

**MASTERGEAR**  
**WORLDWIDE**

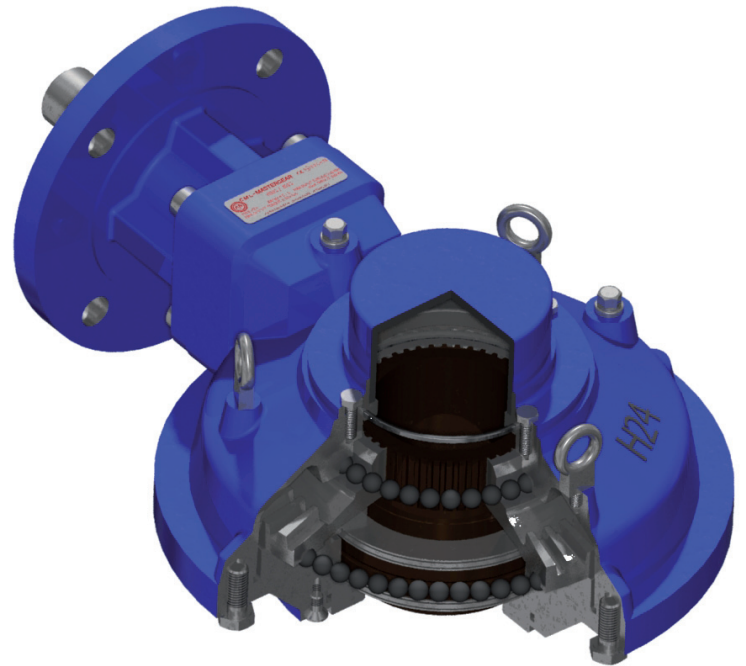
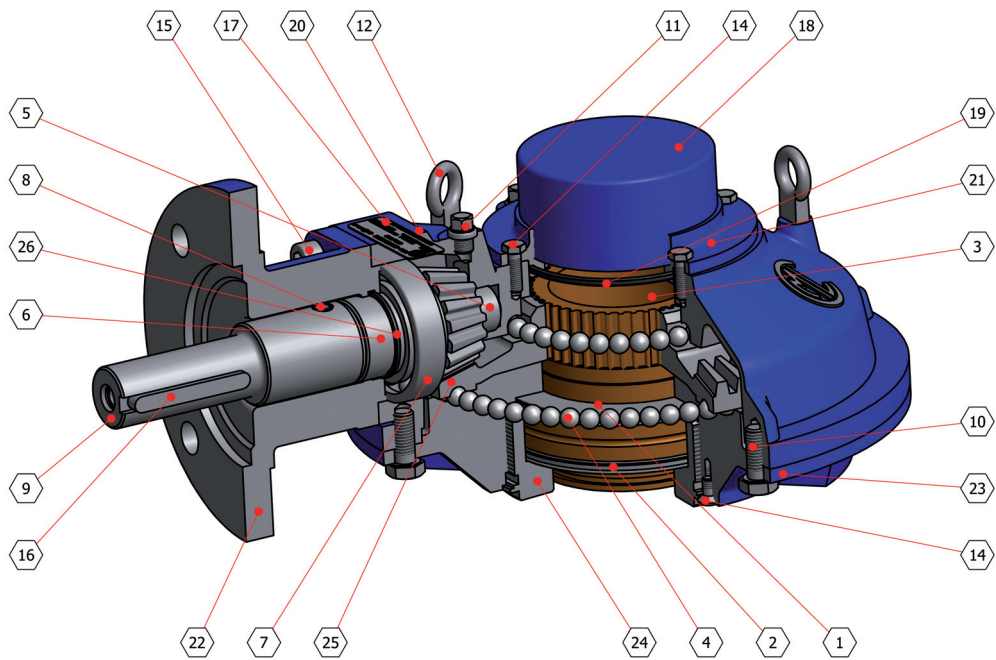


**HIGH EFFICIENCY**  
**BEVEL GEARS OPERATORS**



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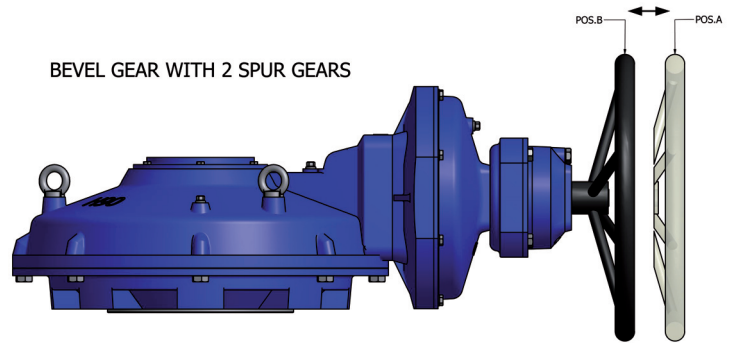
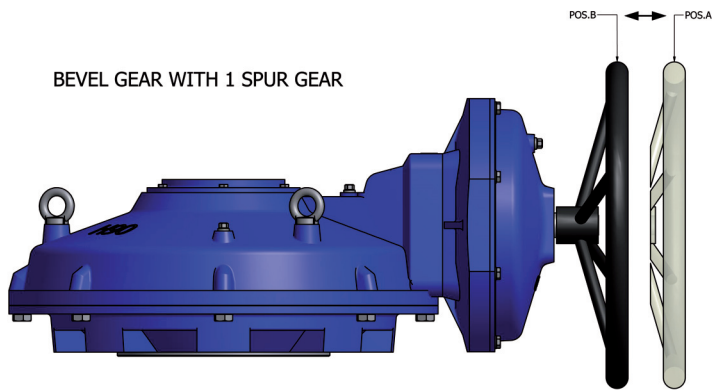


ITEM	COMPONENT	MATERIAL DESCRIPTION
1	Bearing thrust washers	AS-type
2	Needle thrust bearing	AXK-type
3	Stem nut	GCuA/10Fe2 UNI EN 1982 aluminium bronze
4	Ball	CC85 UNI7845 high-carbon hardened steel
5	Needle bearing	HK-type
6	Input pinion	C40 UNI 7845 hardened carbon steel
7	Ball bearing	G20Cr2Ni4A hot-rolled bearing steel
8	Elasti pin	ISO 8752 (DIN 1481)
9	Input extension	C45 UNI 7845 hardened carbon steel
10	Base screws	8,8-grade hexagonal-head
11	Plug	Zinc-plated steel
12	Lifting eye bolt	UNI 3266 - UNI 580
13	Base screws	8,8-grade hexagonal-head
14	ISO type-A screws	8,8-grade countersunk head
15	Input flange screws	8,8-grade socket head
16	Key	UNI 6604
17	Nameplate	Aluminium
18	Stem cover	Fe360B mild steel
19	Stem cover O-Ring	70Sh nitrile rubber
20	Housing	GJS400/15 S.G. cast iron
21	Flange for stem cover	Fe510 UNI 4991 low-carbon steel
22	ISO input flange	GJS 500/7 S.G. ductile cast iron
23	ISO type-A base	GJS 500/7 ductile cast iron
24	Threated thust flange	GJS 500/7 ductile cast iron
25	Output gear	GJS 500/7 ductile cast iron
26	Input flange O-Ring	70Sh nitrile rubber

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I nostri riduttori possono essere forniti completi di semplice o doppio demoltiplicatore addizionale.

L'applicazione dei demoltiplicatori serve per rendere più piccolo il valore dell'input torque, così da facilitare la manovra manuale del riduttore.

I riduttori con demoltiplicatore d'altra parte necessitano di più giri di manovra per fare la corsa di chiusura o apertura della valvola.

Per ovviare a questo inconveniente **C.M.L.** ha realizzato i riduttori a doppio rapporto (2v).

La selezione fra i due rapporti si ottiene spostando assialmente il volantino per una corsa di circa 15/20 mm

#### Esempio

- riduttore con 1 demoltiplicatore H70A+DE90-2v
- volantino in posizione A:  
rapporto corto 1:4,5
- volantino in posizione B:  
rapporto lungo (4,5x8) 36:1

#### Esempio

- riduttore con 2 demoltiplicatori H70A+DE90+DE24-2v
- volantino in posizione A:  
rapporto lungo (4,5x8) 36:1
- volantino in posizione B:  
rapporto lungo (4,5x8x3,5) 126:1

Il volantino resta sempre montato sullo stesso albero anche al cambio del rapporto di riduzione.

Questo meccanismo consente di poter bloccare una valvola agendo con il rapporto più lungo per pochi giri; quando la valvola sarà sbloccata e la pressione differenziale sarà calata, si potrà agire e compiere tutta la corsa rimanente con il rapporto più corto.

Our bevel gears can be supplied with simple or double additional spur gear (DE).

The application of spur gears is needed to reduce the value of input torque, so that the manual driving of gear is easier.

With bevel gears + spur gears more turns are needed, to make the stroke of valve closing or valve opening.

In order to avoid this inconvenient, **C.M.L.** manufactured the bevel gears with double ratio (2v).

The selection between the two ratios is obtained, by axially moving the handwheel for a total stroke of 15 to 20 mm .

#### Example

- bevel gear with 1 spur gear H70A+DE90-2v
- handwheel in Pos. A:  
short ratio 1:4.5
- handwheel in Pos. B:  
long ratio (4.5x8) 36:1

#### Example

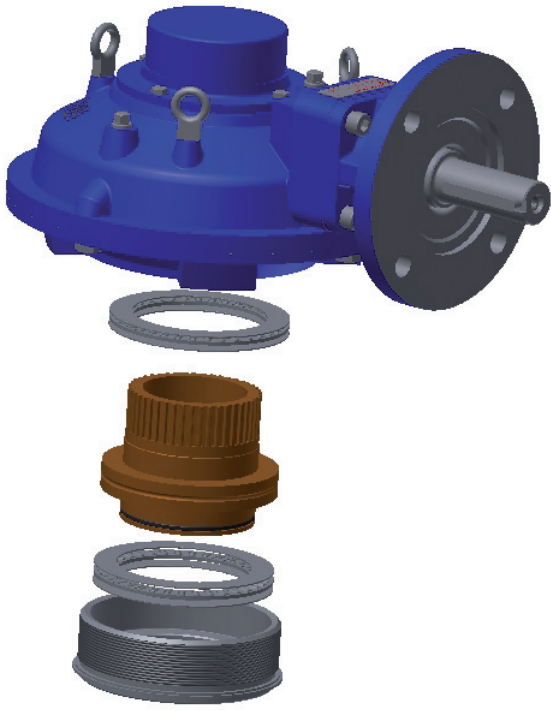
- bevel gear with 2 spur gears H70A+DE90+DE24-2v
- handwheel in Pos. A:  
short ratio (4.5x8) 36:1
- handwheel in Pos. B:  
long ratio (4.5x8x3.5) 126:1

The handwheel is always assembled on the same shaft, also when the reduction ratio is changed.

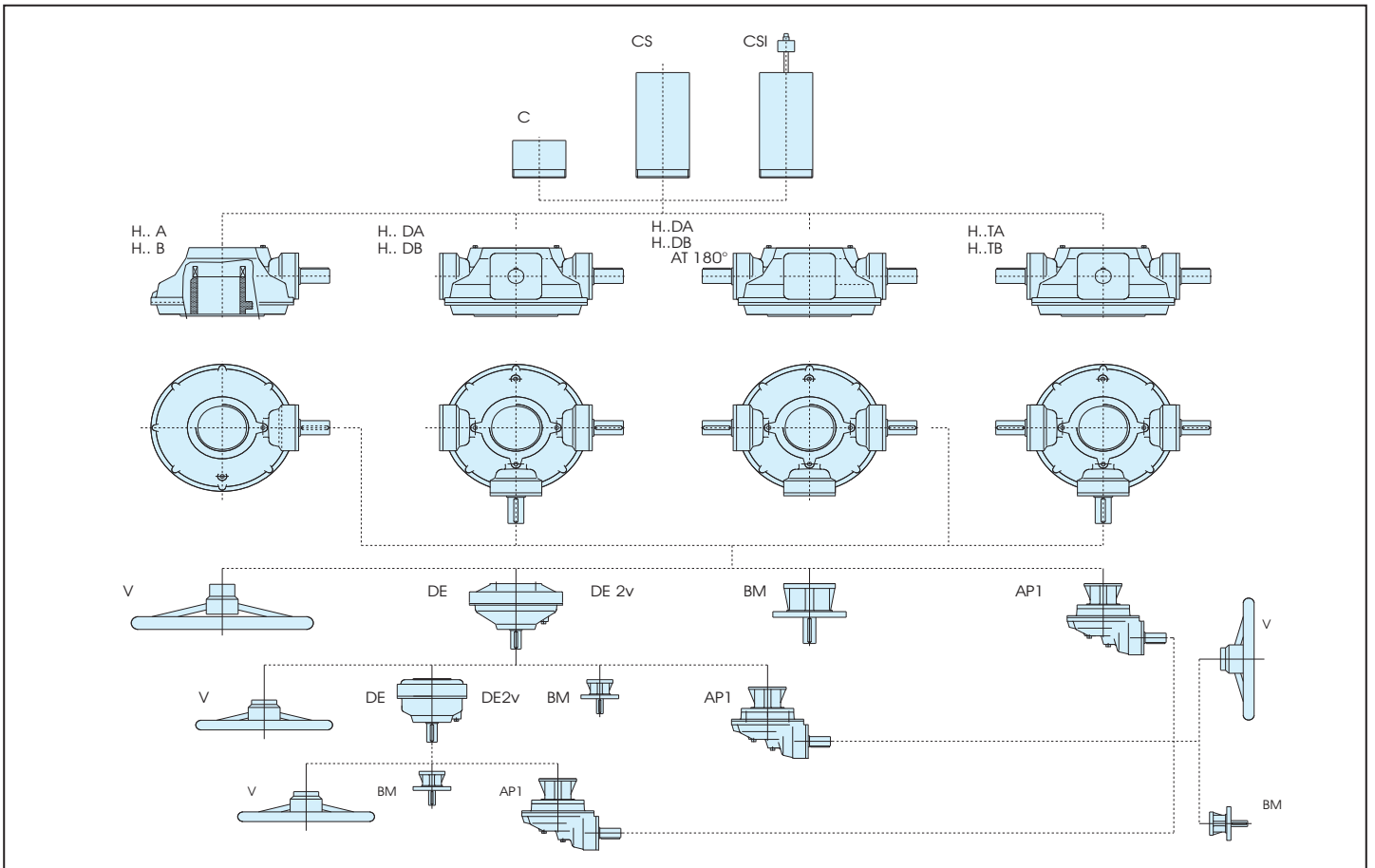
This mechanism permits to unlock a valve, by applying a long ratio for few turns. When the valve is unlocked and the differential pressure decreases, the remaining stroke can be made with the shorter ratio.

