTERCHANGEABILITY
1	Y1P417000	Crank Arm Fixing Bolt	
2	Y1P498010	Left Hand Crank Arm 165 mm	B
	Y1P498020	Left Hand Crank Arm 170 mm	B
	Y1P498030	Left Hand Crank Arm 172.5 mm	B
	Y1P498040	Left Hand Crank Arm 175 mm	B
3	Y1G398010	Clamp Bolt (M6 x 19) & Washer	
4	Y1GE98050	Plate	B
5	Y1F316000	Ring	A
6	Y1P598010	Left Hand Adapter (B.C.1.37" x 24T) English Thread (SM-BBR60)	B
	Y1P598020	Left Hand Adapter (M36 x 24T) Italian Thread (SM-BBR60)	B
7	Y1G398150	Inner Cover & O-Ring	B
8	Y1TF21000	O-Ring	A
9	Y1P598030	Right Hand Adapter (B.C.1.37" x 24T) English Thread (SM-BBR60)	B
	Y1P598040	Right Hand Adapter (M36 x 24T) Italian Thread (SM-BBR60)	B

Y1P434000

Chaining 34T-MA for 50-34T

B

* 11	Y1P436000	Chaining 36T-MB for 46-36T/52-36T	B
	Y1P439000	Chaining 39T-MD for 53-39T	B
* 12	Y1P498050	Chaining 46T-MB for 46-36T	
	Y1P498060	Chaining 50T-MA for 50-34T	B
	Y1P498070	Chaining 52T-MB for 52-36T	B
	Y1P498080	Chaining 53T-MD for 53-39T	B

A: Same parts.

B: Parts are usable, but differ in materials, appearance, finish, size, etc.

Absence of mark indicates non-interchangeability.

Aug.-2013-3609A  
© Shimano Inc. I

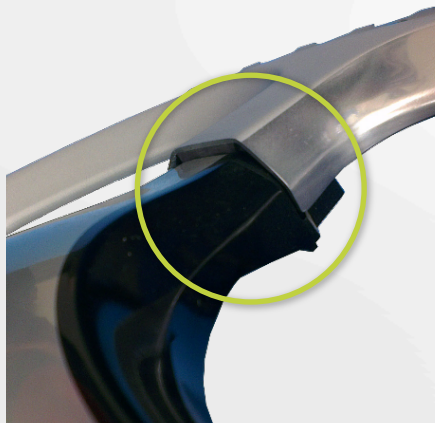
# 11 SPEED CRANKS

*DURA-ACE*

SHIMANO

## B-compatible means:

- ▶ Chainrings will fit but have difference in material or appearance



# 11 SPEED CRANKS – R9100

**DURA-ACE**  
**SHIMANO**

**For new Dura-Ace R9100 cranksets there is one exception:**

- ▶ FC-9000 chainrings can NOT be mounted on FC-R9100 crankset





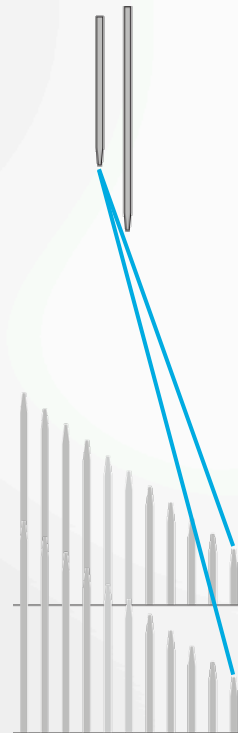
# 11 SPEED CRANKS – R9100

**DURA-ACE**

**SHIMANO**

## **FCR9100 Dura-Ace crank is redesigned:**

- ▶ Distance between chainrings is 0,4 mm bigger
- ▶ Less interference between chain and biggest chainring riding small-small combination
- ▶ Disc brake frames with E-thru rear axle can have a shorter chainstay
- ▶ Better race specific disc brake frames can be made



# 11 SPEED CRANKS

DURA-ACE

SHIMANO

**This brings a compatibility issue regarding the crankset and front derailleur**

- ▶ If you use the latest Dura-Ace or Ultegra crankset you can NOT use an old front derailleur



FD-R9100/50  
FD-R8000/50

FC-R9100  
FC-R9100P  
FC-R8000

FD-9000/70  
FD-6800/70  
FD-5800  
FD-U5000


FC-9000  
FC-6800  
FC-5800  
FC-U5000-2



# CHAIN – LINE-UP AND COMPATIBILITY

**DURA-ACE**

**SHIMANO**

System	Road or MTB	Crank compatibility	Your serie / groupset	Level	Your chain	Compatibility
11-SPEED	ROAD & MTB	DOUBLE / TRIPLE	DURA-ACE / XTR	 <b>ULTIMATE</b>	CN-HG901	CN-9000 (ROAD)
		DOUBLE	ULTEGRA / XT	 <b>ADVANCED</b>	CN-HG701	CN-6800 (ROAD)
		DOUBLE	105 / SLX	 <b>SELECT</b>	CN-HG601	
10-SPEED	ROAD	DOUBLE	DURA-ACE, ULTEGRA, 105	 <b>ADVANCED</b>	CN-6701	CN-7901, CN-5701
		DOUBLE	TIAGRA 4700, CX50, R460	 <b>SELECT</b>	CN-4601	
		TRIPLE	DURA-ACE, ULTEGRA, 105	 <b>ADVANCED</b>	CN-6600	CN-7801, CN-5600
		TRIPLE	TIAGRA 4700 SERIES	 <b>ADVANCED</b>	CN-HG54	
	MTB	DOUBLE / TRIPLE	XTR, XT, SLX	 <b>ULTIMATE</b>	CN-HG95	CN-M981, CN-HG75
		DOUBLE / TRIPLE	DEORE	 <b>SELECT</b>	CN-HG54	
9-SPEED	ROAD & MTB	DOUBLE / TRIPLE	-	 <b>ADVANCED</b>	CN-HG93	
		DOUBLE / TRIPLE	-	 <b>SELECT</b>	CN-HG53	
6/7/8-SPEED	ROAD & MTB	DOUBLE / TRIPLE	-	 <b>ADVANCED</b>	CN-HG71	CN-HG91, CN-HG70
		DOUBLE / TRIPLE	2200	 <b>SELECT</b>	CN-HG40	

## Different connecting pins and quick links for different chains



For 11-speed chain

With one line



For 11-speed chain

Quick link (11 speed only)



