

SMITHS TACAN INSTRUMENT COUPLER

20-2-2024 / kb

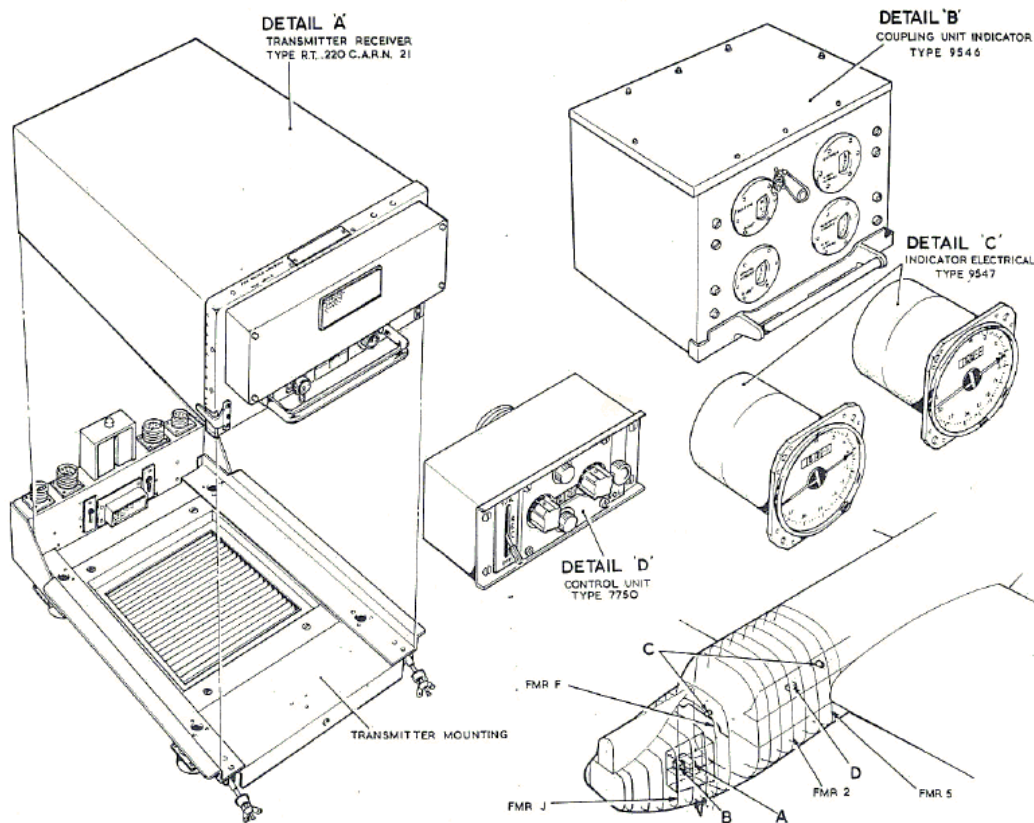


Fig.1 Location of equipment

RESTRICTED

The TACAN installation shown in the picture above was part of the TACAN system in the Hunter GA single seat aircraft. The parts data from 1960.

The installation has the following parts:

- The Tacan transmitter/receiver RT220C / ARN21;
- The mounting base of the R/T MT928 / ARN21;
- The cockpit control C 866/ARN-21 or Type 7750 ;
- The UHF aerial AS133 ;
- The Type 9545 mount of the instrument coupler
- The Type 9546 TACAN instrument coupler
- The Type 9547 TACAN indicator

