

## TACAN INDICATOR COUPLER CU-395 / ARN21



The CU-395 translates the Bearing and Range information from the Tacan ARN21 and the compass into signals for a Bearing-Distance-Heading-Indicator (BDHI) and a Course Deviation Indicator (CDI). There are additional outputs for a navigation computer.

The CU-395 replaces the original bearing indicator ID-307, radio magnetic indicator ID-250, range indicator ID-310 and phase detecting network CV279.

A typical installation has:

- Receiver -transmitter ARN21, all types
- BDHI ID-388 , 653 or -663
- CDI ID-249 ,-351 or -387

The BDHI has an additional input for the second pointer to be connected to a glide slope receiver;

The CDI has an additional input for a lamp to be connected to a marker beacon receiver .

**The schematic diagram has two pages:**

- Page 1 All circuits connected to the ARN21. Resulting in two shaft positions, one for bearing, the other for range (distance). These shaft positions are drawn as blue arrows in the diagrams.
- Page 2: All circuits to make these shaft positions available on the BDHI and CDI instruments.

## The CU-395 has 4 mutually floating circuits:

1. Those connected to the TACAN set ARN21;
2. Those connected to the CDI ID-249;
3. Those connected to the range computer
4. Those connected to the BDHI instrument.

Only the "gnd" from group 4 is connected to the frame including the "cold" side of the 115V/400Hz supply.

## Auxiliary outputs

The CU-395 provides auxiliary outputs for:

- ~ A compass card servoamplifier ( 6.3V~ and + 150V dc )
- ~ 26.5 volts at 400 cps for transmitter and fundamental bearing resolver synchro excitation;
- ~ 12 volts and 4.9 volts at 400 cps for supplying input voltage to the differential synchro transmitter in the magnetic bearing indicator and the hundreds dial synchro receiver of ID-388/ARN

A built-in Relative / Magnetic Relay (A 28 V coil) selects the proper circuits to cause Course Indicator ID-250/ARN to depict either relative or magnetic bearing of the navigational beacon from the aircraft. ( *Course* on top or *Nord* on top )

## Rotary parts inside CU-395, resistance data

	purpose	type	stator ( $\Omega$ )	Vstator	rotor	Vrotor
B201	135Hz fine bearing	resolver	2x 570 $\Omega$		2x 44 $\Omega$	
B202	4044Hz fine range	resolver	2x 12 $\Omega$		2x 44 $\Omega$	
B203	diff synchro	synchro	3x 12 $\Omega$ *		3x 16 $\Omega$ *	
B204	fundamental	resolver	2x 12 $\Omega$		2x 74 $\Omega$	
B205	range nm	synchro	3x 3 $\Omega$ *		7 $\Omega$	
B206	range tens nm	synchro	3x 3 $\Omega$ *		7 $\Omega$	

\*) line to line resistance

## Connector data    Insert both 36-8

J201 Left connector AN3102C36-8P mates with plug AN3102C 36-8S

J202 Right connector AN3102C36-8PW mates with plug AN3102C 36-8SW

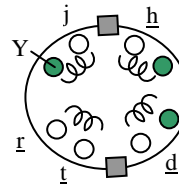
## Servomotors

Both servomotors have the same part number, hence are identical.

Connection is done with an 8-way mini plug.

The green contacts are grounded.

The mini drawing shows the connections for the MG202 Range motor



### Bearing motor/ generator MG201

motor  $22\Omega + 46\Omega$  / tacho  $40\Omega + 270\Omega$

label:

**SERVO MOTOR - TACHOMETER GENERATOR**  
**24v 10SM4c / 24v - 10DG4c**  
 24 VOLTS 400 CYCLES  
 FEDERAL STOCK NR RM6105-688-5526-E111  
 PART. NO. 1474152 SEIAL NO 3610  
 MANUFACTURED BY G-M LABORARORIES, INC., CHICAGO, U.S.A.

