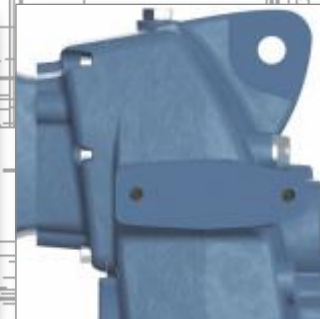


STON SHAFT MOUNTED GEARBOX



rotomotive
looks good. performs better.





Rotomotive Powerdrives India Ltd is an Italian joint venture company operating in India since 2006. It has access to European technology and know-how from Motive srl, one of the joint venture partners and sources parts and components from Indian suppliers. We have a modern manufacturing facility in Gujarat, India. Rotomotive has the capacity to design, prototype and manufacture custom motors for various applications.

Our modern manufacturing plant has advanced machinery for automatic winding, trickle and vacuum pressure impregnation, precise balancing, conveyorized assembly, enclosed painting lines, automatic testing facilities with all components bar coded for traceability, consistent quality and low production time.

We also have an advanced testing facility for type testing motors and gearboxes which enables us to plot accurate speed torque curves and carry out temperature rise tests and other type tests as per IEC 60034/IS: 12615.

Our Manufacturing facility in India



Gearbox machining



Lean Assembly Line



Geared Motor Testing



Hardness Testing



Backlash Checking



Shop Floor



Our Manufacturing facility in Italy

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A



B

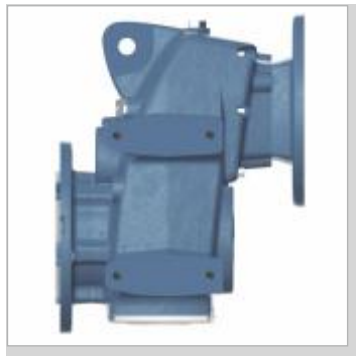


C



D





Uniquely contoured, rigid, precise. monobloc, cast iron Body, Base and Flange ensure extreme robustness.

ROBUST



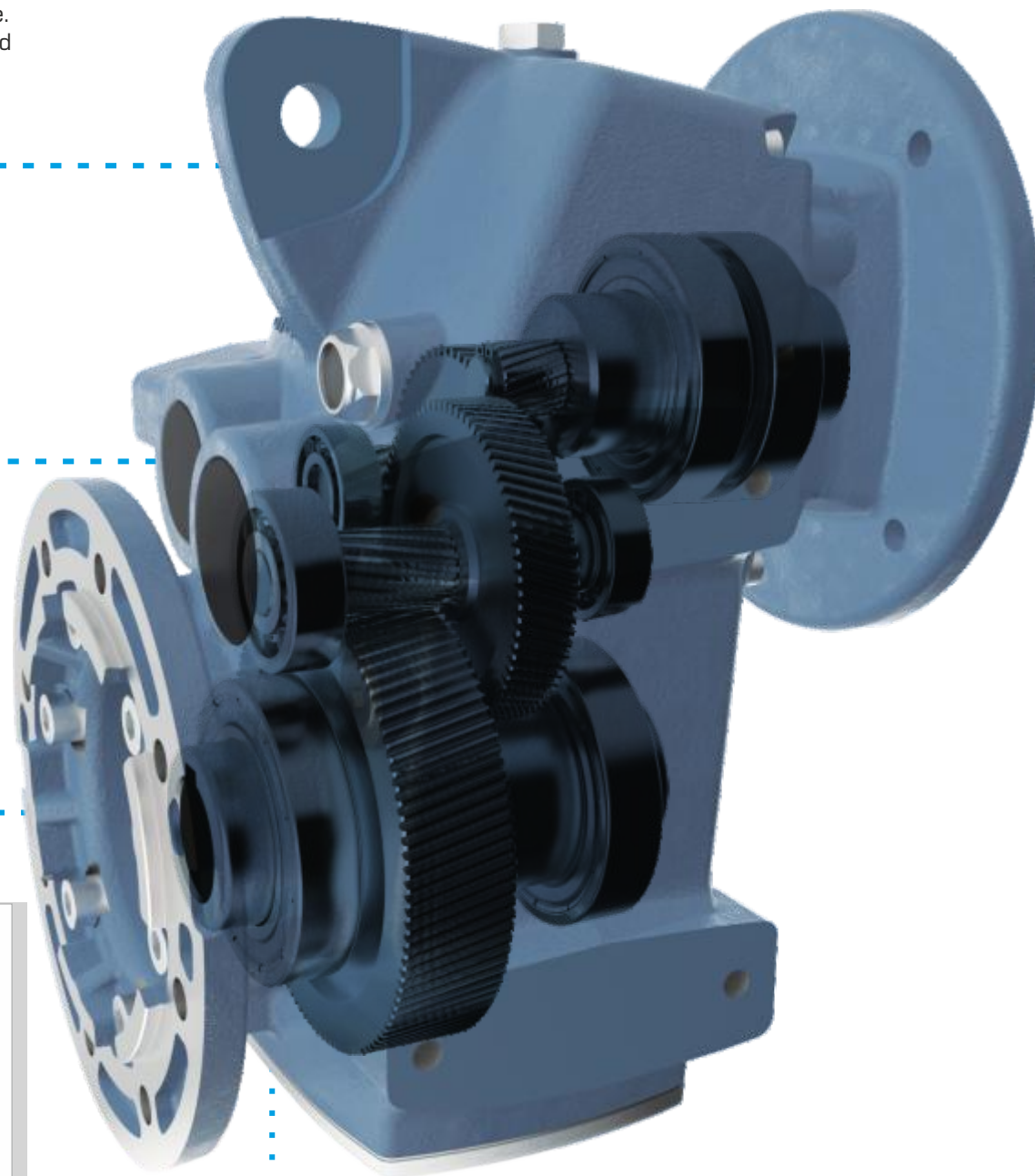
2 or 3 reduction stages inside the same body, in order to have a wider and more reliable range of ratios



VERSATILE

A modular design with detachable output flange and integral feet permits the easy and fast conversion between flange or foot mounting

REGISTERED DESIGN



FLEXIBLE MOUNTING



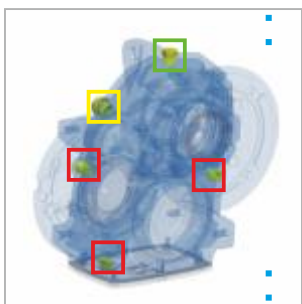
IEC flange and hollow shaft.

Choice of hollow input shaft & input flanges permits direct mounting of any IEC standard motor.



Unique construction of Ston makes it possible to mount any size in any position. this flexibility is achieved by:

+ ZZ pre-lubricated bearings on input and output shaft.



5 interchangeable plugs, including one breather plug and a level plug. Breather plug allows to reduce the internal pressure on seals and thus increases the efficiency of the seals.



+ mechanical parts locked in their positions by snap rings. this also ensures better absorption of axial thrust and prolongs the life of bearings.

ENGINEERED FOR HIGHER RELIABILITY



Use of high strength case hardened steels with case hardening to 58 ± 2 HRC reduce the wear rate. All components are profile ground to DIN 3962 class 6 accuracy for low noise and high efficiency.



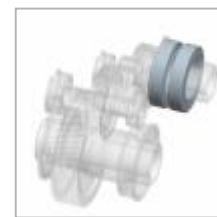
Shafts are made from 42CrMo4 steel and tempered to reach a hardness of 23-35 HRC, thus increasing their capacity to withstand shearing stresses.



If the mechanical robustness and the service factor of an helical gearbox are mainly influenced by the centres distance of the last stage, Ston confirms to be very robust.



Single stages ratios between 2 and 6, together with proper gears sizes, result mathematically in higher teeth number and size (module) of each wheel and a better fractioned load among the reduction stages. that influences both durability and torque transmission capability.



Dual bearing support on the input shaft assures precise alignment of the first stage gears and reduces vibrations and consequent gear wear.



Abounding bearings size, in order to withstand higher loads.

Rated output torque M_{n2} [Nm]

Torque output transmissible under uniform loading and referred to the input speed n_1 and the corresponding output speed n_2 .

The output torque can be calculated with the following formula:

$$M_{n2} = \frac{P_{n1} [\text{kW}] \cdot 9550}{n_2} \cdot \eta$$

Torque demand M_{r2} [Nm]

Torque calculated based on application requirements. It must be $\leq M_{n2}$ of the chosen STON unit.

