Installation Manual P/N 790-010
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# 202 Series Rudder Angle Indicator System

The Model 202 Rudder Angle Indicator System provides continuous and immediate visual indication of a vessel's rudder position. The system consists of the following components:

1) Model 202 Indicator, P/N 510-254 with red illumination and dimmer control, complete with 10 ft. (3 M) of cable.

2) Model 201-JB-Std. Standard Junction Box, P/N 510-030

3) Universal Rudder Follow-up Unit, P/N 510-058 with 2 swivels and an 18 in. (460 mm) long brass connection rod, complete with 50 ft. (15 M) of cable.

## Model 202 Indicator

| | |
|---|---|
| Scale Size: | 4.5 in. (114 mm) |
| Scale Divisions: | every degree up to 10 degrees, Port and Starboard then every 5 degrees. |
| Maximum Angle Indicated: | 2 x 45 degrees |
| Max. Indicators per System: | 8 |
| Housing: | watertight |
| Weight: | 5 lbs (2.3 kg) |



## Model 201-JB-Std Junction Box

| | |
|---|---|
| Supply Voltage: | 12 to 40 vdc |
| Maximum Current: | 0.5 amp |
| Housing: | dripproof |
| Weight: | 6 lbs (2.7 kg) |

## Universal Rudder Follow-up Unit

| | |
|---|---|
| Housing: | waterproof |
| Potentiometer: | conductive plastic |
| Weight: | 2 lbs (0.9 kg) |

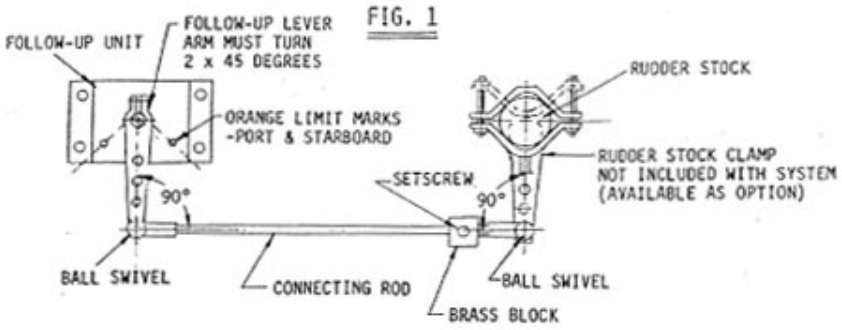
**Manufactured by Wagner Engineering Ltd**
**135 Riverside Dr, North Vancouver, BC, Canada V7H 1T6**
**Tel. (604) 988-1111 - Fax (604) 986-0334**
**e-mail sales@wagnerengineering.ca**

## Mounting the Rudder Follow-up Unit - see Fig. 1

A lever arm to clamp around the rudder stock is required. A Universal Rudder Stock Clamp P/N 510-191 is available from Wagner. It is suitable for rudder stock diameters from 1 to 4.5 inches (25.4 – 225 mm). The length from the center of the rudder stock to the end of the lever should be approximately 6 inches (150mm). Several ¼ inch (6mm) holes are drilled along the length of this lever. Remove one of the ball swivels attached to the rudder Follow-up Lever Arm and attach it to the Rudder Stock Clamp. Thread the brass rod supplied into the end of the ball swivel. The other end of the brass rod is pushed through the clearance hole in the brass block attached to the other ball swivel. Once positioned correctly, the set screw in the brass block is tightened to hold the rod in position.

Be sure that the 90 degree relationships are maintained as shown in Fig. 1 when the rudder is in mid position.

Adjust the ball swivel on the Rudder Follow-up Arm and the Rudder Stock Clamp to allow the Rudder Follow-up Lever Arm to travel through 2 x 45 degrees. This 45 degree travel can be obtained by lining up the edge of the Rudder Follow-up Lever Arm with the center of the orange limit marks. These marks can be found both Port and Starboard on the top of the Rudder Follow-up Unit housing.




