

Detailed Description SFIM 85T31 Automatic Pilot

A. Main function

Figure 1

The A.P. performs the following functions:

- Automatic synchronization in pitch, roll, yaw, altitude, speed and heading before engagement of the A.P..
- Pitch and roll attitude hold in A.P. mode and at values selected by the pilot, and current heading hold with the yaw channel.

At IAS > 50 Kt (90 km/h) and bank > 5°, switching to cruise function with small yaw movements damping and sideslip cancellation (turn coordination):

- Capture and hold of the selected heading (displayed by the pilot with an index on the HSI) by means of the roll channel, with small yaw movements damping and sideslip cancellation (turn coordination).
- Altitude hold by means of the pitch channel, within the entire flight envelope, from altitude difference information transmitted by an air data module.
- Speed hold by means of the pitch channel within the entire flight envelope, in the same way as for altitude hold.
- Transparent pilot within the entire flight envelope; the pilot can control the helicopter through the A.P. without reference loss.
- Modification of the reference attitudes without disengaging the A.P., by means of two trim actuators (pitch and roll) controlled by a four-way switch.
- Modification of the reference attitudes with a "stick disengagement" pushbutton, simultaneous release of the pitch and roll artificial feel loads.

Table 1 - Table of the installation

Electrical item	Description
41F	Gyro-magnetic compass in cargo hold
43F	Horizontal Situation Indicator (HSI)
57F	Vertical gyro
700C	Computer
701C	Control unit
702C2	Indicating panel
703C	TRIM unit
704C	Motion sensor
705C1	A.P. yaw actuator
705C2	A.P. roll actuator

Electrical item	Description
705C3	A.P. pitch actuator
706C1	Roll trim actuator
706C2	Pitch trim actuator
707C	Sideslip detector
708C1	Yaw galvanometer
708C2	Roll galvanometer
708C3	Pitch galvanometer
709C	Air data module
711C	Roll trim actuator control pushbutton
712C	Pitch trim actuator control pushbutton
A	Longitudinal cyclic pitch
B	Main rotor
C	Collective pitch
D	Tail rotor
E	Tail rotor pitch
F	Lateral cyclic pitch
G	Yaw actuator position potentiometer
H	Roll actuator position potentiometer
I	Pitch actuator position potentiometer
J	Aerodynamic reaction
K	Gyro-magnetic compass validity signal
L	Heading signal
M	Heading error signal
N	Vertical gyro validity signal
O	Pitch signal
P	Roll signal
Q	Altitude signal
R	Speed signal
S	Lateral acceleration signal
V	Control stick release pushbutton
W	A.P. disengagement pushbutton
X	Four-way TRIM switch (a - b: Pitch TRIM direction) (c - d: Roll TRIM direction)
Y	TRIM test button

Electrical item	Description
Z	A.P. failure warning indicator light
AA	TRIM failure warning indicator light
BB	Artificial feel load release indicator light

B. Power supply

1. Alternating current power

Figure 2

26 V / 400 Hz alternating current is generated from the aircraft 28 Vdc power network by means of a static converter.

The converter is protected by a circuit breaker.

2. 26 V / 400 Hz power

It is used to supply the following users, through circuit breakers located on the pedestal, on the LH side:

- the A.P. computer,
- the sideslip detector.

3. 28 V dc power

Figure 3

The 28 V dc power is distributed through two networks:

Through the PP6 busbar via the circuit breakers (AFCS and TRIM) on the RH side of the pedestal. These fuses supply:

"A.P." network

- A.P. computer.
- A.P. disengagement controls.
- Channel cut-off relay ("18C").

"TRIM" network

- Control stick release control and BEEP TRIM.
- Trim actuators (TRIMS).
- TRIM actuator controls on the control unit.

