

The history information of QZS-1 operation

date	event	history							mass(kg) (*5)
			start(UT)	stop(UT)	duration	$\Delta V_x$	$\Delta V_y$	$\Delta V_z$	
2011/2/16	orbit maintenance maneuver(*1)	no data							2290
2011/3/7	change of attitude mode(*3)	YS→ON	2011/2/16 09:59:00	2011/2/16 10:32:00					
2011/4/20	change of attitude mode(*3)	ON→YS	2011/4/20 7:40	2011/4/20 08:12:00					
2011/4/27	unloading								
2011/5/11	orbit maintenance maneuver(*1)	no data							2286
2011/8/3	unloading								
2011/9/7	change of attitude mode(*3)	YS→ON	2011/9/7 09:16:00	2011/9/7 09:50:00					
2011/10/19	unloading								
2011/10/22	change of attitude mode(*3)	ON→YS	2011/10/22 07:31:00	2011/10/22 08:04:00					
2011/11/9	orbit maintenance maneuver(*1)	YS→ON	2011/11/9 13:27:31	2011/11/9 13:30:16					
		#1	2011/11/9 13:32:16	2011/11/9 13:35:27	0:03:11	-0.877	-0.034	-0.105	
		#2	2011/11/9 18:30:05	2011/11/9 18:36:53	0:06:48	1.625	-0.029	-0.07	
		#3	2011/11/9 23:31:14	2011/11/9 23:36:29	0:05:15	-1.449	-0.057	0.04	
		ON→YS	2011/11/9 23:36:30	2011/11/9 23:40:45					
2012/1/4	unloading								
2012/3/3	change of attitude mode(*3)	YS→ON	2012/3/3 09:54:00	2012/3/3 10:27:00					
2012/3/7	unloading								
2012/4/16	change of attitude mode(*3)	ON→YS	2012/4/16 7:39	2012/4/16 08:11:00					
2012/5/2	orbit maintenance maneuver(*1)	YS→ON	2012/5/2 01:53:18	2012/5/2 01:57:04					
		#1	2012/5/2 01:59:04	2012/5/2 02:00:51	0:01:47	-0.492	0.007	-0.057	
		#2	2012/5/2 06:57:36	2012/5/2 07:02:20	0:04:44	1.275	-0.006	-0.041	
		#3	2012/5/2 11:57:16	2012/5/2 12:02:40	0:05:24	-1.488	0.021	0.049	
		ON→YS	2012/5/2 12:02:41	2012/5/12 12:04:55					
2012/7/4	unloading								
2012/9/3	change of attitude mode(*3)	YS→ON	2012/9/3 09:20:00	2012/9/3 09:53:00					
2012/10/18	change of attitude mode(*3)	ON→YS	2012/10/18 07:33:00	2012/10/18 08:06:00					
2012/11/7	orbit maintenance maneuver(*1,*2)	YS→ON	2012/11/7 13:10:37	2012/11/7 13:12:55					
		#1	2012/11/7 13:14:55	2012/11/7 13:16:57	0:02:02	-0.563	-0.022	-0.067	
		#2	2012/11/7 18:14:06	2012/11/7 18:17:45	0:03:39	0.993	-0.018	-0.043	
		#3	2012/11/7 23:14:03	2012/11/7 23:17:49	0:03:46	-1.055	-0.041	0.029	
		ON→YS	2012/11/7 23:17:50	2012/11/7 23:22:09					
2013/2/27	change of attitude mode(*3)	YS→ON	2013/2/27 9:54	2013/2/27 10:27:00					
2013/4/13	change of attitude mode(*3)	ON→YS	2013/4/13 07:44:00	2013/4/13 08:17:00					
2013/5/1	orbit maintenance maneuver(*1,*2)	YS→ON	2013/5/1 01:35:55	2013/5/1 01:39:49					
		#1	2013/5/1 01:41:49	2013/5/1 01:42:54	0:01:05	-0.301	0.004	-0.035	
		#2	2013/5/1 06:40:57	2013/5/1 06:43:46	0:02:49	0.763	-0.004	-0.025	
		#3	2013/5/1 11:40:20	2013/5/1 11:44:22	0:04:02	-1.12	0.016	0.037	
		ON→YS	2013/5/1 11:44:23	2013/5/11 01:46:32					
2013/8/30	change of attitude mode(*3)	YS→ON	2013/8/30 09:26:00	2013/8/30 10:00:00					
2013/10/11	change of attitude mode(*3)	ON→YS	2013/10/11 07:42:00	2013/10/11 08:15:00					

