

ACX104C

Potentiometer Rotary Position Sensor

BLN-95-8939-8

Issued: January 1995

DESCRIPTION

The ACX104C Potentiometer Rotary Position Sensor is designed for use as a steering feedback sensor on mobile equipment with automatic steering control systems. The ACX104C follows steering action of the wheels or tracks through rotation of its input shaft. The input shaft is coupled to an internal single or dual potentiometer drive.

Options to the basic ACX104C include single or dual potentiometer drive, resistance of potentiometers, physical stops for rotational input, active sector of rotation and flange/stud mount.



FEATURES

- Rugged housing, designed to withstand the vibration associated with mobile equipment
- Protected against moisture and dust
- Wiring connections made through MS connector or bare wires.
- Easy to install

ENVIRONMENTAL

OPERATING AMBIENT TEMPERATURE RATING
0° - 93° C (32° - 200° F)

VIBRATION

Withstands a vibration test designed for mobile equipment devices that includes two parts:

1. Cycling from 5 to 2000 Hz over a range of ± 1.0 g's to ± 8.0 g's for a period of one hour (if there are four resonant points), for two hours (if there are two or three resonant points) and for three hours (if there is one or no resonant point). The cycling test is performed on each of the three major axes.
2. Resonance dwell for one million cycles over a range of ± 1.0 g's to ± 8.0 g's for each of the four most severe resonant points on each of the three major axes.

SHOCK

Withstands a shock test for mobile equipment devices that consists of three shocks of 50 g's and 11 milliseconds duration in both directions of the three major axes for a total of 18 shocks.

WEIGHT

1.0 kg (2.25 lbs.)

DIMENSIONS

See the Dimension drawing.

TECHNICAL DATA

MAXIMUM INPUT VOLTAGE
24 Vdc

ACTIVE ROTATIONAL SECTOR
Customer specified: 90°, 312° or 342°

POTENTIOMETER RESISTANCE
Customer specified: 1, 10, 20 kilohms

CENTERING ACCURACY
With the longer end of the shaft roll pin centered between the case stops, the potentiometer will be centered in its electrical travel within $\pm 5\%$ of total resistance.

