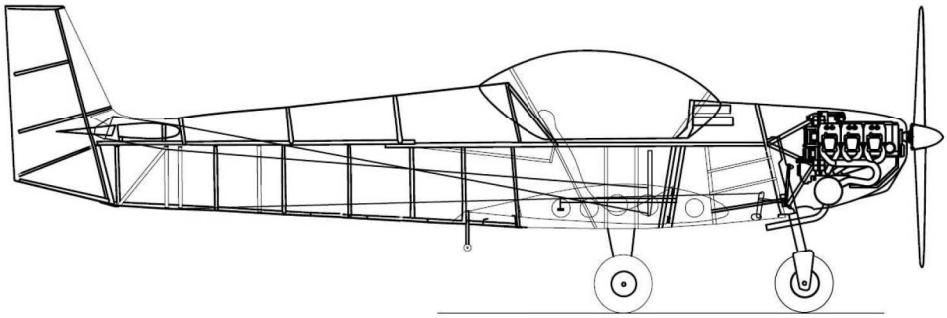
Zenair Photoguide:

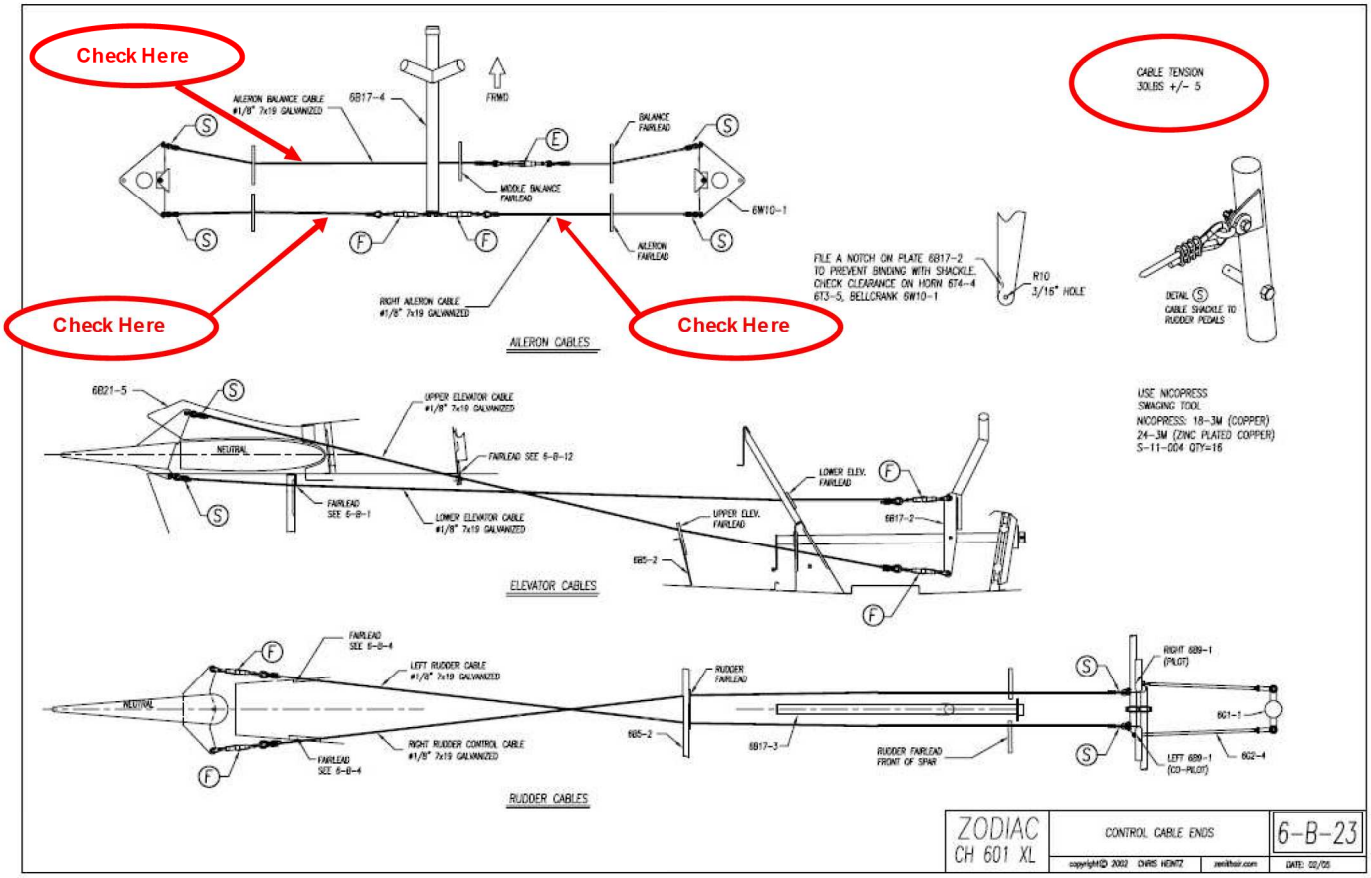
How to check control-cable tension in the Zodiac CH 601XL