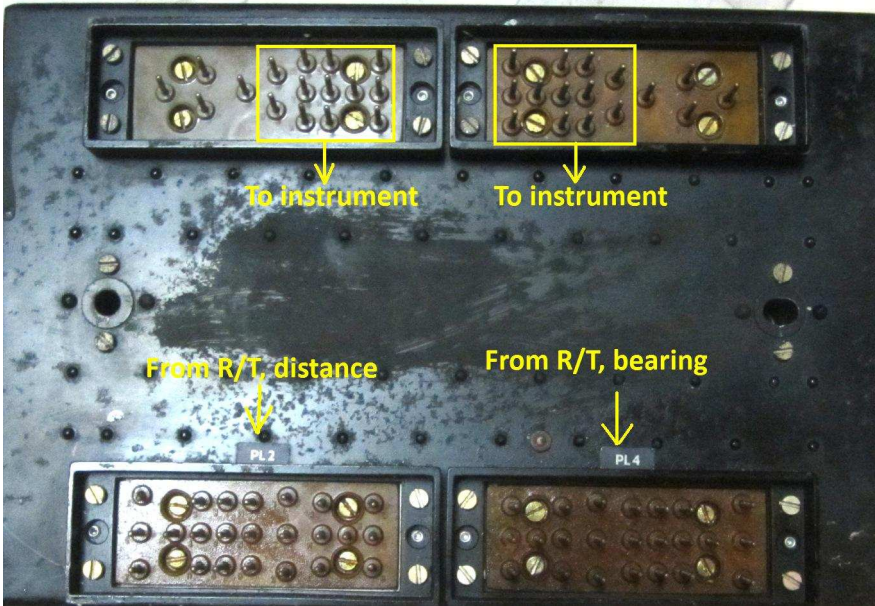
The R/T and the coupler are not pressurized. The coupler drives one (or two) indicators with torque synchro signals of 115V~ 400Hz, to allow a longer distance between coupler and instrument(s).

I have the system running with a single indicator, and an RT220B in stead of the later RT220C.

All cables were made at home, even the 3 special connectors on the coupler made by Film&Equipment (F&E)

Compared with the american CU395 coupler, the system has no support for a course deviation indicator, or connection with a compass to have the flight direction on top, rather than always "north" on top of the dial. The TYPE xxxx parts are British made. The british tacan R/T unit STARN21 was no longer used.

Rear side of the coupler.