### Range motor/generator MG202

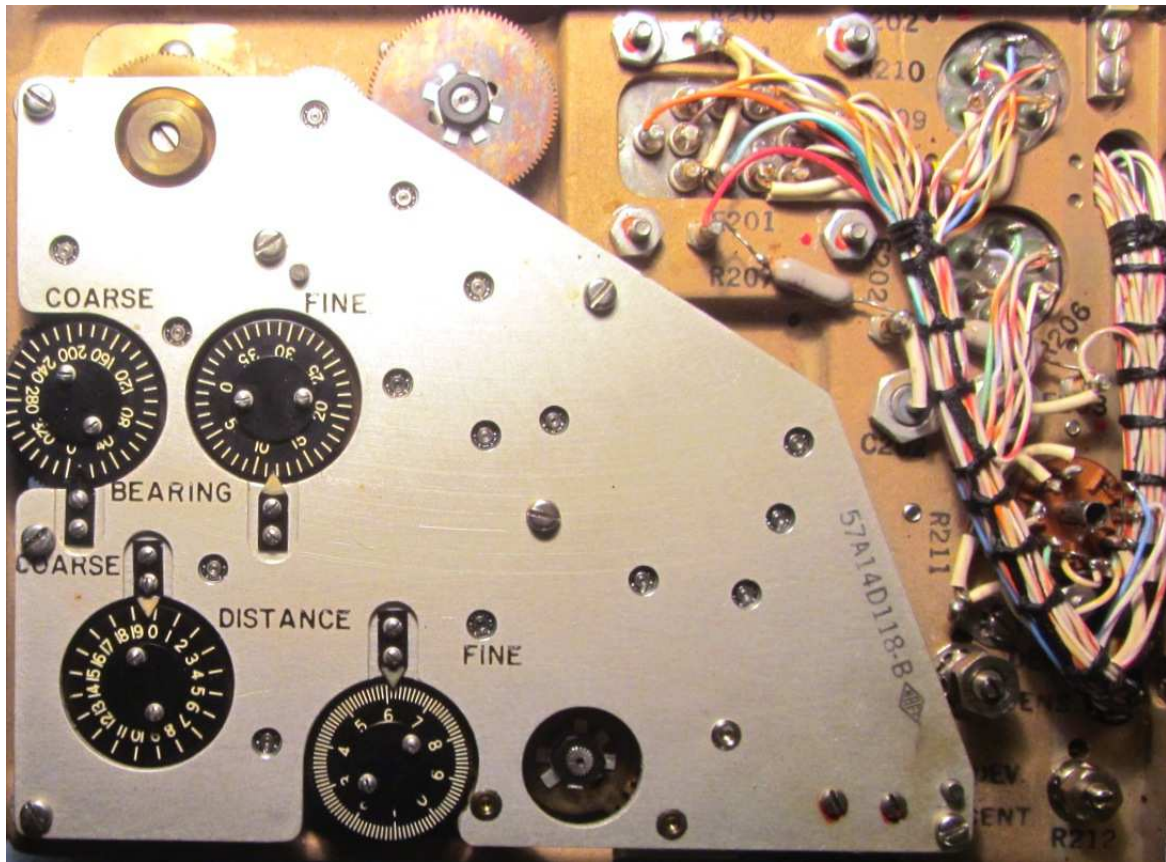
motor  $18\Omega + 31\Omega$  / tacho  $42\Omega + 325\Omega$

label:

