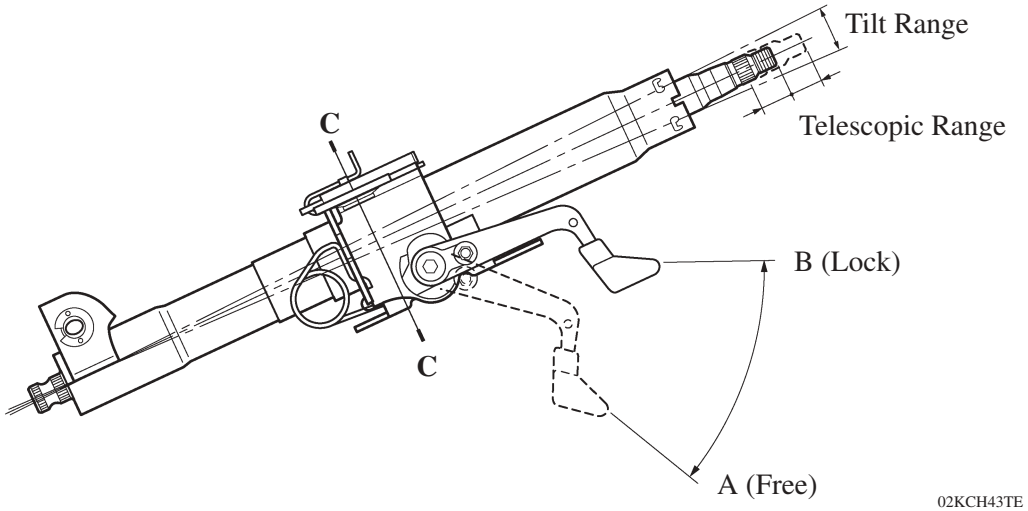
■ STEERING COLUMN

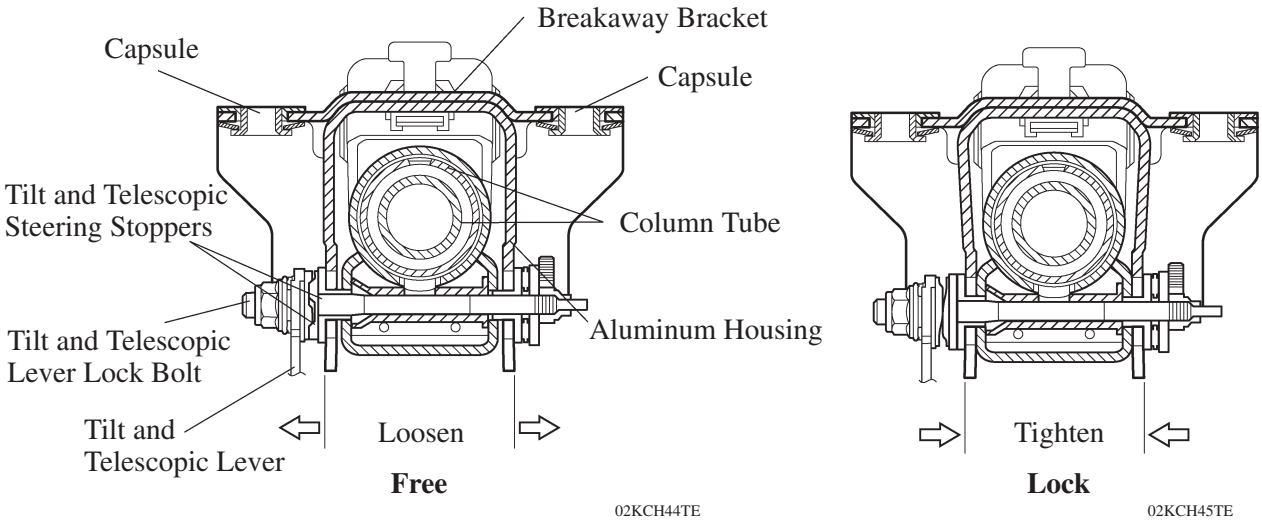
1. Manual tilt and Telescopic Steering Column

- The manual tilt and telescopic mechanism consists mainly of a tilt lever, steering column tube, breakaway bracket, tilt lever lock bolt, and tilt steering stoppers.
- The tilt lever controls the tilt and the telescope motion.
- With the tilt adjustment range of 3.2° (stepless) and the telescopic adjustment range of 40 mm (1.57 in.), the steering column can be adjusted to a position selected by the driver.
- When the tilt and telescopic mechanism is in its locked state, the tilt lever at position B causes the cam of the tilt steering stoppers to tighten the steering column tube.
- When the tilt and telescopic mechanism is in its free state, the tilt lever at position A causes the cam of the tilt steering stoppers to loosen the steering column tube.