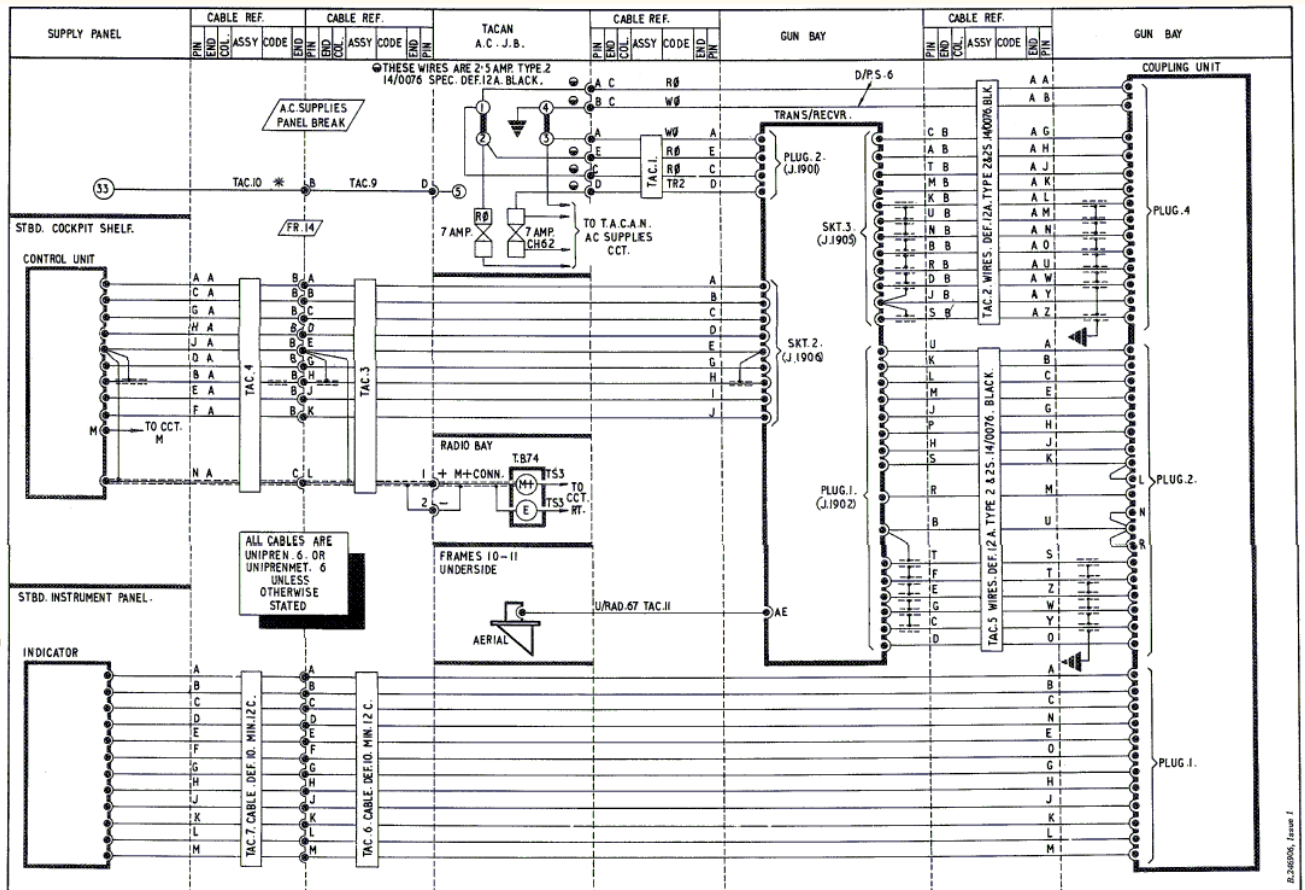
The two 16 way upper connectors PL1 and PL3 connect to 1 or 2 indicators. I use only one via a 12-pole cable.

