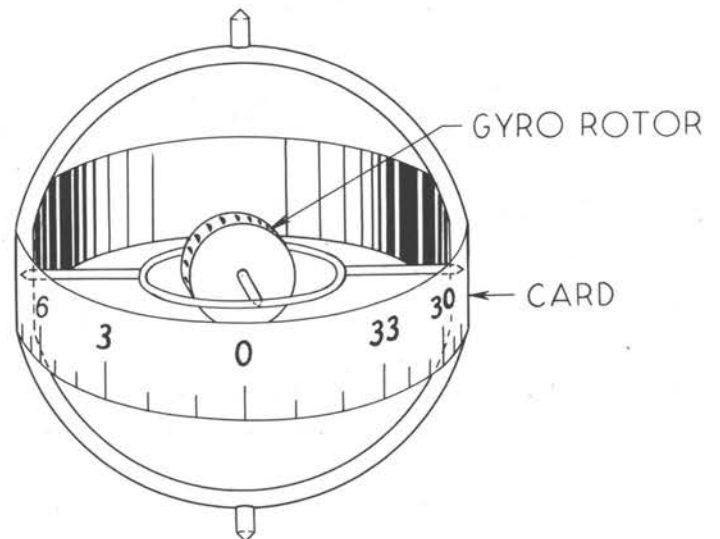




## DIRECTIONAL GYRO

The directional gyro, or turn indicator, is used to establish a fixed reference for maintaining flight direction. It supplements the compass in keeping a specific course, indicates magnitude of turn, and assists in maintaining airplane alignment when making instrument landings. The turn indicator is valuable when used in conjunction with the compass card, because the indicator neither swings nor oscillates when the airplane changes direction.



Basically, the directional gyro consists of either an electrically driven or a vacuum-driven gyroscope, restrained so that the axis of rotation of the gyroscope may not become completely vertical, but providing freedom of motion in all other directions within a stationary frame fixed to the airplane. When the airplane turns, the gyro tends to remain fixed. A scale, graduated in degrees of azimuth, which is attached to a vertical ring support of the gyro, is visible to the pilot through a rectangular opening in the instrument face. This card remains fixed with the gyro rotor, and, as the airplane turns, it affords an indication of the change in the airplane's direction.

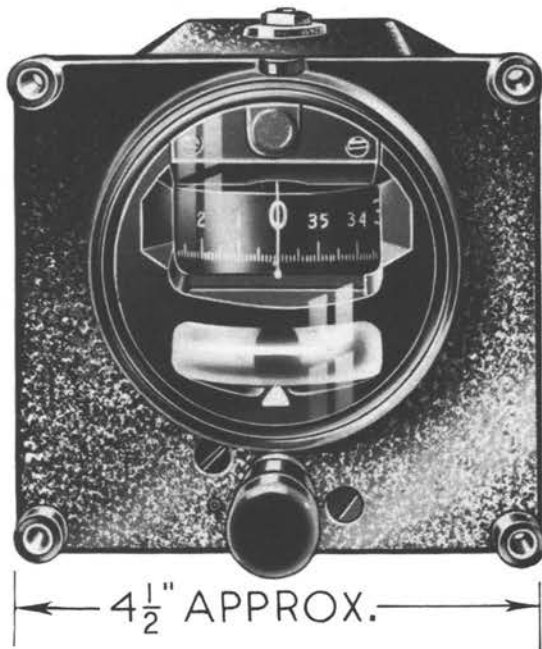
A "caging" mechanism which locks the gyro axis horizontal is provided, in order to align the gyroscope. The caging knob permits setting a reference reading on the indicator card. During violent maneuvers, the instrument should be caged, to avoid damage.

Some indicators (Type "B") have provision for remotely adjusting the indicator card reading through a flexible shaft and remote controller. This arrangement permits the navigator, from his station, to correct the course setting on the pilot's turn indicator card.

Older instruments are provided with an inclinometer, or ball level, which indicates whether the proper bank is being maintained during turns, and also shows whether or not the airplane wings are level during straight flight.

The source of vacuum for vacuum-operated gyros may be either an engine-driven air pump or a venturi tube. A filter must be provided to clean the air entering the instrument. This filter may be a large one, used for all the vacuum instruments in the airplane, or each instrument may be provided with an individual filter.

Electrically-driven instruments utilize an inverter in the airplane as a source of alternating current power.



## INDICATOR—DIRECTIONAL GYRO

### ARMY TYPE A-3

NAMES: Directional gyro indicator  
Turn indicator

Gyro directional indicator

DESCRIPTION: The Army type A-3 directional gyro indicator is equipped with a vacuum-driven gyroscope. The dial includes a ball bank inclinometer. This unit is mounted on the instrument panel in the pilot's compartment. It is connected through a vacuum gage and selector valve to a source of vacuum, either an engine driven air pump or a venturi tube.

#### CHARACTERISTICS:

Dimensions . . . . .	approximately 4 1/2 by 5 1/4 by 6 inches
Weight . . . . .	approximately 4 1/4 pounds
Air filter . . . . .	individual or central
Illumination . . . . .	3-volt dial lamp
Markings . . . . .	fluorescent radio-active
Power . . . . .	vacuum—4 inches of mercury
Vacuum connections . . . . .	two 1/4-inch internal pipe thread

#### ARMY

A. E. REFERENCE NUMBER: 60-7500

#### SPECIFICATIONS:

Detail . . . . .	94-27800
Superseded . . . . .	27800

TYPE DESIGNATION: A-3

MANUFACTURER: Sperry Gyroscope Company.

MANUFACTURER'S PART AND DRAWING NUMBER: 642805

A. S. C. STOCK NUMBER: 6000198325

TECHNICAL ORDER NUMBER: 05-20-4

PRODUCTION STATUS: Not under procurement for initial installation.

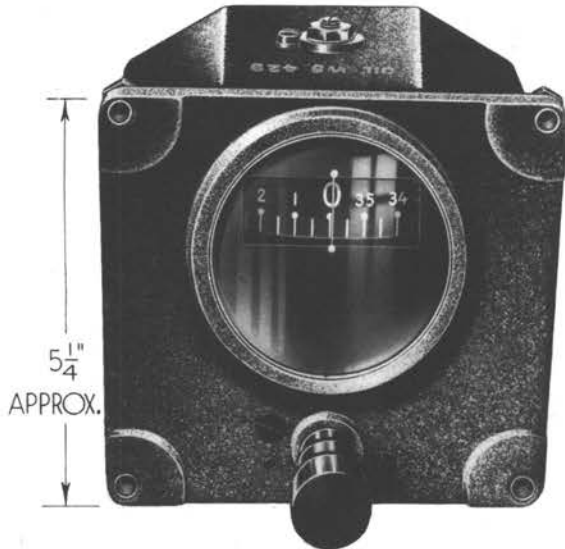
SHIPPING DATA: Shipped as a complete unit.

#### NAVY

There is no Navy equivalent for the Army item.

#### BRITISH

BRITISH REFERENCE NUMBER: 106A/635



## INDICATOR—DIRECTIONAL GYRO

AN5735-2 F.S.S.C. NUMBER 88-I-969

NAMES: Directional gyro indicator  
Turn indicator

Gyro directional indicator

DESCRIPTION: This unit is equipped with a vacuum-driven gyroscope, and is used on night fighters. It is mounted on the instrument panel in the pilot's compartment, and is connected through a vacuum gage and selector valve to a source of vacuum, either an engine driven air pump or a venturi tube.

### CHARACTERISTICS:

Dimensions .....	approximately 4½ by 5¼ by 7 inches
Weight .....	approximately 4¼ pounds
Air filter .....	individual or central
Illumination .....	none
Markings .....	fluorescent
Power .....	3½ inches of mercury vacuum
Vacuum connections .....	three ¼-inch internal pipe thread

### ARMY

A. E. REFERENCE NUMBER: 60-6050

#### SPECIFICATIONS:

Detail .....	AN-GG-I-496
Superseded .....	94-27963

MANUFACTURER: Sperry Gyroscope Company, Incorporated.

MANUFACTURER'S PART AND DRAWING NUMBER: 647910

AN DRAWING NUMBER: AN5735

AN PART NUMBER: AN5735-2

A. S. C. STOCK NUMBER: 6000198050

TECHNICAL ORDER NUMBER: 05-20-10

PRODUCTION STATUS: Under procurement.

SHIPPING DATA: Shipped as a complete unit.