Input power P_{n1} [kW]

This is the power value of the motor applied to the input shaft and corresponding to a certain input speed n_1 , a service factor $f_s = 1$ and a duty service s_1 .

It is even possible to calculate the motor-size necessary by using the formula:

$$P_{n1} [\text{kW}] = \frac{M_{r2} \cdot n_2}{9550 \cdot \eta}$$

Since the value calculated in this way could not really correspond to an input power actually available in the IEC standardised motors, it will be necessary to choose, among the input powers available, the one which is immediately higher, checking this in the Rotomotive catalogue of the motors.

Efficiency η [%]

An inherent factor in the selection of gear boxes is the efficiency η , defined as the ratio between the mechanical power coming out from the output shaft, and the power in the input shaft:

$$\eta = \frac{P_{n2}}{P_{n1}}$$

The efficiency in helical gearboxes is mainly determined by the gearing and

bearing friction.

The efficiency of STON varies with the nr of stages: it's 94% when the reduction stages are 3, 96% when the stages are 2.

The starting efficiency is always less than the efficiency at rated speed

Gear ratio i

It is the relationship of the input speed n_1 and the output speed n_2

$$i = \frac{n_1}{n_2}$$

In the combined, the total ratio is the result of the product of the ratio of the two single boxes.

Input speed n_1 [rpm]

It is the speed the STON unit is driven at.

Output speed n_2 [rpm]

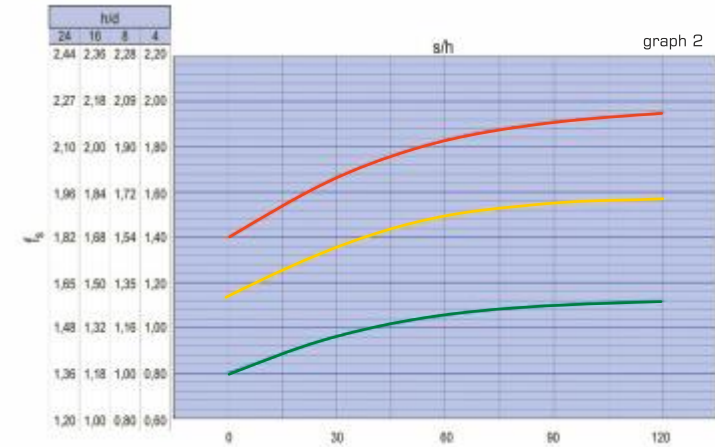
It is the rotation speed of the output shaft.

Service factor f_s

It is a numeric value describing the STON unit service duty. With unavoidable approximation, it takes into consideration:

- the daily working hours **h/d**
- the load classification (see table 2), and then the moment of inertia of the driven masses.
- the number of starts per hour **s/h**
- the presence of brake motors, for which it is necessary to multiply for 1.12 the service factor value deducted by the graph 2.
- The significance of the application in terms of safety, for example lifting of parts

In the graph 2, the service factor f_{sr} required by a certain application can be attained, after having selected the proper "daily working hours" (h/d) column, by intersecting the number of starts per hour (s/h) and one of the a, b or c curves. the curves a, b and c are linked with the load classification described in the table 2.



tab. 2

load classification	application
c uneven operation, heavy loads, larger masses to be accelerated	conveyors with violent jerks; compressors ad alternate pumps with 1 or more cylinders; machinery for bricks, tiles and clay; kneaders; milling machines; lifting winches with buckets; rotting furnaces; heavy fans or mining purposes; mixers for heavy materials; machine-tools; planing kinds; alternating saws; shears; tumbling barrels; vibrators; shredders; turntables
b starting with moderate loads, uneven operating conditions, medium size masses to be accelerated	belt conveyors with varied load with transfer of bridge trucks for light duty; levelling machines; shakers and mixed for liquid with variable density and viscosity; machines for the food industry (kneading troughs, mincing machines, slicing machines, etc); sifting machines for sand gravel; textile industry machines; cranes, hoists, goodstifts; fertilizer scrapers; concrete mixers; folding machines; winches; crane mechanisms
a easy starting, smooth operation, small masses be accelerated	belt conveyors for light material; centrifugal pumps; rotary gear pumps; screw feeders for light materials; lifts; bottling machines; auxiliary controls of tool machines; fans; power generators; fillers; small mixers

If, after the selection of the right M_{r2} and n_2 in the following performance tables, you don't find a STON unit whose service factor f_s is $\geq$ of the requested one f_{sr} , you can choose a ston unit in which $M_{n2} > M_{r2}$.

In fact, in order to satisfy f_{sr} , you can choose another STON unit whose output torque is $\geq M_{c2}$ output torque, where:

$$M_{c2} = M_{r2} \cdot f_{sr}$$

Note: This rule is valid only if the new STON unit that has been selected in this way has a service factor $f_s \geq 1$ in the performance tables.

From another point of view, the value of f_s in the performance tables refers to a case in

which the effective torque requested by the application M_{r2} matches perfectly with the one appearing on the catalogue M_{n2} .

Whenever the torque indicated in the performance table is higher than the requested one, the offered service factor of the performance table can be increased according to the formula:

$$f_{s \text{ real}} = \frac{f_s \text{ on the table} \cdot M_{n2} \text{ on the table}}{M_{r2}}$$

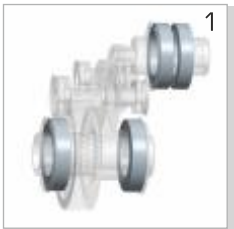
The value of f_s calculated in this way must be $\geq f_{sr}$.

LUBRICATION

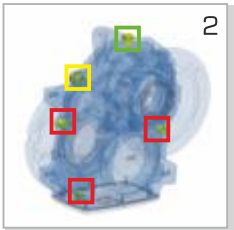
Each STON is supplied with long-life synthetic oil and do not require any maintenance.
The oil quantity is suitable for B3 mounting position

STON	Oil (ltr)						ISO	Temp.	Oil Type
	B3	B6	B7	B8	V5	V6			
ST030	1.05	1.10	1.10	0.95	1.25	1.50	VG 220	-25 +80°C	Mobil SHC 30 Shell Tivela S220 Klubersynth GH6-220
ST040	1.90	1.75	1.75	1.65	2.20	2.55			
ST070	2.20	2.10	2.10	2.00	3.00	3.50			
ST150	4.80	4.40	4.60	4.30	8.00	7.70			
ST300	9.30	8.30	8.60	7.80	14.90	13.80			
ST430	20.60	17.00	16.40	13.60	27.10	26.70			

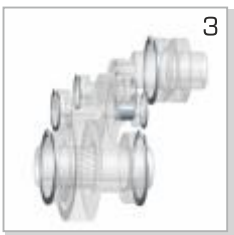
After adapting the oil quantity, each STON can be mounted in ANY position, thus giving big advantages in the stock management and lead time, thanks to the following 3 characteristics:



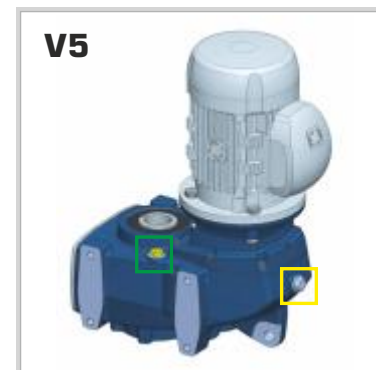
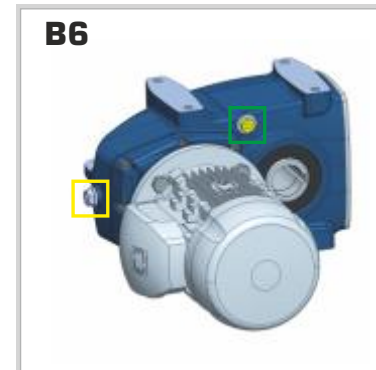
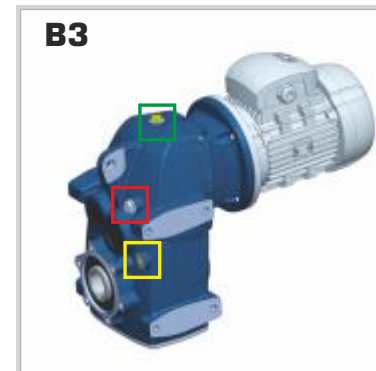
ZZ pre-lubricated bearings on input and output shaft



5 interchangeable plugs, including one breather plug and a level plug. Level and breather plug must be positioned according to this chart



