LINEAR MOTION

LUDE TRANSMISSION

HD Series Right Angle Gearboxes

HD SERIES SPIRAL BEVEL GEAR UNIT

HD series spiral bevel gear unit product introduction

spiral bevel gear unit, the following is trait:
1. the box is hexahedron, which can fit different direction mounting
2. long-lift using and big load, smooth transmission, low noise, transmission efficiency canget up to 94%-98%
3. spiral bevel gears are made of low carbon alloy steel, through quenching and whetting, come to high precision rigidity tooth transmission
4. HD serie have seven species, big choosing range, mult-output shaft mode which meet various situations
5. enhancing and reducing speed

Mode designation

HD AF 11 - 1:2 - D

- D — Mounting type and turning
- 1:2 — ratio
- 11 — Commutator frame size
- AF — Connection symbol and form
- HD — Commutator symbol

Connection symbol and form

HD coupled of input (output) shaft stretch	HAD coupled of input shaft stretch and output shaft mounting
HDF coupled of output shaft with input flange	HDAF input flange、coupled of output shaft mounting

Ratio account

$$\text{Rato } i=\frac{\text{Input speed } n1}{\text{Output speed } n2}$$ When i>1 reducing speed, i<1 adding speed

Choosing type

1. Calculation formula: (1) $P_{1N}=P1\times f$ (not higher than 20/hour)

(2) $P_{1N}=1.2\times P1\times f$ (start 21-60/hour)

(3) $P_{1N}\leq P_N$

select power must be lower or equel to fixed power

note: P_{1N} is select power P1 is demand power, f is service factor, P_N is fixed power.

2. Using coefficient f

Driving machine	Working hours/day (hour)	Load type		
		Uniform load	Medium load	Heavy load
Motor Turbine Hydraulic motor	3	0.8	1	1.5
	3~10	1	1.25	1.25
	10~24	1.25	1.5	2
Gas engine	3	1.25	1.5	2
	3~10	1.5	1.75	2.25
	10~24	1.25	2	2.5

Thermal power

1. thermal power account: $P_{GN}=P_G\times f1\times f2$

$P_{GN}>P1$ (nature cooling)

$P_{GN}<P1$ (fan and oil cooling)

note: surronding temperature coefficient f1, continuous work coefficient f2, commutator thermal capacity P_G, P1: actual need power. P_{GN}: account thermal capacity of commutator

2. surronding temperature coefficient f1

Temperature ℃	10	20	30	40	50
coefficient f1	1.2	1	0.87	0.75	0.64

3. continuous coefficient f2

Working efficiency/hour%	100	80	60	40	20
f2	1	1.2	1.4	1.6	1.8

Thermal capacity P_G(nature cooling)

KW

ratio i	Box type						
	09	11	14	17	21	24	28
1~5	4.5	6.5	11	15.5	24	31	44

Universal technology norm

1. The size of the key and keyway must be accord with GB1095-79、GB1096-79, the tolerance of the keyway width: shaft N9, wheel JS9.
2. The center of the output and input shaft has screw, the standard as follow:
   D=11~13mm screw M3 D>24~30mm screw M10
   >13~16mm screw M5 >30~38mm screw M12
   >16~21mm screw M6 >38~50mm screw M16
   >21~24mm screw M8 >50~85mm screw M20
3. In the diagram of the mouting dimensions, the output shaft can be considered as input shaft if the speed and torque allowed.

Choosing example

Example: beater is drived by spiral bevel gear unit

beater actual need powerP1=28KW; moter power P2=30KW, motor speed n1=2000r/min

ratio i=2, mounting type of commutator D, work 8 hours one day, continuous work

hours of every hour: 60%, start stop 6 times/hour, surrounding temperature:30C.