### NAVY

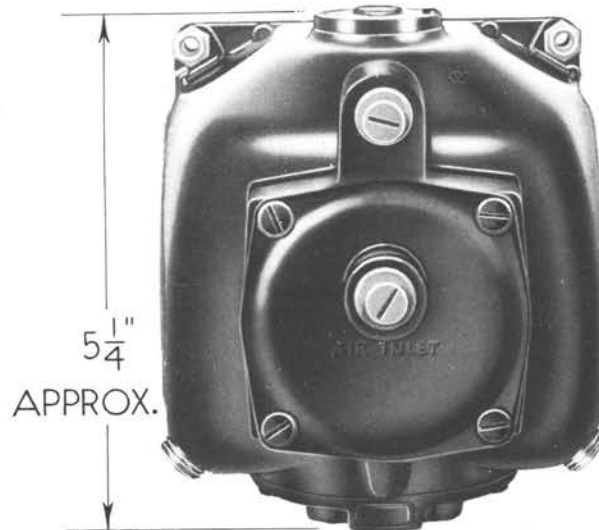
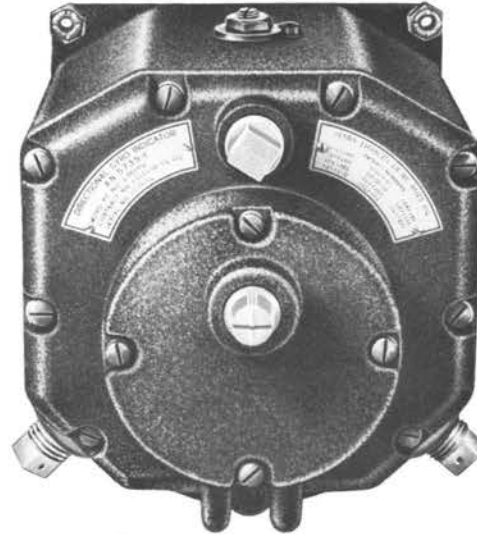
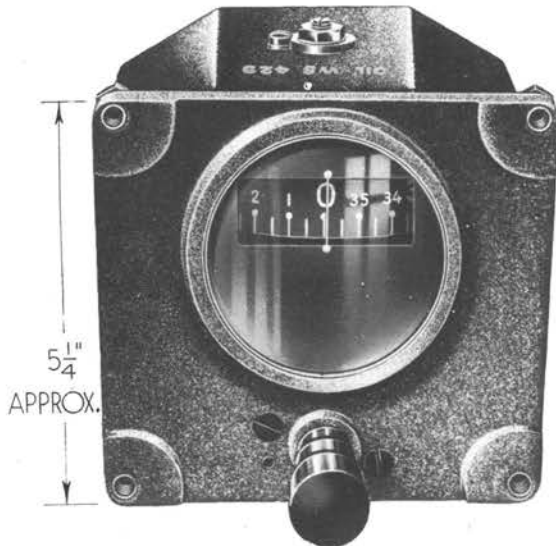
#### SPECIFICATIONS:

Detail .....	AN-GG-I-496
Superseded .....	Bureau of Aeronautics SQ-88, SQ-13

AN DRAWING NUMBER: AN5735

F. S. S. C. STOCK NUMBER: 88-I-969

PROCUREMENT STATUS: Standard. G. F. E.—Order through A. S. O. by F. S. S. C. number.



## INDICATOR—DIRECTIONAL GYRO

AN5735-1    FORMER ARMY TYPE A-5    FORMER NAVY MARK 1-A  
F.S.S.C. NUMBERS 88-I-965, 88-I-970, 88-I-1000

NAMES: Directional gyro indicator  
Turn indicator

Gyro directional indicator

DESCRIPTION: This unit is equipped with a vacuum-driven gyroscope with its operating range limited to 55 degrees climb, dive, or bank. It is mounted on the instrument panel in the pilot's compartment and connected through a vacuum gage and selector valve to a source of vacuum, either an engine driven air pump or a venturi pump. Early models were furnished with a ball type inclinometer bank indicator.

*(Continued on page 235)*

INDICATOR—DIRECTIONAL GYRO

(Continued from page 234)

CHARACTERISTICS:

Dimensions . . . . . approximately 4½ by 5¼ by 7 inches  
 Weight . . . . . approximately 4¼ pounds  
 Air filter . . . . . individual or central  
 Illumination . . . . . none  
 Markings . . . . . fluorescent, radio-active  
 Power . . . . . 3½ inches of mercury vacuum  
 Vacuum connections . . . . . three ¼ inch internal pipe thread

ARMY

A. E. REFERENCE NUMBER: 60-6000

SPECIFICATIONS:

Detail . . . . . AN-GG-I-496  
 Superseded . . . . . 94-27963

AN DRAWING NUMBER: AN5735

AN PART NUMBER: AN5735-1

A. S. C. STOCK NUMBER: Refer to chart.

TECHNICAL ORDER NUMBER: Refer to chart.

PRODUCTION STATUS: Under procurement.

SHIPPING DATA: Shipped as a complete unit.

NAVY

SPECIFICATIONS:

Detail . . . . . AN-GG-I-496  
 Superseded . . . . . Bureau of Aeronautics SQ-88, SQ-13

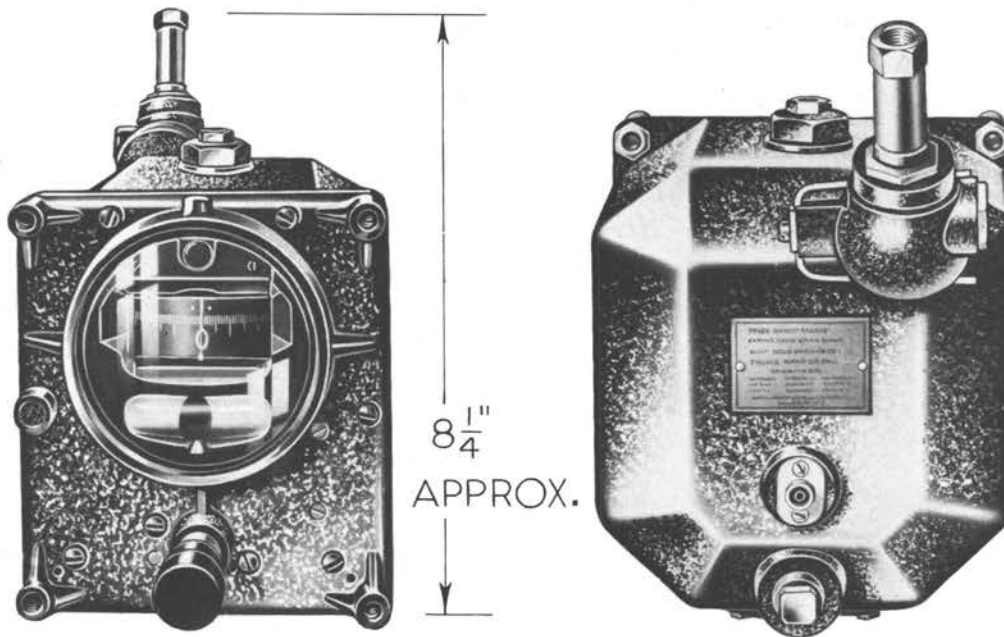
AN DRAWING NUMBER: AN5735 former N. A. F. 39972

F. S. S. C. STOCK NUMBER: Refer to chart.

PROCUREMENT STATUS: Standard. G. F. E.—Order through A. S. O. by F. S. S. C. number.

**ALL MODELS BELOW ARE INTERCHANGEABLE**  
**Models are used in services as noted in column 3**  
**A-Army, N-Navy, B-British, C-Commercial**

Manufacturer	Manufacturer's Part and Drawing Number	Used By	Air Service Command Stock Number	Army Technical Order Number	Federal Standard Stock Catalog Number	British Reference Number	Current Model (X)	Remarks
Sperry Gyroscope Co., Inc.	641362	N-B-C			88-I-1000	106A/687		Has ball inclinometer. Former F. S. S. C. Number 88-I-385.
	644730	A-N-B-C	6000236295 6000236290	05-20-4	88-I-970	106A/688		Has ball inclinometer.
	646050	A-N-B-C	6000198085	05-20-10	88-I-970	106A/690	X	
Jack & Heintz, Inc.	JH5500	A-N-B	6000198075		88-I-970	106A/690	X	
Ternstedt Manufacturing Division	T95090-1	A-N-B	6000198100	05-20HB-1	88-I-970	106A/690	X	
Electric Auto-Lite Co.	AL4000	N-B			88-I-965	106A/690	X	



## INDICATOR—DIRECTIONAL GYRO

### ARMY TYPE B-3

NAMES: Directional gyro indicator  
Turn indicator

Gyro directional indicator

DESCRIPTION: The Army type B-3 directional gyro indicator is equipped with a vacuum-driven gyroscope. The dial includes a ball bank inclinometer. This unit, mounted on the instrument panel in the pilot's compartment, is connected through a vacuum gage and selector valve to a source of vacuum, either an engine driven air pump or a venturi tube. A connector is provided on the rear of the case for attaching the flexible cable when a remote indicator turn control is used with the instrument.