Chinese and Taiwanese Models

▶ C – C Cross Section ◀



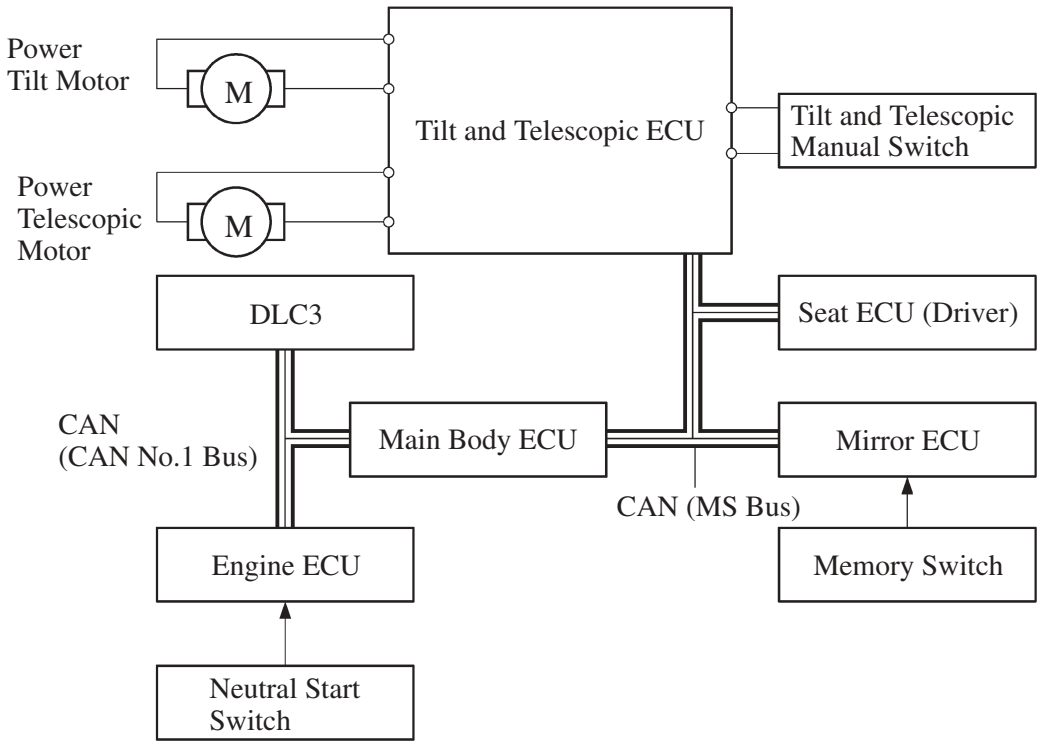
Chinese and Taiwanese Models

2. Power Tilt and Power Telescopic Steering Column

General

- A compact and lightweight power tilt and telescopic steering column is used.
- The automatic set (Away and Return) function is used.
- This steering column contains a driving position memory function, which operates in unison with the driver's seat and outside rear view mirror. This function memorizes 2 driving positions. For driver's seat and outside rear view mirror details, refer to Memory System on page BE-252.

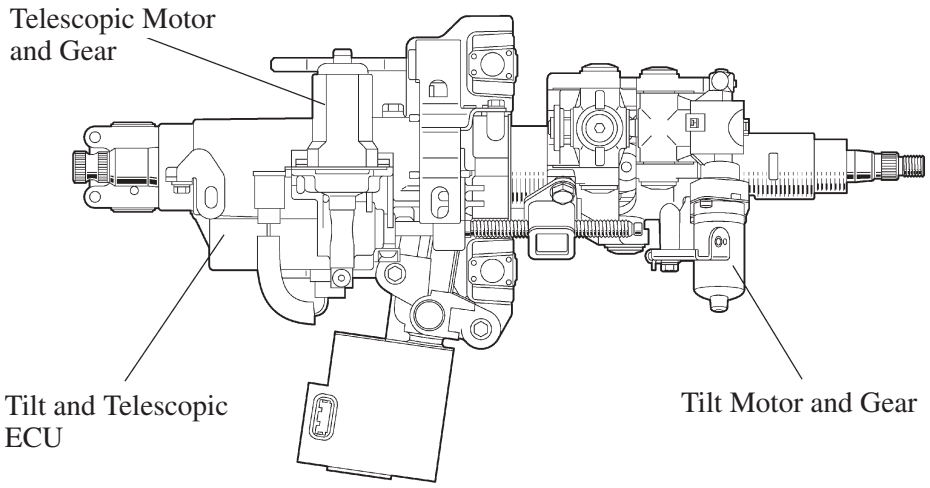
▶ System Diagram ◀



02KCH46TE

Construction

The power tilt and power telescopic steering column consists of the tilt and telescopic ECU, tilt motor, telescopic motor and gears.
The tilt and telescopic motors contain position sensors that use hall elements.



