ROSINA
Flight Operations Plan

Change Record

Issue	Date	Change	Responsible
Draft	October 2000	Initial Issue	Altwegg
Issue 1, rev 0	Mai 2001		Altwegg
Issue 1, rev 2	November 2001		Altwegg
Issue 2, rev. 0	March 2003	Add Mars, remove TBD's	
Issue 2, rev 1	April 2002	Add thruster firing, complete ALL-12	Altwegg
Issue 3, rev 0	November 2002	Changes due to experience with FS model, HV set-up, measurement modes	Altwegg
Issue 3, rev 1	January 2003	Experience from commissioning test, RTOF	Jäckel
Issue 4, rev0	June 2003	Adapted to short passes	Altwegg
Issue 4, rev1	June 2003	Merge rev. 3.2, Commissioning test COPS, DFMS, RTOF All changes to Issue 3.1 are marked yellow/red!!	Fiethe
Issue 4, rev2	Sept 2003	Delete S/W maintenance Replace RTOF HM by calibration modes All changes to Issue 4.1 are marked blue!	Altwegg/Fiethe
Issue 4, rev2a	May 2004	Changes to the timelines Pink = New times Blue=commands can be sent without wait for verification from the previous command Green commands deleted	

List of reference documents

RD1	RO-ROS-MAN-1010	DFMS Instrument Operation Modes
RD2	RO-ROS-MAN-1011	RTOF Instrument Operation Modes
RD3	RO-ROS-MAN-1015	ROSINA User Manual
RD4	RO-ROS-MAN-1006	ROSINA FM operations manual
RD5	RO-ROS-MAN-1019	COPS Instrument Operation Modes
RD6	RO-ROS-MAN-1023	ROSINA Contingency Recovery Procedure

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Flight Control procedures Issue 4.1

1.1 Overview

ROSINA				
Mission Phase	**Abbr.**	**Rosina Name**	**ESOC Name**	**Procedure Title**
Commissioning	CVP	ROSINA_CVP_001	CV-FCP-141	First switch-on of COPS
		ROSINA_CVP_002	CV-FCP-142	Fire DFMS cover pyro
		ROSINA_CVP_003	CV-FCP-143	Fire RTOF cover pyro
		ROSINA_CVP_004	CV-FCP-144	Condition DFMS filaments
		ROSINA_CVP_005	CV-FCP-145	Condition DFMS HV
		ROSINA_CVP_006	CV-FCP-146	Condition DFMS detectors
		ROSINA_CVP_007	CV-FCP-147	Check-out DFMS measurement modes
		ROSINA_CVP_008	CV-FCP-148	Condition RTOF filaments
		ROSINA_CVP_009	CV-FCP-149	Condition RTOF HV
		ROSINA_CVP_010	CV-FCP-150	Condition RTOF detectors
		ROSINA_CVP_011	CV-FCP-151	Check-out RTOF measurement modes
Cruise Phase 1	CR1			No operation
Mars flyby	MARS	ROSINA_MARS_001		Carry out pre-flyby test
		ROSINA_MARS_002		Switch to Background mode
		ROSINA_MARS_003		Switch DFMS and RTOF to measurement mode
		ROSINA_MARS_004		Switch to Standby Mode
Cruise phase 2	CR2			No operation
Earth Flyby 1	EAR1			No operation
Cruise phase 3	CR3			No operation
Asteroid 1 Flyby	AST1	ROSINA_AST1_001	RN-FCP-201	Carry out pre-flyby test
		ROSINA_AST1_002	RN-FCP-202	Switch to Background mode
		ROSINA_AST1_003	RN-FCP-203	Switch DFMS and RTOF to measurement mode
		ROSINA_AST1_004	RN-FCP-204	Switch to Standby Mode
Cruise phase 4	CR4			No operation
Earth Flyby 2	EAR2			No operation
Cruise phase 5	CR5			No operation
Asteroid 2 Flyby	AST2			See AST1
Cruise phase 6	CR6			No operation
All Phases	ALL	ROSINA_ALL_001	RN-FCP-001	Carry out DPU test
		ROSINA_ALL_002	RN-FCP-002	DPU to instrument mode
		ROSINA_ALL_003	RN-FCP-003	Switch DFMS to standby
		ROSINA_ALL_004	RN-FCP-004	Switch RTOF to standby
		ROSINA_ALL_005	RN-FCP-005	Open DFMS cover
		ROSINA_ALL_006	RN-FCP-006	Open RTOF cover
		ROSINA_ALL_007	RN-FCP-007	Switch DFMS to standby heater mode
		ROSINA_ALL_008	RN-FCP-008	Switch RTOF to standby heater

				mode
		ROSINA_ALL_009	RN-FCP-009	Switch off DFMS & close cover
		ROSINA_ALL_010	RN-FCP-010	Switch off RTOF & close cover
		ROSINA_ALL_011	RN-FCP-011	Switch off COPS
		ROSINA_ALL_012	RN-FCP-012	Put COPS into monitoring
		ROSINA_ALL_013		mode
		ROSINA_ALL_014	RN-FCP-013	Thruster firing
			RN-FCP-014	Switch off DFMS & RTOF

1.2 Flight plans for mission phases

General:
The commissioning can be interrupted after each procedure and continued during the next pass. Some of the procedures can be interrupted at the locations indicated in the procedures and continued during the next pass. However, no procedures except ROSINA-ALL-002, -003, -004, -007, -008 should run inbetween passes, that is blind.

1.2.1 Commissioning

ROSINA Plan for Commissioning			
Step No.	**Time (relative to event)**	**Activity**	**Procedure Number**
10	Launch + x d	DPU main manual switch on	ROSINA_ALL_001
15	Launch + x d	Rosina switch off by OBCP	RN-FCP-051
17	Launch + x d	Rosina main switch on by OBCP	RN-FCP-050
20	Launch + x d	DPU to instrument mode	ROSINA_ALL_002
30	Launch + x d (pressure <10^{-4} mbar)	First switch on COPS to monitoring mode	ROSINA_CVP_001
40	Launch + ~60 d (pressure <10^{-6} mbar)	Fire DFMS cover pyro	ROSINA_CVP_002
50	Launch + ~60 d (pressure <10^{-6} mbar)	Fire RTOF cover pyro	ROSINA_CVP_003
60	Launch + ~60 d (pressure <10^{-6} mbar)	DFMS to standby mode	ROSINA_ALL_003
70	Launch + ~60 d (pressure <10^{-6} mbar)	Open DFMS cover	ROSINA_ALL_005
80	Launch + ~60 d (pressure <10^{-6} mbar)	RTOF to standby mode	ROSINA_ALL_004
90	Launch + ~60 d (pressure <10^{-6} mbar)	Open RTOF cover	ROSINA_ALL_006
100	Cover opening + 3 days	Switch DFMS to standby heater mode	ROSINA_ALL_007
110	Cover opening + 3 days	Switch RTOF to standby heater mode	ROSINA_ALL_008
115	Cover opening + 5 days	Switch DFMS & RTOF off	ROSINA_ALL_014
120	Cover opening + 5	DFMS to standby mode	ROSINA_ALL_003

	days		
130	Cover opening + 5 days	Condition DFMS filament	ROSINA_CVP_004
140	Cover opening + 6 days	Condition DFMS HV	ROSINA_CVP_005
150	Cover opening + 6 days	Condition DFMS detectors	ROSINA_CVP_006
160	Cover opening + 7 days	Check-out DFMS measurement modes	ROSINA_CVP_007
170	Cover opening + 7 days	Switch off DFMS Cover closed	ROSINA_ALL_009
180	Cover opening + 7 days	RTOF to standby mode	ROSINA_ALL_004
190	Cover opening + 7 days	Condition RTOF filaments	ROSINA_CVP_008
200	Cover opening + 8 days	Condition RTOF HV	ROSINA_CVP_009
210	Cover opening + 8 days	Condition RTOF detectors	ROSINA_CVP_010
220	Cover opening + 9 days	Check-out RTOF measurement modes	ROSINA_CVP_011
230	Cover opening + 9 days	Switch off RTOF Cover closed	ROSINA_ALL_010
240	Cover opening + 9 days	Switch off COPS	ROSINA_ALL_011
250	Cover opening + 9 days	Rosina switch off by OBCP	RN-FCP-051
260	Cover opening + 9 days	DPU redundant manual switch on	RN-CRP-003
280	Cover opening + 9 days	Rosina switch off by OBCP	RN-FCP-051
290	Cover opening + 9 days	Rosina redundant switch on by OBCP	RN-FCP-050
300	Cover opening + 9 days	Rosina switch off by OBCP	RN-FCP-051

1.2.2 Asteroid Flyby

ROSINA Plan for Asteroid 1& 2 Flyby			
Step No.	**Time (relative to event)**	**Activity**	**Procedure Number**
10	AST 1 Flyby – 10 days	Put DPU into instrument mode	ROSINA_ALL_002
20	AST 1 Flyby – 10 days	Carry out pre-flyby test	ROSINA_AST1_001
30	AST 1 Flyby – 10 days	Switch on COPS to monitoring mode	ROSINA_ALL_012
32	AST 1 Flyby – 10 days	DFMS to standby mode	ROSINA_ALL_003
33	AST 1 Flyby – 10 days	Open DFMS cover	ROSINA_ALL_005
34	AST 1 Flyby – 10 days	RTOF to standby mode	ROSINA_ALL_004
35	AST 1 Flyby – 10 days	Open RTOF cover	ROSINA_ALL_006
40	AST 1 Flyby – 10 days	Switch on DFMS to Heater standby mode	ROSINA_ALL_007
50	AST 1 Flyby – 10 days	Switch on RTOF to Heater standby mode	ROSINA_ALL_008
60	AST 1 Flyby – 5 days	Switch to Background mode	ROSINA_AST1_002
70	AST 1 Flyby – 36 hours	Switch DFMS and RTOF to measurement mode	ROSINA_AST1_003
80	AST 1 Flyby + 5 hours	Switch to Standby Mode	ROSINA_AST1_004

1.2.3 Mars Flyby

ROSINA Plan for MARS Flyby			
Step No.	**Time (relative to event)**	**Activity**	**Procedure Number**
10	MARS Flyby – 10 days	Put DPU into instrument mode	ROSINA_ALL_002
20	MARS Flyby – 10 days	Carry out pre-flyby test	ROSINA_MARS_001
30	MARS Flyby – 10 days	Switch on COPS to monitoring mode	ROSINA_ALL_012
32	MARS Flyby – 10 days	DFMS to standby mode	ROSINA_ALL_003
33	MARS Flyby – 10	Open DFMS cover	ROSINA_ALL_005

	days		
34	MARS Flyby – 10 days	RTOF to standby mode	ROSINA_ALL_004
35	MARS Flyby – 10 days	Open RTOF cover	ROSINA_ALL_006
40	MARS Flyby – 10 days	Switch on DFMS to Heater standby mode	ROSINA_ALL_007
50	MARS Flyby – 10 days	Switch on RTOF to Heater standby mode	ROSINA_ALL_008
60	MARS Flyby – 5 days	Switch to Background mode	ROSINA_MARS_002
70	MARS Flyby – 36 hours	Switch DFMS and RTOF to measurement mode	ROSINA_MARS_003
80	MARS Flyby + 5 hours	Switch to Standby Mode	ROSINA_MARS_004