## Mounting the Rudder Angle Indicator - see Fig. 4

The Rudder Angle Indicator can be mounted in any convenient location but should be at least 5 ft (1.4 M) from a magnetic steering compass. Insert the meter into the panel cut out and secure the clamping ring to the Indicator housing with the clamping setscrews installed through the edge of the ring. Use the panel setscrews on the face of the ring to remove any clearance between the Indicator and the panel.

## Mounting the Junction Box

The Junction Box may be mounted in any convenient dry location.

## Electrical Connections - see Fig. 2 and 3

Fig. 2 shows the electrical connections required when installing a single station Rudder Angle Indicator System. The connection for the (+) positive wire for the 12 or 24 vdc supply is at terminal 2 in the Junction Box. The connection for the (+) positive wire for the 32 vdc supply is made at terminal 3.

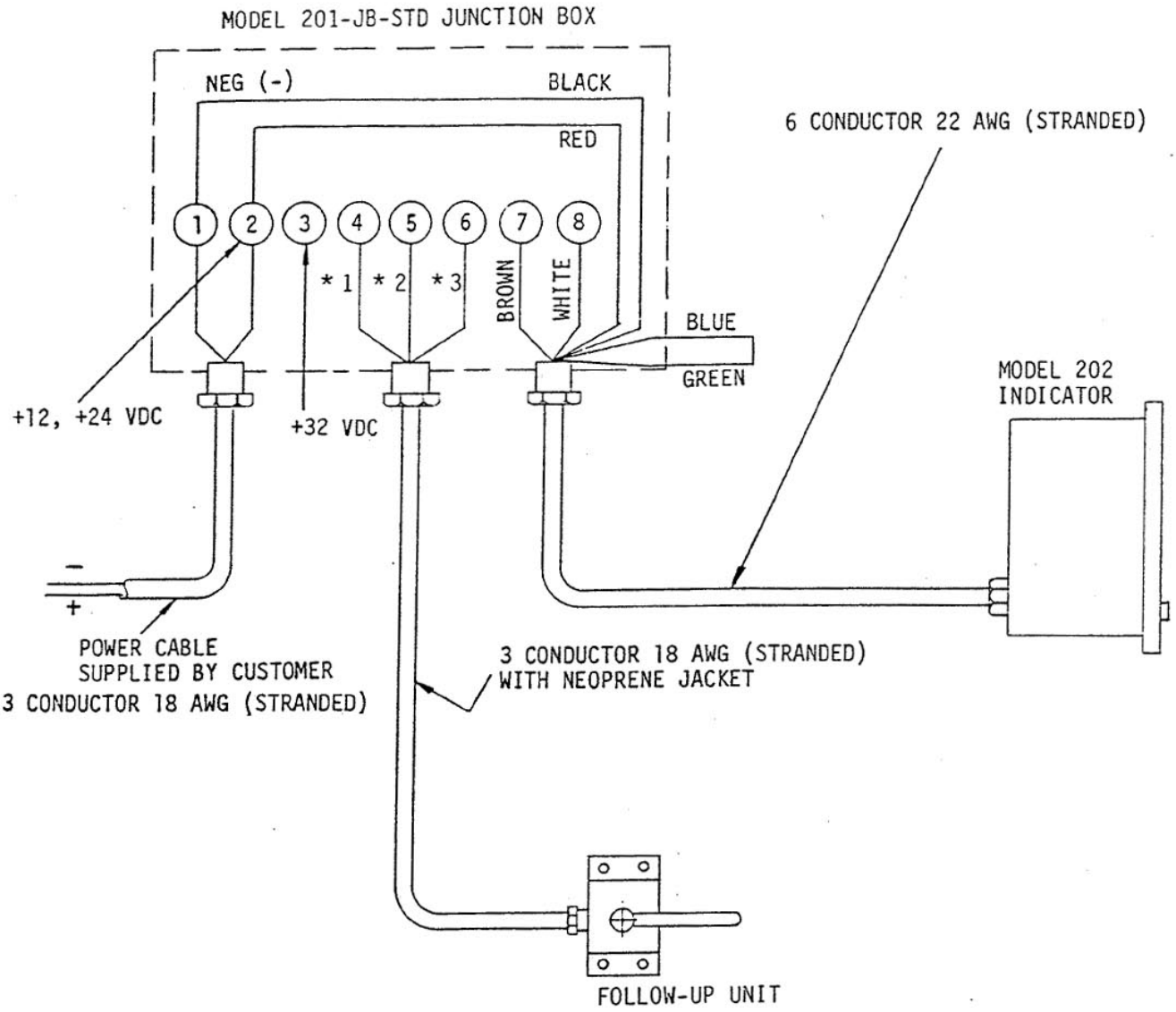
Note: If the installation must meet the requirements of a regulatory body Such as Lloyd's, ABS, etc. ensure cabling used to interconnect components is an approved type.

