

Selection of the flange type and core shaft type indexing drives

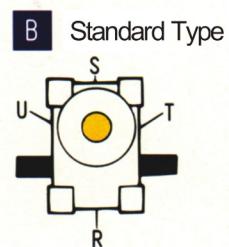
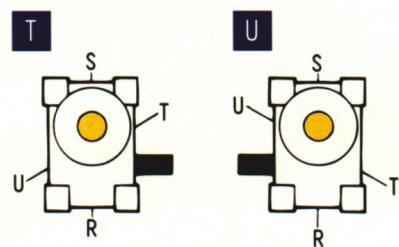
A B C - D - E F G - H I
 EXAMPLE : 8D F 8 - 120 - S L B - 1 R

A	Distance between shafts	2.5D, 4.5D, 6D, 7D, 8D, 11D, 14D, 18D EXP: 6D Distance between shafts=60mm
B	Type of indexing drive	F (Flange type) S (Core shaft type) FE (Swing flange type) FH (Hollow flange) SE (Swing type shaft)
C	Number of divided portions	2, 3, 4, 6, 8, 10, 12, 16, 24, 32... Swing angle (5° ~ 90°) Notes: 2-12 indexing is 1DWELL (R1 single guiding stroke) 16 indexing is 2DWELL (R2 double guiding stroke) above 16, it will be R3, R4... etc.
D	Driving angle of the curve of the input shaft	90, 120, 180, 270 FE type SE type with additional timing diagram attached
E	Cam curve	S (M.S. Curve) V (M.C.V. Curve) T (M.T. Curve)
F	Direction of rotation	L (left rotation) standard type N (allow left and right rotation) R (right rotation)
G	Direction of the input shaft	T (input from T-side) B (input from both sides) standard type U (input from U-side)
H	Installation and fixation	Refer to the figure below (W, V, U, T, R, S): 6 planes (Figure 1, 5 are the standard type)
I	Planes of oil hole	Standard plane is R, S, U plane