<p style="text-align: center;">US NAVY - BU. OF ORD.</p> <p style="text-align: center;"><b>SERVO MOTOR</b>                  MARK 18 MOD 2 WT. 4.6 OZ                  BUORD DWG. NO. 1474152</p> <p style="text-align: center;">KEARFOTT CO. INC., LITTLE FALLS, N.J.                  serial no KE-1726</p>	<p style="text-align: center;"><b>400 CYCLES</b>                  NO LOAD SPEED 8000 RPM                  MIN STALL TORQUE .28 IN.OZ.                  OUTPUT/1000R.P.M. .300V                  NULL MAX. .015 VRMS</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>YEL 24V/0</p> <p>WHT.</p> </div> <div style="text-align: center;"> <p><b>MOTOR</b></p> <p>18V 20</p> <p>RED BLK</p> </div> <div style="text-align: center;"> <p>ORN</p> <p>GY.</p> </div> <div style="text-align: center;"> <p><b>GEN.</b></p> <p>OUTPUT BRN BLU</p> </div> </div>
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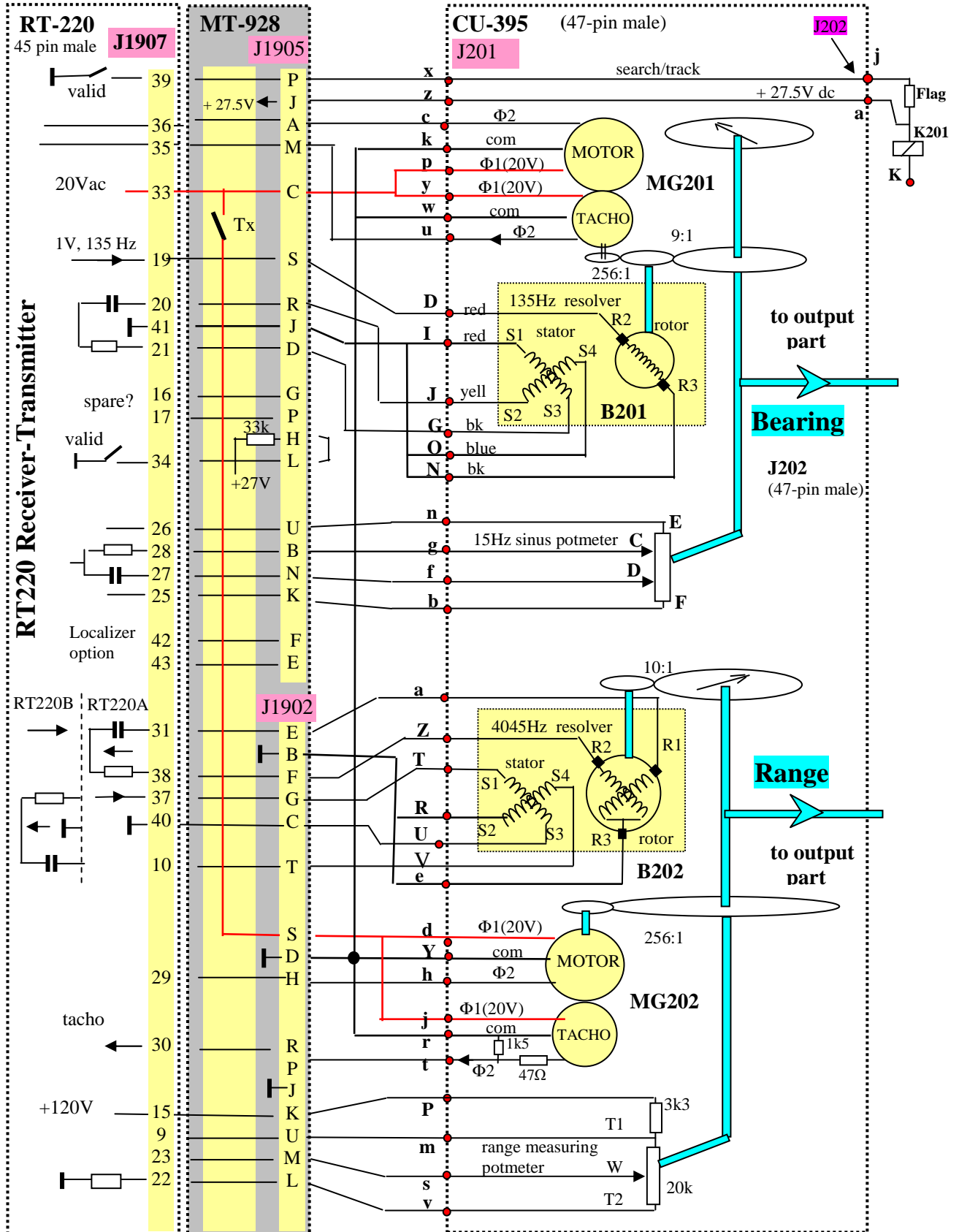
Compare these motors with those in the original instruments

ID307	motor $34\Omega + 34\Omega$ / tacho	50 $\Omega$ + 106 $\Omega$
ID310	motor $44\Omega + 44\Omega$ / tacho	55 $\Omega$ + 200 $\Omega$