Mechanical parts locked in their positions by circlips. This also ensures better absorption of axial thrust and prolongs the life of bearings



breather plug



level plug



filler plug

PERFORMANCE TABLE

STON 030																											Peak torque = 300 Nm						
Input: 63, 71, 80, 90, 100, 112	Rated ratio	4	5	7	10	13	15	20	23	25	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100	110	115						
	Real ratio	4.13	5.04	6.48	10.48	12.01	15.54	19.68	23.16	25.09	20.09	24.51	30.08	33.57	40.46	45.42	51.25	56.79	59.52	65.31	69.75	75.31	80.96	90.27	99.76	108.71	115.80						
	Stages	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3						
	STON 030 with 2 pole / 2880 RPM motors																																
	kW	Frame	Torque (Nm)																														
	Speed	697.3	571.4	444.4	274.8	239.8	185.3	146.3	124.4	114.8	143.3	117.5	95.8	85.8	71.2	63.4	56.2	50.7	48.4	44.1	41.3	38.2	35.6	31.9	28.9	26.5	24.9						
	0.18	63A	2.4	2.9	3.7	6.0	6.9	8.9	11.3	13.3	14.4	11.3	13.7	16.9	18.8	22.7	25.5	28.8	31.9	33.4	36.6	39.1	42.3	45.4	50.6	56.0	61.0	65.0					
	0.25	63B	3.3	4.0	5.2	8.3	9.6	12.4	15.7	18.4	20.0	15.7	19.1	23.4	26.2	31.5	35.4	39.9	44.3	46.4	50.9	54.4	58.7	63.1	70.3	77.7	84.7	90.2					
	0.37	71A	4.9	5.9	7.6	12.3	14.1	18.3	23.2	27.3	29.5	23.2	28.3	34.7	38.7	46.7	52.4	59.1	65.5	68.6	75.3	80.4	86.9	93.4	104	115	125	134					
	0.55	71B	7.2	8.8	11.3	18.3	21.0	27.2	34.5	40.5	43.9	34.4	42.0	51.6	57.6	69.4	77.9	87.9	97.4	102	112	120	129	139	155	171	186	199					
	0.75	80A	9.9	12.0	15.5	25.0	28.7	37.1	47.0	55.3	59.9	47.0	57.3	70.3	78.5	94.6	106	120	133	139	153	163	176	189	211	STON 040							
1.1	80B	14.5	17.6	22.7	36.7	42.0	54.4	68.9	81.1	87.8	68.9	84.0	103	115	139	156	176	195	204	224	239	258	278	STON 040									
1.5	90S	19.7	24.1	30.9	50.0	57.3	74.2	94.0	111	120	94	115	141	157	189	212	240	STON 040							STON 150								
2.2	90L	28.9	35.3	45.4	73.4	84.1	109	138	162	176	138	168	206	230	277	STON 040					STON 150												
3.7	100L	48.6	59.4	76.3	123	141	183	ST 070	ST150	ST 070	232	283	STON 040			STON 070					STON 150								STON 300				
Output flange: Ø160	STON 030 with 4 pole / 1440 RPM motors																																
	Speed	348.7	285.7	222.2	137.4	119.9	92.7	73.2	62.2	57.4	71.7	58.8	47.9	42.9	35.6	31.7	28.1	25.4	24.2	22.0	20.6	19.1	17.8	16.0	14.4	13.2	12.4						
	0.18	63B	4.7	5.8	7.4	12.0	13.8	17.8	22.6	26.5	28.8	22.5	27.5	33.7	37.7	45.4	51.0	57.5	63.7	66.8	73.3	78.3	84.5	90.9	101	112	122	130					
	0.25	71A	6.6	8.0	10.3	16.7	19.1	24.7	31.3	36.9	39.9	31.3	38.2	46.9	52.3	63.1	70.8	79.9	88.5	92.8	102	109	117	126	141	155	169	180					
	0.37	71B	9.7	11.9	15.3	24.7	28.3	36.6	46.4	54.6	59.1	46.3	56.5	69.4	77.4	93.3	105	118	131	137	151	161	174	187	208	230	251	267					
	0.55	80A	14.5	17.6	22.7	36.7	42.0	54.4	68.9	81.1	87.8	68.9	84.0	103	115	139	156	176	195	204	224	239	258	278	STON 040								
	0.75	80B	19.7	24.1	30.9	50.0	57.3	74.2	94.0	111	120	94	115	141	157	189	212	240	266	278	STON 040					STON 070							
	1.1	90S	28.9	35.3	45.4	73.4	84.1	109	138	162	176	138	168	206	230	277	STON 040					STON 070					STON 150						
	1.5	90L	39.4	48.1	61.9	100	115	148	188	221	240	188	229	281	STON 040			STON 070					STON 150										
	2.2	100LA	57.8	70.6	90.8	147	168	218	ST 070	ST150	ST 070	276	STON 040		STON 070					STON 150					STON 150					STON 300			
	3.7	112M	97.3	119	153	247	283	ST 040	ST 070	ST150	STON 070					STON 150					STON 150					STON 300							
Hollow o/p Shaft: 30	STON 030 with 6 pole / 960 RPM motors																																
	Speed	232.4	190.5	148.1	91.6	79.9	61.8	48.8	41.5	38.3	47.8	39.2	31.9	28.6	23.7	21.1	18.7	16.9	16.1	14.7	13.8	12.7	11.9	10.6	9.6	8.8	8.3						
	0.18	71A	7.1	8.7	11.1	18.0	20.6	26.7	33.8	39.8	43.1	33.8	41.2	50.6	56.5	68.1	76.4	86.3	95.6	100	110	117	127	136	152	168	183	195					
	0.25	71B	9.9	12.0	15.5	25.0	28.7	37.1	47.0	55.3	59.9	47.0	57.3	70.3	78.5	94.6	106	120	133	139	153	163	176	189	211	233	254	271					
	0.37	80A	14.6	17.8	22.9	37.0	42.4	54.9	69.6	81.8	88.6	69.5	84.8	104	116	140	157	177	196	206	226	241	261	280	STON 040								
	0.55	80B	21.7	26.5	34.0	55.0	63.1	81.6	103	122	132	103	126	155	173	208	234	264	292	STON 040					STON 070								
	0.75	90S	29.6	36.1	46.4	75.1	86.0	111	141	166	180	141	172	211	235	284	STON 040			STON 070					STON 150								
	1.1	90L	43.4	52.9	68.1	110	126	163	207	243	264	207	252	STON 040			STON 070					STON 150											
	1.5	100L	59.2	72.2	92.8	150	172	223	ST 070	ST150	ST 070	282	STON 040		STON 070			STON 150								STON 300							
	2.2	112M	86.8	106	136	220	252	STON 070		ST150	STON 070					STON 150					STON 150					STON 300							

ST020 : Input 80 available upto 90 ratio; Input 90 available upto 50 ratio
 Input 100/112 available upto 15 (2 stage) ratio and 20 to 30 (3 stage) ratio