C. Location

1. Location of components

Figure 4

Table 2 - Location of components

Item	Description	Electrical item	Location
(1)	A.P. computer	700C	Under cabin floor, copilot side
(2)	Failure passivation unit	14C	Under cabin floor, copilot side
(3)	Yaw channel control actuator assembly	705C1	At the top and at the back of the cargo compartment
(4)	Ground connector	3N	Under cabin floor, copilot side
(5)	Relay	19C 18C	Under cabin floor, copilot side, besides the computer
(6)	Connection strip	20C	Under cabin floor, copilot side, besides the computer
(7)	Printed circuit	25 Alpha	Under LH rear cabin floor
(8)	Sideslip detector	707C	Under cabin floor, copilot side, besides the computer
(9)	Air data module	709C	Under cabin floor, copilot side, besides the TRIM unit
	Gyro-magnetic compass	41F	Under cabin floor, copilot side
(10)	Ground connection	1N	Under cabin floor, copilot side
(11)	Pitch channel control actuator assembly	705C3	Under cabin floor, in the center in the control linkage
(12)	Pitch trim actuator	706C2	Under RH front cabin floor, in the control linkage
(13)	Circuit-breaker panel	31Alpha32	On RH side of control unit
(14)	Connection strip	96DEL	Aircraft nose.
(15)	Printed circuit of control lever base	20 Alpha	Under RH front cabin floor
(16)	Control actuator equipped with the roll channel	705C2	Under RH front cabin floor, in the control linkage
(17)	Roll trim actuator	706C1	Under cabin floor, pilot side
(18)	AFCS relay	711C 712C 713C 131N	Behind pedestal
(19)	Movement detector	704C	Under cabin floor, pilot side
(20)	Circuit-breaker panel	44 Alpha	On LH side of control unit
(21)	TRIM electronic control unit	703C	Under cabin floor, copilot side

2. Location of controls and indicators

Figure 5

Table 3 - Location of controls and indicators

Item	Description	Electrical item	Location
(1)	Pilot cyclic pitch stick grip		On pilot cyclic pitch stick
(2)	Channel galvanometers . Pitch . Roll . Yaw With associated indicator lights	708C3 708C2 708C1 710C1, 710C2 and 710C3	On instrument panel
(3)	Circuit-breaker panel	31Alpha32	On pedestal
(4)	Control unit		
(5)	Artificial feel load pushbutton	713C	On control unit
(6)	Pitch trim actuator	712C	
(7)	Roll trim actuator	711C	
(8)	Fuse panel	31 Delta	
(9)	A.P. control panel	701C1	On instrument panel
(10)	Failure warning panel	4 Alpha	
(11)	A.P. indication unit	702C2	
(12)	Copilot cyclic pitch stick grip		On copilot cyclic pitch stick