**CU-395 primary part from J201 (and ARN21) to shaft position**

# CU-395 primary part from ARN21 to bearing and range shaft angles

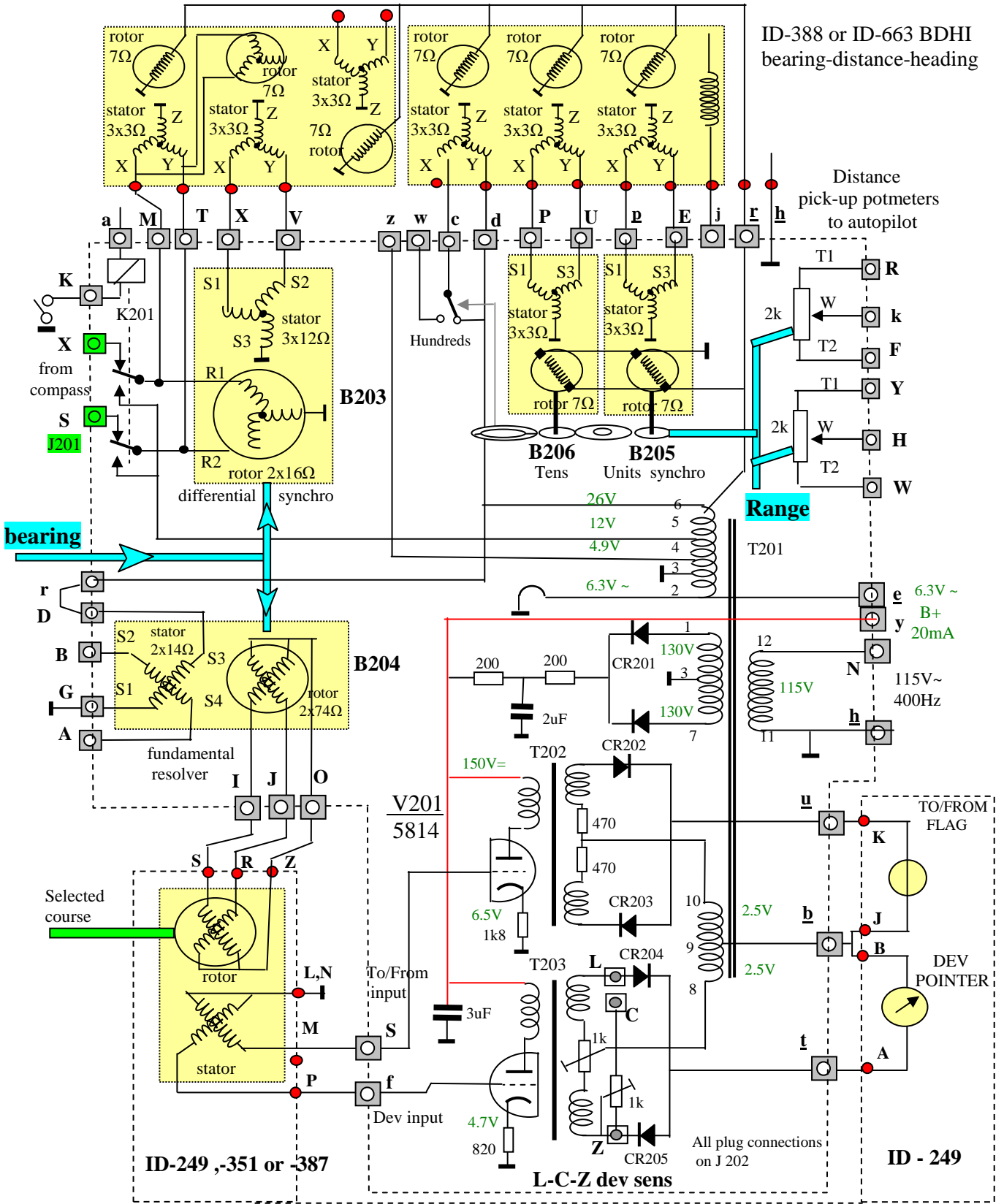


Unused sockets in 47pin J201 :  
A,B,C,E,F,H,K,L,M,W

**CU-395/ARN21A Indicator Coupler**  
primary part : from J201 (ARN21) to shaft angles

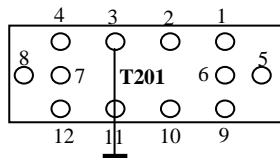
# CU-395 secondary part from shaft positions to indicators