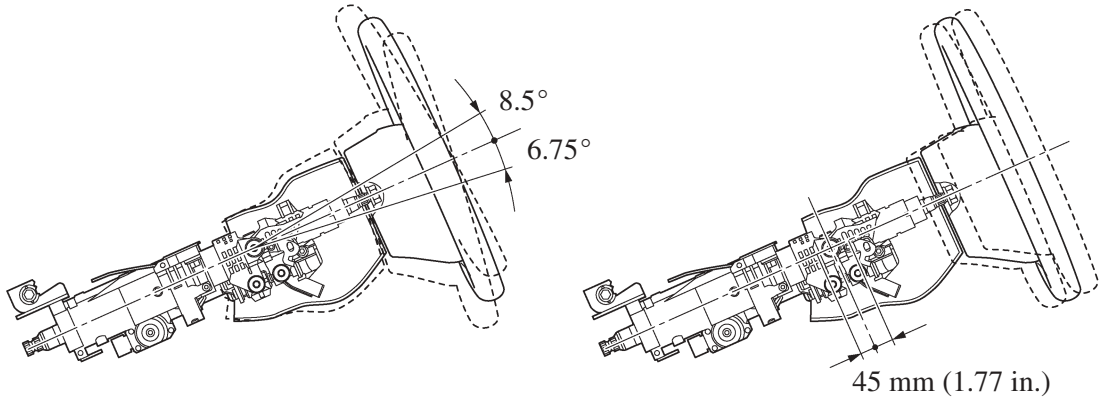
Bottom View

01YCH116Y

Operation

1) Manual Operation

The tilt position and the telescopic position can be adjusted as desired by operating the power tilt and telescopic manual switch.
A stepless adjustment enables the tilt mechanism to be tilted 15.25° vertically, and the telescopic mechanism to be moved 45 mm (1.77 in.) longitudinally.



Tilt **Telescopic**

01YCH106Y

2) Automatic Set (Away and Return) Function

When the engine switch is turned OFF, the steering column moves forward away from the driver and also tilts up for easy exit and entry.
When the engine switch is turned ON, the steering column returns to the previously set position.
The automatic set function can be prohibited by using an intelligent tester II.

3) Driving Position Memory Function

The steering column moves to the previously set position by pressing the driving position memory switches.

4) Position Detection

To detect the position of the tilt and telescopic steering column, position sensors that utilize hall elements are located in the tilt and telescopic motors and are used to detect the changes in the magnetic field of the magnets, which are attached to the shafts of the motors.

Diagnosis

If the tilt and telescopic ECU detects a malfunction in the power tilt and power telescopic steering column system, the ECU stores the malfunction data in memory. Then, by connecting an intelligent tester II to the DLC3 terminal, the DTC (Diagnostic Trouble Code) can be accessed and an active test can be performed to actively operate the tilt motor and the telescopic motor. For details, see the Camry Repair Manual.

Fail-Safe

- If malfunction in the tilt position sensor signal or telescopic position sensor signal occurs while operating the power tilt or power telescopic function, the tilt and telescopic ECU stops the operation of the power tilt and power telescopic steering column system.
- If the power voltage to the ECU drops below approximately 8 V while operating the power tilt or power telescopic function, the ECU stops the operation of the power tilt and power telescopic steering column system.
- If the tilt and telescopic ECU detects that the motor has locked during the operation of the power tilt or power telescopic function, the ECU stops the operation of the power tilt and power telescopic steering column system.
- If the communication of an ECU that is related to the power tilt and power telescopic steering column system is interrupted, the tilt and telescopic ECU effects the controls listed below.

Function	Main Body ECU Communication Interruption	Mirror ECU Communication Interruption	Seat ECU Communication Interruption	All ECUs*1 Communication Interruption
Manual	x*2	○	○	x*2
Automatic Away	x	x	○	x
Automatic Return	x*3	x*3	○	x*3
Memory	x	x	x	x

*1: All ECUs that are related to the power tilt and power telescopic steering column system.

*2:
- The operation is permitted if the engine switch signal is ON while the signal from main body ECU is interrupted.
- The operation is prohibited if the engine switch signal is OFF while the signal from main body ECU is interrupted.

*3:
- In case that the signal from main body ECU is interrupted after the operation was started, the operation will be continued if the engine switch signal is ON.
- The operation is prohibited if the engine switch signal is OFF while the signal from main body ECU is interrupted.