Figure 1: SFIM 85T31 Automatic pilot - Detailed description

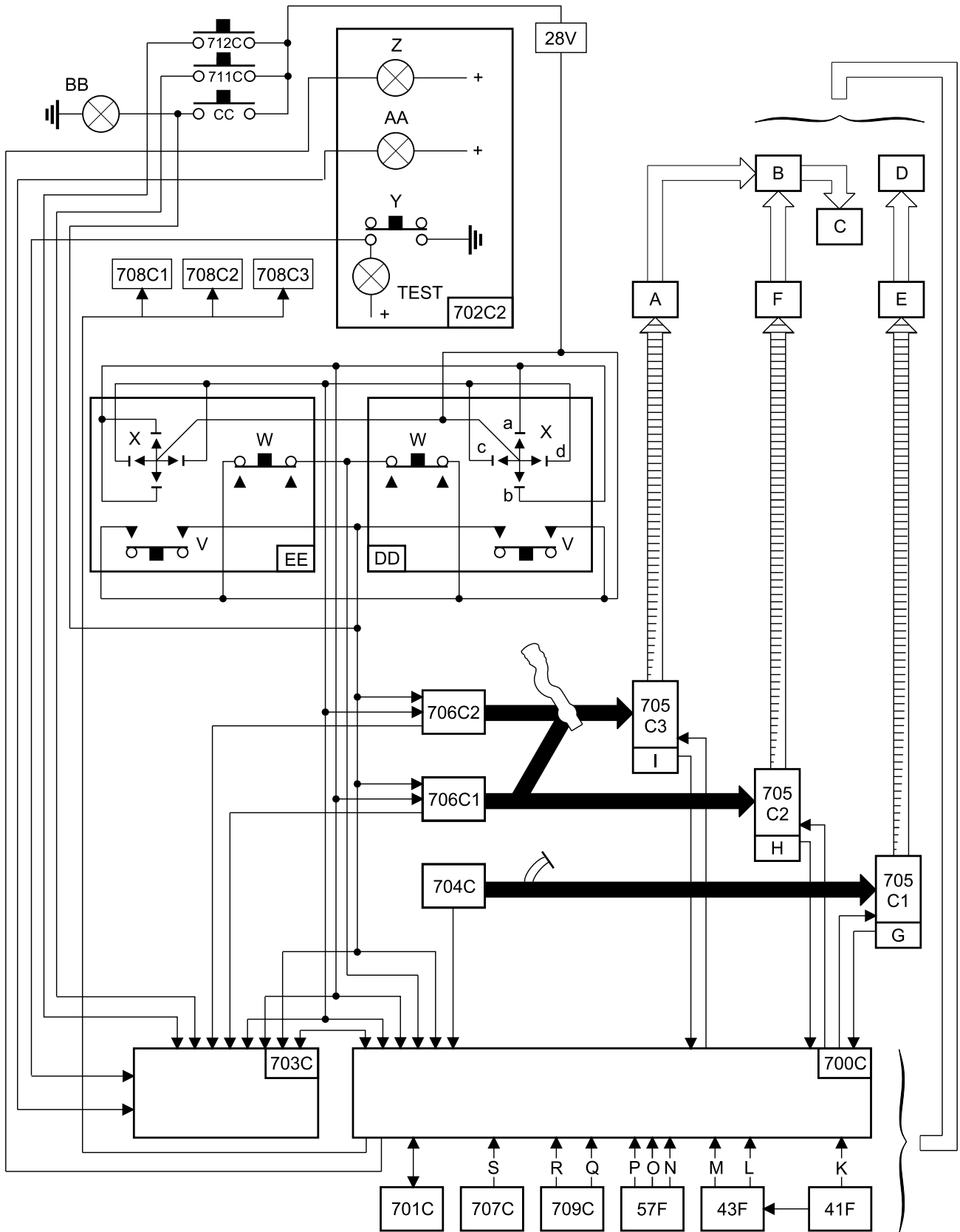


Figure 2: SFIM 85T31 Automatic pilot - Detailed description