For 10-speed chain except CN-7800

With two lines



For 9-speed chain

Silver color



For 6/7/8-speed chain

Black color

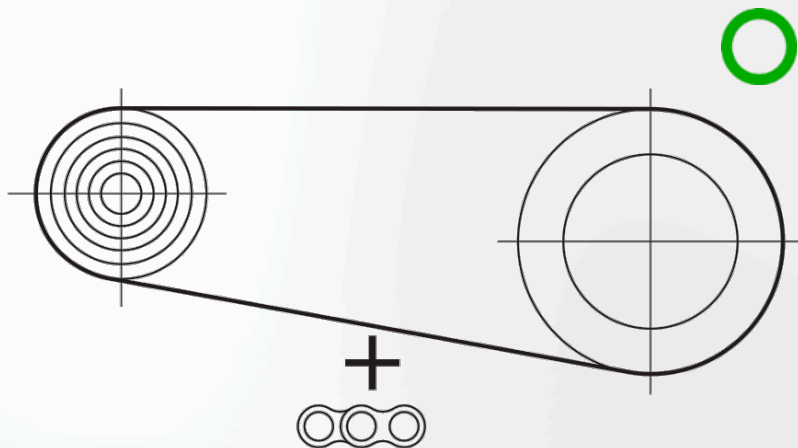
# CHAIN - INSTALLATION

DURA-ACE

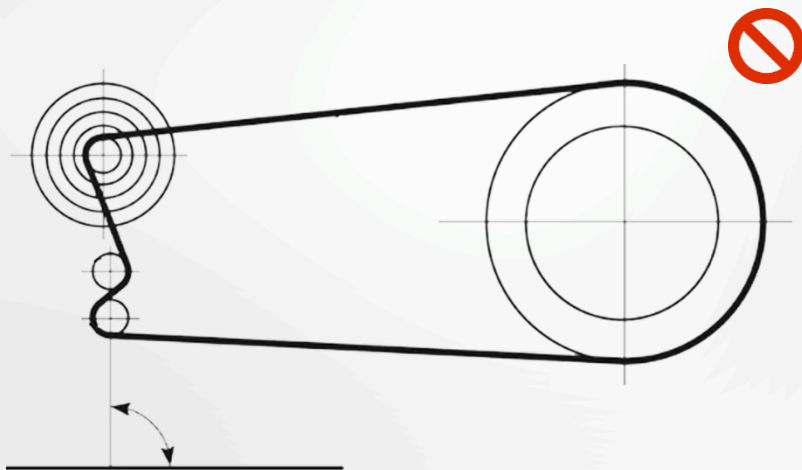
SHIMANO

## Chain length - Shadow rear derailleur

Only use Big – Big + 2 links



NOT possible to use 'vertical' procedure



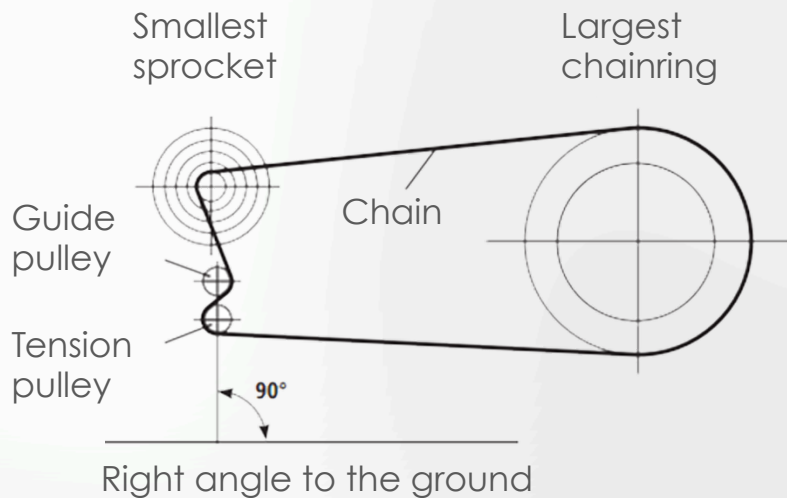
# CHAIN - INSTALLATION

DURA-ACE

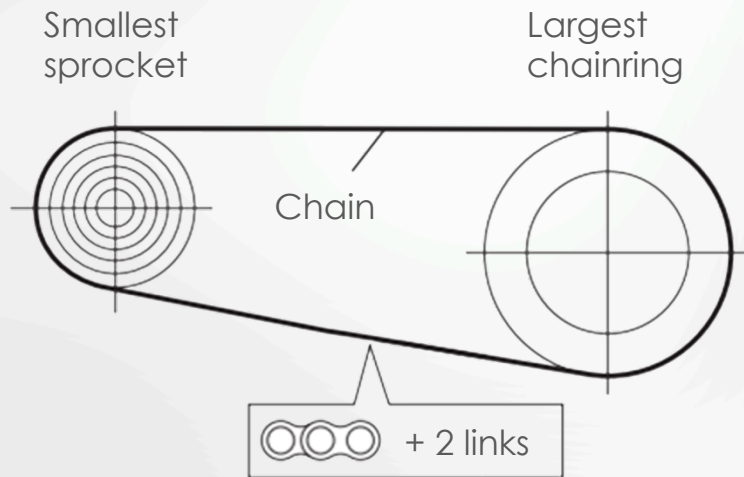
SHIMANO

## Chain length - Other double crankset

With largest sprocket 27 teeth or smaller



With largest sprocket 28 teeth or bigger



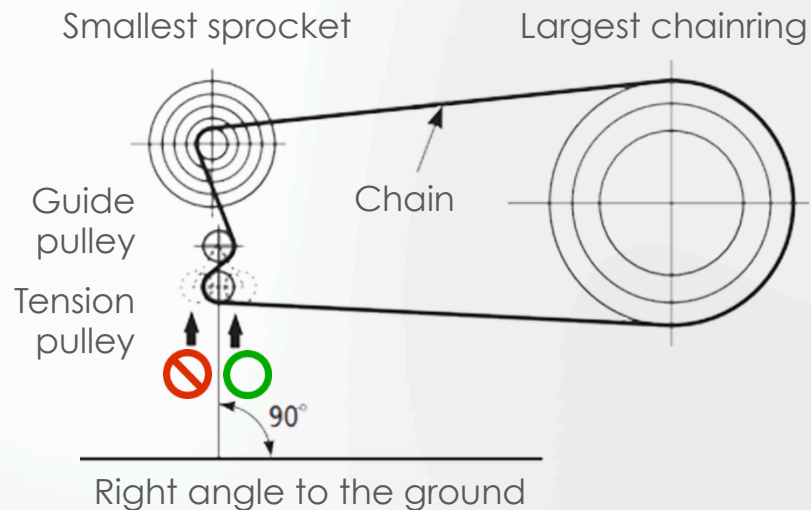
# CHAIN - INSTALLATION

DURA-ACE

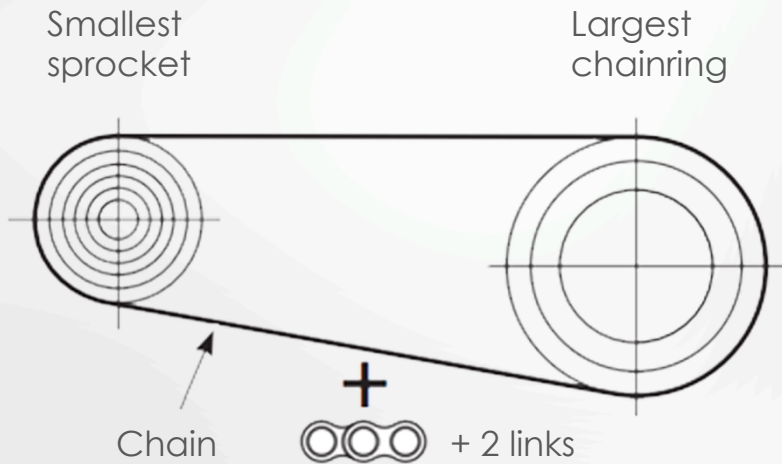
SHIMANO

## Chain length - Other triple crankset

When largest sprocket 30 teeth or smaller



When largest sprocket 32 teeth or bigger



# CHAIN - INSTALLATION

**DURA-ACE**

**SHIMANO**

## Directional chains

- ▶ Some chains are directional and have a outward and a inward side.