Choosing type: driving machine of beater is motor, medium load, work 8 hours/day, according to using coefficient table:

f=1.25

choosing type power: PIN=P1×f=28×1.25=35kw(start stop 6 times/hour)

according to allowable: choosing box type21, PN=52.4KW>35kw

thermal power: box 21, according to thermal capacity form PG=24KW

according to surrounding temperature form: f1=0.87

according to continuous work coefficient form: f2=1.4

PGN=24×0.87×1.4=29.2KW>28KW

nature cooling is ok

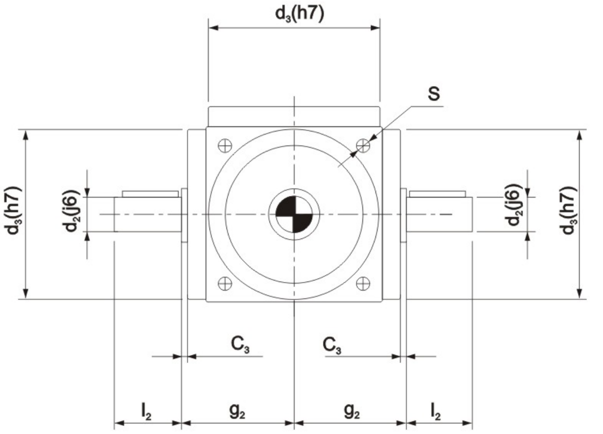
choosing type: HD21-2D

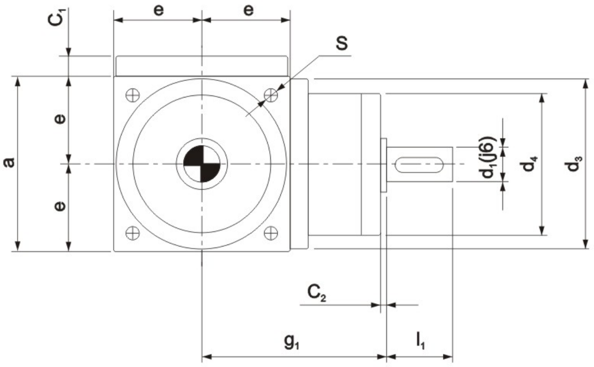
ratio、input (output) speed and allowable input power

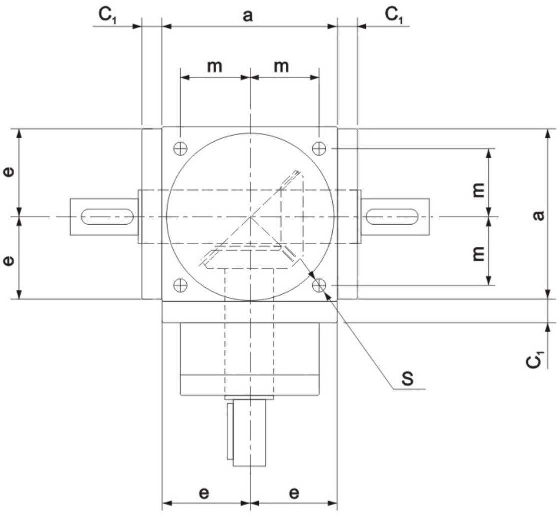
ratio i	Input speed n1 r/min	Output speed n2 r/min	Box type						
			09	11	14	17	21	24	28
			Allowable input power PN(KW)						
1	2000	2000	7.55	13.8	29.9	49.2	84	111	188
	1500	1500	6	11	23.9	39.3	67.5	90.5	156
	1000	1000	4.3	7.85	17.2	28.8	50.5	68	115
	750	750	3.4	6.15	13.4	22.8	40.8	54.5	94.2
1.5	2000	1333	5.45	9.7	16.8	33.9	70	92.5	124
	1500	1000	4.3	7.75	13.5	27.2	56.5	75.5	103
	1000	667	3.05	5.45	9.7	19.6	41.2	55.5	75.5
	750	500	2.3	4.25	7.6	15.5	33	44.5	60.5
2	2000	1000	4.2	7.95	14.1	26.2	52.4	71.5	107
	1500	750	3.35	6.3	11.1	20.8	43.2	58.5	88
	1000	500	2.35	4.45	7.85	14.9	31.4	41.9	64.5
	750	375	1.8	3.45	6.2	11.6	25.2	33.8	51
3	2000	667	2.85	5.6	10.1	18.2	34.9	52.4	73
	1500	500	2.2	4.45	7.95	14.4	27.7	41.9	58.5
	1000	333	1.5	3.1	5.6	10.1	20	30.2	42.4
	750	250	1.2	2.4	4.4	7.8	15.7	23.6	33.5
4	2000	500	2.15	3.75	6.8	10.5	23.3	37.7	47.6
	1500	375	1.65	2.9	5.3	8.4	18.5	30.2	38.5
	1000	250	1.15	2	3.75	5.9	13.4	21.7	27.5
	750	188	0.87	1.55	2.95	4.55	10.4	17.1	21.7
5	2000	400	1.4	2.95	5.05	8.05	15.9	28.9	39.4
	1500	300	1.1	2.35	3.95	6.45	12.7	23.4	31.4
	1000	200	0.75	1.6	2.75	4.5	9	16.4	22.4
	750	150	0.58	1.25	2.1	3.45	6.95	13	17.7