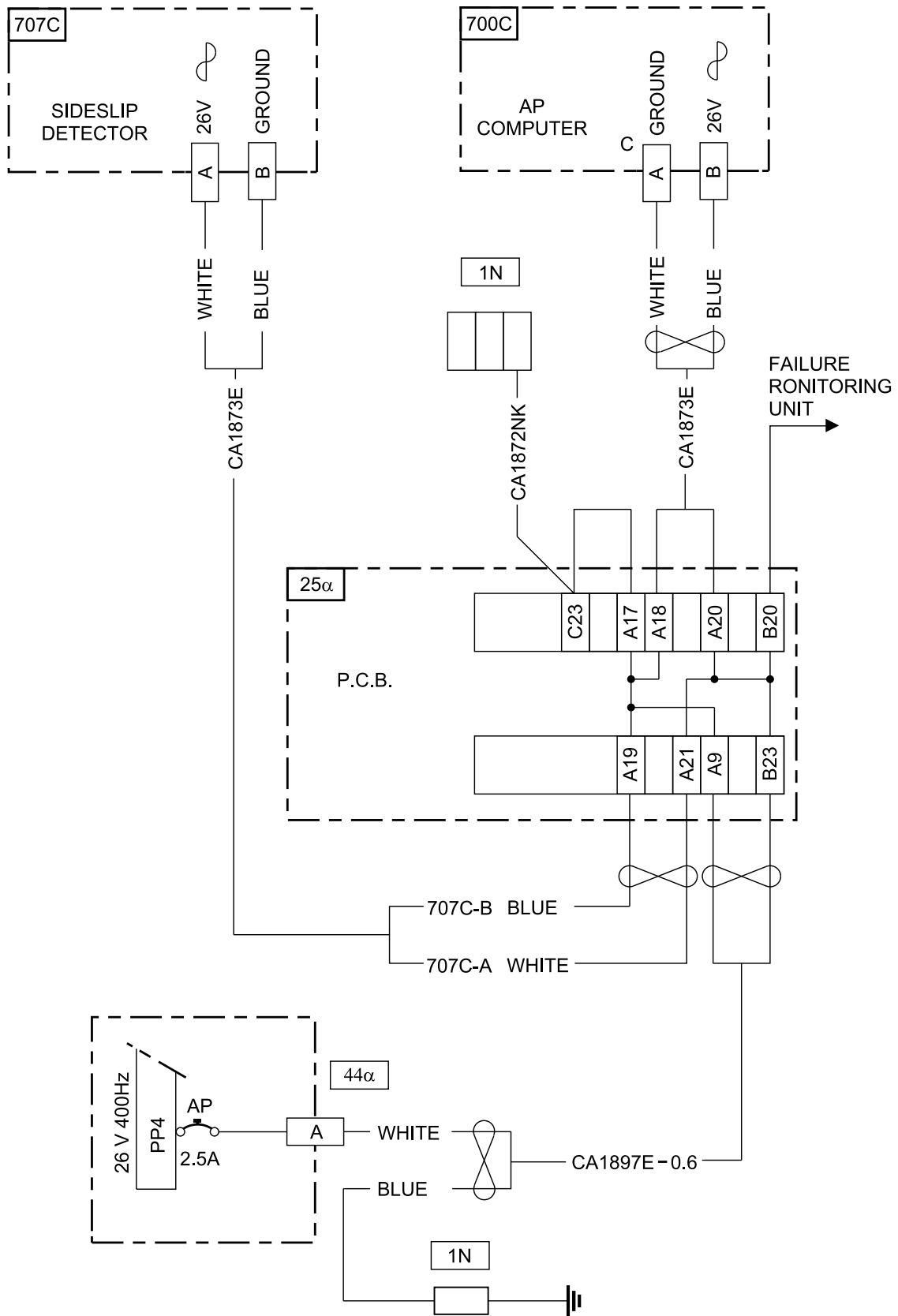


Figure 3: SFIM 85T31 Automatic pilot - Detailed description

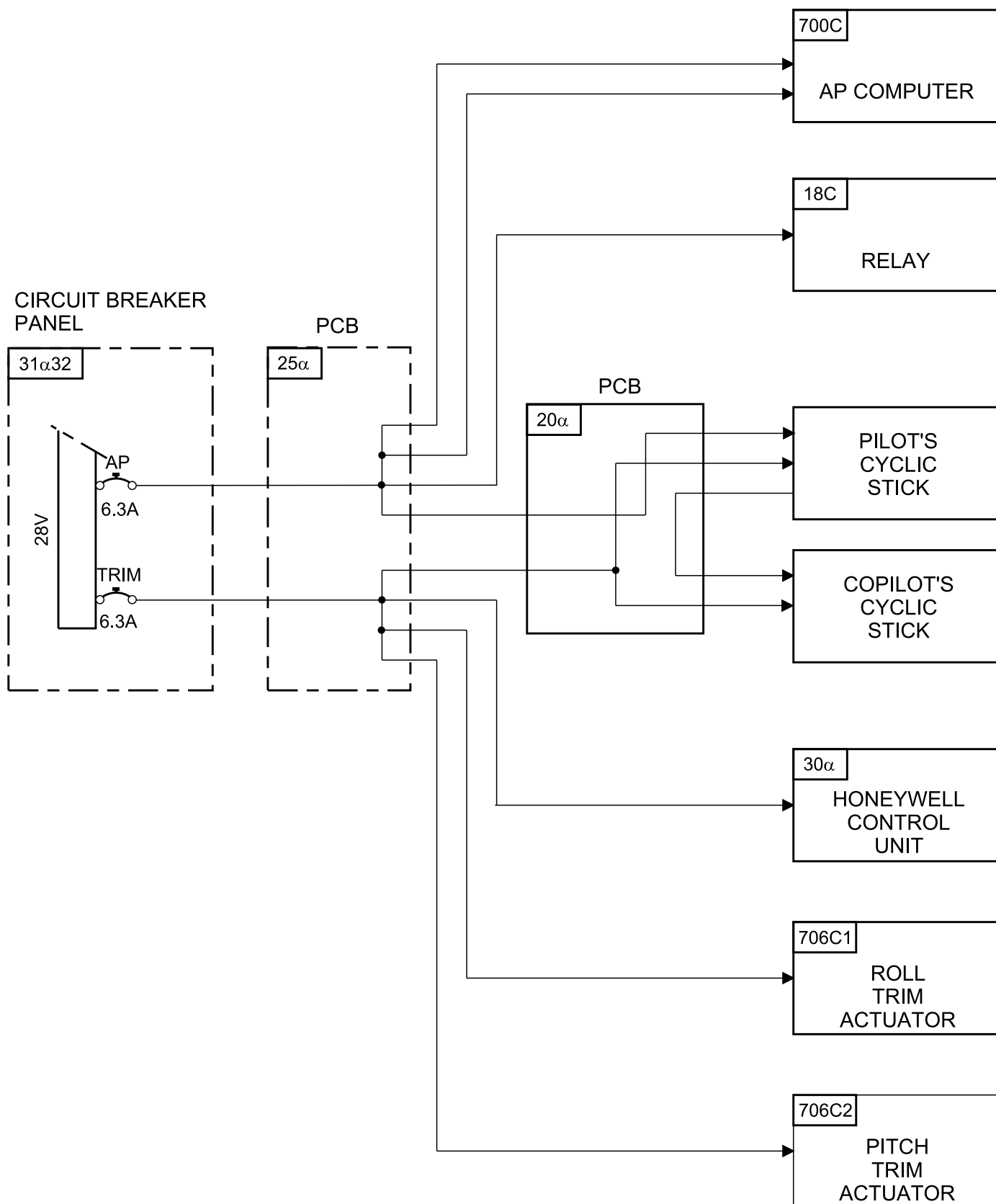


