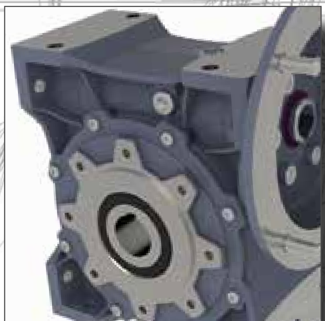
NEMA
BOX SERIES WORMGEAR UNITS

motive®



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CERTIFICATO

Nr. 50 100 1185 - Rev.010

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motive

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Progettazione e fabbricazione di motori elettrici, riduttori meccanici e inverter (IAF 18, 19)

Design and manufacture of electrical motors, mechanical gearboxes and variable speed drives *(IAF 18, 19)*

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"LA VALIDITÀ DEL PRESENTE CERTIFICATO È SUBORDINATA A SORVEGLIANZA PERIODICA A 12 MESI E AL RIESAME COMPLETO DEL SISTEMA DI GESTIONE AZIENDALE CON PERIODICITÀ TRIENNALE"
"THE VALIDITY OF THE PRESENT CERTIFICATE DEPENDS ON THE ANNUAL SURVEILLANCE EVERY 12 MONTHS AND ON THE COMPLETE REVIEW OF COMPANY'S MANAGEMENT SYSTEM AFTER THREE-YEARS"

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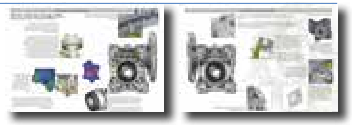

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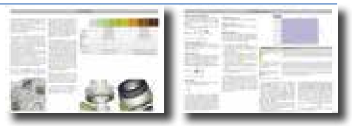

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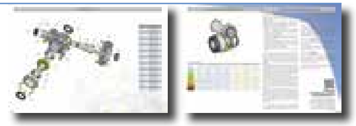


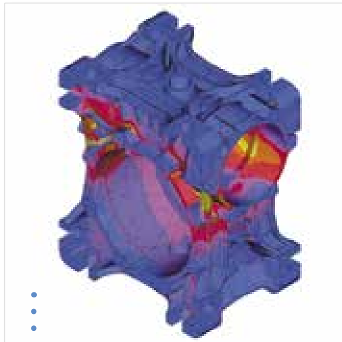
motive

BOX series is available either in IEC version or NEMA version. This catalogue will show the NEMA version only. For IEC version, refer to the specific catalogue

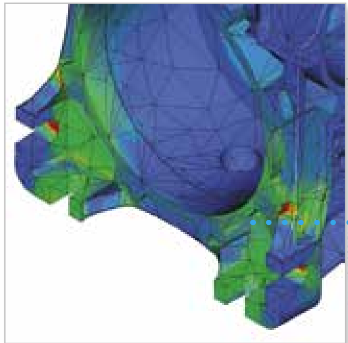
The housing shape has been studied to optimize the water draining during washing.

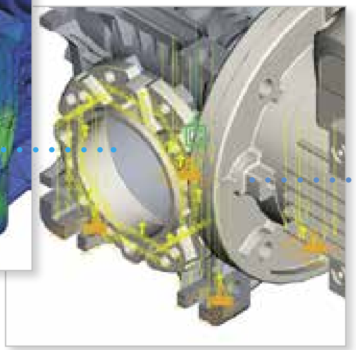
From type 75 and up, 2 taper roller bearings are mounted on the wormshaft, improving the mechanical resistance to the axial loads given by the wormwheel.

Moreover, the combination of this characteristic and 2 nilos (mounted on size 75 and up to keep lubrication grease inside the bearings even when they are not touched by the oil bath), or, in alternative, special RS shields on such taper bearings, permits the mounting of the whole BOX range, from the size 25 to the size 150, in the positions V5 and V6 without any need of additional interventions.



The new patented "BOX" series of worm gear units is made with die-casting aluminium housing from size 30 up to 90, and in cast iron from size 110.





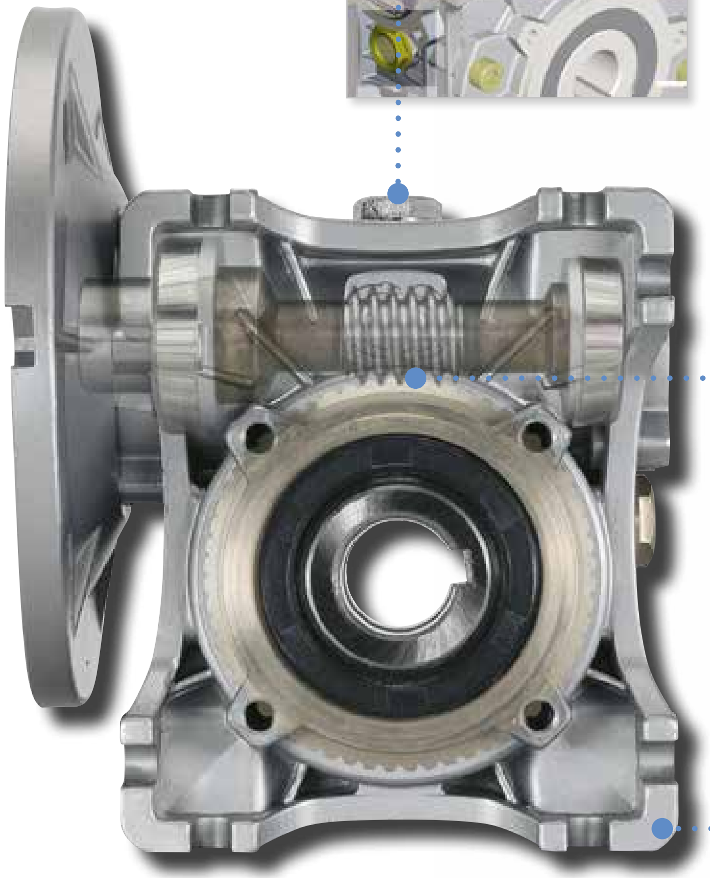
The housing has been designed with parametric three-dimensional CAD SW supported by programs of analysis of the thermal dissipation capacity and the structural resistance/deformation under the effect of working loads.

Mounting positions B6 or B7 are also permitted on all the BOX series, thanks to the adoption of 2RS auto-lubricated bearings on the output gear.
In conclusion, the whole BOX series can be mounted in any position with no need of specifications in the order.

TECHNICAL CHARACTERISTICS

Lubrication is already provided by motive with long-life synthetic oil up to size BOX90, and with mineral oil from size BOX110.

The gear unit is equipped with a full set of filler, level and breather plugs, permitting all mounting positions and facilitating the management of the stock.



In order to increase silence, efficiency and duration, the wormshaft is made in case hardened steel and ground machined, while the worm wheel is in shell cast ZCuSn12 bronze.

The standard worm wheel hub is in spheroidal cast iron, an alloy that offers superior performance to grey cast iron and is suited also to heavy-

An epoxy paint coat cancels the negative effects of the aluminium porosity and protects the housing from oxidation.

REGISTERED DESIGN

Made in an aluminum frame from size BOX30 to size BOX90, and in cast-iron from size BOX110 to size BOX150

Mating surfaces are machined for a perfect planarity.

2 safety plastic covers on the output are always provided to protect BOX during transportation and storage, and then the user from accidental contacts with moving parts

EFFICIENCY

An inherent factor in the selection wormgear 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:

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

Some reasons concurring to a reduction of the efficiency can be identified in the several forms of sliding and rolling friction.

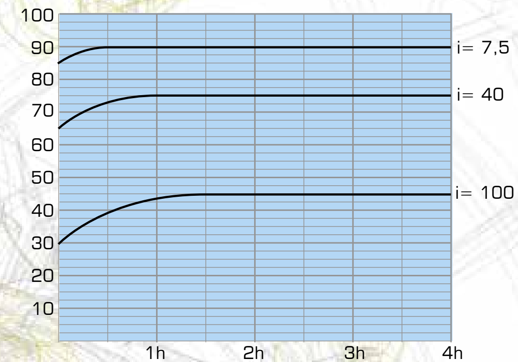
In practice, efficiency depends essentially by:

- helix angle
- material of matching parts
- tooth form accuracy
- gear finishing
- lubrication
- gear sliding speed
- load vibrations
- temperature

In the combined BOX units (BOX+BOX), the total efficiency value is the result of the product of the efficiency of the two single boxes composing the combined unit.

Dynamic efficiency η_d
It is the efficiency value that comes out after completion of the running in time of a few hours and that keeps almost constant in the subsequent time of work.
The graph 1 shows indicatively the time required to reach the maximum value of dynamic efficiency

graph 1



Static efficiency η_s
It is the efficiency obtained at start-up, particularly important in the choice of a BOX unit on those applications (like liftings) where due the very restricted time of work for each operation, the standard operating conditions are reached seldom. In these applications it is necessary to increase properly the motor power, in order to compensate the poor efficiency of the BOX unit while starting up ($\eta_s < \eta_d$).