PERFORMANCE TABLE

STON 040																											Peak torque = 450 Nm							
Input: 71, 80, 90, 100, 112	Rated ratio	4	5	7	10	13	15	20	23	25	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100	110	120							
	Real ratio	4.39	5.43	6.61	9.97	13.24	15.07	20.38	22.75	24.41	19.61	25.42	29.58	34.52	39.69	45.87	49.93	55.52	57.89	64.72	70.08	74.61	81.08	87.80	98.61	106.41	118.81							
	Stages	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3							
	STON 040 with 2 pole / 2880 RPM motors																																	
	kW	Frame	Torque (Nm)																															
	Speed	655.4	529.9	435.8	288.7	217.5	191.1	141.3	126.6	118.0	146.9	113.3	97.4	83.4	72.6	62.8	57.7	51.9	49.7	44.5	41.1	38.6	35.5	32.8	29.2	27.1	24.2							
	0.37	71A	STON 030																															
	0.55	71B	STON 030																															
	0.75	80A	STON 030																									231	249	278				
	1.1	80B	STON 030																								301	338	365	407				
1.5	90S	STON 030															260	271	303	328	349	379	411	STON 150										
2.2	90L	STON 030												315	342	381	397	444	STON 150															
3.7	100L	STON 030						ST 070	ST150	ST 070	STON 030		341	398	STON 070				STON 150						STON 300									
Output flange: Ø200	STON 040 with 4 pole / 1440 RPM motors																																	
	Speed	327.7	265.0	217.9	144.4	108.8	95.5	70.7	63.3	59.0	73.4	56.7	48.7	41.7	36.3	31.4	28.8	25.9	24.9	22.3	20.5	19.3	17.8	16.4	14.6	13.5	12.1							
	0.25	71A	STON 030																															
	0.37	71B	STON 030																															
	0.55	80A	STON 030																								301	338	365	407				
	0.75	80B	STON 030																		303	328	349	379	411	STON 070								
	1.1	90S	STON 030													315	342	381	397	444	STON 070				STON 150									
	1.5	90L	STON 030												323	371	429	STON 070				STON 150												
	2.2	100LA	STON 030						ST 070	ST150	ST 070	ST 030	349	406	STON 070				STON 150						STON 300									
3.7	112M	STON 030						355	ST 070	ST150	STON 070				STON 150					STON 300														
Hollow o/p Shaft: 35	STON 040 with 6 pole / 960 RPM motors																																	
	Speed	218.5	176.6	145.3	96.2	72.5	63.7	47.1	42.2	39.3	49.0	37.8	32.5	27.8	24.2	20.9	19.2	17.3	16.6	14.8	13.7	12.9	11.8	10.9	9.7	9.0	8.1							
	0.18	71A	STON 030																															
	0.25	71B	STON 030																															
	0.37	80A	STON 030																								304	341	368	411				
	0.55	80B	STON 030																	298	333	360	384	417	STON 070									
	0.75	90S	STON 030													322	350	389	406	STON 070				STON 150										
	1.1	90L	STON 030												304	355	408	STON 070				STON 150												
	1.5	100L	STON 030						ST 070	ST150	ST 070	ST 030	357	415	STON 070				STON 150						STON 300									
2.2	112M	STON 030						STON 070		ST150	STON 070				STON 150					STON 300														

ST040 : Input 90 available upto 23 (2 stage) ratio and 20 to 90 (3 stage) ratio;
 Input 100/112 available upto 15 (2 stage) ratio and 20 to 40 (3 stage) ratio

PERFORMANCE TABLE

STON070																											Peak torque = 700 Nm							
Input: 71, 80, 90, 100, 112	Rated ratio	4	5	7	10	13	15	20	23	25	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100	110	120							
	Real ratio	3.85	5.59	7.39	10.04	12.00	15.06	20.42	23.11	25.27	19.91	24.69	29.85	33.89	40.86	46.07	50.29	55.55	60.23	64.86	70.26	75.10	79.76	90.25	98.70	107.84	117.93							
	Stages	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3							
	STON 070 with 2 pole / 2880 RPM motors																																	
	kW	Frame	Torque (Nm)																															
	Speed	748.9	515.5	389.9	286.9	240.1	191.3	141.0	124.6	114.0	144.7	116.7	96.5	85.0	70.5	62.5	57.3	51.8	47.8	44.4	41.0	38.3	36.1	31.9	29.2	26.7	24.4							
	0.37	71A	STON 030																															
	0.55	71B	STON 030																															
	0.75	80A	STON 030																						STON 040									
	1.1	80B	STON 030																				STON 040											
1.5	90S	STON 030																	STON 040				STON 150											
2.2	90L	STON 030														STON 040				STON 150														
3.7	100L	STON 030						241	ST150	298	STON 030		STON 040		471	531	580	641	STON 150					STON 300										
Output flange: Ø250	STON 070 with 4 pole / 1440 RPM motors																																	
	Speed	374.5	257.7	195.0	143.4	120.0	95.6	70.5	62.3	57.0	72.3	58.3	48.2	42.5	35.2	31.3	28.6	25.9	23.9	22.2	20.5	19.2	18.1	16.0	14.6	13.4	12.2							
	0.25	71A	STON 030																															
	0.37	71B	STON 030																															
	0.55	80A	STON 030																						STON 040									
	0.75	80B	STON 030																	STON 040				461	504	551								
	1.1	90S	STON 030										STON 040								482	515	547	619	STON 150									
	1.5	90L	STON 030										STON 040				470	519	563	606	657	STON 150												
	2.2	100LA	STON 030						286	ST150	354	ST 030	STON 040		465	560	632	690	STON 150					STON 300										
	3.7	112M	STON 030						ST 040	481	ST150	595	459	569	689	STON 150					STON 300													
Hollow o/p Shaft: 40	STON 070 with 6 pole / 960 RPM motors																																	
	Speed	249.6	171.8	130.0	95.6	80.0	63.8	47.0	41.5	38.0	48.2	38.9	32.2	28.3	23.5	20.8	19.1	17.3	15.9	14.8	13.7	12.8	12.0	10.6	9.7	8.9	8.1							
	0.18	71A	STON 030																															
	0.25	71B	STON 030																															
	0.37	80A	STON 030																						STON 040									
	0.55	80B	STON 030																	STON 040				464	508	555	607							
	0.75	90S	STON 030														STON 040				455	493	527	559	633	STON 150								
	1.1	90L	STON 030										STON 040				474	517	571	619	667	STON 150												
	1.5	100L	STON 030						293	ST150	362	ST 030	STON 040		475	573	646	STON 150					STON 300											
	2.2	112M	STON 030						316	429	ST150	531	410	508	614	697	STON 150					STON 300												

ST070 : Input 90 available upto 90 ratio;
Input 100/112 available upto 55 ratio (except ratio 23)

PERFORMANCE TABLE

STON 150																												Peak torque = 1500 Nm					
Input: 80, 90, 100, 112, 132	Rated ratio	4	5	7	10	13	15	20	23	25	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100	110	120						
	Real ratio	4.27	5.05	7.08	10.01	13.61	15.37	20.29	22.45	24.16	20.22	25.03	29.87	34.10	40.06	44.62	50.12	54.46	61.49	65.39	70.53	75.62	79.53	89.81	98.16	110.84	120.35						
	Stages	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3						
	STON 150 with 2 pole / 2880 RPM motors																																
	kW	Frame	Torque (Nm)																														
	Speed	675.2	569.8	406.7	287.6	211.5	187.3	141.9	128.3	119.2	142.4	115.1	96.4	84.4	71.9	64.6	57.5	52.9	46.8	44.0	40.8	38.1	36.2	32.1	29.3	26.0	23.9						
	0.75	80A	STON 030																						STON 040								
	1.1	80B	STON 030																						STON 040								
	1.5	90S	STON 030																STON 040						459	518	563						
	2.2	90L	STON 030												STON 040						484	519	545	616	673	760	825						
3.7	100L	STON 030							ST 070	264	ST 070	STON 030		STON 040		STON 070				709	754	813	872	917	1036	1132	STON 300						
5.5	132SA	75	88	124	175	238	269	355	393	423	347	429	512	585	687	765	STON 300						STON 430										
7.5	132SB	102	121	169	239	325	367	484	536	577	473	585	698	797	936	1043	STON 300						STON 430										
Output flange: Ø300	STON 150 with 4 pole / 1440 RPM motors																																
	Speed	337.6	284.9	203.3	143.8	105.8	93.7	71.0	64.1	59.6	71.2	57.5	48.2	42.2	35.9	32.3	28.7	26.4	23.4	22.0	20.4	19.0	18.1	16.0	14.7	13.0	12.0						
	0.55	80A	STON 030																						STON 040								
	0.75	80B	STON 030																STON 040						STON 070								
	1.1	90S	STON 030												STON 040						STON 070						673	760	825				
	1.5	90L	STON 030															STON 070						707	744	840	918	1036	1125				
	2.2	100L	STON 030							ST 070	314	ST 070	ST 030	STON 040		STON 070				747	843	897	967	1037	1091	1232	1346	STON 300					
	3.7	112M	STON 030						ST 040	ST 070	529	STON 070				787	924	1029	1156	1256	1418	STON 300						STON 430					
	5.5	132S	149	177	248	351	477	538	711	786	846	693	858	1024	1169	1373	STON 300						STON 430										
	7.5	132M	204	241	338	478	650	734	969	1072	1153	945	1170	1397	STON 300						STON 430												
Hollow o/p Shaft: 50	STON 150 with 6 pole / 960 RPM motors																																
	Speed	225.1	189.9	135.6	95.9	70.5	62.4	47.3	42.8	39.7	47.5	38.4	32.1	28.1	24.0	21.5	19.2	17.6	15.6	14.7	13.6	12.7	12.1	10.7	9.8	8.7	8.0						
	0.37	80A	STON 030																						STON 040								
	0.55	80B	STON 030																STON 040						STON 070								
	0.75	90S	STON 030												STON 040				STON 070						688	777	844						
	1.1	90L	STON 030												STON 040				STON 070						726	778	818	924	1010	1140	1238		
	1.5	100L	STON 030							ST 070	322	ST 070	ST 030	STON 040		STON 070				703	764	862	917	989	1061	1116	1260	1377	STON 300				
	2.2	112M	STON 030						STON 070		472	STON 070				824	918	1031	1120	1265	1345	1451	STON 300										
	3.7	132S	151	179	250	354	481	543	717	793	854	700	866	1033	1180	1386	STON 300						STON 430										
	5.5	132M	224	265	372	526	715	807	1066	1179	1269	1040	1287	STON 300						STON 430													