Figure 4: SFIM 85T31 Automatic pilot - Detailed description

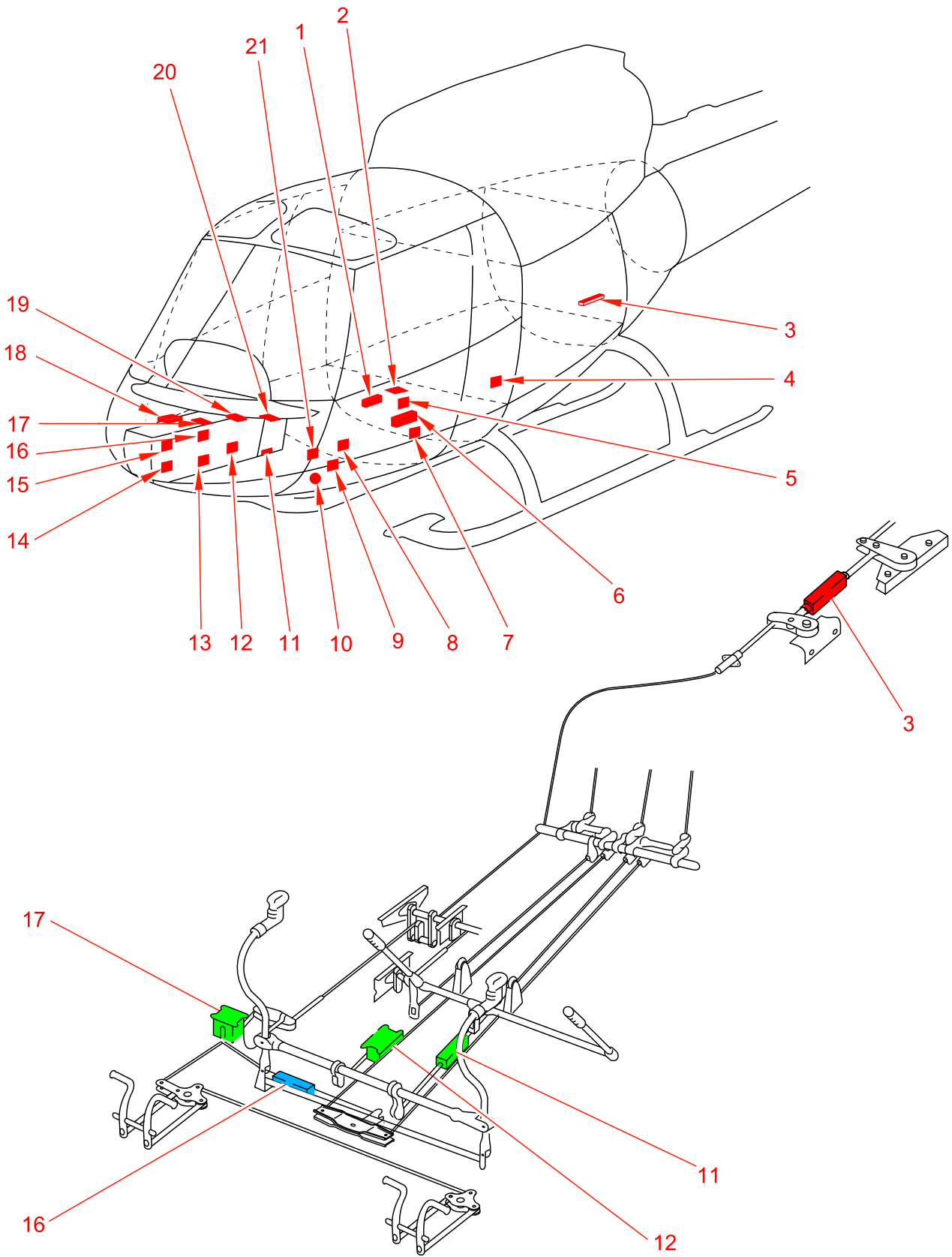
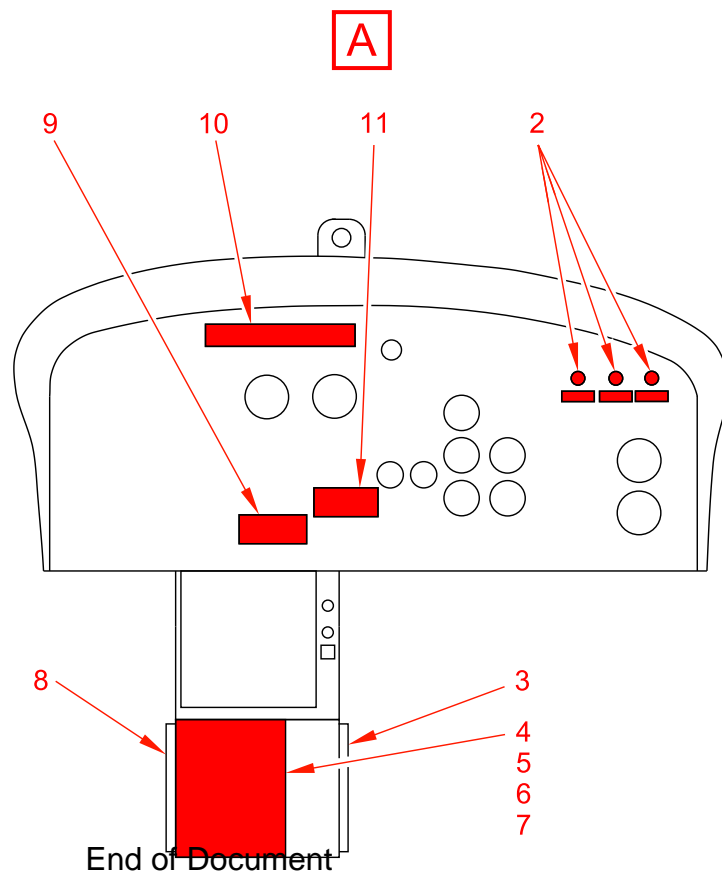