Fig. 3 shows the connections required for a multiple station system. The connection for the (+) positive wire for the 12 or 24 vdc supply is at terminal 2 in the 201-JB-STD Junction Box. The connection for the (+) positive wire for the 32 vdc supply is made at terminal 3. Adding additional Indicators only requires breaking the white conductor of a single station system and connecting the brown and white wire from this additional Indicator in series with the break. (brown to white going to meter and white to white going to terminal 8) The red and black conductors from the additional Indicators are connected in parallel with the red and black of the first Indicator. Up to 7 additional Indicators can be added to the single station system. It is advisable to use a separate Junction box when connecting additional Indicators.

## Trouble Shooting

| Symptom | Probable Cause | Remedy |
|---|---|---|
| All indicators move in the wrong direction when the rudder is turned | Incorrect wiring | Reverse the connections at terminals 4 and 6 in the 201-JB-STD Junction Box. |
| One Indicator of a multiple station system moves in the wrong direction when the rudder is turned | Incorrect wiring on the Indicator that moves in the wrong direction | Reverse the brown and white wires on the faulty indicator. |
| The Port and Starboard hard over positions are not equal on the Indicator(s) | Geometry of the Rudder Follow-up linkage is not according to the instructions | Refer to Rig. 1 and correct linkage |
| To little or to much movement of Indicator(s) (Indicator readings are variable +/- one degree) | Trimming potentiometer inside the 201-JB-STD junction box is not adjusted correctly | Adjust Trimming Potentiometer |
| Dimmer does not work | ½ amp fuse on the Indicator Circuit board is blown | Replace fuse |
| | Power supply is not correct | Check power supply |

FIG. 2




* UNIVERSAL F/U WIRING - STANDARD COLOURS

| | 1 | 2 | 3 |
|---|---|---|---|
| A | BLACK | GREEN | WHITE |
| B | BLACK | GREEN | RED |
| C | BLACK | WHITE | RED |
| D | BROWN | GREEN | RED |