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## Manufacturing program for cml bevel actuators

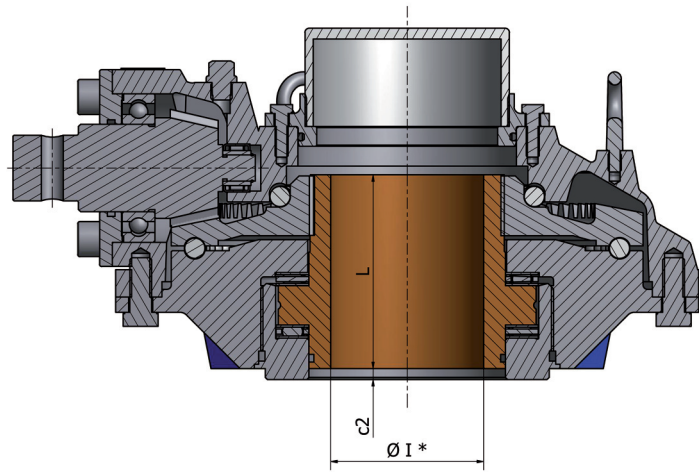
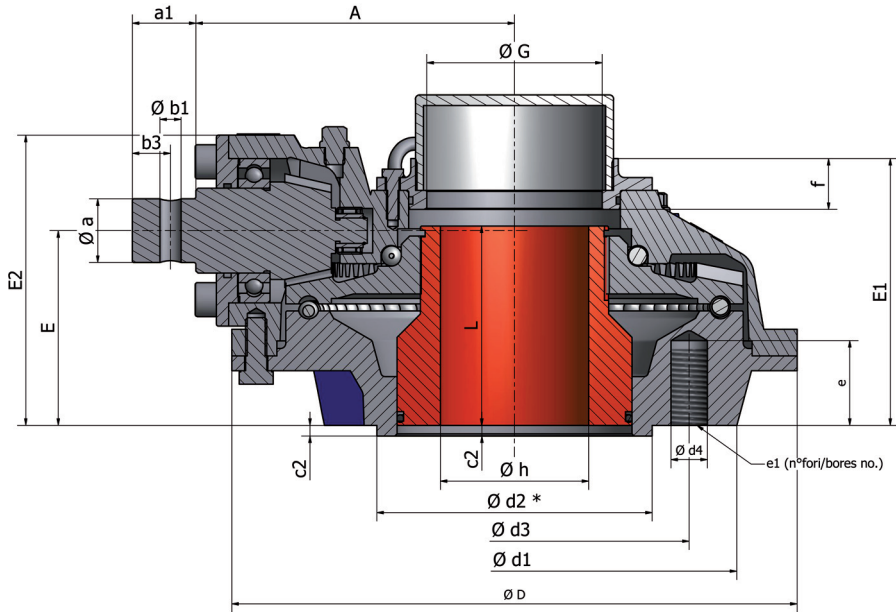


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# Performance specification and dimensions



UNIT SIZE	MAX OUTPUT TORQUE		VALVE MOUNTING	RATIO			Øa	a1	A	Øb1	b3	c2	Ød1	Ød2	Ød3	Ød4		ØD	e	e1	E	E1	E2	f	ØG	Ø h	Ø I	L
	Nm	Ft*Lb			ISO 5211											Ft*Lb	metric											
AP1	310	228	F10	1,762:1	206	152	25	50	100	8	18	3	125	70	102	M10	3/8"-16	172	18	4	78	-	123	-	-	20	-	68
H03	300	221	F10	2,3:1	145	113	30	27	121	8	18	3	125	70	102	M10	3/8"-16	180	18	4	69	115	114	24	55	45	40	55
H04	300	221	F10	4,5:1	74	55	20	34	97	6	18	3	125	70	102	M10	3/8"-16	180	18	4	60	94	91	24	55	45	40	55
H13	600	442	F14	4,5:1	148	109	30	34	121	8	18	4	175	100	140	M16	5/8"-11	226	26	4	80	113	118	24	70	65	60,5	73
H24	1.100	811	F16	4,5:1	272	200	30	30	150	10	18	5	210	130	165	M20	3/4"-10	267	34	4	92	126	137	24	83	85	70	89
H33	2.300	1.696	F25	4,5:1	568	419	35	36	198	10	17	5	300	200	254	M16	5/8"-11	340	30	8	115	153	177	25	133	110	85	105
H43	3.800	2.802	F30	4,5:1	938	692	35	35	215	10	17	5	350	230	298	M20	3/4"-10	380	34	8	128	164	190	25	133	120	102	115
H70	6.000	4.423	F35	4,5:1	1.481	1.093	40	41	244	12	20	5	415	260	356	M30	1"-8	433	45	8	155	187	243	25	133	130	115	140
H90	9.000	6.638	F35	5,0:1	2.000	1.475	50	75	308	14	12	5	415	260	356	M30	1"-8	525	50	8	168	211	256	25	161	170	122	162
H110	16.000	11.800	F40	5,0:1	3.556	2.622	50	100	332	14	13	8	475	300	406	M36	1 1/4"-7	602	65	8	225	295	313	25	235	200	140	235
H120	19.000	14.000	F48	5,0:1	4.222	3.114	50	100	332	14	13	8	560	370	483	M36	1 1/4"-7	602	65	12	225	295	313	25	235	200	140	235
H200	25.000	18.420	F48	5,0:1	5.556	4.098	80	100	590	-	-	8	560	370	483	M36	1 1/4"-7	705	65	12	280	395	405	40	11"G	200	180	290
H300	30.000	22.127	F60 (X)	6,0:1	5.556	4.098	-	-	-	-	-	8	686	470	603	M36	1 1/4"-7	840	65	20	330	470	455	45	11"G	240	200	353
H450	45.000	33.160	F60	6,0:1	8.333	6.146	-	-	-	-	-	8	686	470	603	M36	1 1/4"-7	940	80	20	375	520	500	45	11"G	260	215	370
H650	70.000	51.590	n/a*	6,0:1	12.963	9.362	-	-	-	-	-	8	910	500	764	M52	1 1/4"-2	1.060	90	16	450	660	590	50	13"G	280	230	462

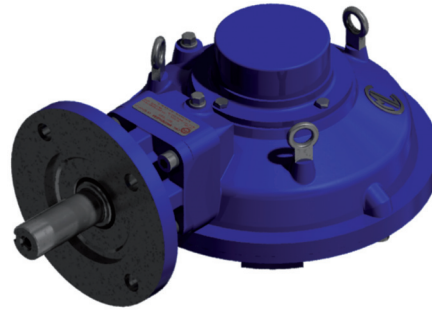
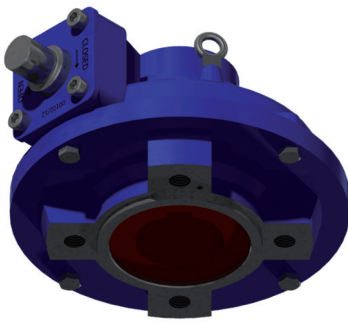
(X) F48 available only for H300S

(\*) 16 bores m52 on PCD 764 mm

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# Performance specification and dimensions



