

“ONE REVOLUTION” INSPECTION SEQUENCE CHARTS

The following engine “One Revolution” inspection sequence charts are designed to speed up air box inspection of power assembly components and minimize required engine manual barring. The charts show the power assembly checks that can be made during one revolution of the crankshaft.

Select the chart which is applicable to the number of cylinders and the direction of rotation of the engine to be inspected. (The right-hand rotation charts are applicable only to right-hand rotation marine engines.)

The column headings can be interpreted as follows:

FLYWHEEL DEGREES — Flywheel location as indicated by the flywheel pointer.

BLOWER — Indicates the flywheel setting required on a blower-type engine to perform the applicable inspections.

TURBOCHARGED — Indicates the flywheel setting required on a turbocharged engine to perform the applicable inspections.

SET INJECTOR — The number appearing in this column opposite “flywheel degrees” indicates that the injector of that cylinder can be timed.

NO.1 RING — This indicates that the top compression ring of that cylinder can be inspected.

UP — The number appearing in this column indicates that the compression rings in that cylinder are moving upward past the ports of the liner, and can be inspected.

DOWN — The number appearing in this column indicates that the compression rings in that cylinder are moving downward past the ports of the liner, and can be inspected.

PISTON COOLING OIL PIPE — The number appearing in this column indicates that the clearance between the piston cooling oil pipe and the piston carrier can be observed and the alignment gauge can be used.

PISTON — The number appearing in this column indicates that the skirt of the piston in that cylinder can be inspected through the liner ports.

LINER — The number appearing in this column indicates that the piston in that cylinder is at or near bottom dead center, which allows inspection of the liner bore through the liner ports.

**8-CYLINDER ENGINE (LEFT-HAND ROTATION)
"ONE REVOLUTION" INSPECTION SEQUENCE**

FLYWHEEL DEGREES				SET INJECTOR	NO. 1 RING		PISTON COOLING OIL PIPE	PISTON	LINER
BLOWER	STD. TURBO- CHARGED	A.T.D.C.			UP	DOWN			
		+1°	+2°						
356	0	1	2	1					4
18½	22½	23½	24½		7	2			
41	45	46	47	5					8
63½	67½	68½	69½		4	6	4-6	1-7	
86	90	91	92	3					2
108½	112½	113½	114½		8	1			
131	135	136	137	7					6
153½	157½	158½	159½		2	5	2-5	3-8	
176	180	181	182	4					1
198½	202½	203½	204½		6	3			
221	225	226	227	8					5
243½	247½	248½	249½		1	7	1-7	4-6	
266	270	271	272	2					3
288½	292½	293½	294½		5	4			
311	315	316	317	6					7
333½	337½	338½	339½		3	8	3-8	2-5	

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**12-CYLINDER ENGINE (LEFT-HAND ROTATION)
"ONE REVOLUTION" INSPECTION SEQUENCE**

FLYWHEEL DEGREES				SET INJECTOR	NO. 1 RING		PISTON COOLING OIL PIPE	PISTON	LINER
BLOWER	STD. TURBO- CHARGED	A.T.D.C.			UP	DOWN			
		+1°	+2°						
356	0	1	2	1	3	2	3-2	8	
15	19	20	21	12	10	11	10-11	4	
									5
41	45	46	47	7	9	8	9-8	3-6	
									2
66	70	71	72					10-1	
									11
90	94	95	96	4	5	6	5-6	9-12	
									8
116	120	121	122	3	2	1	2-1	7	
135	139	140	141	10	11	12	11-12	5	
									6
161	165	166	167	9	8	7	8-7	2-4	
									1
186	190	191	192				11-3		
									12
210	214	215	216	5	8	4	8-4	8-10	
									7
236	240	241	242	2	1	3	1-3	9	
255	259	260	261	11	12	10	12-10	6	
									4
281	285	286	287	8	7	9	7-9	1-5	
									3
306	310	311	312					12-2	
									10
330	334	335	336	6	4	5	4-5	7-11	
									9
356	0	1	2	1	3	2	3-2	8	

16-CYLINDER ENGINE (LEFT-HAND ROTATION)
"ONE REVOLUTION" INSPECTION SEQUENCE

FLYWHEEL DEGREES				SET INJECTOR	NO. 1 RING		PISTON COOLING OIL PIPE	PISTON	LINER
BLOWER	STD. TURBO- CHARGED	A.T.D.C.			UP	DOWN			
		+1°	+2°						
356	0	1	2	1	6	13	6-13	7-16	4
18½	22½	23½	24½	8	11	2			5
41	45	46	47	9	14	7			12
63½	67½	68½	69½	16	4	10	4-10	1-11	13
86	90	91	92	3	5	15	5-15	8-14	2
108½	112½	113½	114½	6	12	1			7
131	135	136	137	11	13	8			10
153½	157½	158½	159½	14	2	9	2-9	3-12	15
176	180	181	182	4	7	16	7-16	6-13	1
198½	202½	203½	204½	5	10	3			8
221	225	226	227	12	15	6			9
243½	247½	248½	249½	13	1	11	1-11	4-10	16
266	270	271	272	2	8	14	8-14	5-15	3
288½	292½	293½	294½	7	9	4			6
311	315	316	317	10	16	5			11
333½	337½	338½	339½	15	3	12	3-12	2-9	14