IRREVERSIBILITY

Some BOX units permit to lock and hold in place a load when electric power switches off.

This characteristic, called irreversibility, is inversely proportional to the efficiency and the helix inclination, and directly proportional to the reduction ratio.

The efficiency of the toothing profiles is the main factor in effecting successfully the whole efficiency of the wormgear units, and it is on a large extent tied to the helix angle of profiles.

In order to get the fittest solution for a certain application, it is necessary to analyse the difference between static and dynamic irreversibility.

Static irreversibility
A BOX unit has a low static reversibility whenever it is possible to put it in rotation only through driving the output shaft with a very high torque and/or vibration or twisting of the output load. The static irreversibility is inversely proportional to the static efficiency. Theoretically:

η_s < 50%	static irreversibility
50%<η_s<55%	low static reversibility
$\eta_s \geq$ 55%	good static reversibility

Dynamic irreversibility
This is the most difficult condition to get. It occurs whenever, at the stop of the conditions keeping the worm shaft in rotation, even the motion of the output shaft stops immediately. The dynamic irreversibility is inversely proportional to the dynamic efficiency. Theoretically:

η_d < 40%	total dynamic irreversibility
40%<η_d<50%	good dynamic irreversibility
50%<η_d<60%	low dynamic reversibility
$\eta_d \geq$ 60%	good dynamic reversibility

The table 1 proposes an indicative analysis of the different degrees of irreversibility based on the helix angle.

Note: Whenever a total irreversibility of a BOX unit is important for safety reasons, we strongly recommend the use of brake motors of the AT Delphi series.

MESH DATA

type	i	7,5	10	15	20	25	30	40	50	60	80	100
BOX 030	Z_1	4	3	2	2	2	2	1	1	1	1	
	Z_2	30	30	30	40	50	30	40	50	60	80	
	β	18° 48' 58"	14° 20' 8"	9° 40' 7"	7° 42' 13"	5° 42' 38"	4° 52' 9"	3° 52' 10"	3°15' 37"	2° 13' 37"	2° 6' 36"	
	m_x	1,44	1,44	1,44	1,10	1,75	1,44	1,10	0,90	0,70	0,56	
	η_d (1750)	82,00%	80,70%	72,60%	72,00%	68,00%	62,00%	55,00%	52,00%	46,00%	40,00%	
	η_s	65,42%	62,00%	51,86%	47,33%	39,27%	34,68%	31,74%	25,65%	25,89%	19,60%	
BOX 040	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	24° 28' 25"	18° 50' 51"	12° 49' 17"	10° 29' 51"	8° 45' 5"	6° 29' 31"	5° 17' 36"	4° 24' 5"	3° 47' 4"	2° 56' 9"	2° 28' 53"
	m_x	2	1,5	2	1,5	2,5	2	1,5	1,25	1	0,75	0,65
	η_d (1750)	87,30%	85,30%	81,00%	78,00%	75,00%	69,70%	65,00%	62,00%	56,00%	50,00%	0,485
	η_s	71,24%	67,24%	59,27%	53,87%	50,18%	44,81%	38,77%	35,07%	29,90%	25,95%	24,77%
BOX 050	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	23° 57' 45"	18° 26' 6"	12° 31' 43"	10° 18' 17"	8° 35' 51"	6° 20' 25"	5° 11' 40"	4° 24' 5"	3° 41' 53"	2° 51' 45"	2° 17' 26"
	m_x	2,5	2	2,5	2	1,5	2,5	2	1,5	1,25	1	0,75
	η_d (1750)	89,00%	87,50%	81,80%	80,20%	75,20%	70,60%	68,30%	61,30%	57,90%	52,80%	46,00%
	η_s	70,80%	67,15%	58,86%	55,84%	50,46%	43,14%	39,76%	34,06%	31,40%	26,90%	21,12%
BOX 063	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	25° 50' 36"	19° 57' 51"	13° 36' 49"	10° 53' 8"	8° 44' 46"	6° 30' 20"	5° 29' 32"	4° 23' 55"	3° 56' 43"	3° 5' 17"	2° 26' 1"
	m_x	3	2,5	3	2,5	2	3	2,5	2	1,75	1,25	1
	η_d (1750)	89,10%	88,60%	82,40%	81,80%	79,70%	73,00%	70,60%	67,50%	64,50%	57,90%	51,10%
	η_s	71,89%	68,23%	59,57%	55,54%	52,11%	43,97%	40,34%	36,82%	34,33%	28,44%	24,05%
BOX 075	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	26° 38' 16"	20° 36' 57"	14° 4' 5"	11° 18' 36"	10° 18' 18"	7° 8' 51"	5° 42' 38"	5° 11' 40"	4° 20' 31"	3° 24' 42"	2° 51' 45"
	m_x	4	3	3,75	3	2,5	3,75	3	2,5	2	1,5	1,25
	η_d (1750)	91,00%	89,60%	85,20%	83,50%	81,90%	75,80%	73,80%	70,70%	65,50%	59,00%	56,50%
	η_s	72,60%	69,24%	61,14%	58,04%	54,26%	45,88%	43,05%	38,94%	35,27%	28,52%	26,71%
BOX 090	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	29° 11' 11"	22° 43' 48"	15° 36' 15"	13° 1' 15"	11° 18' 36"	7° 56' 58"	6° 35' 44"	5° 42' 38"	4° 45' 49"	3° 52' 55"	3° 7' 20"
	m_x	4,5	3,5	5	3,5	3	5	3,5	3	2,5	1,75	1,5
	η_d (1750)	91,30%	89,90%	88,20%	84,10%	83,50%	80,80%	74,00%	73,10%	69,60%	61,40%	59,00%
	η_s	74,05%	70,71%	65,64%	60,07%	57,02%	50,76%	44,40%	41,63%	38,33%	31,19%	28,00%
BOX 110	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	28° 14' 32"	21° 56' 32"	15° 1' 59"	14° 48' 14"	12° 59' 41"	7° 38' 54"	7° 31' 39"	6° 34' 55"	5° 48' 8"	4° 27' 28"	3° 52' 55"
	m_x	6	4,5	6	4,5	3,5	6	4,5	3,5	3	2,25	1,85
	η_d (1750)	92,40%	91,20%	88,40%	86,10%	83,80%	81,00%	77,20%	73,50%	72,00%	66,00%	63,00%
	η_s	73,92%	70,71%	64,76%	62,80%	58,86%	49,22%	47,51%	43,12%	40,20%	34,93%	31,80%
BOX 130	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	29° 14' 56"	22° 46' 57"	15° 38' 32"	13° 47' 27"	11° 53' 34"	7° 58' 11"	6° 59' 48"	6° 0' 40"	5° 16' 6"	4° 23' 55"	3° 34' 35"
	m_x	7	7	7	5,4	4,37	7	5,4	4,37	3,67	2,75	2,75
	η_d (1750)	90,00%	86,00%	84,00%	83,00%	81,00%	79,00%	75,00%	72,00%	70,00%	65,00%	62,00%
	η_s	72,00%	66,67%	61,53%	60,54%	56,89%	48,00%	46,15%	42,24%	39,09%	34,40%	31,29%
BOX 150	Z_1	6	4	3	2	2	2	1	1	1	1	1
	Z_2	45	40	45	40	50	60	40	50	60	80	100
	β	32° 54' 19"	25° 29' 51"	17° 55' 41"	13° 24' 45"	11° 18' 36"	9° 55' 34"	6° 47' 58"	5° 42' 38"	5° 0' 2"	4° 9' 35"	3° 37' 43"
	m_x	5,5	6,2	5,5	6,2	5	4,2	6,2	5	4,2	3,2	2,6
	η_d (1750)	90,00%	86,00%	84,00%	83,00%	81,00%	79,00%	75,00%	72,00%	70,00%	65,00%	62,00%
	η_s	72,00%	66,67%	61,53%	60,54%	56,89%	48,00%	46,15%	42,24%	39,09%	34,40%	31,29%

Z_1	nr of starts of the worm
Z_2	nr of wormwheel teeth = $Z_1 \cdot i$
β	helix angle
m_x	normal module
η_d(1750)	dynamic efficiency with n_1=1750rpm
η_s	static efficiency

tab. 1

	irreversibility	
	dynamic	static
$\beta > 20°$	total reversibility	
$10° < \beta < 20°$	high dynamic reversibility	almost total reversibility, quick return
$8° < \beta < 10°$	high dynamic reversibility, low irreversibility	quick return
$5° < \beta < 8°$	low dynamic reversibility, but easy in case of vibrations	good reversibility and poor self-locking
$3° < \beta < 5°$	low dynamic reversibility, good irreversibility	very low reversibility and good irreversibility
$1° < \beta < 3°$	total irreversibility	

Unless otherwise specified, BOX units sizes 30 up to 90 are supplied with long-life lubrication and they don't require any maintenance.
BOX110, BOX130 and BOX150 are already pre-lubricated as well, with mineral oil VG460.