1.2.4 Comet encounter

1.3 Flight Procedures

1.3.1 All

ROSINA_ALL_001	DPU main manual switch on (RN-FCP-001)			
Procedure Objective: Self test of DPU				
Procedure Execution pre-conditions/constraints:				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1		Verify LCLs off		NPWDA095 = Off NPWDA215 = Off
2		Set nominal branch	NPWDA215	FDM30029 = nom. branch NA
				NDWD0A1L = NOMINAL
3		HPC Reset A	ZRNH1001	
4		HPC Reset B	ZRNH2001	
5		Enable TC	ZDMX0068	FDM30031 = enab (autho) NA
				NDWD0A1N = ENABLED
6		Enable TM	ZDMX0057	FDM30030 = enab (start) NA
				NDWD0A1M = ENABLED
7		LCL A On A	ZPWMA069	
8		LCL A On B	ZPWMB069	

9		Send time	ZDMX0210	FDMX0010 = 225
		Verify LCL A on		NPWDA095 = On
10	20s	Verify POST	YRNG3001	NRNAG305 = 0xD000 NRNAG306 = 0 NRNAG307 = 0 NRNAG308 = 0 NRNAG309 = 0x2000 NRNAG30A = 0xD410
		Verify mode change report	YRNG3005	NRNAG305 = 0xD000 NRNAG31B = 0xD400 NRNAG31C = 0 NRNAG31D = 0 NRNAG31E = 0 NRNAG31F = 0xD100 NRNAG320 = 0x0100
		Verify LCL current		NPWDA370 > 0.05 < 0.35
		Wait for HK packet	YRNP1001	NRNDP116 = 0xD4
20	After HK received	Sensor power I/F to normal	ZRNP2100	
				NRNDP104 = Off
30		Send connection test	ZDMD0017	
		Wait for connection report	YRNG3030	
40	After report received	Retrieve Context file	ZDM03003	FDMX1000 = ROSINA
50		Enable COPS pressure distribution	ZDMTAD0C	PDMG1000 = 0 PDMG1001 = 1 PDMG110C = 44300

Nominal: Use main power and data lines.

DPU is in D4 mode (HK every 2 seconds, depends on last mode stored in context file).

ROSINA_ALL_002	DPU to instrument mode (RN-FCP-002)			
Procedure Objective: Configure DPU to instrument mode				
Procedure Execution pre-conditions/constraints:				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	DPU to Stand-by mode	ZRNP4001	PRNGX400 = MODE_D2 PRNDX401 = DISABLE PRNGX403 = 0
			YRNG3005	NRNAG31B = 0xD200 NRNAG305 = 0xD000
				NRNDP116 = 210
20	00:01:00	Enable SID 17	ZRNP1004	PRNDST02 = 17
				NRNAP103 = +1
30	00:00:10	Enable SID 9	ZRNP1004	PRNDST02 = 9
				NRNAP103 = +1
40	00:00:10	Enable SID 25	ZRNP1004	PRNDST02 = 25
				NRNAP103 = +1
50	00:00:10	Enable SID 5	ZRNP1004	PRNDST02 = 5
				NRNAP103 = +1
60	00:00:10	Enable SID 21	ZRNP1004	PRNDST02 = 21
				NRNAP103 = +1
70	00:00:10	Enable SID 3	ZRNP1004	PRNDST02 = 3
				NRNAP103 = +1
80	00:00:10	Enable SID 19	ZRNP1004	PRNDST02 = 19
				NRNAP103 = +1
90	00:00:10	Enable SID 11	ZRNP1004	PRNDST02 = 11
				NRNAP103 = +1
100	00:00:10	Enable SID 27	ZRNP1004	PRNDST02 = 27
				NRNAP103 = +1
110	00:00:10	Enable SID 15	ZRNP1004	PRNDST02 = 15
				NRNAP103 = +1
120	00:00:10	Enable SID 31	ZRNP1004	PRNDST02 = 31
				NRNAP103 = +1
130	00:00:10	Enable SID 13	ZRNP1004	PRNDST02 = 13
				NRNAP103 = +1
140	00:00:10	Enable SID 29	ZRNP1004	PRNDST02 = 29
				NRNAP103 = +1
150	00:00:10	Enable SID 32	ZRNP1004	PRNDST02 = 32
				NRNAP103 = +1
160	00:00:10	Enable Science	ZRNP100D	PRNDST06 = 80
				NRNAP103 = +1

DPU is in D2 mode (HK every one minute).

ROSINA_ALL_003	Switch DFMS to standby (RN-FCP-003)			
Procedure Objective: Switch on DFMS into Standby mode				
Procedure Execution pre-conditions/constraints: DPU in instrument mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	DFMS 28 V on, goto S4 mode	ZRNP4001	PRNGX400 = MODE_S2 PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 10000
			YRNG3005	NRNAG31C = 0x0100
				NRNDP116 = 0xA2 or 0xA4

Monitoring:
MEP current main
MEP current float
All voltages to 0
Thermistor values

ROSINA_ALL_004	Switch RTOF to standby (RN-FCP-004)			
Procedure Objective: Switch on RTOF into Standby mode				
Procedure Execution pre-conditions/constraints: DPU in instrument mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	RTOF 28 V on, goto S4 mode	ZRNP4001	PRNGX400 = MODE_S1 PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 10000
			YRNG3005	NRNAG31D = 0x0100
				NRNDP116 = 0xA1 or 0xA4

ROSINA_ALL_005	Open DFMS cover (RN-FCP-005)			
Procedure Objective: Open DFMS cover				
Procedure Execution pre-conditions/constraints: $p<10^{-6}$ mbar, DFMS standby mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	Open cover	ZRND12F8	
			ZRND23F8	PRNDD229 = 2 PRNDD230 = 1 PRNDD231 = 7 PRNDD232 = 4 PRNDD233 = 1 PRNDD235 = Mv to AbsPos PRNDD236 = Nominal PRNDD237 = Open PRNDD238 = 0
	00:05:00	Verify progress report	YRNG3010	NRNAG322 = 0xC4XX NRNAG3A5 = 0x0020
		Verify cover status flag	YRNG1001 YRNG1002	NRNDD127 = OFF NRNDD128 = ON

ROSINA_ALL_006	Open RTOF cover (RN-FCP-006)			
Procedure Objective: Open RTOF cover				
Procedure Execution pre-conditions/constraints: $p<10^{-6}$ mbar, RTOF standby mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	Open cover	ZRNR12F8	
			ZRNR23F8	PRNDR251 = 10 Hz PRNDR253 = On PRNDR254 = Move PRNDR256 = On PRNDR257 = Mv to AbsPos PRNDR258 = 0
	00:05:00	Verify progress report	YRNG3010	NRNAG322 = 0xC8XX NRNAG3A5 = 0x0020
		Verify cover status flag	YRNG1005 YRNG1006	NRNDR120 = ON or OFF NRNDR121 = OFF

ROSINA_ALL_007	Switch DFMS to standby heater mode (FN-FCP-007)			
Procedure Objective: Switch on DFMS ion source heater for outgassing				
Procedure Execution pre-conditions/constraints: DFMS cover open, DFMS standby mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	Switch on ion source heater	ZRND2213	
				NRNDD104 = ON
20	24:00:00	Switch ion source heater off	ZRND2212	
				NRNDD104 = OFF

Monitoring:
MEP current main
Ion source temperature
GCU out pressure

ROSINA_ALL_008	Switch RTOF to standby heater mode (RN-FCP-008)			
Procedure Objective: Put RTOF into Standby heater mode				
Procedure Execution pre-conditions/constraints: RTOF in standby mode, RTOF cover open				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1		Verify DPU mode		NRNDP116 = 0xA1 or 0xA4
2		Closed switch		NRNDR121 = Off
10	0	Switch on ion source heater SS T>300°C (stop heating) T<250°C (start heating)	ZRNR220F	
			YRNG1005 YRNG1006	NRNDR129 = ON NRNDR12A = OFF
15	24:00:00	Switch off ion source heater SS	ZRNR2210	
				NRNDR129 = OFF NRNDR12A = OFF
20	00:01:00	Switch on ion source heater OS T>300°C (stop heating) T<250°C (start heating)	ZRNR220E	
			YRNG1005 YRNG1006	NRNDR12B = ON NRNDR12C = OFF
30	24:00:00	Switch ion source heater OS off	ZRNR2210	
				NRNDR129 = OFF NRNDR12A = OFF

Monitoring: (how often?)
Ion source temperature
GCU out pressure

ROSINA_ALL_009	Switch off DFMS, cover closed (RN-FCP-009)			
Procedure Objective: Switch off DFMS after the cover has been closed				
Procedure Execution pre-conditions/constraints: DPU in instrument mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	DFMS to standby mode	ZRNP4001	PRNGX400 = MODE_S2 PRNDX401 = DISABLE PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 10000
20	00:05:00	Close cover	ZRND12F8	
			ZRND23F8	PRNDD229 = 2 PRNDD230 = 1 PRNDD231 = 7 PRNDD232 = 4 PRNDD233 = 1 PRNDD235 = Mv to AbsPos PRNDD236 = Nominal PRNDD237 = Close PRNDD238 = 160
	00:05:00	Verify progress report	YRNG3010	NRNAG322 = 0xC4XX NRNAG3A5 = 0x0020
		Verify cover status flag	YRNG1005 YRNG1006	NRNDD127 = ON NRNDD128 = OFF
30	00:01:00	Switch off DFMS	ZRNP4001	PRNGX400 = MODE_S1 PRNDX401 = DISABLE PRNDX405 = ENABLE PRNDX406 = 1 PRNDX407 = 1 PRNDX408 = 1 PRNGX403 = 0
			YRNG3005	

ROSINA_ALL_010	Switch off RTOF, cover closed (RN-FCP-010)			
Procedure Objective: Switch off RTOF after cover has been closed				
Procedure Execution pre-conditions/constraints: DPU in instrument mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	RTOF to standby mode	ZRNP4001	PRNGX400 = MODE_S1 PRNDX401 = DISABLE PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 10000
20	00:20:00	Close cover	ZRNR12F8	
			ZRNR23F8	PRNDR251 = 10 Hz PRNDR253 = On PRNDR254 = Move PRNDR256 = On PRNDR257 = Mv to AbsPos PRNDR258 = 20
	00:05:00	Verify progress report	YRNG3010	NRNAG322 = 0xC8XX NRNAG3A5 = 0x0020
		Verify cover status flag	YRNG1003 YRNG1004	NRNDR120 = OFF NRNDR121 = OFF
30	00:01:00	Switch off RTOF	ZRNP4001	PRNGX400 = MODE_S2 PRNDX401 = DISABLE PRNDX405 = ENABLE PRNDX406 = 1 PRNDX407 = 1 PRNDX408 = 1 PRNGX403 = 0
			YRNG3005	

ROSINA_ALL_011	Switch off COPS (RN-FCP-011)			
Procedure Objective: Switch off COPS				
Procedure Execution pre-conditions/constraints: DPU in instrument mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	COPS in standby mode	ZRNP4001	PRNGX400 = MODE_S5 PRNDX401 = DISABLE PRNDX405 = ENABLE PRNDX406 = 1 PRNDX407 = 1 PRNDX408 = 1 PRNGX403 = 0
			YRNG3005	
20	00:10:00	Switch off COPS	ZRNP4001	PRNGX400 = MODE_D2 PRNDX401 = DISABLE PRNGX403 = 0
			YRNG3005	NRNAG31B = 0xD200 NRNDP116 = 210

