FLIGHT 4A EEATCS ACTIVATION AND CHECKOUT

> NOTE
> This procedure is performed twice sequentially: once to activate Loop A and once to activate Loop B.

1. INHIBIT AND VERIFY EEATCS SOFTWARE ALGORITHM STATES

PCS P6: TCS: EEATCS Overview: LoopA(B) PFCS Nominal Commands

LoopA(B) PFCS Nominal Commands

'EEATC LoopA(B) PFCS'

√FCV Cntl - Inh

sel LoopA(B) PFCS FDIR Commands

LoopA(B) PFCS FDIR Commands

'EEATC LoopA(B) PFCS'

cmd Inval Data FDIR Inh - Arm
cmd Inval Data FDIR Inh - Fire
√Inval Data FDIR - Inh

cmd FCV Temp Recal FDIR Inh - Arm
cmd FCV Temp Recal FDIR Inh - Fire
√FCV Temp Recal FDIR - Inh

> NOTE
> The Leak Detection FDIR operates within the Firmware. The FDIR status cannot be verified until the PFCS is activated.

cmd Min Out Temp FDIR Inh - Arm
cmd Min Out Temp FDIR Inh - Fire
√Min Out Temp FDIR - Inh

cmd Pump FDIR Inh - Arm
cmd Pump FDIR Inh - Fire
√Pump FDIR - Inh

2. INHIBIT AND VERIFY ADDITIONAL EEATCS SOFTWARE ALGORITHM STATES

PCS P6: TCS: EEATCS Overview: LoopA(B) PFCS Nominal Commands: LoopA(B) PFCS FDIR Commands: LoopA(B) PFCS FDIR Additional Commands

LoopA(B) PFCS FDIR Additional Commands

'EEATC LoopA(B) PFCS'

cmd Min In Temp FDIR Inh - Arm
cmd Min In Temp FDIR Inh - Fire
√Min In Temp FDIR - Inh

√Max Out Temp FDIR - Inh

√Auto FCV Recal - Ena

sel EEATCS Overview: LoopA(B) Line Heater Commands

LoopA(B) Line Heater Commands
'EEATC LoopA(B) PFCS'

√Line Htr Cntl - Inh

√Line Htr Cmd Ck - Ena

After completing steps 1 and 2, the EEATCS FDIR and Closed Loop Control Algorithms within the software should be in the following configuration.

Parameter	Display	State
FCV Cntl	LoopA(B) PFCS Nominal Commands	Inhibited
Inval Data FDIR	LoopA(B) PFCS FDIR Commands	Inhibited
FCV Temp Recal FDIR	LoopA(B) PFCS FDIR Commands	Inhibited
Min Out Temp FDIR	LoopA(B) PFCS FDIR Commands	Inhibited
Pump FDIR	LoopA(B) PFCS FDIR Commands	Inhibited
Min In Temp FDIR	LoopA(B) PFCS FDIR Additional Commands	Inhibited
Max Out Temp FDIR	LoopA(B) PFCS FDIR Additional Commands	Inhibited
Auto FCV Recal	LoopA(B) PFCS FDIR Additional Commands	Enabled
Line Htr Cntl	LoopA(B) Line Heater Commands	Inhibited
Line Htr Cmd Ck	LoopA(B) Line Heater Commands	Enabled

3. POWER-ON LOOP A(B) PFCS

PCS P6: TCS: EEATCS Overview: LoopA(B) PFCS Nominal Commands:
RPCM 4B(2B) A RPC 04
RPCM 4B(2B) A RPC 04

cmd RPC Position - Close
√RPC Posn - Cl

NOTE
Upon application of power to the PFCS, the FCV executes an Auto Recal algorithm which lasts approximately 93 seconds.