The use of oil instead of grease offers remarkable improvements under the point of view of the application, especially in the effectiveness and efficiency of the lubrication in the "limit layer" condition as well as under high intermittence applications.
Furthermore, synthetic oil lubrication assures a much wider range of low and high operating temperatures.
With the use of synthetic oil, the temperature limits turn out to be determined by the properties of the seal material as well as the thermal expansion of the frame material.

All units are supplied with plugs for loading, discharging and checking the level of the oil. Furthermore, the units BOX063, BOX075, BOX090, BOX110, BOX130 and BOX150 are accompanied by a breather plug. Before start-up, we suggest to re-place the filler plug in the upper side of the unit with the breather plug. This operation is compulsory on BOX110, 130 and 150.

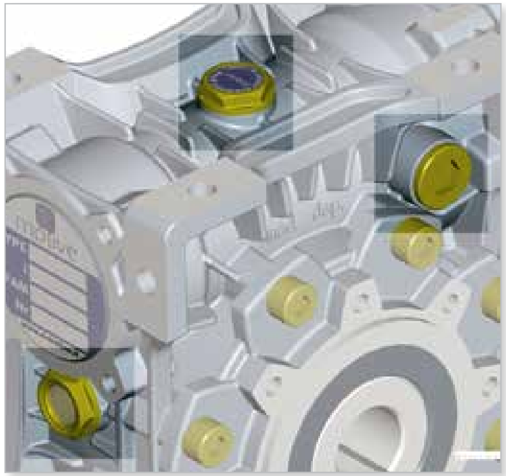
		BOX030	BOX040	BOX050	BOX063	BOX075	BOX090		BOX110	BOX130	BOX150
		synthetic oil							mineral oil		
	T°C	-25°C ÷ +50°C							-5°C ÷ +40°C		
	ISO VG...	ISO VG320							ISO VG460		
oil type	AGIP	TELIUM VSF320							BLASIA 460		
	SHELL	OMALA S4 320							OMALA OIL460		
	MOBIL	GLYGOYLE 320							MOBILGEAR 634		
	CASTROL	ALPHASYN PG320							ALPHA MAX 460		
	BP	ENERGOL SG-XP320							ENERGOL GR-XP460		
oil quantity (lt)	B3	0,02	0,04	0,08	0,15	0,30	0,55	1,00	2,5	4,5	6,5
	B6,B7 B8,V5,V6								2,2	3,3	5,1
maintenance		pre-lubricated by Motive none, lifetime lubrication							pre-lubricated with oil for B3 position oil change after 400 working hours, than every 4000 working hours		

tab. 3

The combination on the input shaft of 2 taper roller bearings (mounted on size 75 and up to get an high resistance to the axial loads) and 2 nilos (mounted on the unit sizes 75 up to 150 to keep lubricating grease inside the bearings even when they are not touched by the lubrication oil) or, in alternative, special RS shields on such taper bearings, permits the mounting of the whole BOX range, from the size 25 to the size 150, in the positions V5 and V6.

Mounting positions B6 or B7 are also permitted on all the BOX series, thanks to the adoption of 2RS auto-lubricated bearings on the output shaft.

In conclusion, the whole BOX series can be mounted in any position with no need of specifications in the order.



Rated output torque M_{n2}
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:

$$M_{n2}\,[\mathrm{Nm}] = \frac{P_{n1}\,[\mathrm{kW}] \cdot 9550}{n_2} \cdot \eta_d$$

1 in-lbs = 0.11298 Nm

Torque demand M_{r2} [Nm]
Torque calculated based on application requirements. It must be ≤ M_{n2} of the chosen BOX unit.

Input power P_{n1}
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 possibile to calculate the motorsize necessary by using the formula:

$$P_{n1}\,[\mathrm{kW}] = \frac{M_{r2} \cdot n_2}{9550 \cdot \eta_d}$$

1 Hp=0,745701 kW

Gear ratio i
It is the relationship of the input speed n1and the output speed n_2

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

In the BOX units with pre-stage reduction (BOX+STADIO), the total ratio is given by the PC pre-stage reduction ratio multiplied by the BOX unit ratio.
In the combined BOX units (BOX+BOX), the total ratio is the result of the product of the ratio of the two single boxes composing the combined unit.

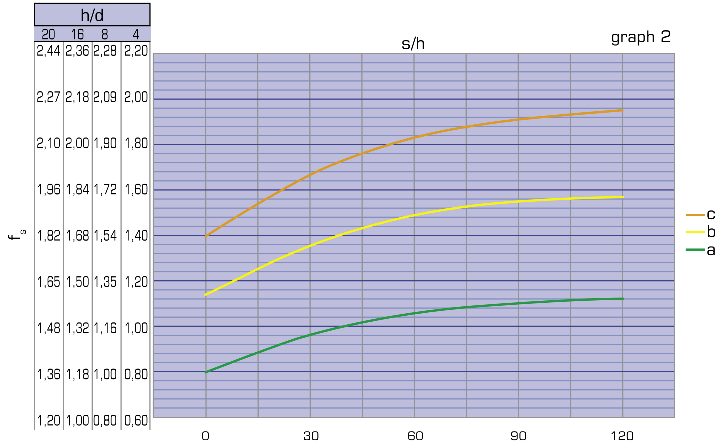
Input speed n_1 [rpm]
It is the speed the BOX unit is driven at.

Output speed n_2 [rpm]
It is the rotation speed of the output shaft.

Service factor s.f.
It is a numeric value describing the BOX unit service duty. With unavoidable approximation, the required service factor s.f.r. 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
- if the rotation is in 2 senses, the s.f.r. increases by 25%.

In the graph 2, the s.f.r. 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	applications examples
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

(for further examples, see AGMA)

If, after the selection of the required torque $\mathbf{M_{r2}}$ and $\mathbf{n_2}$ in the following performance tables, you don't find a BOX unit whose service factor **s.f.** is ≥ of the requested one **s.f.r.**, you can choose a BOX unit in which $\mathbf{M_{n2}} > \mathbf{M_{r2}}$.
In fact, in order to satisfy **s.f.r.**, you can choose another BOX unit whose output torque is ≥ $\mathbf{M_{c2}}$ output torque, where:
$\mathbf{M_{c2}} = \mathbf{M_{r2}} \cdot$ **s.f.r.**
Note: This rule is valid only if the new BOX unit that has been selected in this way has a service factor $\mathbf{f_s} \geq 1$ in the performance tables.
From another point of view, the value of $\mathbf{f_s}$ in the performance tables refers to a case in which the effective torque requested by the application $\mathbf{M_{r2}}$ matches perfectly with the one appearing on the catalogue $\mathbf{M_{n2}}$.
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 **s.f.** calculated in this way must be ≥ **s.f.r.**

Configure what you need by this automatic consultant, and get CAD files and data sheets

Motive configurator allows you to shape Motive products, combine them as you want, and finally to download 2D/3D CAD drawings, and a PDF datasheet.

Search by performance
If you're not sure about the best products combination that you should select for your purpose, you can input your wishes, like final torque, final speed, use, etc, and the configurator will act like a consultant.
It will give you a list of applicable product configurations; you can then download a PDF data sheet featuring performance data and dimensional drawings for each configuration, as well as 2D and 3D drawings.

Search by product
To be used if you already know the product configuration that you want, and you just want to get quicker a PDF data sheet featuring performance data and dimensional drawings for 2D and 3D drawings.