Direction of rotation

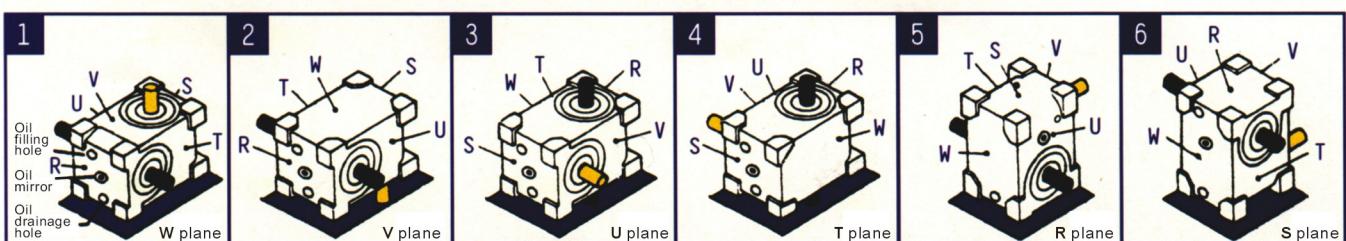


Direction of the input shaft

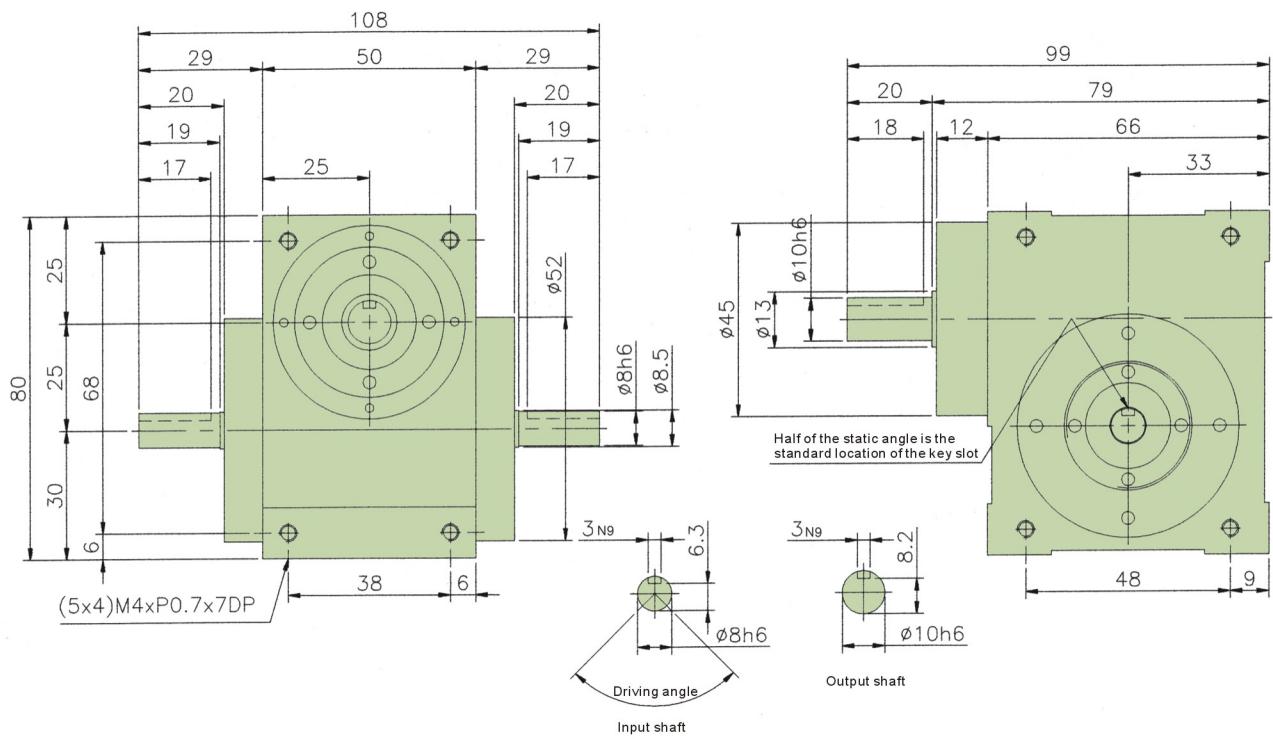


Datum for installation and the location of oil drainage hole

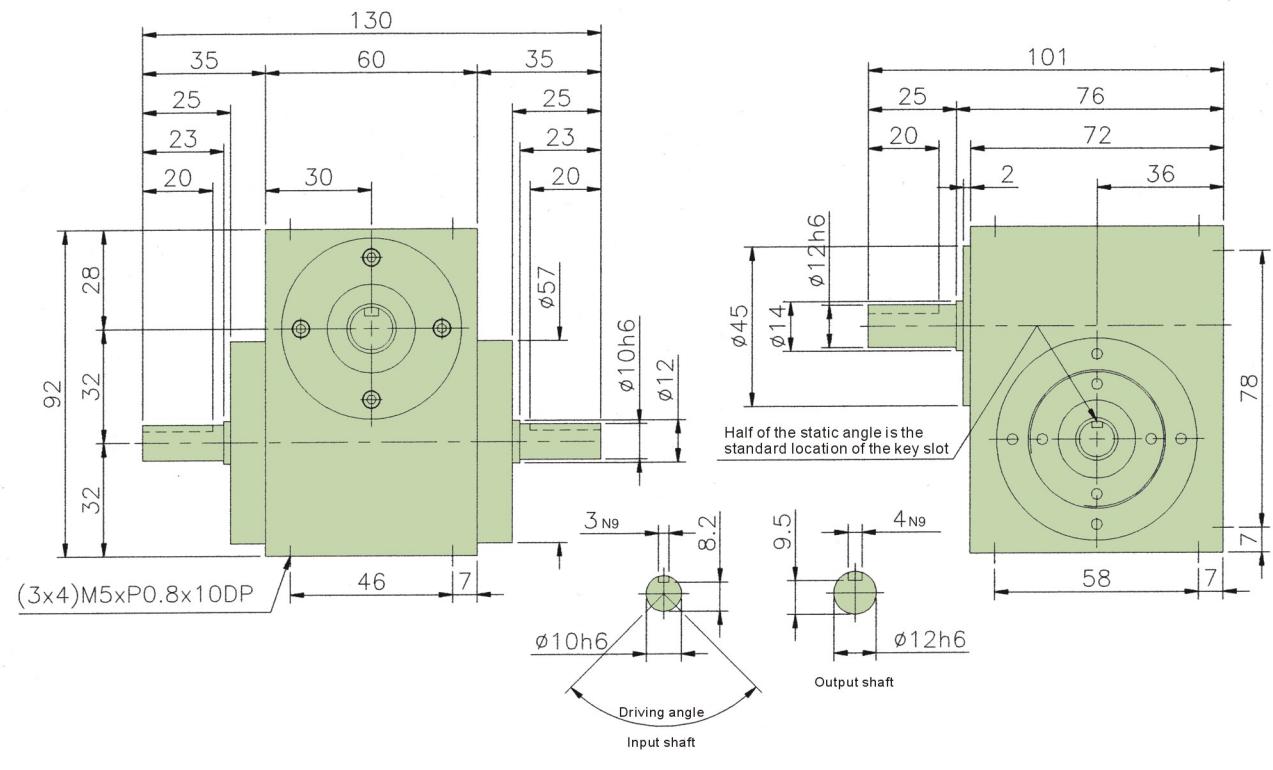
■ : Input shaft ■ : Output shaft



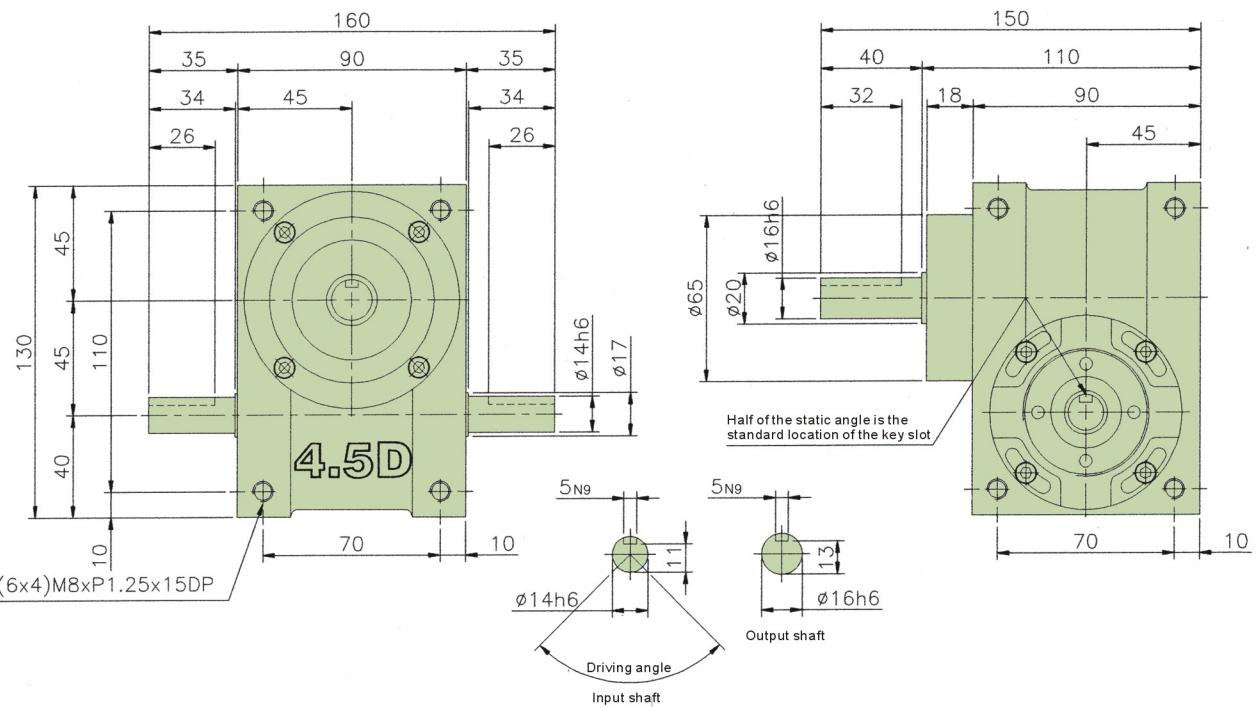
2.5DS



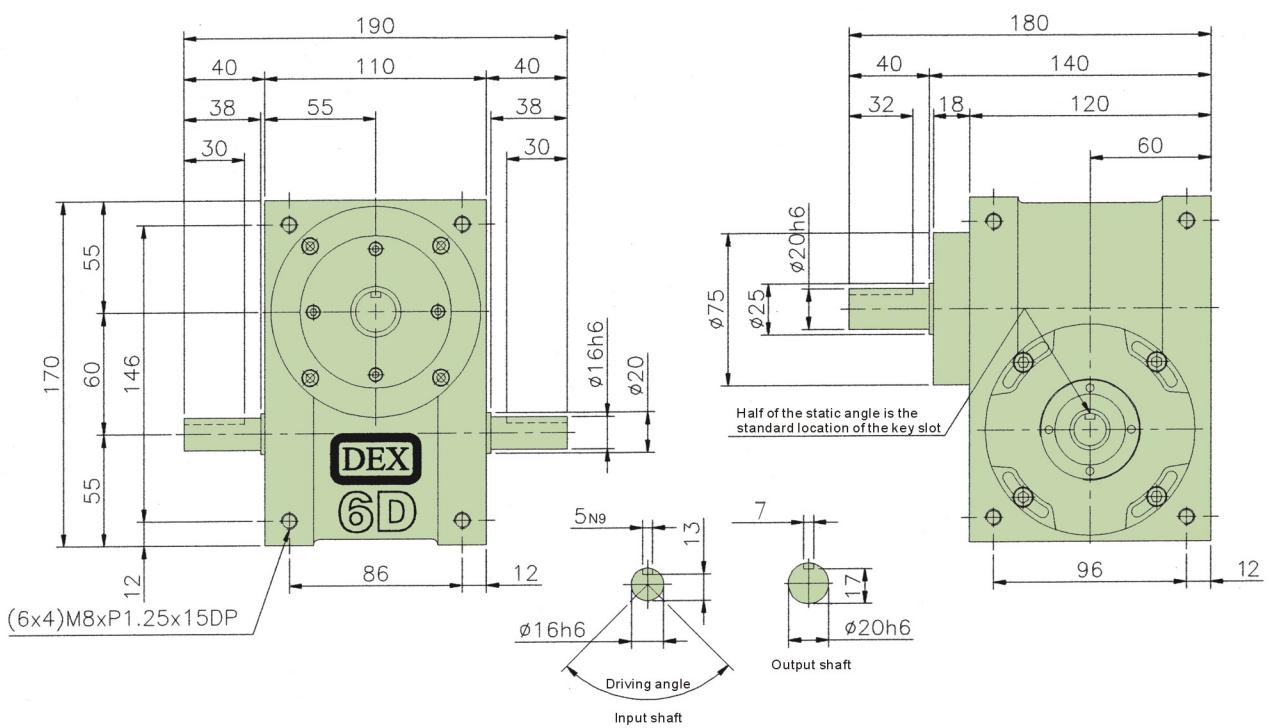
3.2DS



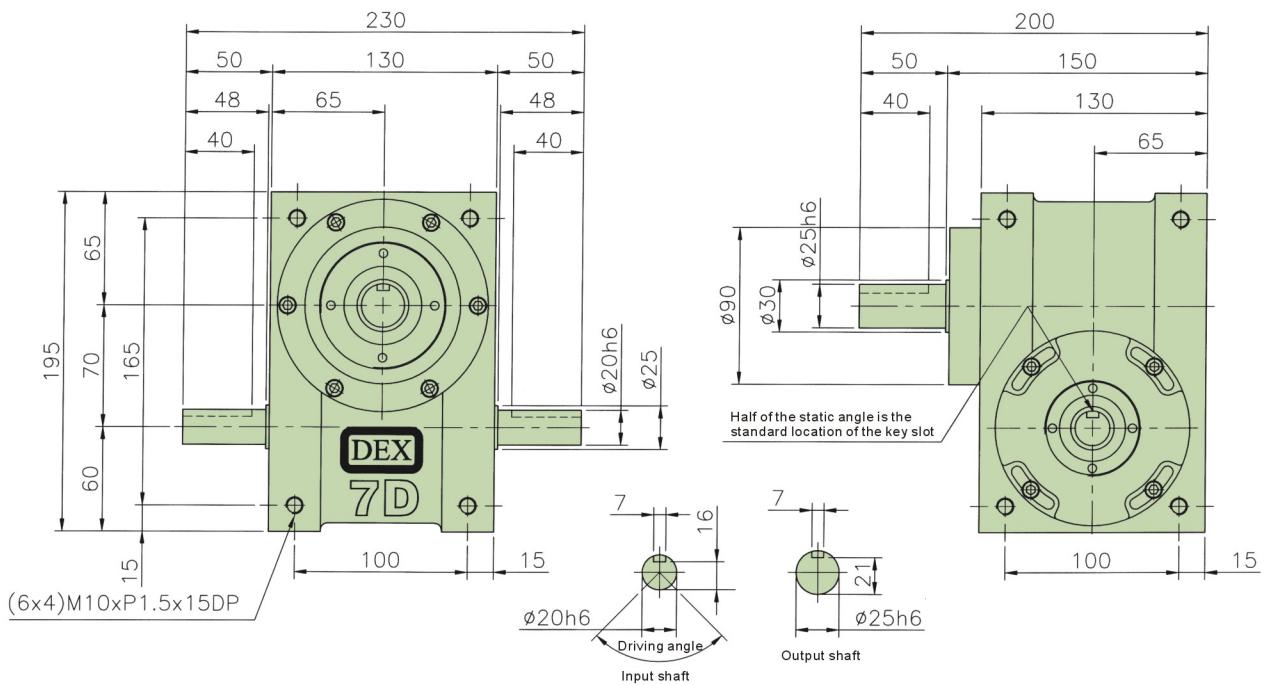
4.5DS



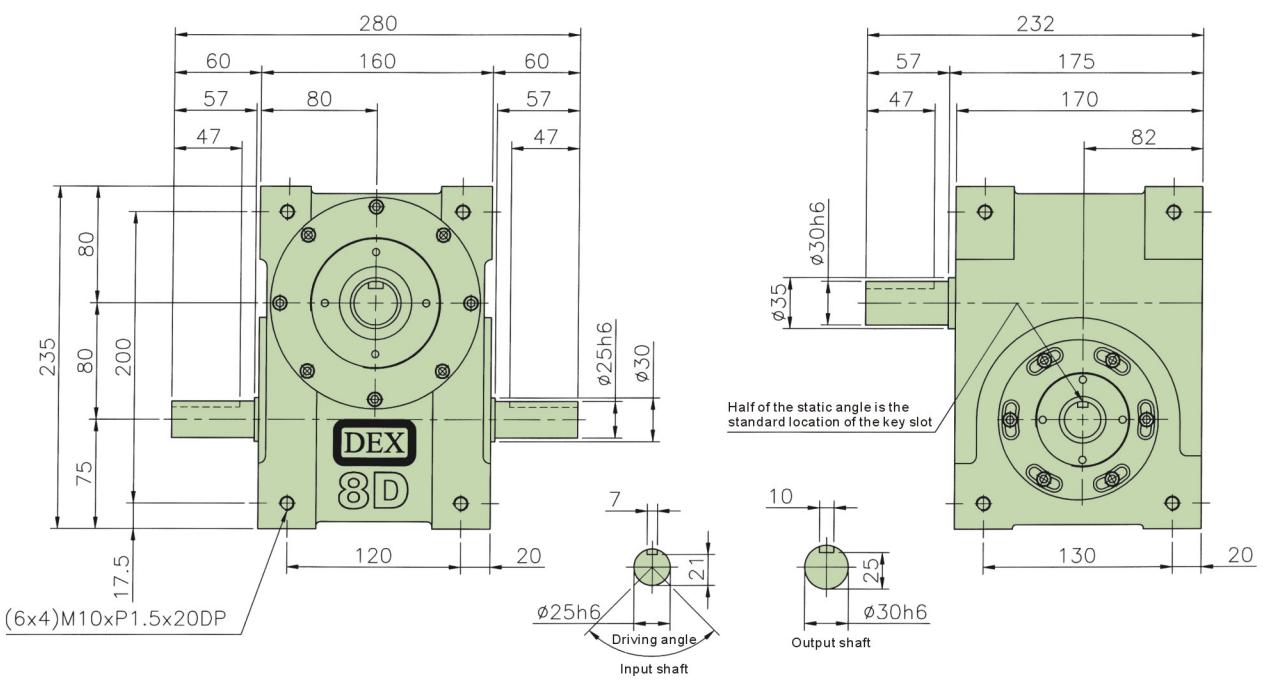
6DS



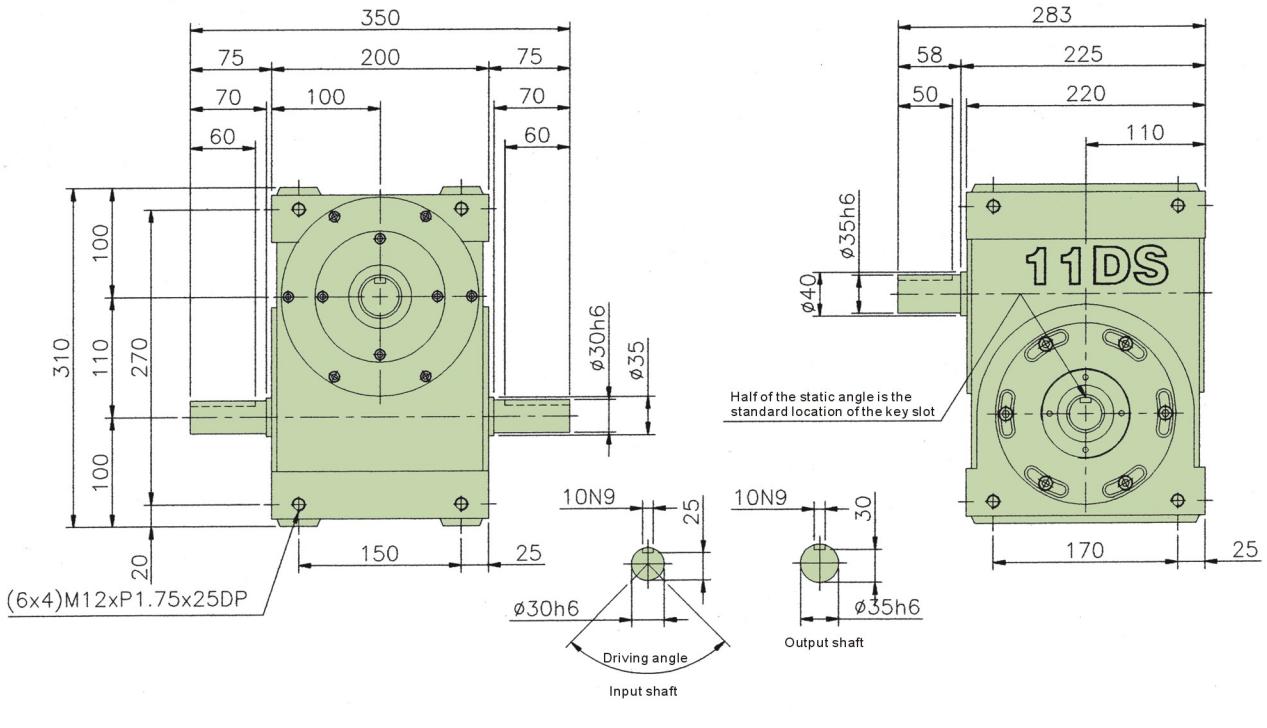