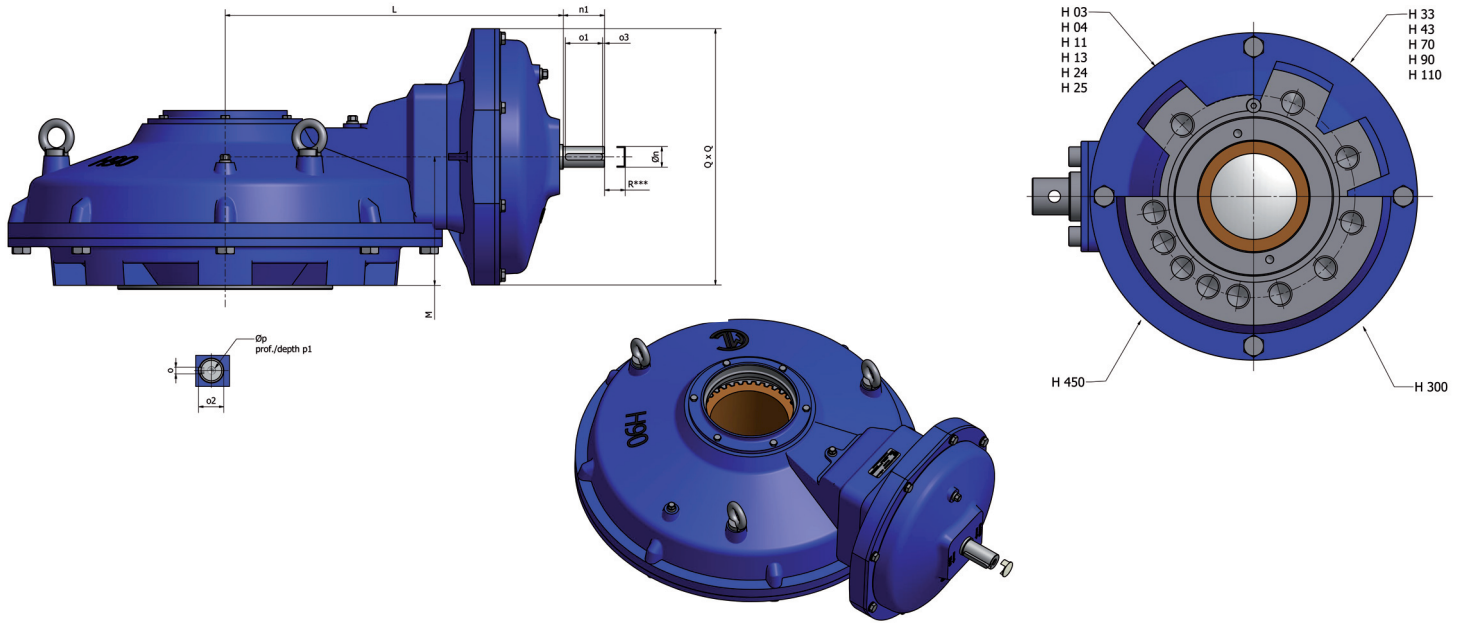
UNIT SIZE	OUTPUT FLANGE	OUTPUT TORQUE		RATIO	M.A.	MAX INPUT TORQUE		MAX THRUST TORQUE		INPUT FLANGE		WEIGHT		MAX STEM CAPACITY "B form"		MAX STEM CAPACITY "A form"	
		Nm	Ft*LB			Nm	Ft*LB	KN	Lbs	ISO 5210	DIN	KG	Lbs	mm	inches	mm	inches
AP1	F10	310	228	1,762:1	1,50	206	152	-	-	F10-F14	Gr0-Gr1/2	8	18	20	0,78	-	-
H03	F10	300	221	2,3:1	2,07	145	113	40	9.000	F07-F10	Gr0	8	18	45	1,77	40	1,57
H04	F10	300	221	4,5:1	4,05	74	55	40	9.000	F07-F10	Gr0	8,5	19	45	1,77	40	1,57
H13	F14	600	442	4,5:1	4,05	148	109	135	30.400	F07-F10-F14	Gr0-Gr1/2	15	33	65	2,56	60,5	2,38
H2	F16	1.100	811	4,5:1	4,05	272	200	240	54.000	F10-F14-F16	Gr0-Gr1/2-Gr3	25	55	85	3,35	70	2,75
H24 + DE24	F16	1.100	811	15,7:1	12,77	85	64	240	54.000	F10-F14	Gr0-Gr1/2	34	76				
H33	F25	2.300	1.696	4,5:1	4,05	568	419	330	74.200	F14-F16-F25	Gr1/2-Gr3-Gr4	55	121				
H33 + DC33	F25	2.300	1.696	9,0:1	7,28	316	233	330	74.200	F14-F16-F25	Gr1/2-Gr3-Gr4	75	169	110	4,33	85	3,34
H33 + DE43	F25	2.300	1.696	20,5:1	16,43	140	103	330	74.200	F10-F14-F16	Gr0-Gr1/2-Gr3	68	153				
H33 + DE43 + DE24	F25	2.300	1.696	70,9:1	51,79	44	32	330	74.200	F10-F14	Gr0-Gr1/2	64	144				
H43	F30	3.800	2.802	4,5:1	4,05	938	692	430	96.700	F14-F16-F25	Gr1/2-Gr3-Gr4	73	164				
H43 + DC33	F30	3.800	2.802	9,0:1	7,28	521	385	430	96.700	F14-F16-F25	Gr1/2-Gr3-Gr4	93	209	120	4,72	102	4,01
H43 + DE43	F30	3.800	2.802	20,25:1	16,43	231	171	430	96.700	F10-F14-F16	Gr0-Gr1/2-Gr3	86	193				
H43 + DE43 + DE24	F30	3.800	2.802	70,9:1	51,79	74	54	430	96.700	F10-F14	Gr0-Gr1/2	96	216				
H70	F35	6.000	4.425	4,5:1	4,05	1.481	1.093	700	157.400	F16-F25-F30	Gr3-Gr4-Gr5	115	259				
H70 + DC70	F35	6.000	4.425	9,0:1	7,28	824	608	700	157.400	F16-F25-F30	Gr3-Gr4-Gr5	145	326	130	5,12	115	4,52
H70 + DE90	F35	6.000	4.425	36,0:1	29,19	205	151	700	157.400	F10-F14-F16	Gr0-Gr1/2-Gr3	146	328				
H70 + DE90 + DE24	F35	6.000	4.425	126,0:1	93,30	64	47	700	157.400	F10-F14	Gr0-Gr1/2	165	371				
H90	F35	9.000	6.638	5,0:1	4,50	2.000	1.475	900	202.300	F16-F25-F30	Gr3-Gr4-Gr5	177	390				
H90 + DC70	F35	9.000	6.638	10,0:1	8,10	1.111	819	900	202.300	F16-F25-F30	Gr3-Gr4-Gr5	207	466	170	6,7	122	122
H90 + DE90	F35	9.000	6.638	40,0:1	32,40	277	202	900	202.300	F10-F14-F16	Gr0-Gr1/2-Gr3	217	488				
H90 + DE90 + DE24	F35	9.000	6.638	140,0:1	102,42	88	64	900	202.300	F10-F14	Gr0-Gr1/2	227	511				
H110	F40	16.000	11.800	5,0:1	4,50	3.556	2.622	1.100	247.300	F16-F35	Gr3+Gr6	315	709				
H110 + DC70	F40	16.000	11.800	10,0:1	8,10	1.978	1.458	1.100	247.300	F16-F25-F30	Gr3-Gr4-Gr5	345	776				
H110 + DE110	F40	16.000	11.800	30,0:1	24,37	657	484	1.100	247.300	F10-F14-F16	Gr0-Gr1/2-Gr3	360	810	200	7,87	140	5,51
H110 + DE110 + DE24	F40	16.000	11.800	105,0:1	77,01	208	153	1.100	247.300	F10-F14	Gr0-Gr1/2	370	832				
H110S	F40	16.000	11.800	5,0:1	4,50	3.556	2.622	1.600	359.800	F16-F35	Gr3+Gr6	315	709				
H110S + DC70	F40	16.000	11.800	10,0:1	8,10	1.978	1.458	1.600	359.800	F16-F25-F30	Gr3-Gr4-Gr5	345	776				
H110S + DE110	F40	16.000	11.800	30,0:1	24,37	657	484	1.600	359.800	F10-F14-F16	Gr0-Gr1/2-Gr3	360	810	200	7,87	N/A	5,51
H110S + DE110 + DE24	F40	16.000	11.800	105,0:1	77,01	208	153	1.600	359.800	F10-F14	Gr0-Gr1/2	370	832				
H111	F40	12.000	8.850	5,8:1	5,22	2.299	1.695	1.100	247.300	F16-F35	Gr3+Gr6	315	709	200	7,87	N/A	N/A
H111 + DC70	F40	12.000	8.850	11,6:1	9,40	1.277	941	1.100	247.300	F16-F25-F30	Gr3-Gr4-Gr5	345	776				
H111 + D110	F40	12.000	8.850	34,8	28,20	426	314	1.100	247.300	F10-F14-F16	Gr0-Gr1/2-Gr3	360	810				
H111 + DE 110 + DE24	F40	12.000	8.850	121,8	88,80	135	100	1.100	247.300	F10-F14	Gr0-Gr1/2	370	832	200	7,87	140	5,51
H111S	F40	12.000	8.850	5,8:1	5,22	2.299	1.695	1.600	359.800	F16-F35	Gr3-Gr6	315	709				
H111S + DC70	F40	12.000	8.850	11,6:1	9,40	1.277	941	1.600	359.800	F16-F25-F30	Gr3-Gr4-Gr5	345	776				
H111S + DE110	F40	12.000	8.850	34,8	28,20	426	314	1.600	359.800	F10-F14-F16	Gr0-Gr1/2-Gr3	360	810				
H111S + DE110 + DE24	F40	12.000	8.850	121,8	88,80	135	100	1.600	359.800	F10-F14	Gr0-Gr1/2	370	832	200	7,87	140	5,51
H120	F48	19.000	14.000	5,0:1	4,50	4.222	3.114	1.800	404.700	F16-F35	Gr3+Gr6	345	776	200	7,87	140	5,51
H120 + DE110 + DE43	F48	19.000	14.000	135,0:1	98,42	193	142	1.800	404.700	-	-	403	907				
H200	F48	25.000	18.420	5,0:1	4,50	5.556	4.098	2.500	562.000	F35-F40	Gr6-Gr7	520	1.126				
H200 + DE450.v	F48	25.000	18.420	30,0:1	24,30	1.030	765	2.500	562.000	F14-F16	Gr1/2-Gr3	640	1.422	200	7,87	180	7,08
H200 + DE450.x	F48	25.000	18.420	50,0:1	40,50	618	459	2.500	562.000	F14-F16	Gr1/2-Gr3	640	1.422				
H200 + DE450.x + DE43	F48	25.000	18.420	225,0:1	164,31	152	113	2.500	562.000	F10-F14	Gr0-Gr1/2	640	1.422				
H300	F60	30.000	22.127	6,0:1	5,40	5.556	4.098	3.000	674.400	F35-F40	Gr6-Gr7	730	1.610				
H300 + DE450.v	F60	30.000	22.127	36,0:1	29,81	1.027	757	3.000	674.400	F14-F16	Gr1/2-Gr3	850	1.870	240	9,45	200	7,87
H300 + DE450.x	F60	30.000	22.127	60,0:1	49,57	618	455	3.000	674.400	F14-F16	Gr1/2-Gr3	850	1.870				
H300 + DE450.x + DE43	F60	30.000	22.127	270,0:1	200,77	152	112	3.000	674.400	F10-F14	Gr0-Gr1/2	863	1.900				
H450	F60	45.000	33.160	6,0:1	5,40	8.333	6.146	4.500	1.011.800	F35-F40	Gr6-Gr7	830	1.850				
H450 + DE450.v	F60	45.000	33.160	36,0:1	29,22	1.544	1.139	4.500	1.011.800	F16-F25	Gr3-Gr4	950	2.110				
H450 + DE450.x	F60	45.000	33.160	60,0:1	48,60	926	681	4.500	1.011.800	F16-F25	Gr3-Gr4	950	2.110				
H450 + DE450.x + DE43	F60	45.000	33.160	270,0:1	196,84	229	170	4.500	1.011.800	F10-F14-F16	Gr0-Gr1/2-Gr3	963	2.140				
H450 + DE450.v + DE90	F60	45.000	33.160	288,0:1	209,96	214	158	4.500	1.011.800	F10-F14-F16	Gr0-Gr1/2-Gr3	960	2.130				
H450 + DE450.x + DE90	F60	45.000	33.160	480,0:1	349,94	128	95	4.500	1.011.800	F10-F14-F16	Gr0-Gr1/2-Gr3	980	2.180				
H650	N/A	70.000	51.590	6,0:1	5,40	12.963	9.362	6.500	1.461.200	F35-F40	Gr6-Gr7	900	2.000				
H650 + DE650.3	N/A	70.000	51.590	22,1:1	17,88	3.915	2.828	6.500	1.461.200	F16-F25	Gr3-Gr4	1.050	2.340				
H650 + DE650.4	N/A	70.000	51.590	25,7:1	20,81	3.365	2.430	6.500	1.461.200	F16-F25	Gr3-Gr4	1.050	2.340				
H650 + DE650.5	N/A	70.000	51.590	30,1:1	24,34	2.876	2.077	6.500	1.461.200	F16-F25	Gr3-Gr4	1.050	2.340				
H650 + DE650.8	N/A	70.000	51.590	52,0:1	42,09	1.663	1.201	6.500	1.461.200	F16-F25	Gr3-Gr4	1.050	2.340				
H650 + DE650.8 + DE90	N/A	70.000	51.590	415,7:1	302,82	231	167	6.500	1.461.200	F10-F14-F16	Gr0-Gr1/2-Gr3	1.095	2.440				

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# Performance specification and dimensions



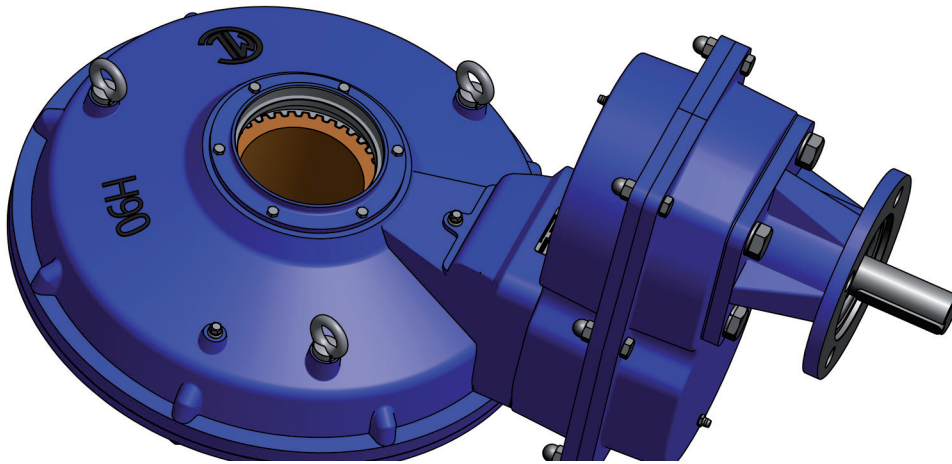
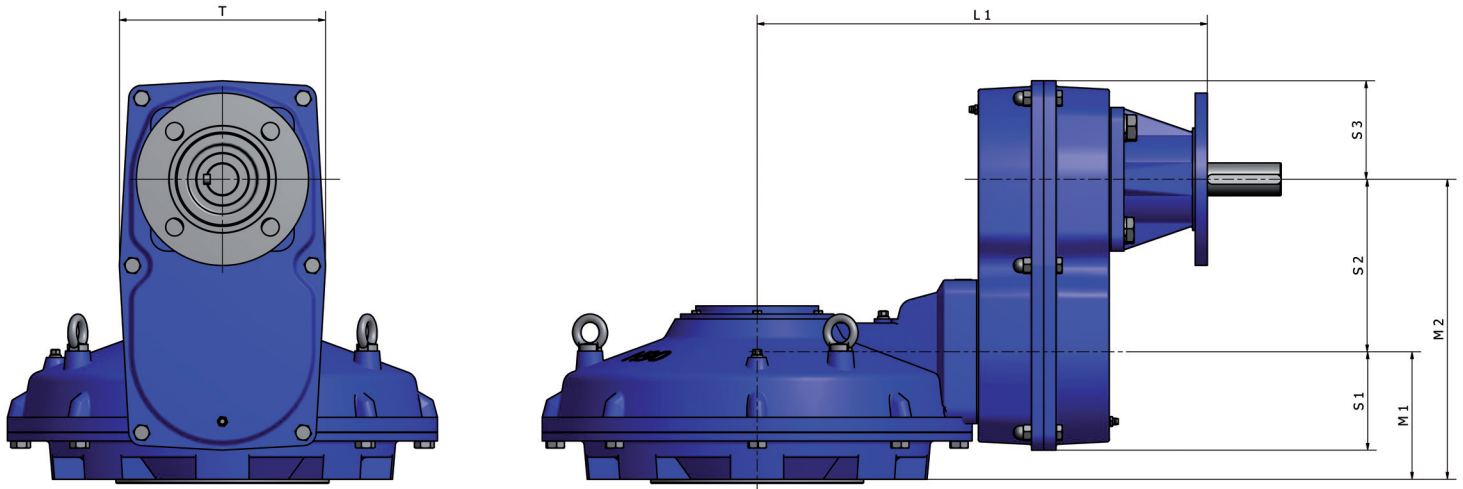
## ACTUATORS WITH MULTIPLE REDUCTIONS DE / DE 2v