ROSINA_ALL_012	Switch on COPS (RN-FCP-012)			
Procedure Objective: Switch on COPS to monitoring mode				
Procedure Execution pre-conditions/constraints: DPU in instrument mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1		Verify DPU mode		NRNDP116 = 0xD2
10	0	COPS in standby mode	ZRNP4001	PRNGX400 = MODE_S5 PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 0
			YRNG3005	NRNAG31E = 0x0100
30	00:05:00	COPS in monitoring mode (nude gauge, 15µA, auto range)	ZRNP4001	PRNGX400 = MODE_5M PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 0
			YRNG3005	NRNAG31E = 0x0101

ROSINA_ALL_013	Thruster firing mode (RN-FCP-013)			
Procedure Objective: Put ROSINA in a safe mode before thruster firing				
Procedure Execution pre-conditions/constraints: DPU in instrument mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	RTOF to mode 0 (standby & close cover)	ZRNR4100	PRNGG401 = 0
				NRNAR10C = 0
	0	DFMS to mode 0 (standby & close cover)	ZRND4100	PRNGG401 = 0
				NRNAD10E = 0
	00:10:00	Verify progress report	YRNG3010	NRNAG322 = 0xC4XX NRNAG3A5 = 0x0020
	00:20:00	Verify progress report	YRNG3010	NRNAG322 = 0xC8XX NRNAG3A5 = 0x0020

ROSINA_ALL_014	Switch off DFMS & RTOF (RN-FCP-014)			
Procedure Objective: Switch off DFMS & RTOF (leave COPS on)				
Procedure Execution pre-conditions/constraints: DFMS & RTOF in standby mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	00:00:00	Switch off RTOF	ZRNP4001	PRNGX400 = MODE_S2 PRNDX401 = DISABLE PRNDX405 = ENABLE PRNDX406 = 1 PRNDX407 = 1 PRNDX408 = 1 PRNGX403 = 0
			YRNG3005	
20	00:01:00	Switch off DFMS	ZRNP4001	PRNGX400 = MODE_S1 PRNDX401 = DISABLE PRNDX405 = ENABLE PRNDX406 = 1 PRNDX407 = 1 PRNDX408 = 1 PRNGX403 = 0
			YRNG3005	

1.3.2 CVP

ROSINA_CVP_001	First Switch-on COPS (CV-FCP-141)			
Procedure Objective: Bring COPS to the measurement mode with filament and microtips conditioning				
Procedure Execution pre-conditions/constraints: DPU in instrument mode, pressure < 10^{-4} mbar				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1		Verify DPU mode		NRNDP116 = 0xD2
10	0	COPS 28 V on	ZRNP4001	PRNGX400 = MODE_S5 PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 0
			YRNG3005	NRNAG31E = 0x0100
20		Disable auto range	ZRNC2307	PRNDC209 = Off PRNDC20D = Filament
		Enable filament 1 in low emission range		
30	5 min	Switch on nude gauge	ZRNC2303	PRNDC201 = Off PRNDC202 = 0 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 0 PRNGC204 = -0.7581
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
				NRNAC11E = 12
35	10 min	Measure offset	ZRNC2304	PRNDC207 = Filament
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
40	10 min	Subemission, set filament current limit to 10 Set regulation value to 1,5µA	ZRNC2303	PRNDC201 = Off PRNDC202 = 0 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 10 PRNGC204 = 1.5
		Verify error report (current limit to low)	YRNG300B	NRNAG322 = 0xCCXX NRNAG3BC = 0x0018
50	15 min	Subemission, set filament current limit to 20	ZRNC2303	PRNDC201 = Off PRNDC202 = 0 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 20 PRNGC204 = 1.5

		Verify error report (current limit to low)	YRNG300B	NRNAG322 = 0xCCXX NRNAG3BC = 0x0018
70	15 min	Set filament current limit to 31	ZRNC2303	PRNDC201 = Off PRNDC202 = 0 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 31 PRNGC204 = 1.5
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
100	20 min	Set filament current limit 40 (standard value from DPU) Set regulation value to 5 µA	ZRNC2303	PRNDC201 = Off PRNDC202 = 0 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 40 PRNGC204 = 5
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
120	20 min	Set regulation value to 15 µA	ZRNC2303	PRNDC201 = Off PRNDC202 = 0 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 40 PRNGC204 = 15
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
130		If pressure < 10-8 mbar Perform steps 134-140, high emission		NRNAC109 < 10e-8
134	20 min	Enable filament in high emission range Set filament current limit 36 (standard value from DPU) Set regulation value to 100 µA	ZRNC2303	PRNDC201 = Off PRNDC202 = 0 PRNDC203 = Low PRNDC204 = High PRNDC205 = Filament PRNGC203 = 36 PRNGC204 = 100
138		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000

140	20 min	Set regulation value to 150 µA	ZRNC2303	PRNDC201 = Off PRNDC202 = 0 PRNDC203 = Low PRNDC204 = High PRNDC205 = Filament PRNGC203 = 36 PRNGC204 = 150
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
142	20 min	Set regulation value to 200 µA	ZRNC2303	PRNDC201 = Off PRNDC202 = 0 PRNDC203 = Low PRNDC204 = High PRNDC205 = Filament PRNGC203 = 36 PRNGC204 = 200
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
		Outgassing of COPS		
145	60 min	Switch off filament	ZRNC2306	PRNDC207 = Filament
		Enable filament 2 in low emission range		
150	5 min	Switch on nude gauge	ZRNC2303	PRNDC201 = Off PRNDC202 = 1 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 0 PRNGC204 = -0.7581
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
152	10 min	Measure offset	ZRNC2304	PRNDC207 = Filament
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
154	10 min	Subemission, set filament current limit to 10 Set regulation value to 1,5µA	ZRNC2303	PRNDC201 = Off PRNDC202 = 1 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 10 PRNGC204 = 1.5
		Verify error report (current limit to low)	YRNG300B	NRNAG322 = 0xCCXX NRNAG3BC = 0x0018
156	15 min	Subemission, set filament current limit to 20	ZRNC2303	PRNDC201 = Off PRNDC202 = 1 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 20 PRNGC204 = 1.5
		Verify error report (current limit to low)	YRNG300B	NRNAG322 = 0xCCXX NRNAG3BC = 0x0018

158	15 min	Set filament current limit to 31	ZRNC2303	PRNDC201 = Off PRNDC202 = 1 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 31 PRNGC204 = 1.5
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
160	20 min	Set filament current limit 40 (standard value from DPU) Set regulation value to 5 µA	ZRNC2303	PRNDC201 = Off PRNDC202 = 1 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Filament PRNGC203 = 40 PRNGC204 = 5
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
162	20 min	Switch off filament	ZRNC2306	PRNDC207 = Filament
		Switch off Nude Gauge		
Procedure can be interrupted at this time and continued during the next pass				
170		Disable auto range	ZRNC2307	PRNDC209 = Off PRNDC20D = Microtips
172	5 min	Switch on ram gauge	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfe PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 0 PRNGC204 = -0.2043
				NRNAC120 = 12
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
174	10 min	Measure offset	ZRNC2304	PRNDC207 = Microtips
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
		Enable microtip group 1 in low emission mode		
180	10 min	Set regulation value to 1,75 µA and emission current limit to 200	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfe PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 200 PRNGC204 = 1.75
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
190	20 min	Set regulation value to 5 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfe PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 5
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000

200	20 min	Set regulation value to 10 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfe PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 10
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
210	20 min	Set regulation value to 18 µA and emission current limit to 240 (standard value from DPU	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfe PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 18
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
215	20 min	Switch microtip group 1 off	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfe PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 0 PRNGC204 = -0.2043
Needs 1 ½ h per Microtip, can be interrupted here and continued during the next pass				
		Repeat steps for microtip groups 2 to 8		
		Enable microtip group 2 in low emission mode		
180	5 min	Set regulation value to 1,75 µA and emission current limit to 200	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfd PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 200 PRNGC204 = 1.75
				NRNAC120 = 12
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
190	20 min	Set regulation value to 5 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfd PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 5

		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
200	20 min	Set regulation value to 10 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfd PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 10
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
210	20 min	Set regulation value to 18 µA and emission current limit to 240 (standard value from DPU	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfd PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 18
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
215	20 min	Switch microtip group 2 off	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfd PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 0 PRNGC204 = -0.2043
Needs 1 ½ h per Microtip, can be interrupted here and continued during the next pass				
		Enable microtip group 3 in low emission mode		
180	5 min	Set regulation value to 1,75 µA and emission current limit to 200	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfb PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 200 PRNGC204 = 1.75
				NRNAC120 = 12
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
190	20 min	Set regulation value to 5 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfb PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 5

		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
200	20 min	Set regulation value to 10 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfb PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 10
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
210	20 min	Set regulation value to 18 µA and emission current limit to 240 (standard value from DPU	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfb PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 18
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
215	20 min	Switch microtip group 3 off	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xfb PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 0 PRNGC204 = -0.2043
Needs 1 ½ h per Microtip, can be interrupted here and continued during the next pass				
		Enable microtip group 4 in low emission mode		
180	5 min	Set regulation value to 1,75 µA and emission current limit to 200	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xf7 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 200 PRNGC204 = 1.75
				NRNAC120 = 12
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
190	20 min	Set regulation value to 5 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xf7 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 5
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000

215	20 min	Switch microtip group 4 off	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xf7 PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 0 PRNGC204 = -0.2043
Needs 1 ½ h per Microtip, can be interrupted here and continued during the next pass				
		Enable microtip group 5 in low emission mode		
180	5 min	Set regulation value to 1,75 µA and emission current limit to 200	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xef PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 200 PRNGC204 = 1.75
				NRNAC120 = 12
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
190	20 min	Set regulation value to 5 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xef PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 5
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000

215	20 min	Switch microtip group 5 off	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xef PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 0 PRNGC204 = -0.2043
Needs 1 ½ h per Microtip, can be interrupted here and continued during the next pass				
		Enable microtip group 6 in low emission mode		
180	5 min	Set regulation value to 1,75 µA and emission current limit to 200	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xdf PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 200 PRNGC204 = 1.75
				NRNAC120 = 12
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
190	20 min	Set regulation value to 5 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xdf PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 5
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
215	20 min	Switch microtip group 6 off	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xdf PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 0 PRNGC204 = -0.2043
Needs 1 ½ h per Microtip, can be interrupted here and continued during the next pass				
		Enable microtip group 7 in low emission mode		

180	5 min	Set regulation value to 1,75 µA and emission current limit to 200	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xbf PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 200 PRNGC204 = 1.75
				NRNAC120 = 12
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
190	20 min	Set regulation value to 5 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xbf PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 5
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
215	20 min	Switch microtip group 7 off	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xbf PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 0 PRNGC204 = -0.2043
Needs 1 ½ h per Microtip, can be interrupted here and continued during the next pass				
		Enable microtip group 8 in low emission mode		
180	5 min	Set regulation value to 1,75 µA and emission current limit to 200	ZRNC2303	PRNDC201 = Off PRNDC202 = 0x7f PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 200 PRNGC204 = 1.75
				NRNAC120 = 12
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000

190	20 min	Set regulation value to 5 µA and emission current limit to 240 (standard value from DPU)	ZRNC2303	PRNDC201 = Off PRNDC202 = 0x7f PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 240 PRNGC204 = 5
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
215	20 min	Switch microtip group 8 off	ZRNC2303	PRNDC201 = Off PRNDC202 = 0x7f PRNDC203 = Low PRNDC204 = Low PRNDC205 = Microtips PRNGC203 = 0 PRNGC204 = -0.2043
		If pressure < 10-7 mbar high emission, Perform steps 220 to 240		
Needs 1 ½ h per Microtip, can be interrupted here and continued during the next pass				
		Enable microtip groups 1 to 3 in high emission mode		
220	5 min	Set regulation value to 25 µA and emission current limit to 239 (standard value from DPU	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xf8 PRNDC203 = Low PRNDC204 = High PRNDC205 = Microtips PRNGC203 = 239 PRNGC204 = 25
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
230	20 min	Set regulation value to 100 µA and emission current limit to 239 (standard value from DPU	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xf8 PRNDC203 = Low PRNDC204 = High PRNDC205 = Microtips PRNGC203 = 239 PRNGC204 = 100
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000