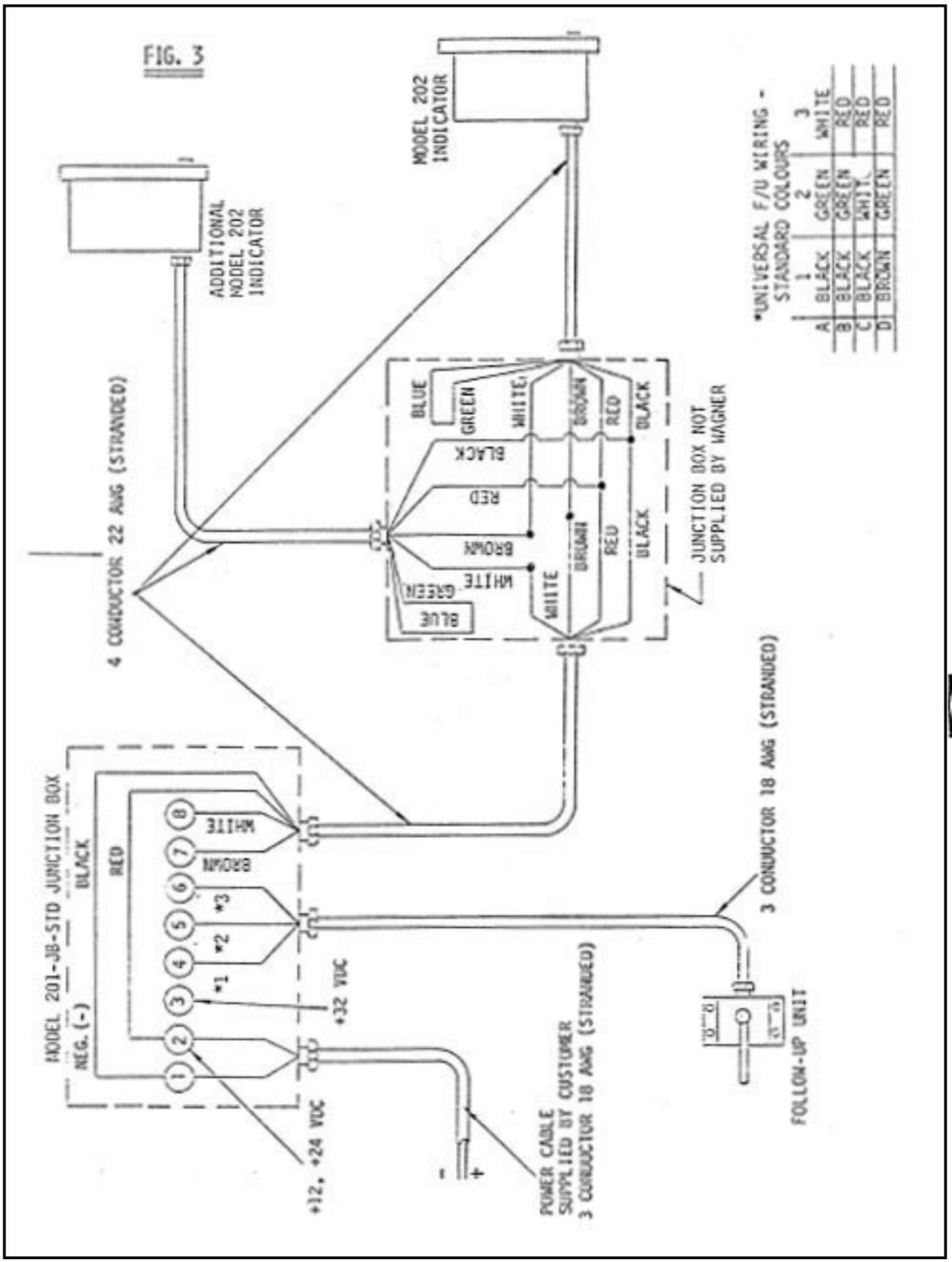
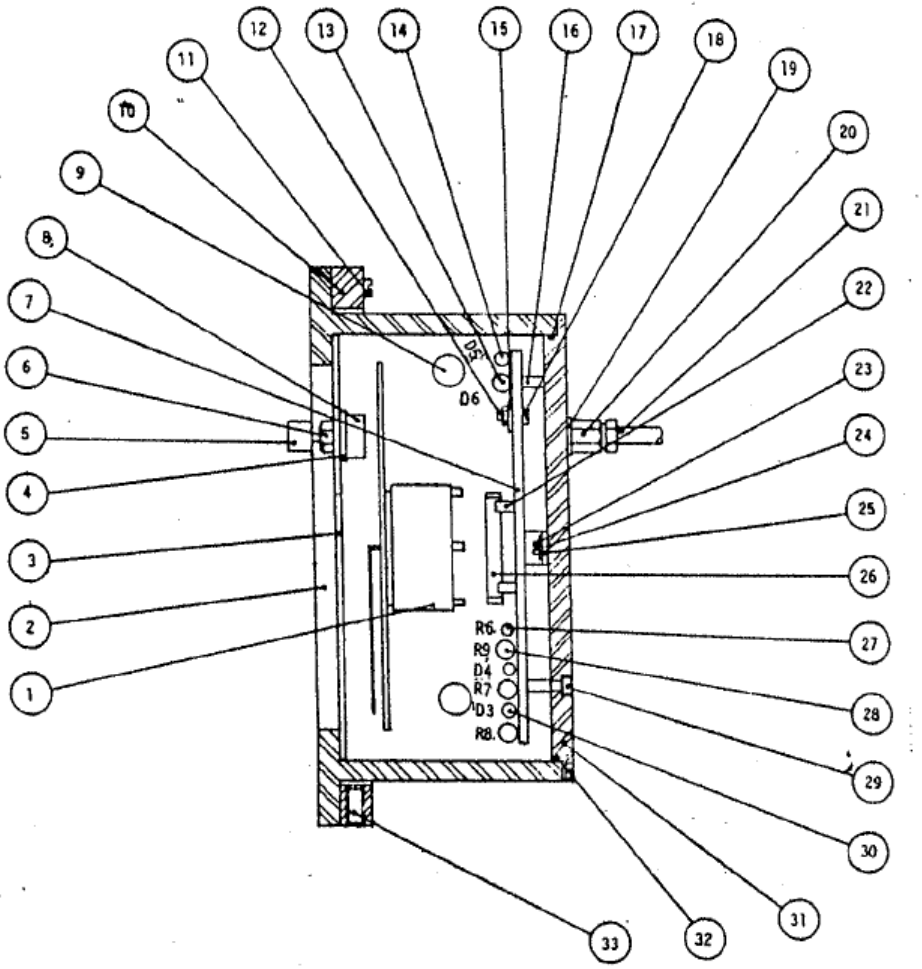