REDUCTION TYPE	RATIO	MAX INPUT TORQUE		L	M	Øn	n1	o	o1	o2	o3	Øp	p1	Q	R
		Nm	Ft*Lb												
mm															
H24 + DE 24	15,75:1	85	63	254	92	25	50	8	45	28,0	2,5	M8	18	166	19
H33 + DE 43	20,25:1	140	103	300	102	25	50	8	45	28,0	2,5	M8	18	222	20
H33 + DE43 + DE24	70,9:1	44	32	414										166	19
H43 + DE43	20,25:1	231	171	317	120	25	50	8	45	28,0	2,5	M8	18	222	20
H43 + DE43 + DE24	70,9:1	74	54	432										166	19
H70 + DE90	36,0:1	205	151	364	150	25	50	8	45	28,0	2,5	M8	18	310	25
H70 + DE90 + DE24	126,0:1	64	47	474										166	19
H90 + DE90	40,0:1	277	204	409	155	25	50	8	45	28,0	2,5	M8	18	310	25
H90 + DE90 + DE24	140,0:1	88	64	520										166	19
H110 + DE110	30,0:1	657	484	451	225	38	70	10	65	41,0	2,5	M10	21	332	N/A
H110S + DE110															
H110 + DE110 + DE24	105,0:1	208	153	565	225	25	50	8	45	28,0	2,5	M8	18	166	19
H110S + DE110 + DE24															
H111 + DE110	34,8:1	426	314	451	225	38	70	10	65	41,0	2,5	M10	21	332	N/A
H111S + DE110															
H111 + DE110 + DE24	121,8:1	135	100	565	225	25	50	8	45	28,0	2,5	M8	18	166	19
H111S + DE110 + DE24															
H120 + DE110 + DE43	135,0:1	193	142	572	225	25	50	8	45	28,0	2,5	M8	18	222	20
H200 + DE450.v	30,0:1	1.030	760	656	280	38	70	10	65	41,0	2,5	M10	21	490	N/A
H200 + DE 450.x	50,0:1	618	455												
h200 + DE450.x + DE43	225,0:1	152	113	710	280	25	50	8	45	28,0	2,5	M8	18	222	19
H300 + DE450.v	36,0:1	1.027	757	659	330	38	70	10	65	41,0	2,5	M10	21	490	N/A
H300 + DE450.x	60,0:1	618	455												
H300 + DE450.x + DE43	270,0:1	152	112	778	330	25	50	8	45	28,0	2,5	M8	18	222	20
H450 + DE450.v	36,0:1	1.544	1.139	707	375	38	70	10	65	41,0	2,5	M10	21	490	N/A
H450 + DE450.v	60,0:1	926	681												
H450 + DE450.x + DE43	270,0:1	229	170	826	375	25	50	8	8	28,0	2,5	M8	18	222	20
H450 + DE450.v + DE90	288,0:1	214	158	840	310									25	
H450 + DE450.x + DE90	480,0:1	128	95	840	375	25	50	8	8	28,0	2,5	M8	18	310	25
H650 + DE650.3	22,1:1	3.195	2.356	900	450									50	155
H650 + DE650.4	25,7:1	3.365	2.481												
H650 + DE650.5	30,1:1	2.876	2.786	900	450	50	155	14	150	53,8	2,5	M10	18	480	N/A
H650 + DE650.8	52,0:1	1.663	1.226												
H650 + DE650.8 0	415,7:1	231	170	1036	450	25	50	8	45	28,0	2,5	M8	18	310	25

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## Bevel actuators with spur gear - technical data



### ACTUATORS WITH SPUR GEARS

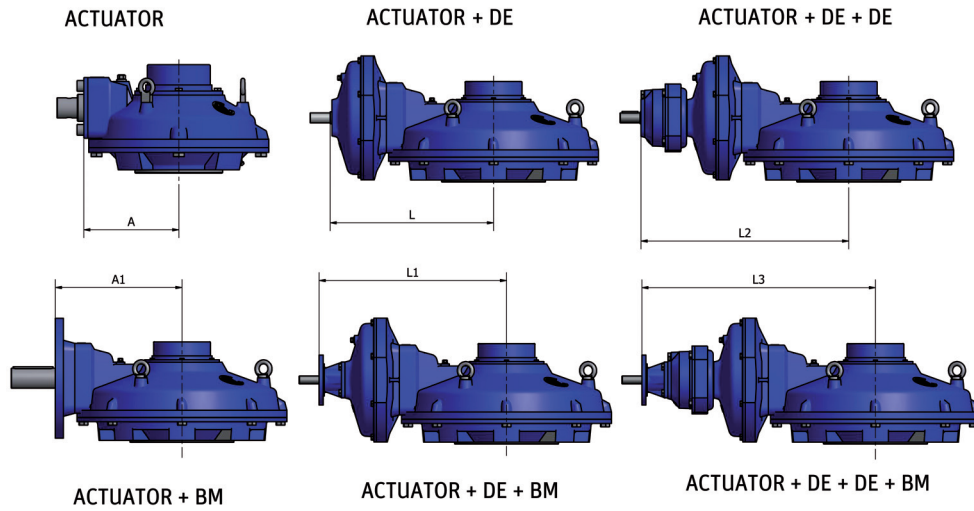
REDUCTION TYPE	MAX THRUST ("A" form)		MAX OUTPUT TORQUE		VALVE MOUNTING ISO 5211	RATIO	M.A. ±10%	MAX INPUT TORQUE		L1	M1	M2	S1	S2	S3	T	INPUT FLANGES
	KN	Lbs	Nm	Ft*lb				Nm	NmFt*lb								ISO 5211
H33 + DC33	330	74.200	2.300	1.696	F25	9,0:1	7,28	316	233		115	283	90	168	90	190	F14
																	F16
																	F25
																	F30
H43 + DC33	430	96.700	3.800	2.802	F30	9,0:1	7,28	521	385		128	296	90	168	90	190	F14
																	F16
																	F25
																	F30
H70 + DC70	700	157.400	6.000	4.425	F35	9,0:1	7,28	824	608		155	365	120	210	120	252	F16
																	F25
																	F30
																	F30
H90 + DC70	900	202.300	9.000	6.638	F35	10,0:1	8,10	1.111	819		168	378	120	210	120	252	F16
																	F25
																	F30
																	F30
H110 + DC70	1.100	247.300	16.000	11.800	F40	10,0:1	8,10	1.978	1.458		225	435	120	210	120	252	F16
																	F25
																	F30
																	F30
H110AS + DC70	1.600	359.800	16.000	11.800	F40	10,0:1	8,10	1.978	1.458		225	435	120	210	120	252	F16
																	F25
																	F30
																	F30

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# Motorizable bevel actuator for valves and sluice gates

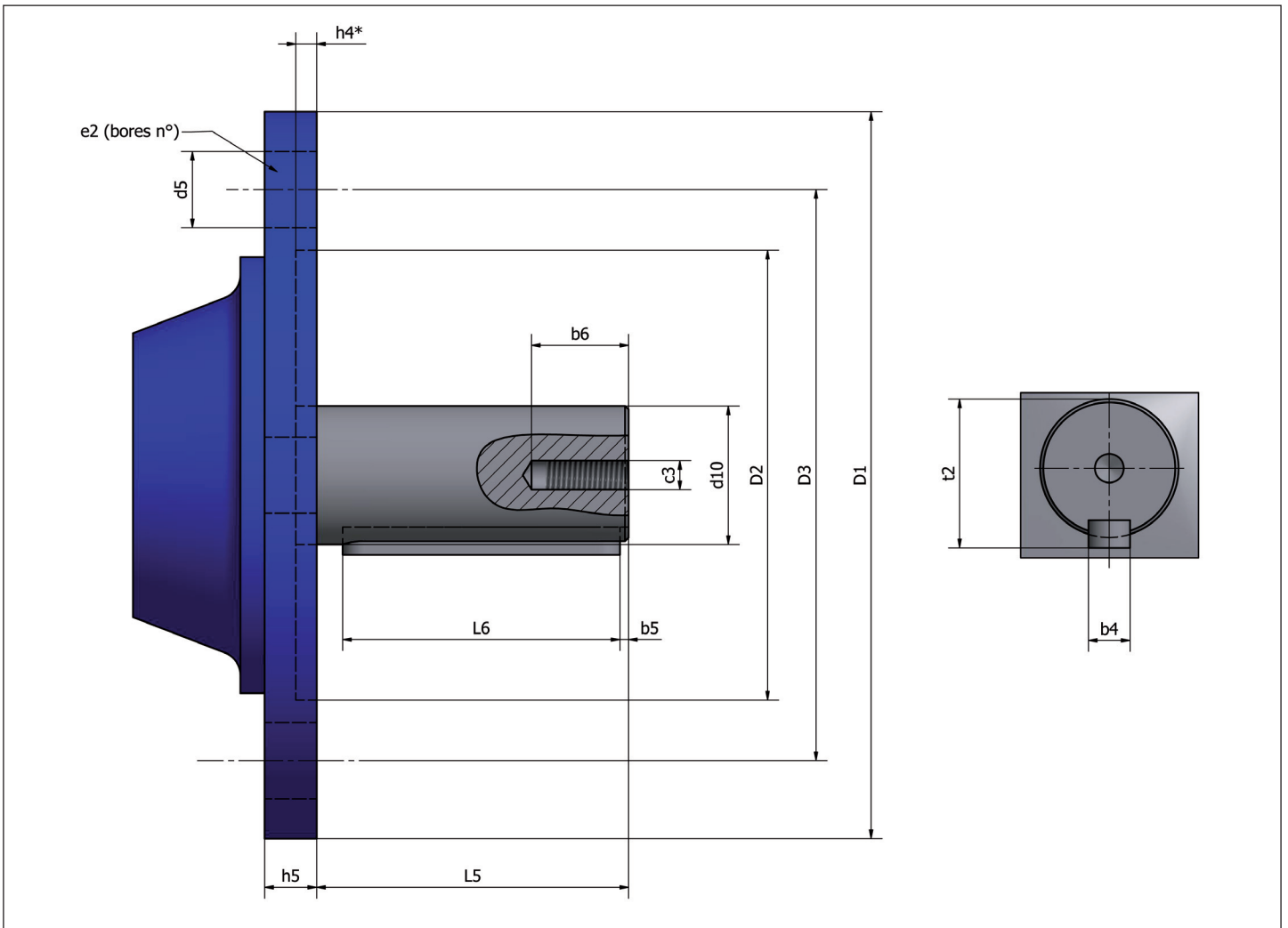


UNIT SIZE	WITHOUT BM		WITH BM								
			ISO DIN	F07	F10 Gr0	F14 Gr1/2	F16 Gr3	F25 Gr4	F30 Gr5	F35 Gr6	F40 Gr7
H04	A	100	A1	143	138						
H13	A	123	A1	173	175	145					
H24	A	144	A1		202	210	180				
	L	254	L1		317	325					
H33	A	186	A1			264	278	222			
	L	300	L1		363	371	340				
	L2	414	L3		468	483					
H43	A	204	A1			282	296	240			
	L	313	L1		381	389	358				
	L2	425	L3		486	494					
H70	A	241	A1				341	272	272		
	L	363	L1		426	434	404				
	L2	474	L3		537	545					
H90	A	287	A1				386	317	317		
	L	409	L1		471	479	449				
	L2	520	L3		582	590					
H110-H111	A	325	A1				424	355	355	355	
	L	451	L1		513	521	491				
	L2	564	L3		626	634					
H200	A	379	A1						451		459
	L	594	L1			663	689			451	
	L2	710	L3		778	786					
H300	A	449	A1							516	524
	L	659	L1			728	754				
	L2	778	L3		843	851					
H450	A	502	A1							566	574
	L	707	L1				819	749			
	L2 (43)	840	L3 (43)		889	897	867				
	L2 (90)	826	L3 (90)		903	911	881				
H650	A	557	A1							633	633
	L	900	L1				1.019	950			
	L2	1.041	L3		1.104	1.112	1.082				