240	20 min	Set regulation value to 150 µA and emission current limit to 239 (standard value from DPU	ZRNC2303	PRNDC201 = Off PRNDC202 = 0xf8 PRNDC203 = Low PRNDC204 = High PRNDC205 = Microtips PRNGC203 = 239 PRNGC204 = 150
		Verify progress report	YRNG3010	NRNAG322 = 0xCCXX NRNAG3A5 = 0x8000
360	20 min	Switch microtips off	ZRNC2306	PRNDC207 = Microtips
20	1 min	Enable auto range	ZRNC2307	PRNDC209 = On PRNDC20D = Filament
				NRNDC131 = On
20	1 min	Enable auto range	ZRNC2307	PRNDC209 = On PRNDC20D =Microtips
				NRNDC132 = On
370	10 min	COPS in monitoring mode (nude gauge, 15µA, auto range)	ZRNP4001	PRNGX400 = MODE_5M PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 0
380			YRNG3005	
390				
400				

ROSINA_CVP_002	Fire DFMS Pyro			
Procedure Objective: Breaking of the vacuum seal of DFMS				
Procedure Execution pre-conditions/constraints: COPS pressure reading < 10^{-6} mbar				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10	0	Fire DFMS cover pyros	S/C, TBD	

ROSINA_CVP_003	Fire RTOF Pyro			
Procedure Objective: Breaking of the vacuum seal of RTOF				
Procedure Execution pre-conditions/constraints: COPS pressure reading < 10^{-6} mbar				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
10		Fire RTOF cover pyros	S/C, TBD	

	Condition DFMS filament (CV-FCP-144)Total time 65 min			
Procedure Objective: Condition DFMS filaments				
Procedure Execution pre-conditions/constraints: DPU in instrument mode, DFMS cover open, standby mode, ion source heater off				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1	0	Check heater status off		NRNDD104 = Off
2	0	Verify Ion source temp < 150 °C		NRNAD12B < 150
3	0	Verify DPU mode		NRNDP116 = 0xA2 or 0xA4
	0	Configure ion source Fil1 Bias = –75V ERP = –80V Fil2 Bias = 80V		
10	1 min	Enable HV	ZRND2215	
				NRNDD102 = Off
20	0	Fil 1 subemission	ZRND230C	PRNDD213 = SUB PRNDD214 = Filament 1
		Verify status flags	YRNG1005 YRNG1006	NRNDD129 = SUB NRNDD132 = ON
30	00:15:00	Fil 1 2 uA emission	ZRND230C	PRNDD213 = 2uA PRNDD214 = Filament 1
		Verify status flags	YRNG1005 YRNG1006	NRNDD129 = 2uA NRNDD132 = ON
40	0:15:00	Fil 1 off	ZRND238C	
		Verify status flags	YRNG1005 YRNG1006	NRNDD132 = OFF
		Configure ion source Fil1 Bias = 80V ERP = –80V Fil2 Bias = –75V		
50	0:1:00	Fil 2 subemission	ZRND230C	PRNDD213 = SUB PRNDD214 = Filament 2
		Verify status flags	YRNG1005 YRNG1006	NRNDD129 = SUB NRNDD131 = ON

60	00:15:00	Fil 2 2 uA emission	ZRND230C	PRNDD213 = 2uA PRNDD214 = Filament 2
		Verify status flags	YRNG1005 YRNG1006	NRNDD129 = 2uA NRNDD131 = ON
70	0:15:00	Fil 2 off	ZRND238C	
		Verify status flags	YRNG1005 YRNG1006	NRNDD131 = OFF

ROSINA_CVP_005		Condition DFMS HV (CV-FCP-145)		
Procedure Objective: First HV switch on of DFMS, Total time 250 min				
Procedure Execution pre-conditions/constraints: COPS pressure reading < 10^{-6} mbar, DFMS cover open, DFMS standby				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1		Verify DPU mode		NRNDP116 = 0xA2 or 0xA4
10	0 min	Reset HV's to 0	ZRND2200	
				NRNDD102 = On
20	1 min	Enable HV	ZRND2215	
				NRNDD102 = Off
		Enable SLx		
40	1 min	Set SLL to –140 V	ZRND1201	PRNGD101 = ISCSLL
45	0 min		ZRND2100	PRNGD101 = ISCSLL PRNGD103 = -140
				NRNDD12C = On NRNDD12F = On NRNAD139 ≈ -140
50	5 min	Set SLL to –280 V	ZRND2100	PRNGD101 = ISCSLL PRNGD103 = -280
				NRNAD139 ≈ -280
60	5 min	Set SLL to –400 V	ZRND2100	PRNGD101 = ISCSLL PRNGD103 = -400
				NRNAD139 ≈ -400
70	5 min	Set SLR to –140 V	ZRND1201	PRNGD101 = ISCSLR
75	0 min		ZRND2100	PRNGD101 = ISCSLR PRNGD103 = -140
				NRNAD13A ≈ -140
80	5 min	Set SLR to –280 V	ZRND2100	PRNGD101 = ISCSLR PRNGD103 = -280
				NRNAD13A ≈ -280
90	5 min	Set SLR to –400 V	ZRND2100	PRNGD101 = ISCSLR PRNGD103 = -400
				NRNAD13A ≈ -400
		Enable SEx		
110	5 min	Set SES to –1050 V	ZRND1201	PRNGD101 = ISCSES
115	0 min		ZRND2100	PRNGD101 = ISCSES PRNGD103 = -1050
				NRNDD12E = On NRNAD13B ≈ -1050
120	5 min	Set SES to –2100 V	ZRND2100	PRNGD101 = ISCSES PRNGD103 = -2100
				NRNAD13B ≈ -2100

130	5 min	Set SES to –2990 V	ZRND2100	PRNGD101 = ISCSES PRNGD103 = -2990
				NRNAD13B ≈ -2990
		Enable TLx		
150	5 min	Set TLL to –665 V	ZRND1201	PRNGD101 = ISCTLL
155	10 sec		ZRND2100	PRNGD101 = ISCTLL PRNGD103 = -665
				NRNDD12B = On NRNAD13E ≈ -665
160	5 min	Set TLL to –1330 V	ZRND2100	PRNGD101 = ISCTLL PRNGD103 = -1330
				NRNAD13E ≈ -1330
170	5 min	Set TLL to –1900V	ZRND2100	PRNGD101 = ISCTLL PRNGD103 = -1900
				NRNAD13E ≈ -1900
180	5 min	Set TLR to –490V	ZRND1201	PRNGD101 = ISCTLR
185	10 sec		ZRND2100	PRNGD101 = ISCTLR PRNGD103 = -490
				NRNAD13D ≈ -490
190	5 min	Set TLR to –980V	ZRND2100	PRNGD101 = ISCTLR PRNGD103 = -980
				NRNAD13D ≈ -980
200	5 min	Set TLR to –1400 V	ZRND2100	PRNGD101 = ISCTLR PRNGD103 = -1400
				NRNAD13D ≈ -1400
210	5 min	Reset TLR	ZRND2100	PRNGD101 = ISCTLR PRNGD103 = 0
				NRNAD13D ≈ 0
220	1 min	Reset TLL	ZRND1201	PRNGD101 = ISCTLL
225	0 min		ZRND2100	PRNGD101 = ISCTLL PRNGD103 = 0
				NRNAD13E ≈ -0
230	1 min	Reset SES	ZRND1201	PRNGD101 = ISCSES
235	0 min		ZRND2100	PRNGD101 = ISCSES PRNGD103 = 0
240	1 min	Reset SLR	ZRND1201	PRNGD101 = ISCSLR
245	0 min		ZRND2100	PRNGD101 = ISCSLR PRNGD103 = 0
250	1 min	Reset SLL	ZRND1201	PRNGD101 = ISCSLL
255	0 min		ZRND2100	PRNGD101 = ISCSLL PRNGD103 = 0
				NRNAD13B ≈ 0
				NRNAD13A ≈ 0
				NRNAD139 ≈ 0
		Disable TLx		
		Disable SEx		

		Disable SLx		
		Enable Vaccl		
290	1 min	Set Vaccl to –2030 V	ZRND1201	PRNGD101 = MEPHVACC
295	0 min		ZRND2100	PRNGD101 = MEPHVACC PRNGD103 = -2030
				NRNAD129 ≈ -2030
300	5 min	Set Vaccl to –4060 V	ZRND2100	PRNGD101 = MEPHVACC PRNGD103 = -4060
				NRNAD129 ≈ -4060
310	5 min	Set Vaccl to –5800 V	ZRND2100	PRNGD101 = MEPHVACC PRNGD103 = -5800
				NRNAD129 ≈ -5800
320	10 min	Set Vaccl to –2200 V	ZRND2100	PRNGD101 = MEPHVACC PRNGD103 = -2200
				NRNAD129 ≈ -2200
		Enable HVbias		
350	1 min		ZRND1211	PRNGD102 = ASPHVBIAS
355	0 min	Set HVbias to –1050 V	ZRND2110	PRNGD102 = ASPHVBIAS PRNGD103 = -1050
				NRNAD13F ≈ -1050
360	5 min	Set HVbias to –2100 V	ZRND2110	PRNGD102 = ASPHVBIAS PRNGD103 = -2100
				NRNAD13F ≈ -2100
375	5 min	Set HVbias to –3000 V	ZRND2110	PRNGD102 = ASPHVBIAS PRNGD103 = -3000
				NRNAD13F ≈ -3000
		Enable ASP E		
400	1 min	Set HVFDP to –1050 V	ZRND1201	PRNGD101 = HVFDP
405	0 min		ZRND2100	PRNGD101 = HVFDP PRNGD103 = -1050
				NRNDD146 = On NRNAD141 ≈ -1050
410	5 min	Set HVFDP to –2100 V	ZRND2100	PRNGD101 = HVFDP PRNGD103 = -2100
				NRNAD141 ≈ -2100
420	5 min	Set HVFDP to –2900 V	ZRND2100	PRNGD101 = HVFDP PRNGD103 = -2900
				NRNAD141 ≈ -2900
430	5 min	Set HVFDP to 0 V	ZRND2100	PRNGD101 = HVFDP PRNGD103 = 0
				NRNAD141 ≈ 0
		Enable ASP D		
490	1 min	Set ZQ2 to 700 V	ZRND1201	PRNGD101 = ASPZ2Q

