

# STAINLESS STEEL ELECTRIC MOTORS & GEAR MOTORS





▲ Lean manufacturing is applied in the assembly department.

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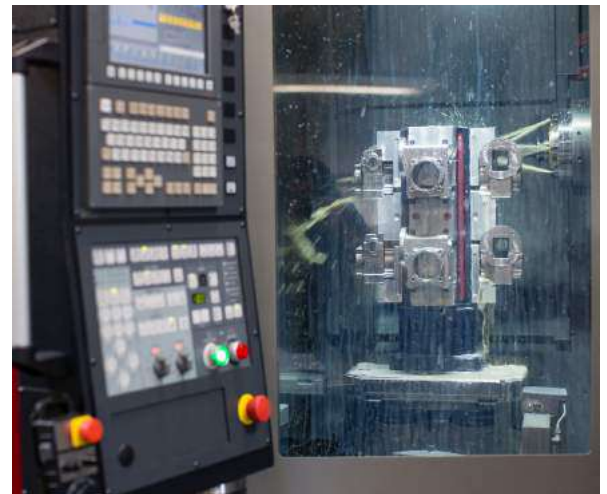
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▲ ABI's production facility is equipped with advanced CNC machinery.



# Stainless steel electric motors

ABI b.v., located in Haarlem, Holland, has been developing and manufacturing electric motors and gear motors since 1955. Responding to market needs, ABI has developed a completely stainless steel aseptic electric motor, especially designed for markets dealing with high standards in hygiene and cleaning. In the past years these motors have been further developed into the current full range of stainless steel products.

The range is characterized by high quality and reliability. Years of experience, market feedback and optimization of the design ensure that our motors live up to your expectations, even in the toughest of environments.

## IP69K

The motors are manufactured out of AISI 304, DIN 1.4301 and the shaft out of AISI 420, DIN 1.4021. The protection class is IP69K; which means that the motors are pressure washer proof according to DIN-40050. The maximum water pressure is 100bar, with a maximum temperature of 80°C. This assures effortless high pressure cleaning. Stainless steel motors often fail because of moisture (condensation) which builds up in the motor over time. This is caused by a combination of temperature changes, wash downs at different temperatures and a high humidity environment. Specially designed seals and pressure proof chambers in the ABI motors prevent this moisture build-up.

Fields of application for these motors are environments which have to conform to the HACCP regulations as well as situations with special requirements regarding hygiene and cleaning or extremely humid environments. For example: food and dairy production, meat and poultry processing, carwashes and the pharmaceutical industry.

## IE3 efficiency

The stainless steel motors produced by ABI meet the highest standard in efficiency, the IE3 standard (premium efficiency).

Reducing energy consumption by the application of highly energy efficient motors is only one of the advantages of stainless steel motors. Due to the higher efficiency, heat production is reduced, offering large advantages in safety and applicability.

## TCO and machine downtime

By choosing an ABI stainless steel motor, you contribute to a lower energy consumption, and the motor can offer you a considerable reduction in costs over time.

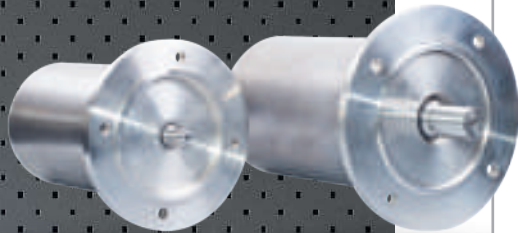
In the long run 'Total Cost of Ownership' is more important than the initial purchase price of a machine. In tough conditions, where corrosion or wear by moisture occurs, it has been proven that an IP69K motor (our ABI quality) has a much longer life span than a lesser quality motor. Next to the cost reductions by greatly reducing machine downtime, this also cuts down on replacement costs of the motors themselves.

Because of high efficiency and a longer life span, the ABI stainless steel motors add to a much lower TCO. The ABI sales engineers are happy to help you with your TCO calculations.



# Product range

ABI produces the following **product range**



Motors in different sizes

**Stainless steel motors**, 0.18-4kW, in 2, 4, 6 and 8 pole versions. Available in B14, B5 and B3 mounting positions, both in non-ventilated (TENV) and water cooled (TELC) designs.