FIG. 3
MODEL 202 INDICATOR
ADDITIONAL MODEL 202 INDICATOR
4 CONDUCTOR 22 AWG (STRANDED)
JUNCTION BOX NOT SUPPLIED BY WAGNER
BLUE
GREEN
WHITE
BROWN
RED
BLACK
*UNIVERSAL F/U WIRING - STANDARD COLOURS
A BLACK GREEN WHITE
B BLACK GREEN RED
C BLACK WHITE RED
D BROWN GREEN RED
MODEL 201-JB-STD JUNCTION BOX
NEG. (-)
*1
*2
*3
+32 VDC
+12, +24 VDC
POWER CABLE SUPPLIED BY CUSTOMER 3 CONDUCTOR 18 AWG (STRANDED)
3 CONDUCTOR 18 AWG (STRANDED)
FOLLOW-UP UNIT

# 202 Series Rudder Angle Indicator System




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 1 | 700-201 | Meter Movement |
| 2 | 1 | 690-477 | Housing |
| 3 | 1 | 600-105 | Glass |
| 4 | 1 | 604-046 | Washer (neo.) |
| 5 | 1 | 620-024 | Knob |
| 6 | 1 | 211-011 | Seal Shaft |
| 7 | 1 | 130-024 | Circuit Board * |
| 8 | 1 | 740-021 | Dimmer Pot |
| 9 | 2 | 410-001 | Lamp * |
| 10 | 1 | 690-479 | Clamping Ring |
| 11 | 3 | 603-089 | Cap Screw |
| 12 | 2 | 602-013 | Nut |
| 13 | 1 | 302-022 | Zener Diode |
| 14 | 2 | 500-003 | Diode |
| 15 | 2 | 604-027 | Washer |
| 16 | 3 | 600-106 | Stand Off |
| 17 | 3 | 616-067 | O-Ring |
| 18 | 2 | 603-092 | Cap Screw |
| 19 | 1 | 610-011 | Washer |
| 20 | 1 | 610-009 | Cable Gland |
| 21 | 10' | 750-209 | Cable |
| 22 | 2 | 421-005 | Fuse Clip |
| 23 | 1 | 603-007 | Cap Screw |
| 24 | 1 | 604-019 | Washer |
| 25 | 1 | 312-007 | Transistor |
| 26 | 1 | 420-001 | Fuse * |
| 27 | 1 | 100-059 | Resistor |
| 28 | 3 | 103-001 | Resistor |
| 29 | 3 | 603-039 | Cap Screw |
| 30 | 1 | 302-009 | Zener Diode |
| 31 | 1 | 690-478 | Back Plate |
| 32 | 3 | 603-010 | Cap Screw |
| 33 | 3 | 603-090 | Set Screw |