NOTE: At the date of issue of this catalogue, Motive configurator only shows IEC products

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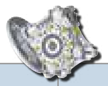
BOX PERFORMANCE TABLES

Max input Power M_1 or output torque M_2 with s.f.=1
with input (motor) speed n_1 =1750 [rpm]




box	i	n_2 [rpm]	MAX M_2 [In-lbs]	P_1 [Hp]
30	7,5	233,3	155	0,70
	10	175,0	163	0,56
	15	116,7	157	0,40
	20	87,5	166	0,32
	25	70,0	196	0,32
	30	58,3	174	0,26
	40	43,8	158	0,20
	50	35,0	150	0,16
	60	29,2	139	0,14
	80	21,9	115	0,10
40	7,5	233,3	358	1,52
	10	175,0	363	1,18
	15	116,7	359	0,82
	20	87,5	348	0,62
	25	70,0	351	0,52
	30	58,3	407	0,54
	40	43,8	375	0,40
	50	35,0	357	0,32
	60	29,2	315	0,26
	80	21,9	288	0,20
	100	17,5	280	0,16
50	7,5	233,3	640	2,66
	10	175,0	656	2,08
	15	116,7	663	1,50
	20	87,5	670	1,16
	25	70,0	623	0,92
	30	58,3	748	0,98
	40	43,8	709	0,72
	50	35,0	640	0,58
	60	29,2	601	0,48
	80	21,9	609	0,40
	100	17,5	497	0,30


box	i	n_2 [rpm]	MAX M_2 [In-lbs]	P_1 [Hp]
63	7,5	233,3	1155	4,80
	10	175,0	1181	3,70
	15	116,7	1238	2,78
	20	87,5	1226	2,08
	25	70,0	1191	1,66
	30	58,3	1404	1,78
	40	43,8	1302	1,28
	50	35,0	1240	1,02
	60	29,2	1227	0,88
	80	21,9	1135	0,68
	100	17,5	1068	0,58
75	7,5	233,3	1686	6,86
	10	175,0	1769	5,48
	15	116,7	1786	3,88
	20	87,5	1913	3,18
	25	70,0	1829	2,48
	30	58,3	2031	2,48
	40	43,8	2020	1,90
	50	35,0	1935	1,52
	60	29,2	1812	1,28
	80	21,9	1666	0,98
	100	17,5	1669	0,82
90	7,5	233,3	2619	10,62
	10	175,0	2791	8,62
	15	116,7	3288	6,90
	20	87,5	3175	5,24
	25	70,0	3098	4,12
	30	58,3	3789	4,34
	40	43,8	3177	2,98
	50	35,0	3081	2,34
	60	29,2	2888	1,92
	80	21,9	2477	1,40
	100	17,5	2423	1,14


box	i	n_2 [rpm]	MAX M_2 [In-lbs]	P_1 [Hp]
110	7,5	233,3	4388	17,58
	10	175,0	4743	14,44
	15	116,7	5215	10,92
	20	87,5	5061	8,16
	25	70,0	5237	6,94
	30	58,3	5759	6,58
	40	43,8	5383	4,84
	50	35,0	5242	3,96
	60	29,2	5010	3,22
	80	21,9	4336	2,28
	100	17,5	4085	1,80
130	7,5	233,3	6598	27,14
	10	175,0	7056	22,78
	15	116,7	7906	17,42
	20	87,5	7821	13,08
	25	70,0	7979	10,94
	30	58,3	9151	10,72
	40	43,8	8990	8,32
	50	35,0	8377	6,46
	60	29,2	7806	5,16
	80	21,9	7155	3,82
	100	17,5	6387	2,86
150	7,5	233,3	10561	43,44
	10	175,0	10538	34,02
	15	116,7	10611	23,38
	20	87,5	11157	18,66
	25	70,0	10313	14,14
	30	58,3	10175	11,92
	40	43,8	13269	12,28
	50	35,0	11800	9,10
	60	29,2	10741	7,10
	80	21,9	9814	5,24
	100	17,5	8620	3,86

BOX PERFORMANCE TABLES

input (motor) speed n_1 = 1750 [rpm]

P_1 [Hp]	input flange	ratio i:	n_2 [rpm]	M_2 [In-lbs]	BOX	s.f.	AGMA
0.16	56C	7.5	233.3	35	BOX30	4.4	III
		10	175.0	47		3.5	III
		15	116.7	63		2.5	III
		20	87.5	83		2.0	III
		25	70.0	98		2.0	III
		30	58.3	107		1.6	II
		40	43.8	127		1.3	I
		50	35.0	150		1.0	I
		60	29.2	159		0.9	I
		25	70.0	108	BOX40	3.3	III
		30	58.3	121		3.4	III
		40	43.8	150		2.5	III
		50	35.0	179		2.0	III
		60	29.2	194		1.6	II
		80	21.9	231		1.3	I
		100	17.5	280		1.0	I
		60	29.2	200	BOX50	3.0	III
		80	21.9	243		2.5	III
		100	17.5	265		1.9	III
0.25		15	116.7	109	BOX40	3.3	III
		20	87.5	140		2.5	III
		25	70.0	169		2.1	III
		30	58.3	188		2.2	III
		40	43.8	234		1.6	II
		50	35.0	279		1.3	I
		60	29.2	303		1.0	I
		80	21.9	360		0.8	I
		40	43.8	246	BOX50	2.9	III
		50	35.0	276		2.3	III
		60	29.2	313		1.9	III
		80	21.9	380		1.6	II
		100	17.5	414		1.2	I

P_1 [Hp]	input flange	ratio i:	n_2 [rpm]	M_2 [In-lbs]	BOX	s.f.	AGMA
0.33	56C	15	116.7	144	BOX40	2.5	III
		20	87.5	185		1.9	III
		25	70.0	223		1.6	II
		30	58.3	249		1.6	II
		40	43.8	309		1.2	I
		50	35.0	368		1.0	I
		20	87.5	191	BOX50	3.5	III
		30	58.3	252		3.0	III
		40	43.8	325		2.2	III
		50	35.0	364		1.8	III
		60	29.2	413		1.5	II
		80	21.9	502		1.2	I
		100	17.5	547		0.9	I
0.5		7.5	233.3	118	BOX40	3.0	III
		10	175.0	154		2.4	III
		15	116.7	219		1.6	II
		20	87.5	281		1.2	I
		25	70.0	338		1.0	I
		30	58.3	377		1.1	I
		40	43.8	468		0.8	I
		15	116.7	221	BOX50	3.0	III
		20	87.5	289		2.3	III
		25	70.0	339		1.8	III
		30	58.3	381		2.0	III
		40	43.8	492		1.4	II
		50	35.0	552		1.2	I
		60	29.2	626		1.0	I
		80	21.9	761		0.8	I
		40	43.8	509	BOX63	2.6	III
		50	35.0	608		2.0	III
		60	29.2	697		1.8	III
		80	21.9	834		1.4	II
		100	17.5	920		1.2	I
		50	35.0	637	BOX75	3.0	III
		60	29.2	708		2.6	III
		80	21.9	850		2.0	III
		100	17.5	1018		1.6	II

P_1 [Hp]	input flange	ratio i:	n_2 [rpm]	M_2 [In-lbs]	BOX	s.f.	AGMA
0.75	56C	7.5	233.3	180	BOX50	3.5	III
		10	175.0	236		2.8	III
		15	116.7	331		2.0	III
		20	87.5	433		1.5	II
		25	70.0	508		1.2	I
		30	58.3	572		1.3	I
		40	43.8	738		1.0	I
		20	87.5	442	BOX63	2.8	III
		25	70.0	538		2.2	III
		30	58.3	592		2.4	III
		40	43.8	763		1.7	II
		50	35.0	912		1.4	II
		60	29.2	1045		1.2	I
		80	21.9	1251		0.9	I
		100	17.5	1380		0.8	I
		50	35.0	955	BOX75	2.0	III
		60	29.2	1062		1.7	II
		80	21.9	1275		1.3	I
		100	17.5	1526		1.1	I
		80	21.9	1327	BOX90	1.9	III
		100	17.5	1594		1.5	II
1	140TC	60	29.2	1556	BOX110	3.2	III
		80	21.9	1902		2.3	III
		100	17.5	2269		1.8	III
		15	116.7	445	BOX63	2.8	III
		20	87.5	589		2.1	III
		25	70.0	718		1.7	II
		30	58.3	789		1.8	III
		40	43.8	1017		1.3	I
		20	87.5	602	BOX75	3.2	III
		25	70.0	737		2.5	III
		30	58.3	819		2.5	III
		40	43.8	1063		1.9	III
		50	35.0	1273		1.5	II
		40	43.8	1066	BOX90	3.0	III
		50	35.0	1316		2.3	III
		60	29.2	1504		1.9	III

BOX PERFORMANCE TABLES

input (motor) speed n_1 = 1750 [rpm]

