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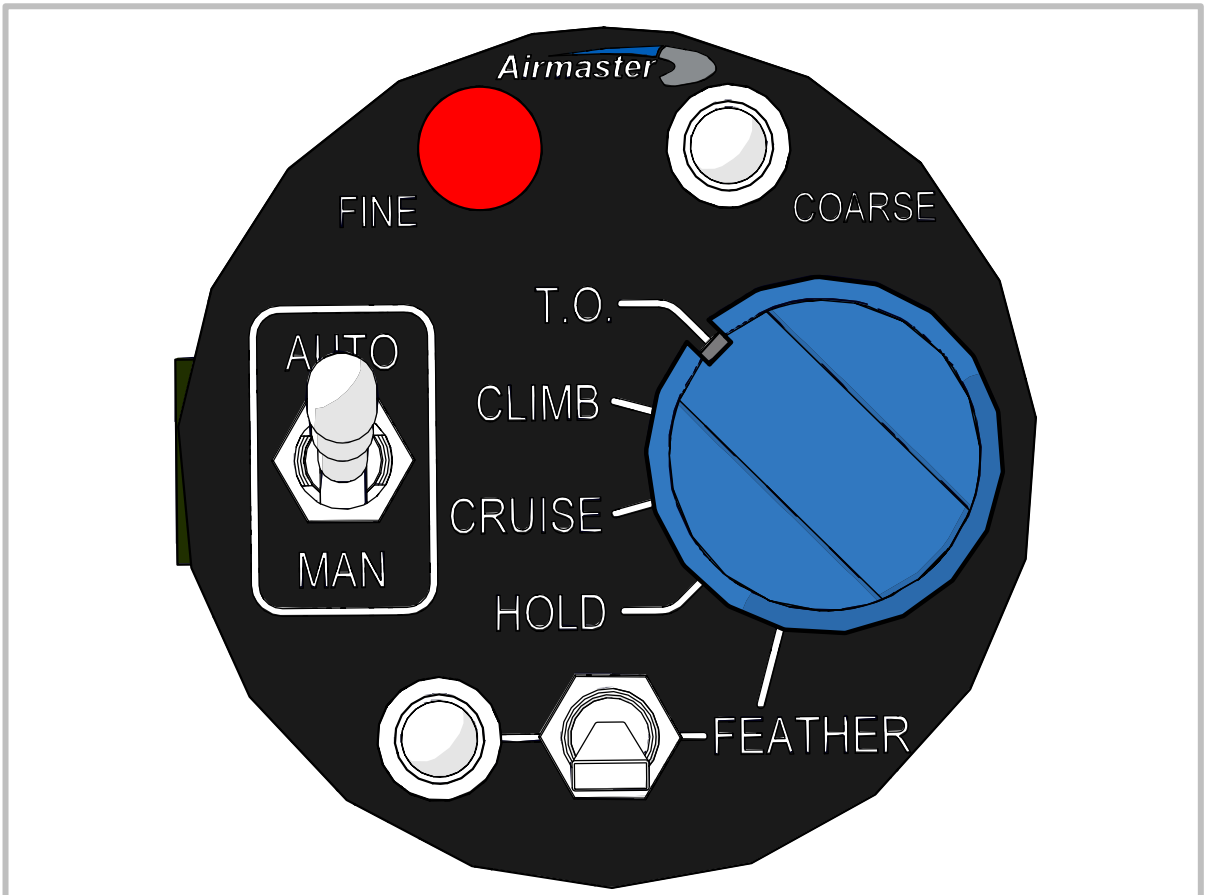
ASI-7-3-4

TROUBLESHOOTING OVER-CURRENT ALARM

PROCEDURE



SUBJECT:	
Troubleshooting	
ASSEMBLY NO:	**APPLICABILITY:**
AP-xxx	All propeller models

1. TOPIC

1.1 Introduction

This document covers the recommended procedure for troubleshooting an over-current alarm for an Airmaster propeller. An over-current occurs when the electrical load (current) drawn by the propeller's pitch change motor exceeds:

- In AUTO mode: the preset current limit programmed in the controller.
- In MAN mode, the thermal circuit breaker threshold (typically 6.1A).