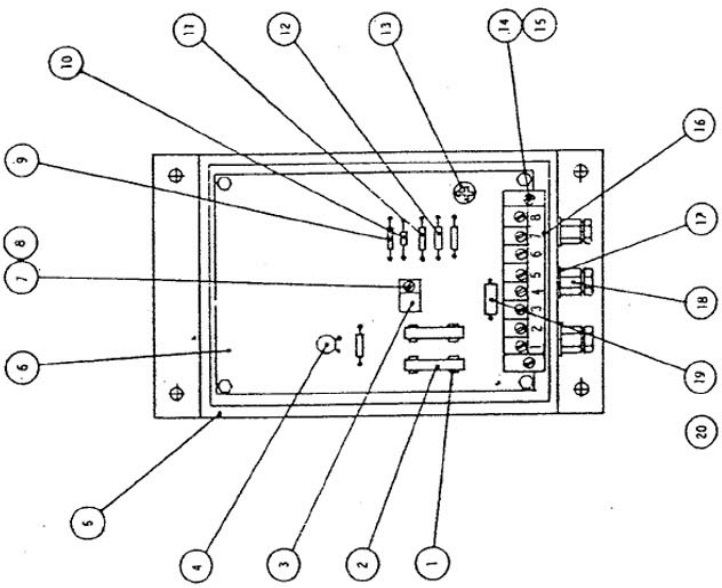
*SPARE KIT P.N. 740-026

| DETAIL | QUANTITY | DESCRIPTION | MATERIAL |
|---|---|---|---|

WAGNER
Manufacturers of MARINE HYDRAULIC STEERING GEARS

TITLE
PARTS LIST FOR
MODEL 202 INDICATOR

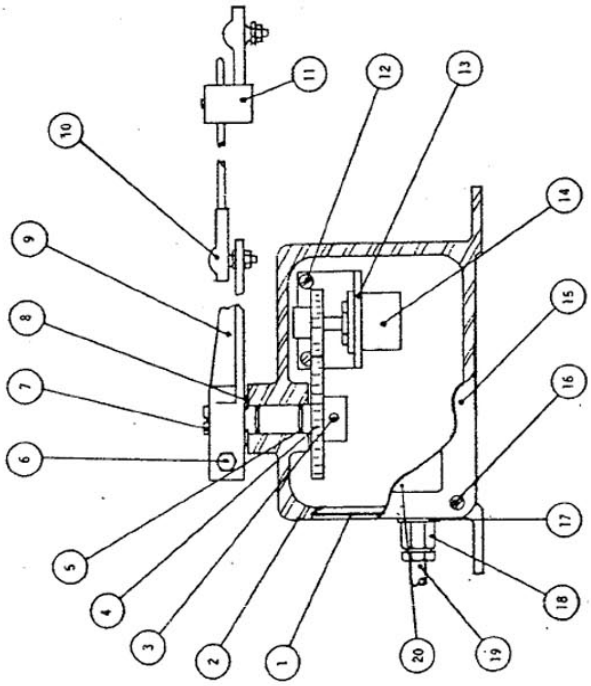
| DRAWN | DATE | SCALE | QUOTE NO |
|---|---|---|---|
| | 6CP/81 | — | |
| REVISION NOTES | | | DRAWING NO / REV. |
| | | | C-6-224 |