7DS



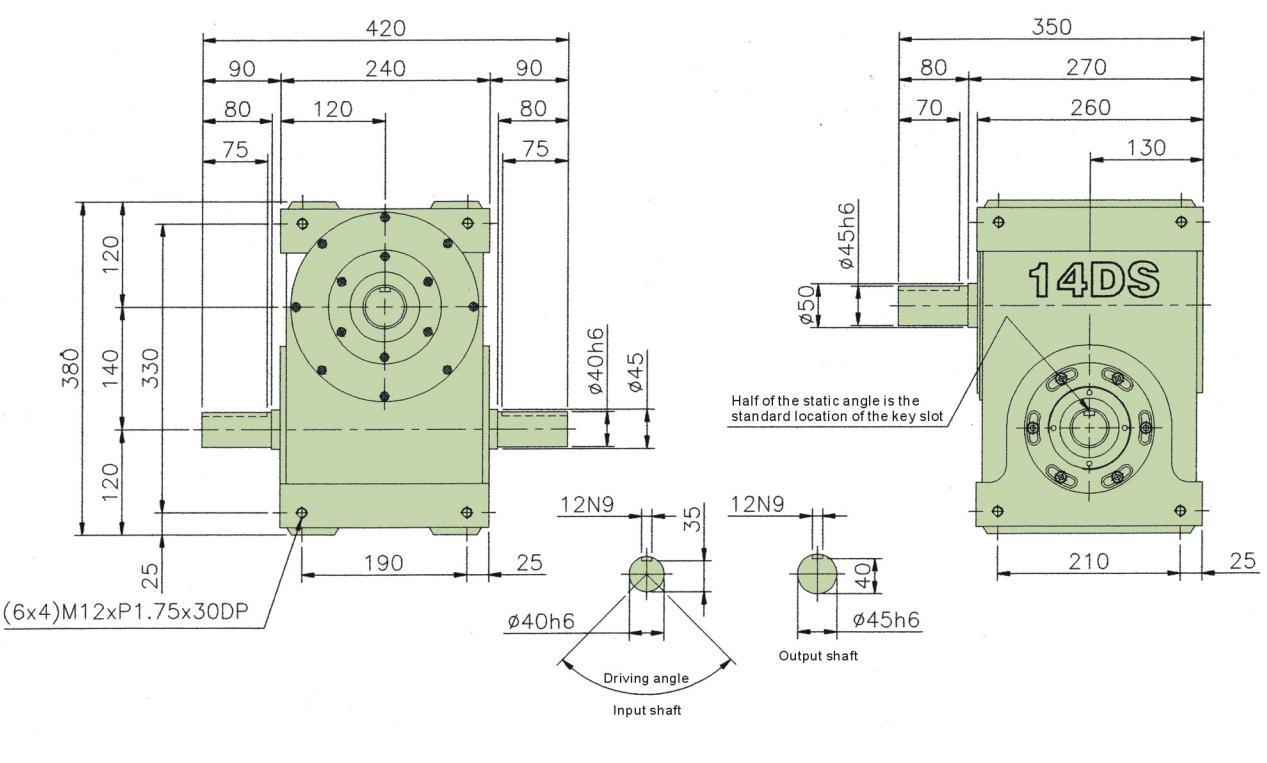
8DS



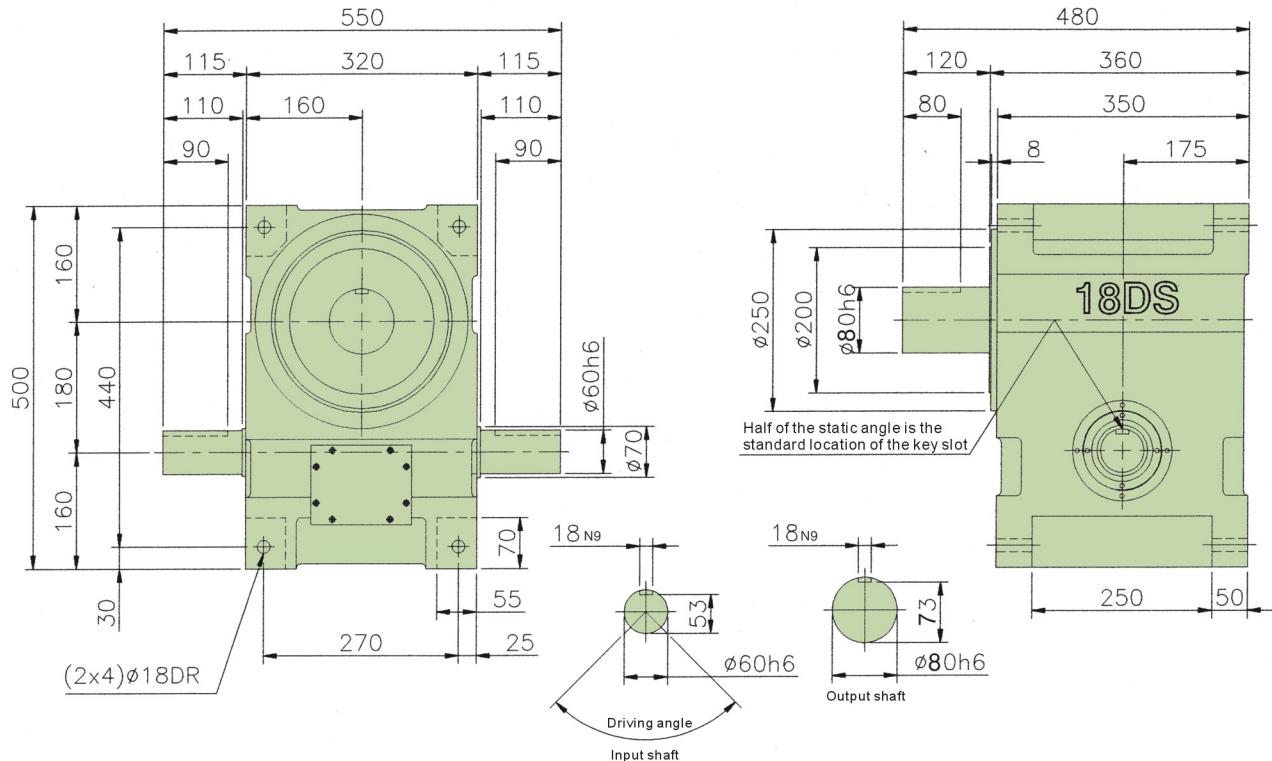
11DS



14DS



18DS



Technical parameters 2.5DS

Note 1: GD² of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	15	Allowable radial loading of the input shaft	C3	kgf	10	GD ² of the input shaft (Note 1)	C6	kgf·m ²	9.6x10 ⁻⁵
Allowable axial loading of the output shaft	C2	kgf	20	Allowable axial loading of the input shaft	C4	kgf	15	Accuracy of positioning indexing		sec.	±75
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	2	Weight		Kg	1.0

Technical parameters 3.2DS

Note 1: GD² of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	20	Allowable radial loading of the input shaft	C3	kgf	18	GD ² of the input shaft (Note 1)	C6	kgf·m ²	30x10 ⁻⁴
Allowable axial loading of the output shaft	C2	kgf	30	Allowable axial loading of the input shaft	C4	kgf	20	Accuracy of positioning indexing		sec.	±75
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	3	Weight		Kg	1.4