CHARACTERISTICS:

Dimensions .....	approximately 4½ by 6 by 8¼ inches
Weight .....	approximately 5 pounds
Air filter .....	individual or central
Illumination .....	3 volt dial lamp
Markings .....	fluorescent radio-active
Power .....	vacuum—4 inches of mercury
Vacuum connection .....	one ¼ inch internal pipe thread

#### ARMY

A. E. REFERENCE NUMBER: 60-7700

SPECIFICATIONS:

Detail .....	94-27801
Superseded .....	27801

MANUFACTURER: Sperry Gyroscope Co.

MANUFACTURER'S PART AND DRAWING NUMBER: 642919

TYPE DESIGNATION: B-3

A. S. C. STOCK NUMBER: 6000237750

TECHNICAL ORDER NUMBER: 05-20-4

PRODUCTION STATUS: Not under procurement for initial installation.

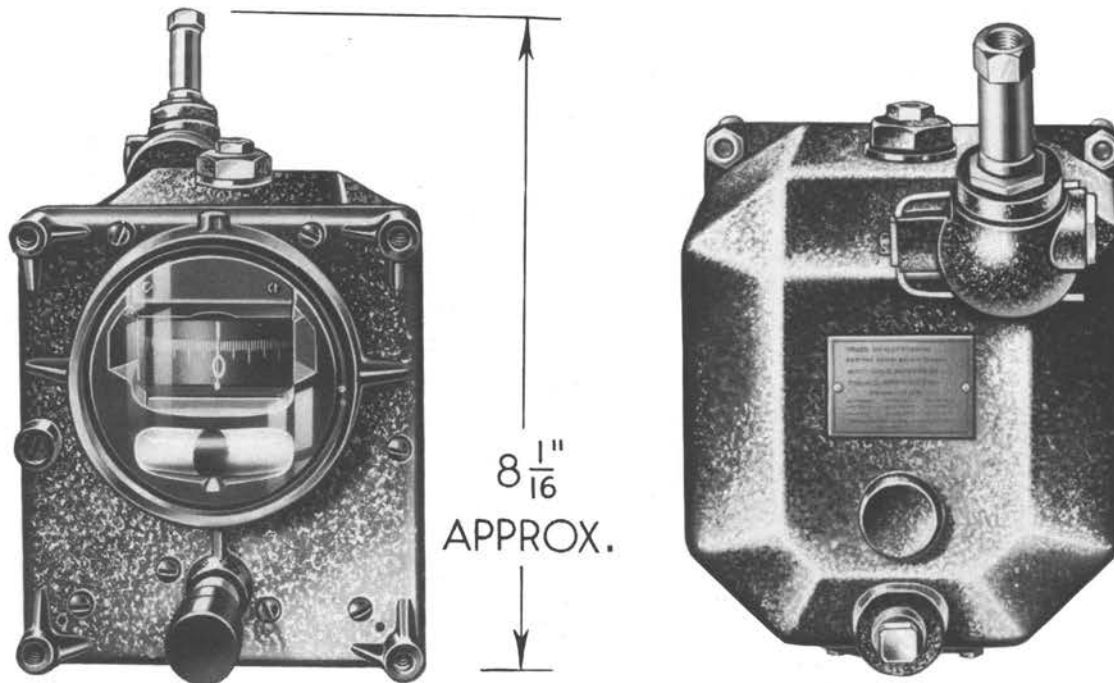
SHIPPING DATA: Shipped as a complete unit.

#### NAVY

There is no Navy equivalent for the Army item.

#### BRITISH

BRITISH REFERENCE NUMBER: 106A/638



**INDICATOR—DIRECTIONAL GYRO**  
**ARMY TYPE B-4**

NAMES: Directional gyro indicator  
Flight indicator  
Directional gyro turn indicator  
Turn indicator  
Gyro directional indicator  
Indicator—turn

DESCRIPTION: The Army type B-4 directional gyro indicator is equipped with a vacuum driven gyroscope. The dial includes a ball-bank inclinometer. This unit, mounted on the instrument panel in the pilot's compartment, is connected through a vacuum gage and selector valve to a source of vacuum, either an engine driven air pump or a venturi tube. A connector is provided on the rear of the case for attaching the flexible shaft when a remote indicator turn control is used with the instrument.

**CHARACTERISTICS:**

Dimensions . . . . . approximately 4½ by 6⅙ by 8⅙ inches  
Weight . . . . . approximately 4¾ pounds  
Air filter . . . . . individual or central  
Illumination . . . . . none  
Markings . . . . . fluorescent, radioactive  
Power . . . . . 4 inches of mercury vacuum  
Vacuum connections . . . . . one ¼ inch internal pipe thread

**ARMY**

A. E. REFERENCE NUMBER: 60-7800

**SPECIFICATIONS:**

Detail . . . . . 94-27964-B  
Superseded . . . . . 94-27964-A

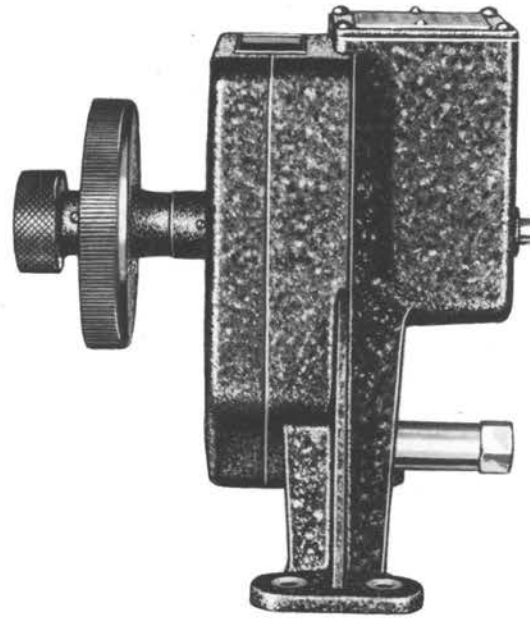
MANUFACTURER: Sperry Gyroscope Company, Inc.  
MANUFACTURER'S DRAWING AND PART NUMBER: 644772  
TYPE DESIGNATION: B-4  
A. S. C. STOCK NUMBER: 6000238090  
TECHNICAL ORDER NUMBER: 05-20-4  
PRODUCTION STATUS: Under procurement.  
SHIPPING DATA: Shipped as a complete unit.

**NAVY**

There is no Navy equivalent for this item.

**BRITISH**

BRITISH REFERENCE NUMBER: 106A/689



### CONTROL—TURN (REMOTE INDICATOR)

B-4

NAMES: Turn control (Remote Indicator)  
Turn control  
Turn controller  
Control unit

Remote controller  
Turn (indicator control unit)  
Remove indicator control  
Controller assembly

DESCRIPTION: This unit is used in order to remotely set the card of the pilot's turn indicator. The turn control contains an indicator card similar to that in the turn indicator. The navigator can indicate to the pilot the course to be flown by using the control. It is mounted remote from the pilot's compartment, and is connected by flexible shaft to the turn indicator, Army type B-4, A. E. Reference Number 60-7800.

CHARACTERISTICS:

Dimensions . . . . .	approximately 5 <sup>5</sup> / <sub>16</sub> by 5 <sup>1</sup> / <sub>4</sub> by 5 <sup>3</sup> / <sub>16</sub> inches
Weight . . . . .	approximately 1 <sup>3</sup> / <sub>4</sub> pounds
Dial range . . . . .	0 to 45 degrees, right or left turn
Markings . . . . .	1 degree graduation, fluorescent
Illumination . . . . .	none

**ARMY**

A. E. REFERENCE NUMBER: 60-2000

SPECIFICATIONS:

Detail . . . . .	94-27964-B (part of)
Superseded . . . . .	94-27964-A

MANUFACTURER: Sperry Gyroscope Company, Inc.

MANUFACTURER'S PART AND DRAWING NUMBER: 644887; Outline Drawing Number 150774

TYPE DESIGNATION: B-4

A. S. C. STOCK NUMBER: 6000100350

TECHNICAL ORDER NUMBER: 05-20-4

PRODUCTION STATUS: Under procurement.

SHIPPING DATA: Shipped as a unit complete with flexible shaft.