MODEL 201-JB-STD JUNCTION BOX

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 4 | 421-005 | FUSE CLIP |
| 2 | 2 | 420-001 | FUSE* |
| 3 | 1 | 315-002 | REGULATOR |
| 4 | 1 | 400-010 | CAPACITOR |
| 5 | 1 | 670-021 | HOUSING |
| 6 | 1 | 580-030 | PC BOARD COMPL.* |
| 7 | 1 | 603-007 | CAP SCREW |
| 8 | 1 | 602-003 | NUT |
| 9 | 1 | 100-080 | RESISTOR |
| 10 | 2 | 300-003 | DIODE |
| 11 | 2 | 102-008 | RESISTOR |
| 12 | 2 | 102-003 | RESISTOR |
| 13 | 2 | 130-019 | TRIMPOT |
| 14 | 2 | 603-015 | CAP SCREW |
| 15 | 2 | 602-001 | NUT |
| 16 | 1 | 430-009 | TERMINAL STRIP |
| 17 | 3 | 610-011 | NYLON WASHER |
| 18 | 3 | 610-009 | CABLE GLAND |
| 19 | 3 | 105-002 | RESISTOR |
| 20 | 1 | 660-035 | LABEL |

* SPARE KIT P.N. 740-027



UNIVERSAL FOLLOW-UP UNIT

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 1 | 615-005 | O-RING |
| 2 | 1 | 655-105 | HOUSING |
| 3 | 1 | 600-052 | ROLL PIN |
| 4 | 1 | 650-107 | GEAR (62T) |
| 5 | 2 | 615-010 | O-RING |
| 6 | 1 | 603-114 | CAP SCREW |
| 7 | 1 | 690-019 | SHAFT |
| 8 | 1 | 605-002 | SNAP RING |
| 9 | 1 | 690-288 | LEVER ARM |
| 10 | 1 | 550-004 | SWIVEL ASS'Y* |
| 11 | 1 | 550-005 | BRASS BLOCK + SWIVEL* |
| 12 | 2 | 603-072 | CAP SCREW |
| 13 | 4 | 670-022 | BRACKET (POT) |
| 14 | 1 | 550-013 | POT & GEAR ASS'Y* |
| 15 | 1 | 655-106 | COVER (HOUSING) |
| 16 | 4 | 603-081 | CAP SCREW |
| 17 | 1 | 610-011 | WASHER (NYLON) |
| 18 | 1 | 610-009 | GLAND CABLE |
| 19 | 5' | 750-102 | CABLE |
| 20 | 1 | 660-005 | LABEL |