Technical parameters 4.5DS

Note 1: GD² of the input shaft is the value during its motion in the dwelling range.
 Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	80	Allowable radial loading of the input shaft	C3	kgf	85	GD ² of the input shaft (Note 1)	C6	kgf-m ²	3.2x10 ⁻⁴
Allowable axial loading of the output shaft	C2	kgf	72.5	Allowable axial loading of the input shaft	C4	kgf	75	Accuracy of positioning indexing		sec.	±60
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	4	Weight		Kg	6

Technical parameters 6DS

Note 1: GD² of the input shaft is the value during its motion in the dwelling range.
 Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	180	Allowable radial loading of the input shaft	C3	kgf	100	GD ² of the input shaft (Note 1)	C6	kgf-m ²	1.9x10 ⁻³
Allowable axial loading of the output shaft	C2	kgf	150	Allowable axial loading of the input shaft	C4	kgf	95	Accuracy of positioning indexing		sec.	±45
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	6	Weight		Kg	10

Technical parameters 7DS

Note 1: GD² of the input shaft is the value during its motion in the dwelling range.
 Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	220	Allowable radial loading of the input shaft	C3	kgf	150	GD ² of the input shaft (Note 1)	C6	kgf-m ²	1.9x10 ⁻³
Allowable axial loading of the output shaft	C2	kgf	220	Allowable axial loading of the input shaft	C4	kgf	110	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	9.5	Weight		Kg	16

Technical parameters 8DS

Note 1: GD² of the input shaft is the value during its motion in the dwelling range.
 Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	220	Allowable radial loading of the input shaft	C3	kgf	210	GD ² of the input shaft (Note 1)	C6	kgf-m ²	1.9x10 ⁻³
Allowable axial loading of the output shaft	C2	kgf	220	Allowable axial loading of the input shaft	C4	kgf	190	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	18.5	Weight		Kg	29

Technical parameters 11DS

Note 1: GD² of the input shaft is the value during its motion in the dwelling range.
 Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	500	Allowable radial loading of the input shaft	C3	kgf	360	GD ² of the input shaft (Note 1)	C6	kgf-m ²	2.8x10 ⁻²
Allowable axial loading of the output shaft	C2	kgf	550	Allowable axial loading of the input shaft	C4	kgf	290	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	32	Weight		Kg	51

Technical parameters 14DS

Note 1: GD² of the input shaft is the value during its motion in the dwelling range.
 Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	730	Allowable radial loading of the input shaft	C3	kgf	440	GD ² of the input shaft (Note 1)	C6	kgf-m ²	0.11
Allowable axial loading of the output shaft	C2	kgf	860	Allowable axial loading of the input shaft	C4	kgf	560	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	75	Weight		Kg	120

Technical parameters 18DS

Note 1: GD² of the input shaft is the value during its motion in the dwelling range.
 Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	1200	Allowable radial loading of the input shaft	C3	kgf	590	GD ² of the input shaft (Note 1)	C6	kgf-m ²	0.39
Allowable axial loading of the output shaft	C2	kgf	1500	Allowable axial loading of the input shaft	C4	kgf	1045	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	147	Weight		Kg	220

Notes on the use of lubricant

- After installation and fixation of the indexing drive, the exhaust cap on the oil-filling hole should be replaced (attached to the core of the input shaft) in order to release high pressure generated by thermal expansion during the operation.
- This indexing drive should use:
CPC #90 gear oil, Mobil #630 gear oil, or Shell #220 gear oil.
- Period for oil change:
1000 hours (about half year) after the first operation.
Change oil once a year after that.



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Stop S	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)		
				Index Per Min N (rpm)										
				50	100	150	200	300	500	700				
2	180	2.5D	0.12	0.03	0.03	0.03	0.02	0.02	0.02		0.04	6		
		2.5D	0.12	0.03	0.02	0.02	0.01	0.01	0.01		0.04	6		
		4.5D	1.22	0.48	0.39	0.35	0.32	0.28	0.24		0.12	12		
		6D	4.34	1.41	1.15	1.02	0.93	0.83	0.71	0.64	0.22	14		
		7D	11.3	4.3	3.5	3.1	2.9	2.5	2.2	2.0	0.50	19		
		8D	20.2	7.8	6.4	5.6	5.2	4.6	3.9	3.6	0.80	22		
		11D	49.8	19.0	15.4	13.7	12.5	11.1	9.5		1.60	30		
		14D	80.4	28.6	23.2	20.6	18.9	16.7			2.30	35		
		18D	175.4	62.9	51.1	45.2	41.5	36.7			4.10	47		
		25D	377.2	136.1	110.5	97.9	89.9				7.20	60		
3	270	2.5D	0.12	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.04	6		
		4.5D	1.22	0.58	0.47	0.42	0.38	0.34	0.29		0.12	12		
		6D	4.34	1.70	1.38	1.22	1.12	0.99	0.85	0.77	0.22	14		
		7D	11.3	5.2	4.2	3.7	3.4	3.0	2.6	2.4	0.50	19		
		8D	20.2	9.4	7.7	6.8	6.2	5.5	4.7		0.80	22		
		11D	49.8	22.8	18.5	16.4	15.0	13.3	11.2		1.60	30		
		14D	80.4	34.3	27.9	24.7	24.7	20	18.4		2.30	35		
		18D	175.4	75.4	61.3	54.3	19.8	44.1			4.10	47		
		25D	377.2	16.3	132.7	117.5	107.8				7.20	60		
		2.5D	0.54	0.18	0.14	0.12	0.12	0.11	0.11	0.10	0.04	8		
4	180	4.5D	3.10	1.23	1.00	0.88	0.81	0.72	0.61	0.56	0.12	14		
		6D	12.26	4.30	3.49	30.9	2.84	2.51	2.16	1.95	0.28	16		
		7D	15.5	5.9	4.8	4.30	3.90	3.50	3.00	2.70	0.40	22		
		8D	25.3	9.30	7.6	6.70	6.20	5.50	4.7	4.20	0.70	22		
		11D	61.8	22.5	18.3	16.2	14.8	13.1	11.3		1.30	30		
		14D	97.6	33.5	27.2	24.1	22.1	19.6	16.8		1.90	35		
		18D	251.9	93.7	76.1	67.4	61.8	54.7			4.00	52		
		25D	588.0	230.5	187.3	165.8	152.1	134.7			7.00	70		
		2.5D	0.14	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.03	6		
		4.5D	1.17	0.53	0.43	0.38	0.35	0.31	0.27		0.09	10		
6	90	6D	2.06	0.81	0.66	0.59	0.54	0.48	0.41		0.13	12		
		7D	12.6	5.70	4.60	4.10	3.80	3.30	2.9	2.60	0.40	16		
		8D	21.7	10.1	8.20	7.30	6.70	5.90	5.1	4.60	0.70	19		
		11D	48.2	22.4	18.2	16.1	14.8	13.1	11.2		1.20	26		
		14D	74.5	32.4	26.4	23.3	21.4	19.0			1.70	30		
		18D	149.2	66.0	53.6	47.5	43.5	38.6			3.00	40		
		25D	327.0	152.3	123.7	109.6	100.5				5.30	52		
		2.5D	0.17	0.06	0.06	0.04	0.04	0.04	0.03	0.02	0.04	6		
		4.5D	1.75	0.71	0.57	0.51	0.47	0.41	0.35	0.32	0.10	12		
		6D	5.42	1.90	1.54	1.36	1.25	1.11	0.95	0.86	0.18	14		
2	270	7D	14.8	5.50	4.50	3.90	3.60	3.20	2.70	2.50	0.30	16		
		8D	25.7	9.70	7.90	7.0	6.4	5.70	4.90	4.40	0.60	19		
		11D	56.9	21.5	17.5	14.2	12.6	11.5	9.80		1.00	26		
		14D	86.5	31.0	25.1	22.3	20.4	18.1	15.5		1.40	30		
		18D	239.2	93.4	75.9	67.2	61.6	54.6	46.8		3.20	47		
6	90	25D	528.5	210.1	170.7	151.1	138.6	122.8			5.50	60		
		2.5D	0.12	0.06	0.04	0.04	0.03	0.03	0.03	0.02	0.05	6		
		4.5D	1.22	0.79	0.64	0.57	0.52	0.46			0.12	12		
		6D	4.34	2.32	1.88	1.67	1.53	1.35	1.16		0.22	14		
		7D	12.5	8.20	6.70	5.90	5.40	4.80	4.1		0.50	22		
4	180	8D	20.2	12.9	10.5	9.30	8.50	7.50	6.40		0.80	22		