> **Note** *For AC200 hardware versions 4 or lower, the circuit breaker threshold is 3.15A.*

1.1.1 Symptoms

If the over-current occurs during automatic (AUTO) mode:

- The controller lamp illuminates red in the affected pitch change direction.

If the over-current occurs during manual (MAN) mode:

- The controller's resettable thermal circuit breaker (FS1) may trip.

In either scenario, no automatic (AUTO) operation of the propeller is possible (this is disabled due to the internal current-monitoring function of the controller).

1.1.2 Possible Causes

- Mechanical constriction in the pitch change mechanism or blades (e.g. poor lubrication, seized components, or foreign material causing obstruction).
- Electrical short from damaged or exposed electrical hardware.
- Current limit setting programmed into the controller is too low for PC motor type.
- Faulty circuit breaker.
- Failure of the propeller's adjustable pitch limit stops, allowing the pitch change mechanism to drive against the hard stops of the propeller hub.

1.2 Prerequisites

Complete the following tasks before proceeding:

- Inspect all electrical looms to the propeller for signs of damage, corrosion, moisture ingress or loose connection (i.e. power supply cable, extension loom, sensor-brush cable, slipring connections).
- With power to the propeller turned off, unplug the connectors at each end of the sensor-brush assembly cable (*A0120*) and the extension loom (*A0125-x*). Check all pins are inserted properly into their receptacle and appear in good condition.

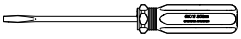
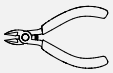
> **Note** *Refer to control system assembly drawing (AC-xxx).*

- Inspect sensor-brush assembly in accordance with procedure ***ASI-7-4-1*.**

> ⓘ *Note*
> *The expected service life for these brushes is approximately 600 hours with a mini slipring assembly and approximately 300 hours with a standard slipring assembly. Environmental factors also influence service life.*

2. MATERIAL REQUIREMENTS

2.1 Tooling

ITEM	QTY	DESCRIPTION	IMAGE
1.	1	PH2 Screwdriver	
2.	1	Flathead Screwdriver	
3.	1	Wire Cutter	
4.	1	Airmaster USB-Serial Cable A0117	
5.	1	MS Windows PC	
6.	1	Airmaster User Program (*.exe*)	
7.	1	Airmaster Diagnostics Program (*.exe*)	

2.2 Paperwork

ITEM	QTY	CODE	DESCRIPTION
1.	1	-	Airmaster Control System Circuit Diagram
2.	1	AC-xxx	Airmaster Control System Assembly Drawing & BoM
3.	1	AH-xxx	Airmaster Hub Assembly Drawing & BoM
4.	1	AR-xxx	Airmaster Slipring Assembly Drawing & BoM

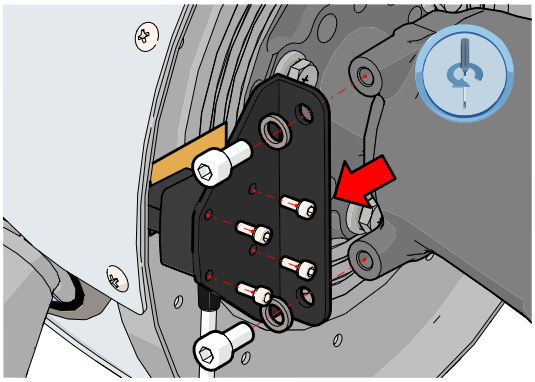
3. PROCEDURE

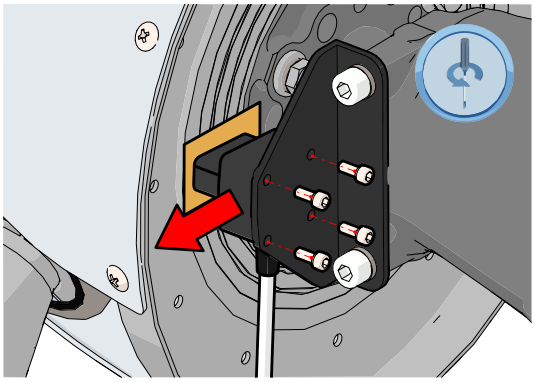
3.1 Check Brush Block Solder Joint

PROCEDURE

Step 1 Remove Sensor-Brush Assembly

- Remove sensor-brush assembly by either of the following methods, based on which is most convenient:
  - Detach sensor-brush block from mounting bracket via (4) 8-32 UNC cap screws, then carefully slide the block out from between the bracket and slipring.
  - Remove mounting bracket from engine first, then detach sensor-brush assembly via (4) 8-32 UNC cap screws.
- Unplug sensor-brush cable connector from extension loom.