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20-CYLINDER ENGINE (LEFT-HAND ROTATION)
"ONE REVOLUTION" INSPECTION SEQUENCE

FLYWHEEL DEGREES			SET INJECTOR	NO. 1 RING		PISTON COOLING OIL PIPE	PISTON	LINER
STD. TURBO- CHARGED	A.T.D.C.			UP	DOWN			
	+1°	+2°						
0	1	2	1	15	3	15-6	4	10
9	10	11	19	17	6	15-6	16	12
36	37	38	8	17	6	17-4	9	3
45	46	47	11	12	4	17-4	14	20
72	73	74	5	12	4	12-9	1	6
81	82	83	18	20	9	12-9	19	13
108	109	110	7	20	9	20-1	8	4
117	118	119	15	13	1	20-1	11	16
144	145	146	2	13	1	13-8	5	9
153	154	155	17	16	8	13-8	18	14
180	181	182	10	16	8	16-5	7	1
189	190	191	12	14	5	16-5	15	19
216	217	218	3	14	5	14-7	2	8
225	226	227	20	19	7	14-7	17	11
252	253	254	6	19	7	19-2	10	5
261	262	263	13	11	2	19-2	12	18
288	289	290	4	11	2	11-10	3	7
297	298	299	16	18	10	11-10	20	15
324	325	326	9	18	10	18-3	6	2
333	334	335	14	15	3	18-3	13	17
360	361	362	1	15	3	15-6	4	10

(MARINE ONLY) 8-CYLINDER ENGINE (RIGHT-HAND ROTATION)
"ONE REVOLUTION" INSPECTION SEQUENCE

FLYWHEEL DEGREES				SET INJECTOR	NO. 1 RING		PISTON COOLING OIL PIPE	PISTON	LINER
BLOWER	STD. TURBO- CHARGED	A.T.D.C.			UP	DOWN			
		+1°	+2°						
356	0	1	2	1					4
18½	22½	23½	24½		8	3			
41	45	46	47	6					7
63½	67½	68½	69½		4	5	4-5	1-8	
86	90	91	92	2					3
108½	112½	113½	114½		7	1			
131	135	136	137	8					5
153½	157½	158½	159½		3	6	3-6	2-7	
176	180	181	182	4					1
198½	202½	203½	204½		5	2			
221	225	226	227	7					6
243½	247½	248½	249½		1	8	1-8	4-5	
266	270	271	272	3					2
288½	292½	293½	294½		6	4			
311	315	316	317	5					8
333½	337½	338½	339½		2	7	2-7	3-6	
356	0	1	2	1					4

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(MARINE ONLY) 12-CYLINDER ENGINE (RIGHT-HAND ROTATION)
"ONE REVOLUTION" INSPECTION SEQUENCE

FLYWHEEL DEGREES				SET INJECTOR	NO. 1 RING		PISTON COOLING OIL PIPE	PISTON	LINER
BLOWER	STD. TURBO- CHARGED	A.T.D.C.			UP	DOWN			
		+1°	+2°						
356	0	1	2	1	2	3	2-3	8	
									9
22	26	27	28	6	5	4	5-4	7-11	
									10
46	50	51	52					2-12	
									3
71	75	76	77	8	9	7	9-7	1-5	
									4
97	101	102	103	11	10	12	10-12	6	
116	120	121	122	2	3	1	3-1	9	
									7
142	146	147	148	5	4	6	4-6	8-10	
									12
166	170	171	172					11-3	
									1
191	195	196	197	9	7	8	7-8	2-4	
									6
217	221	222	223	10	12	11	12-11	5	
236	240	241	242	3	1	2	1-2	7	
									8
262	266	267	268	4	6	5	6-5	9-12	
									11
286	290	291	292					10-1	
									2
311	315	316	317	7	8	9	8-9	3-6	
									5
337	341	342	343	12	11	10	11-10	4	
356	0	1	2	1	2	3	2-3	8	

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(MARINE ONLY) 16-CYLINDER ENGINE (RIGHT-HAND ROTATION)
"ONE REVOLUTION" INSPECTION SEQUENCE