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Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)		
				Index Per Min N (rpm)										
				50	100	150	200	300	500	700				
6	90 1DWELL	11D	49.8	31.1	25.3	22.4	20.6	18.2			1.60	30		
		14D	80.4	46.9	38.1	33.7	30.9	27.4			2.30	35		
		18D	175.4	103.1	83.7	74.1	68.0				4.10	47		
		25D	377.2	223.1	181.2	160.5					7.20	60		
	120	2.5D	0.52	0.25	0.20	0.17	0.15	0.14	0.13	0.12	0.04	8.5		
		4.5D	2.92	1.68	1.37	1.21	1.11	0.98	0.84	0.76	0.12	14		
		6D	11.69	5.77	4.83	4.27	3.92	3.47	2.98	2.69	0.30	16		
		7D	14.6	8.20	6.60	5.90	5.40	4.80	4.10	3.70	0.50	22		
		8D	35.1	20.0	16.3	14.4	13.2	11.7	10.0	9.10	0.90	26		
		11D	60.7	32.9	26.7	23.7	21.7	19.2	16.5		1.40	32		
		14D	115.7	60.3	49.0	43.4	39.8	35.2			2.30	40		
		18D	238.5	129.0	104.8	92.8	85.1	75.3			4.20	52		
		25D	550.0	315.5	256.3	226.9	208.3				7.40	70		
		2.5D	0.62	0.26	0.20	0.20	0.17	0.15	0.14	0.13	0.03	8.5		
	180	4.5D	3.50	1.63	1.32	1.17	1.08	0.95	0.82	0.74	0.11	14		
		6D	13.43	5.64	4.58	4.06	3.72	3.30	2.83	2.56	0.26	16		
		7D	17.2	7.80	6.40	5.60	5.20	4.60	3.90	3.60	0.40	22		
		8D	41.4	19.3	15.7	13.9	12.7	11.3	9.70	8.70	0.80	26		
		11D	85.9	39.3	31.9	28.3	25.9	23.0	19.7	17.8	1.40	35		
		14D	133.0	57.3	46.5	41.2	37.8	33.4	28.7		2.00	40		
		18D	375.5	176.6	143.5	127.0	116.5	103.2	88.5		4.30	60		
		25D	873.9	425.4	345.5	305.9	280.7	248.5			8.00	80		
		2.5D	0.70	0.25	0.21	0.18	0.16	0.15	0.14	0.12	0.02	8.5		
		4.5D	3.90	1.52	1.24	1.10	1.01	0.89	0.76	0.69	0.10	14		
	270	6D	14.5	5.19	4.22	3.73	3.42	3.03	2.60	2.35	0.23	16		
		7D	18.8	7.30	5.90	5.20	4.80	4.20	3.60	3.30	0.40	22		
		8D	45.6	17.9	14.6	12.9	11.8	10.8	9.00	8.10	0.70	26		
		11D	94.1	36.4	29.6	26.2	24.0	21.3	18.3	16.5	1.30	35		
		14D	143.6	52.7	42.8	37.9	34.8	30.8	26.4	23.9	1.80	40		
		18D	414.0	164.2	133.4	118.1	108.4	96.0	82.3	74.4	3.8	60		
		25D	995.3	402.0	326.6	289.1	265.2	234.8	201.5		7.1	80		
		2.5D	0.14	0.07	0.06	0.05	0.05	0.04	0.04	0.03	0.03	6		
		4.5D	1.50	0.96	0.78	0.69	0.63	0.56	0.48		0.09	10		
		6D	2.06	1.11	0.90	0.80	0.73	0.65	0.56		0.13	12		
8	90	7D	12.6	6.90	6.30	5.60	5.20	4.60	3.90	3.50	0.40	16		
		8D	21.5	11.4	11.4	10.2	9.40	8.30	7.10		0.70	19		
		11D	48.2	30.6	24.8	22.0	20.2	17.9			1.20	26		
		14D	74.5	44.3	36.0	31.9	29.2	25.9			1.70	30		
		18D	149.2	90.2	73.2	64.8	59.5				3.00	40		
		25D	327.0	208.1	169.0	149.7					5.30	52		
		2.5D	0.16	0.07	0.05	0.05	0.05	0.05	0.04	0.04	0.03	6		
		4.5D	2.15	1.25	1.02	0.90	0.83	0.73	0.63	0.57	0.10	12		
		6D	5.29	2.65	2.15	1.91	1.75	1.55	1.33	1.20	0.18	14		
		7D	14.2	7.40	6.20	5.50	5.00	4.40	3.8	3.50	0.40	16		
	120	8D	24.7	11.9	11.0	9.70	8.90	7.90	6.8	6.10	0.60	19		
		11D	54.7	29.9	24.3	21.5	19.7	17.5	15.0		1.10	26		
		14D	86.6	45.6	37.1	32.8	30.1	26.7	22.9		1.60	32		
		18D	167.3	87.6	71.2	63.0	57.8	51.2			2.80	40		
		25D	503.2	290.2	235.7	208.7	191.4				5.70	60		

Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)		
				Index Per Min N (rpm)										
				50	100	150	200	300	500	700				
8	180	2.5D	0.1875	0.085	0.0625	0.0625	0.054	0.054	0.035	0.035	0.025	6		
		4.5D	2.44	1.18	0.96	0.85	0.78	0.69	0.59	0.54	0.09	12		
		6D	5.66	2.43	1.97	1.75	1.60	1.42	1.22	1.10	0.17	14		
		7D	16.8	8.00	6.50	5.80	5.30	4.70	4.00	3.60	0.30	19		
		8D	30.4	14.7	11.9	10.5	9.70	8.60	7.30	6.60	0.60	22		
		11D	74.3	35.7	29.0	25.7	23.6	20.9	17.9	16.2	1.10	30		
		14D	113.4	51.4	41.8	37.0	33.9	30.0	25.8	23.3	1.60	35		
		18D	257.3	121.4	98.6	87.3	80.1	70.9	60.9		2.90	47		
		25D	739.7	373.0	303.0	268.3	246.1	217.9			5.80	70		
	270	2.5D	0.72	0.29	0.23	0.1875	0.1875	0.19	0.16	0.143	0.03	8		
		4.5D	2.62	1.09	0.88	0.78	0.72	0.63	0.54	0.49	0.08	12		
		6D	5.85	2.18	1.77	1.57	1.44	1.28	1.09	0.99	0.16	14		
		7D	17.8	7.30	5.90	5.20	4.80	4.30	3.70	3.30	0.30	19		
		8D	32.3	13.4	10.9	9.60	8.80	7.80	6.70	6.10	0.60	22		
		11D	79.0	32.6	26.5	23.4	21.5	19.0	16.3	14.8	1.00	30		
		14D	118.9	46.4	37.9	33.5	30.7	27.2	23.4	21.1	1.40	35		
10	90	18D	320.6	134.8	109.5	96.9	88.9	78.7	67.6	61.1	3.00	52		
		25D	802.2	344.0	279.4	274.4	226.9	200.9	172.4		5.30	70		
		2.5D	0.18	0.08	0.07	0.065	0.06	0.055	0.05	0.045	0.03	6		
		4.5D	1.25	0.84	0.68	0.59	0.50	0.43	0.33		0.08	9		
		6D	1.76	0.94	0.76	0.68	0.62	0.55	0.47		0.10	10		
		7D	5.00	3.00	2.50	2.20	2.00	1.80	1.50		0.30	14		
		8D	22.7	8.40	8.40	8.30	8.20	8.00	7.10	6.40	0.60	16		
		11D	36.2	22.3	18.1	16.1	14.7	13.1			0.90	22		
		14D	46.0	26.0	21.1	18.7	17.2	15.2			1.10	22		
	120	18D	108.7	63.2	51.4	45.5	41.7				2.20	32		
		25D	312.7	198.4	161.1	142.7					4.30	47		
		2.5D	0.17	0.09	0.08	0.07	0.065	0.06	0.055	0.05	0.03	6		
		4.5D	1.34	0.90	0.72	0.67	0.62	0.54	0.41		0.09	9		
		6D	2.33	1.18	0.96	0.85	0.78	0.69	0.59	0.54	0.12	12		
		7D	5.50	2.90	2.40	2.10	1.90	1.70	1.50	1.30	0.30	14		
		8D	25.0	8.80	8.65	8.5	8.4	7.80	6.90	6.20	0.60	16		
	180	11D	39.7	21.4	17.4	15.4	14.2	12.5	10.8		0.80	22		
		14D	73.8	38.7	31.4	27.8	25.5	22.6	19.4		1.20	26		
		18D	114.1	76.8	62.4	55.2	50.7	44.9			2.30	35		
		25D	410.8	235.1	190.9	169.1	155.1				4.50	52		
		2.5D	0.20	0.09	0.08	0.065	0.065	0.05	0.045	0.04	0.03	6		
		4.5D	1.46	0.88	0.72	0.63	0.52	0.40	0.31		0.09	9		
		6D	2.44	1.07	0.87	0.77	0.71	0.63	0.54	0.48	0.11	12		
	270	7D	5.90	2.70	2.20	1.90	1.80	1.60	1.30	1.20	0.20	14		
		8D	27.2	9.20	9.10	9.00	8.30	7.40	6.30	5.70	0.50	16		
		11D	42.9	19.7	16.0	14.2	13.0	11.5	9.90	8.90	0.70	22		
		14D	79.5	35.6	28.9	25.6	23.5	20.8	17.8	16.1	1.10	26		
		18D	191.7	90.7	73.7	65.3	59.9	53.0	45.5		2.40	40		
		25D	453.9	218.8	177.7	157.4	144.4	127.8			4.00	52		
		2.5D	0.20	0.085	0.071	0.065	0.06	0.055	0.05	0.04	0.03	6		
		4.5D	1.58	0.86	0.70	0.60	0.49	0.37	0.28		0.10	9		
		6D	2.50	0.96	0.78	0.69	0.63	0.56	0.48	0.43	0.10	12		
		7D	6.10	2.40	2.00	1.70	1.60	1.40	1.20	1.10	0.20	14		
		8D	28.3	9.40	9.30	8.20	7.5	6.70	5.70	5.20	0.50	16		



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Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)		
				Index Per Min N (rpm)										
				50	100	150	200	300	500	700				
10	270	11D	44.6	17.8	14.5	12.8	11.8	10.4	8.9	8.1	0.70	22		
		14D	82.5	32.1	26.0	23.1	21.2	18.7	16.1	14.5	1.00	26		
		18D	198.6	81.8	66.4	58.8	54.0	47.8	41.0	37.1	2.20	40		
		25D	643.9	282.8	229.7	203.4	186.6	165.2			4.40	60		
12	90	6D	0.94	0.49	0.48	0.35	0.30	0.29			0.10	8.5		
		7D	2.70	1.60	1.30	1.10	1.10	0.90			0.20	12		
		8D	24.3	8.70	8.50	8.35	8.20	8.00			0.60	16		
		11D	35.5	16.8	16.8	15.9	14.6	12.9			0.80	19		
		14D	48.3	27.9	22.7	20.1	18.4	16.3			1.00	22		
		18D	110.9	65.7	53.3	47.2	43.3	38.4			2.00	30		
		25D	246.7	151.7	123.3	109.1					3.40	40		
	120	4.5D	1.42	0.90	0.74	0.64	0.58	0.51			0.09	8.5		
		6D	1.91	0.96	0.78	0.69	0.63	0.56	0.48	0.43	0.09	10		
		7D	2.80	1.50	1.20	1.10	1.00	0.90	0.80		0.20	12		
		8D	26.1	9.50	9.00	8.50	7.80	6.70	5.30	6.80	0.50	16		
		11D	37.8	17.5	17.1	15.2	13.9	12.3	10.6		0.70	19		
		14D	51.4	26.4	21.5	19.0	17.4	15.4			0.90	22		
		18D	118.2	62.2	50.5	44.7	41.0	36.3			1.90	30		
		25D	367.6	211.5	171.8	152.1	139.6				3.70	47		
	180	4.5D	1.57	0.80	0.62	0.54	0.43	0.39			0.10	8.5		
		6D	1.97	0.86	0.70	0.62	0.57	0.50	0.43	0.39	0.10	10		
		7D	3.00	1.40	1.10	1.00	0.90	0.80	0.70	0.60	0.20	12		
		8D	27.8	9.40	9.25	9.10	9.00	8.00	6.80	6.20	0.50	16		
		11D	40.9	18.1	15.6	13.9	12.7	11.3	9.70	8.70	0.70	19		
		14D	79.3	37.2	30.2	26.7	24.5	21.7	18.0	16.8	1.00	26		
		18D	157.1	75.3	61.2	54.2	49.7	44.0	37.7		2.00	35		
		25D	395.5	194.3	157.8	139.7	128.2	113.5			3.40	47		
	270	4.5D	1.68	0.68	0.52	0.48	0.41	0.36			0.10	8.5		
		6D	2.01	0.77	0.63	0.55	0.51	0.45	0.39	0.35	0.10	10		
		7D	3.10	1.20	1.00	0.90	0.80	0.70	0.60	0.60	0.20	12		
		8D	28.6	9.40	9.10	8.80	8.10	7.20	6.10	5.60	0.50	16		
		11D	46.4	20.0	16.2	14.4	13.2	11.7	10.0	9.00	0.70	22		
		14D	81.2	33.3	27.1	24.0	22.0	19.5	16.7	15.1	1.00	26		
		18D	161.3	67.5	54.8	48.6	44.6	39.4	33.8	30.6	1.90	35		
		25D	484.4	214.6	174.3	154.3	141.6	125.3	107.5		3.70	52		
16	1DWELL	8D	4.70	3.0	2.40	2.10	2.00	1.70			0.30	12		
		11D	36.2	12.5	12.5	12.5	12.5	12.5	11.4		0.70	16		
		14D	46.3	20.8	20.8	19.6	17.9	15.9			0.90	19		
		18D	65.9	37.6	30.5	27.0	24.8				1.40	22		
		25D	178.6	108.6	88.2	78.1					2.50	32		
	2DWELL (R2)	6D	2.06	1.11	0.90	1.80	0.73	0.65			0.13	12		
		7D	12.6	6.90	6.30	5.60	5.20	4.60	3.90		0.40	16		
		8D	21.5	11.4	11.4	10.2	9.40	8.30			0.70	19		