4. VERIFY FCV RECALIBRATION COMPLETION

PCS P6: TCS: EEATCS Overview: LoopA(B) PFCS Nominal Commands

LoopA(B) PFCS Nominal Commands

'EEATC LoopA(B) PFCS'

Wait Until FCV Recal - Not performing
Verify FCV Calc Setpt: 0 (Full bypass)
Verify FCV Integ Posn: 0 ± 5.3 Degrees (Full bypass)

5. VERIFY FIRMWARE FDIR STATUSES

PCS P6: TCS: EEATCS Overview: LoopA(B) PFCS Nominal Commands: Loop(B) PFCS FDIR Commands

LoopA(B) PFCS FDIR Commands

'EEATC LoopA(B) PFCS'

√Leak Det FDIR - Ena

sel EEATCS Overview: LoopA(B) Firmware

Loop A(B) Firmware

'EEATC LoopA(B) PFCS'

√eBIT - Inh

sel EEATCS Overview: TTCR(STCR)

TTCR(STCR) Commands

'EEATC Loop A(B) TTCR(STCR)'

√Config Fail FDIR - Ena

√Auto Time Out FDIR - Ena

√Auto Off - Ena

6. ISSUE COMMON CLEAR TO PFCS

PCS P6: TCS: EEATCS Overview: LoopA(B) Firmware

LoopA(B) Firmware

'EEATC PFCS LoopA(B)'

cmd Common Clear - Arm
cmd Common Clear - Fire

7. VERIFY PFCS SENSOR OPERATION

PCS P6: TCS

EEATCS Overview

'EEATC PFCS'

Verify that the following quantities read within the specified range.

Parameter	Lower Limit	Upper Limit	Other/Comments
Accum Fltrd Avg Qty	30.9%	74.1%	
Integ In Press	896 kPa	2066 kPa	
Integ Out Press	896 kPa	2066 kPa	
Integ Flow Rate	-424 kg/hr	793 kg/hr	
PumpA Conv Spd	-975 rpm	975 rpm	
PumpB Conv Spd	-975 rpm	975 rpm	
FCV Integ Posn	-5.3 Deg	5.3 Deg	Full Bypass
Byp In Temp	-78° C	50° C	
Rad Rtn Fltrd Temp	-78° C	50° C	
Out Fltrd Lwr Temp	-44° C	11° C	
Out Line Fltrd Temp	-44° C	11° C	
Integ Counter			incrementing

'EEATC Z1 Loop A(B)'

Parameter	Lower Limit	Upper Limit
Z1 Feed Accum Integ Qty	30.9%	74.1%
Z1 Rtn Accum Integ Qty	30.9%	74.1%

sel LoopA(B) PFCS Nominal Commands: LoopA(B) PFCS FDIR Commands: LoopA(B) PFCS FDIR Additional Commands
LoopA(B) PFCS FDIR Additional Commands
'EEATC LoopA(B) PFCS'

Verify Accum Qty1 Sel Stat - Selected
Verify Accum Qty2 Sel Stat - Selected
Verify STCR Accum Qty Sel Stat - Selected
Verify TTCR Accum Qty Sel Stat - Selected

8. <u>ACTIVATE PUMP B AND VERIFY PARAMETERS</u>

PCS P6: TCS: EEATCS Overview: LoopA(B) PFCS Nominal Commands
LoopA(B) PFCS Nominal Commands
'EEATC LoopA(B) PFCS'

CAUTION
If the Loop A(B) PFCS Integ In Press is less than 896 kPa, do not start the pump. A potential for cavitation exists below this pressure.

Verify Integ In Press ≥ 896 kPa

If Integ In Press ≤ 896 kPa

√**MCC**

cmd PumpB - On
√PumpB Cmd Stat - On

Verify the following parameters read within the specified ranges.

Parameter	Lower Limit	Upper Limit
PumpB Conv Spd	13275 rpm	15225 rpm
Integ Pump Out DP (flow)	765 kg/hr	1176 kg/hr
Integ In Press	896 kPa	2066 kPa
Integ Out Press	896 kPa	2066 kPa
Accum Fltrd Avg Qty	30.9%	74.1%

9. <u>DEACTIVATE PUMP B, ACTIVATE PUMP A, AND VERIFY PARAMETERS</u>

PCS P6: TCS: EEATCS Overview: LoopA(B) PFCS Nominal Commands
LoopA(B) PFCS Nominal Commands
'EEATC LoopA(B) PFCS'

cmd PumpB - Off
√PumpB Cmd Stat - Off
Verify PumpB Conv Spd: 0 ± 975 rpm

CAUTION
If the Loop A(B) PFCS Integ In Press is less than 896 kPa, do not start the pump. A potential for cavitation exists below this pressure.