- *Drawing Reference*
- *Instrument details*
- *Calibration of tool*
- *Using the tensiometer*
- *Recording Chart*

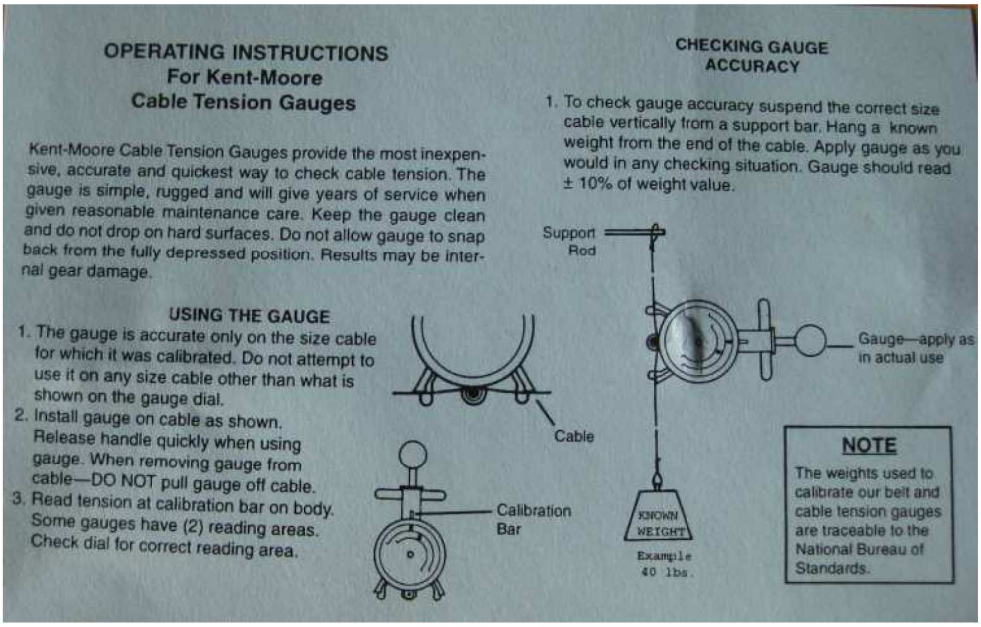
The purpose of this photoguide is to assist aircraft owners conduct the cable tension verification required as stipulated in the Zenair-issued AD #ZE-2008-01.

Proper cable tension is an important factor in the maintenance of an aircraft. As with other type-certificated aircraft, the process described in this photoguide should be carried out on a regular basis for all amateur-built and ULM Zenair CH 601 XL.





The required tool: a cable tension gauge (or “tensiometer”)



OPERATING INSTRUCTIONS
For Kent-Moore
Cable Tension Gauges

Kent-Moore Cable Tension Gauges provide the most inexpensive, accurate and quickest way to check cable tension. The gauge is simple, rugged and will give years of service when given reasonable maintenance care. Keep the gauge clean and do not drop on hard surfaces. Do not allow gauge to snap back from the fully depressed position. Results may be internal gear damage.