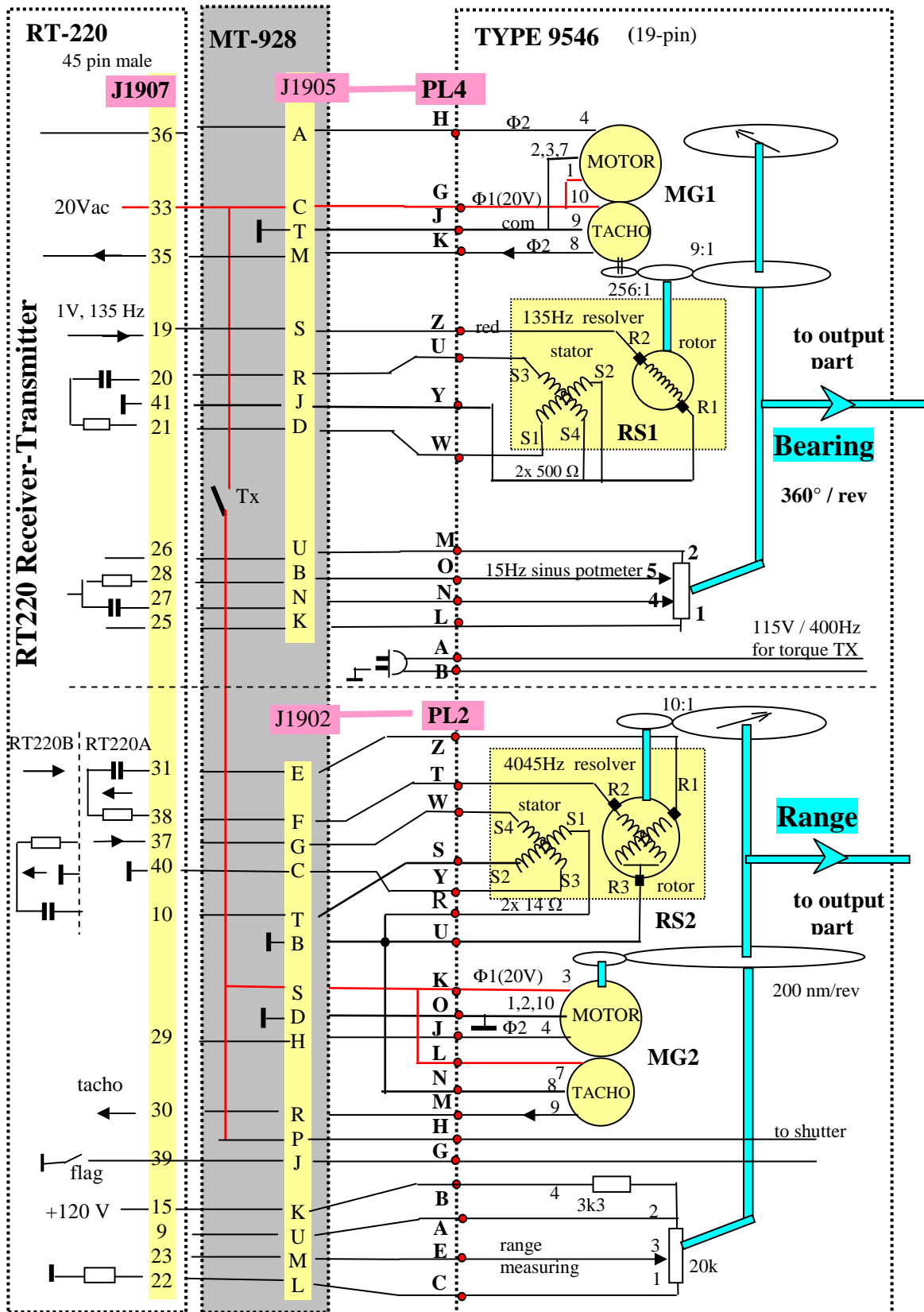
The lower two are 23 way connectors PL2 and PL4 connecting to plugs on the mount of the ARN21.

Distance signals:
PL2 connects to J1902 thru a 19 wire cable.