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## Motorizable flanges



BM - FLANGE SIZES ACCORDING TO ISO 5210 and DIN 3210

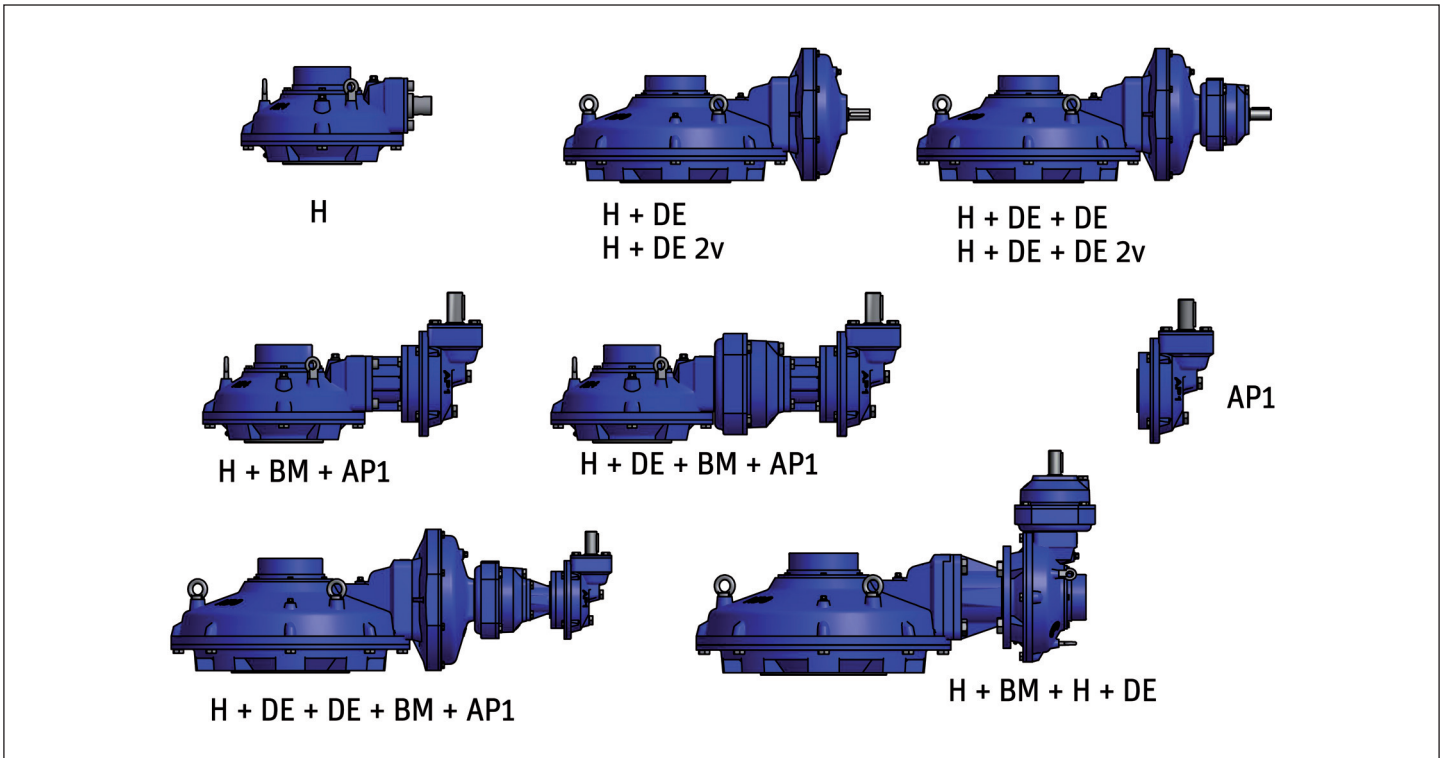
	b4	b5	b6	Øc3	D1	D2 (H8)	D3	d5	d10 (f8)	e2	h4	h5	L5	L6	t2
ISO F07	5,0	2,5	21,0	M8	90,0	55,0	70,0	10,0	16,0	4	4,0	10,0	40,0	35,0	18,0
IDO F10	6,0	2,5	21,0	M8	125,0	70,0	102,0	12,0	20,0	4	4,0	10,0	50,0	45,0	22,5
DIN Gr0	6,0	2,5	21,0	M8	125,0	<b>60,0</b>	102,0	12,0	20,0	4	4,0	10,0	50,0	45,0	22,5
ISO F14	8,0	2,5	24,0	M10	175,0	100,0	140,0	18,0	30,0	4	5,0	15,0	70,0	65,0	33,0
DIN Gr1/2	8,0	2,5	24,0	M10	175,0	100,0	140,0	18,0	30,0	4	5,0	15,0	70,0	65,0	33,0
ISO F16	12,0	2,5	24,0	M10	210,0	130,0	165,0	22,0	40,0	4	6,0	15,0	90,0	85,0	43,0
DIN Gr3	12,0	2,5	24,0	M10	210,0	130,0	165,0	22,0	40,0	4	6,0	15,0	90,0	85,0	43,0
ISO F25	14,0	5,0	27,0	M12	300,0	200,0	254,0	18,0	50,0	8	6,0	18,0	110,0	100,0	53,5
DIN Gr4	14,0	5,0	27,0	M12	300,0	<b>160,0</b>	254,0	18,0	50,0	8	6,0	18,0	110,0	100,0	53,5
ISO F30	18,0	5,0	27,0	M12	350,0	230,0	298,0	22,0	60,0	8	6,0	20,0	120,0	110,0	64,0
DIN Gr5	18,0	5,0	27,0	M12	350,0	<b>180,0</b>	<b>300,0</b>	22,0	60,0	8	6,0	20,0	120,0	110,0	64,0
ISO F35	22,0	2,5	27,0	M12	415,0	260,0	356,0	32,0	80,0	8	6,0	25,0	135,0	130,0	85,0
DIN Gr6	22,0	2,5	27,0	M12	<b>41,0,0</b>	<b>220,0</b>	356,0	32,0	80,0	8	6,0	25,0	135,0	130,0	85,0
ISO F40	28,0	5,0	27,0	M12	475,0	300,0	406,0	38,0	100,0	8	9,0	28,0	180,0	170,0	106,0
DIN Gr7	28,0	5,0	27,0	M12	475,0	<b>230,0</b>	406,0	38,0	100,0	8	9,0	28,0	180,0	170,0	106,0
ISO F48					560,0	370,0	483,0	38,0		12	9,0				
ISO F60						470,0	603,0	38,0		20					

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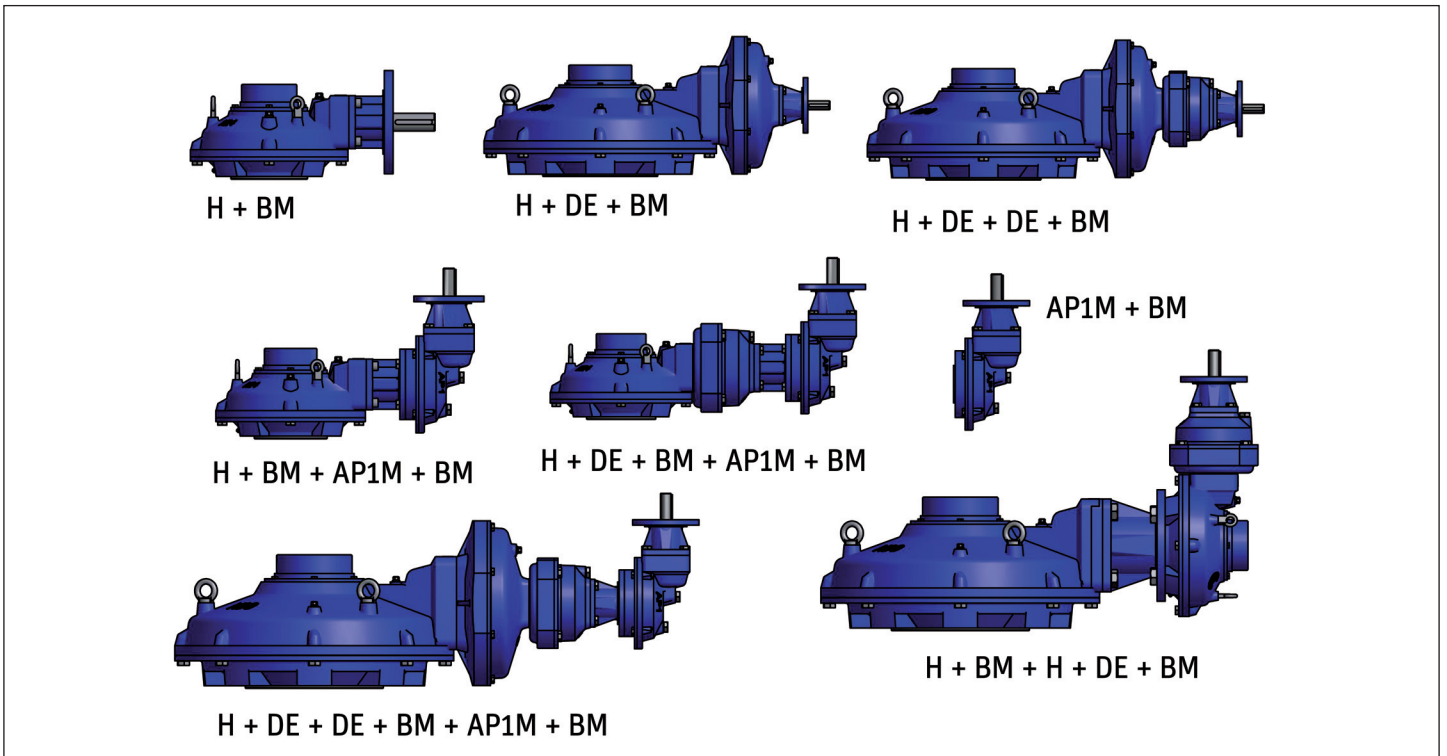




## Combinations for manual actuators



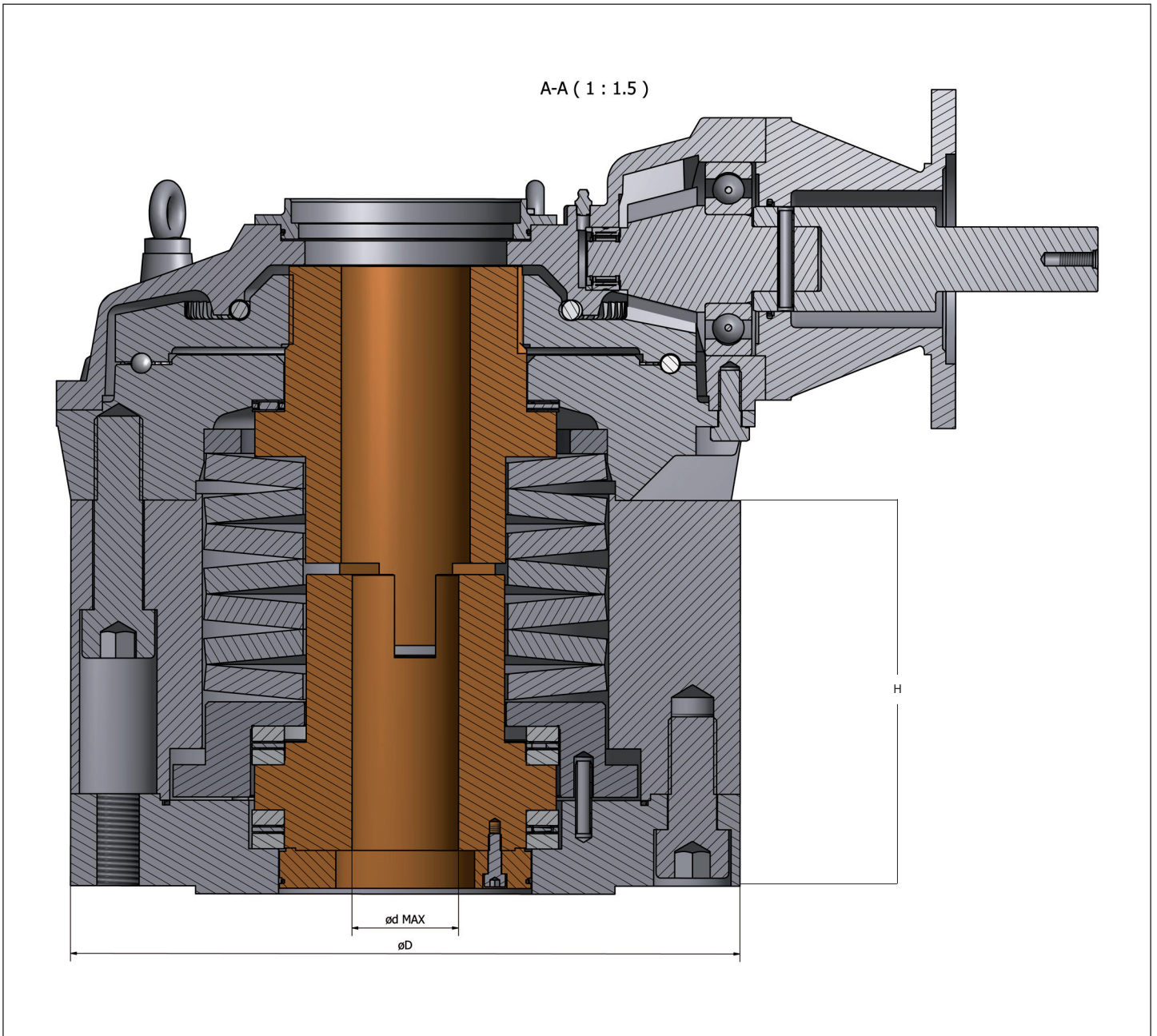
## Combinations for motorizable actuators