* SPARE KIT P.N. 740-028

| DETAIL | QUANTITY | DESCRIPTION | MATERIAL |
|---|---|---|---|
| | | | |

WAGNER

MANUFACTURERS OF MARINE HYDRAULIC STEERING GEARS

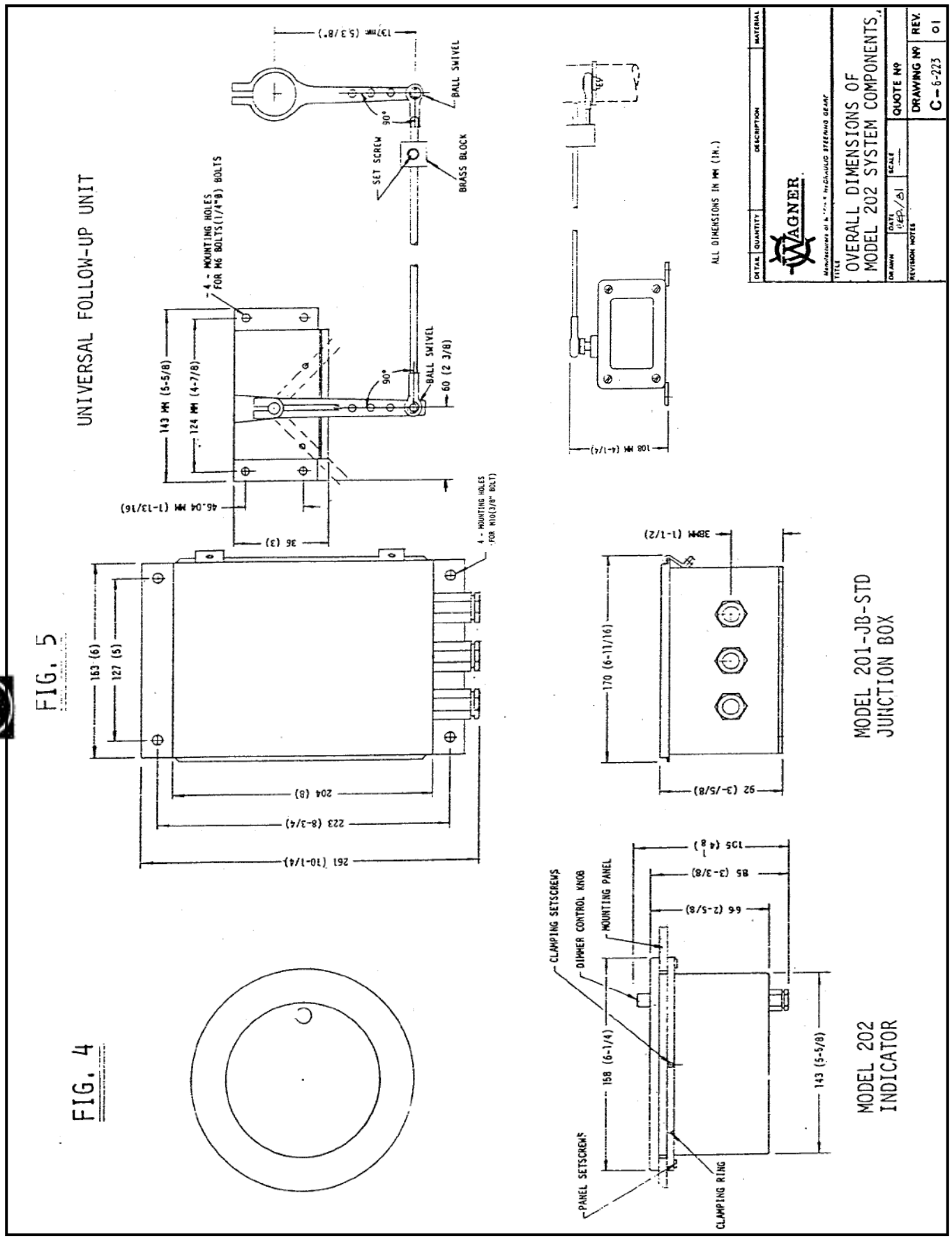
TITLE

PARTS LIST FOR
UNIVERSAL FOLLOW-UP UNIT
AND MODEL 201-JB-STD

REVISION NOTES

DRAWING NO C-6-225

REV


OVERALL DIMENSIONS OF
MODEL 202 SYSTEM COMPONENTS.
WAGNER
ALL DIMENSIONS IN MM (IN.)
DRAWING Nº C-6-223
REV. 01
UNIVERSAL FOLLOW-UP UNIT
4 - MOUNTING HOLES FOR M6 BOLTS(1/4"Ø) BOLTS
BALL SWIVEL
SET SCREW
BRASS BLOCK
143 MM (5-5/8)
124 MM (4-7/8)
46.04 MM (1-13/16)
36 (3)
60 (2 3/8)
4 - MOUNTING HOLES FOR M10(3/8" BOLT)
163 (6)
127 (5)
204 (8)
223 (8-3/4)
261 (10-1/4)
108 MM (4-1/4)
38MM (1-1/2)
170 (6-11/16)
92 (3-5/8)
MODEL 201-JB-STD
JUNCTION BOX
FIG. 5
FIG. 4
CLAMPING SETSCREWS
DIMMER CONTROL KNOB
MOUNTING PANEL
PANEL SETSCREWS
CLAMPING RING
158 (6-1/4)
143 (5-5/8)
85 (3-3/8)
66 (2-5/8)
MODEL 202
INDICATOR