P_1 [Hp]	input flange	ratio i:	n_2 [rpm]	M_2 [In-lbs]	BOX	s.f.	AGMA
2	140TC	50	35.0	2647	BOX110	2.0	III
		60	29.2	3112		1.6	II
		80	21.9	3804		1.1	I
		100	17.5	4538		0.9	I
		80	21.9	3746	BOX130	1.9	III
		100	17.5	4466		1.4	II
		7.5	233.3	481	BOX63	2.4	III
		10	175.0	638		1.9	III
		15	116.7	890		1.4	II
		20	87.5	1179		1.0	I
		25	70.0	1435		0.8	I
		15	116.7	921	BOX75	1.9	III
		20	87.5	1203		1.6	II
		25	70.0	1475		1.2	I
		30	58.3	1638		1.2	I
		40	43.8	2127		1.0	I
		50	35.0	2547		0.8	I
		25	70.0	1504	BOX90	2.1	III
		30	58.3	1746		2.2	III
		40	43.8	2132		1.5	II
		50	35.0	2633		1.2	I
		60	29.2	3008		1.0	I
3	180TC	20	87.5	1861	BOX110	2.7	III
		25	70.0	2264		2.3	III
		30	58.3	2626		2.2	III
		40	43.8	3337		1.6	II
		50	35.0	3971		1.3	I
		60	29.2	4668		1.1	I
		7.5	233.3	737	BOX75	2.3	III
		10	175.0	968		1.8	III
		15	116.7	1381		1.3	I
		7.5	233.3	740	BOX90	3.5	III
		10	175.0	971		2.9	III
		15	116.7	1430		2.3	III
		20	87.5	1818		1.7	II
		25	70.0	2256		1.4	II
		30	58.3	2619		1.4	II
		40	43.8	3198		1.0	I

P_1 [Hp]	input flange	ratio i:	n_2 [rpm]	M_2 [In-lbs]	BOX	s.f.	AGMA
5	210TC*	10	175.0	1642	BOX110	2.9	III
		15	116.7	2388		2.2	III
	180TC	20	87.5	3101		1.6	II
		25	70.0	3773		1.4	II
		30	58.3	4376		1.3	I
		40	43.8	5561		1.0	I
	210TC*	15	116.7	2269	BOX130	3.5	III
		20	87.5	2990		2.6	III
		25	70.0	3647		2.2	III
	180TC	30	58.3	4268		2.1	III
		40	43.8	5403		1.7	II
		50	35.0	6483		1.3	I
		60	29.2	7564		1.0	I
		80	21.9	9365		0.8	I
		30	58.3	4268	BOX150	2.4	III
		40	43.8	5403		2.5	III
		50	35.0	6483		1.8	III
		60	29.2	7564		1.4	II
		80	21.9	9365		1.0	I
		100	17.5	11166		0.8	I
		7.5	233.3	1229	BOX75	1.4	II
		10	175.0	1614		1.1	I
		15	116.7	2302		0.8	I
		7.5	233.3	1233	BOX90	2.1	III
		10	175.0	1619		1.7	II
		15	116.7	2383		1.4	II
		20	87.5	3029		1.0	I

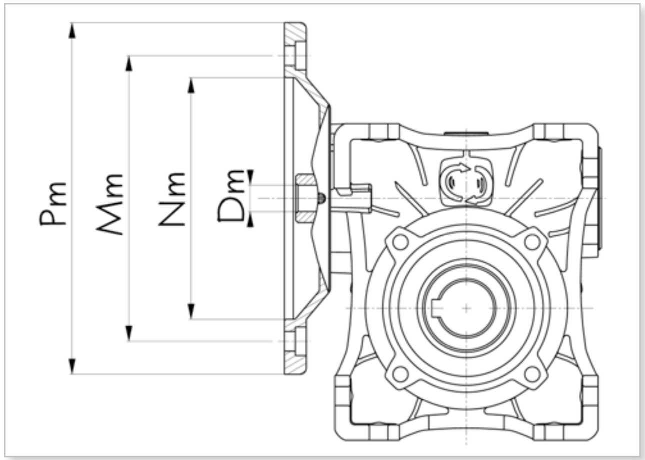
* with input shaft hole diameter adapter 1 1/8"→9/8"
(210TC gearbox→180TC motor)

P_1 [Hp]	input flange	ratio i:	n_2 [rpm]	M_2 [In-lbs]	BOX	s.f.	AGMA
7.5	210TC	7.5	233.3	1872	BOX110	2.3	III
		10	175.0	2464		1.9	III
		15	116.7	3582		1.5	II
		20	87.5	4652		1.1	I
		10	175.0	2323	BOX130	3.0	III
		15	116.7	3404		2.3	III
		20	87.5	4484		1.7	II
		25	70.0	5470		1.5	II
		30	58.3	6402		1.4	II
		40	43.8	8104		1.1	I
		15	116.7	3404	BOX150	3.1	III
		20	87.5	4484		2.5	III
		25	70.0	5470		1.9	III
		30	58.3	6402		1.6	II
		40	43.8	8104		1.6	II
10		7.5	233.3	2496	BOX110	1.8	III
		10	175.0	3285		1.4	II
		15	116.7	4776		1.1	I
		20	87.5	6202		0.8	I
		7.5	233.3	2431	BOX130	2.7	III
		10	175.0	3098		2.3	III
		15	116.7	4538		1.7	II
		20	87.5	5979		1.3	I
		25	70.0	7294		1.1	I
		30	58.3	8536		1.1	I
		15	116.7	4538	BOX150	2.3	III
		20	87.5	5979		1.9	III
		25	70.0	7294		1.4	II
		30	58.3	8536		1.2	I
		40	43.8	10806		1.2	I
15	250TC	7.5	233.3	3647		2.9	III
		10	175.0	4646		2.3	III
		15	116.7	6808		1.6	II
		20	87.5	8969		1.2	I

DIMENSIONAL TABLES

BOX input and combinations

type	flange	Nm	Mm	Pm	Dm	i:5	i:7.5	i:10	i:15	i:20	i:25	i:30	i:40	i:50	i:60	i:80	i:100
		NEMA [inches]															
BOX030	56C	4.5	5.88	6.5	0.625 (5/8")												
BOX040	56C	4.5	5.88	6.5	0.625 (5/8")												
BOX050	56C	4.5	5.88	6.5	0.625 (5/8")												
BOX063	56C	4.5	5.88	6.5	0.625 (5/8")												
	140TC	4.5	5.88	6.5	0.875 (8/8")												
BOX075	56C	4.5	5.88	6.5	0.625 (5/8")												
	140TC	4.5	5.88	6.5	0.875 (7/8")												
	180TC	8.5	7.25	9.0	1.125 (9/8")												
BOX090	56C	4.5	5.88	6.5	0.625 (5/8")												
	140TC	4.5	5.88	6.5	0.875 (7/8")												
	180TC	8.5	7.25	9.0	1.125 (9/8")												
BOX110	140TC	4.5	5.88	6.5	0.875 (7/8")												
	180TC	8.5	7.25	9.0	1.125 (9/8")												
	210TC	8.5	7.25	9.0	1.375 (11/8")												
BOX130	140TC	4.5	5.88	6.5	0.875 (7/8")												
	180TC	8.5	7.25	9.0	1.125 (9/8")												
	210TC	8.5	7.25	9.0	1.375 (11/8")												
BOX150	180TC	8.5	7.25	9.0	1.125 (9/8")												
	210TC	8.5	7.25	9.0	1.375 (11/8")												
	250TC	8.5	7.25	10.0	1.625 (13/8")												

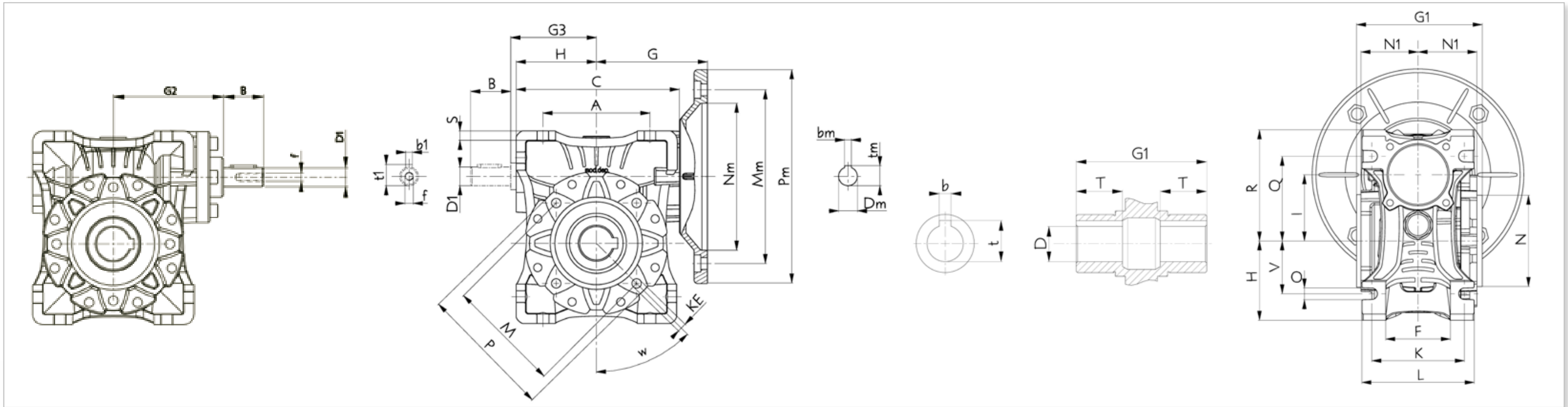


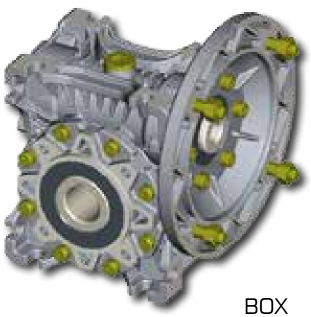
You can download 2D and 3D drawings from www.motive.it