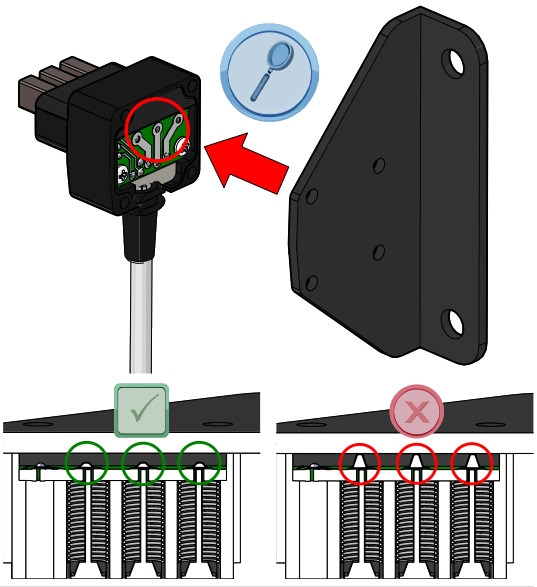
⚠ *Caution*
Insert a piece of card between the brushes and slipring to protect the brushes as the sensor-brush assembly is removed.

ⓘ *Note*
Standard slipring and sensor-brush bracket shown.

ⓘ *Attention*
9/64” Hex-key (for 8-32 UNC cap screws)
5mm or 6mm Hex-key (depending on bracket).

Step 2 Check Solder Joint Height

- Dry-fit sensor-brush block against mounting bracket.
- Confirm solder joints located on rear circuit board do not contact the bracket (this may create an electrical short).
- Trim solder joints as necessary to prevent contact.



ⓘ *Attention* *Wire Cutter (as required)*

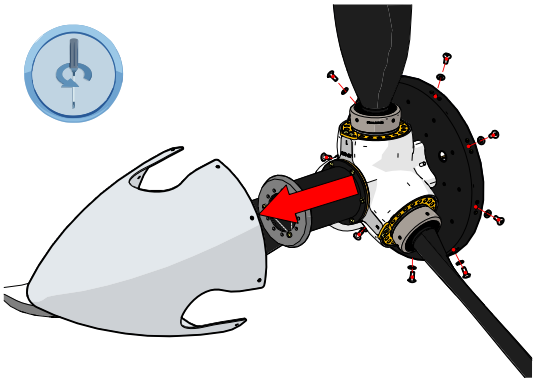
3.2 Check Hub Wiring

PROCEDURE

Step 1 Remove Spinner Cone

- Remove spinner cone from backplate via truss-head screws.

Attention *PH2 Screwdriver*

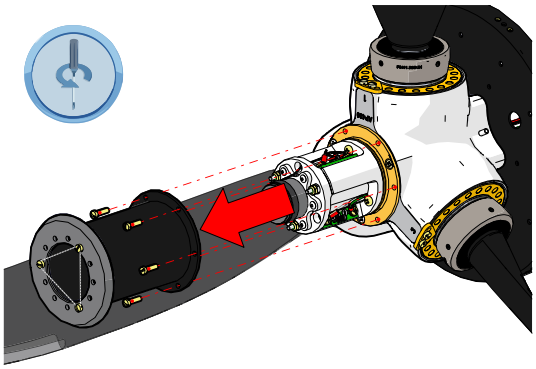


Step 1 Remove Motor Cap

- Remove any lock-wire retaining motor cap screws.
- Remove motor cap from hub via (6) fillister-head screws.

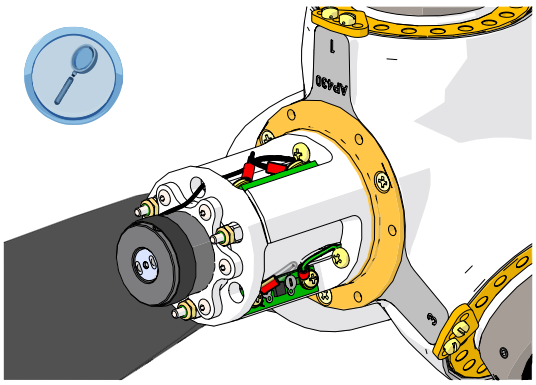
Note
Do not remove front support from hub motor cap.