495	0 min		ZRND2100	PRNGD101 = ASPZ2Q PRNGD103 = 700
				NRNDD145 = On NRNAD145 ≈ 700
500	5 min	Set ZQ2 to 1400 V	ZRND2100	PRNGD101 = ASPZ2Q PRNGD103 = 1400
				NRNAD145 ≈ 1400
510	5 min	Set ZQ2 to 2000 V	ZRND2100	PRNGD101 = ASPZ2Q PRNGD103 = 2000
				NRNAD145 ≈ 2000
520	2 min	Set ESS1 to 210 V	ZRND1201	PRNGD101 = ASPESS1
525	0 min		ZRND2100	PRNGD101 = ASPESS1 PRNGD103 = 210
				NRNAD144 ≈ 210
530	2 min	Set ESS1 to 420 V	ZRND2100	PRNGD101 = ASPESS1 PRNGD103 = 420
				NRNAD144 ≈ 420
540	2 min	Set ESS1 to 600 V	ZRND2100	PRNGD101 = ASPESS1 PRNGD103 = 600
				NRNAD144 ≈ 600
550	2 min	Set ESS2 to 175 V	ZRND1201	PRNGD101 = ASPESS2
555	0 min		ZRND2100	PRNGD101 = ASPESS2 PRNGD103 = 175
				NRNAD143 ≈ 175
560	2 min	Set ESS2 to 350 V	ZRND2100	PRNGD101 = ASPESS2 PRNGD103 = 350
				NRNAD143 ≈ 350
570	2 min	Set ESS2 to 500 V	ZRND2100	PRNGD101 = ASPESS2 PRNGD103 = 500
				NRNAD143 ≈ 500
580	5 min	Reset ZQ2	ZRND1201	PRNGD101 = ASPZ2Q
585	0 min		ZRND2100	PRNGD101 = ASPZ2Q PRNGD103 = 0
				NRNAD145 ≈ 0
590	1 min	Reset ESS1	ZRND1201	PRNGD101 = ASPESS1
595	0 min		ZRND2100	PRNGD101 = ASPESS1 PRNGD103 = 0
				NRNAD144 ≈ 0
600	1 min	Reset ESS2	ZRND1201	PRNGD101 = ASPESS2
605	0 min		ZRND2100	PRNGD101 = ASPESS2 PRNGD103 = 0
				NRNAD143 ≈ 0
		Enable ASP C		
660	1 min	Set ZQ1 to 140 V	ZRND1201	PRNGD101 = ASPZ1Q
665	0 min		ZRND2100	PRNGD101 = ASPZ1Q PRNGD103 = 140
				NRNDD144 = On NRNAD149 ≈ 140
670	2 min	Set ZQ1 to 280 V	ZRND2100	PRNGD101 = ASPZ1Q PRNGD103 = 280
				NRNAD149 ≈ 280

680	2min	Set ZQ1 to 400 V	ZRND2100	PRNGD101 = ASPZ1Q PRNGD103 = 400
				NRNAD149 ≈ 400
685	1 min	Set ESAC to 1hex	ZRND1201	PRNGD101 = ASPESAC
687	0 min		ZRND2100	PRNGD101 = ASPESAC PRNGD103 = 1
700	3 min	Set ESAO to +50 V	ZRND1201	PRNGD101 = ASPESAO4
705	0 min		ZRND2100	PRNGD101 = ASPESAO4 PRNGD103 = 50
				NRNAD147 ≈ 50
710	3 min	Set ESAI to –60 V	ZRND1201	PRNGD101 = ASPESAI4
715	0 min		ZRND2100	PRNGD101 = ASPESAI4 PRNGD103 = 125.53
				NRNAD146 ≈ -60
720	3 min	Set ESAC to 3000h	ZRND1201	PRNGD101 = ASPESAC
725	0 min		ZRND2100	PRNGD101 = ASPESAC PRNGD103 = 12288
730	3 min	Set ESAO to +150 V	ZRND1201	PRNGD101 = ASPESAO
735	0 min		ZRND2100	PRNGD101 = ASPESAO PRNGD103 = 150
				NRNAD147 ≈ 150
740	3 min	Set ESAI to –160 V	ZRND1201	PRNGD101 = ASPESAI
745	0 min		ZRND2100	PRNGD101 = ASPESAI PRNGD103 = 125.67
				NRNAD146 ≈ -160
750	3 min	Set ESAC to 6000h	ZRND1201	PRNGD101 = ASPESAC
755	0 min		ZRND2100	PRNGD101 = ASPESAC PRNGD103 = 24576
760	3 min	Set ESAO to +250 V	ZRND1201	PRNGD101 = ASPESAO2
765	0 min		ZRND2100	PRNGD101 = ASPESAO2 PRNGD103 = 250
				NRNAD147 ≈ 250
770	3 min	Set ESAI to –260 V	ZRND1201	PRNGD101 = ASPESAI2
775	0 min		ZRND2100	PRNGD101 = ASPESAI2 PRNGD103 = 125.8
				NRNAD146 ≈ -260
780	3 min	Set ESAC to 9800h	ZRND1201	PRNGD101 = ASPESAC
785	0 min		ZRND2100	PRNGD101 = ASPESAC PRNGD103 = 38912
790	3 min	Set ESAO to +350 V	ZRND1201	PRNGD101 = ASPESAO3
795	0 min		ZRND2100	PRNGD101 = ASPESAO3 PRNGD103 = 350
				NRNAD147 ≈ 350
800	3 min	Set ESAI to –360 V	ZRND1201	PRNGD101 = ASPESAI3
805	0 min		ZRND2100	PRNGD101 = ASPESAI3 PRNGD103 = 125.94

				NRNAD146 ≈ -360
810	3 min	Set ESAC to cd00h	ZRND1201	PRNGD101 = ASPESAC
815	0 min		ZRND2100	PRNGD101 = ASPESAC PRNGD103 = 52480
820	3 min	Set ESAO to +450 V	ZRND1201	PRNGD101 = ASPESAO5
825	0 min		ZRND2100	PRNGD101 = ASPESAO5 PRNGD103 = 450
				NRNAD147 ≈ 450
830	3 min	Set ESAI to –460 V	ZRND1201	PRNGD101 = ASPESAI5
835	0 min		ZRND2100	PRNGD101 = ASPESAI5 PRNGD103 = 126.07
				NRNAD146 ≈ -460
840	3 min	Reset ZQ1	ZRND1201	PRNGD101 = ASPZ1Q
845	0 min		ZRND2100	PRNGD101 = ASPZ1Q PRNGD103 = 0
				NRNAD149 ≈ 0
850	1 min	Reset ESAC	ZRND1201	PRNGD101 = ASPESAC
855	0 min		ZRND2100	PRNGD101 = ASPESAC PRNGD103 = 0
860	1 min	Reset ESAO	ZRND1201	PRNGD101 = ASPESAO4
865	0 min		ZRND2100	PRNGD101 = ASPESAO4 PRNGD103 = 0
				NRNAD147 ≈ 0
870	1 min	Reset ESAI	ZRND1201	PRNGD101 = ASPESAI4
875	0 min		ZRND2100	PRNGD101 = ASPESAI4 PRNGD103 = 135.47
				NRNAD146 ≈ 0
		Reset CEM Rep		
		Reset MP		
		Reset RQ		
		Reset HP		
		Enable ASP A		
930	1 min	Set CEM Rep to –100V	ZRND1201	PRNGD101 = CEMREP
935	0 min		ZRND2100	PRNGD101 = CEMREP PRNGD103 = -100
				NRNDD143 = On NRNAD14D ≈ -100
940	3 min	Set MP to –100 V	ZRND1201	PRNGD101 = ASPMP
945	0 min		ZRND2100	PRNGD101 = ASPMP PRNGD103 = -100
				NRNAD14C ≈ -100
950	3 min	Set MP to 100 V	ZRND2100	PRNGD101 = ASPMP PRNGD103 = 100
				NRNAD14C ≈ 100
960	3 min	Set RQ to –50 V	ZRND1201	PRNGD101 = ASPRQ

965	0 min		ZRND2100	PRNGD101 = ASPRQ PRNGD103 = -50
				NRNAD14B ≈ -50
970	3 min	Set RQ to 50 V	ZRND2100	PRNGD101 = ASPRQ PRNGD103 = 50
				NRNAD14B ≈ 50
980	5 min	Set HP to -100 V	ZRND1201	PRNGD101 = ASPHP
985	0 min		ZRND2100	PRNGD101 = ASPHP PRNGD103 = -100
				NRNAD14A ≈ -100
990	3 min	Set HP to 100 V	ZRND2100	PRNGD101 = ASPHP PRNGD103 = 100
				NRNAD14A ≈ 100
1000	3min	Reset CEM Rep	ZRND1201	PRNGD101 = CEMREP
1005	0 min		ZRND2100	PRNGD101 = CEMREP PRNGD103 = 0
				NRNAD14D ≈ 0
1010	1 min	Reset MP	ZRND1201	PRNGD101 = ASPMP
1015	0 min		ZRND2100	PRNGD101 = ASPMP PRNGD103 = 0
				NRNAD14C ≈ 0
1020	1 min	Reset RQ	ZRND1201	PRNGD101 = ASPRQ
1025	0 min		ZRND2100	PRNGD101 = ASPRQ PRNGD103 = 0
				NRNAD14B ≈ 0
1030	1 min	Reset HP	ZRND1201	PRNGD101 = ASPHP
1035	0 min		ZRND2100	PRNGD101 = ASPHP PRNGD103 = 0
				NRNAD14A ≈ 0
1040	1 min	Reset HV's to 0	ZRND2200	
				NRNDD102 = On

ROSINA_CVP_006	Condition DFMS detectors (CV-FCP-146)			
Procedure Objective: First detector switch-on of DFMS Total time: 452 min				
Procedure Execution pre-conditions/constraints: COPS pressure reading < 10^{-6} mbar,				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1		Verify DPU mode		NRNDP116 = 0xA2 or 0xA4
5	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
		Reset MCP Front		
		Reset MCP Back		
30	2 min	Enable MCPHV	ZRND2215	
31	1 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
32	2 min	Set MCP Front to –50V	ZRND1201	PRNGD101 = MCPFront
33	0 min		ZRND2100	PRNGD101 = MCPFront PRNGD103 = -50
				NRNDD135 = On NRNAD159 ≈ -50
34	1 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
35	5 min	Set MCP Back to –10 V	ZRND1201	PRNGD101 = MCPBack
36	0 min		ZRND2100	PRNGD101 = MCPBack PRNGD103 = -10
				NRNAD152 ≈ -10
37	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
40	2 min	Set MCP Front to –100V	ZRND1201	PRNGD101 = MCPFront
42	0 min		ZRND2100	PRNGD101 = MCPFront PRNGD103 = -100
				NRNDD135 = On NRNAD159 ≈ -100
45	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
50	5 min	Set MCP Front to –200V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -200
				NRNAD159 ≈ -200
55	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
60	5 min	Set MCP Front to –300V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -300
				NRNAD159 ≈ -300
65	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7

70	5 min	Set MCP Front to –400V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -400
				NRNAD159 ≈ -400
75	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
80	5 min	Set MCP Front to –500V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -500
				NRNAD159 ≈ -500
85	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
90	5 min	Set MCP Back to –20 V	ZRND1201	PRNGD101 = MCPBack
92	0 min		ZRND2100	PRNGD101 = MCPBack PRNGD103 = -20
				NRNAD152 ≈ -20
95	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
100	10 min	Set MCP Back to –40 V	ZRND2100	PRNGD101 = MCPBack PRNGD103 = -40
				NRNAD152 ≈ -40
105	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
110	5 min	Set MCP Back to –60 V	ZRND2100	PRNGD101 = MCPBack PRNGD103 = -60
				NRNAD152 ≈ -60
115	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
120	5 min	Set MCP Back to –80 V	ZRND2100	PRNGD101 = MCPBack PRNGD103 = -80
				NRNAD152 ≈ -80
125	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
130	5 min	Set MCP Back to –100 V	ZRND2100	PRNGD101 = MCPBack PRNGD103 = -100
				NRNAD152 ≈ -100
131	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
132	5 min	Set MCP Back to –120 V	ZRND2100	PRNGD101 = MCPBack PRNGD103 = -120
				NRNAD152 ≈ -120
133	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
134	5 min	Set MCP Back to –140 V	ZRND2100	PRNGD101 = MCPBack PRNGD103 = -140
				NRNAD152 ≈ -140
135	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
136	5 min	Set MCP Back to –160 V	ZRND2100	PRNGD101 = MCPBack PRNGD103 = -160
				NRNAD152 ≈ -160