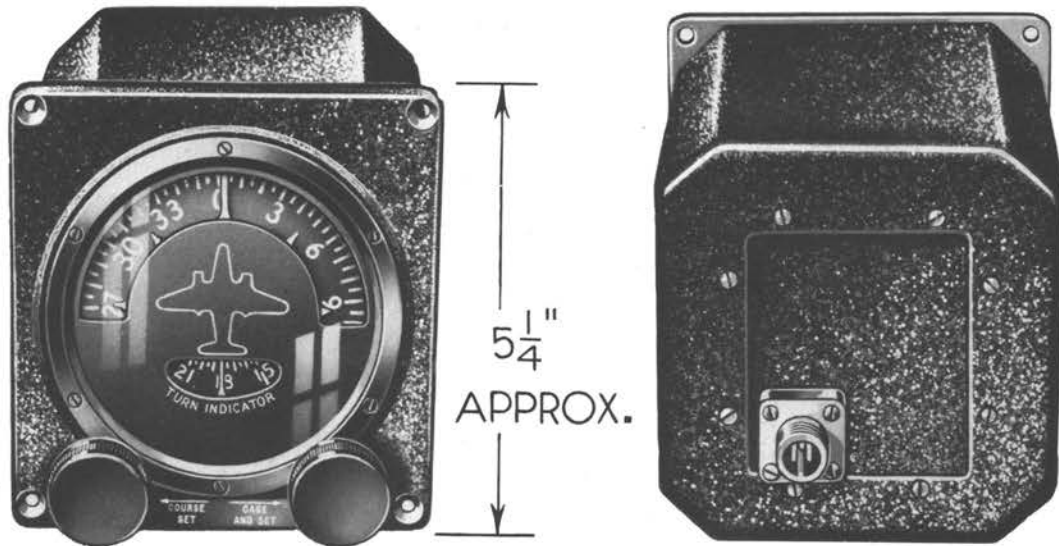
**NAVY**

There is no Navy equivalent for this item.

**BRITISH**

BRITISH REFERENCE NUMBER: 106J/673





**INDICATOR—DIRECTIONAL GYRO**  
ARMY TYPE C-1 F.S.S.C. NUMBER 88-I-1005

NAMES: Directional gyro indicator  
Turn indicator

Gyro directional indicator

DESCRIPTION: The type C-1 directional gyro indicator is equipped with an electrically driven gyro. This unit, mounted on the instrument panel in the pilot's compartment, is connected to the source of power through a receptacle in the case. Through use of a gear arrangement, the indicator dial card is mounted vertically, rather than horizontally.

CHARACTERISTICS:

- Dimensions . . . . . approximately 5 by 5 1/4 by 6 1/2 inches
- Weight . . . . . approximately 5 pounds
- Illumination . . . . . none
- Markings . . . . . fluorescent, radioactive
- Power . . . . . alternating current 115 volt, 3 phase, 400 cycle

**ARMY**

A. E. REFERENCE NUMBER: 60-6100

SPECIFICATIONS:

- Detail . . . . . 27393-A
- Superseded . . . . . 27393

TYPE DESIGNATION: C-1

A. S. C. STOCK NUMBER: Refer to chart.

PRODUCTION STATUS: Under procurement.

SHIPPING DATA: Shipped as a complete unit.

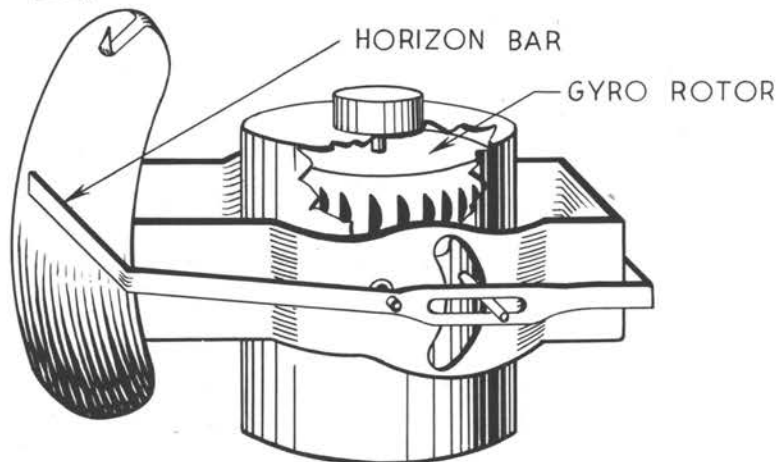
**NAVY**

F. S. S. C. STOCK NUMBER: 88-I-1005

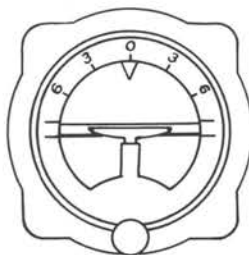
PROCUREMENT STATUS: Standard. G. F. E.—Order through A. S. O. by F. S. S. C. number.

**MODELS BELOW ARE INTERCHANGEABLE**  
Models are used in services as noted in column 3  
A-Army, N-Navy, B-British, C-Commercial

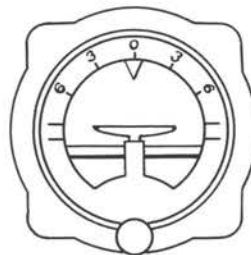
Manufacturer	Manufacturer's Part and Drawing Number	Used By	Air Service Command Stock Number	British Reference Number
Sperry Gyroscope Co., Inc.	657069	A-N-B-C		106A/1435
General Electric Co.	8KCIACI	A-N-B	6000218580	106A/1435



30° LEFT BANK



LEVEL FLIGHT



CLIMB, LEVEL LATERALLY

## GYRO HORIZON INDICATOR

The gyro horizon indicator, also known as the flight indicator or artificial horizon indicator, provides the pilot with visual indication of the altitude of the airplane in relation to the horizon. It is also used to maintain the proper glide angle during instrument landing approaches, and to measure the amount of bank when making precision turns.

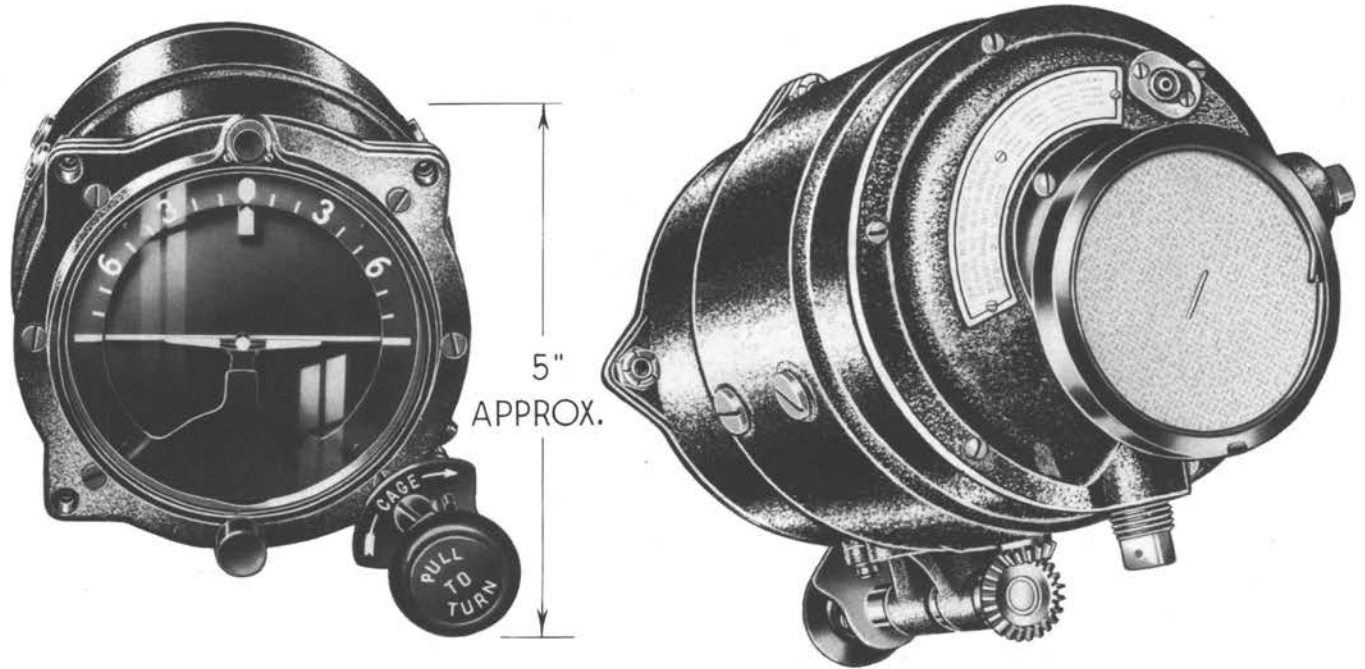
The instrument consists principally of a gyroscope, either vacuum or electrically driven, with axle mounted and maintained vertical.

The dial face, which is fixed to the instrument case, consists of two parts—a miniature rear view outline of an airplane, and a banking indicator, graduated from zero to ninety degrees, right and left bank.

When the airplane moves so that the nose is above or below the actual horizon, an horizon bar pivoted to the gyro shows below or above the miniature airplane.

When the airplane banks, a hand, attached to one of the gyro supporting rings, points to the degree of bank on the fixed dial face, and shows whether the bank is left or right.

A knob provides for “caging” the instrument, which is necessary when aligning the gyro or, during violent maneuvers, to prevent damage to the instrument.