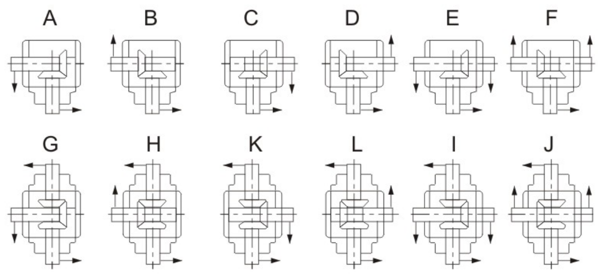
Notes: 1. The allowable power value of this table is used for deceleration.
When it is required to increase speed, the allowable power should be multiplied by the transmission ratio
2. If the input/output shaft exceeds the range in the table, please contact us.

HD09-HD28 (i=1~5) coupled of input (output) shaft stretch
HD outline and mounting dimension







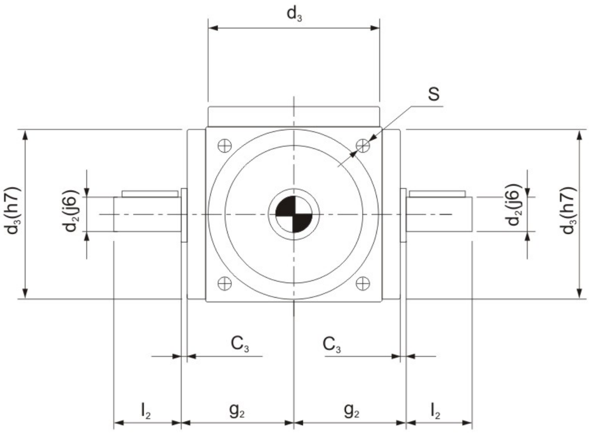


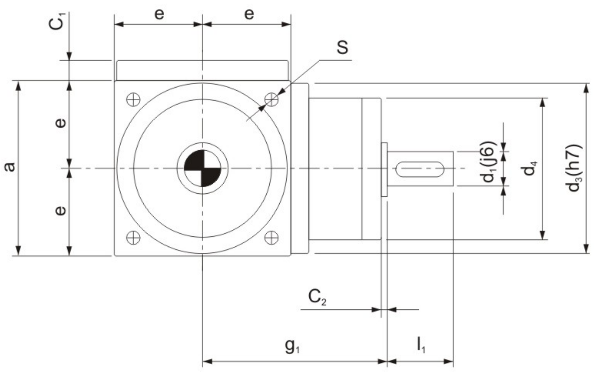
Mounting form and rotation direction

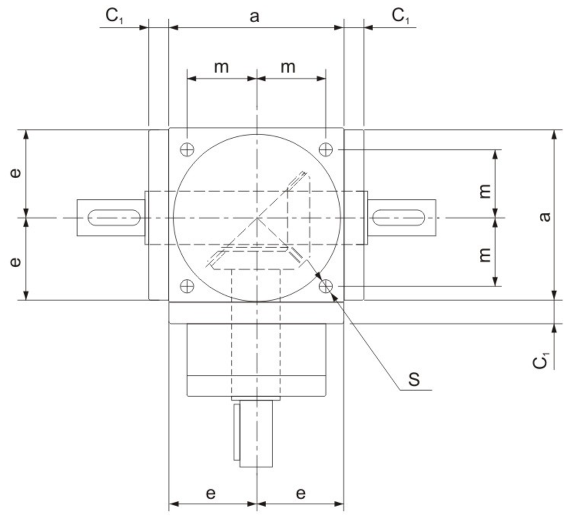
Type	a	C_1	C_2	C_3	d_2	l_2	d_3	e	g_1	g_2	m	S	i=1~2		i=3		i=4		i=5		i=1~3	i=4~5	Weight	Oil
													d_1	l_1	d_1	l_1	d_1	l_1	d_1	l_1	d_4	d_4	Kg	L
09	90	12	2	2	18	35	88	45	100	59	36	M6	18	35	16	30	11	23	11	23	72	62	6	0.2
11	110	12	2	2	22	40	108	55	122	69	44	M8	22	40	20	35	16	30	14	25	81	72	10	0.3
14	140	12	2	2	32	50	135	70	142	84	55	M10	32	50	26	45	20	35	16	30	98	81	20	0.4
17	170	15	2	2	40	60	165	85	168	103	67	M12	40	60	32	50	26	45	22	40	118	98	32	1
21	210	18	2	2	45	70	205	105	220	125	85	M16	45	70	38	55	32	50	30	50	128	110	60	2
24	240	18	2	2	55	85	235	120	240	140	95	M16	55	85	45	70	38	55	35	55	138	120	75	2.5
28	280	18	2	2	60	110	275	140	280	160	110	M16	60	110	50	80	45	70	42	70	150	135	115	3

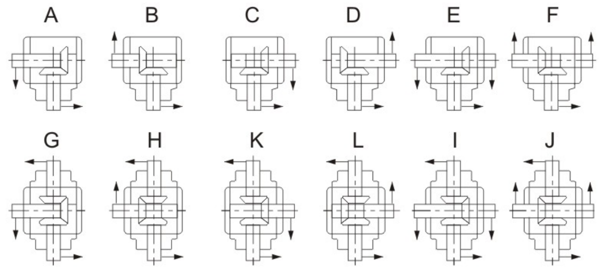
HD09-HD28 (i=1:1.5,i=1:2) coupled of input (output) shaft stretch