USING THE GAUGE

1. The gauge is accurate only on the size cable for which it was calibrated. Do not attempt to use it on any size cable other than what is shown on the gauge dial.
2. Install gauge on cable as shown. Release handle quickly when using gauge. When removing gauge from cable—DO NOT pull gauge off cable.
3. Read tension at calibration bar on body. Some gauges have (2) reading areas. Check dial for correct reading area.

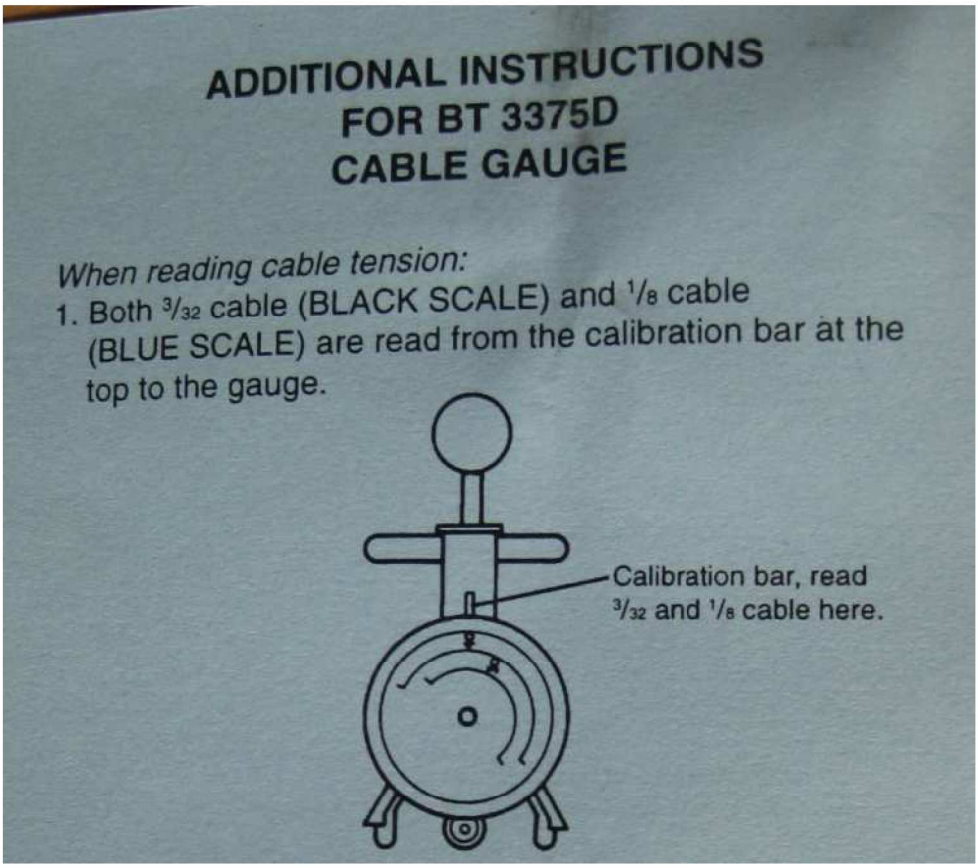
CHECKING GAUGE ACCURACY

1. To check gauge accuracy suspend the correct size cable vertically from a support bar. Hang a known weight from the end of the cable. Apply gauge as you would in any checking situation. Gauge should read ± 10% of weight value.

Support Rod
Gauge—apply as in actual use
Cable
Calibration Bar
KNOWN WEIGHT
Example 40 lbs.

NOTE
The weights used to calibrate our belt and cable tension gauges are traceable to the National Bureau of Standards.