**INDICATOR—GYRO HORIZON**  
**ARMY TYPE C-5**

NAMES: Gyro horizon indicator  
Artificial horizon

Flight indicator

DESCRIPTION: The Army type C-5 gyro horizon indicator has a vacuum driven gyroscope, and an individual air filter. It is illuminated by an individual 3 volt dial lamp. No resistor is provided for the lamp. Some of these indicators have a single horizon bar, while others have a double bar.

CHARACTERISTICS:

- Dimensions . . . . . approximately 5 by 5 by 7¼ inches
- Weight . . . . . approximately 4½ pounds
- Illumination . . . . . 3 volt dial lamp, no resistor
- Markings . . . . . fluorescent, radioactive
- Power . . . . . 3½ inches of mercury vacuum
- Vacuum connections . . . . . two, ¼ inch internal pipe thread

**ARMY**

A. E. REFERENCE NUMBER: 60-5600

SPECIFICATIONS:

- Detail . . . . . 94-27802
- Superseded . . . . . 27802-A

TYPE DESIGNATION: C-5

A. S. C. STOCK NUMBER: Refer to chart.

TECHNICAL ORDER NUMBER: Refer to chart.

PRODUCTION STATUS: Not under procurement for initial installation.

SHIPPING DATA: Shipped as a complete unit.

**NAVY**

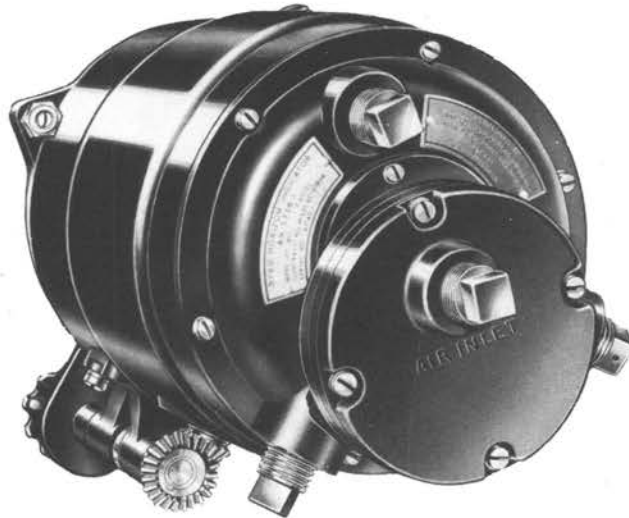
There is no Navy equivalent for this item.

**MODELS BELOW ARE INTERCHANGEABLE**  
**Models are used in services as noted in column 3**  
**A-Army, N-Navy, B-British, C-Commercial**

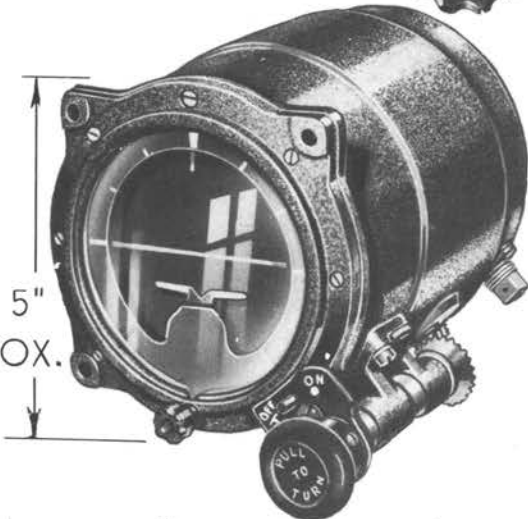
Manufacturer	Manufacturer's Part and Drawing Number	Used By	Air Service Command Stock Number	Army Technical Order Number	British Reference Number	Current Model X	Remarks
Sperry Gyroscope Co., Inc.	642921	A-B-C	6000207000	05-20-3	106A/634		Double horizon bar.
	643770	A-B-C	6000207250	05-20-3	106A/634	X	Single horizon bar.



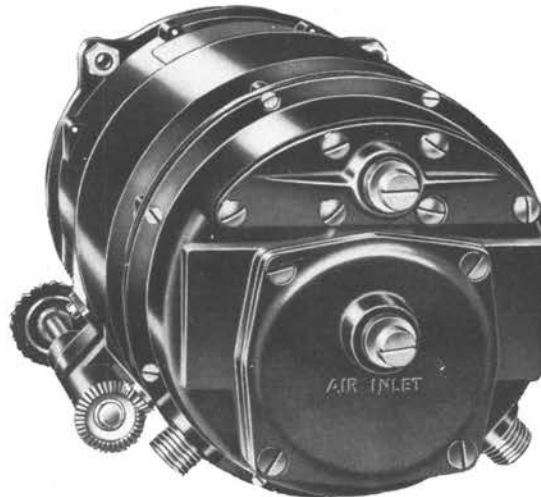
5" APPROX.



5" APPROX.



5" APPROX.



**INDICATOR—GYRO HORIZON**

**AN5736-1 FORMER ARMY TYPE C-7 F.S.S.C. NUMBER 88-I-1350**

NAMES: Gyro horizon indicator  
Artificial horizon

Flight indicator

*(Continued on page 243)*

INDICATOR—GYRO HORIZON

(Continued from page 242)



DESCRIPTION: This gyro horizon indicator is powered by a vacuum driven gyroscope. It is not illuminated.

CHARACTERISTICS:

- Dimensions . . . . . refer to chart
- Weight . . . . . refer to chart
- Air filter . . . . . individual or central
- Illumination . . . . . none
- Markings . . . . . fluorescent, radioactive
- Power . . . . . 3 1/2 inches of mercury vacuum
- Vacuum connections . . . . . two, 1/4 inch internal pipe threads

ARMY

A. E. REFERENCE NUMBER: 60-5800

SPECIFICATIONS:

- Detail . . . . . AN-GG-I-506
- Superseded . . . . . 94-27962-A

AN DRAWING NUMBER: AN5736

AN PART NUMBER: AN5736-1

A. S. C. STOCK NUMBER: Refer to chart.

TECHNICAL ORDER NUMBER: Refer to chart.

PRODUCTION STATUS: Under procurement.

SHIPPING DATA: Shipped as a complete unit.

NAVY

SPECIFICATIONS:

- Detail . . . . . AN-GG-I-506
- Superseded . . . . . Bureau of Aeronautics SQ-90 and SE-14