DIMENSIONAL TABLES

BOX general data
NEMA (inches)

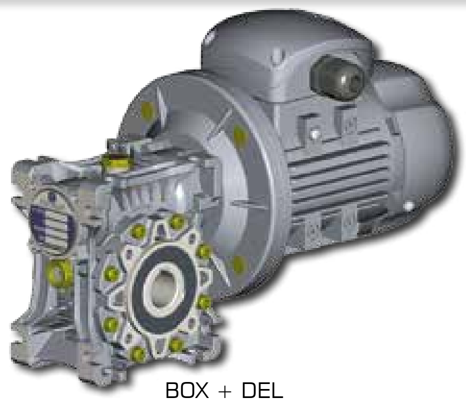
Type	A	C	G	H	I	K	KE	L	M	N (h8)	N1	O	P	Q	R	S	V	W	output T	output G1	output D	output b	output t	MB/MF B	MB/MF D1	MB/MF G2	MB/MF G3	MB/MF b1	MB/MF t1	MB/MF f
BOX030	2.13	3.19	2.64	1.57	1.18	1.73	M6x0.43 (n°4)	2.20	2.56	2.17 $^{0}_{-0.0018}$	1.14	0.26	2.95	1.73	2.24	0.22	1.06	-	0.787	2.48	0.625 (5/8") $^{-0}_{+0.001}$	0.188	0.71	1.181	0.375 (3/8") $^{+0}_{-0.0005}$	2.64	1.772	0.093	0.42	1/4-20UNC
BOX040	2.76	3.98	3.43	1.97	1.57	2.36	M6x0.32 (n°4)	2.80	2.95	2.36 $^{0}_{-0.0018}$	1.44	0.26	3.43	2.17	2.81	0.26	1.38	45°	0.906	3.07	0.750 (6/8") $^{-0}_{+0.001}$	0.188	0.84	1.181	0.500 (4/8") $^{+0}_{-0.0005}$	3.15	2.087	0.125	0.55	1/4-20UNC
BOX050	3.15	4.76	3.43	2.36	1.97	2.76	M8x0.39 (n°4)	3.35	3.35	2.76 $^{0}_{-0.0018}$	1.71	0.33	3.94	2.52	3.31	0.28	1.57	45°	1.181	3.62	1.000 (8/8") $^{-0}_{+0.001}$	0.25	1.12	1.575	0.625 (5/8") $^{+0}_{-0.0005}$	3.54	2.520	0.188	0.70	1/4-20UNC
BOX063	3.94	5.75	4.13	2.83	2.48	3.35	M8x0.55 (n°8)	4.06	3.74	3.15 $^{0}_{-0.0021}$	2.09	0.33	4.33	3.15	4.02	0.31	1.97	45°	1.417	4.41	1.125 (9/8") $^{-0}_{+0.001}$	0.25	1.24	1.969	0.750 (6/8") $^{+0}_{-0.0005}$	4.13	2.953	0.188	0.83	1/4-20UNC
BOX075	4.72	6.81	4.92	3.39	2.95	3.54	M8x0.55 (n°8)	4.45	4.53	3.74 $^{0}_{-0.0021}$	2.24	0.43	5.51	3.66	4.69	0.39	2.36	45°	1.575	4.72	1.250 (10/8") $^{-0}_{+0.001}$	0.25	1.37	2.362	0.875 (7/8") $^{+0}_{-0.0005}$	4.96	3.543	0.188	0.96	1/4-20UNC
BOX090	5.51	8.19	5.63	4.06	3.54	3.94	M10x0.71 (n°8)	5.12	5.12	4.33 $^{0}_{-0.0021}$	2.64	0.51	6.3	4.02	5.31	0.43	2.76	45°	1.772	5.51	1.375 (11/8") $^{-0}_{+0.001}$	0.313	1.52	2.362	0.875 (7/8") $^{+0}_{-0.0005}$	5.63	4.252	0.188	0.96	1/4-20UNC
BOX110	6.69	10.04	6.81	5.02	4.33	4.53	M10x0.71 (n°8)	5.67	6.5	5.12 $^{0}_{-0.0025}$	2.91	0.55	7.87	4.92	6.59	0.59	3.35	45°	1.969	6.10	1.625 (13/8") $^{-0}_{+0.001}$	0.375	1.80	2.756	1.125 (9/8") $^{+0}_{-0.0005}$	6.81	5.315	0.250	1.24	1/4-20UNC
BOX130	7.87	11.52	7.6	5.81	5.12	4.72	M12x0.83 (n°8)	6.10	8.46	7.09 $^{0}_{-0.0025}$	3.19	0.63	9.84	5.51	7.38	0.61	3.94	45°	2.362	6.69	1.750 (14/8") $^{-0}_{+0.001}$	0.375	1.93	3.150	1.250 (10/8") $^{+0}_{-0.0005}$	7.60	6.102	0.250	1.36	1/4-20UNC
BOX150	9.45	13.39	8.27	6.69	5.91	5.71	M12x0.83 (n°8)	7.28	8.46	7.09 $^{0}_{-0.0025}$	3.78	0.71	9.84	7.09	9.06	0.71	4.72	45°	2.854	7.87	2.000 (16/8") $^{-0}_{+0.001}$	0.71	2.2	3.150	1.375 (11/8") $^{+0}_{-0.0005}$	8.27	6.890	0.315	1.51	1/4-20UNC