ORDERING INFORMATION

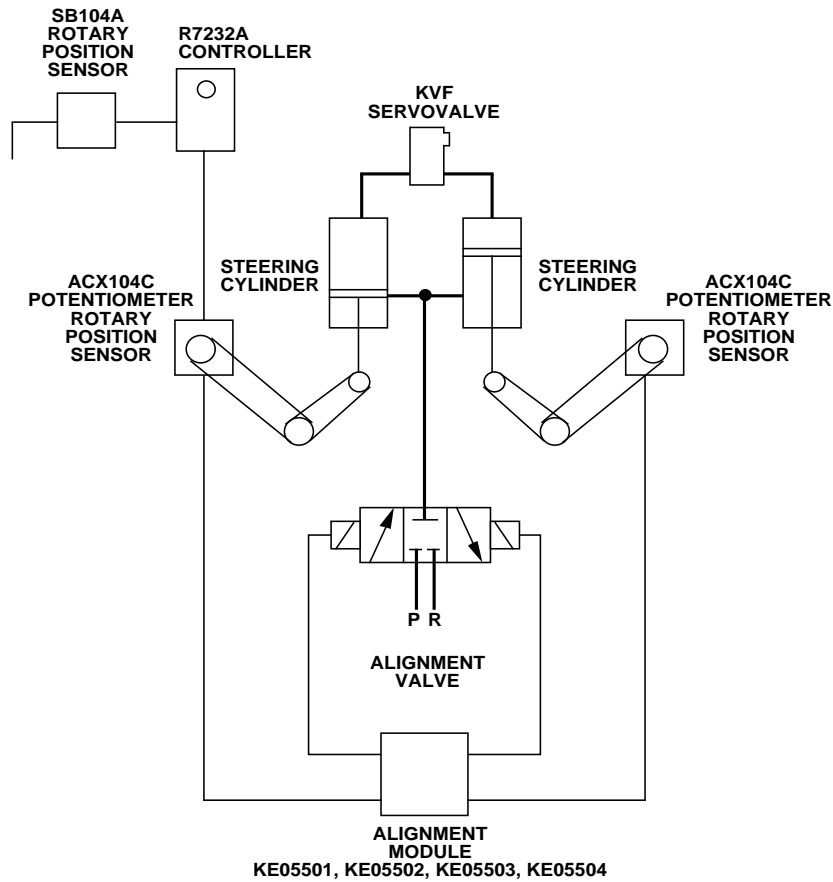
SPECIFY

1. Part Number: ACX104CXXXX
2. Controller if needed: ACE100B or R7232A
 - A. For steering feedback into an ACE100B Controller using potentiometer inputs, one of the 1000 ohm options is selected.
 - B. For steering feedback into an R7232A Controller, a 20,000 ohm potentiometer is required. The ganged 1000 ohm section is used for steering alignment.
3. Sensor if needed: SB104A
4. Servovalve if needed: KVFXXXXXX
5. Cable if needed: KW01009, KW01007

ORDERING INFORMATION (continued)

ORDER NUMBER	APPLICATION	OHMS	POTENTIOMETER	MOUNT	CONNECTOR
ACX104C1001	Steering Fdbk	1K, 20K	312°, 312°	Flange	6 Pin MS
ACX104C1100	Position Fdbk	1K	312°	Flange	6 Pin MS
ACX104C1118	Angular Position	1K	342°	Flange	Coil Cord
ACX104C1126	Steering Fdbk	1K	90°	Flange	6 Pin MS
ACX104C1134	Transducer	50K	300°	Flange	10 Pin MS
ACX104C1152	Steering Fdbk	1K	312°	Flange	6 Pin MS
ACX104C1167	Angular Position	1K	342°	Flange	Coil Cord
ACX104C1191	Position Sensor	1K	90°	Flange	3 Pin Packard
ACX104C1209	Steering Fdbk	20K	342°	Flange	3 Pin Packard
ACX104C1217	Position Sensor	1K	90°	Flange	4 Pin MS
ACX104C1225	Steering Fdbk	20K	342°	Flange	4 Pin MS
ACX104C1233	Position Sensor	1K	90°	Flange	4 Pin MS
ACX104C1241	Steering Fdbk	20K	342°	Flange	3 Pin Packard
ACX104C1258	Steering Fdbk	1K	90°	Flange	6 Pin MS

BLOCK DIAGRAM

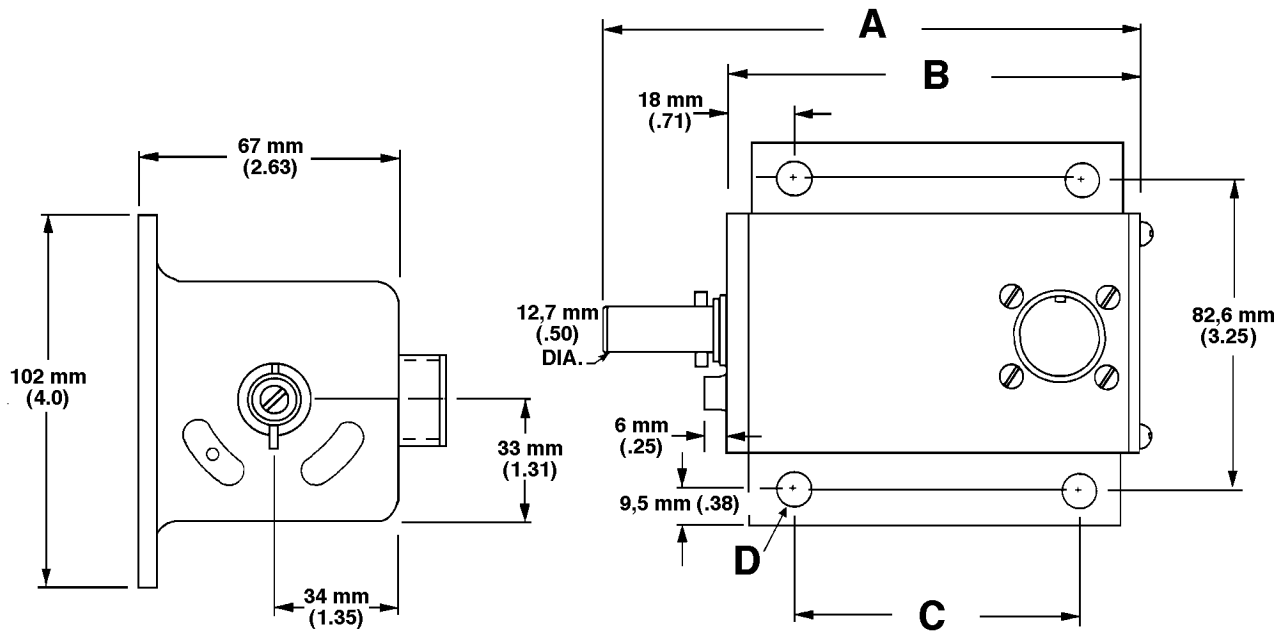


— Bold lines represent hoses.