137	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
138	5 min	Set MCP Back to –180 V	ZRND2100	PRNGD101 = MCPBack PRNGD103 = -180
				NRNAD152 ≈ -180
139	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
140	5 min	Set MCP Back to –200 V	ZRND2100	PRNGD101 = MCPBack PRNGD103 = -200
				NRNAD152 ≈ -200
145	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
150	5 min	Set MCP Front to –600V	ZRND1201	PRNGD101 = MCPFront
152	0 min		ZRND2100	PRNGD101 = MCPFront PRNGD103 = -600
				NRNAD159 ≈ -600
155	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
160	5 min	Set MCP Front to –700V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -700
				NRNAD159 ≈ -700
165	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
170	5 min	Set MCP Front to –800V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -800
				NRNAD159 ≈ -800
175	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
180	5 min	Set MCP Front to –900V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -900
				NRNAD159 ≈ -900
185	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
200	5 min	Set MCP Front to –938 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -938
				NRNAD159 ≈ -938
205	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
210	5 min	Set MCP Front to –975 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -975
				NRNAD159 ≈ -975
215	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
220	5 min	Set MCP Front to –1012 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1012
				NRNAD159 ≈ -1012
225	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7

230	5 min	Set MCP Front to –1052 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1052
				NRNAD159 ≈ -1052
235	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
240	5 min	Set MCP Front to –1095 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1095
				NRNAD159 ≈ -1095
245	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
250	5 min	Set MCP Front to –1138 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1138
				NRNAD159 ≈ -1138
255	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
260	5 min	Set MCP Front to –1185 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1185
				NRNAD159 ≈ -1185
265	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
270	5 min	Set MCP Front to –1232 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1232
				NRNAD159 ≈ -1232
275	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
280	5 min	Set MCP Front to –1280 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1280
				NRNAD159 ≈ -1280
285	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
290	5 min	Set MCP Front to –1328 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1328
				NRNAD159 ≈ -1328
295	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
300	5min	Set MCP Front to –1380 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1380
				NRNAD159 ≈ -1380
305	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
310	5 min	Set MCP Front to –1450 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1450
				NRNAD159 ≈ -1450
315	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7

320	5 min	Set MCP Front to –1528 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1528
				NRNAD159 ≈ -1528
325	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
330	5 min	Set MCP Front to –1630 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1630
				NRNAD159 ≈ -1630
335	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
340	5 min	Set MCP Front to –1770 V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -1770
				NRNAD159 ≈ -1770
345	0 min	Read LEDA 6.5 ms 10 accu	ZRND2301	PRNDD222 = 10 PRNGD203 = 7
350	5 min	Set MCP Front to –500V	ZRND2100	PRNGD101 = MCPFront PRNGD103 = -500
				NRNAD159 ≈ -500
360	2 min	Reset MCP Back	ZRND1201	PRNGD101 = MCPBack
365	0 min		ZRND2100	PRNGD101 = MCPBack PRNGD103 = 0
				NRNAD152 ≈ 0
370	2 min	Reset MCP Front	ZRND1201	PRNGD101 = MCPFront
375	0 min		ZRND2100	PRNGD101 = MCPFront PRNGD103 = 0
				NRNAD159 ≈ 0
Needs 200min, can be interrupted here and continued during the next pass				
410	2 min	Set CEMHV to –100V	ZRND1211	PRNGD101 = MEPHVCEM
415	0 min		ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -100
				NRNAD127 ≈ -100
420	1 min	Set CEMHV to –200V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -200
				NRNAD127 ≈ -200
430	1 min	Set CEMHV to –300V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -300
				NRNAD127 ≈ -300
440	1 min	Set CEMHV to –400V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -400
				NRNAD127 ≈ -400
450	1 min	Set CEMHV to –500V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -500
				NRNAD127 ≈ -500
460	1 min	Set CEMHV to –600V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -600

				NRNAD127 ≈ -600
470	1 min	Set CEMHV to –700V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -700
				NRNAD127 ≈ -700
480	1 min	Set CEMHV to –800V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -800
				NRNAD127 ≈ -800
490	1 min	Set CEMHV to –900V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -900
				NRNAD127 ≈ -900
500	1 min	Set CEMHV to –1000V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1000
				NRNAD127 ≈ -1000
510	1 min	Set CEMHV to –1100V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1100
				NRNAD127 ≈ -1100
520	2 min	Set CEMHV to –1130V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1130
				NRNAD127 ≈ -1130
530	2 min	Set CEMHV to –1165V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1165
				NRNAD127 ≈ -1165
540	2 min	Set CEMHV to –1205V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1205
				NRNAD127 ≈ -1205
550	2 min	Set CEMHV to –1245V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1245
				NRNAD127 ≈ -1245
560	2 min	Set CEMHV to –1290V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1290
				NRNAD127 ≈ -1290
570	2 min	Set CEMHV to –1340 V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1340
				NRNAD127 ≈ -1340
580	2 min	Set CEMHV to –1395 V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1395
				NRNAD127 ≈ -1395
590	2 min	Set CEMHV to –1450 V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1450
				NRNAD127 ≈ -1450
600	2 min	Set CEMHV to –1510 V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1510
				NRNAD127 ≈ -1510
610	3 min	Set CEMHV to –1580 V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1580
				NRNAD127 ≈ -1580
620	3 min	Set CEMHV to –1650 V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1650
				NRNAD127 ≈ -1650
630	3 min	Set CEMHV to –1740 V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1740

				NRNAD127 ≈ -1740
640	3 min	Set CEMHV to –1860 V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -1860
				NRNAD127 ≈ -1860
650	3 min	Set CEMHV to –2035 V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -2035
				NRNAD127 ≈ -2035
660	3 min	Set CEMHV to –2337 V	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = -2337
				NRNAD127 ≈ -2337
670	3 min	Reset CEMHV	ZRND2110	PRNGD101 = MEPHVCEM PRNGD103 = 0
				NRNAD127 ≈ 0
		Disable CEMHV		
Needs 51min,				

ROSINA_CVP_007		Check-out DFMS measurement modes (CV-FCP-147)		
Procedure Objective: First check-out of all measurement mode parameters for DFMS Total time 575 min				
Procedure Execution pre-conditions/constraints: COPS pressure reading < 10^{-6} mbar, DFMS in standby mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1		Verify DPU mode		NRNDP116 = 0xA2 or 0xA4
10	00:00:00	M5, Gas mode, MCP	ZRNP4001	PRNGX400 = MODE_2 PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 10000
			YRNG3005	
15	00:02:00		ZRND4100	PRNGG401 = 5
20	00:05:00	M209, MCP, electr. background	ZRND4100	PRNGG401 = 209
30	00:05:00	M211, Gas, MCP, med. sens, low res, background	ZRND4100	PRNGG401 = 211
40	03:00:00	M210, Gas, MCP, med. sens., low res., survey, fast	ZRND4100	PRNGG401 = 210
50	00:20:00	M205, Ion, MCP, low res., survey, fast	ZRND4100	PRNGG401 = 205
60	00:20:00	M150, Gas, MCP, med. sens., low res., calibration with GCU	ZRND4100	PRNGG401 = 150
70	00:15:00	M152, Gas, MCP, med. sens., high res., calibration with GCU	ZRND4100	PRNGG401 = 152
80	00:15:00	M212, Gas, MCP, med. sens., high res. survey	ZRND4100	PRNGG401 = 212
90	01:00:00	M1912, Gas, MCP, med. sens., high res., detail, selective	ZRND4100	PRNGG401 = 1912
95	00:05:00	M1, standby open, only needed if sequence interrupted	ZRND4100	PRNGG401 = 1
Needs 312 min, can be interrupted here and continued during the next pass				
100	00:15:00	M219, Gas, CEM,	ZRND4100	PRNGG401 = 219

		electr. noise		
110	00:05:00	M160, Gas, CEM, med. sens, low res., calibration with GCU	ZRND4100	PRNGG401 = 160
120	01:00:00	M162, Gas, CEM, med. sens., high res., calibration with GCU	ZRND4100	PRNGG401 = 162
130	01:30:00	M229, Gas, FAR, electr. background	ZRND4100	PRNGG401 = 229
140	00:05:00	M170, Gas, FAR, med. sens, low res., calibration with GCU	ZRND4100	PRNGG401 = 170
150	01:00:00	M172, Gas, FAR, med. sens., high res., calibration with GCU	ZRND4100	PRNGG401 = 172
155	01:30:00	Standby mode	ZRNP4001	PRNGX400 = MODE_S2 PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 10000
			YRNG3005	

ROSINA_CVP_009	Condition RTOF HV (CV-FCP-149)			
Procedure Objective: First switch on of RTOF HV's Total time 319 min				
Procedure Execution pre-conditions/constraints: COPS pressure reading < 10^{-6} mbar, RTOF cover open				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
		Verify DPU mode		NRNDP116 = 0xA1 or 0xA4
10	0	Switch ETS on	ZRNR2304	PRNDR242 = ETS
				NRNDR143 = On
12	1'	ETS 10k Mode 1	ZRNR2206	
14	1'	ETS SS Mode	ZRNR2207	
16	1'	Enable ETS ExDel	ZRNR1211	PRNGR102 = ETSDEL
18	1'	Set ETS ExDel	ZRNR2110	PRNGR102 = ETSDEL PRNGR103 = 1500
20	1'	Pulser P_SS Test on	ZRNR2303	PRNDR203 = Test PRNDR204 = SS
				NRNDR135 = On
30	5'	Read out ETS	ZRNR2306	PRNDR260 = 10000 PRNDR267 = Disable PRNDR265 = Enable
40	5'	Pulser P_SS off	ZRNR2383	PRNDR208 = SS
				NRNDR135 = Off

50	1’	Switch ETSL on	ZRNR2304	PRNDR242 = ETS Light
				NRNDR127 = On
52	1’	ETSL 10k Mode 1	ZRNR2211	
54	1’	ETSL OS Mode	ZRNR2213	
56	1’	Enable ETSL ExDel	ZRNR1211	PRNGR102 = ETLDEL
58	1’	Set ETSL ExDel	ZRNR2110	PRNGR102 = ETLDEL PRNGR103 = 1500
60	2’	Pulser P_OSTest on	ZRNR2303	PRNDR203 = Test PRNDR204 = OS
				NRNDR139 = On
70	5’	Read out ETSL	ZRNR2306	PRNDR260 = 10000 PRNDR267 = Disable PRNDR264 = Enable
130	5’	Pulser P_I off	ZRNR2383	PRNDR208 = OS
				NRNDR139 = Off
131	1’	Swich off ETS and ETS-L	ZRNR2384	PRNDR245 = ETS
132	0’		ZRNR2384	PRNDR245 = ETS Light
133	0’		ZRNR1201	PRNGR101 = D
134	1’	Set Drift voltage to –1000V	ZRNR2100	PRNGR101 = D PRNGR103 = -1000
				NRNAR145 ≈ -1000
135			ZRNR1201	PRNGR101 = A1_SS
136	3’	Switch on A1_SS, 50%= –750 V	ZRNR2100	PRNGR101 = A1_SS PRNGR103 = -750
137	5’	Switch on A1_SS, 100 % nominal = –1250V	ZRNR2100	PRNGR101 = A1_SS PRNGR103 = -1250
				NRNAR13F ≈ -1500
140	1’	Switch on A2_SS to –1200 V	ZRNR1201	PRNGR101 = A2_SS
			ZRNR2100	PRNGR101 = A2_SS PRNGR103 = -1200
				NRNDR106 = On NRNAR13E ≈ -1200
150	3’	Switch on A2_SS to –2500 V	ZRNR2100	PRNGR101 = A2_SS PRNGR103 = -2500
				NRNAR13E ≈ -2500
160	3’	Switch on SL_SS to 25% of nominal value	ZRNR1201	PRNGR101 = SL_SS
			ZRNR2100	PRNGR101 = SL_SS PRNGR103 = -1000
				NRNAR13D ≈ -1000

