



## IAC-90 Angular Protractor



### PRECISION ANGULAR PROTRACTOR

The IAC-90 angular protractor is an electromechanical device used to measure the relative rotation between movable surfaces; it consists of two light alloy rigid arms rotating around the same axis, two pulley mechanisms and toothed belts installed on each of the two arms.

A goniometric scale and a decimal vernier scale are used for direct reading of the angular position.

An angular position transmitter, which converts mechanical rotation into electrical signals to be used by an external control unit, is pivoted on the same axis, opposite to the scale.

The IAC 90 is particularly suitable for testing the aircraft control surfaces during its ground check.

Protractor can be supplied with two different type of plates:

- The screw type plate;
- The suction type plates ( this type needs a vacuum source device for fixing to surfaces under test ).

A special bearing on the mounting and a cylindrical hinge allow the protractor to be used for checking relative rotation between movable surfaces having a transversal misalignment of 20 mm (0.8 inch.) max.

### FEATURES

- Mechanical accuracy:  $\pm 0.1$  deg.
- Total accuracy with analogic transmitter:  $\pm 0.3$  deg.
- Total accuracy with medium resolution digital transmitter:  $\pm 0.2$  deg.
- Total accuracy with high resolution digital transmitter:  $\pm 0.12$  deg.
- Mechanical zero adjustment.
- Electrical zero adjustment.
- Translation effects: less than 0.05 deg.
- Ideal plane motion with less than 0.8 inch transversal misalignment.
- Screw or suction plate fixing.
- Computer controlled reading system with 4, 8 or 16 channels.

### SPECIFICATIONS

The IAC-90 can measure relative rotation angle between movable surfaces by direct reading or by a control unit .

The IAC can be supplied with two different types of transmitter: analogic type, a high linear angular potentiometer, or digital encoder; medium resolution (0.1 degrees) or high res (0.025 degrees) encoders can be selected.

Three types of control units can be used: MAN-4, MAN-8 or MAN-16 to read 4, 8 or 16 protractors simultaneously.



The control unit can read the two types of angular sensors, and can be used as heart of automatic test systems; it can be provided with analog output or with PWM motor control output.

Angle values can be zeroed in any position and can be transmitted trough RS232 serial output.

Upon request MAN-X can be supplied complete with vacuum source and pneumatic circuit to permit suction plate fixing. With suction type plate three rigid bearings assure the right coupling between the plate and the movable surfaces.



## STANDARD SPECIFICATIONS

Operating temperature range, from -0°C to +50°C

### PERFORMANCES

Range:  
-90 ÷ +90 deg

Accuracy:  
(mechanical) ± 0.1 deg  
(total w/ potentiometer) ± 0.3 deg  
(total w/ m.res.encoder) ± 0.2 deg  
(total w/ h.res.encoder) ± 0.12 deg

Resolution:  
(mechanical) 0.1 deg  
(potentiometer) 0.01 deg  
(med.res.encoder) 0.1 deg  
(hi.res.encoder) 0.025 deg

Translation effects on angle accuracy  
<= 0.05 deg

Transversal misalignment:  
IAC90 plane motion to max 0.8 inch

### CONTROLS

Mechanical zeroing in any position  
Electrical zeroing on the MAN X  
Mechanical and electrical zero can be different  
Mechanical zero is maintained until new adjustment

### FIXING

With screw  
Suction plate with three points rigid support

### CALIBRATION

Calibration time interval:  
IAC 90 w/ potentiometer 6 months  
IAC90 w/ encoder 12 months

Automatic, software driven with TIP180  
TIP180 resolution 0.01 deg  
TIP180 accuracy ± 0.02 deg

### MAN-XX CONTROL UNIT

4, 8 or 16 channel  
LCD backlit display, keypad and RS232 serial data output  
± 10 Volt analog output (optional)  
PWM DC servomotor controller (optional)  
Pump with pneumatic circuit for suction plate fixing (optional)

### POWER SUPPLY

110 to 240 VAC

### WARRANTY

IAC90 one year  
MAN-XX one year

### OPTIONS

Long translation unit (IAC90L)  
Windows based software for PC controlled test system

Note: --- Specifications subject to change ---



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