BOX


BOX + MF

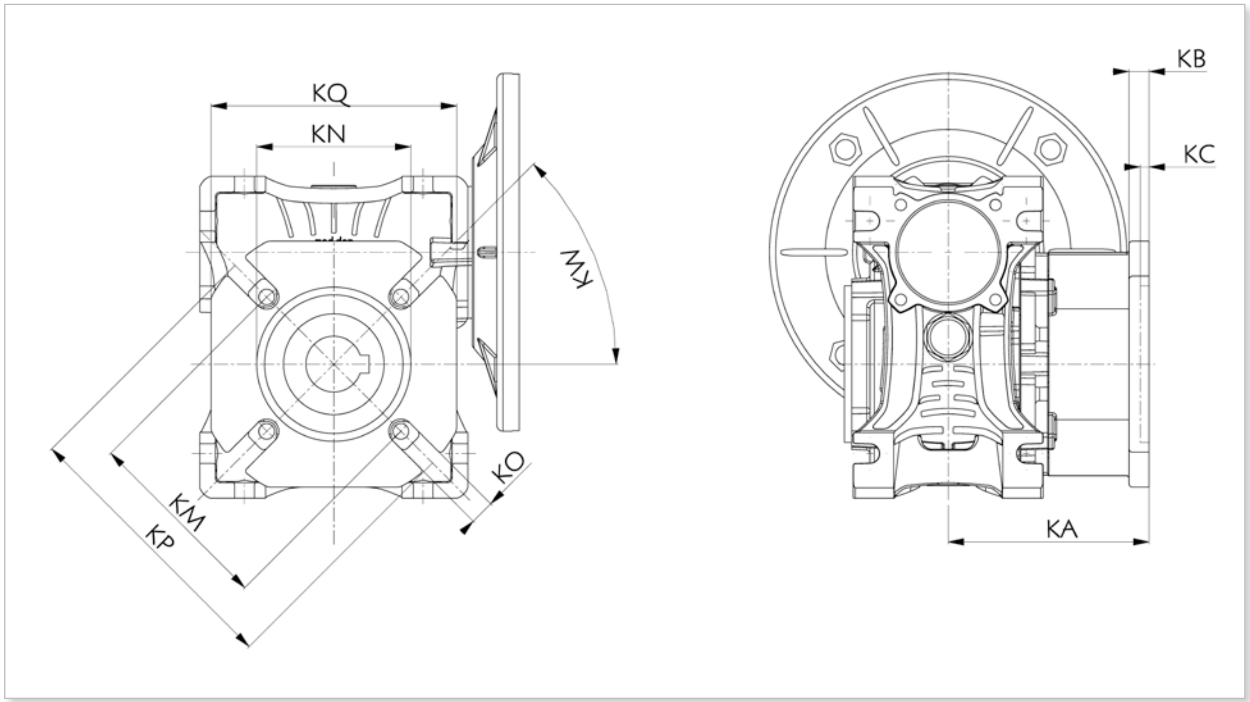

BOX + MB


BOX + DEL

DIMENSIONAL TABLES

type	output flange F									output flange FL								
	KA	KB	KC	KM	KN (h8)	KO	KP	KQ	KW	KA	KB	KC	KM	KN	KO	KP	KQ	KW
	NEMA (inches)																	
BOX030	2.15	0.24	0.16	2.68	1.97	0.26 (n°4)	3.15	2.76	45°	-	-	-	-	-	-	-	-	-
BOX040	2.64	0.28	0.16	2.95	2.36	0.35 (n°4)	4.33	3.74	45°	3.82	0.28	0.16	2.95	2.36	0.35 (n°4)	4.33	3.74	45°
BOX050	3.54	0.35	0.20	3.35	2.76	0.43	4.92	4.33	45°	4.72	0.35	0.20	3.35	2.76	0.43 (n°4)	4.92	4.33	45°
BOX063	3.23	0.39	0.24	5.91	4.53	0.43	7.09	5.59	45°	4.41	0.39	0.24	5.91	4.53	0.43 (N°4)	7.09	5.59	45°
BOX075	4.37	0.51	0.24	6.50	5.12	0.55	7.87	6.69	45°	-	-	-	-	-	-	-	-	-
BOX090	4.37	0.51	0.24	6.89	5.98	0.55	8.27	7.87	45°	-	-	-	-	-	-	-	-	-
BOX110	5.16	0.59	0.24	9.06	6.69	0.55	11.02	10.24	22.5°	-	-	-	-	-	-	-	-	-
BOX130	5.51	0.59	0.24	10.04	7.09	0.63	12.6	11.42	22.5°	-	-	-	-	-	-	-	-	-
BOX150	6.10	0.59	0.24	10.04	7.09	0.63	12.6	11.42	22.5°	-	-	-	-	-	-	-	-	-


BOX + F/FL

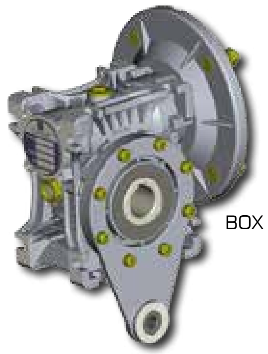


DIMENSIONAL TABLES

Accessories

Torque arm - NEMA [inches]

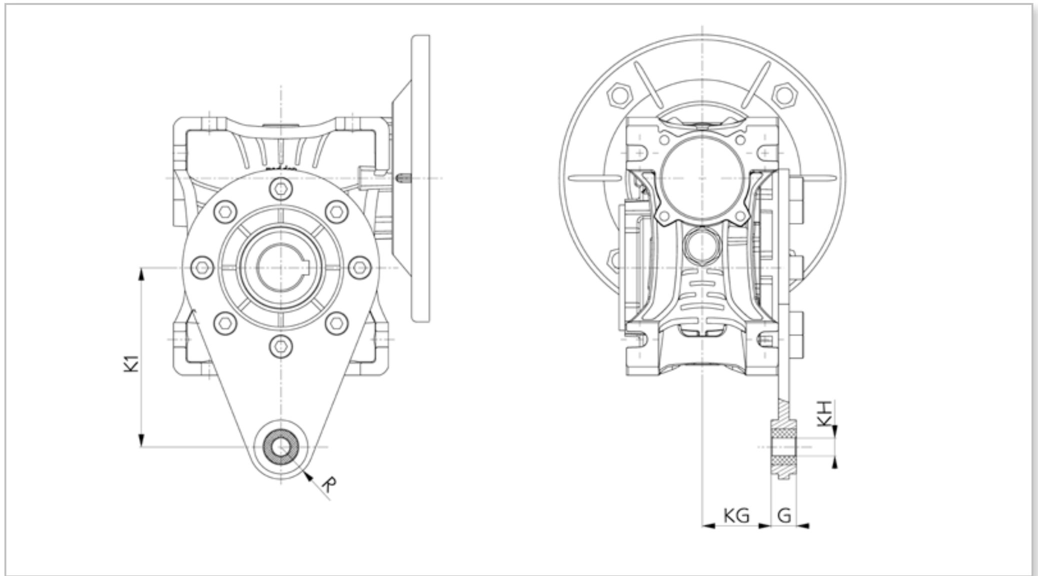
Type	K1	G	KG	KH	R
BOX030	3.35	0.55	0.94	0.31	0.59
BOX040	3.94	0.55	1.24	0.39	0.71
BOX050	3.94	0.55	1.52	0.39	0.71
BOX063	5.91	0.55	1.93	0.39	0.71
BOX075	7.87	0.98	1.87	0.79	1.18
BOX090	7.87	0.98	2.26	0.79	1.18
BOX110	9.84	1.18	2.44	0.98	1.38
BOX130	9.84	1.18	2.72	0.98	1.38
BOX150	9.84	1.18	3.31	0.98	1.38

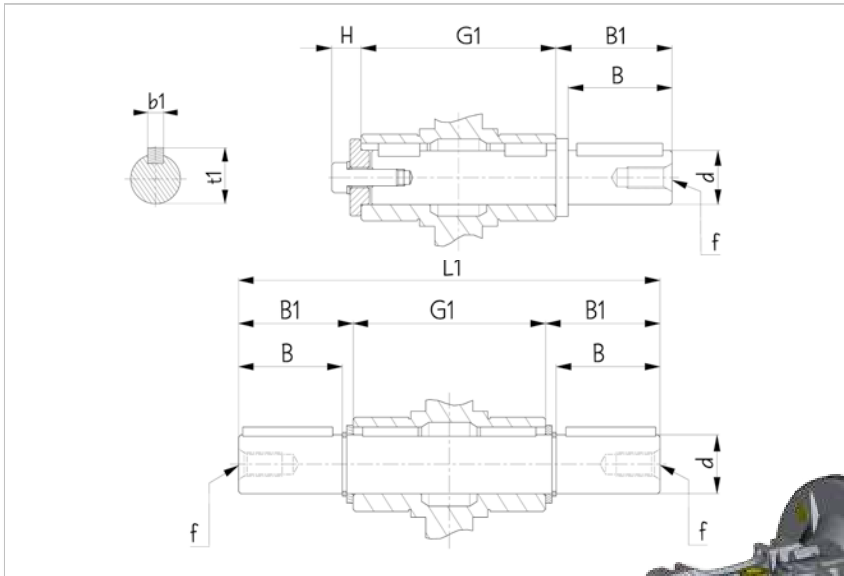


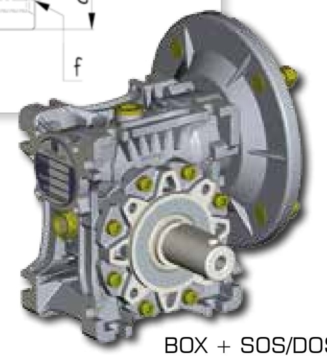
BOX + TA

Single and double output shaft - NEMA [inches]