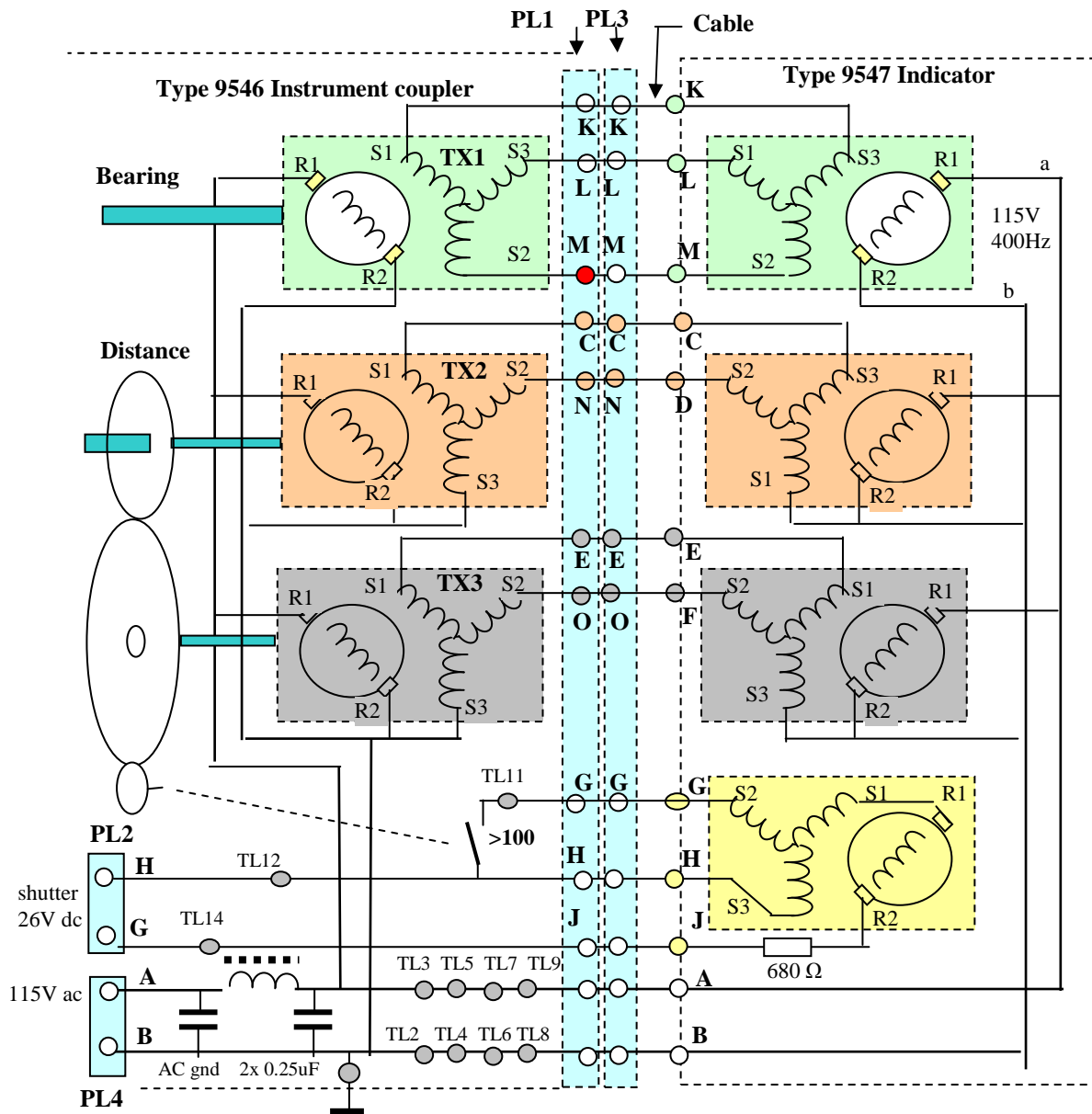
Bearing signals:
PL4 connects to J1905 thru a 14 wire cable.