1374A

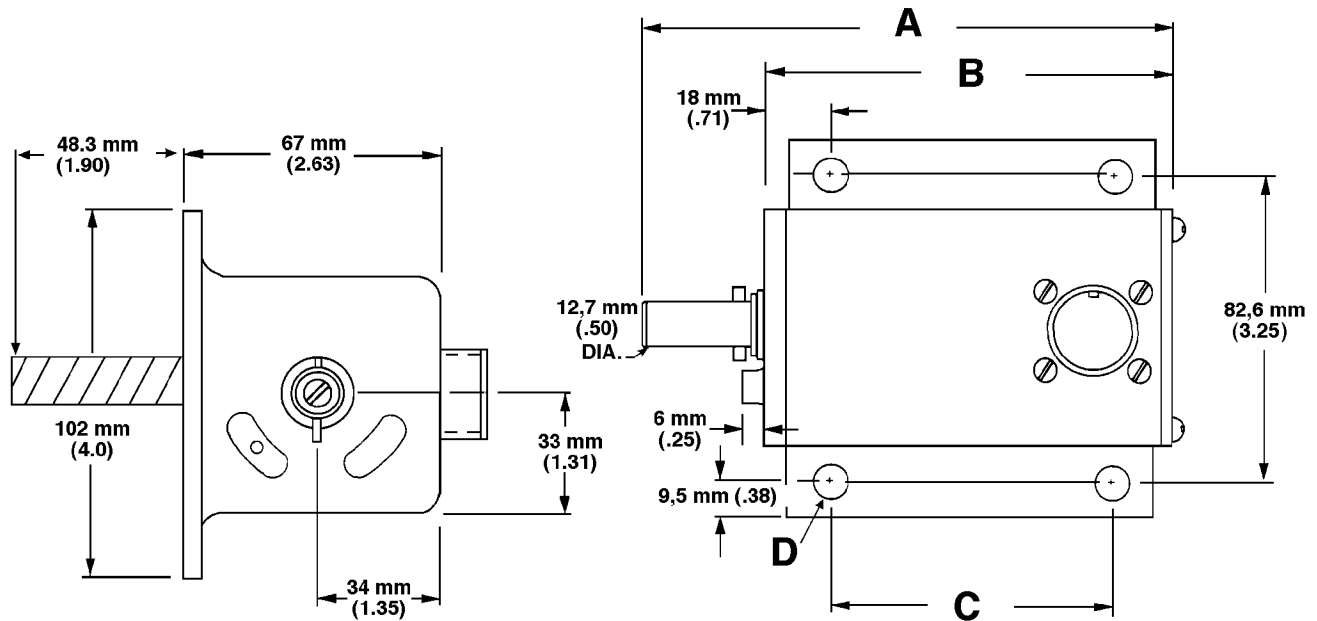
Typical Steering Control System For a Steerable Track or Wheel Vehicle, Including Alignment. The Two Pictured Cylinders Control the Left and Right Front Tracks.

DIMENSIONS



MODEL	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D
ACX104C1209	142 mm (5.6 inches)	107 mm (4.2 inches)	70 mm (2.8 inches)	6 mm (0.24 inch)
ACX104C1225,1233	140,97 mm (5.55 inches)	105,41 mm (4.15 inches)	76,2 mm (3.0 inches)	8,64 mm (0.34 inch)
ACX104C1134	169,67 mm (6.68 inches)	134,11 mm (5.28 inches)	76,2 mm (3.0 inches)	8,13 mm (0.32 inch)