Compass dial Pointer1 Pointer2 Hundreds Tens Units



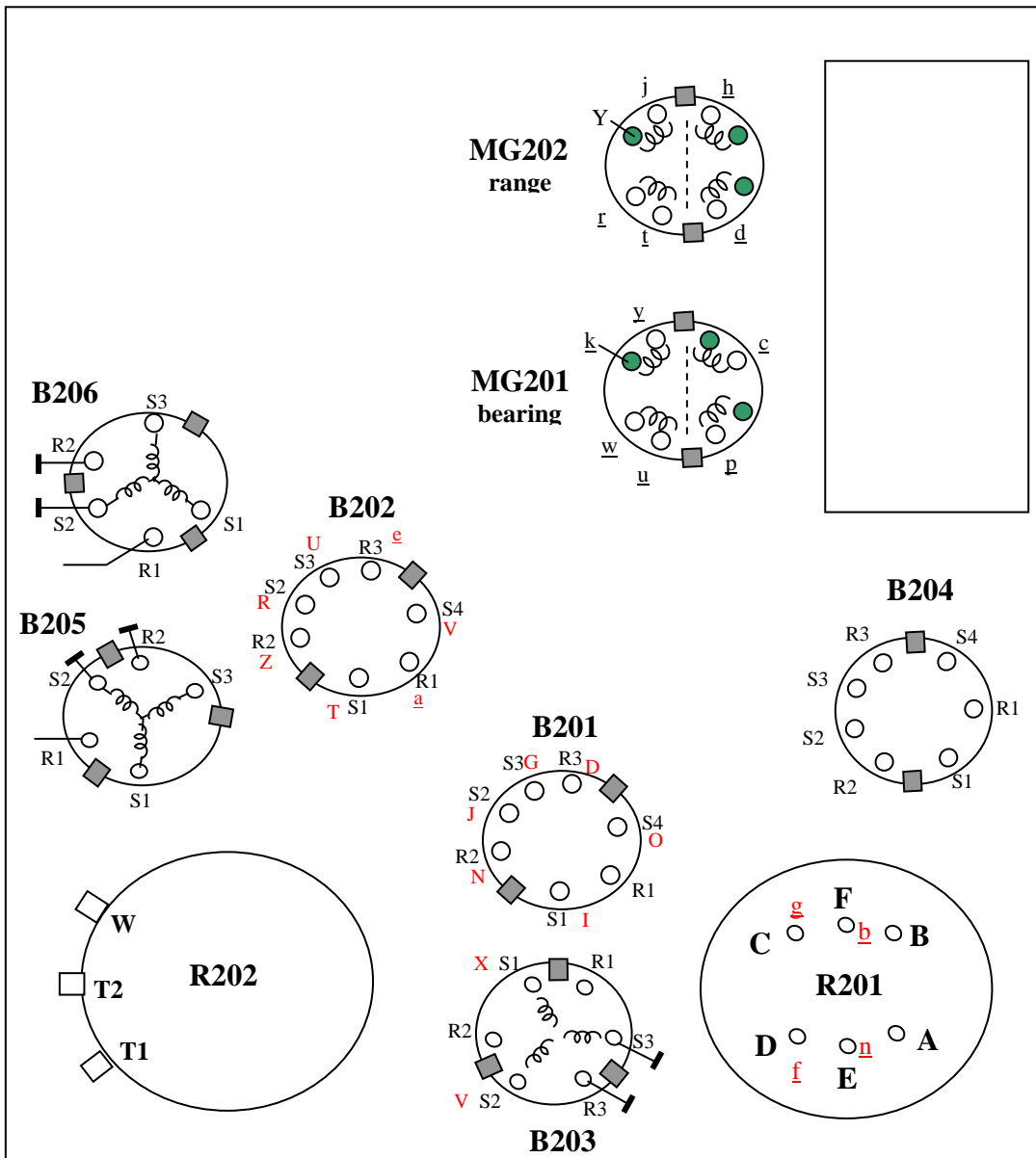
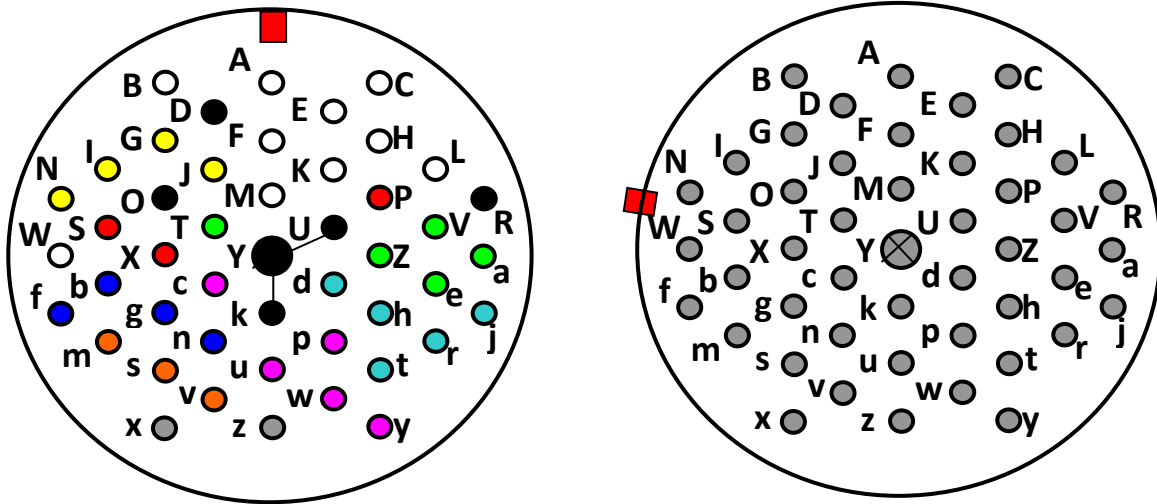
Transformer T201