- ▶ Always make sure the markings on the chain are facing outward

**Forward (outward side)**



**Reverse (inner side)**



The side  
with the mark  
is the forward  
(outer) side



# CHAIN - INSTALLATION

## Connecting method:

1. Connecting pin
2. Quick-Link

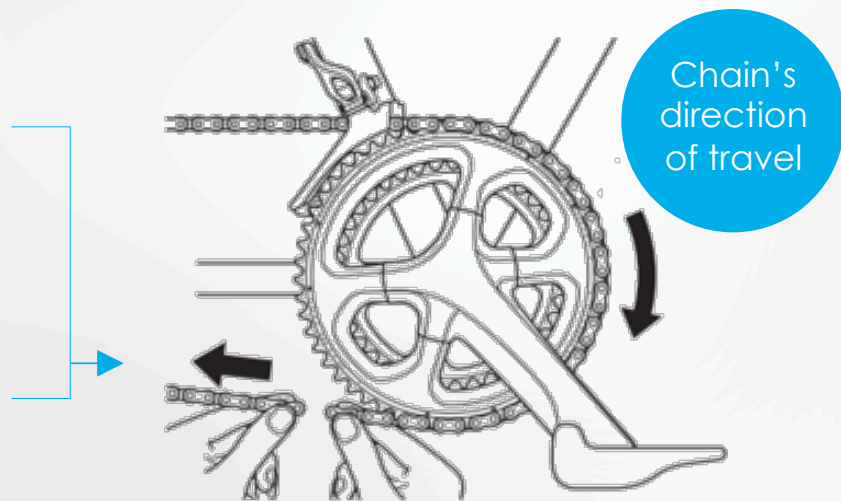
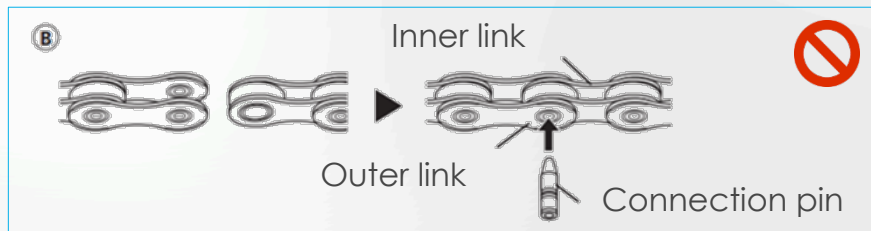
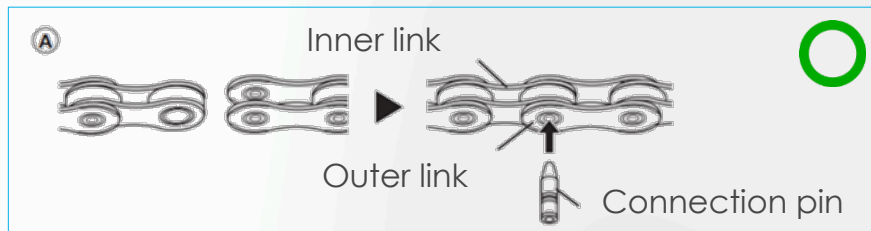
# CHAIN - INSTALLATION

DURA-ACE

SHIMANO

## Connecting method 1: Connecting pin

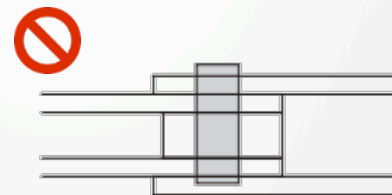
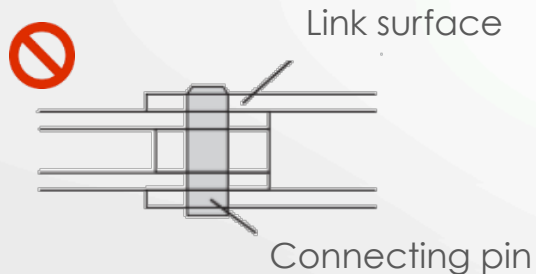
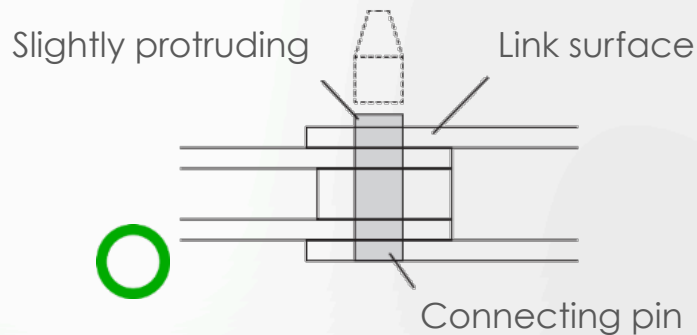
- ▶ When installing the chain on the bike make sure you connect the pin as shown in figure A
- ▶ The chain's level of strength is enhanced compared to figure B



## Connecting method 1: Connecting pin

- ▶ When pushing in the connecting pin the pin should be aligned with the outer link surface and it should feel smooth