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**REGAL**

## Bevel gear with springs compensator SC series

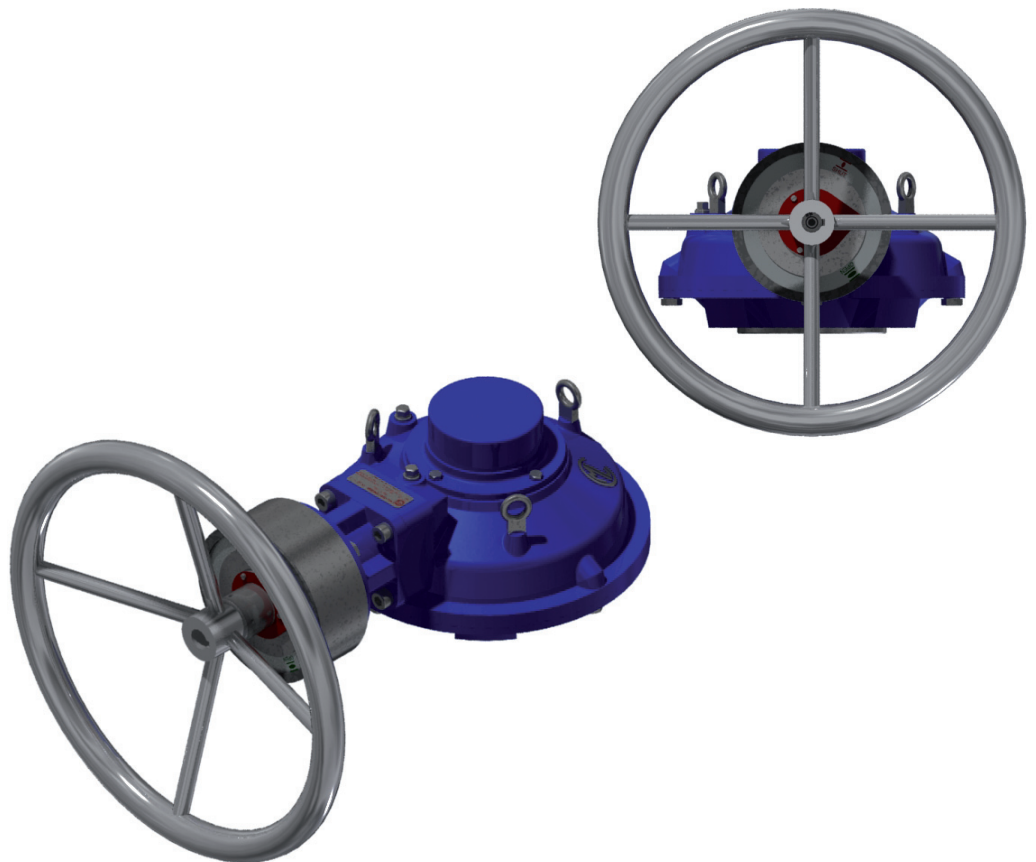
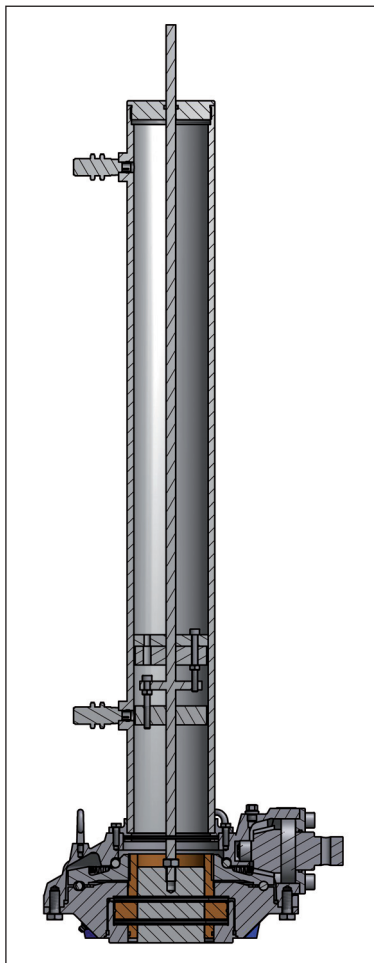
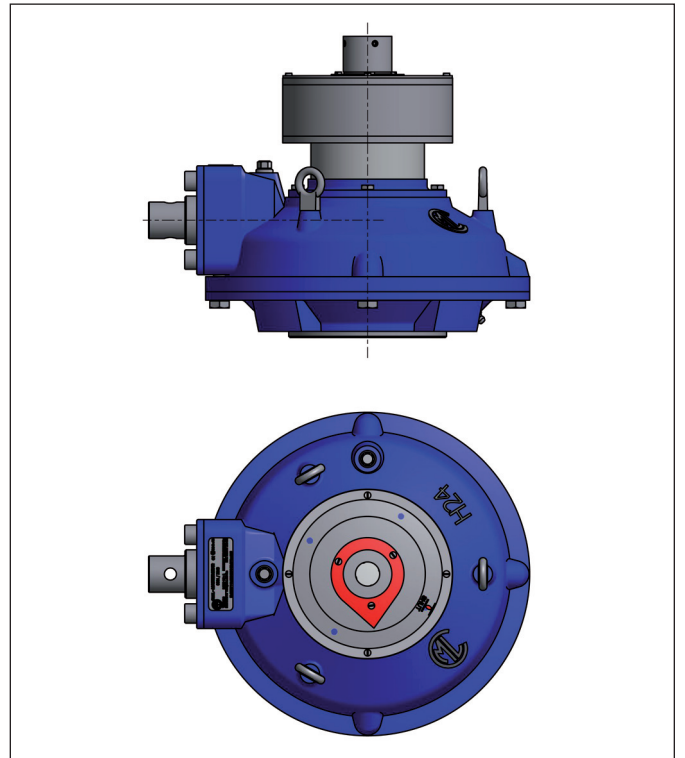
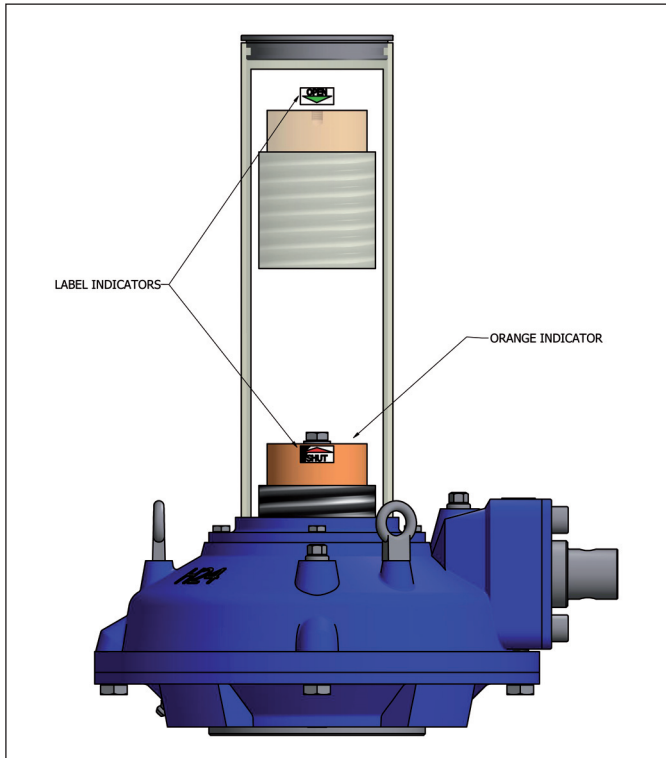


BEVEL GEARS WITH SPRING COMPENSATORS - SC SERIES											
UNIT SIZE	MAX OUTPUT TORQUE	RATIO	M.A. ± 10%	MAX INPUT TORQUE	MAX VALVE THRUST	MAX STEM ELONGATION	MAX FINAL THRUST	MAX STEM CAPACITY (ød)	VALVE MOUNTING ISO 5211	ø D	H
	Nm			Nm	KN	mm	KN	mm		mm	mm
H04	300	4,5:1	4,05	74	15	2,0	40	25	F10	125	95
H13	600	4,5:1	4,05	148	62	2,0	125	40	F14	175	100
H24	1.100	4,5:1	4,05	272	114	2,3	235	55	F16	210	215
H33	2.300	4,5:1	4,05	568	162	3,5	295	65	F25	300	180
H43	3.800	4,5:1	4,05	938	211	4,3	390	70	F30	350	200
H70	6.000	4,5:1	4,05	1.481	326	4,3	690	75	F35	415	250
H90	9.000	5,0:1	4,50	2.000	413	4,3	890	115	F35	415	380
H110	16.000	5,0:1	4,50	3.556	434	4,5	1.070	135	F40	475	300

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# Bevel gear position indicator: examples

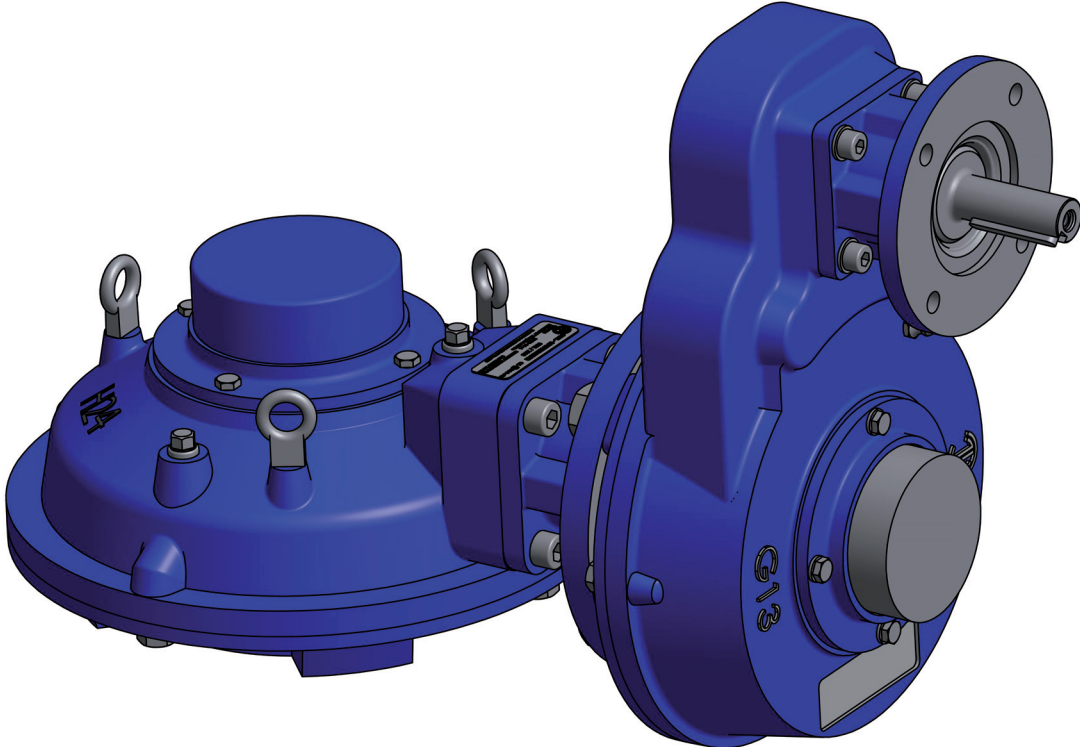
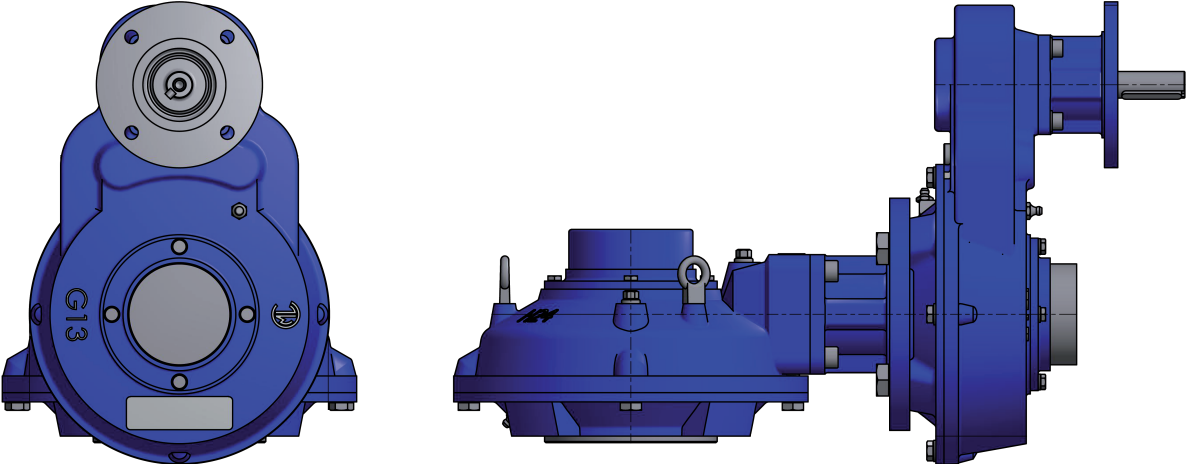


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**REGAL**



Titolo

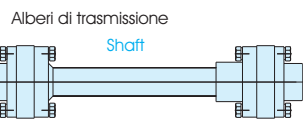
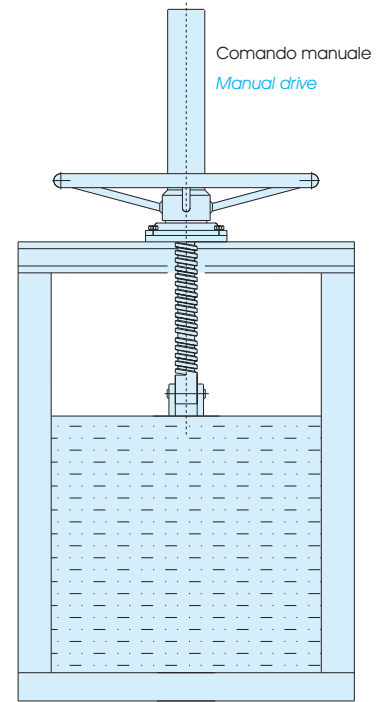
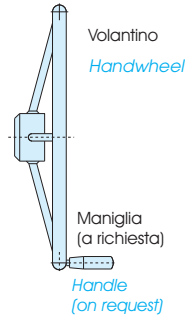
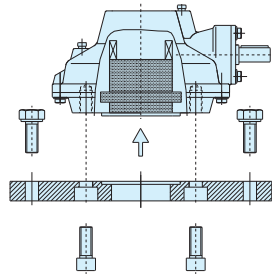
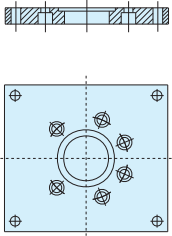


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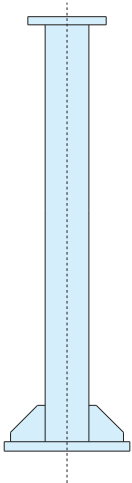


# Accessories for bevel gear actuators

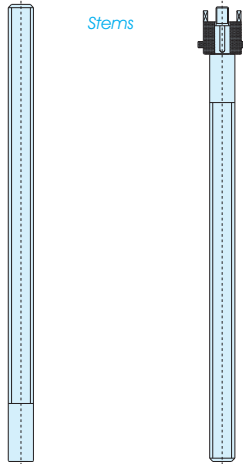
Piastre di attacco  
*Plates*



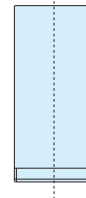
Colonnine  
*Columns*



Viti di sollevamento  
*Stems*



Copristelo tipo CS  
*Cover tube type CS*



Copristelo tipo C  
*Cover tube type C*

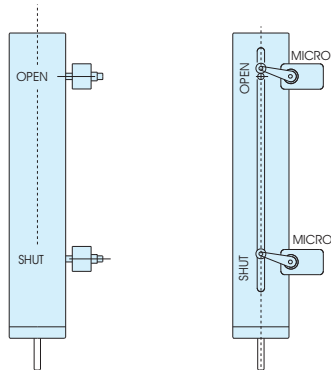


Copristelo con indicatore locale tipo CSI  
*Cover tube with position indicator type CSI*