1,7	130V / 30mA
2	6.3V / 500mA
3	0
4	4.9V / 40 mA
5	12V / 250 mA
6	26V / 650 mA



**CU-395/ARN21A Indicator Coupler secondary part to J202 (instruments)**

Annex 1 Connector locations J 201 and J 202

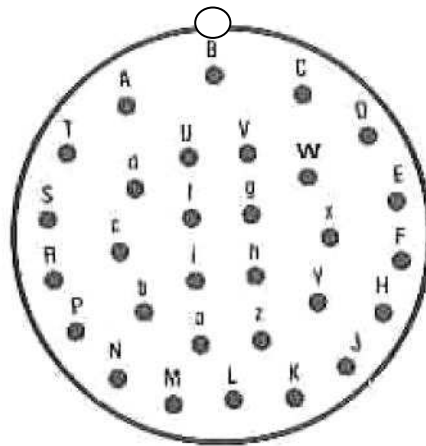


## Annex 2 Bearing-distance-heading- Indicators , BDHI

Originally the **ID-663/ U**, a later model of the bearing-distance-heading indicator (BDHI) is the **ID-653/U** Aeronautics (Milwaukee, US) used in the F-4J/S with horizontal range display

Pinouts: A,B = magnetic heading signal.  
 J,K,L,a = 26 V AC phase C.  
 C,D,E,W,b= GND,  
 H,F = Lead comp. ADF or NAV comp. single bar pointer relative bearing signal.  
 M,N = double bar pointer relative bearing signal.  
 P,R = hundreds counter TACAN or "miles to go" signal.  
 S,T = tens counter signal,  
 V,U = units counter signal,  
 Y = 28 V DC,  
 Z,c = shutter counter GND,  
 k = 26 V AC phase C.  
 d,f = 5V ac or dc for lamps