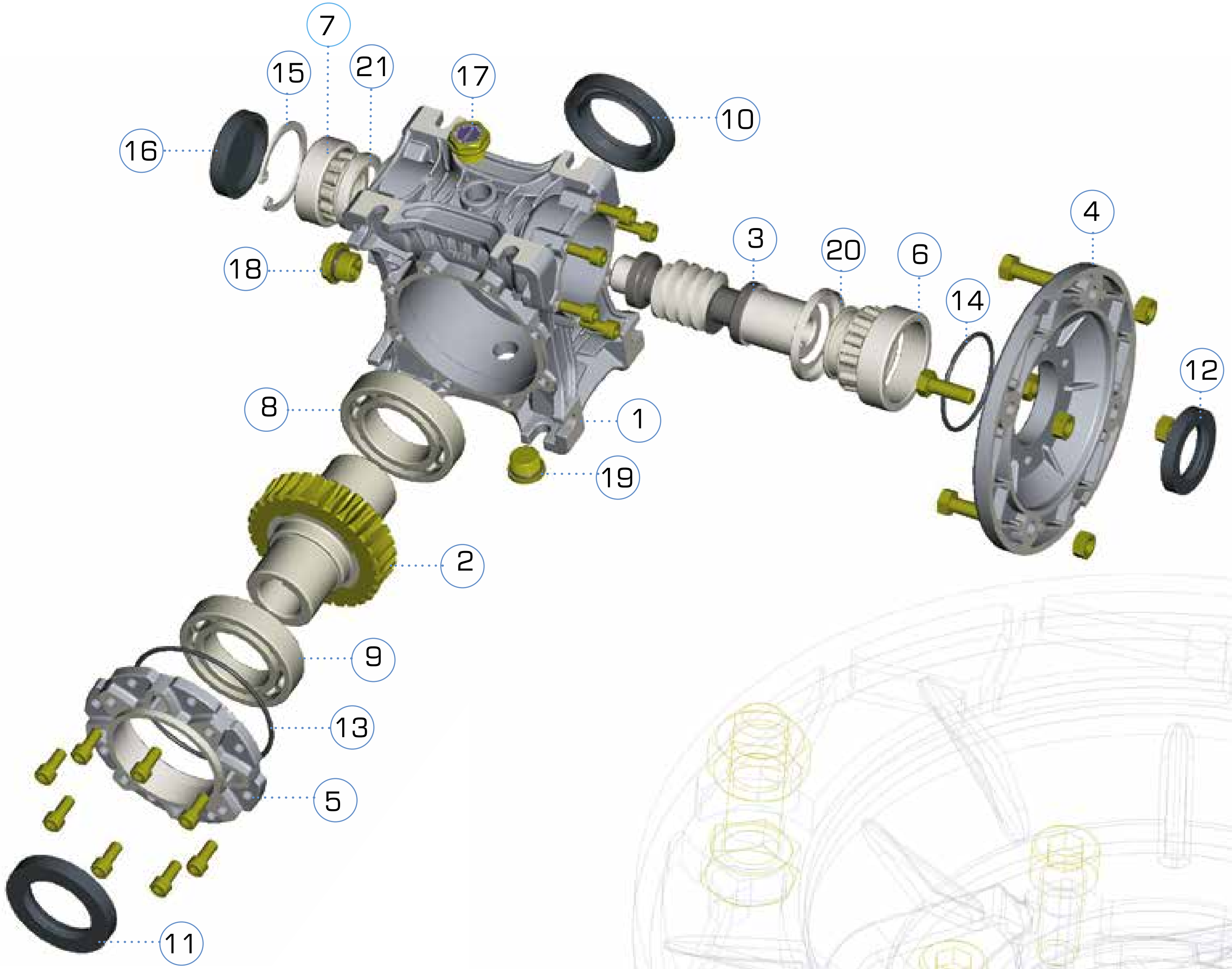
Type	d	B	B1	G1	H	L1	f	b1	t1
BOX030	0.625 (5/8") $^{-0.0005}_{+0}$	1.58	1.67	2.48	0.26	5.83	M6	0.188	0.70
BOX040	0.750 (6/8") $^{-0.0005}_{+0}$	1.97	2.09	3.07	0.27	7.24	M6	0.188	0.83
BOX050	1.000 (8/8") $^{-0.0005}_{+0}$	1.97	2.11	3.62	0.29	7.83	M10	0.250	1.11
BOX063	1.125 (9/8") $^{-0.0005}_{+0}$	2.36	2.50	4.41	0.12	9.41	M10	0.250	1.23
BOX075	1.250 (10/8") $^{-0.0005}_{+0}$	2.76	2.89	4.72	0.34	10.51	M10	0.250	1.36
BOX090	1.375 (11/8") $^{-0.0005}_{+0}$	3.15	3.33	5.51	0.37	12.13	M12	0.313	1.51
BOX110	1.625 (13/8") $^{-0.0010}_{+0}$	3.54	4.13	6.10	0.40	13.54	M16	0.375	1.79
BOX130	1.750 (14/8") $^{-0.0010}_{+0}$	3.54	3.74	6.69	0.41	14.17	M16	0.375	1.92
BOX150	2.000 (16/8") $^{-0.0010}_{+0}$	4.02	4.57	7.87	0.40	16.14	M16	0.500	2.50







BOX + SOS/DOS



N°	CODE
1	BOXHOU
2	BOXGEA
3	BOXSHA
4	BOXFLA
5	BOXCAP
6	BOXB06
7	BOXB07
8	BOXB08
9	BOXB09
10	BOXS10
11	BOXS11
12	BOXS12
13	BOXS13
14	BOXS14
15	BOXSEE
16	BOXCOV
17	BOXBPL
18	BOXLPL
19	BOXFPL
20	BOXN20
21	BOXN21

OIL SEAL RINGS AND BEARINGS LIST

Mounting position: any

	bearirngs				oil seals		
	6	7	8	9	10	11	12
BOX 30	61904	6002-ZZ	6005	6005	25×47×7	25×47×7	20×30×7
BOX 40	6005	6203-ZZ	6006	6006	30×40×7	30×40×7	25×35×7
BOX 50	6006	6204-ZZ	6008-ZZ	6008-ZZ	40×62×8	40×62×8	30×47×7
BOX 63	6007	6205-ZZ	6009-ZZ	6009-ZZ	45×65×10	45×65×10	35×52×7
BOX 75	6008	6206-ZZ	6010-ZZ	6010-ZZ	50×72×8	50×72×8	40×60×8
BOX 90	32008+NILOS	30206+NILOS	6012-ZZ	6012-ZZ	60×85×10	60×85×10	40×60×8
BOX110	32010+NILOS	32207+NILOS	6013-ZZ	6013-ZZ	65×85×8	65×85×8	50×68×8
BOX130	32010+NILOS	32207+NILOS	6014-ZZ	6014-ZZ	70×90×10	70×90×10	50×68×8
BOX150	30212+NILOS	30209+NILOS	6018-ZZ	6018-ZZ	90×120×12	90×120×12	60×90×10

TERMS OF SALE AND GUARANTEE

ARTICLE 1 - **GUARANTEE**

1.1 Barring written agreements, entered into between the parties hereto each time, Motive hereby guarantees compliance with specific agreements.
The guarantee for defects shall be restricted to product defects following design, materials or manufacturing defects leading back to Motive.
The guarantee shall not include:

* Faults or damages ensuing from transport. Faults or damages ensuing from installation defects; incompetent use of the product, or any other unsuitable use.
* Tampering or damages ensuing from use by non-authorised staff and/or use of non-original parts and/or spare parts;
* Defects and/or damages ensuing from chemical agents and/or atmospheric phenomena (e.g. burnt out material, etc.); routine maintenance and required action or checks;
* Products lacking a plate or having a tempered plate.

1.2 Returns to credit or replace will be accepted only in exceptional cases; however returns of goods already used to credit or replace won't be accepted in any case.The guarantee shall be effective for all Motive products, with a term of validity of 12 months, starting from the date of shipment.
The guarantee shall be subject to specific written request for Motive to take action, according to statements, as described at the paragraphs herein below. By virtue of aforesaid approval, and as regards the claim, Motive shall be bound at its discretion, and within a reasonable time-limit, to alternatively take the following actions:
a) To supply the Buyer with products of the same type and quality as those having proven defective and not complying with agreements, free ex-works; in aforesaid case, Motive shall have the right to request, at Buyer's charge, early return of defective goods, which shall become Motive's property;
b) To repair, at its charge , the defective product or to modify the product which does not comply with agreements, by performing aforesaid action at its facilities; in aforesaid cases, all costs regarding product transport shall be sustained by the Buyer.
c) To send spare parts free of charge: all costs regarding product transport shall be sustained by the Buyer.

1.3. The guarantee herein shall assimilate and replace legal guarantees for defects and discrepancies, and shall exclude any other eventual Motive liability, however caused by supplied products; in particular, the Buyer shall have no right to submit any further claims.
Motive shall not be liable for the enforcement of any further claims, as of the date the guarantee's term of validity expires.

ARTICLE 2 - **CLAIMS**

2.1. Claims, regarding quantity, weight, gross weight and colour, or claims regarding faults and defects in quality or compliance, and which the Buyer may discover on goods delivery, shall be submitted by a max. 7 days of aforesaid discovery, under penalty of nullity.

ARTICLE 3 - **DELIVERY**

3.1. Any liability for damages ensuing from total or partial delayed or failed delivery, shall be excluded.
3.2. Unless differently communicated by written to the Client, the transport terms have to be intended ex-works.

ARTICLE 4 - **PAYMENT**

4.1. Any delayed or irregular payments shall entitle Motive to cancel ongoing agreement, including agreements which do not regard the payments at issue, as well as entitling Motive to claim damages, if any.

4.2. The Buyer shall be bound to complete payment, including cases whereby claims or disputes are underway.

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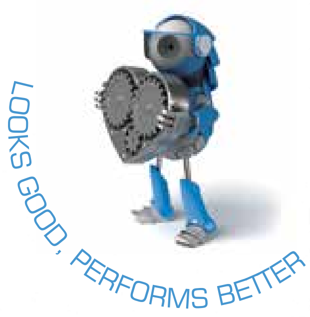

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