HD outline and mounting dimension





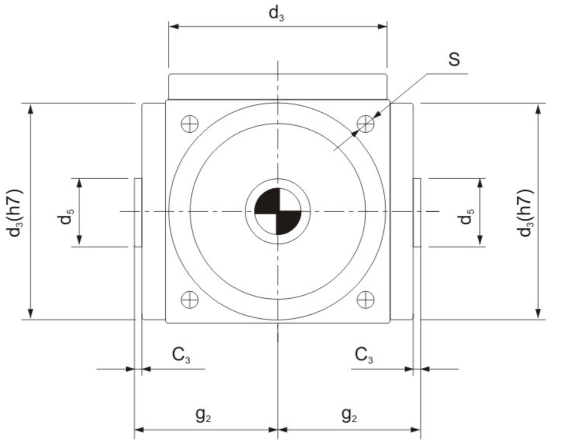


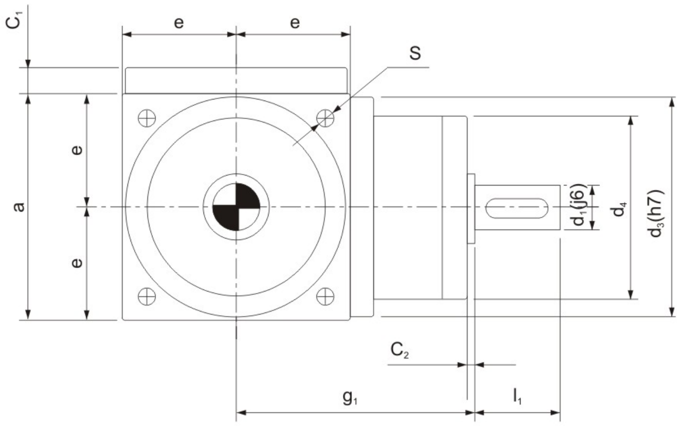


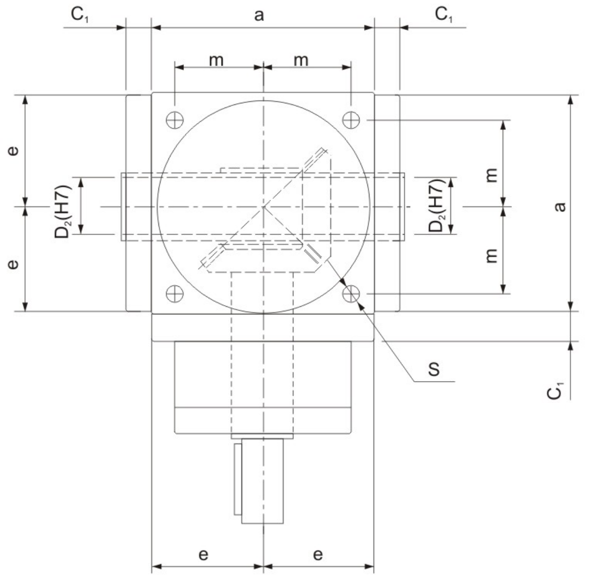
Mounting form and rotation direction

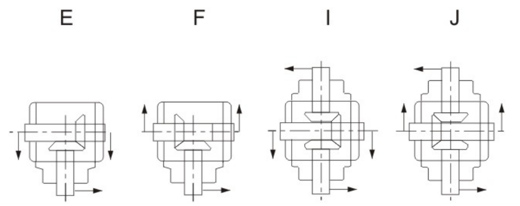
Type	a	C_1	C_2	C_3	d_1	l_1	d_3	e	g_1	g_2	m	S	d_4	i=1:1.5		i=1:2		Weight	Oil
														d_2	l_2	d_2	l_2	Kg	L
09	90	12	2	2	18	35	88	45	100	59	36	M6	72	11	23	18	35	6	0.2
11	110	12	2	2	22	40	108	55	122	69	44	M8	81	14	25	22	40	10	0.3
14	140	12	2	2	32	50	135	70	142	84	55	M10	98	16	30	32	50	20	0.4
17	170	15	2	3	40	60	165	85	168	103	67	M12	118	22	40	40	60	32	1
21	210	18	2	2	45	70	205	105	220	125	85	M16	128	30	50	45	70	60	2
24	240	18	2	2	55	85	235	120	240	140	95	M16	138	35	55	55	85	75	2.5
28	280	18	2	2	60	110	275	140	280	160	110	M16	150	42	70	60	110	115	3

HDA09-HDA28 coupled of input shaft stretch and output shaft mounting
HD outline and mounting dimension