FLYWHEEL DEGREES				SET INJECTOR	NO. 1 RING		PISTON COOLING OIL PIPE	PISTON	LINER
BLOWER	STD. TURBO- CHARGED	A.T.D.C.			UP	DOWN			
		+1°	+2°						
356	0	1	2	1	13	6			4
18½	22½	23½	24½	15	12	3			14
41	45	46	47	10	5	16	5-16	8-13	11
63½	67½	68½	69½	7	4	9	4-9	1-12	6
86	90	91	92	2	14	8			3
108½	112½	113½	114½	13	11	1			16
131	135	136	137	12	6	15	6-15	7-14	9
153½	157½	158½	159½	5	3	10	3-10	2-11	8
176	180	181	182	4	16	7			1
198½	202½	203½	204½	14	9	2			15
221	225	226	227	11	8	13	8-13	5-16	10
243½	247½	248½	249½	6	1	12	1-12	4-9	7
266	270	271	272	3	15	5			2
288½	292½	293½	294½	16	10	4			13
311	315	316	317	9	7	14	7-14	6-15	12
333½	337½	338½	339½	8	2	11	2-11	3-10	5
356	0	1	2	1	13	6			4

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(MARINE ONLY) 20-CYLINDER ENGINE (RIGHT-HAND ROTATION)
"ONE REVOLUTION" INSPECTION SEQUENCE

FLYWHEEL DEGREES			SET INJECTOR	NO. 1 RING		PISTON COOLING OIL PIPE	PISTON	LINER
STD. TURBO- CHARGED	A.T.D.C.			UP	DOWN			
	+1°	+2°						
0	1	2	1	20	7	13-7	5	10
27	28	29	14	20	7	20-5	11	17
36	37	38	9	12	5	20-5	8	2
63	64	65	16	12	5	12-8	19	15
72	73	74	4	17	8	12-8	1	7
99	100	101	13	17	8	17-1	14	18
108	109	110	6	15	1	17-1	9	5
135	136	137	20	15	1	15-9	16	11
144	145	146	3	18	9	15-9	4	8
171	172	173	12	18	9	18-4	13	19
180	181	182	10	11	4	18-4	6	1
207	208	209	17	11	4	11-6	20	14
216	217	218	2	9	6	11-6	3	9
243	244	245	15	19	6	19-3	12	16
252	253	254	7	14	3	19-3	10	4
279	280	281	18	14	3	14-10	17	13
288	289	290	5	16	10	14-10	2	6
315	316	317	11	16	10	16-2	15	20
324	325	326	8	13	2	16-2	7	3
351	352	353	19	13	2	13-7	18	12
0	1	2	1	13	7	13-7	5	10

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FIRING ORDER AND TOP DEAD CENTER FOR 645 ENGINES**LEFT-HAND ROTATION ENGINE****RIGHT-HAND ROTATION ENGINE**

8-CYLINDER		8-CYLINDER	
FIRING ORDER	TOP DEAD CENTER	FIRING ORDER	TOP DEAD CENTER
1	0°	1	0°
5	45°	6	45°
3	90°	2	90°
7	135°	8	135°
4	180°	4	180°
8	225°	7	225°
2	270°	3	270°
6	315°	5	315°
12-CYLINDER		12-CYLINDER	
FIRING ORDER	TOP DEAD CENTER	FIRING ORDER	TOP DEAD CENTER
1	0°	1	0°
12	19°	6	26°
7	45°	8	75°
4	94°	11	101°
3	120°	2	120°
10	139°	5	146°
9	165°	9	195°
5	214°	10	221°
2	240°	3	240°
11	259°	4	266°
8	285°	7	315°
6	334°	12	341°
16-CYLINDER		16-CYLINDER	
FIRING ORDER	TOP DEAD CENTER	FIRING ORDER	TOP DEAD CENTER
1	0°	1	0°
8	22-1/2°	15	22-1/2°
9	45°	10	45°
16	67-1/2°	7	67-1/2°
3	90°	2	90°
6	112-1/2°	13	112-1/2°
11	135°	12	135°
14	157-1/2°	5	157-1/2°
4	180°	4	180°
5	202-1/2°	14	202-1/2°
12	225°	11	225°
13	247-1/2°	6	247-1/2°
2	270°	3	270°
7	292-1/2°	16	292-1/2°
10	315°	9	315°
15	337-1/2°	8	337-1/2°
20-CYLINDER		20-CYLINDER	
FIRING ORDER	TOP DEAD CENTER	FIRING ORDER	TOP DEAD CENTER
1	0°	1	0°
19	9°	14	27°
8	36°	9	36°
11	45°	16	63°
5	72°	4	72°
18	81°	13	99°
7	108°	6	108°
15	117°	20	135°
2	144°	3	144°
17	153°	12	171°
10	180°	10	180°
12	189°	17	207°
3	216°	2	216°
20	225°	15	243°
6	252°	7	252°
13	261°	18	279°
4	288°	5	288°
16	297°	11	315°
9	324°	8	324°
14	333°	19	351°

NOTE

Locomotive, drilling rig, and power generating installations are available only with left-hand rotating engines.

Only marine and industrial installations are available with either a left or right-hand rotating engine.