AN DRAWING NUMBER: AN5637

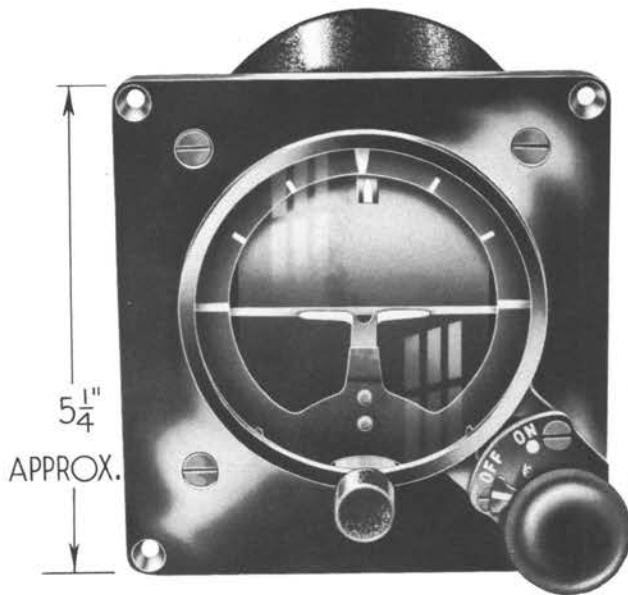
AN PART NUMBER: AN5736-1

F. S. S. C. STOCK NUMBER: 88-I-1350

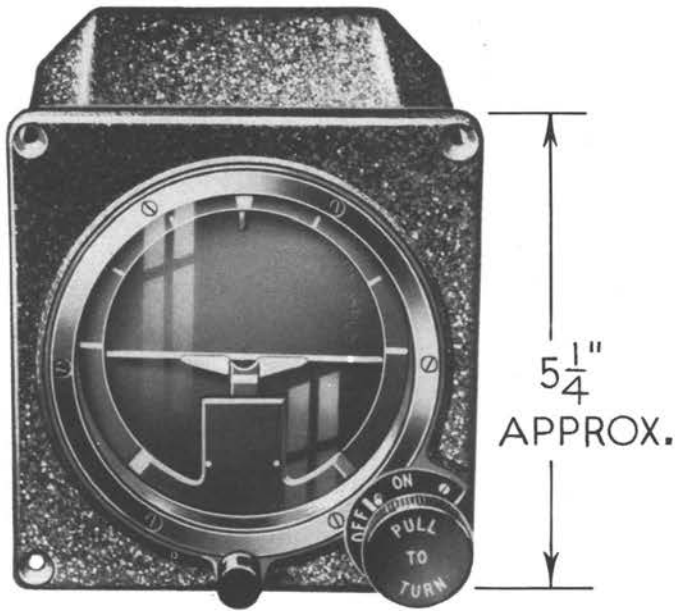
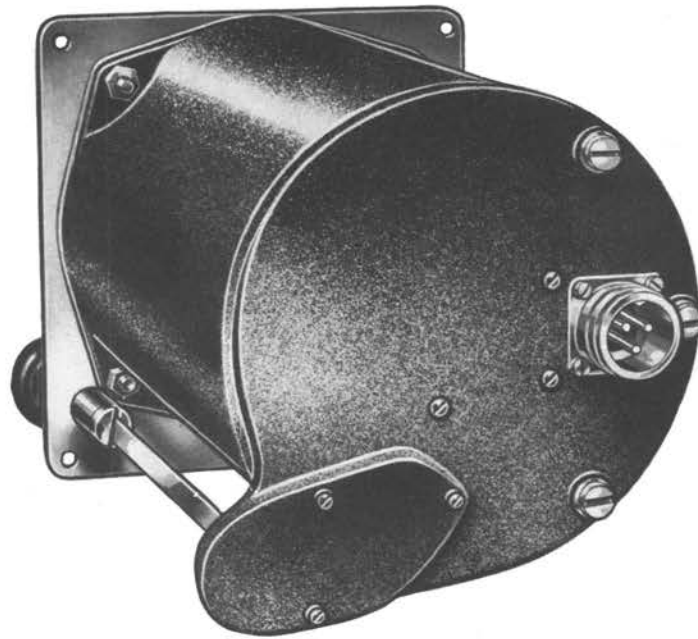
PROCUREMENT STATUS: Standard. G. F. E.—Order through A. S. O. by F. S. S. C. number.

ALL MODELS BELOW ARE INTERCHANGEABLE  
Models are used in services as noted in column 6  
A-Army, N-Navy, B-British, C-Commercial

Manufacturer	Manufacturer's Part and Drawing Number	Dimensions Approximately—Inches	Weight Approximately—Pounds	Current Model (X)	Used By	Army Technical Order Number	Air Service Command Stock Number	British Reference Number
Sperry Gyroscope Co., Inc.	644729	5 by 5 by 7 1/2	4-3/5		A-N-B-C	05-20-3	6000207580	106A/697
	645391	5 by 5 by 8	4-3/5		A-N-B-C	05-20-3	6000207585	106A/697
	646040	5 by 5 by 7 1/2	4-3/5	X	A-N-B-C	05-20-9	6000218700	106A/700
Jack & Heintz, Inc.	JH6500	5 by 5 by 8 1/16	2-4/5	X	A-N-B	05-20-9	6000218500	106A/700
Ternstedt Manufacturing Division	T95100	5 by 5 by 7 1/2	4-3/5	X	AN--B	02-20-9	6000218750	106A/700
C. G. Conn Co.	646040	5 by 5 by 7 1/2	4-3/5	X	A-N-B	05-20-9	6000218700	106A/700



5 1/4"  
APPROX.



5 1/4"  
APPROX.



**INDICATOR—GYRO HORIZON**

ARMY TYPE E-1    NAVY—SEE NEXT PAGE    F.S.S.C. NUMBER 88-I-1357

NAMES: Gyro horizon indicator  
Artificial horizon

Flight indicator

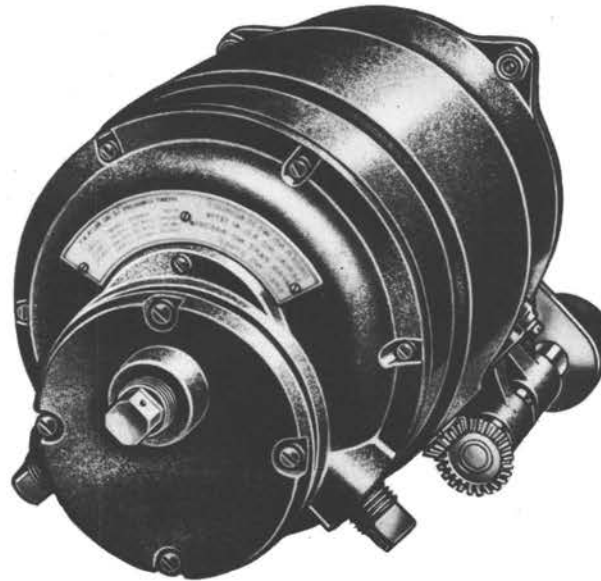
DESCRIPTION: The Army type E-1 gyro horizon indicator is operated by an electrically-driven gyroscope. It is mounted on the instrument panel, and is connected to the electrical supply through a receptacle on the instrument case.

(Continued on page 245)





5" APPROX.



**INDICATOR—GYRO HORIZON**  
**AN5736-2 FORMER ARMY TYPE C-7 F.S.S.C. NUMBER 88-I-1345**

NAMES: Gyro horizon indicator  
Artificial horizon indicator

Flight indicator

DESCRIPTION: This gyro horizon indicator is powered by a vacuum driven gyroscope. It is not illuminated. Its dial is marked with fluorescent material so that it may be used in night fighters.

CHARACTERISTICS:

Dimensions . . . . .	approximately 5 by 5 by 7½ inches
Weight . . . . .	approximately 4⅓ pounds
Illumination . . . . .	none
Markings . . . . .	fluorescent
Power . . . . .	3½ inches of mercury vacuum
Vacuum connections . . . . .	two ¼ inch internal pipe thread

**ARMY**

A. E. REFERENCE NUMBER: 60-5850

SPECIFICATIONS:

Detail . . . . .	AN-GG-I-506
Superseded . . . . .	94-27962-A

AN DRAWING NUMBER: AN5736

AN PART NUMBER: AN5736-2

MANUFACTURER: Sperry Gyroscope Co.

MANUFACTURER'S PART AND DRAWING NUMBER: 647900

A. S. C. STOCK NUMBER: 6000218550

TECHNICAL ORDER NUMBER: 05-20-9

PRODUCTION STATUS: Under procurement.

SHIPPING DATA: Shipped as a complete unit.

**NAVY**

SPECIFICATIONS:

Detail . . . . .	AN-GG-I-506
Superseded . . . . .	Bureau of Aeronautics SQ-90 and SE-14

AN DRAWING NUMBER: AN5736

AN PART NUMBER: AN5736-2

F. S. S. C. NUMBER: 88-I-1345

PROCUREMENT STATUS: Standard. G. F. E.—Order through A. S. O. by F. S. S. C. number.

**BRITISH**

BRITISH REFERENCE NUMBER: 106A/1434





## INDICATOR—TURN AND BANK

The turn and bank indicator is a flight instrument used by the pilot as an aid in making precision turns at a predetermined rate.

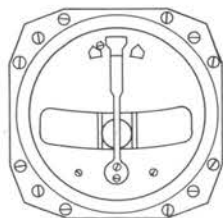
The instrument consists of a turn reference and a bank reference in a single case. The turn reference, or indicator, shows the direction and rate at which the airplane is turning about a vertical axis.

Operation of the turn indicator is based upon the principle of precession in a gyroscope. The gyroscope is a wheel turning on its axle and powered by a small electric motor, or by air pressure. Air or vacuum is provided, either by an engine operated pump, a venturi tube mounted in the air stream, or by suction from the engine manifold. The gyroscope is mounted horizontally, with its axis perpendicular to the direction of flight. When the airplane changes its direction, the gyroscope tends to turn in a direction at right angles to the longitudinal or fore and aft axis of the ship. This is known as precession. This motion of the gyroscope is restrained by a spring.

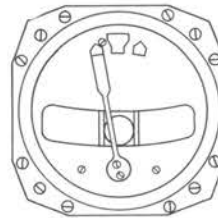
The instrument indicates the rate of turn by the degree of movement of a hand on the dial face, so attached that it moves with the precession of the gyro. In addition to restraining the motion of the gyro, the spring mentioned in the preceding paragraph restores the gyro to its centered position after the turn has been completed.

The bank indicator consists of a spirit level containing a ball of metal or glass in a tube filled with compass liquid. In straight flight, the ball remains in the center of the tube. In a properly executed banked turn, the ball also remains in the center of the tube. Movement of the ball away from the center of the tube indicates that the airplane is slipping or skidding.