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			start(UT)	stop(UT)	duration	$\Delta V_x$	$\Delta V_y$	$\Delta V_z$	
2013/10/30	orbit maintenance maneuver(*1,*2)	YS→ON	2013/10/30 13:20:22	2013/10/30 13:22:57					2269
		#1	2013/10/30 13:24:57	2013/10/30 13:25:37	0:00:40	-0.181	-0.007	-0.022	
		#2	2013/10/30 18:24:28	2013/10/30 18:26:07	0:01:39	0.448	-0.008	-0.02	
		#3	2013/10/30 23:23:46	2013/10/30 23:26:07	0:02:21	-0.838	-0.033	0.023	
		ON→YS	2013/10/30 23:26:49	2013/10/30 23:31:14					
2014/2/24	change of attitude mode(*3)	YS→ON	2014/2/24 09:50:00	2014/2/24 10:23:00					
2014/4/9	change of attitude mode(*3)	ON→YS	2014/4/9 07:40:00	2014/4/9 08:14:00					
2014/4/30	orbit maintenance maneuver(*1,*2)	YS→ON	2014/4/30 01:14:28	2014/4/30 01:18:30					2267
		#1	2014/4/30 01:20:30	2014/4/30 01:20:42	0:00:12	0.055	0	0.002	
		#2	2014/4/30 06:20:15	2014/4/30 06:20:56	0:00:41	0.184	-0.001	-0.006	
		#3	2014/4/30 11:19:06	2014/4/30 11:22:05	0:02:59	-0.82	0.012	0.027	
		ON→YS	2014/4/30 11:22:06	2014/4/30 11:24:12					
2014/8/26	change of attitude mode(*3)	YS→ON	2014/8/26 09:31:00	2014/8/26 10:05:00					
2014/10/11	change of attitude mode(*3)	ON→YS	2014/10/11 07:43:00	2014/10/11 08:16:00					
2014/10/29	orbit maintenance maneuver(*1,*2)	YS→ON	2014/10/29 13:06:42	2014/10/29 13:09:09					2265
		#1	2014/10/29 13:11:09	2014/10/29 13:12:07	0:00:58	0.266	-0.005	0.008	
		#2	2014/10/29 18:11:15	2014/10/29 18:12:00	0:00:45	-0.199	-0.008	-0.009	
		#3	2014/10/29 23:10:28	2014/10/29 23:12:47	0:02:19	-0.634	-0.025	0.017	
		ON→YS	2014/10/29 23:12:48	2014/10/29 23:17:17					
2015/2/20	change of attitude mode(*3)	YS→ON	2015/2/20 09:53:00	2015/2/20 10:26:00					
2015/4/6	change of attitude mode(*3)	ON→YS	2015/4/6 07:41:00	2015/4/6 08:15:00					
2015/4/22	orbit maintenance maneuver(*1,*2)	YS→ON	2015/4/22 01:23:38	2015/4/22 01:27:45					2263
		#1	2015/4/22 01:29:45	2015/4/22 01:31:27	0:01:42	0.468	-0.002	0.02	
		#2	2015/4/22 06:29:57	2015/4/22 06:31:15	0:01:18	-0.354	0.005	-0.005	
		#3	2015/4/22 11:29:28	2015/4/22 11:31:44	0:02:16	-0.626	0.009	0.038	
		ON→YS	2015/4/22 11:31:45	2015/4/22 11:33:44					
2015/8/23	change of attitude mode(*3)	YS→ON	2015/8/23 9:34:00	2015/8/23 10:06:00					
2015/10/7	change of attitude mode(*3)	ON→YS	2015/10/7 07:47:00	2015/10/7 08:20:00					
2015/10/21	orbit maintenance maneuver(*1,*2)	YS→ON	2015/10/21 13:14:45	2015/10/21 13:17:06					2261
		#1	2015/10/21 13:19:06	2015/10/21 13:21:32	0:02:26	0.673	-0.012	0.02	
		#2	2015/10/21 18:18:55	2015/10/21 18:21:42	0:02:47	-0.754	-0.03	-0.034	
		#3	2015/10/21 23:19:31	2015/10/21 23:21:06	0:01:35	-0.435	-0.017	0.012	
		ON→YS	2015/10/21 23:21:07	2015/10/21 23:25:44					
2016/2/16	change of attitude mode(*3)	YS→ON	2016/2/16 09:54:00	2016/2/16 10:27:00					
2016/4/1	change of attitude mode(*3)	ON→YS	2016/4/1 07:45:00	2016/4/1 08:18:00					
2016/4/20	orbit maintenance maneuver(*1,*2)	YS→ON	2016/4/20 01:07:34	2016/4/20 01:11:48					2258
		#1	2016/4/20 01:13:48	2016/4/20 01:16:46	0:02:58	0.817	-0.004	0.034	
		#2	2016/4/20 06:13:44	2016/4/20 06:16:48	0:03:04	-0.835	0.012	-0.033	
		#3	2016/4/20 11:14:24	2016/4/20 11:16:10	0:01:46	-0.483	0.007	0.016	
		ON→YS	2016/4/20 11:16:11	2016/4/20 11:18:07					
2016/8/18	change of attitude mode(*3)	YS→ON	2016/8/18 09:39:00	2016/8/18 10:12:00					
2016/10/3	change of attitude mode(*3)	ON→YS	2016/10/3 7:51:00	2016/10/3 8:25:00					