170	3’	Switch on SL_SS to 50% of nominal value	ZRNR2100	PRNGR101 = SL_SS PRNGR103 = -2000
				NRNAR13D ≈ -2000
180	3’	Switch on SL_SS to 60% of nominal value	ZRNR2100	PRNGR101 = SL_SS PRNGR103 = -2400
				NRNAR13D ≈ -2400
190	3’	Switch on SL_SS to 70% of nominal value	ZRNR2100	PRNGR101 = SL_SS PRNGR103 = -2800
				NRNAR13D ≈ -2800
200	3’	Switch on SL_SS to 80% of nominal value	ZRNR2100	PRNGR101 = SL_SS PRNGR103 = -3200
				NRNAR13D ≈ -3200
210	3’	Switch on SL_SS to 90% of nominal value	ZRNR2100	PRNGR101 = SL_SS PRNGR103 = -3600
				NRNAR13D ≈ -3600
215	5’	Switch on SL_SS to 95% of nominal value	ZRNR2100	PRNGR101 = SL_SS PRNGR103 = -4000
				NRNAR13D ≈ -4000
220	5’	Switch on SL_SS to 100% of nominal value	ZRNR2100	PRNGR101 = SL_SS PRNGR103 = -4500
				NRNAR13D ≈ -4500
230	3’	Switch on R1 to -300 V	ZRNR1201	PRNGR101 = R1
235			ZRNR2100	PRNGR101 = R1 PRNGR103 = -300
				NRNAR147 ≈ -500
230	1’	Switch on R1 to 500 V	ZRNR2100	PRNGR101 = R1 PRNGR103 = 500
				NRNAR147 ≈ 500
230	3’	Switch off R1 to 0 V	ZRNR2100	PRNGR101 = R1 PRNGR103 = 0
				NRNAR147 ≈ 0
235			ZRNR1201	PRNGR101 = R2
240	3’	Switch on R2 to 50% of nominal value	ZRNR2100	PRNGR101 = R2 PRNGR103 = -500
				NRNAR148 ≈ -500
250	3’	Switch on R2 to 100% of nominal value	ZRNR2100	PRNGR101 = R2 PRNGR103 = -1500
				NRNAR148 ≈ -1500
260	3’	Switch on RL to 25% of nominal value	ZRNR1201	PRNGR101 = RL
265			ZRNR2100	PRNGR101 = RL PRNGR103 = -1300

				NRNAR149 ≈ -1300
270	3’	Switch on RL to 50% of nominal value	ZRNR2100	PRNGR101 = RL PRNGR103 = -2600
				NRNAR149 ≈ -2600
280	3’	Switch on RL to 60% of nominal value	ZRNR2100	PRNGR101 = RL PRNGR103 = -3100
				NRNAR149 ≈ -3100
290	3’	Switch on RL to 70% of nominal value	ZRNR2100	PRNGR101 = RL PRNGR103 = -3600
				NRNAR149 ≈ -3600
300	3’	Switch on RL to 80% of nominal value	ZRNR2100	PRNGR101 = RL PRNGR103 = -4100
				NRNAR149 ≈ -4100
310	5’	Switch on RL to 90% of nominal value	ZRNR2100	PRNGR101 = RL PRNGR103 = -4600
				NRNAR149 ≈ -4600
320	5’	Switch on RL to 100% of nominal value	ZRNR2100	PRNGR101 = RL PRNGR103 = -5000
				NRNAR149 ≈ -5000
330	2’	Switch on HM1 to 50% of nominal value	ZRNR1201	PRNGR101 = HM1
335			ZRNR2100	PRNGR101 = HM1 PRNGR103 = -200
				NRNAR14A ≈ -200
340	5’	Switch on HM1 to -1000 V	ZRNR2100	PRNGR101 = HM1 PRNGR103 = -1000
				NRNAR14A ≈ -1000
350	3’	Switch on HML to 25% of nominal value	ZRNR1201	PRNGR101 = HML
355			ZRNR2100	PRNGR101 = HML PRNGR103 = -1100
				NRNAR14C ≈ -1100
360	3’	Switch on HML to 50% of nominal value	ZRNR2100	PRNGR101 = HML PRNGR103 = -2200
				NRNAR14C ≈ -2200
370	3’	Switch on HML to 60% of nominal value	ZRNR2100	PRNGR101 = HML PRNGR103 = -2600
				NRNAR14C ≈ -2600
380	5’	Switch on HML to 70% of nominal value	ZRNR2100	PRNGR101 = HML PRNGR103 = -3000
				NRNAR14C ≈ -3000
390	5’	Switch on HML to 80% of nominal value	ZRNR2100	PRNGR101 = HML PRNGR103 = -3400

				NRNAR14C ≈ -3400
400	5’	Switch on HML to 90% of nominal value	ZRNR2100	PRNGR101 = HML PRNGR103 = -3800
				NRNAR14C ≈ -3800
405	5’	Switch on HML to -4200V (95% of nominal value	ZRNR2100	PRNGR101 = HML PRNGR103 = -4200
				NRNAR14C ≈ -4200
410	5’	Switch on HML to 100% of nominal value	ZRNR2100	PRNGR101 = HML PRNGR103 = -4500
				NRNAR14C ≈ -4500
420			ZRNR1201	PRNGR101 = D
430	3’	Switch on Drift to 50% of nominal value	ZRNR2100	PRNGR101 = D PRNGR103 = -1500
				NRNAR145 ≈ -1500
440	3’	Switch on Drift to 60% of nominal value	ZRNR2100	PRNGR101 = D PRNGR103 = -1800
				NRNAR145 ≈ -1800
450	5’	Switch on Drift to 70% of nominal value	ZRNR2100	PRNGR101 = D PRNGR103 = -2100
				NRNAR145 ≈ -2100
460	5’	Switch on Drift to 80% of nominal value	ZRNR2100	PRNGR101 = D PRNGR103 = -2400
				NRNAR145 ≈ -2400
470	5’	Switch on Drift to 90% of nominal value	ZRNR2100	PRNGR101 = D PRNGR103 = -2700
				NRNAR145 ≈ -2700
480	5’	Switch on Drift to 100% of nominal value	ZRNR2100	PRNGR101 = D PRNGR103 = -3000
				NRNAR145 ≈ -3000
490	1’	Switch on Drift to -1000 V	ZRNR2100	PRNGR101 = D PRNGR103 = -1000
				NRNAR145 ≈ -1000
495			ZRNR1201	PRNGR101 = HML
500	1’	Switch off HML -3V	ZRNR2100	PRNGR101 = HML PRNGR103 = -3
505			ZRNR1201	PRNGR101 = HM1
510	1’	Switch off HM1 to -3V	ZRNR2100	PRNGR101 = HM1 PRNGR103 = -3
511			ZRNR1201	PRNGR101 = RL

512	1’	Switch off RL to -2V	ZRNR2100	PRNGR101 = RL PRNGR103 = -2
513			ZRNR1201	PRNGR101 = R2
514	1’	Switch off R2 to -1V	ZRNR2100	PRNGR101 = R2 PRNGR103 = -1
515	1’	Switch off SL_SS	ZRNR1201	PRNGR101 = SL_SS
516			ZRNR2100	PRNGR101 = SL_SS PRNGR103 = 0
				NRNAR13D ≈ 0
517	1’	Switch off A2_ SS	ZRNR1201	PRNGR101 = A2_SS
518			ZRNR2100	PRNGR101 = A2_SS PRNGR103 = 0
				NRNAR13E ≈ 0
519	1’	Switch off A1_SS	ZRNR1201	PRNGR101 = A1_SS
520			ZRNR2100	PRNGR101 = A1_SS PRNGR103 =-1
				NRNAR13F ≈ 0
521	1’	Switch on A1_OS to nominal value	ZRNR1201	PRNGR101 = A1_OS
522			ZRNR2100	PRNGR101 = A1_OS PRNGR103 = -650
				NRNAR142 ≈ -650
530	3’	Switch on A2_OS to 50% of nominal value	ZRNR1201	PRNGR101 = A2_OS
535			ZRNR2100	PRNGR101 = A2_OS PRNGR103 = -1200
				NRNAR141 ≈ -1200
540	3’	Switch on A2_OS to 100% of nominal value	ZRNR2100	PRNGR101 = A2_OS PRNGR103 = -2500
				NRNAR141 ≈ -2500
550	3’	Switch on SL_OS to 25% of nominal value	ZRNR1201	PRNGR101 = SL_OS
555			ZRNR2100	PRNGR101 = SL_OS PRNGR103 = -1100
				NRNAR140 ≈ -1100
560	3’	Switch on SL_OS to 50% of nominal value	ZRNR2100	PRNGR101 = SL_OS PRNGR103 = -2200
				NRNAR140 ≈ -2200
570	5’	Switch on SL_OS to 60% of nominal value	ZRNR2100	PRNGR101 = SL_OS PRNGR103 = -2600
				NRNAR140 ≈ -2600
580	5’	Switch on SL_OS to 70% of nominal value	ZRNR2100	PRNGR101 = SL_OS PRNGR103 = -3000
				NRNAR140 ≈ -3000
590	5’	Switch on SL_OS to 80% of nominal value	ZRNR2100	PRNGR101 = SL_OS PRNGR103 = -3400

				NRNAR140 ≈ -3400
600	5’	Switch on SL_OS to 90% of nominal value	ZRNR2100	PRNGR101 = SL_OS PRNGR103 = -3800
				NRNAR140 ≈ -3800
600	5’	Switch on SL_OS to 95% of nominal value	ZRNR2100	PRNGR101 = SL_OS PRNGR103 = -4200
				NRNAR140 ≈ -4200
610	5’	Switch on SL_OS to 100% of nominal value	ZRNR2100	PRNGR101 = SL_OS PRNGR103 = -4500
				NRNAR140 ≈ -4500
620	5’	Switch on low voltages Ion (ELA_OS, ELB_OS, E2_OS, E1_OS, Gr_OS, BP_OS)	ZRNR230A	PRNDR222 = Excluded PRNDR223 = SROS PRNDR224 = OS
660	3’	Switch off HV Gas	ZRNR230B	PRNDR227 = Included PRNDR229 = Keep On PRNDR230 = SS
670	3’	Switch off HV Ion	ZRNR230B	PRNDR227 = Included PRNDR229 = All Off PRNDR230 = OS

ROSINA_CVP_008	Condition RTOF Filament (CV-FCP-148)			
Procedure Objective: Condition RTOF filament Total time 68 min				
Procedure Execution pre-conditions/constraints: DPU in instrument mode, RTOF cover open, RTOF in Standby mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1		Verify DPU mode		NRNDP116 = 0xA1 or 0xA4
10	5’	Fil SS1 standby	ZRNR2305	PRNDR213 = SS PRNDR214 = Filament 1 PRNGR205 = 11
				NRNDR14F = On