Interconnections between parts



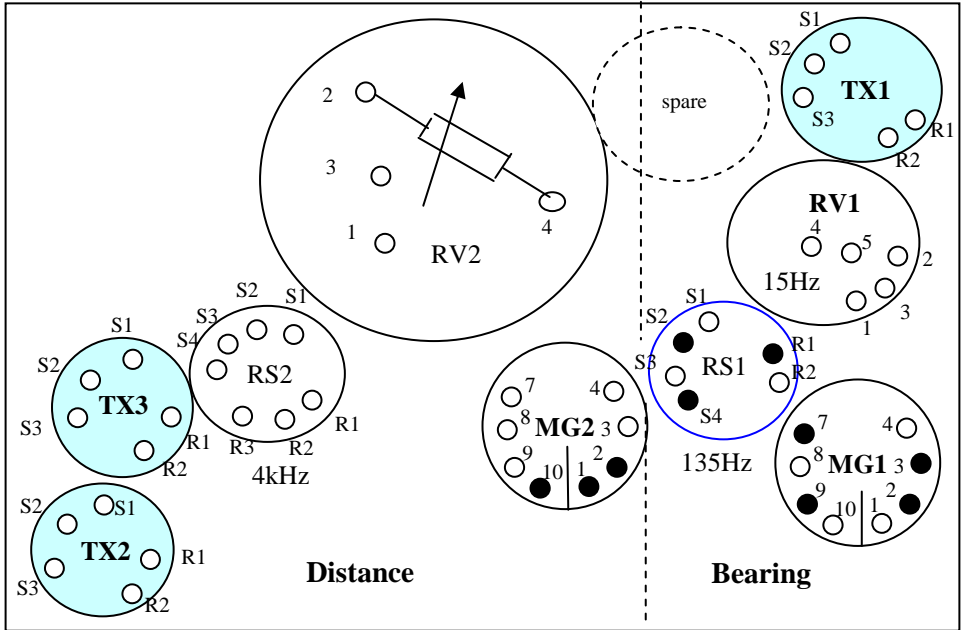


TYPE 9546 Indicator Coupler
 primary part, from J1907 (ARN21) to shaft angles



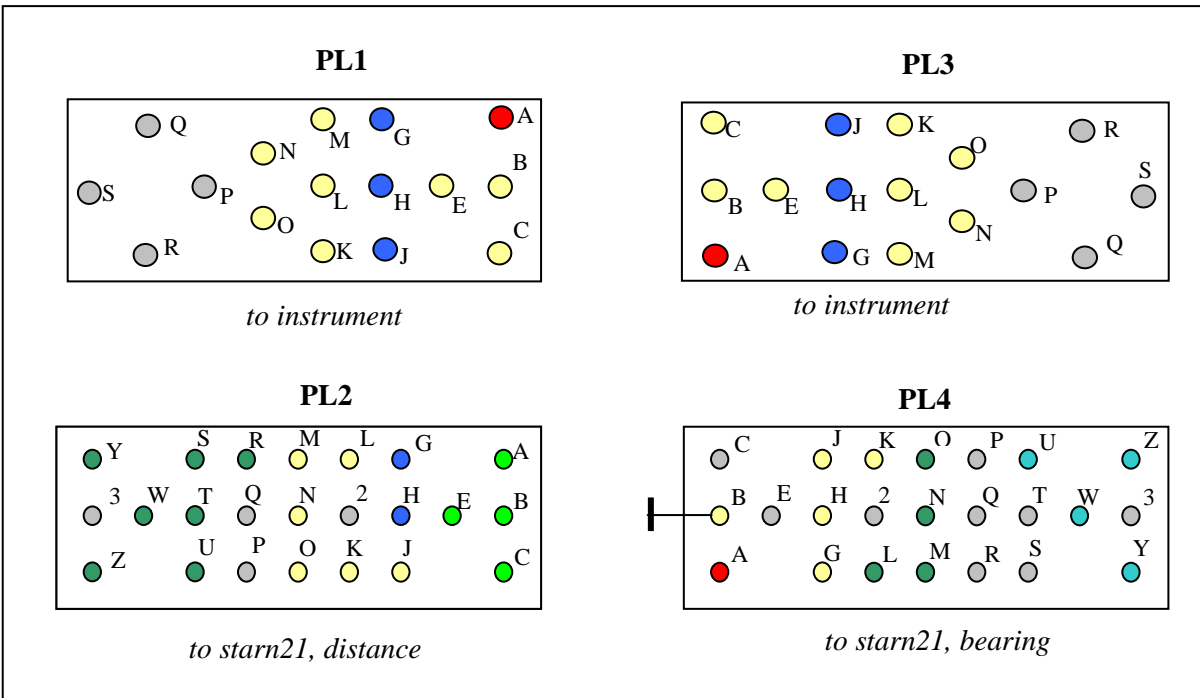
TYPE 9546 Indicator Coupler
 secondary part : from shaft angles to indicator type 9547

Mounting plate and connectors layout

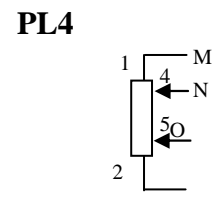
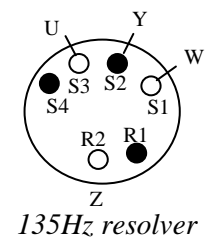
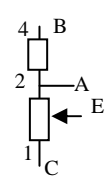
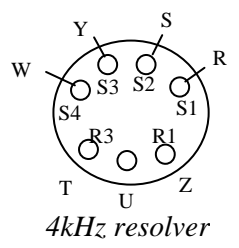


This tacan instrument coupler type 9546 is a subset of the US made CU395.