DEX

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Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)		
				Index Per Min N (rpm)										
				50	100	150	200	300	500	700				
16	120 1DWELL	8D	5.00	2.80	2.30	2.00	1.80	1.60	1.40		0.3	12		
		11D	38.1	12.8	12.8	12.8	12.8	12.5	10.7		0.7	16		
		14D	48.1	21.1	20.6	18.3	16.8	14.8	12.7		0.8	19		
		18D	68.5	35.2	28.6	25.3	23.2	20.5			1.40	22		
		25D	228.5	128.1	104.0	92.1	84.5				2.70	35		
	120 2DWELL (R2)	4.5D	1.67	0.98	0.79	1.70	0.64	0.57	0.49		0.10	12		
		6D	5.29	2.65	2.15	1.91	1.75	1.55	1.33	1.20	0.18	14		
		7D	15.1	8.60	7.00	6.20	5.60	5.00	4.30	3.90	0.40	16		
		8D	24.8	12.2	11.4	10.1	9.20	8.20	7.00		0.60	19		
	180 1DWELL	8D	5.20	2.50	2.00	1.80	1.70	1.50	1.30	1.10	0.30	12		
		11D	39.6	13.1	13.1	13.1	12.7	11.3	9.70	8.70	0.60	16		
		14D	49.4	21.4	18.5	16.4	15.0	13.3	11.4	10.3	0.80	19		
		18D	104.5	49.6	40.3	35.6	32.7	29.0	24.3		1.50	26		
		25D	295.1	149.1	121.1	107.3	98.4	87.1			2.80	40		
	180 2DWELL (R2)	4.5D	1.90	0.92	0.75	0.66	0.61	0.54	0.46	0.42	0.09	12		
		6D	5.66	2.43	1.97	1.75	1.60	1.42	1.22	1.10	0.17	14		
		7D	16.8	8.00	6.50	5.80	5.30	4.70	4.00	3.60	0.3	19		
		8D	31.4	15.6	12.7	11.3	10.3	9.10	7.8	7.10	0.6	22		
	270 1DWELL	8D	5.30	2.30	1.30	1.60	1.50	1.30	1.10	1.00	0.3	12		
		11D	40.4	13.2	13.2	12.4	11.4	10.1	8.60	7.80	0.60	16		
		14D	50.1	20.3	16.5	14.6	13.4	11.9	10.2	9.20	0.70	19		
		18D	106.0	44.2	35.9	31.8	29.2	25.8	22.1	20.0	1.40	26		
		25D	301.0	133.4	108.9	95.9	88.0	77.9	66.8		2.70	40		
	270 2DWELL (R2)	4.5D	2.04	0.84	0.69	0.61	0.56	0.49	0.42	0.38	0.08	12		
		6D	5.85	2.18	1.77	1.57	1.44	1.28	1.09	0.99	0.16	14		
		7D	17.8	7.30	5.90	5.20	4.80	4.30	3.7	3.30	0.30	19		
		8D	33.9	14.4	11.7	10.4	9.50	8.40	7.2	3.50	0.60	22		
20	180 2DWELL (R2)	6D	2.44	1.07	0.87	0.77	0.71	0.63	0.54	0.48	0.11	12		
		7D	5.90	2.70	2.20	1.90	1.80	1.60	1.30	1.20	0.20	14		
		8D	28.0	9.50	9.20	9.00	8.70	7.70	6.60	6.00	0.50	16		
		11D	42.9	19.7	16.0	14.2	13.0	11.5	9.90		0.70	22		
		14D	79.6	35.6	28.9	25.6	23.5	20.8	17.8		1.10	26		
		18D	191.7	90.7	73.7	65.3	59.9	53.0			2.40	40		
		25D	453.9	218.8	177.7	157.4	144.4				4.00	52		
	270 2DWELL (R2)	6D	2.50	0.96	0.78	0.69	0.63	0.56	0.48	0.43	0.10	12		
		7D	6.10	2.40	2.00	1.70	1.60	1.40	1.20	1.10	0.20	14		
		8D	29.4	9.80	9.30	8.70	7.90	7.0	6.00	5.50	0.50	16		
		11D	44.6	17.8	14.5	12.8	11.8	10.4	8.90	8.10	0.70	22		
		14D	82.5	32.1	26.0	23.1	21.2	18.7	16.1	14.5	1.00	26		
		18D	198.6	81.8	66.4	58.8	54.0	47.8	41.0		2.20	40		
		25D	643.9	232.8	229.7	203.4	186.6	165.2			4.40	60		
24	180 3DWELL (R3)	4.5D	1.90	0.92	0.75	0.66	0.61	0.54	0.46		0.09	12		



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Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)		
				Index Per Min N (rpm)										
				50	100	150	200	300	500	700				
24	180 2DWELL (R2)	6D	1.97	0.86	0.70	0.62	0.57	0.50	0.43	0.39	0.09	10		
		7D	3.00	1.40	1.10	1.00	0.90	0.80	0.70		0.20	12		
		8D	28.8	9.75	9.70	9.60	9.50	8.40	7.20	6.50	0.50	16		
		11D	40.9	18.1	15.6	13.9	12.7	11.3	9.70		0.70	19		
		14D	54.0	24.0	19.5	17.2	15.8	14.0			0.90	22		
		18D	157.1	75.3	61.2	54.2	49.7	44.0			2.00	35		
		25D	395.5	194.3	157.8	139.7	128.2				3.40	47		
	270 2DWELL (R2)	3DWELL (R3)	4.5D	2.04	0.84	0.69	0.61	0.56	0.49	0.42	0.38	0.08	12	
		6D	2.01	0.77	0.63	0.55	0.51	0.45	0.39	0.35	0.09	10		
		7D	3.10	1.20	1.00	0.99	0.80	0.70	0.60	0.60	0.20	12		
		8D	29.8	9.80	9.60	9.30	8.60	7.60	6.50	5.90	0.50	16		
		11D	42.2	17.3	14.1	12.5	11.4	10.1	8.70	7.90	0.60	19		
		14D	55.3	21.5	17.5	15.5	14.2	12.6	10.8		0.80	22		
		18D	161.1	67.5	54.8	48.6	44.6	39.4	33.8		1.90	35		
30	180 2DWELL (R2)	25D	484.4	214.6	174.3	154.3	141.6	125.3				3.70	52	
		3DWELL (R3)	7D	5.90	2.70	2.20	1.90	1.80	1.60	1.303		0.20	14	
		8D	28.0	9.50	9.50	9.50	8.70	7.70	6.60	6.00	0.50	16		
		11D	39.4	13.1	13.1	13.1	12.4	11.0	9.40		0.60	16		
		14D	49.3	21.4	18.1	16.0	14.7	13.0	11.2		0.80	19		
		18D	104.2	48.4	46.5	34.8	31.9	28.3			1.50	26		
		25D	293.7	145.6	118.2	104.7	96.0				2.80	40		
	270 2DWELL (R2)	3DWELL (R3)	7D	6.10	2.40	2.00	1.70	1.60	1.40	1.20	1.10	0.20	14	
		8D	29.4	9.80	9.50	8.70	7.90	7.00	6.00	5.50	0.50	16		
		11D	40.3	13.2	13.0	12.1	11.1	9.80	8.40	7.60	0.60	16		
		14D	50.0	19.9	16.2	14.3	13.1	11.6	10.0	9.00	0.70	19		
		18D	105.9	43.2	35.1	31.1	28.5	25.2	21.7		1.50	26		
		25D	300.4	130.3	105.9	93.7	86.0	76.1			2.70	40		
32	180 2DWELL (R2)	4DWELL (R4)	8D	31.4	15.6	12.7	11.3	10.3	9.10	7.80		0.60	22	
		11D	39.6	13.1	13.1	13.1	12.7	11.3	9.70		0.60	16		
		14D	49.4	21.4	18.5	16.5	15.0	13.3	11.4		0.80	19		
		18D	104.5	49.6	40.1	35.6	32.7	29.0			1.50	26		
		25D	295.1	149.1	121.1	107.3	98.4				2.80	40		
	270 2DWELL (R2)	4DWELL (R4)	8D	33.9	14.4	11.7	11.4	9.50	8.40	7.20	6.50	0.60	22	
		11D	40.4	13.2	13.2	12.4	11.4	10.1	8.60	7.80	0.60	16		
		14D	50.1	20.3	16.5	14.6	13.4	11.9	10.2	9.20	0.70	19		
		18D	106.1	44.2	35.9	31.08	29.2	25.8	22.1		1.40	26		
		25D	301.1	133.4	108.3	95.9	88.0	77.9			2.70	40		