BURROUGHS CABLE GAUGE BT33-75D



ADDITIONAL INSTRUCTIONS FOR BT 3375D CABLE GAUGE

When reading cable tension:

1. Both 3/32 cable (BLACK SCALE) and 1/8 cable (BLUE SCALE) are read from the calibration bar at the top to the gauge.

Calibration bar, read 3/32 and 1/8 cable here.

Control cables on the CH 601 XL are all 1/8” cables

ULM Technologie can be contacted on-line or at:
33-(0)3 27 33 20 20

Note: Different types and brands of this instrument exist. Some clubs have them for use by their members; they can also be borrowed or purchased. The one pictured here is item #33211 from the ULM-Technologie catalogue.

Checking gauge accuracy:

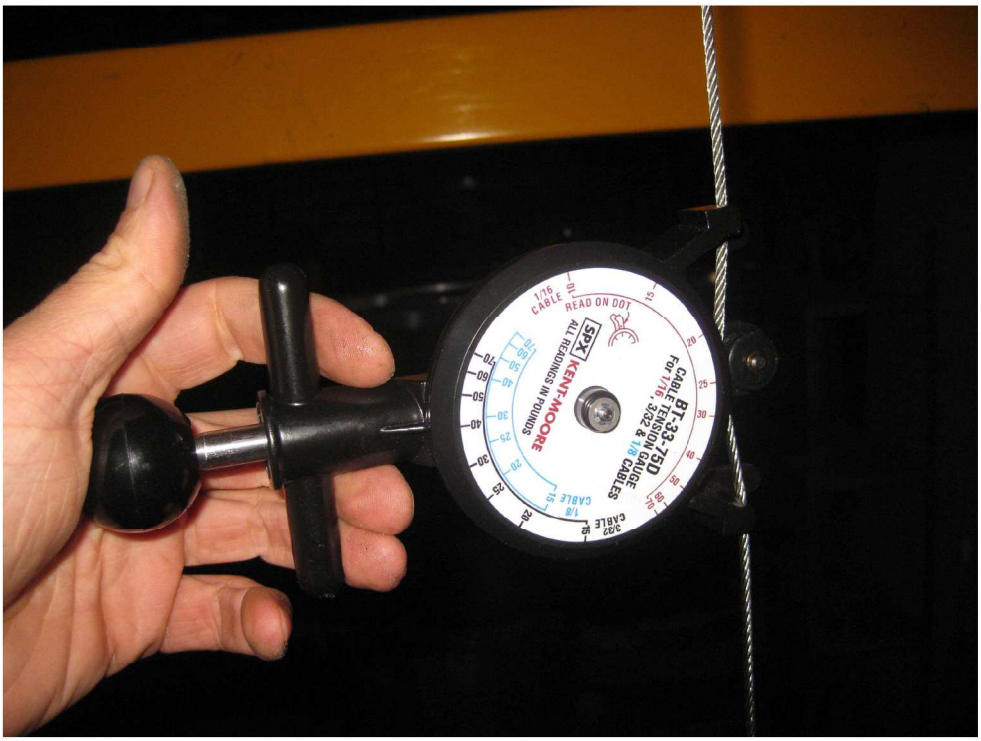
Need a "known weight"

Weight calibration

In this example:
14 kg (approx. 31 lbs)
(water in container)