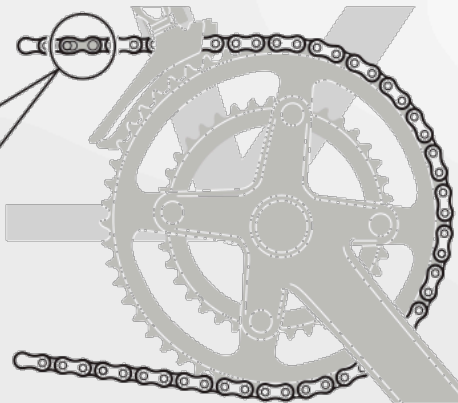
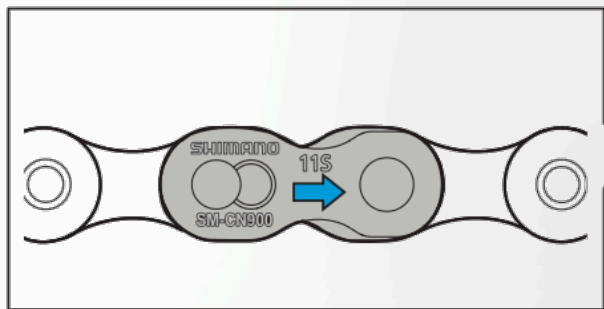
### Inside of drivetrain



### Outside of drivetrain

## Connecting method 2: 11 speed Quick-Link

- ▶ Quick-Link has 2 parts which are exactly the same
- ▶ Pay attention to the rotation direction. Arrow will be visible on the Quick-Link



SM-CN900-11

# CHAIN - INSTALLATION

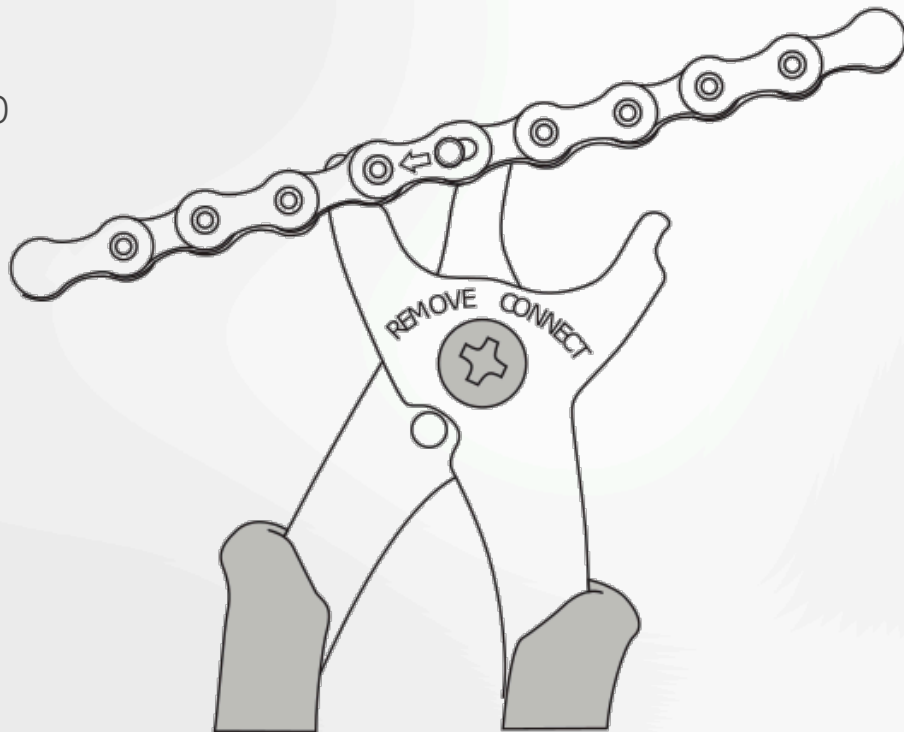
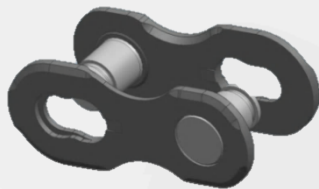
**DURA-ACE**

**SHIMANO**

## Connecting method 2: Quick-Link

- ▶ One tool for assembly and disassembly TL-CN10

SM-CN900-11

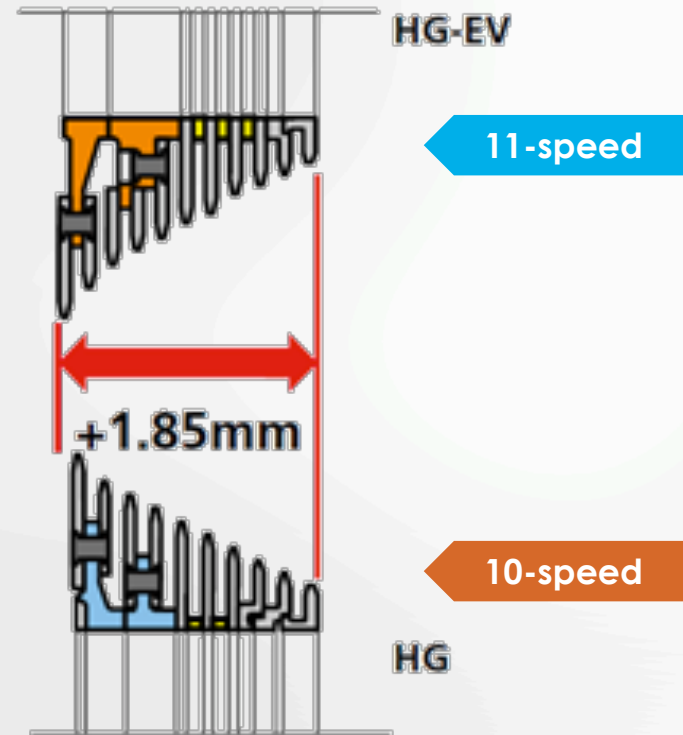


# WHEELS AND CASSETTE SPROCKETS

- ▶ All specific 8,9,10-speed Shimano road hubs or wheels are not compatible with 11 speed cassette sprockets
- ▶ Only exception is CS-HG800 (11-34) 11 speed cassette which is using 10-speed width



- ▶ Always use a 1,85mm spacer when using this cassette on a 11 speed wheel



# TIAGRA 4700 COMPATIBILITY



- ▶ Shifter, RD and FD are NOT compatible with any other 10 speed model
- ▶ Due to new cable pitch for FD and RD