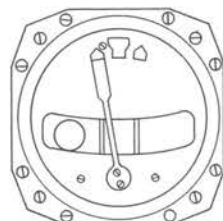
INDICATOR READINGS FOR SEVERAL CONDITIONS OF TURN AND BANK



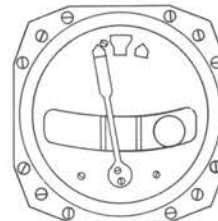
STRAIGHT AND LATERALLY LEVEL FLIGHT



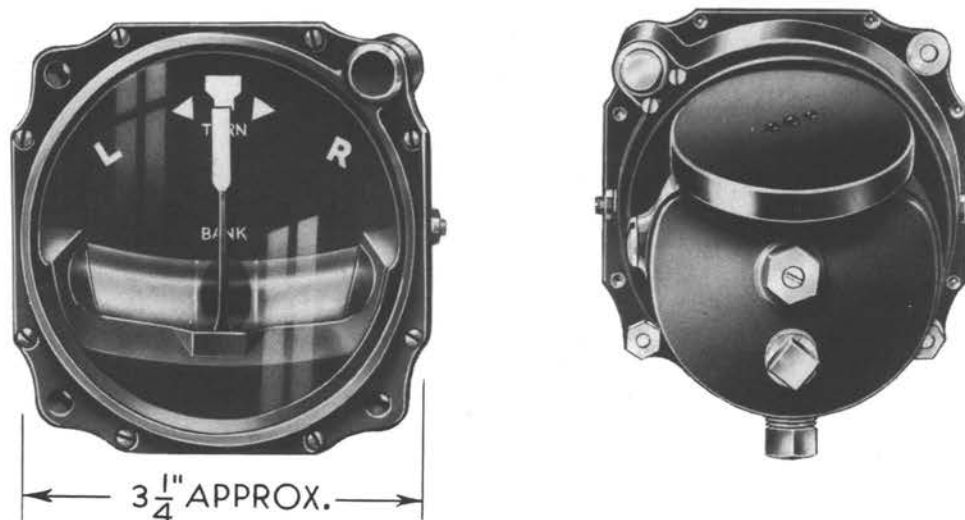
LEFT TURN PROPERLY BANKED



LEFT TURN SLIPPING INWARD



LEFT TURN SKIDDING OUTWARD



### INDICATOR—TURN AND BANK

#### ARMY TYPE A-5

NAMES: Turn and bank indicator

Bank and turn indicator

DESCRIPTION: The Army type A-5 turn and bank indicator is an individually lighted instrument operated by a vacuum driven gyroscope. It uses an individual air filter.

CHARACTERISTICS:

- Dimensions . . . . . approximately 3 1/4 by 3 1/4 by 5 3/8 inches
- Weight . . . . . approximately 1 2/5 pounds
- Deflection . . . . . 5/32 inch for 180 degrees turn per minute
- Illumination . . . . . 3-volt rim light
- Markings . . . . . fluorescent radioactive
- Power . . . . . 26 inches of water vacuum
- Vacuum connections . . . . . two 1/8-inch internal pipe thread

RELATIONSHIP OF PARTS: Used with:

Turn and bank indicator air filter, A. E. Reference Number 60-2300. If a central air filter installation is provided in the airplane, connection can be made by using an adapter, A. A. F. drawing number 42A7905.

#### ARMY

A. E. REFERENCE NUMBER: 60-5000

SPECIFICATIONS:

- Detail . . . . . 94-27803
- Superseded . . . . . 27803-A

TYPE DESIGNATION: A-5

A. S. C. STOCK NUMBER: Refer to chart.

TECHNICAL ORDER NUMBER: Refer to chart.

PRODUCTION STATUS: Not under procurement for initial installation.

SHIPPING DATA: Shipped as a complete unit.

#### NAVY

There is no Navy equivalent for this item.

**ALL MODELS BELOW ARE INTERCHANGEABLE**  
Models are used in services as noted in column 4  
A-Army, N-Navy, B-British, C-Commercial

Manufacturer	Manufacturer's Model Identification	Manufacturer's Drawing Number	Used By	Air Service Command Stock Number	Army Technical Order Number	British Reference Number
Pioneer Instrument Division	1703	1703-2A-B2	A-B-C	6000193250	05-20-2	106A/415
	1703	1703-A2	A-B-C	6000193500	05-20-2	106A/415
	1707	1707-2A-A2	A-B-C	6000193750	05-20-2	106A/415
	1707	1707-1A-A1	A-B-C	6000193625	05-20-2	106A/88



← 3 1/4" APPROX. →

### INDICATOR—TURN AND BANK

ARMY TYPE A-8 F.S.S.C. NUMBER 88-I-3280

NAMES: Turn and bank indicator

Bank and turn indicator

DESCRIPTION: The Army type A-8 turn and bank indicator is operated by a vacuum driven gyroscope. It uses an individual air filter. It is not illuminated.

CHARACTERISTICS:

- Dimensions . . . . . approximately 3 1/4 by 3 1/4 by 5 7/32 inches
- Weight . . . . . approximately 1 1/2 pounds
- Deflection . . . . . 3/32 inch for 180 degrees turn per minute
- Illumination . . . . . none
- Markings . . . . . fluorescent, radioactive
- Power . . . . . 26 inches of water vacuum
- Vacuum connections . . . . . two 1/8-inch internal pipe thread

RELATIONSHIP OF PARTS: Used with:

Turn and bank indicator air filter, A. E. Reference Number 60-2300. If a central air filter installation is provided in the airplane, connection can be made by using an adapter, A. A. F. drawing number 42A7905.

#### ARMY

A. E. REFERENCE NUMBER: 60-5200

SPECIFICATIONS:

- Detail . . . . . 94-27955
- Superseded . . . . . 27955

TYPE DESIGNATION: A-8

A. S. C. STOCK NUMBER: Refer to chart.

TECHNICAL ORDER NUMBER: Refer to chart.

PRODUCTION STATUS: Not under procurement for initial installation.

SHIPPING DATA: Shipped as a complete unit.

#### NAVY

SPECIFICATIONS:

- Detail . . . . . SQ-84A
- Superseded . . . . . SQ-84

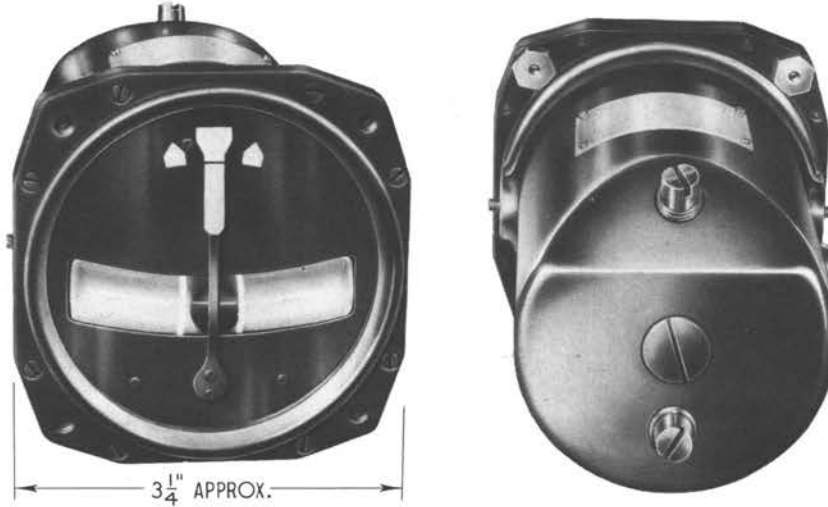
BUAER DRAWING NUMBER: 845-SK

F. S. S. C. STOCK NUMBER: 88-I-3280

PROCUREMENT STATUS: Standard. G. F. E.—Order through A. S. O. by F. S. S. C. number.

**ALL MODELS BELOW ARE INTERCHANGEABLE**  
Models are used in services as noted in column 4  
A-Army, N-Navy, B-British, C-Commercial

Manufacturer	Manufacturer's Model Identification	Manufacturer's Part and Drawing Number	Used By	Air Service Command Stock Number	Army Technical Order Number	British Reference Number
Pioneer Instrument Division	1718	1718-2S-A2	A-B-C	6000194770	05-20-2	106A/850
	1718	1718-1A-A1	A-B-C	6000194765	05-20-2	106A/850
	1719	1719-1AF-A1	N-B			106A/978



**INDICATOR—TURN AND BANK**  
**AN5820-1 FORMER ARMY TYPE A-11 F.S.S.C. NUMBER 88-I-3255**

**NAMES:** Turn and bank indicator Bank and turn indicator  
**DESCRIPTION:** This turn and bank indicator is operated by a vacuum driven gyroscope. It is not illuminated.  
**CHARACTERISTICS:**  
Dimensions . . . . . approximately 3 1/4 by 3 1/4 by 4 7/8 inches  
Weight . . . . . approximately 1 3/4 pounds  
Deflection . . . . . 5/32 inch for 180 degrees turn per minute  
Markings . . . . . fluorescent—radioactive  
Power . . . . . 2 inches of mercury vacuum  
Vacuum connections . . . . . two; 1/8-inch internal pipe thread  
**RELATIONSHIP OF PARTS:** When airplane installation does not include vacuum operated instrument air filter, individual filter, A. E. Reference Number 60-2300, must be provided.