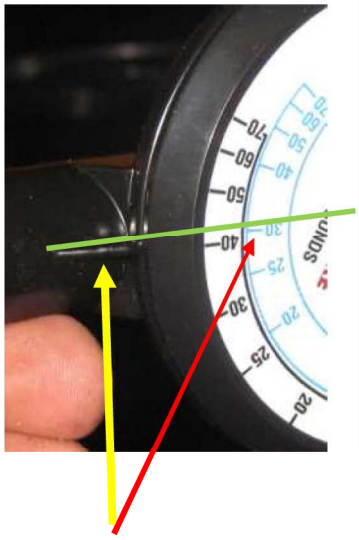
CONVERSION:
1KG =2.2 LBS

Test weight hanging freely at end of 1/8" control cable

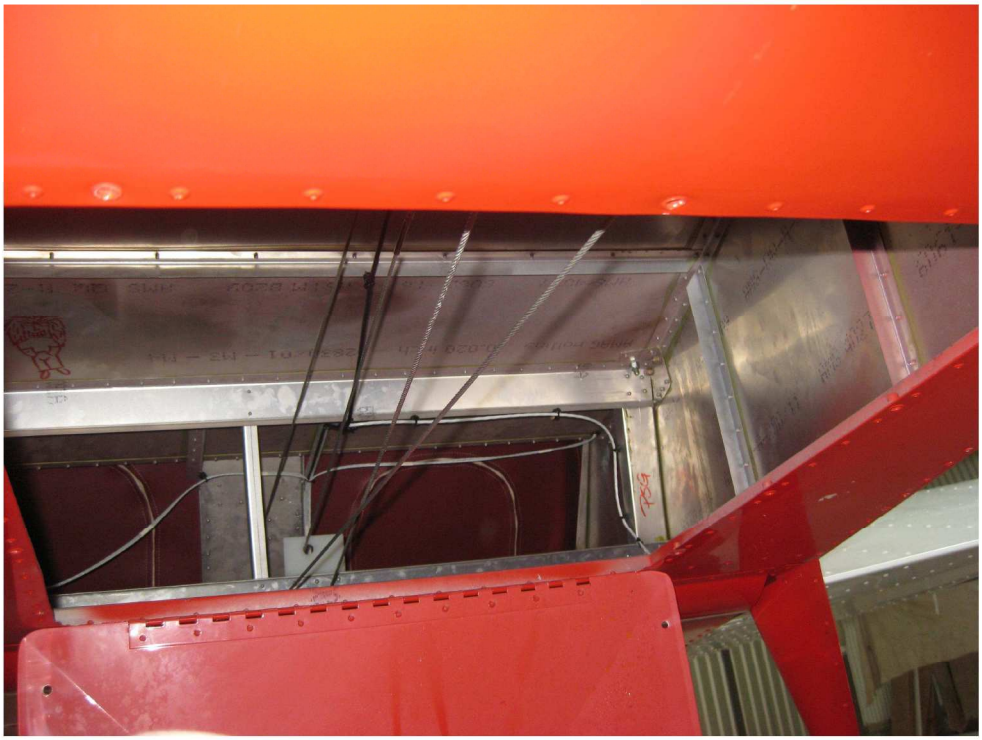


Proper application of tensiometer

Detail: suspended cable with test weight.

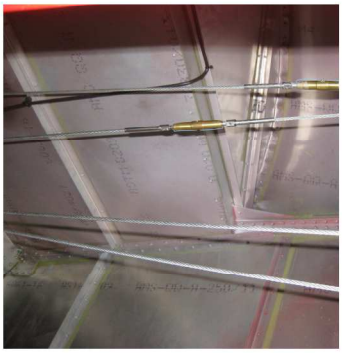


Index mark
(read blue scale for 1/8 cables)



Checking cables to the rudder and elevator. Two ways to do this:
a) Through the bottom fuselage access panel (shown on these pictures), or
b) From cabin area, reaching behind seat backs.

Below: Turn-buckles to be used if cable tension needs to be adjusted.



Easy access to control cables and to turn-buckles through bottom fuselage door.

View of control cables as seen through bottom fuselage door (looking forward towards back of seats.

If fuselage door not installed, elevator cable tension can be measured through access holes behind seat backs.

Elevator Cables:

Above: Checking elevator cable tension inside fuselage.

Check tension of top and bottom elevator cables.