# TIAGRA RD-4700 COMPATIBILITY

- ▶ Capacity of RD not only depends on length of cage
- ▶ 2 types of RD which result in 3 different combinations

RD-4700 SS



RD-4700 GS





# TIAGRA RD-4700 CAPACITY



Same RD – RD-4700 GS

Series	TIAGRA	TIAGRA	TIAGRA
Model no.	RD-4700-SS	RD-4700-GS	RD-4700-GS
Pulley cage	SS	GS(Front double)	GS(Front triple)

Max. front difference		16T	16T	20T
Total capacity		33T	39T	41T
Low sprocket	Max.	28T	34T	32T
	Min.	25T	28T	25T
Top sprocket	Max.	14T	12T	12T
	Min.	11T	11T	11T

# FRONT DERAILLEUR

**DURA-ACE**

**SHIMANO**

New FD structure results in:

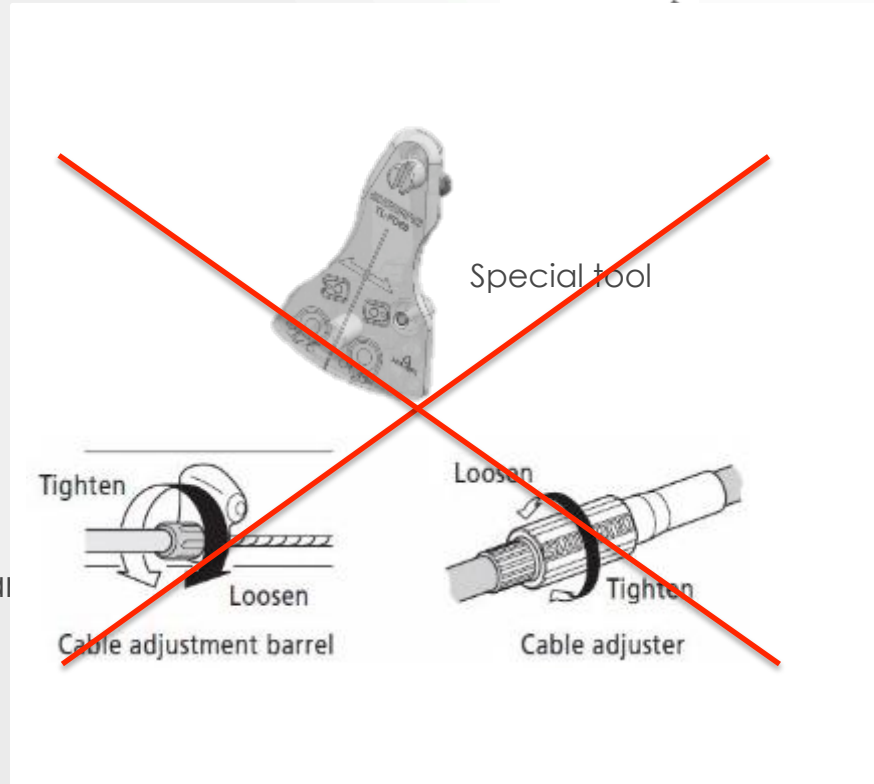
- Less shifting effort
- Easy installation and adjustment
- Stable performance



FD-R9100 B/F

# NEW STRUCTURE

- Possible with 2 different cable routings
  - ✓ Standard (inner) cable routing from BB
  - ✓ Full outer casing to FD
- New cable guide inside FD
  - ✓ No special tool needed
- New cable adjust function by Allen key
  - ✓ No cable adjuster or cable adjustment barrel needed