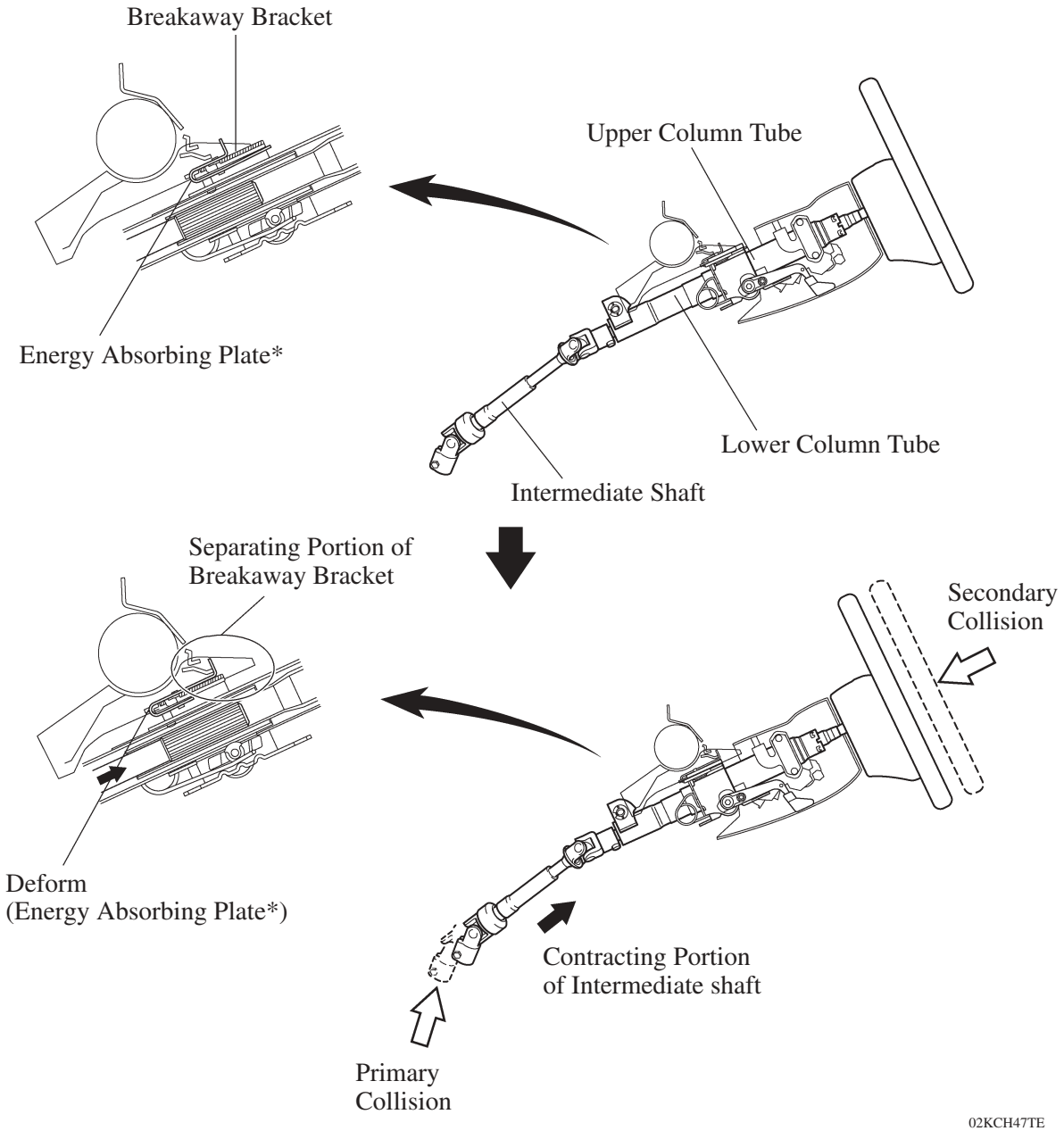
3. Energy Absorbing Mechanism

Manual Tilt and Telescopic Steering Column

- The energy absorbing mechanism consists of a breakaway bracket, breakaway capsule, energy absorbing plate*, upper column tube and lower column tube.
- When an impact is transmitted to the steering wheel during a collision (secondary collision), the steering wheel and the steering wheel pad help absorb the impact. In addition, the breakaway bracket and the reinforcement separate, and the upper and lower column tubes contracts.
- At this time, the energy absorbing plate becomes deformed to help absorb the impact of the secondary collision*.

*: Except Chinese models

▶ **Energy Absorbing Mechanism** ◀



*: Except Chinese models

Power Tilt and Telescopic Steering Column

- The energy absorbing mechanism mainly consists of a lower bracket, breakaway bracket and energy absorbing plate.
- When an impact is transmitted to the steering wheel in a collision (secondary collision), the steering wheel and the steering wheel pad help absorb the impact. In addition, the breakaway bracket and the lower bracket separate, causing the entire steering column to move forward.
- At the time, the energy absorbing plate becomes deformed to help absorb the impact of the secondary collision.

▶ Energy Absorbing Mechanism ◀