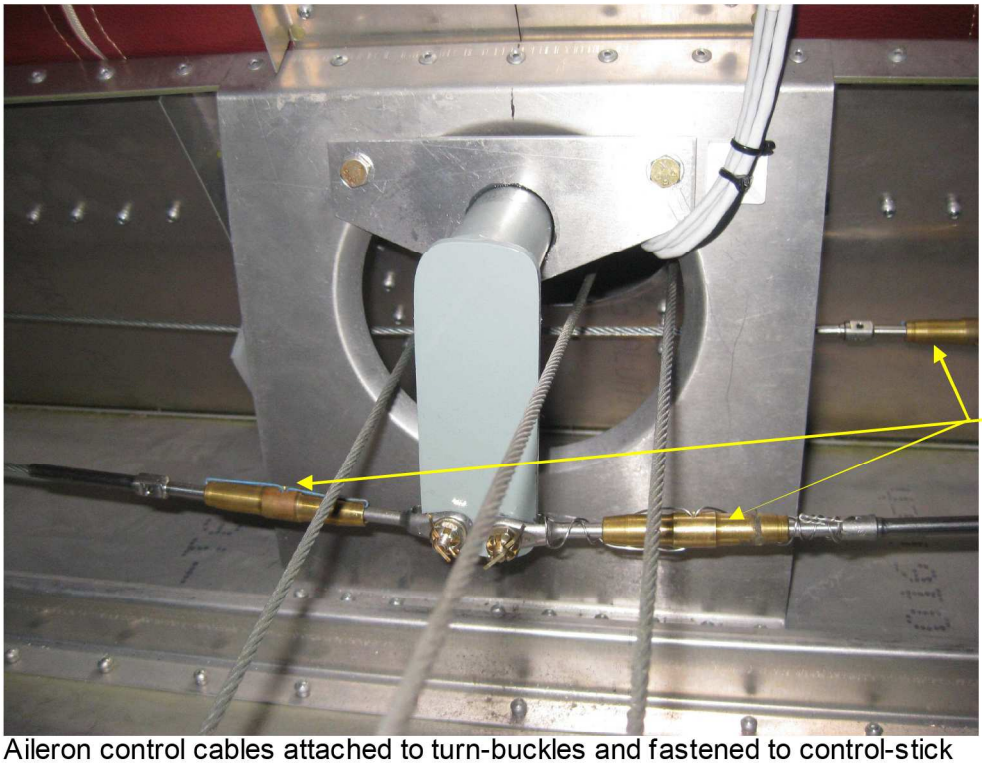
Note: When adjusting the tension on one cable, tension on the other cable in the system will also likely change. Adjust cables so that they balance out within specifications.

Rudder Cables:

IMPORTANT: Remember to lift nose-wheel off the ground when measuring cable tension for rudder!

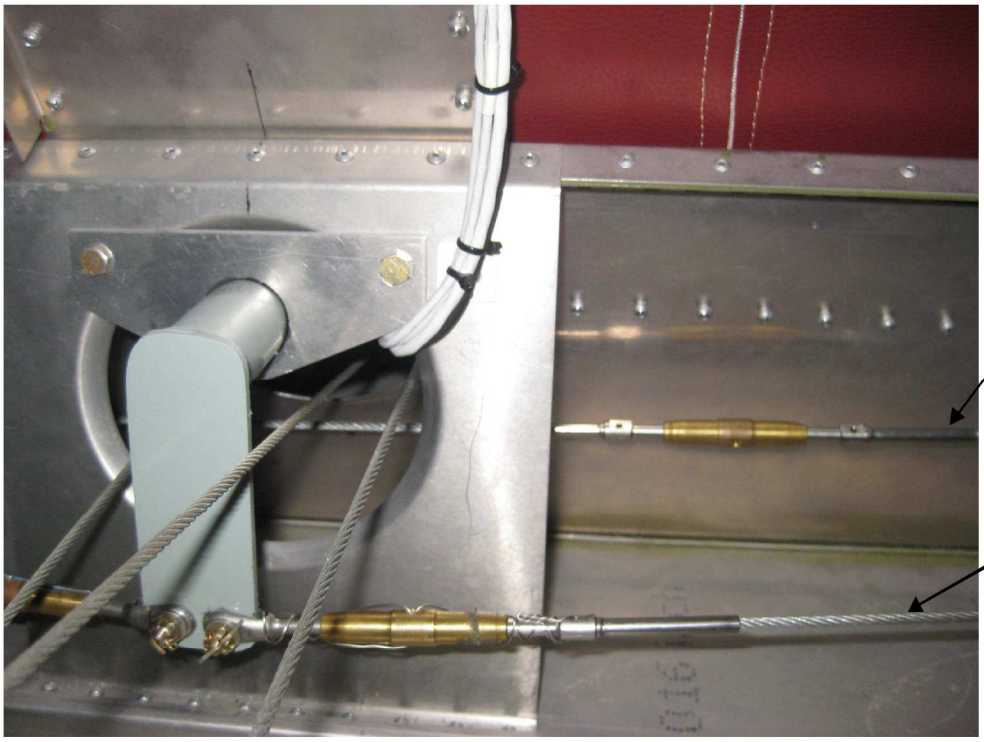
Have nose wheel lifted off the ground while rudder cable tension is checked.
(no necessary with tail dragger)