278B

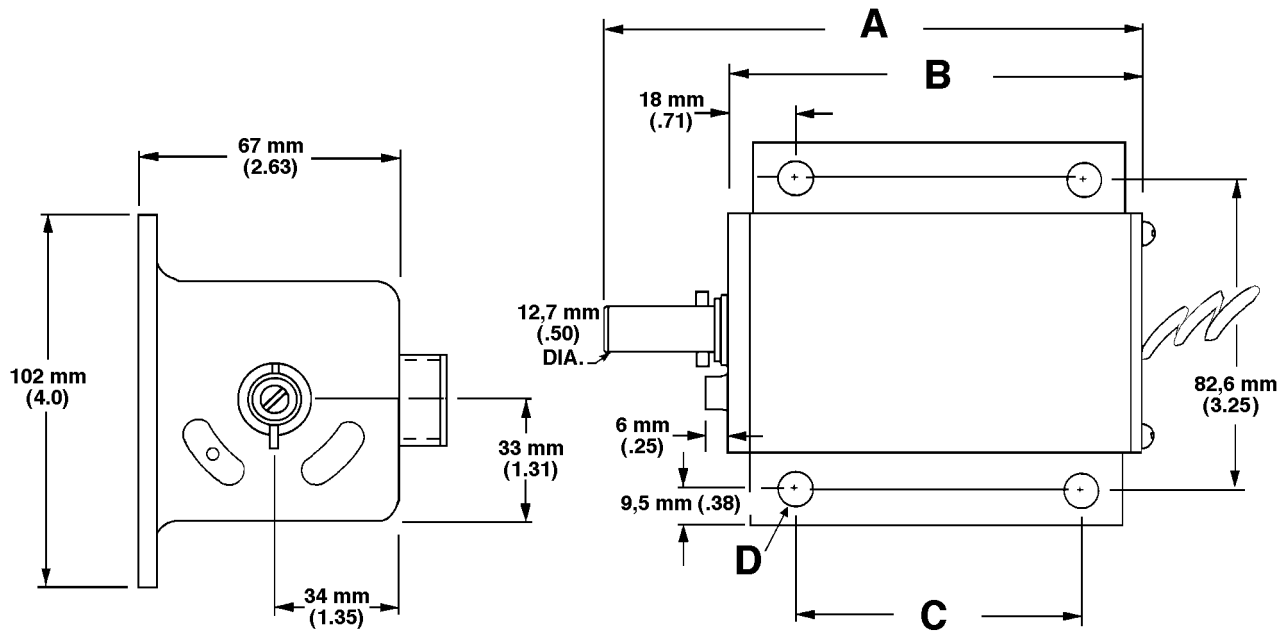


MODEL	DIMENSION A	DIMENSION B
ACX104AC1068	157.48 mm (6.2 inches)	121.92 mm (4.8 inches)

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Dimensions of the ACX104C in Millimeters (Inches).

DIMENSIONS (continued)



MODEL	DIMENSION A	DIMENSION B	DIMENSION C	DIMENSION D
ACX104C 1191, 1167 1118, 1100, 1084, 1241	157.48 mm (6.2 inches)	121.92 mm (4.8 inches)	76.2 mm (3.00 inches)	8.128 mm (.32 inch)

Dimensions of the ACX104C in Millimeters (Inches).

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THEORY OF OPERATION

The ACX104C Potentiometer Rotary Position Sensor provides steering angle position information in automatic steering control systems, with a typical example shown in the Block Diagram. The function of the steering system is to maintain the machine frame at a constant distance from the string line or other steering reference. To do so, the machine position is detected through a vertical sensing wand attached to an SB104A Rotary Position Sensor. Changes in the machine tracking line cause the steering sensor hub to rotate, sending a signal to the R7232A Controller. This signal is compared in the Controller with another signal from the ACX104C track position feedback sensor (necessary to stabilize steering) and the Controller's output is fed to the KVF Servovalve for corrective action from the steering cylinder. Two of these systems, one front and one back, are necessary to maintain proper alignment along the string line.

A second steering function is provided by the automatic front track alignment system, which provides an electronic "tie rod" feature. Using a track position feedback transducer on the left front track and an identical transducer on the right front track, the KE05501, KE05502, KE05503, or KE05504 alignment module compares the steering angle of both tracks. Internal logic allows the alignment module to maintain the proper ratio of left-to-right track pivot throughout full turning range.

INSTALLATION

MOUNTING

Two mounting styles are available. If the mounting stud is chosen, a half-inch (1/2-13 UNC-2A thread) bolt extending from the case is a rotatable mounting.