The 3 output signals however are 115V /400Hz signals for torque transmitters, instead of 26V/400Hz signals as in the CU395.



- 115V /400Hz
- 15 Hz potmeter
- 135 Hz
- 4 kHz
- shutter & >100nm
- distance pot



Indicator Type 9547

REF NO 10Q/16355

CODE WT/D 143473

This indicator was used with the British STARN21 TACAN set. The coupler type 9546, (like the CU-395) is required to convert the tacan signals intended for the ID-307 azimuth and ID-310 Range indicators into signals for the four synchro's in the type 9547 indicator.

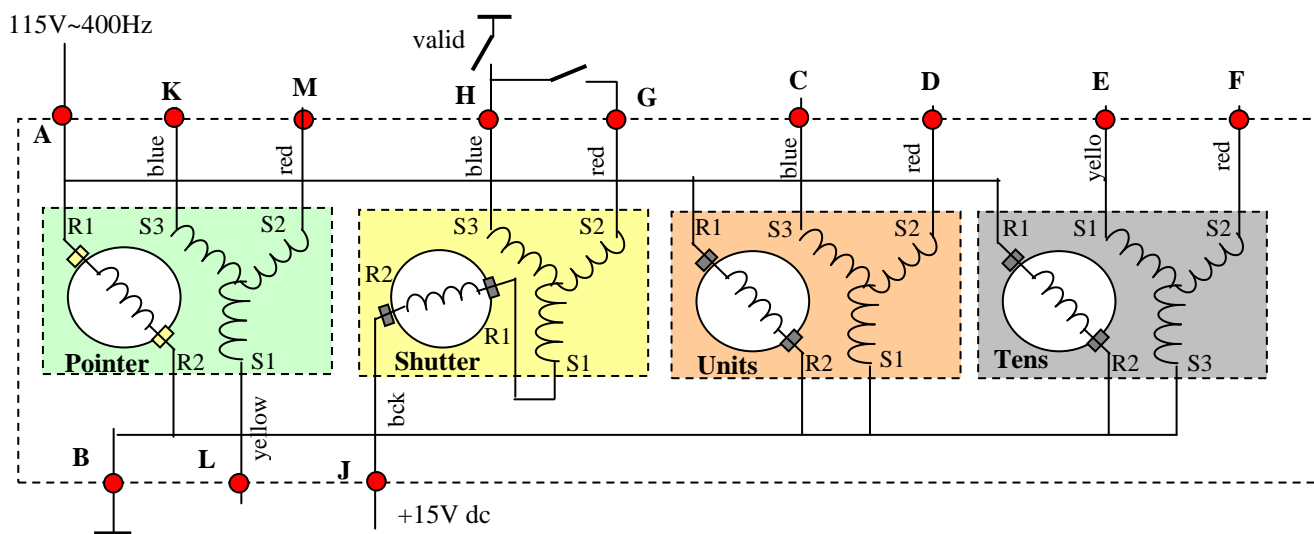
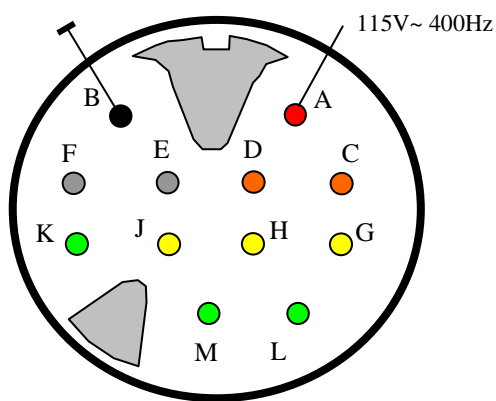
The four synchro torque receivers drive: the azimuth pointer, tens and units (0...9) of the range, and the shutter. The shutter has 3 positions: a yellow bar (invalid), a "1" before the two digits, or no shutter. Spring action shows the invalid bar when the shutter synchro is not powered.