Attention
Wire Cutter, Pliers, Flathead screwdriver



Step 2 Check Hub Wiring

- Inspect all wiring inside the hub for damage such as breaks or pinches which may cause an electrical short.

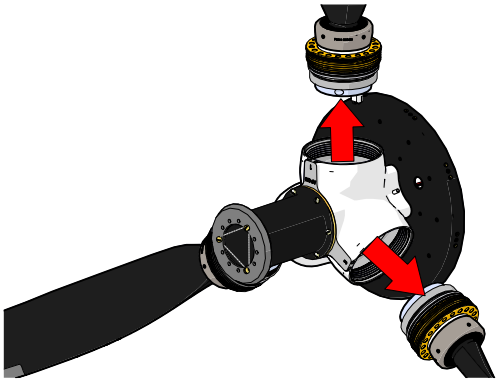


3.3 Check for Mechanical Resistance

PROCEDURE

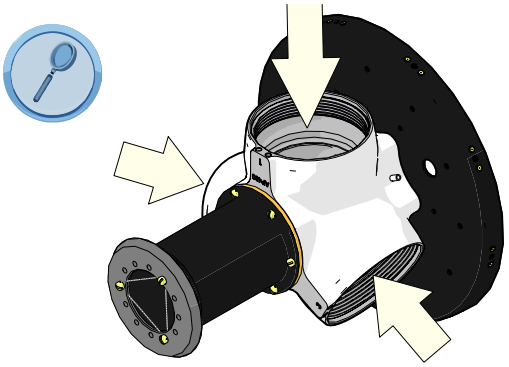
Step 1 Remove Blades

- Remove blades from hub in accordance with procedure ***ASI-7-6***.



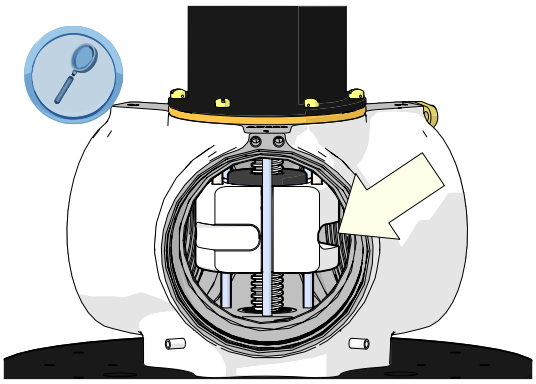
Step 2 Inspect Hub Bores

- Inspect hub bores for damage.
- Check hub bores are adequately greased in accordance with procedure ***ASI-4-5***.



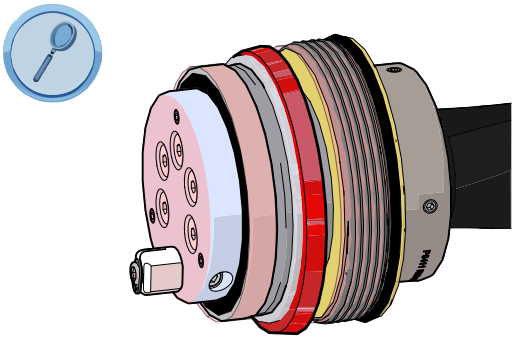
Step 3 Inspect Pitch Change Mechanism

- Inspect pitch change mechanism in central area of hub for signs of damage or deformation (i.e. lead screw, rods, beatings, plastic block).
- Check leadscrew is lubricated.
- Check for presence of foreign material



Step 4 Inspect Blades

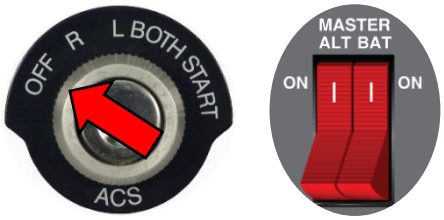
- Check blade retention assemblies are adequately greased in accordance with procedure ***ASI-4-5.***
- Inspect blade retention assemblies for signs of damage.
- Rotate deep groove bearing (base of blade) by hand and check for smooth rotation.