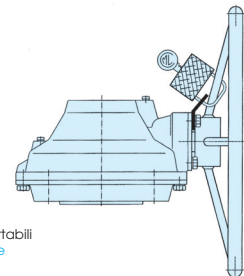


Indicatori di posizione per valvole con stelo non saliente  
*Position indicator for valves with no rising stem*

*Position indicator for valves with no rising stem*



Flange Luchettabili  
*Padlock flange*

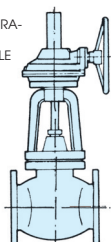


A Regal Brand

**REGAL**

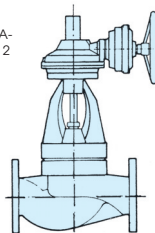
1. RIDUTTORE A INGRANAGGI A COMANDO MANUALE

*BEVEL GEAR ACTUATOR FOR MANUAL OPERATION*



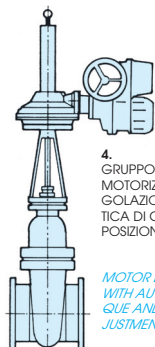
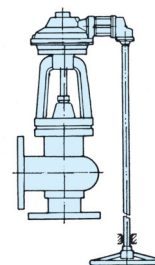
2. RIDUTTORE A INGRANAGGI CONICI CON DEMOLTIPLICATORE EPICICLOIDALE A 1 O 2 RAPPORTI DI RIDUZIONE

*BEVEL-GEAR ACTUATOR WITH ADDITIONAL REDUCTION SPUR DRIVE, WITH ONE OR TWO RATIOS*



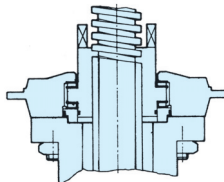
3. RIDUTTORE A INGRANAGGI CONICI CON RINVIO AD ANGOLO VERSO IL BASSO

*RIGHT ANGLE INPUT, IN THIS CASE DOWNWARDS*



4. GRUPPO DI COMANDO MOTORIZZATO CON REGOLAZIONE AUTOMATICA DI COPPIA E POSIZIONE

*MOTOR DRIVEN UNIT WITH AUTOMATIC TORQUE AND POSITION ADJUSTMENT*

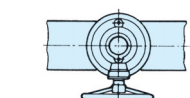
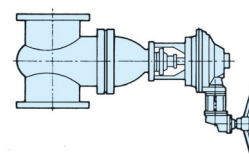


5. GRUPPO REGGISPINTA SU VALVOLA. NEL CASO DI DANNEGGIAMENTO AL RIDUTTORE. LO STESSO PUÒ ESSERE SMONTATO DALLA VALVOLA SENZA INTERRUPERE L'OPERATIVITÀ. LA MANOVRA DI APERTURA O CHIUSURA SI EFFETTUA CON APPPOSITO VOLANTINO

*THRUST-BLOCK ON VALVE. IN CASE OF DAMAGE TO THE GEARBOX, THIS CAN BE DISASSEMBLED FROM THE VALVE WITHOUT STOPPING THE OPERATION. OPENING AND CLOSING IS CARRIED OUT BY APPROPRIATE HANDWHEEL.*

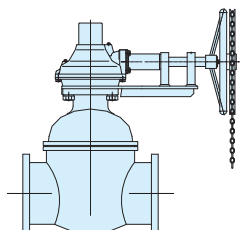
6. RIDUTTORE A INGRANAGGI CONICI CON RINVIO AD ANGOLO

*RIGHT-ANGLE INPUT BEVEL GEAR ACTUATOR*



7. RIDUTTORE A INGRANAGGI CONICI SU PARATOIA CON 1 VITE DI MANOVRA A COMANDO MANUALE

*BEVEL GEAR ACTUATOR ON SLUICE GATE WITH CONTROL SPINDLE FOR MANUAL OPERATION*



8. RIDUTTORE SU VALVOLA AZIONATO DA VOLANTINO CON CATENA.

*BEVEL GEAR ACTUATOR WITH CHAINWHEEL*



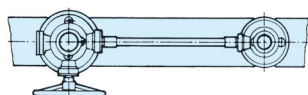
9. VITE NON SALIENTE MONTATA SU CHIOCCIOLA REGGISPINTA

*NON RISING STEM*



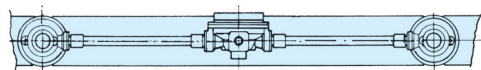
10. VITE SALIENTE CON CHIOCCIOLA REGGISPINTA

*RISING STEM*



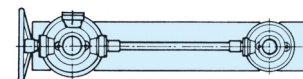
11. GRUPPO DI COMANDO MANUALE CON VOLANTINO FRONTALE PER PARATOIA E DUE VITI DI MANOVRA

*HAND OPERATED UNIT WITH FRONT-SIDE HANDWHEEL FOR SLUICE WITH DOUBLE CONTROL SCREWS*



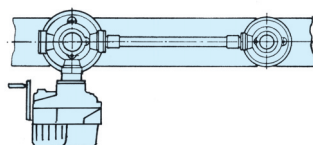
15. GRUPPO DI COMANDO MANUALE CON RINVIO CENTRALE VERSO L'ALTO PER MANOVRA DAL PIANO DI CALPESTIO.

*HAND OPERATED UNIT WITH CENTRAL BACK-GEARING UPWARDS FOR OPERATION FROM PLATFORM.*



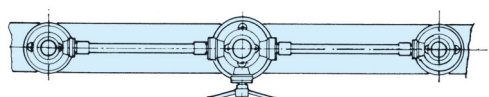
12. GRUPPO DI COMANDO MANUALE CON VOLANTINO LATERALE PER PARATOIA A DUE VITI DI MANOVRA

*HAND OPERATED UNIT WITH SIDE HANDWHEEL FOR SLUICE WITH DOUBLE CONTROL SCREWS*



13. GRUPPO DI COMANDO MOTORIZZATO CON REGOLAZIONE AUTOMATICA DI COPPIA E DI POSIZIONE.

*MOTOR-DRIVEN UNIT WITH AUTOMATIC ADJUSTMENT OF TORQUE AND POSITION.*



14. GRUPPO DI COMANDO MANUALE CON RINVIO CENTRALE E VOLANTINO FRONTALE PER PARATOIA A DUE VITI DI MANOVRA.

*HAND OPERATED UNIT WITH CENTRAL BACK-GEARING AND FRONT-SIDE HANDWHEEL FOR DOUBLE-SCREW SLUICE.*

La C.M.L. può fornire oltre al riduttore, al demoltiplicatore e agli accessori standard di produzione, anche i componenti specifici per il cliente quali:

- Viti per paratoie tipo saliente e non saliente.
- Alberi per il collegamento di più riduttori, con giunti rigidi od oscillanti.
- Flange speciali per applicazione motori ai riduttori
- Gruppi di motorizzazione con regolazione di coppia, a comando elettrico, oleodinamico, pneumatico

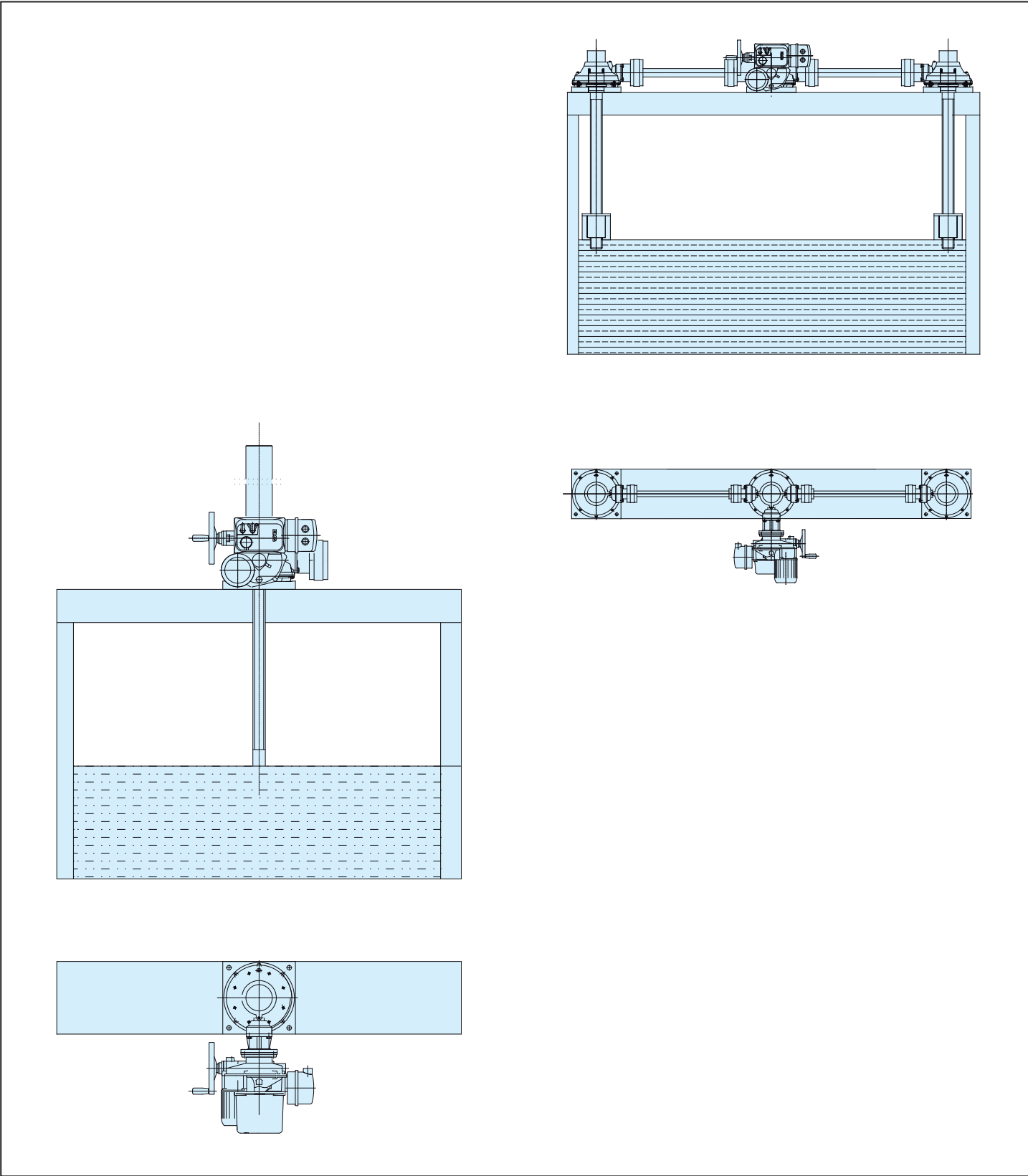
*In addition to bevel gear actuators with additional reductions and other standard features CML can also provide special accessories and features:*

- Threaded shafts
- Connecting drive shafts with couplings and joints
- Special flanges
- Motor-driven electric, hydraulic or pneumatic units, complete with torque adjustment capabilities

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# Possible application

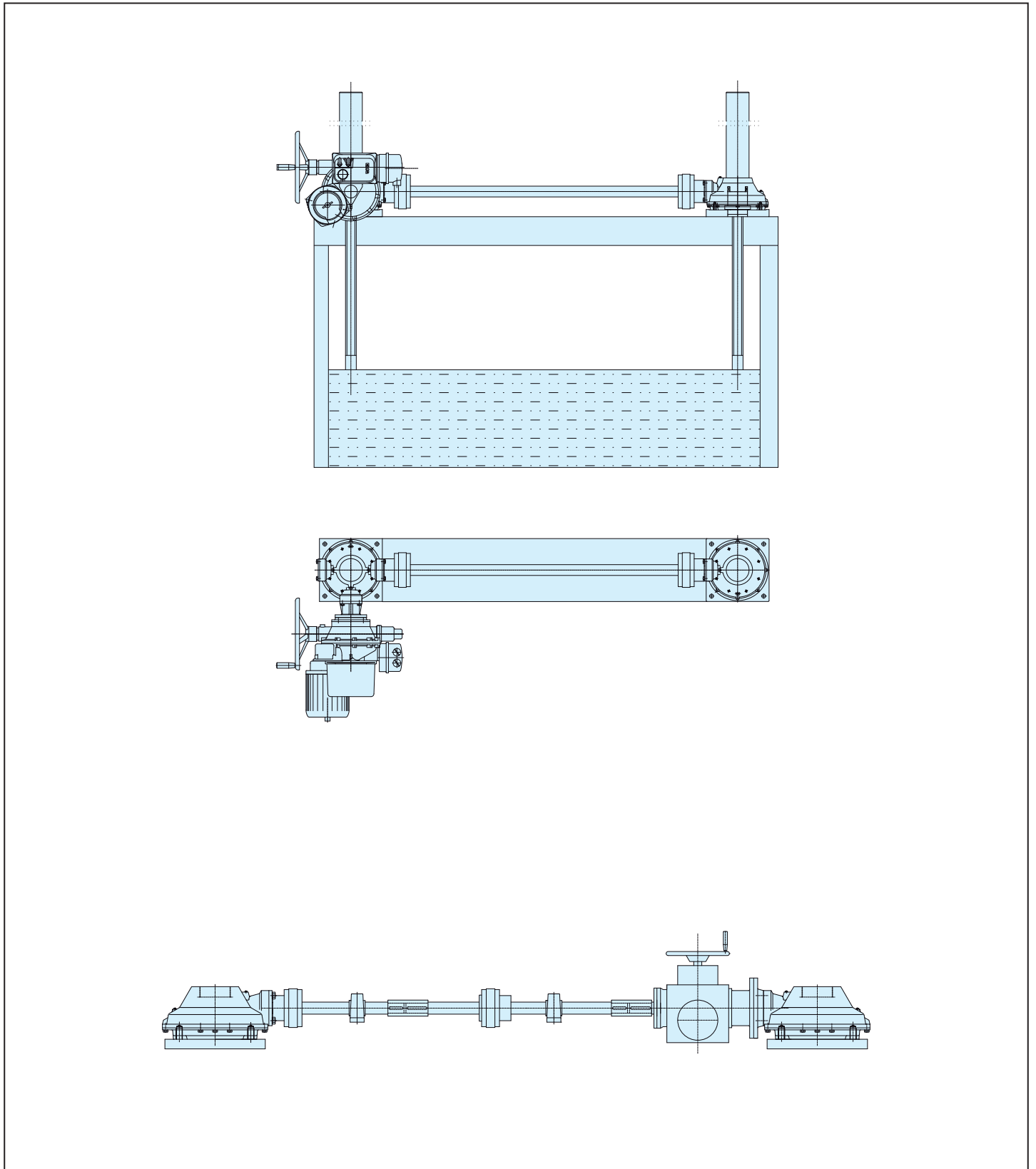


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## Possible application



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## ENVIRONMENTAL SPECIFICATION