Aileron Cables:

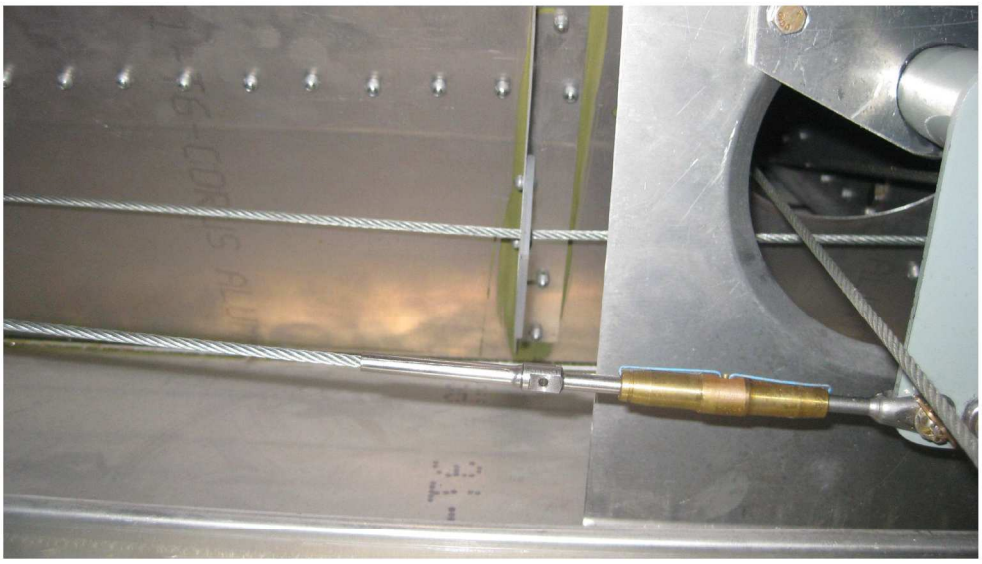


Aileron control cables attached to turn-buckles and fastened to control-stick bellcrank.

The aileron cables can easily be reached from the cabin area, behind seat backs.



Note the aileron turn-buckle for the "balance cable" (forward of the right aileron cable in the background of this photo)



Above: Cable turn-buckle (for left-side aileron) in foreground ; aileron balance cable and fairlead above (in background)

Check tension in all three aileron cables:

- Right cable
- Left cable
- Balance cable

The tension for each should be within 5 pounds of 30 lbs.