20	20’	Fil SS 1 20 uA emission	ZRNR2305	PRNDR213 = SS PRNDR214 = Filament 1 PRNGR205 = 20
				NRNAR11A ≈ 20
30	2’	Fil SS 1 off	ZRNR2385	PRNDR249 = SS
				NRNDR14F = Off
40	5’	Fil SS 2 standby	ZRNR2305	PRNDR213 = SS PRNDR214 = Filament 2 PRNGR205 = 11
				NRNDR14F = On
50	2h	Fil SS 2 20 uA emission	ZRNR2305	PRNDR213 = SS PRNDR214 = Filament 2 PRNGR205 = 20
				NRNAR11A ≈ 20
60	2’	Fil SS 2 off	ZRNR2385	PRNDR249 = SS
				NRNDR14F = Off
Needs 34 min, can be interrupted here and continued during the next pass				
70	5’	Fil OS 1 standby	ZRNR2305	PRNDR213 = OS PRNDR214 = Filament 1 PRNGR205 = 11
				NRNDR14F = On
80	20’	Fil OS 1 20 uA emission	ZRNR2305	PRNDR213 = OS PRNDR214 = Filament 1 PRNGR205 = 20
				NRNAR11A ≈ 20
90	2’	Fil OS 1 off	ZRNR2385	PRNDR249 = OS
				NRNDR14F = Off
100	5’	Fil OS 2 standby	ZRNR2305	PRNDR213 = OS PRNDR214 = Filament 2 PRNGR205 = 11
				NRNDR14F = On
110	2h	Fil OS 2 20 uA emission	ZRNR2305	PRNDR213 = OS PRNDR214 = Filament 2 PRNGR205 = 20
				NRNAR11A ≈ 20
120	2’	Fil OS 2 off	ZRNR2385	PRNDR249 = OS
				NRNDR14F = Off

To be done only in Fall

ROSINA_CVP_010		Condition of RTOF detectors (CV-FCP-150)		
Procedure Objective: First switch-on of RTOF detectors , total time 410 min				
Procedure Execution pre-conditions/constraints: COPS pressure reading < 10^{-6} mbar, RTOF cover open, RTOF standby mode, Detector temperature –55°c < T < + 55°C				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1		Verify DPU mode		NRNDP116 = 0xA1 or 0xA4
		Enable MCP_SS HV		
10	0	Set Drift to –1000V	ZRNR1201	PRNGR101 = D
15			ZRNR2100	PRNGR101 = D PRNGR103 = -1000
				NRNAR145 ≈ -1000
20	5’	MCP_SS HV 200V	ZRNR1201	PRNGR101 = M_SS
25			ZRNR2100	PRNGR101 = M_SS PRNGR103 = 200
				NRNDR109 = On NRNAR14E ≈ 200
100	5’	MCP_SS HV 1000V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 1000
				NRNAR14E ≈ 1000
120	5’	MCP_SS HV 1250V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 1250
				NRNAR14E ≈ 1250
150	~~5’~~	MCP_SS HV 1500V	ZRNR2100	PRNGR101 = M_SS ~~PRNGR103 = 1500~~
				NRNAR14E ≈ 1500
170	~~5’~~	MCP_SS HV 1700V	ZRNR2100	PRNGR101 = M_SS ~~PRNGR103 = 1700~~
				NRNAR14E ≈ 1700
180	~~5’~~	MCP_SS HV 1800V	ZRNR2100	PRNGR101 = M_SS ~~PRNGR103 = 1800~~
				NRNAR14E ≈ 1800

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190	5’	MCP_SS HV 1900V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 1900
				NRNAR14E ≈ 1900
200	10’	MCP_SS HV 2000V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2000
				NRNAR14E ≈ 2000
210	10’	MCP_SS HV 2100V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2100
				NRNAR14E ≈ 2100
220	10’	MCP_SS HV 2200V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2200
				NRNAR14E ≈ 2200
230	10’	MCP_SS HV 2300V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2300
				NRNAR14E ≈ 2300
240	10’	MCP_SS HV 2400V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2400
				NRNAR14E ≈ 2400
250	5’	MCP_SS HV 2450V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2450
				NRNAR14E ≈ 2450
260	5’	MCP_SS HV 2500V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2500
				NRNAR14E ≈ 2500
270	5’	MCP_SS HV 2550V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2550
				NRNAR14E ≈ 2550
280	5’	MCP_SS HV 2600V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2600
				NRNAR14E ≈ 2600
290	5’	MCP_SS HV 2650V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2650
				NRNAR14E ≈ 2650
300	5’	MCP_SS HV 2700V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2700
				NRNAR14E ≈ 2700
310	5’	MCP_SS HV 2750V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2750
				NRNAR14E ≈ 2750
320	5’	MCP_SS HV 2800V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2800
				NRNAR14E ≈ 2800
321	5’	MCP_SS HV 2850V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2850
				NRNAR14E ≈ 2850
322	5’	MCP_SS HV 2900V	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 2900
				NRNAR14E ≈ 2900
330	10’	MCP_SS HV off	ZRNR2100	PRNGR101 = M_SS PRNGR103 = 56
				NRNAR14E ≈ 56

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		Disable MCP_SS HV		
Needs 205 min, can be interrupted here and continued during the next pass				
		Enable MCP_OS HV		
340	5’	MCP_OS HV 200V	ZRNR1201	PRNGR101 = M_OS
345			ZRNR2100	PRNGR101 = M_OS PRNGR103 = 200
				NRNDR108 = On NRNAR14D ≈ 200
420	5’	MCP_OS HV 1000V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 1000
				NRNAR14D ≈ 1000
440	5’	MCP_OS HV 1250V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 1250
				NRNAR14D ≈ 1250
470	5’	MCP_OS HV 1500V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 1500
				NRNAR14D ≈ 1500
480	5’	MCP_OS HV 1600V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 1600
				NRNAR14D ≈ 1600
490	5’	MCP_OS HV 1700V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 1700
				NRNAR14D ≈ 1700
500	5’	MCP_OS HV 1800V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 1800
				NRNAR14D ≈ 1800
510	5’	MCP_OS HV 1900V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 1900
				NRNAR14D ≈ 1900
520	5’	MCP_OS HV 2000V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2000
				NRNAR14D ≈ 2000
530	10’	MCP_OS HV 2100V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2100
				NRNAR14D ≈ 2100
540	10’	MCP_OS HV 2200V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2200
				NRNAR14D ≈ 2200

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550	10’	MCP_OS HV 2300V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2300
				NRNAR14D ≈ 2300
560	10’	MCP_OS HV 2400V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2400
				NRNAR14D ≈ 2400
570	5’	MCP_OS HV 2450V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2450
				NRNAR14D ≈ 2450
580	5’	MCP_OS HV 2500V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2500
				NRNAR14D ≈ 2500
590	5’	MCP_OS HV 2550V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2550
				NRNAR14D ≈ 2550
600	5’	MCP_OS HV 2600V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2600
				NRNAR14D ≈ 2600
610	5’	MCP_OS HV 2650V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2650
				NRNAR14D ≈ 2650
620	5’	MCP_OS HV 2700V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2700
				NRNAR14D ≈ 2700
630	5’	MCP_OS HV 2750V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2750
				NRNAR14D ≈ 2750
640	5’	MCP_OS HV 2800V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2800
				NRNAR14D ≈ 2800
641	5’	MCP_OS HV 2850V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2850
				NRNAR14D ≈ 2850
642	5’	MCP_OS HV 2900V	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 2900
				NRNAR14D ≈ 2900
650	10’	MCP_OS HV off	ZRNR2100	PRNGR101 = M_OS PRNGR103 = 0
				NRNAR14D ≈ 0
		Disable MCP_OS HV		
660	5’	Switch off Drift	ZRNR1201	PRNGR101 = D
665			ZRNR2100	PRNGR101 = D PRNGR103 = 0
				NRNAR145 ≈ 0

Deleted: 10’ (550)
Deleted: 10’ (570)
Deleted: 10’ (580)
Deleted: 10’ (590)
Deleted: 10’ (600)
Deleted: 10’ (610)
Deleted: 10’ (620)
Deleted: 10’ (630)
Deleted: 10’ (640)
Deleted: 10’ (641)
Deleted: 10’ (642)
Deleted: 10’ (660)

Monitoring:
MCP current, MCP current,
MCP temperature
ETS start rate

Steps to be done 1-20, rest after detector conditioning in fall

ROSINA_CVP_011		Check-out RTOF measurement modes (CV-FCP-151)		
Procedure Objective: First check-out of all measurement mode parameters for RTOF Total time: 420 min				
Procedure Execution pre-conditions/constraints: COPS pressure reading < 10^{-6} mbar, RTOF cover open, standby mode				
Step No.	Time (hh:mm:ss) *	Activity	TM/TC Packet	TM/TC Parameters
1		Verify DPU mode		NRNDP116 = 0xA1 or 0xA4
10	0	M11, SS switch on,	ZRNP4001	PRNGX400 = MODE_1G PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 10000
			YRNG3005	
15	2’		ZRNR4100	PRNGG401 = 11
16	3’	M211, int cal. ETS, std	ZRNR4100	PRNGG401 = 211
17	3’	M221, int cal. ETS, DTS	ZRNR4100	PRNGG401 = 221
18	3’	M231, int cal. ETS, Hirm	ZRNR4100	PRNGG401 = 231
19	3’	M213, int cal. ETS-L, std	ZRNR4100	PRNGG401 = 213
20	3’	M223, int cal. ETS-L, DTS	ZRNR4100	PRNGG401 = 223
20	10’	M191, SS, electr. Noise, ETS	ZRNR4100	PRNGG401 = 191
30	10’	M511, SS, survey, ETS, med sens.	ZRNR4100	PRNGG401 = 511
50	45’	M541, SS, background, med. sens., ETS	ZRNR4100	PRNGG401 = 541

60	60’	M171, SS, calibration, ETS	ZRNR4100	PRNGG401 = 171
80	30’	M516, SS, survey, med. Sens, 5kHz, ETS	ZRNR4100	PRNGG401 = 516
90	30’	M571, SS, survey, low power, ETS	ZRNR4100	PRNGG401 = 571
110	30’	M601, SS, high res., ETS	ZRNR4100	PRNGG401 = 601
120	20’	Standby mode	ZRNP4001	PRNGX400 = MODE_S1 PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 10000
237 min, can be interrupted here and continued during the next pass				
			YRNG3005	
130	20’	M60, OS switch on, Gas,	ZRNP4001	PRNGX400 = MODE_1I PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 10000
			YRNG3005	
135	2’		ZRNR4100	PRNGG401 = 60
140	10’	M193, OS, electr. Noise	ZRNR4100	PRNGG401 = 193
150	10’	M513, OS, survey, ETS_L, med sens.	ZRNR4100	PRNGG401 = 513
170	45 ’	M543, OS, background, med. sens., ETS_L	ZRNR4100	PRNGG401 = 543
180	60’	M173, OS, calibration, ETS_L	ZRNR4100	PRNGG401 = 173

200	20’	M603, OS, high res., ETS_L	ZRNR4100	PRNGG401 = 603
210	20’	Standby mode	ZRNP4001	PRNGX400 = MODE_S1 PRNDX402 = ENABLE PRNDX403 = 1 PRNDX404 = 1 PRNGX403 = 10000
			YRNG3005	