ST150 : Input 100/112 available upto 100 ratio;
Input 132 available upto 45 ratio

PERFORMANCE TABLE

STON 300																												Peak torque = 3000 Nm							
Input: 90, 100, 112, 132, 160	Rated ratio	4	5	7	10	13	15	20	23	25	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100	110	120								
	Real ratio	4.07	5.04	6.85	10.14	13.69	15.05	19.53	22.71	25.26	20.80	25.75	29.04	34.74	39.76	45.06	49.57	54.90	60.38	64.12	70.25	76.12	80.37	90.64	100.18	111.44	117.88								
	Stages	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3								
	STON 300 with 2 pole / 2880 RPM motors																																		
	kW	Frame	Torque (Nm)																																
	Speed	708.0	571.9	420.6	283.9	210.4	191.3	147.5	126.8	114.0	138.5	111.8	99.2	82.9	72.4	63.9	58.1	52.5	47.7	44.9	41.0	37.8	35.8	31.8	28.7	25.8	24.4								
	1.5	90S	STON 030															STON 040							STON 150										
	2.2	90L	STON 030															STON 040							STON 150										
	3.7	100L	STON 030							ST 070	ST 150	ST 070	STON 030			STON 040		STON 070					STON 150					1285	1359						
	5.5	132SA	STON 150															850	941	1035	1099	1204	1305	1378	1554	STON 430									
	7.5	132SB	STON 150															1159	1283	1411	1499	1642	1779	1879	2119	STON 430									
	11	160MA	142	176	240	355	479	527	684	795	885	713	883	996	1191	1363	1545	STON 430																	
	15	160MB	194	240	327	484	653	719	932	1084	1206	972	1204	1358	1624	1859	2107	STON 430																	
	18.5	160L	240	297	403	597	806	887	1150	1337	1488	1199	1485	1674	2003	2293	2599	STON 430																	
Output flange: Ø350	STON 300 with 4 pole / 1440 RPM motors																																		
	Speed	354.0	285.9	210.3	142.0	105.2	95.7	73.7	63.4	57.0	69.2	55.9	49.6	41.5	36.2	32.0	29.1	26.2	23.9	22.5	20.5	18.9	17.9	15.9	14.4	12.9	12.2								
	1.1	90S	STON 030												STON 040							STON 070					STON 150								
	1.5	90L	STON 030												STON 040				STON 070					STON 150											
	2.2	100L	STON 030							ST 070	ST 150	ST 070	ST 030	STON 040		STON 070			STON 150						1528	1617									
	3.7	112M	STON 030							ST 040	ST 070	ST 150	STON 070			STON 150					1479	1620	1756	1854	2091	2311	2570	2719							
	5.5	132S	STON 150															1545	1700	1882	2070	2199	2409	2610	2756	STON 430									
	7.5	132M	STON 150												1624	1859	2107	2318	2567	2823	2998	STON 430													
	11	160M	285	353	480	710	958	1054	1368	1590	1769	1426	1766	1991	2382	2727	STON 430																		
	15	160L	388	481	654	969	1307	1438	1865	2168	2412	1945	2408	2715	STON 430																				
Hollow o/p Shaft: 60	STON 300 with 6 pole / 160 RPM motors																																		
	Speed	236.0	190.6	140.2	94.6	70.1	63.8	49.2	42.3	38.0	46.2	37.3	33.1	27.6	24.1	21.3	19.4	17.5	15.9	15.0	13.7	12.6	11.9	10.6	9.6	8.6	8.1								
	0.75	90S	STON 030														STON 040				STON 070						STON 150								
	1.1	90L	STON 030												STON 040				STON 070					STON 150											
	1.5	100L	STON 030							ST 070	ST 150	ST 070	ST 030	STON 040		STON 070			STON 150						1563	1653									
	2.2	112M	STON 030							STON 070		ST 150	STON 070			STON 150					1566	1653	1865	2061	2293	2425									
	3.7	132S	STON 150															1559	1715	1899	2089	2218	2431	2634	2781	STON 430									
	5.5	132M	STON 150												1493	1787	2045	2318	2549	2823	STON 430														
	7.5	160M	291	361	490	727	980	1078	1399	1626	1809	1459	1806	2036	2436	2789	STON 430																		
	11	160L	427	529	719	1066	1438	1581	2051	2385	2654	2139	2649	2987	STON 430																				

ST300 : Input 132 available upto 90 ratio;
Input 160 available upto 45 ratio

PERFORMANCE TABLE

STON 430																											Peak torque = 4300 Nm							
Input: 100, 112, 132, 160, 180	Rated ratio	4	5	7	10	13	15	20	23	25	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100	110	120							
	Real ratio	4.04	5.01	7.24	9.82	13.54	15.38	20.29	23.24	24.71	20.47	24.40	30.59	34.71	39.31	45.21	49.36	55.85	59.57	65.68	69.85	74.48	81.41	89.75	102.49	110.07	120.28							
	Stages	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3							
	STON 430 with 2 pole / 2880 RPM motors																																	
	kW	Frame	Torque (Nm)																															
	Speed	712.6	574.3	397.6	293.3	212.7	187.3	141.9	123.9	116.5	140.7	118.0	94.1	83.0	73.3	63.7	58.3	51.6	48.3	43.9	41.2	38.7	35.4	32.1	28.1	26.2	23.9							
	3.7	100L	STON 030					ST 070	ST 150	ST 070	STON 030		STON 040		STON 070				STON 150								STON 300							
	5.5	132SA	STON 150														STON 300										1757	1887	2062					
	7.5	132SB	STON 150														STON 300										2396	2573	2812					
	11	160MA	STON 300														1692	1915	2043	2252	2395	2554												
15	160MB	STON 300														2308	2611	2785	3071	3266	3482													
18.5	160L	STON 300														2846	3221	3435	3787	4028	4295													
22	180M	283	351	507	688	948	1077	1421	1628	1731	1404	1673	2098	2380	2696	3100	3385																	
Output flange: Ø450	STON 430 with 4 pole / 1440 RPM motors																																	
	Speed	356.3	287.2	198.8	146.7	106.3	93.6	71.0	62.0	58.3	70.3	59.0	47.1	41.5	36.6	31.8	29.2	25.8	24.2	21.9	20.6	19.3	17.7	16.0	14.1	13.1	12.0							
	2.2	100L	STON 030					ST 070	ST 150	ST 070	ST 030	STON 040		STON 070				STON 150								STON 300								
	3.7	112M	STON 030					ST 040	ST 070	ST 150	STON 070				STON 150				STON 300															
	5.5	132S	STON 150														STON 300										3077	3514	3774	4124				
	7.5	132M	STON 150														STON 300										3266	3482	3806	4196				
	11	160M	STON 300														3100	3385	3830	4085														
	15	160L	STON 300														3246	3676	4228															
	18.5	180M	476	591	853	1157	1595	1811	2390	2737	2911	2361	2815	3528	4003																			
22	180L	566	702	1015	1375	1897	2154	2843	3255	3462	2808	3347	4196																					
Hollow o/p Shaft: 70	STON 430 with 6 pole / 960 RPM motors																																	
	Speed	237.5	191.4	132.5	97.8	70.9	62.4	47.3	41.3	38.8	46.9	39.3	31.4	27.7	24.4	21.2	19.4	17.2	16.1	14.6	13.7	12.9	11.8	10.7	9.4	8.7	8.0							
	1.5	100L	STON 030					ST 070	ST 150	ST 070	ST 030	STON 040		STON 070				STON 150								STON 300								
	2.2	112M	STON 030					STON 070		ST 150	STON 070				STON 150						STON 300													
	3.7	132S	STON 150														STON 300										3105	3546	3808	4162				
	5.5	132M	STON 150														STON 300										3064	3378	3592	3831	4187			
	7.5	160M	STON 300														3171	3462	3917	4178														
	11	160L	STON 300														3570	4044																
	15	180L	579	718	1038	1407	1940	2203	2907	3329	3540	2871	3423	4291																				