**Stainless steel worm gear motors** in 2 sizes, up to a maximum torque of appr. 80Nm, in the most common ratios (from 3.6:1 to 75:1).

**Stainless steel planetary gearboxes** with IEC mounting position. Type PRS80 (up to 130Nm) and type PRS120 (up to 260Nm). These completely sealed (IP69K) stainless steel planetary gearboxes can be attached to IEC motors.



Terminal box version

## Stainless steel motors

The motors are characterized by a very smooth appearance, which leaves no areas where germs or dirt can collect. The mounting dimensions are according to the IEC72 standard construction forms B5 or B14. Different shaft and/or flange dimensions are available.

ABI also produces water cooled stainless steel motors. An advantage of the application of water cooling is the increased manageability of motor temperature, thereby reducing the motor's outer temperature. A second reason for applying water cooling is the significant increase in power output at a S1-100% duty cycle. This option is available on the MRS14, MRS18 and MRS20 motors. The dimensions are similar to the standard motors, except for the outer diameter of the motor housing. Please contact one of our engineers for more information.



Water cooled motor

- Round smooth housing AISI 304
- Available in 2, 4, 6 and 8 poles
- 3-phase motor according to IEC34
- Mounting type B5, B14 or B3 according to IEC72
- Motor enclosure protection class IP69K
- Non-ventilated motors (TENV) or water cooled motors (TELC)
- Integrated thermal protector
- UL / CSA certified

## Brake / Encoder

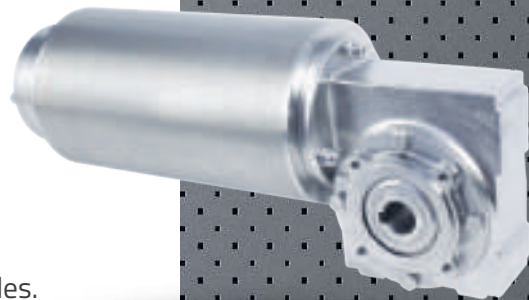
ABI is unique in the way it integrates holding brakes and/or encoders into the motors, without making concessions in protection class. Due to the modular setup of these options, we are able to adapt to our customers' wishes quickly and flexibly.

- Fully integrated
- Brake in 24Vdc or 230Vac
- Encoder TTL, HTL in 2 – 1024 pulses/rev.

## Stainless steel worm gear motors

The worm gearboxes are completely constructed from casted AISI 304, and they are available in two sizes. WRS2 has output torques up to 20Nm and WRS3 has a maximum output torque of 80Nm. The gearbox design ensures a smooth surface and easy cleaning to avoid areas where contamination can build up over time.

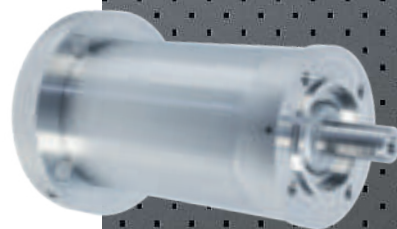
Reduction ratios are available from 3.6:1 to 75:1. The worm gear motors are manufactured with a hollow output shaft. Single or double solid output shafts are available on request. The construction is adapted for the use of a torque arm or foot mounting (B3) with tapped holes. For all types of gear motors Food Grade Oil is used.



Worm gear motor

## Stainless steel planetary gearboxes

ABI has a full range of planetary gearboxes, type PRS. These fully enclosed (IP69K) stainless steel planetary gearboxes are prepared for connection to IEC motors. The planetary gearboxes are available in 2 sizes; PRS80 has a maximum output torque of 130Nm and PRS120 has output torques up to 260Nm. Reduction ratios are available from 3:1 to 512:1.