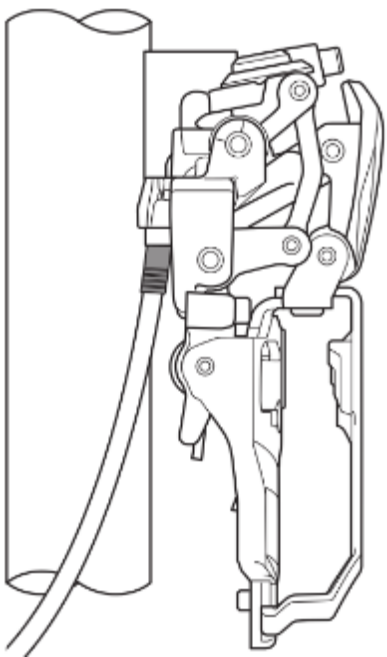


# SECURING CABLE

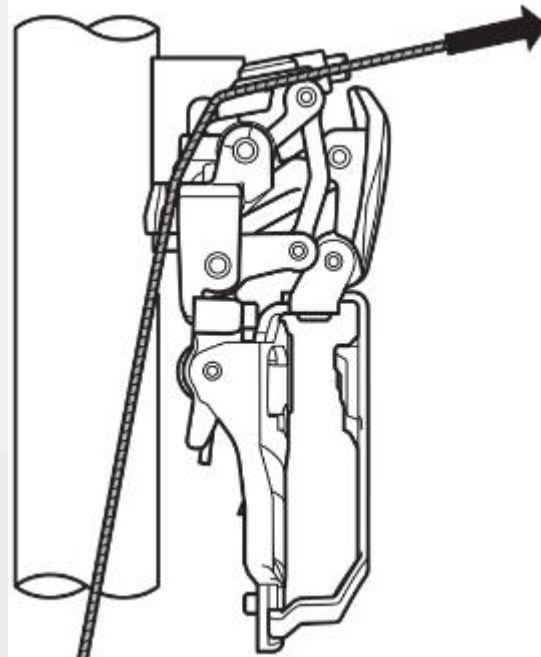
**DURA-ACE**

**SHIMANO**

Full outer casing



Standard cable routing

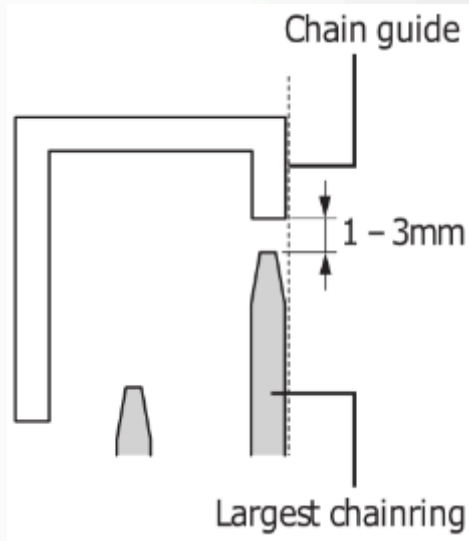


# SECURING CABLE

**DURA-ACE**

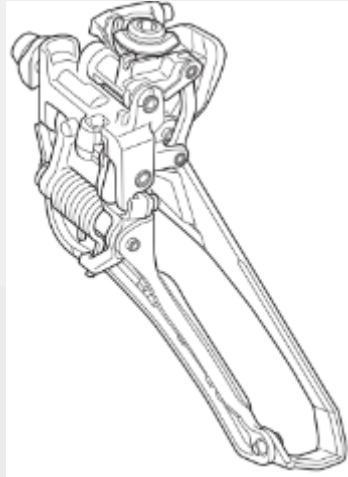
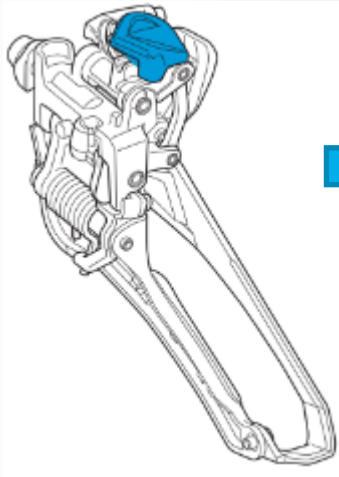
**SHIMANO**

## 1. Align FD cage with largest chainring



# SECURING CABLE

1. Align FD cage with largest chainring
2. Remove link cover

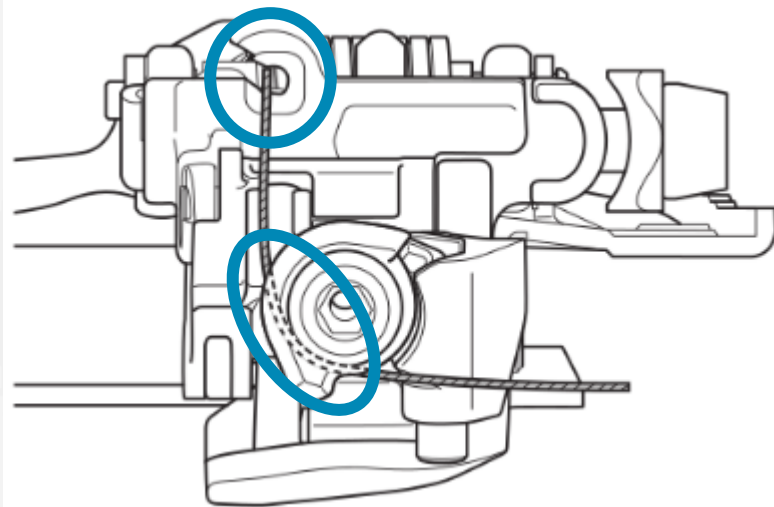


# SECURING CABLE

**DURA-ACE**

**SHIMANO**

1. Align FD cage with largest chainring
2. Remove link cover
3. Insert inner cable through cable guide and cable adjustment barrel



# CABLE TENSION ADJUSTMENT

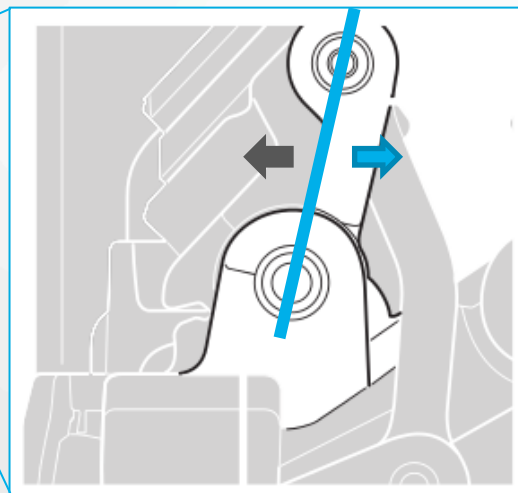
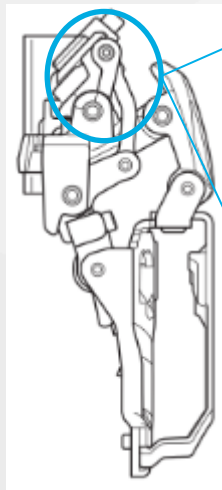
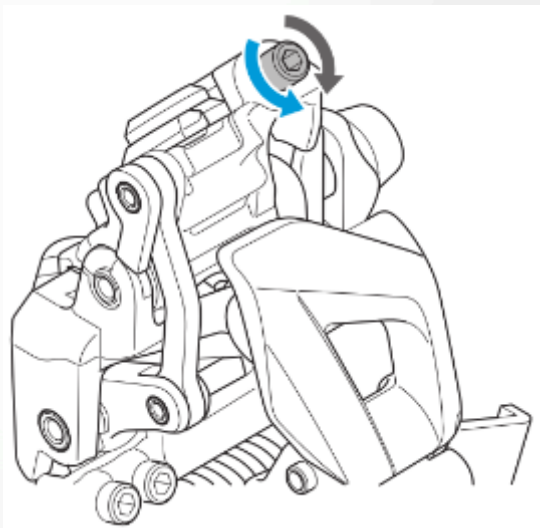
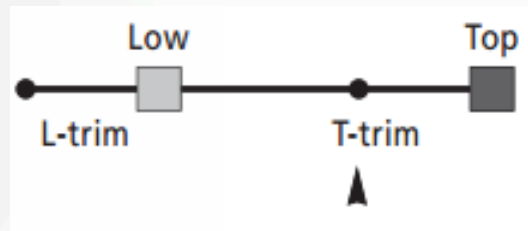
DURA-ACE

SHIMANO

## Cable tension adjustment

Should be done on Top trim position of shifter

Align the indicator with the adjustment barrel





# CABLE TENSION ADJUSTMENT

**DURA-ACE**

**SHIMANO**



# TOP-TRIM ADJUSTMENT

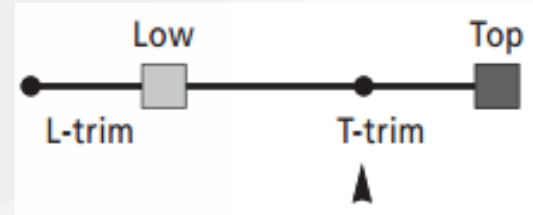
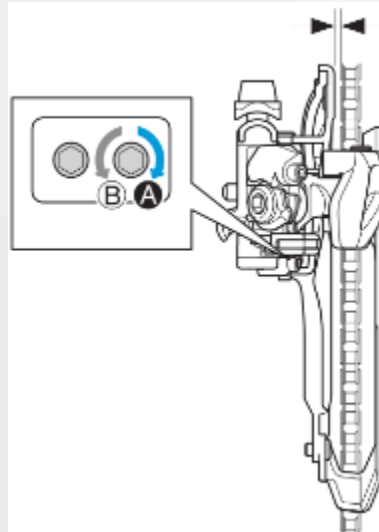
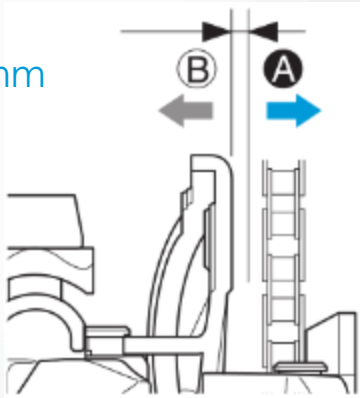
DURA-ACE