All 4 synchro torque receivers are identical, rated:

Voltage **115V/ 90V, 400Hz.** Rotor 500 ohm dc
 TYPE MOD 01 02 04 Stator 3 x 350 ohm dc
 REF 10K/ 19434
 CODE ACS8/AF

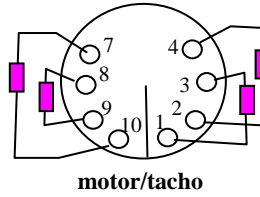
The synchro's differ only in the colorgroup of the wires. These are also shown on the connector pinout and the front view of the synchro's as shown below.



Component data of the type 9546 instrument coupler and the type 9547 indicator.

1. MotorGen sets MG1 and MG2

Resistance winding 1-3	60 Ω	fixed motor
winding 2-4	57 Ω	var. motor
winding 7-10	37 Ω	exc tachometer
winding 8-9	270 Ω	output tachometer



2. 135Hz resolver (18V)

Rotor	43 Ω (18V)	CU395 als referentie
Stator	2 x 500 Ω	2 x 44 Ω
		2 x 570

3. 4 kHz resolver (18V)

Rotor	2x 80 Ω	CU395 ref
Stator	2x 14 Ω	2 x 44 Ω
		2 x 14

4. Torque transmitters (3x) and torque receivers (4x) , all 115/ 90V/400Hz

Rotor	500 Ω	Rated 115/90 V
Stator	3x 350 Ω	

5. 15Hz sin/cos potmeter Geshunt met ... k geeft 14k4 zoals vereist.

Test met L = +1.2V, en op M -1.2V (L = "E" in de CU395)

1	L	Extremen bij	344	68	162	252 graden	
4	N	Correctie +18° geeft	362	86	180	270	
5		wiper 4 (pin N)	+max	0	-max	0	(is "C" in de CU395)
2	M	wiper 5 (pin O)	0	-max	0	+max	(is "D" in de CU395)
		Dus aansluiten als	L > U,	N > N,	O > B	en M > K	

6. Range potmeter

20k + 3k3 1% potmeter 0... 195 nm

Cable wire colours

Connected to rear side of the coupler type 9546

1. Cable from PL1 or PL3 to the indicator Type 9547

20 x 0.14 cable, used as 12 way cable

PL3	Cable	Indicator
A	red,red/white/pink/wh	A
B	blu,blu/wh,brown/blu	B
C	brown	C
N	white/yel	D
E	brown/green	E
O	purple	F
G	gray/brown	G
H	white/gray	H
J	yel/brown	J
K	2x pink	K
L	green, blk/white	L
M	yell/gray	
	M	

The other two cables goto to the ARN21 mount. This mount has the following connectors:

- J 1901 Power (400Hz and DC)
- J 1902 Range indicator
- J 1905 Bearing indicator
- J 1906 Control panel



2. Cable from PL2 to J1902 (range signals)

A 20 wire cable from PL2(23 way connentor) to J1902 (19 way round connector)

Note: Pin Y from PL2 is damaged, replaced by pin 3

PL2	Cable	J1902 mount
A	oranje	U
B	bruin	K
C	blauw/groen	L
E	wit/zwart	M
G	paars	J flag
H	wit	P flag
J	rood-rood	H
K	roze/oranje	S
L	idem	S
M	zwart	D tacho-lo & scherm
N	blauw/groen	N tacho-hi
O	zw-bl-d.blauw	D scherm
R	dubbel grijs	T
S	dubbel L.blauw	B
T	roze	F
U		B
W	groen	G
Y =3		B
Z	geel	E

