

Kell-Strom

Kell-Strom Tool Company Inc.

214 Church Street; Wethersfield, Connecticut 06109; USA

Tel: 860 529-6851, 800 851-6851; FAX: 860 257-9694

www.kell-strom.com Email: kell-strom@kell-strom.com



KS5582 DIGITAL PROTRACTOR UNIVERSAL ATTITUDE ADAPTER

INSTRUCTIONS FOR USE

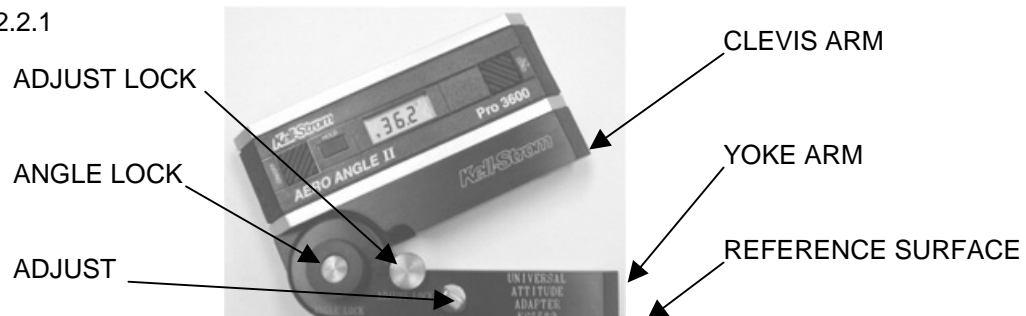
1. INTRODUCTION

- 1.1. The Kell-Strom 'Aero-Angle' Digital Protractor has been successfully used for many years in a number of applications. However, the design of the electronics does not provide for an angular measurement in any axis other than the relational change between the horizontal (X) and the vertical (Y) along the longitudinal axis of the Protractor. Measurement of angular relational change between X and Z axes when rotated on the Y axis or relational change between the X or Y axes and the Z axis when rotated on the radial axis of the Protractor is also not possible directly with the current electronics. In short, anything other than vertical angular change can not be measured directly.
- 1.2. The Universal Attitude Adapter, by utilizing the principle of similar triangles and by making use of all of the Aero-Angle's features, overcomes the limitations of the Protractor's electronics. With the addition of the Universal Attitude Adapter, the user will be able to accurately measure any angle where there is space for the Protractor and Adapter Assembly or where the angle's sides can be extended and/or represented.
- 1.3. Be sure the Universal Attitude Adapter is assembled to the Protractor before continuing. The Adapter is attached to the base of the Protractor in exactly the same fashion as any template or magnetic base through the Clevis Arm of the Adapter.

2. DIRECTIONS FOR USE AS A NORMAL PROTRACTOR

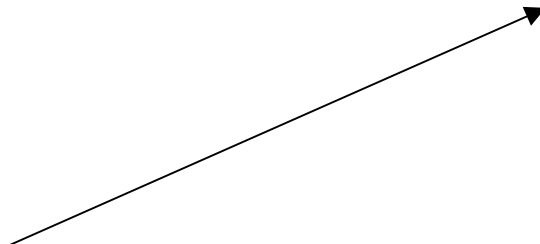
- 2.1. It is first important to know your Digital Protractor. All of the features are made use of when using the Universal Attitude Adapter. Please read the Aero-Angle instruction booklet and have it ready for consultation before continuing.
- 2.2. Loosen both the 'ANGLE LOCK' and 'ADJUST LOCK' knobs until they move freely and the Adapter arms open and close easily with minimal resistance. See Fig 2.2.1.