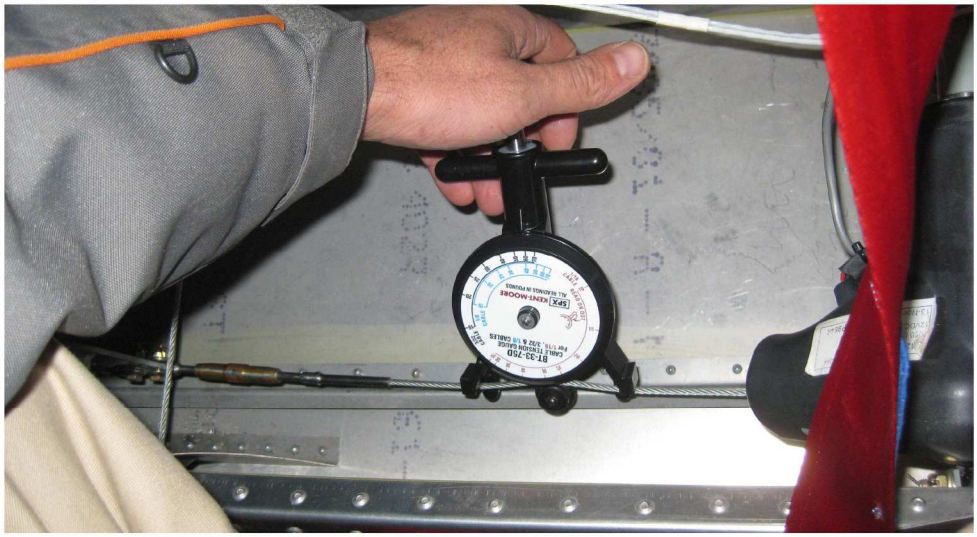


Photo of tensiometer on left Aileron cable seen from pilot seat (see flap motor on right). Repeat process on right aileron cable, behind passenger seat.

pounds =	kilograms
15	6.804
20	9.072
25	11.34
30	13.608
35	15.876
40	18.144
45	20.412

Adjust tension as necessary by using the appropriate turn-buckles.

Note: When changing the tension on one aileron cable, tension on the other two aileron cables will likely also change. Adjust the cables so that they balance out within specifications.

Remember to safety each turnbuckle (with clips or safety-wire) after it has been adjusted.

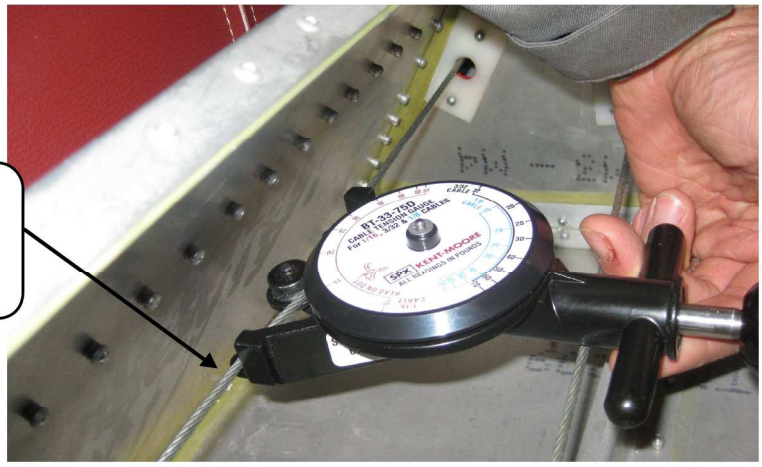


Photo of tensiometer on balance cable, behind pilot seat

Last step: record verification in logbook when required.

Record of Control-Cable Verification for A.D. No. ZE-2008-01

Aircraft Model: **Zenair CH 601** _____		Aircraft Serial #:
Date of Mfg.:	Registration #:	Country:
Owner:		
Address:		
Tel.	e-mail:	
Date of inspection:	Location:	
Inspected/adjusted by:		

Note of recorded cable tensions:

Cable	Tension Needed:	Tension found (lbs):	Adjusted to (lbs):
Right Aileron	30 lbs +/- 5 lbs.		
Left Aileron	30 lbs +/- 5 lbs.		
Aileron Balance	30 lbs +/- 5 lbs.		
Up Elevator (from lower stick)	40 lbs +/- 5 lbs.		
Down Elevator (from upper stick)	40 lbs +/- 5 lbs.		
Right Rudder	22 lbs +/- 5 lbs.		
Left Rudder	22 lbs +/- 5 lbs		