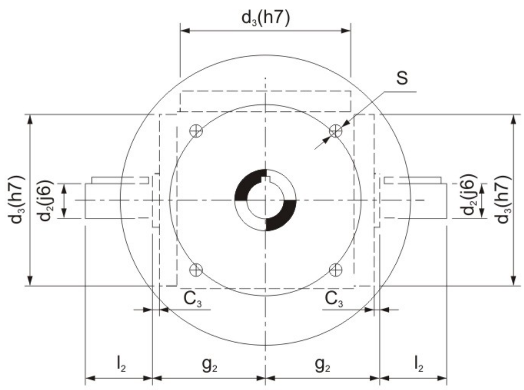


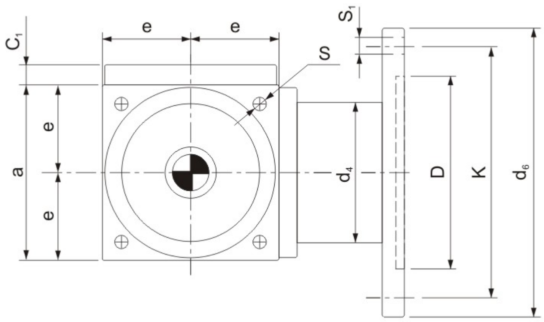


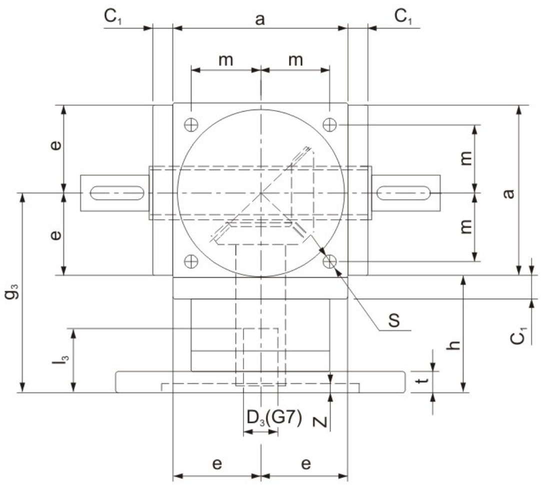
Mounting form and rotation direction

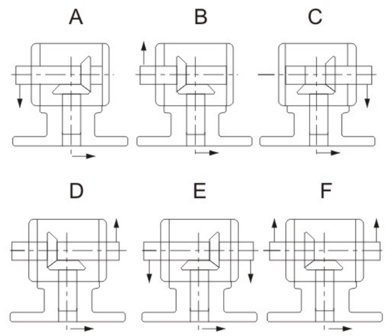
Type	a	C_1	C_2	C_3	D_2	d_5	d_3	e	g_1	g_2	m	S	i=1~2		i=3		i=4		i=5		i=1~3	i=4~5	Weight	Oil
													d_1	l_1	d_1	l_1	d_1	l_1	d_1	l_1	d_4	d_4	Kg	L
09	90	12	2	2	16	25	88	45	100	59	36	M6	18	35	16	30	11	23	11	23	72	62	6	0.2
11	110	12	2	2	22	35	108	55	122	69	44	M8	22	40	20	35	16	30	14	25	81	72	10	0.3
14	140	12	2	2	28	45	135	70	142	84	55	M10	32	50	26	45	20	35	16	30	98	81	20	0.4
17	170	15	2	3	38	55	165	85	168	103	67	M12	40	60	32	50	26	45	22	40	118	98	32	1
21	210	18	2	2	45	65	205	105	220	125	85	M16	45	70	38	55	32	50	30	50	128	110	60	2
24	240	18	2	2	55	75	235	120	240	140	95	M16	55	85	45	70	38	55	35	55	138	120	75	2.5
28	280	18	2	2	60	85	275	140	280	160	110	M16	60	110	50	80	45	70	42	70	150	135	115	3