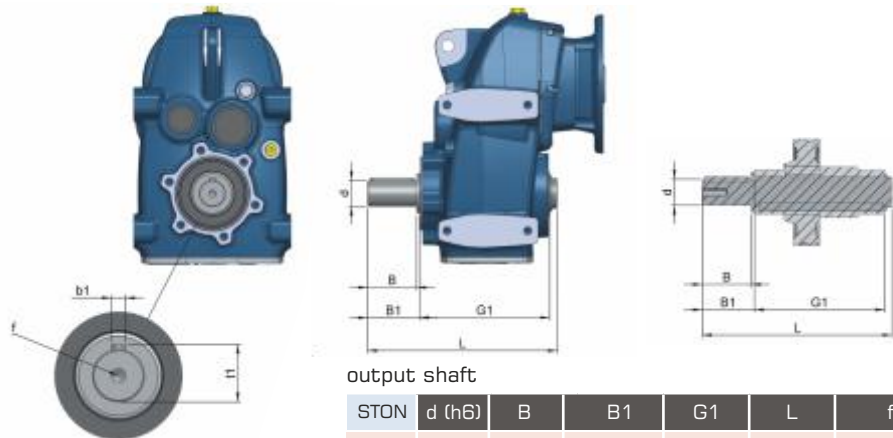
ST430 : Input 160 available upto 75 ratio;
Input 180 available upto 50 ratio

Note : Efficiency is computed considering the frictional losses of output seals, bearing frictional losses and lubrication losses.
Torque increase by 3% in 2 stage gearboxes and 5% in 3 stage gearboxes if these losses are not considered.

DIMENSIONS

STON input and combination

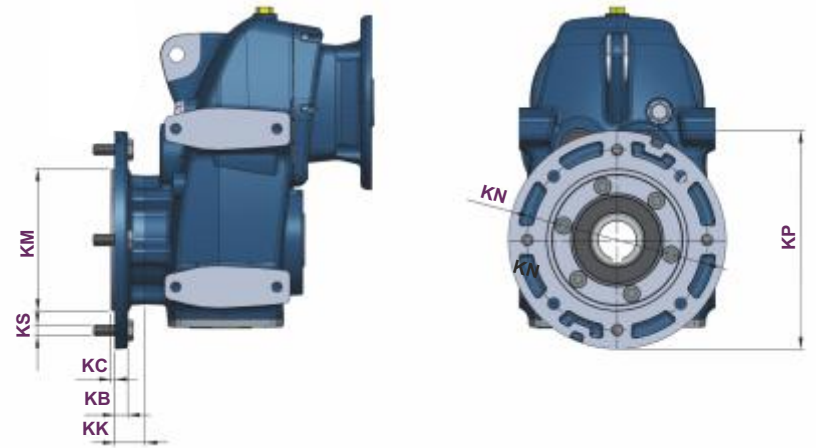
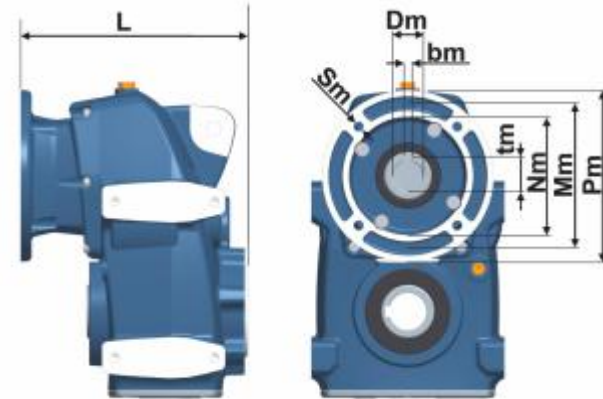
STON	Motor type		Nm	Mm	Pm	Sm	Dm	tm	bm	L
030	63	B5	95	115	140	M8	11	12.8	4	177.5
	71	B5	110	130	160		14	16.3	5	
	80	B5	130	165	200	M10	19	21.8	6	178.5
	90	B5	130	165	200		24	27.3	8	
040	100/112	B5	180	215	250	M12	28	31.3	8	184.5
	71	B5	110	130	160	M8	14	16.3	5	211.5
	80	B5	130	165	200		19	21.8	6	
	90	B5	130	165	200	M10	24	27.3	8	220.5
070	100/112	B5	180	215	250	M12	28	31.3	8	221.5
	71	B5	110	130	160	M8	14	16.3	5	226.5
	80	B5	130	165	200		19	21.8	6	
	90	B5	130	165	200	M10	24	27.3	8	235.5
150	100/112	B5	180	215	250	M12	28	31.3	8	236.5
	90	B5	130	165	200	M10	24	27.3	8	284.5
	100/112	B5	180	215	250		28	31.3	8	
	132	B5	230	265	300	M12	38	41.3	12	286.5
300	90	B5	130	165	200	M10	24	27.3	8	297
	100/112	B5	180	215	250		28	31.3	8	
	132	B5	230	265	300	M12	38	41.3	12	300.5
	160	B5	250	300	350		42	45.3	12	
430	100/112	B5	180	215	250	M12	28	31.3	8	367.5
	132	B5	230	265	300		38	41.3	12	
	160	B5	250	300	350	M16	42	45.3	12	406.7
	180	B5	250	300	350		48	51.8	14	



output shaft

STON	d (h6)	B	B1	G1	L	f	b1	t1
030	25	50	53.5	120	186.5	M10x20	8	28
040	30	60	63.5	150	223	M10x20	8	33
070	35	70	73.5	166	254.5	M12x24	10	38
150	50	100	80	210	306.5	M16x32	14	53.5
300	60	120	110	240	348.5	M20x40	18	64
430	70	140	125	300	428.5	M20x40	20	74.5

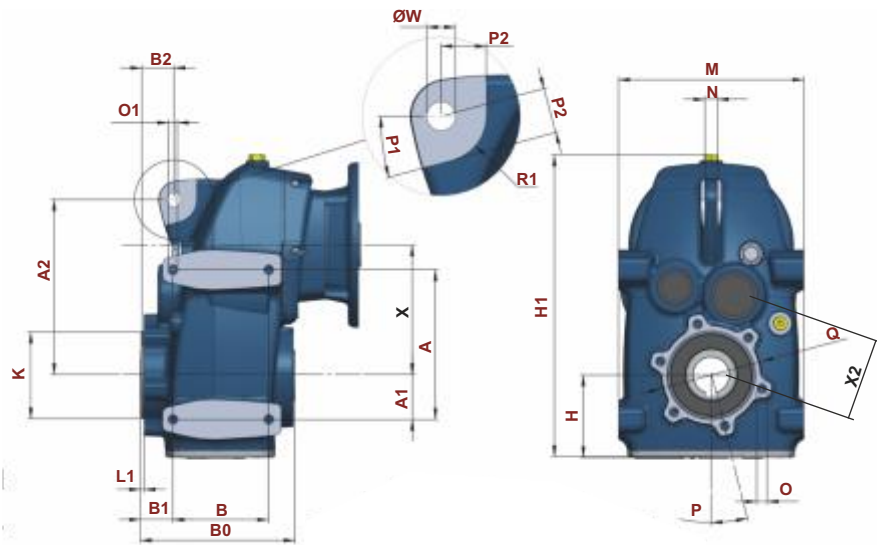
PAM



flange mounting

STON	OFL	IEC	KP	KM (j6)	KN	KS	KK	KB	KC (0; -0.5)
030	OFL160	71B5	160	110	130	M8x30	26	10	3.5
040	OFL200	80/90B5	200	130	165	M10x30	28	12	3.5
070	OFL250	100/112B5	250	180	215	M12x40	26.5	12	4
150	OFL300	132B5	300	230	265	M12x45	41	18	4
300	OFL350	160/180B5	350	250	300	M16x50	34	18	4
430	OFL450	225B5	450	350	400	M16x55	47	23	5