If the flange mount is chosen, use four quarter-inch bolts to attach the back plate to the machine, with the hole pattern as shown in the Dimension drawing. In either mounting style, the sensor can be oriented in any position dictated by the application.

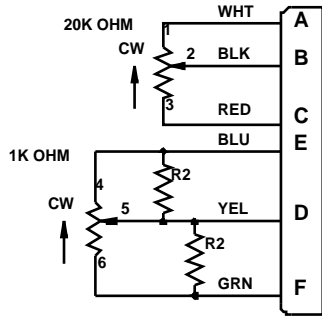
The most common means of attaching the input shaft to the steering post is with a chain and sprocket, with the ratio of post movement to feedback sensor shaft rotation selected by the user.

WIRING

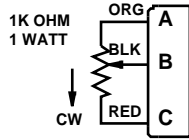
If electrical wheel alignment (using the KE05501, KE05502, KE05503 or KE05504 alignment module, described in the section "Theory Of Operation") is desired, a ganged dual potentiometer drive ACX104C should be specified. If a simple steering system is the application, a single potentiometer is sufficient.

The appropriate cable is the KW01009, (a two-foot coiled cable that extends to ten feet). The KW01007 is similar, but extends to twenty feet.

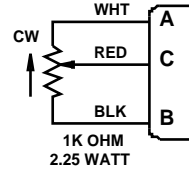
CONNECTION DIAGRAM



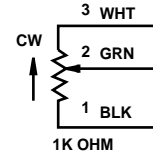
ACX104C1001



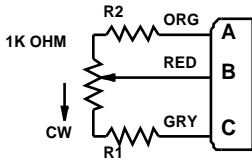
ACX104C1068



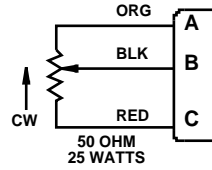
ACX104C1100



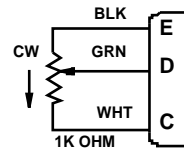
ACX104C1118



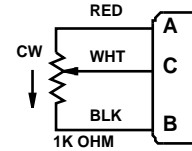
ACX104C1152



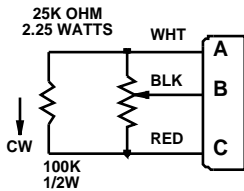
ACX104C1134



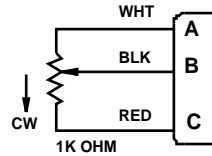
ACX104C1167



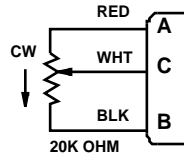
ACX104C1191



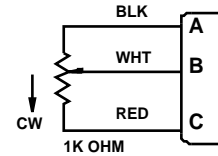
ACX104C1084



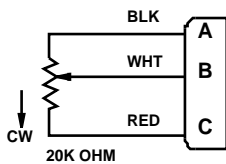
ACX104C1142



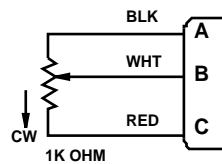
ACX104C1209



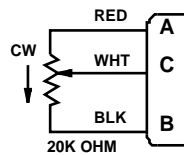
ACX104C1217



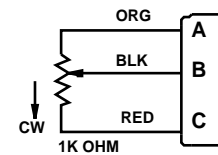
ACX104C1225



ACX104C1233



ACX104C1241



ACX104C1258

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Dual and Single Potentiometer ACX104C Schematics.
The Wipers on Pins B, C and D (As Appropriate) Are Moved by Shaft Rotation.

CUSTOMER SERVICE

NORTH AMERICA

ORDER FROM

Sauer-Danfoss (US) Company
Customer Service Department
3500 Annapolis Lane North
Minneapolis, Minnesota 55447
Phone: (763) 509-2084
Fax: (763) 559-0108

DEVICE REPAIR

For devices in need of repair, include a description of the problem, a copy of the purchase order and your name, address and telephone number.

RETURN TO

Sauer-Danfoss (US) Company
Return Goods Department
3500 Annapolis Lane North
Minneapolis, Minnesota 55447

EUROPE

ORDER FROM

Sauer-Danfoss (Neumünster) GmbH & Co.
Order Entry Department
Krokamp 35
Postfach 2460
D-24531 Neumünster
Germany
Phone: 49-4321-8710
Fax: 49-4321-871-184