HDF09-HDF28 coupled of output shaft with input flange
HD outline and mounting dimension









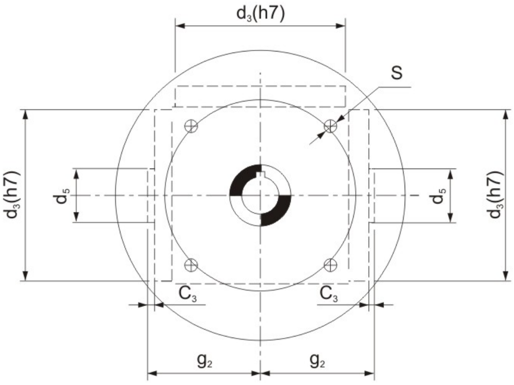
Mounting form and rotation direction

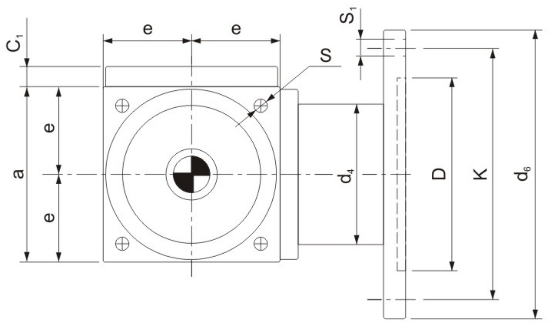
Type	a	C_1	C_3	d_3	d_4	d_2	l_2	i=1~2				i=3~5			
								$D_3 \times l_3$				$D_3 \times l_3$			
09	90	12	2	88	86	18	35	19×43	14×33	11×26	9×23	19×43	14×33	11×26	9×23
11	110	12	2	108	82	22	40	24×53	19×43	14×33	11×26	24×53	19×43	14×33	11×26
14	140	12	2	135	104	32	50	38×83	28×63	24×53	19×43	28×63	24×53	19×43	14×43
17	170	15	3	165	128	40	60	42×115	38×83	28×63	24×53	38×83	28×63	24×53	19×43
21	210	18	2	205	160	45	70	48×115	42×115	38×83	28×63	42×115	38×83	28×63	24×53
24	240	18	2	235	170	55	85	55×115	48×115	42×115	38×83	48×115	42×115	38×83	28×63
28	280	18	2	275	190	60	110	60×145	55×115	48×115	42×115	55×115	48×115	42×115	38×83