SLO39-D	WEATHERPROOF STANDARD VERSION	THIS IS THE MOST COMMON SPEC. MANUFACTURED AND IS THE BASIS OF ALL OTHER SPECIFICATIONS. TEMPERATURE RANGE: -20°C TO 80°C PROTECTION: IP67 (TEMPORARY IMMERSION)
SLO20	LOW TEMPERATURE	SUITABLE FOR SHIP DECK, OILRING AND SHORE BASED INSTALLATION SUBJECT TO SALT WATER SPRAY. RECOMMENDED FOR HIGH HUMIDITY TROPICAL CONDITIONS. INCORPORATING STAINLESS STEEL INPUT SHAFT AND GASKET . LOW TEMPERATURE GREASE. TEMPERATURE RANGE : - 60°C TO 80°C , WITHOUT IMPACT TEST CERTIFICATE. PROTECTION: IP 67 (TEMPORARY IMMERSION)
SLO21 SLO60	HIGH TEMP / FIRE SAFE	ALL SIZES OF MANUAL GEAR OPERATORS CAN BE BUILT TO THIS SPECIFICATION WHICH INCLUDES SPECIAL LUBRICATION. THIS REQUIRES THE VALVE TO OPERATE SATISFACTORY AFTER THE FIRE. TEMPERATURE RANGE: -20°C TO 200°C OR TO FIRE CONDITION. PROTECTION: IP 67 (TEMPORARY IMMERSION)
SLO29	OXYGEN SERVICE	OXYGEN SERVICE SPECIFICATION. ALWAYS FOLLOWING ATEX SPECIFICATION. PROTECTION: IP 67 (TEMPORARY IMMERSION)
SLO40	MARINIZED MARINE ENVIRONMENT IMPROVED CORROSION PROTECTION	SUITABLE FOR SHIP DECK, OILRING AND SHORE BASED INSTALLATION SUBJECT TO SALT WATER SPRAY. RECOMMENDED FOR HIGH HUMIDITY TROPICAL CONDITIONS. TEMPERATURE RANGE: -20°C TO 80°C PROTECTION: IP 67 (TEMPORARY IMMERSION)
SLO40-SS	MARINIZED MARINE ENVIRONMENT IMPROVED CORROSION PROTECTION	SUITABLE FOR SHIP DECK, OILRING AND SHORE BASED INSTALLATION SUBJECT TO SALT WATER SPRAY. RECOMMENDED FOR HIGH HUMIDITY TROPICAL CONDITIONS. INCORPORATING STAINLESS STEEL INPUT SHAFT AND GASKET. TEMPERATURE RANGE: -20°C TO 80°C PROTECTION: IP 67 (TEMPORARY IMMERSION)
SLO47	SUPER MARINIZED MARINE ENVIRONMENT IMPROVED CORROSION PROTECTION	SUITABLE FOR SHIP DECK, OILRING AND SHORE BASED INSTALLATION SUBJECT TO SALT WATER SPRAY. RECOMMENDED FOR HIGH HUMIDITY TROPICAL CONDITIONS. LOW TEMPERATURE GREASE. INSPECTION 1/8" ON HOUSING WITH CAP, RELIEF VALVE. TEMPERATURE RANGE: -40°C TO 100°C PROTECTION: IP 67 (TEMPORARY IMMERSION)
SLO48	EXTREME ENVIRONMENTS (OFFSHORE)	SUITABLE FOR SHIP DECK, OILRING AND SHORE BASED INSTALLATION SUBJECT TO SALT WATER SPRAY. UNIT CONSTRUCTED WITH AISI 316 STAINLESS STEEL HOUSING, OUTPUT BASE, TRIM, INPUT PINION AND SCREW. ALWAYS FITTED WITH GREASE NIPPLE AND RELIEF VALVE. RECOMMENDED FOR HIGH HUMIDITY TROPICAL CONDITIONS. TEMPERATURE RANGE: -40°C TO 100°C PROTECTION: IP 67 (TEMPORARY IMMERSION)
SLO50	SUBMERSIBLE (MAX 25 MT) (NO COMPENSATION)	OPTIONAL: OIL LUBRICATION (IMPREGNATION REQUIRED). TEMPERATURE RANGE : -0°C TO 60°C PROTECTION: IP 68 (SUBMERSIBLE DOWN TO 25 METERS DEPTH WITHOUT PRESSURE COMPENSATOR)
SLO72	BURIED SERVICE (WET)	SUITABLE FOR APPLICATION WHERE SOIL IS COMPACTED AROUND THE ACTUATOR. IT IS NECESSARY TO CONNECT STAND PIPE TO THE INPUT FACING TO PROTECT ROTATING INPUT PARTS. STAINLESS STEEL HASKET AND SEALING OF ALL FACES AND OPENINGS PREVENT CORROSION AND INGRESS OF MOISTURE. TEMPERATURE RANGE: -20°C TO 80°C PROTECTION: IP 67 (TEMPORARY IMMERSION)
SL120	LOW TEMPERATURE	SUITABLE FOR SHIP DECK, OILRING AND SHORE BASED INSTALLATION SUBJECT TO SALT WATER SPRAY. RECOMMENDED FOR HIGH HUMIDITY TROPICAL CONDITIONS. INCORPORATING STAINLESS STEEL INPUT SHAFT AND GASKET. LOW TEMPERATURE GREASE LUBRICANT. HOUSING, OUTPUT FLANGE COVER AND INPUT ADAPTOR FLANGE IN LCC. TEMPERATURE RANGE: - 60°C TO 100°C PROTECTION: IP 67 (TEMPORARY IMMERSION)
SL120-SS	ATEX TO LOW TEMPERATURE	SUITABLE FOR SHIP DECK, OILRING AND SHORE BASED INSTALLATION SUBJECT TO SALT WATER SPRAY. RECOMMENDED FOR HIGH HUMIDITY TROPICAL CONDITIONS. INCORPORATING STAINLESS STEEL INPUT SHAFT AND GASKET. STAINLESS STEEL LABEL, GREASER NIPPLE AND RELIEF VALVE. LOW TEMPERATURE GREASE LUBRICANT. HOUSING, OUTPUT FLANGE COVER AND INPUT ADAPTOR FLANGE IN LCC. TEMPERATURE RANGE: - 60°C TO 100°C PROTECTION: IP 67 (TEMPORARY IMMERSION)
SL150	SUBMERSIBLE AT DEEP SEA BELOW 25 METER DEPTH WITH PRESSURE COMPENSATOR	OPTIONAL: OIL LUBRICATION (IMPREGNATION REQUIRED). TEMPERATURE RANGE: -0°C TO 60°C PROTECTION: IP 68 (SUBMERSIBLE BELOW 25 METERS DEPTH WITH PRESSURE COMPENSATOR)

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# ESEMPIO PER ORDINE RIDUTTORE CML

## HOW TO ORDER A CML BEVEL ACTUATOR

1	2	3	4	+	5	6	+	7	8	+	9	10	+	11	+	12
H33	T	A	M		DE43	M		DE24	M		AP1	M		V 400		BM ISO F10

I riferimenti da 1 a 12 rappresentano le possibili versioni dei riduttori CML.

Referrals from 1 to 12 represent CML actuator versions.

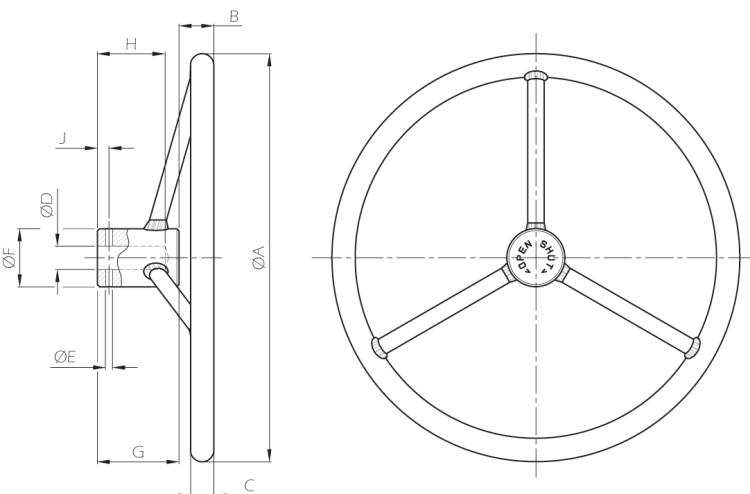
La tabella sotto riportata illustra il significato delle sigle.

Below are explanations of the letter designations.

- 1: Grandezza riduttore conico (vedere tabella di pag. 6): H...
- 2: Riduttore conico a due pignoni a 90° (vedere schema di pag. 4): lettera D  
Riduttore conico a due pignoni a 180° (vedere schema di pag. 4): lettera D  
Riduttore conico a tre pignoni (vedere schema di pag. 4): lettera T
- 3: Riduttore conico senza gruppo reggispinta: lettera B  
Riduttore conico con gruppo reggispinta: lettera A
- 4: Riduttore conico manuale: lettera-  
Riduttore conico motorizzabile: lettera M
- 5: Riduttore supplementare o demoltiplicatore (vedere tab. pag. 7-8-9): sigla DE...
- 6: Riduttore supplementare o demoltiplicatore manuale: lettera-  
Riduttore supplementare o demoltiplicatore motorizzabile: lettera M...
- 7: Secondo riduttore supplementare o demoltiplicatore (vedere tab. pag. 9): sigla DE...
- 8: Secondo riduttore supplementare o demoltiplicatore manuale: lettera-  
Secondo riduttore supplementare o demoltiplicatore motorizzabile: lettera M
- 9: Rinvio angolare manuale: sigla AP1
- 10: Rinvio angolare manuale: lettera-  
Rinvio angolare motorizzabile: lettera M
- 11: Volantino per manovra manuale (diametro in mm): V...
- 12. Grandezza flangia BM ISO (vedere tabella di pag. 9-10): sigla ISO...

- 1: Bevel gears model (see listing page 6): H...
- 2: Bevel gear, two pinions at a 90° (see diagram page 4): letter D  
Bevel gear, two pinions at 180° (see diagram page 4): letter D  
Bevel gear, three pinions (see diagram page 4): letter T
- 3: Bevel gear without thrust unit: letter B  
Bevel gear with thrust unit: letter A
- 4: Manual bevel gear: letter-  
Motorizable bevel gear: letter M
- 5: Additional bevel gear or manual spur gear (see listing pag. 7-8-9): DE...
- 6: Additional bevel gear or manual spur gear: letter-  
Additional bevel gear or motorizable spur gear: letter M
- 7: Second additional bevel gear or spur gear (see listing page 9): DE...
- 8: Second additional bevel gear or manual spur gear: letter-  
Second additional bevel gear or motorizable spur gear: letter M
- 9: Manual mitre: AP1
- 10: Manual mitre: letter-  
Motorizable mitre: letter M
- 11: Handwheel for manual driving (diameter in mm): V...
- 12. Size of BM flange (see listing page 9-10): ISO...

## Handwheels



HANDWHEEL - DATA				
ØA ±10	B ±15	ØC	No.OF SPOKES	WEIGHT (Kg)
200	8	21	3	2.2
300	35	27	4	2.5
400	34	27	4	3.0
500	48	27	4	3.5
600	67	34	4	5.5
700	73	34	4	6.5
800	85	34	4	7.5
900	101	42	5	8.5
1000	115	42	5	9.5

HANDWHEEL - DATA					
ØD +0.05/+0.1	ØE +0.05/+0.1	ØF ±2	G ±0.5	H 0/+0.5	J ±2
20	6	40	60	40	8
30	8	50	80	58	11
30	10	50	80	58	11
30	10	55	80	58	11



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