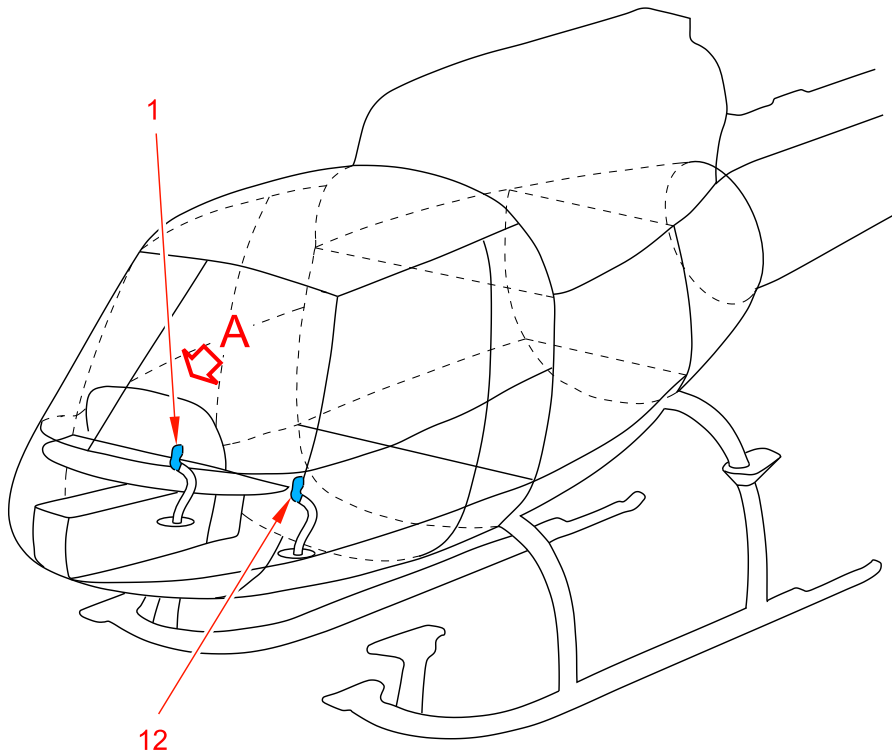


Figure 5: SFIM 85T31 Automatic pilot - Detailed description



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