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			start(UT)	stop(UT)	duration	$\Delta V_x$	$\Delta V_y$	$\Delta V_z$	
2016/10/5	orbit maintenance maneuver(*1,*2)	YS→ON	2016/10/5 13:48:07	2016/10/5 13:50:19					2255
		#1	2016/10/5 13:52:19	2016/10/5 13:56:24	0:04:05	1.131	-0.02	0.035	
		#2	2016/10/5 18:51:45	2016/10/5 18:56:58	0:05:13	-1.412	-0.055	-0.064	
		#3	2016/10/5 23:54:11	2016/10/5 23:54:33	0:00:22	-0.098	-0.004	0.003	
		ON→YS	2016/10/5 23:54:34	2016/10/5 23:59:29					
2017/2/17	change of attitude mode(*3)	YS→ON	2017/2/17 08:47:00	2017/2/17 09:14:00					
2017/3/27	change of attitude mode(*3)	ON→YS	2017/3/27 7:57:10	2017/3/27 08:29:21					
2017/4/4	unloading	UNLD	2017/4/4 06:00:23	2017/4/4 06:04:39				2255	
2017/4/7 -4/9	orbit maintenance maneuver(*1,*2)	UNLD	2017/4/7 10:11:03	2017/4/7 10:13:11					2251
		YS→ON	2017/4/7 10:13:16	2017/4/7 10:14:57					
		#1	2017/4/7 10:21:09	2017/4/7 10:25:36	0:04:27	-1.462	0.013	-0.051	
		ON→YS (*4)	2017/4/7 19:15:00	2017/4/7 23:18:57					
		YS→ON	2017/4/8 15:14:36	2017/4/8 15:19:29					
		#2	2017/4/8 18:22:17	2017/4/8 18:24:28	0:02:11	0.710	-0.008	-0.014	
		ON→YS	2017/4/8 18:36:01	2017/4/8 18:41:37					
		YS→ON	2017/4/9 16:16:36	2017/4/9 16:21:53					
		#3	2017/4/9 18:23:11	2017/4/9 18:23:34	0:00:23	0.125	-0.001	-0.002	
ON→YS	2017/4/9 18:30:21	2017/4/9 18:35:45							
2017/8/20	change of attitude mode(*3)	YS→ON	2017/8/20 9:41:44	2017/8/20 10:07:40					
2017/9/22	orbit maintenance maneuver(*1,*2) (Out-of-plane maneuver)	UNLD	2017/9/22 0:41:09	2017/9/22 0:47:17				2250	
		#1	2017/9/22 00:52:27	2017/9/22 00:57:32	0:05:05	0.001	-2.000		0.025
2017/9/23 -9/25	orbit maintenance maneuver(*6) (In-plane maneuver)	UNLD	2017/9/23 23:55:17	2017/9/23 23:57:25				2248	
		#1	2017/9/24 00:15:08	2017/9/24 00:19:47	0:04:39	-1.531	-0.030		-0.032
		#2	2017/9/25 07:46:11	2017/9/25 07:48:44	0:02:33	0.829	0.004		-0.028
		#3	2017/9/25 13:17:16	2017/9/25 13:17:39	0:00:23	0.126	0.001		-0.004
2017/9/27	change of attitude mode(*3)	ON→YS	2017/9/27 8:03:48	2017/9/27 8:34:55					
2018/2/12	change of attitude mode(*3)	YS→ON	2018/2/12 09:48:38	2018/2/12 10:17:31					
2018/3/15 -3/16	orbit maintenance maneuver(*6) (In-plane maneuver)	UNLD	2018/3/15 11:35:15	2018/3/15 11:38:43				2244	
		#1	2018/3/15 11:55:42	2018/3/15 12:01:09	0:05:27	-1.875	0.049		-0.068
		#2	2018/3/15 19:26:06	2018/3/15 19:30:45	0:04:39	1.613	-0.046		-0.034
		#3	2018/3/16 00:08:48	2018/3/16 00:09:02	0:00:14	-0.081	0.002		-0.003
2018/3/23	change of attitude mode(*3)	ON→YS	2018/3/23 07:49:21	2018/3/23 08:20:47					

(\*1)  
The attitude change operation is also carried out in the orbit maintenance maneuver period.  
The orbit maintenance maneuver is basically carried out by ON attitude mode.  
The  $\Delta V$  information shows the planned value.

(\*2)  
Since November 7 2012, the unloading operation is basically performed during the orbit maintenance maneuver operation period.

(\*3)  
The attitude change operation will take about 20 to 30 minutes until finishing the attitude change.  
QZS will rotate very slowly at the change rate of about 0.01 deg/s during the attitude change operation.

(\*4)  
The change from ON to YS attitude mode was conducted by wheel control operation.  
The another attitude change operation was conducted by thruster control.

(\*5)  
This information includes the analysis error.

(\*6)  
The attitude change operation was not carried out in the orbit maintenance maneuver period.  
The  $\Delta V$  information shows the planned value.