SHIMANO

Top adjustment procedure:

- Shifter on **top-trim** position
- Rear on biggest sprocket
- With high (H) bolt

0 – 0,5 mm



# LOW ADJUSTMENT

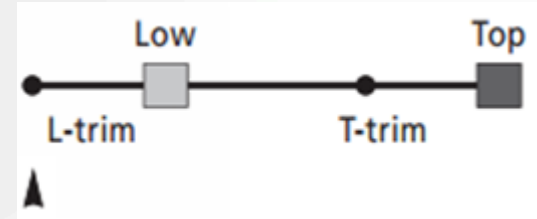
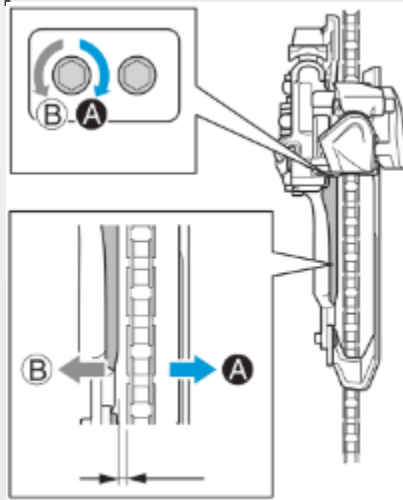
**DURA-ACE**  
**SHIMANO**

Low adjustment procedure is as previous:

Shifter on Low-trim position

Rear on biggest sprocket

With low (L) limit bolt



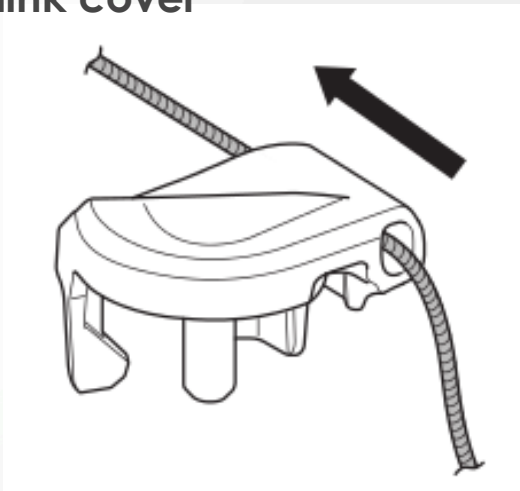
# EXCESS CABLE

**DURA-ACE**

**SHIMANO**

After adjustment final procedure is to finish the end of inner cable

1. Attach link cover
2. Pass the end of any removing cable through the link cover



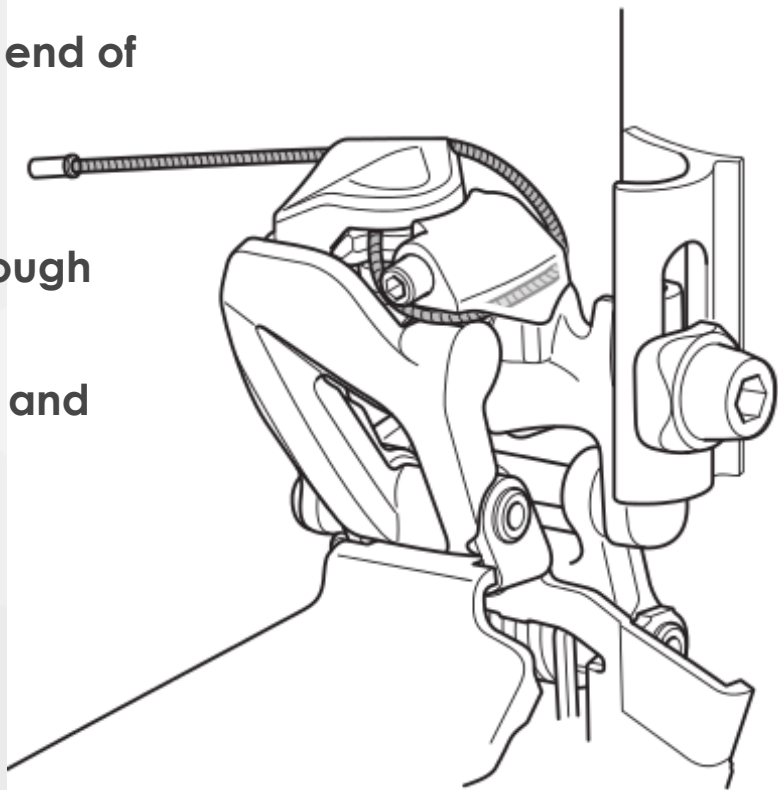
# EXCESS CABLE

**DURA-ACE**

**SHIMANO**

After adjustment final procedure is to finish the end of inner cable

1. Attach link cover
2. Pass the end of any remaining cable through the link cover
3. Route the cable as shown, cut the cable and attach end cap



# HYDRAULIC DISC BRAKE CALIPER AND ROTOR

BR-M9070, SM-RT800, BR-R8070,

SHIMANO

## Greater rider control in all conditions

- ▶ Hydraulic disc brake provides the next stage of control

## Sleek integration into a road bike's aero profile

- ▶ Designed to integrate seamlessly with a road bike's profile
- ▶ Flat mount hydraulic type

## Better heat dispersion than current road disc systems (SM-RT900 / SM-RT800)

- ▶ New construction provides better heat management than current ICE TECHNOLOGIES FREEZA