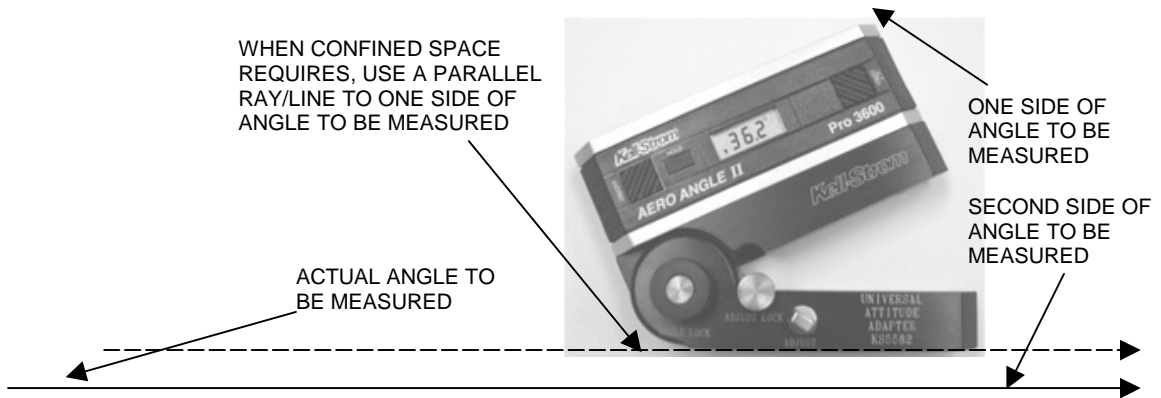
2.2.1



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- 2.3. Close the Adapter Arms fully and hold them together with one hand tightly. This is done by gripping the entire Assembly, Protractor and Adapter, and squeezing in one hand.
 - 2.4. With the free hand, tighten the 'ANGLE LOCK' knob very tightly. (In time, you will learn just how tight this needs to be by feel.)
 - 2.5. Again, with the free hand, tighten the 'ADJUST LOCK' slightly less than tight but more than snug. (In time, you will learn just how tight this needs to be by feel.)
 - 2.6. The Adapter Clevis Arm bottom surface now becomes the reference surface for the Protractor and Adapter Assembly. The Protractor can be used in it's regular fashion at this point as long as the Adapter Arms are locked in place and not open in the slightest.
3. USING THE PROTRACTOR AND UNIVERSAL ATTITUDE ADAPTER AS AN ASSEMBLY FOR MEASURING NON-VERTICAL ANGLES.
- 3.1. Same as 2.1-2.3
 - 3.2. With the free hand, tighten the 'ANGLE LOCK' knob very snugly, almost tight. (In time, you will learn just how tight this needs to be by feel.)
 - 3.3. Again, with the free hand, tighten the 'ADJUST LOCK' slightly less than snug, almost loose. (In time, you will learn just how tight this needs to be by feel.)
 - 3.4. Locate a clean *FLAT* surface close to your work area and set the Assembly, Protractor up, on that surface. The top of a closed toolbox lid or toolbox front shelf will usually work just fine. This surface will become your working reference plane for every measurement made during the given work session. Other surfaces and reference planes will undoubtedly be used in other measuring environments and conditions.
 - 3.5. Turn on the Protractor and let it find it's angle. Do not worry about what the read-out is.
 - 3.6. Push the 'ALTERNATE ZERO' button and wait for the Protractor to re-zero itself to the working reference plane.
 - 3.7. Remember this: When using the Adapter to measure angles, it is required that the same reference plane always be used in the given session *UNLESS YOU RE-SET THE ALTERNATE ZERO TO A NEW PLANE.*
 - 3.8. To measure angles other than X to Y axes relationships, lay the Protractor-Adapter Assembly on it's side, control and read out face up, with the top of the Protractor against one side of the angle to be measured or along the same angle's extended line. (See figure 3.11.1)
 - 3.9. With one hand, hold the Protractor only in place against the working surface(s), especially 'down'.
 - 3.10. Loosen the 'ANGLE LOCK' knob slightly, enough so that the Yoke Arm of the Adapter can be moved away from the Clevis Arm and Protractor easily. (You may have to loosen the 'ADJUST LOCK' slightly as well.)
 - 3.11. Open the Clevis Arm so that the bottom reference surface of the Clevis Arm is aligned completely with the other side of the angle to be measured or parallel with an extended line of the same side of the angle. You may have to relocate the Assembly to do this. You can also extend both sides of the angle with a straight edge if necessary where space is limited. Just align both the protractor top and the Clevis Arm reference surface parallel to the extended side(s). (See figure 3.11.1)
 - 3.12. Tighten the 'ANGLE LOCK' just less than snug.
 - 3.13. Turn the 'ADJUST' knob to "fine tune" the position of the Clevis Arm so that it is perfectly in alignment with or parallel with the side of the angle being measured.
 - 3.14. Tighten the 'ADJUST LOCK' knob fully.
 - 3.15. Tighten the 'ANGLE LOCK' knob fully.
 - 3.16. Relocate the Protractor and Adapter Assembly to the previously established reference surface; i.e. tool box lid, Protractor in it's 'normal' position and the Adapter Clevis Arm bottom on the reference surface.
 - 3.17. Read the angle of the Protractor sitting on the angle formed by the Adapter. This is the same angle as the one just measured. (See figure 3.17.1)





3.17.1



REFERENCE PLANE/SURFACE

- 3.18 Note: Be careful not to accidentally contact the 'ALTERNATE ZERO' or 'ON OFF' switches on the Protractor during this operation. You will definitely get false readings. And that's all there is to it!

For questions or problems, contact Kell-Strom Tool, Co. at:

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