**ARMY**

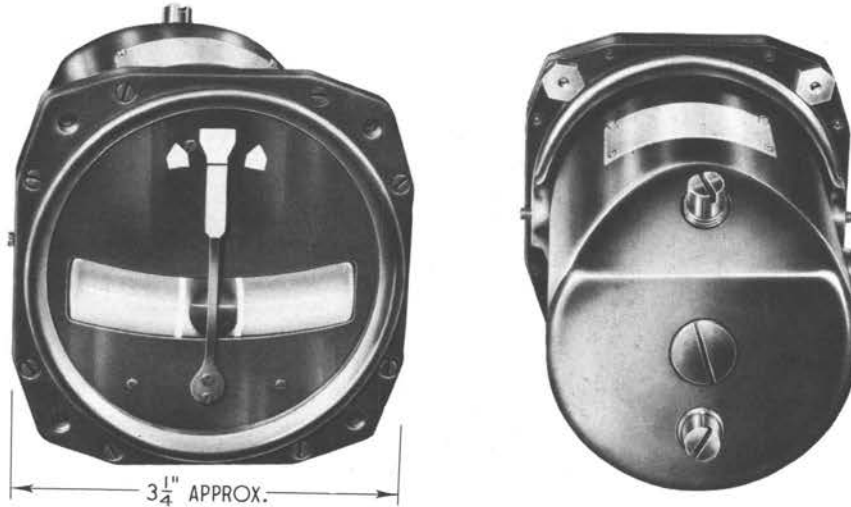
A. E. REFERENCE NUMBER: 60-5400  
**SPECIFICATIONS:**  
Detail . . . . . AN-GG-I-525  
Superseded . . . . . 94-27348  
AN DRAWING NUMBER: AN5820  
AN PART NUMBER: AN5820-1  
A. S. C. STOCK NUMBER: Refer to chart.  
TECHNICAL ORDER NUMBER: 05-20-2  
PRODUCTION STATUS: Under procurement.  
SHIPPING DATA: Shipped as a complete unit.

**NAVY**

**SPECIFICATIONS:**  
Detail . . . . . AN-GG-I-525  
Superseded: Bureau of Aeronautics . . . . . SQ-84  
AN DRAWING NUMBER: AN5820  
AN PART NUMBER: AN5820-1  
F. S. S. C. STOCK NUMBER: 88-I-3255  
PROCUREMENT STATUS: Standard. G. F. E.—Order through A. S. O. by F. S. S. C. number.

**ALL MODELS BELOW ARE INTERCHANGEABLE**  
**Models are used in services as noted in column 4**  
**A-Army, N-Navy, B-British, C-Commercial**

Manufacturer	Manufacturer's Model Identification	Manufacturer's Drawing Number	Used By	Air Service Command Stock Number	Army Technical Order Number	British Reference Number	Remarks
Pioneer Instrument Division	1721	1721-2U-A2	A-N-B-C	6000194925	05-20-2	106A/1116	
	1722	1722-2V-A2	A-N-B-C	6000195000	05-20-2	106A/1116	
	1722	1722-2X-A2	A-N-B	6000195200	05-20-2	106A/1373	Fluorescent markings only.
Burton Manufacturing Co.	1721	1721-2U-A2B	A-N-B	6000194935	05-20-2	106A/1116	
Longines Wittnauer Watch Co.	1940	1940	A-B	6000194950	05-20-2	106A/1116	



### INDICATOR—TURN AND BANK

**AN5820-2      FORMER ARMY TYPE A-12      F.S.S.C. NUMBER 88-I-3250**

NAMES: Turn and bank indicator

Bank and turn indicator

DESCRIPTION: This turn and bank indicator is operated by a vacuum driven gyroscope. It is not illuminated, and all markings are of fluorescent material, since this instrument is intended for use on night fighters.

CHARACTERISTICS:

Dimensions . . . . .	approximately 3 1/4 by 3 1/4 by 4 7/8 inches
Weight . . . . .	approximately 1 3/4 pounds
Deflection . . . . .	5/32 inch for 180 degrees turn per minute
Illumination . . . . .	None
Markings . . . . .	fluorescent
Power . . . . .	21 inches of mercury vacuum
Vacuum connections . . . . .	two 1/8-inch internal pipe thread

RELATIONSHIP OF PARTS: When airplane installation does not include vacuum operated instrument air filter, individual filter, A. E. Reference Number 60-2300, must be provided.

**ARMY**

A. E. REFERENCE NUMBER: 60-5450

SPECIFICATIONS:

Detail . . . . .	AN-GG-I-525
Superseded . . . . .	94-27407

AN DRAWING NUMBER: AN5820

AN PART NUMBER: AN5820-2

MANUFACTURER: Pioneer Instrument Division of Bendix Aviation Corp.

MANUFACTURER'S DRAWING AND PART NUMBER: 1722-2X-A2

TECHNICAL ORDER NUMBER: 05-20-2

PRODUCTION STATUS: Under procurement.

SHIPPING DATA: Shipped as a complete unit.

**NAVY**

SPECIFICATIONS:

Detail . . . . .	AN-GG-I-525
Superseded . . . . .	Bureau of Aeronautics, SQ-84

AN DRAWING NUMBER: AN5820

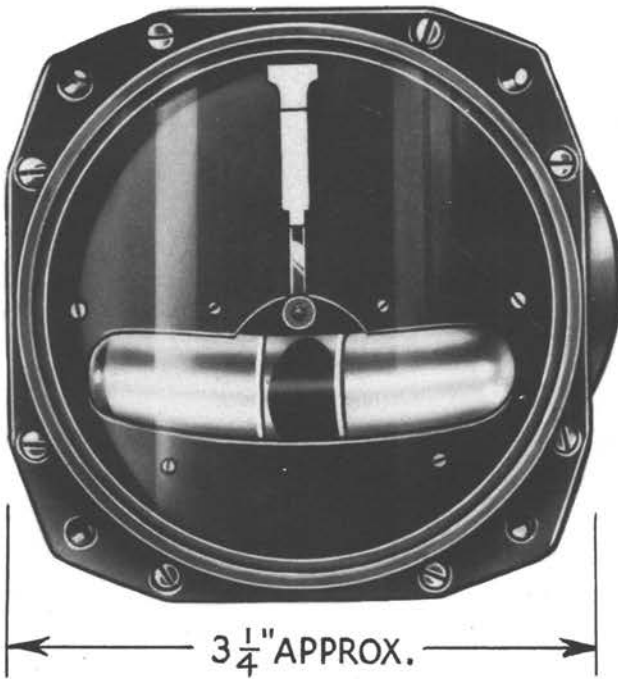
AN PART NUMBER: AN5820-2

F. S. S. C. STOCK NUMBER: 88-I-3250

PROCUREMENT STATUS: Standard. G. F. E.—Order through A. S. O. by F. S. S. C. number.

**BRITISH**

BRITISH REFERENCE NUMBER: 106A/1373



### INDICATOR—TURN AND BANK

ARMY TYPE C-1 F.S.S.C. NUMBER 88-I-3221

NAMES: Turn and bank indicator  
Bank and turn indicator

DESCRIPTION: The Army type C-I turn and bank indicator is operated by an electrically actuated gyroscope. It is not illuminated.

**CHARACTERISTICS:**

- Dimensions . . . . . approximately 3 1/4 by 3 1/4 by 6 3/8 inches
- Weight . . . . . approximately 1 1/4 pounds
- Deflection . . . . . 1/2 inch for 180 degrees turn per minute
- Markings . . . . . fluorescent radioactive
- Power . . . . . 24 volts direct current

**ARMY**

A. E. REFERENCE NUMBER: 60-5500

**SPECIFICATIONS:**

- Detail . . . . . 94-27337
- Superseded . . . . . 27337-A

TYPE DESIGNATION: C-1

- A. S. C. STOCK NUMBER: Refer to chart.
- TECHNICAL ORDER NUMBER: Refer to chart.
- PRODUCTION STATUS: Under procurement.
- SHIPPING DATA: Shipped as a complete unit.

**NAVY**

SPECIFICATIONS: Detail . . . . . 94-27337 (Army Specification)

BUAER DRAWING NUMBER: 909-SK

F. S. S. C. STOCK NUMBER: 88-I-3221

TECHNICAL ORDER NUMBER: 05-20AB-1 (Army Technical Order)

PROCUREMENT STATUS: Standard. G. F. E.—Order through A. S. O. by F. S. S. C. number.

**ALL MODELS BELOW ARE INTERCHANGEABLE**  
Models are used in services as noted in column 4  
A-Army, N-Navy, B-British, C-Commercial

Manufacturer	Manufacturer's Model Identification	Manufacturer's Part and Drawing Number	Used By	Air Service Command Stock Number	Army Technical Order Number	British Reference Number
Pioneer Instrument Division	3904	3904-1B-A1	A-N-B-C	6000195850	05-20AB-1	106A/1363
Allen Calculator Co.	21500	21500	A-B	6000196000	05-20A-2	106A/1363
L. W. Schwein Engineering Co.	21500	21500	A-B	6000196000	05-20A-2	106A/1363