ID-663 dial



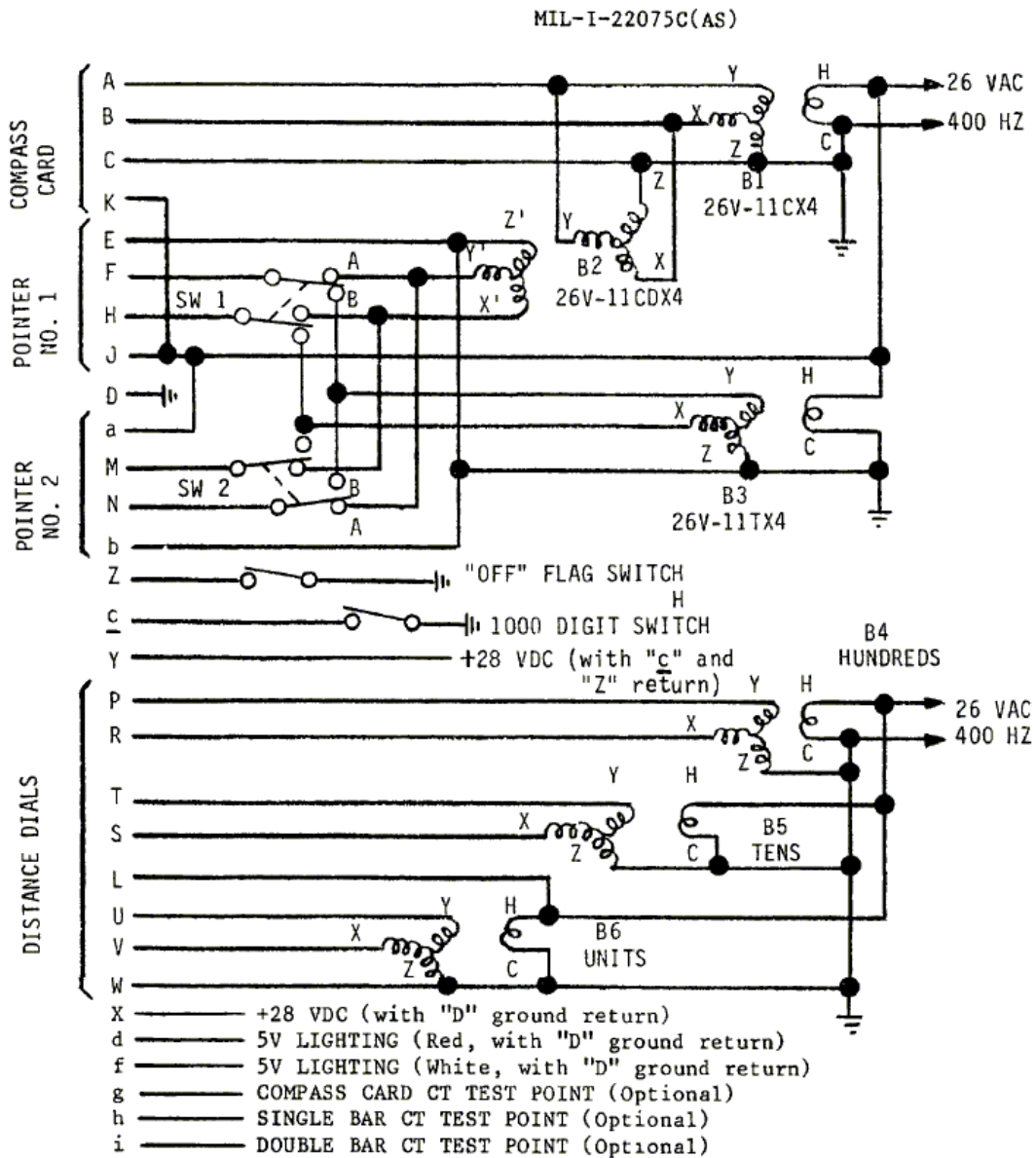
MS24241  
M21 - 30N

21-30

30 - #20



# BDHI generic wiring



SYNCHROS B3, B4, B5 AND B6 ARE ELECTRICALLY  
EQUAL TO TYPE 26V-11TX4 OF SPEC. MIL-S-20708.

Each synchro transmitter shall rotate clockwise (viewed from shaft end) for increasing reading of the compass dial, all pointers and all distance dials with electrical connections in accordance with MIL-C-5824. With the synchro transmitter at the high null (zero degrees) position, the compass card shall read zero degrees at the lubber line, the tail of each pointer shall be at the lubber line and all distance dials shall read zero miles.

Figure 2. Test Circuit Wiring Diagram,