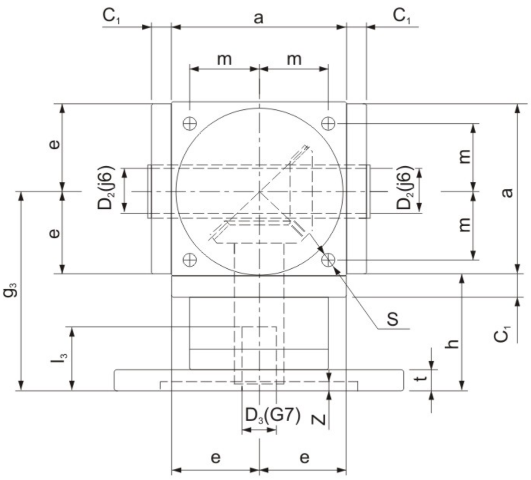
Type	e	g_2	g_3	h	m	S	i=1~2				i=3~5			
							d_6							
09	45	59	110	65	36	M6	200	160	140	120	200	160	140	120
11	55	69	130	75	44	M8	200	160	140	120	200	160	140	120
14	70	84	170	100	55	M10	300	250	200	160	300	250	200	160
17	85	103	215	130	67	M12	350	300	250	200	350	300	250	200
21	105	125	245	140	85	M16	350	300	250	-	350	300	250	200
24	120	140	265	145	95	M16	400	350	300	250	400	350	300	250
28	140	160	315	175	110	M16	450	400	350	300	400	350	300	

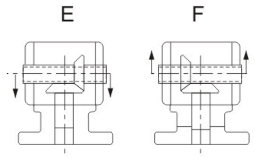
d_6	D	K	S_1	t	Z
120	80	100	4×M6	11	3.5
140	95	115	4×M8	11	3.5
160	110	130	4×M8	11	4
200	130	165	4×M10	14	4
250	180	215	4×M12	16	4.5
300	230	265	4×M12	16	4.5
350	250	300	4×M16	20	6
400	300	350	4×M16	20	6
450	350	400	4×M16	25	6

HDAF09-HDAF28 coupled of output shaft with input flange
HD outline and mounting dimension









Mounting form and rotation direction

Type	a	C_1	C_3	d_3	d_4	D_2	d_5	i=1~2				i=3~5			
								$D_3 \times l_3$				$D_3 \times l_3$			
09	90	12	2	88	86	16	25	19×43	14×33	11×26	9×23	19×43	14×33	11×26	9×23
11	110	12	2	108	82	22	35	24×53	19×43	14×33	11×26	24×53	19×43	14×33	11×26
14	140	12	2	135	104	28	45	38×83	28×63	24×53	19×43	28×63	24×53	19×43	14×33
17	170	15	3	165	128	38	55	42×115	38×83	28×63	24×53	38×83	28×63	24×53	19×43
21	210	18	2	205	160	45	65	48×115	42×115	38×83	28×63	42×115	38×83	28×63	24×53
24	240	18	2	235	170	55	75	55×115	48×115	42×115	38×83	48×115	42×115	38×83	28×63
28	280	18	2	275	190	60	85	60×145	55×115	48×115	42×115	55×115	48×115	42×115	38×83

Type	e	g_2	g_3	h	m	S	i=1~2				i=3~5			
							d_6							
09	45	59	110	65	36	M6	200	160	140	120	200	160	140	120
11	55	69	130	75	44	M8	200	160	140	120	200	160	140	120
14	70	84	170	100	55	M10	300	250	200	160	300	250	200	160
17	85	103	215	130	67	M12	350	300	250	200	350	300	250	200
21	105	125	245	140	85	M16	350	300	250	-	350	300	250	200
24	120	140	265	145	95	M16	400	350	300	250	400	350	300	250
28	140	160	315	175	110	M16	450	400	350	300	400	350	300	

d_6	D	K	S_1	t	Z
120	80	100	4×M6	11	3.5
140	95	115	4×M8	11	3.5
160	110	130	4×M8	11	4
200	130	165	4×M10	14	4
250	180	215	4×M12	16	4.5
300	230	265	4×M12	16	4.5
350	250	300	4×M16	20	6
400	300	350	4×M16	20	6
450	350	400	4×M16	25	6

LINEAR MOTION

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