3.4 Check Pitch Limit Stops

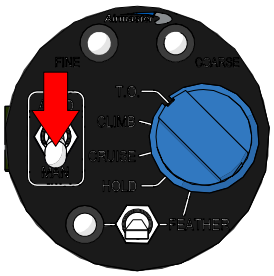
PROCEDURE

Step 1 Aircraft Setup



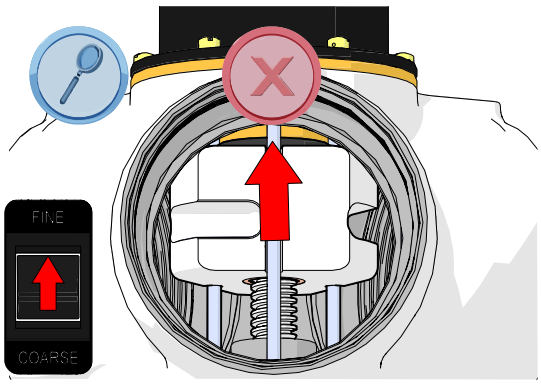
- Engine OFF.
- Apply power to the propeller.

Step 2 Set Controller to MAN



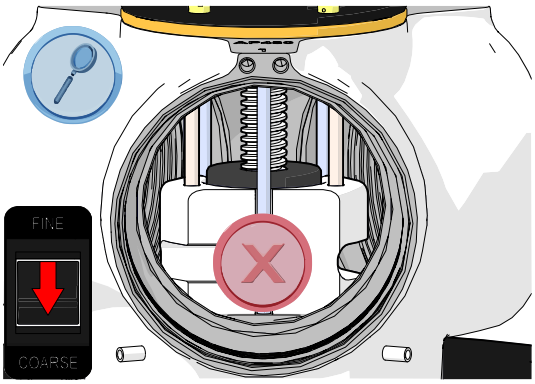
- Set controller to manual over-ride mode (MAN).

Step 1 Check Fine Pitch Stop



- Toggle FINE on manual control switch to drive propeller to fine pitch limit stop (FINE lamp on controller illuminates green).
- Inspect pitch change mechanism inside hub and confirm it has not impacted the fixed hard stop (ceiling of hub).

Step 2 Check Coarse Pitch Stop



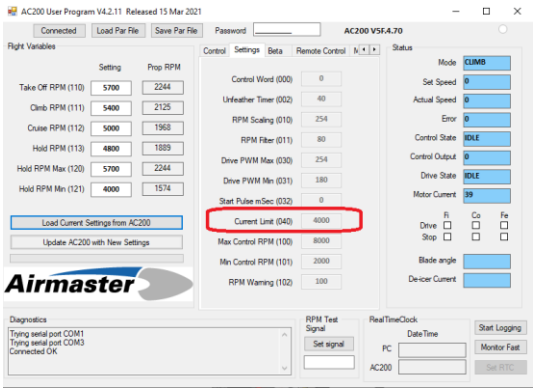
- Toggle COARSE on manual control switch to drive propeller to coarse pitch limit stop (COARSE lamp on controller illuminates green).
- Inspect pitch change mechanism inside hub and confirm it has not impacted the fixed hard stop (floor of hub).

3.5 Check Controller Settings

PROCEDURE

Step 1 Check Current Limit Parameter

- Connect to controller in User Program and view controller parameters in accordance with procedure ***ASI-7-2-1***.
- Navigate to ‘Settings’.
- Check ‘Current Limit (040)’ parameter matches the value shown in the ‘ACx00 Parameters Sheet’, representing current in [mA].



> ***Note***
> *The correct current limit value depends on PC motor type (refer to Airmaster if in doubt):*
>
> *- Maxon 150/231/243 motor = 2500mA*
> *- Faulhaber 196 motor = 4000mA*
> *- AMC Maxon AMC18/24-231 motor = 5000mA*
> *- (AMC) Maxon 326 motor = 5000mA*
> *- Brushless Maxon i30 motor = 5000mA*

Step 2 Download Log Files

- If applicable, download log files from controller in accordance with procedure ***ASI-7-2-4***.
- Send resultant log file (*.dat*) to Airmaster (*support@propellor.com*) for review and advice.