SM-RT900



SM-RT800



BR-R8070



BR-R9070



ICE  
TECHNOLOGIES  
FREEZA



ONE WAY BLEEDING

# DISC BRAKE

**New SM-RT900 rotor**

**Clean Appearance specific for road bike**

**Better Heat management than FREEZA**



**Current**



**AL  
Adapter**

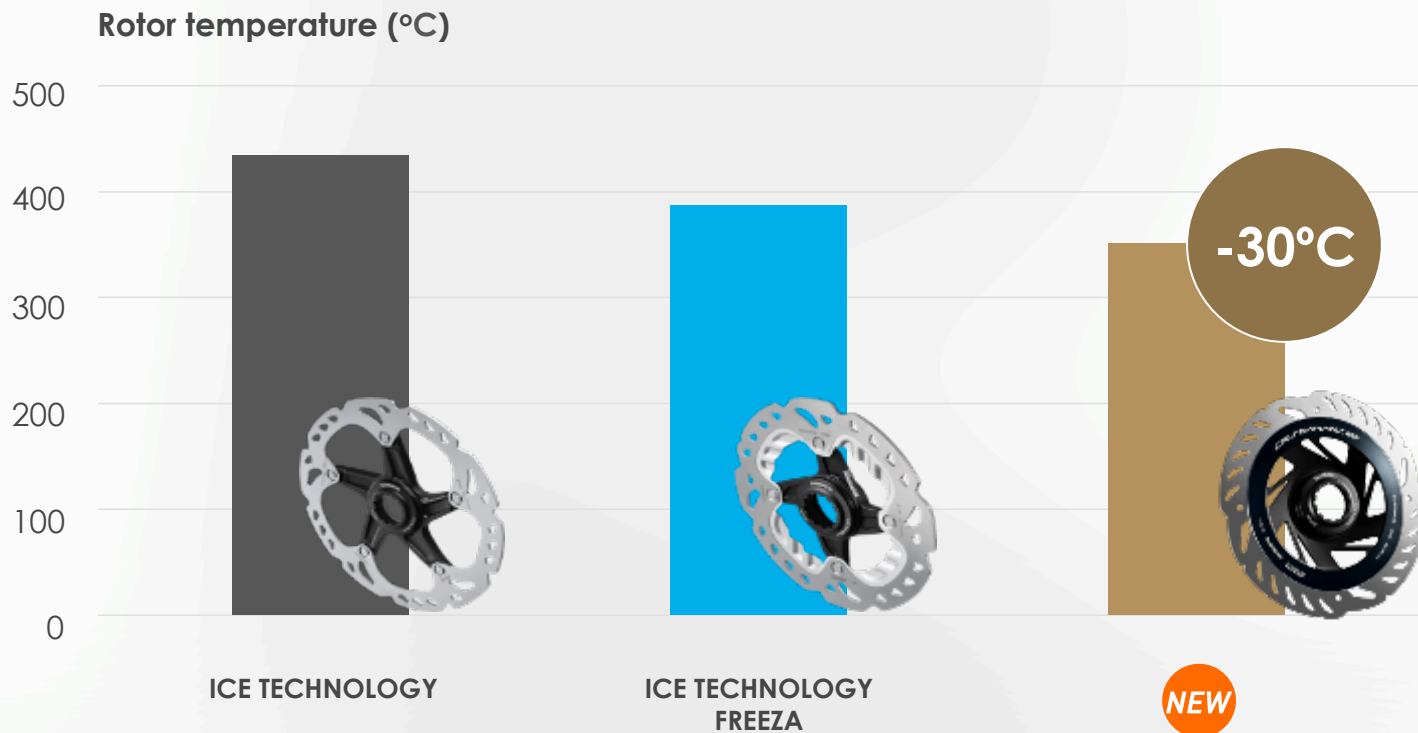
**NEW**



**AL**

# NEW DURA-ACE ROTOR

SHIMANO





# ROTOR SIZE FOR ROAD DISC BRAKE

SHIMANO

## NOTE

Please check in advance with bicycle manufacture or supplier to the influence of heat generated by disc brake on performance and quality, such as the strength of the frame, under actual usage condition.

Rotor size	Indication
F140mm / R140mm	Same brake power performance as a caliper brake with overheating the rotor in case extreme conditions (heavy weight or long steep decent and only using the front brake)
F160mm /R140mm	Best recommendation. 14% up brake power and 30% up heat dissipation in front brake for high speed braking.
F160mm / R160mm	If you want to avoid heat issues at more wider usage. In addition more brake power and heat dissipation on the rear for drag braking with heavy weight.

\*The number of % is under conditions set by SHIMANO

# BRAKE PADS

SHIMANO

## ROAD / Brake (Hydraulic disc brake)

Series		DURA-ACE	DURA-ACE	ULTEGRA	ULTEGRA
Model no.		BR-R9170-F	BR-R9170-R	BR-R8070-F	BR-R8070-R
Brake type		Hydraulic disc brake	Hydraulic disc brake	Hydraulic disc brake	Hydraulic disc brake
Color	1	Series color	Series color	Series color	Series color
	2	-	-	-	-
	3	-	-	-	-
Brake hose (kit)		SM-BH90-JK-SSR	SM-BH90-JK-SSR	SM-BH90-JK-SSR SM-BH90-J-SSR	SM-BH90-JK-SSR SM-BH90-J-SSR
Hose joint		Straight	Straight	Straight	Straight
Brake hose color (kit)	1	Black	Black	Black	Black
	2	-	-	-	-
ICE TECHNOLOGIES pad compatible caliper		X	X	X	X
Brake Pad	Standard 1	K02Ti-Resin	K02Ti-Resin	K02S-Resin	K02S-Resin
	Standard 2	L02A-Resin	L02A-Resin	L02A-Resin	L02A-Resin
	Option 1	K04Ti-Metal	K04Ti-Metal	K04S-Metal	K04S-Metal
	Option 2	L04C-Metal	L04C-Metal	L04C-Metal	L04C-Metal

### L02Ti-Resin







### K02A-Resin



# BRAKE PADS

SHIMANO

Model No.	Type	L02A	L04C	K02S	K04S	J02A	J04C	K02Ti	K04Ti
		Resin	Metal	Resin	Metal	Resin	Metal	Resin	Metal
Pad Shape Type		L-type: Narrow type 		K-type: Narrow type 		F-type: Narrow type 		K-type: Narrow type 	
Characteristics	Modulation	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★☆
	Power	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★
	Durability	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★
	Anti-fading	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★
	Silence	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★☆	★★★★★	★★★★☆
Pad Radiator fin		X	X	—	—	X	X	—	—
High heat insulation		—	X	—	X	X	X	—	X
Pad Back plate	Titanium	—	—	—	—	—	—	X	X
	Aluminum	X	—	—	—	X	—	—	—
	Stainless steel/Aluminum	—	X	—	—	—	X	—	—

L02Ti-Resin



K02A-Resin



How to use the Bluetooth version of E-Tube  
and what can be done with it.

THANK YOU FOR YOUR ATTENTION