DIMENSIONS



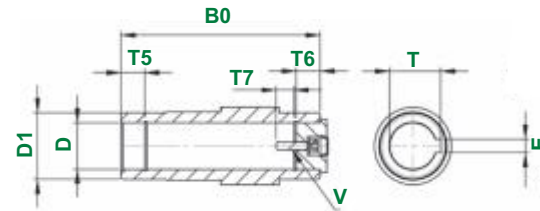
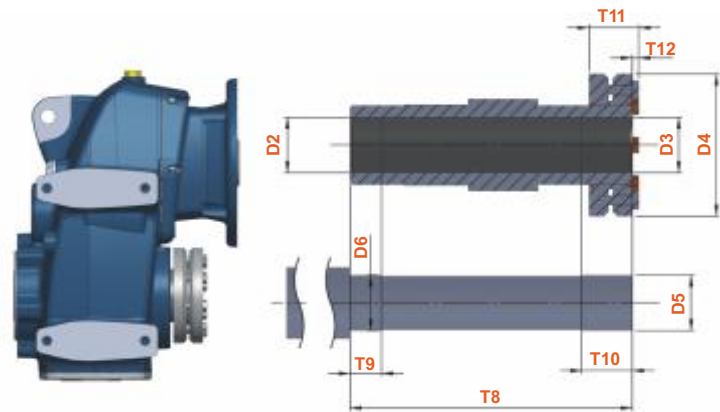
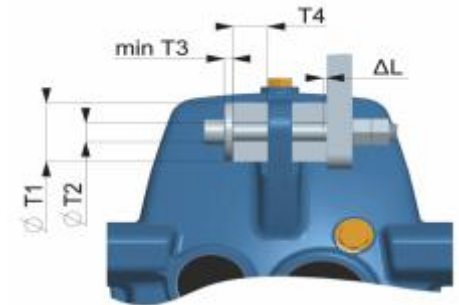
For Size 150, 300 & 430

standard output shaft

STON	D1 (Øk6)	D (ØH7)	B0 (±0,1)	T5	T6	T7	V	T (+0,2;0)	E (E9)
030	45	30	120	15	15	17	M10x25	33.3	8
040	50	35	150	18	18	22	M12x30	38.5	10
070	55	40	166	24	24	29	M16x40	43.3	12
150	70 (C8)	50	210	27	27	32	M16x45	53.8	14
300	85 (C8)	60	240	30	30	36	M20x50	64.5	18
430	95 (C8)	70	300	30	30	34	M20x50	74.9	20

foot mounting

STON	B2	A2	K (Øg7)	A	A1	O1	L1	B1	B	X	X2	P1	R1	P2	W (Ø)	M	N	H1	H	P	O	Q (Ø)
030	31.5	158	80	115	31	M8x15	2.5	23	77	105	66	17°	22	22	14	165	12	250.5	71.5	15°	M8x15	94
040	32	170	85	145	43	M10x15	3	31	93	126	80	15°	22	22	14	180	12	294.5	81	15°	M10x15	102
070	40.5	198	105	170	55	M12x20	3	33.5	102	137	88	15°	22	22	14	200	14	328	93.5	15°	M12x20	125
150	115	278	120	240	70	M16x26	4	35	140	178	118	15°	30	25	22	270	20	438.5	117	40°	M12x25	142
300	134.5	346	140	310	100	M16x26	4	43	165	240	160	20°	24	42	22	330	26	543.5	153.7	45°	M16x26	178
430	159.5	395	185	350	120	M20x30	4.5	47.5	205	285	195	25°	29	35	26	400	30	649.5	194.5	45°	M16x30	220



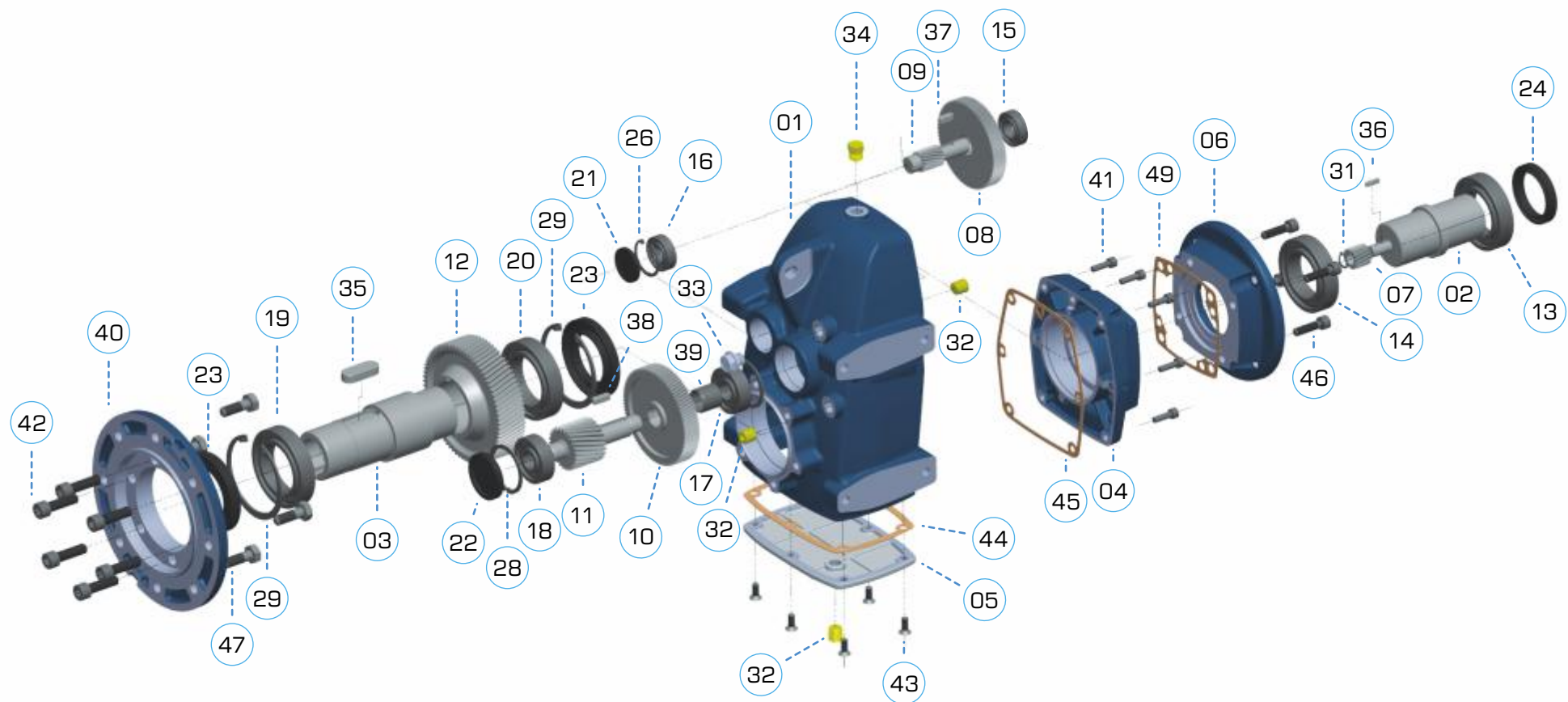
shrink disc shaft

STON	D2 (ØH7)	D3 (ØH7)	D4 (Ø)	D5 (Øh6)	ØD6 (h6)	T8 (±0,1)	T9	T10	T11	T12
030	30	30	80	30	30	148	20	31	24.2	5.3
040	35	35	90	35	35	179	20	32	26.1	5.3
070	40	40	100	40	40	195	20	26	29	5.3
150	50	50	138	50	50	241	30	36	37.3	5.3
300	65	65	155	65	65	281	40	41	44.3	5.3
430	75	75	170	75	75	345	50	55	49.3	5.3

torque arm

STON	ØT1	ØT2	T3	T4	ΔL
030	40	12.5	5	18	1
040	40	12.5	5	18	1.5
070	40	12.5	5	18	1.5
150	60	21	10	20	3.2
300	60	21	10	20	4.5
430	80	25	12	30	5

LIST OF COMPONENTS STON 3 REDUCTION STAGES



LIST OF COMPONENTS STON (3 REDUCTION STAGES)