Verify Integ In Press ≥ 896 kPa

If Integ In Press ≤ 896 kPa

√**MCC**

cmd PumpA - On
√PumpA Cmd Stat - On

Verify the following parameters read within the specified ranges.

Parameter	Lower Limit	Upper Limit
PumpA Conv Spd	13275 rpm	15225 rpm
Integ Pump Out dP (flow)	765 kg/hr	1176 kg/hr
Integ In Press	896 kPa	2066 kPa
Integ Out Press	896 kPa	2066 kPa
Accum Fltrd Avg Qty	30.9%	74.1%

10. ENABLE EEATCS CLOSED LOOP CONTROL ALGORITHMS

PCS P6: TCS: EEATCS Overview: LoopA(B) PFCS Nominal Commands

LoopA(B) PFCS Nominal Commands

'EEATC LoopA(B) PFCS'

cmd FCV Cntl Ena - Arm
cmd FCV Cntl Ena - Fire
√FCV Cntl - Ena

sel LoopA(B) PFCS FDIR Commands

LoopA(B) PFCS FDIR Commands

'EEATC LoopA(B) PFCS'

cmd Inval Data FDIR Ena - Arm
cmd Inval Data FDIR Ena - Fire
√Inval Data FDIR - Ena

cmd Pump FDIR Ena - Arm
cmd Pump FDIR Ena - Fire
√Pump FDIR - Ena

sel EEATCS Overview: LoopA(B) Line Heater Commands

LoopA(B) Line Heater Commands

'EEATC LoopA(B) PFCS'

cmd Line Htr Cntl Ena - Arm
cmd Line Htr Cntl Ena - Fire
√Line Htr Cntl - Ena

11. CONFIGURE FDIR AND CLOSED LOOP CONTROL ALGORITHMS IN BACKUP MDM

PCS P6: TCS: EEATCS Overview: LoopA(B) PFCS Nominal Commands: Bkup PVCU Command

Bkup PVCU Commands

cmd Bkup PVCU EEATCA(B) PFCS FCV Cntrl Ena - Arm
cmd Bkup PVCU EEATCA(B) PFCS FCV Cntrl Ena - Fire

cmd Bkup PVCU EEATCA(B) PFCS Line Htr Cntl Ena - Arm
cmd Bkup PVCU EEATCA(B) PFCS Line Htr Cntl Ena - Fire

cmd Bkup PVCU EEATCA(B) PFCS Min Out Temp FDIR Inh - Arm
cmd Bkup PVCU EEATCA(B) PFCS Min Out Temp FDIR Inh - Fire

NOTE

MCC-H will characterize the performance of the EEATCS over the next 2-3 hours. Once this is complete, a new EEATCS Setpt PPL will be loaded. This PPL contains lower setpoints which prevent the Line Heaters from cycling frequently.

Step 12 is a ground only step.

12. LOAD EEATCS SETPT PPL VERSION 2 INTO PRIMARY AND BACKUP PVCU MDM DRAM

PCS P6: CDH

P6: CDH: TBD

'TBD'

Load EEATCS Setpt PPL Ver ID 2 into Primary PVCU MDM DRAM

Load EEATCS Setpt PPL Ver ID 2 into Backup PVCU MDM DRAM

NOTE

MCC-H will notify crew when step 12 is complete.

13. VERIFY PPL LOAD BY TELEMETRY PARAMETERS

PCS P6: TCS: EEATCS Overview: LoopA(B) PFCS Nominal Commands

LoopA(B)_PFCS_Nominal_Commands

'EEATC LoopA PFCS'

Verify FCV Calc Setpt ≥ 80°

sel EEATCS Overview: Line Heater Icon

LoopA(B)_Line_Heater_Commands

'EEATC LoopA PFCS'

√Ln Htr1 RPC Posn - Op

√Ln Htr2 RPC Posn - Op

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