STON 030				STON 040			STON 070			STON 150			STON 300			STON 430		
item	code	description	q.ty	code	description	q.ty	code	description	q.ty	code	description	q.ty	code	description	q.ty	code	description	q.ty
1	HOU ST030	housing	1	HOU ST040	housing	1	HOU ST070	housing	1	HOU ST150	housing	1	HOU ST300	housing	1	HOU ST430	housing	1
2	ISH	input shaft... RB021	1	ISH	input shaft...RB030	1	ISH	input shaft...RB060	1	ISH	input shaft...RB085	1	ISH	input shaft...RB150	1	ISH	input shaft...RB300	1
3	OSH	output shaft	1	OSH	output shaft	1	OSH	output shaft	1	OSH	output shaft	1	OSH	output shaft	1	OSH	output shaft	1
4	ICV	input cover	1	ICV	input cover	1	ICV	input cover	1	ICV	input cover	1	ICV	input cover	1	ICV	input cover	1
5	TCV	cover	1	TCV	cover	1	TCV	cover	1	TCV	cover	1	TCV	cover	1	TCV	cover	1
6	IFL	input flange 63B5	1	IFL		1	IFL		1	IFL		1	IFL	input flange 90B5	1	IFL		1
		input flange 71B5			input flange 71B5			input flange 71B5			input flange 80/90B5			input flange 100/112B5			input flange 100/112B5	
		input flange 80/90B5			input flange 80/90B5			input flange 80/90B5			input flange 100/112B5			input flange 132B5			input flange 132B5	
		input flange 100/112B5			input flange 100/112B5			input flange 100/112B5			input flange 132B5			input flange 160/180B5			input flange 160/180B5	
7	P1	pinion 1	1	P1	pinion 1	1	P1	pinion 1	1	P1	pinion 1	1	P1	pinion 1	1	P1	pinion 1	1
8	G2	Gear 1 *	1	G2	Gear 1 *	1	G2	Gear 1 *	1	G2	Gear 1 *	1	G2	Gear 1 *	1	G2	Gear 1 *	1
9	P2	pinion 2 *	1	P2	pinion 2 *	1	P2	pinion 2 *	1	P2	pinion 2 *	1	P2	pinion 2 *	1	P2	pinion 2 *	1
10	G2	Gear 2	1	G2	Gear 2	1	G2	Gear 2	1	G2	Gear 2	1	G2	Gear 2	1	G2	Gear 2	1
11	P3	pinion 3	1	P3	pinion 3	1	P3	pinion 3	1	P3	pinion 3	1	P3	pinion 3	1	P3	pinion 3	1
12	G3	Gear 3	1	G3	Gear 3	1	G3	Gear 3	1	G3	Gear 3	1	G3	Gear 3	1	G3	Gear 3	1
13	BEA	bearing 6008ZZ	1	BEA	bearing 6008ZZ	1	BEA	bearing 6009ZZ	1	BEA	bearing 6211ZZ	1	BEA	bearing 6009ZZ ** bearing 6213ZZ ***	1	BEA	bearing 6216ZZ	1
14	BEA	bearing 6008ZZ	1	BEA	bearing 6008ZZ	1	BEA	bearing 6009ZZ	1	BEA	bearing 6210ZZ	1	BEA	bearing 6009ZZ ** bearing 6212ZZ ***	1	BEA	bearing 6215ZZ	1
15	BEA	bearing 6002ZZ *	1	BEA	bearing 6003ZZ *	1	BEA	bearing 6203ZZ *	1	BEA	bearing 6304ZZ *	1	BEA	bearing 6206ZZ **	1	BEA	bearing 6207ZZ *	1
16	BEA	bearing 6202ZZ *	1	BEA	bearing 6003ZZ *	1	BEA	bearing 6203ZZ *	1	BEA	bearing 6304ZZ *	1	BEA	bearing 6306ZZ *	1	BEA	bearing 6207ZZ *	1
17	BEA	bearing 6202ZZ *	1	BEA	bearing 6303ZZ *	1	BEA	bearing 6304ZZ *	1	BEA	bearing 30304 *	1	BEA	bearing 30306 *	1	BEA	bearing 30307 *	1
18	BEA	Bearing 6302ZZ *	1	BEA	bearing 6303ZZ *	1	BEA	bearing 6304ZZ *	1	BEA	bearing 32206 *	1	BEA	bearing 30308 *	1	BEA	bearing 32208 *	1
17	BEA	bearing 7202ZZ	1	BEA	bearing 7303ZZ	1	BEA	bearing 7304ZZ	1	BEA	bearing 30304	1	BEA	bearing 30306	1	BEA	bearing 30307	1
18	BEA	bearing 7302ZZ	1	BEA	bearing 7303ZZ	1	BEA	bearing 7304ZZ	1	BEA	bearing 32206	1	BEA	bearing 30308	1	BEA	bearing 32208	1
19	BEA	bearing 6009ZZ	1	BEA	bearing 6010ZZ	1	BEA	bearing 6211ZZ	1	BEA	bearing 6014ZZ	1	BEA	bearing 6017ZZ	1	BEA	bearing 6219ZZ	1
20	BEA	bearing 6009ZZ	1	BEA	bearing 6010ZZ	1	BEA	bearing 6211ZZ	1	BEA	bearing 6014ZZ	1	BEA	bearing 6017ZZ	1	BEA	bearing 6219ZZ	1
21	COV	plug	1	COV	plug	1	COV	plug	1	COV	plug	1	COV	plug	1	COV	plug	1
22	COV	plug	1	COV	plug	1	COV	plug	1	COV	plug	1	COV	plug	1	COV	plug	1
23	OS	oil seal 45x75x8	2	OS	oil seal 50x80x10	2	OS	oil seal 55x100x10	2	OS	oil seal 70x110x12	2	OS	oil seal 85x130x12	2	OS	oil seal 95x170x12	2
24	OS	oil seal 40x55x8	1	OS	oil seal 45x60x9	1	OS	oil seal 45x60x9	1	OS	oil seal 55x80x10	1	OS	oil seal 45x65x10 ** oil seal 65x90x12 ***	1	OS	oil seal 80x105x12	1
26	SNR	snap ring *	1	SNR	snap ring *	1	SNR	snap ring *	1	SNR	snap ring *	1	SNR	snap ring *	1	SNR	snap ring *	1
28	SNR	snap ring	1	SNR	snap ring	1	SNR	snap ring	1	SNR	snap ring	1	SNR	snap ring	1	SNR	snap ring	1
29	SNR	snap ring	2	SNR	snap ring	2	SNR	snap ring	2	SNR	snap ring	2	SNR	snap ring	2	SNR	snap ring	2
31	SNR	snap ring	1	SNR	snap ring	1	SNR	snap ring	1	SNR	snap ring	1	SNR	snap ring	1	SNR	snap ring	1
32	FPL	filler plug	3	FPL	filler plug	3	FPL	filler plug	3	FPL	filler plug	3	FPL	filler plug	3	FPL	filler plug	3
33	LPL	level plug	1	LPL	level plug	1	LPL	level plug	1	LPL	level plug	1	LPL	level plug	1	LPL	level plug	1
34	BPL	breather plug	1	BPL	breather plug	1	BPL	breather plug	1	BPL	breather plug	1	BPL	breather plug	1	BPL	breather plug	1
35	KEY	key	1	KEY	key	1	KEY	key	1	KEY	key	1	KEY	key	1	KEY	key	1
36	KEY	key	1	KEY	key	1	KEY	key	1	KEY	key	1	KEY	key	1	KEY	key	1
37	KEY	key *	1	KEY	key *	1	KEY	key *	1	KEY	key *	1	KEY	key *	1	KEY	key *	1
38	KEY	key	1	KEY	key	1	KEY	key	1	KEY	key	1	KEY	key	1	KEY	key	1
39	SP	spacer	1	SP	spacer	1	SP	spacer	1	SP	spacer	1	SP	spacer	1	SP	spacer	1
40	OFL	output flange 160	1	OFL	output flange 200	1	OFL	output flange 250	1	OFL	output flange 300	1	OFL	output flange 350	1	OFL	output flange 450	1
41	SCR	screw	7	SCR	screw	7	SCR	screw	7	SCR	screw	7	SCR	screw	7	SCR	screw	7
42	SCR	screw	6	SCR	screw	6	SCR	screw	6	SCR	screw	6	SCR	screw	6	SCR	screw	6
43	SCR	screw	6	SCR	screw	6	SCR	screw	6	SCR	screw	6	SCR	screw	6	SCR	screw	6
44	GK44	gasket	1	GK44	gasket	1	GK44	gasket	1	GK44	gasket	1	GK44	gasket	1	GK44	gasket	1
45	GK45	gasket	1	GK45	gasket	1	GK45	gasket	1	GK45	gasket	1	GK45	gasket	1	GK45	gasket	1
46	SCR	screw	4	SCR	screw	4	SCR	screw	4	SCR	screw	4	SCR	screw	4	SCR	screw	4
47	SCR	screw	4	SCR	screw	4	SCR	screw	4	SCR	screw	4	SCR	screw	4	SCR	screw	4
49	GK49	gasket	1	GK49	gasket	1	GK49	gasket	1	GK49	gasket	1	GK49	gasket	1	GK49	gasket	1

* In 3 stages only, ** for input flange 90-112, *** for input flange 132-160