Planetary gearbox

## Certifications



## NON-VENTILATED MOTOR (TENV)

Type	IEC Size	Power [kW]	Duty Cycle	n nom [RPM]	T nom [Nm]	Efficiency	Power-factor cos φ	I nom 400V [A]	Starting Torque Ts/Tn	Starting Current Is/In	Max Torque Tm/Tn
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### MRS Series, 2-poles, 3-phase

MRS14a-2	71	0.18	S1-100%	2935	0.59	57.6%	0.64	0.69	9.56	8.12	9.73
MRS14b-2	71	0.25	S1-100%	2910	0.82	65.9%	0.73	0.81	6.83	6.91	6.95
MRS14d-2	71	0.37	S3-60%	2880	1.23	70.6%	0.79	0.96	4.56	5.83	4.65
MRS18a-2	80	0.37	S1-100%	2965	1.19	70.7%	0.65	1.16	7.89	11.72	10.32
MRS18b-2	80	0.55	S1-100%	2949	1.78	76.8%	0.75	1.37	5.28	9.93	6.91
MRS18c-2	80	0.75	S1-100%	2933	2.44	80.7%	0.82	1.65	3.85	8.24	5.04
MRS20a-2	90	0.9	S1-100%	2963	2.90	82.7%	0.75	2.1	6.79	13.62	9.31
MRS20b-2	90	1.1	S1-100%	2956	3.55	83.0%	0.8	2.4	5.54	11.92	7.60
MRS20c-2	90	1.5	S1-100%	2941	4.87	85.8%	0.85	3	4.04	9.53	5.54

### MRS Series, 4-poles, 3-phase

MRS14a-4	71	0.18	S1-100%	1459	1.18	65.9%	0.55	0.73	5.94	6.44	6.54
MRS14b-4	71	0.25	S1-100%	1446	1.65	71.7%	0.64	0.79	4.24	5.95	4.66
MRS14d-4	71	0.37	S3-60%	1421	2.49	73.5%	0.75	0.96	2.82	4.90	3.10
MRS18a-4	80	0.37	S1-100%	1472	2.40	72.6%	0.49	1.47	7.08	7.69	7.79
MRS18b-4	80	0.55	S1-100%	1460	3.60	78.1%	0.61	1.66	4.73	6.81	5.20
MRS18c-4	80	0.75	S1-100%	1445	4.96	82.5%	0.7	1.93	3.43	5.86	3.77
MRS18d-4	80	0.9	S3-25%	1432	6.00	83.0%	0.75	2.17	2.83	5.21	3.12
MRS20a-4	90	0.9	S1-100%	1475	5.83	83.0%	0.6	2.7	5.29	8.83	7.69
MRS20b-4	90	1.1	S1-100%	1470	7.15	84.1%	0.66	2.9	4.32	8.22	6.27
MRS20c-4	90	1.5	S1-100%	1458	9.82	85.3%	0.75	3.4	3.14	7.01	4.56

### MRS Series, 6-poles, 3-phase

MRS14a-6	71	0.09	S1-100%	960	0.90	48.0%	0.48	0.56	4.69	3.57	4.91
MRS14d-6	71	0.12	S3-25%	950	1.21	54.0%	0.54	0.59	3.48	3.39	3.65
MRS18a-6	80	0.18	S1-100%	981	1.75	61.5%	0.41	1.06	6.56	5.85	8.56
MRS18b-6	80	0.25	S1-100%	974	2.45	67.6%	0.5	1.11	4.69	5.59	6.12
MRS18d-6	80	0.37	S3-60%	963	3.67	72.4%	0.61	1.23	3.13	5.04	4.09
MRS20a-6	90	0.55	S1-100%	968	5.43	80.0%	0.68	1.45	3.10	6.28	3.80
MRS20b-6	90	0.75	S1-100%	954	7.51	80.3%	0.76	1.78	2.24	5.11	2.74

For MRS14: size IEC63 on request.

For MRS18 and MRS20: size IEC100 on request.

Specifications 8-pole motor on request.

Ts = Starting torque

Tn = Nominal torque

Tm = Maximum torque

Is = Starting current

In = Nominal current

## WATER COOLED MOTOR (TELC)

Type	IEC Size	Power [kW]	Duty Cycle	n nom [RPM]	T nom [Nm]
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### MRSL Series, 2-poles, 3-phase

MRSL14a-2	71	0.37	S1-100%	2880	1.23
MRSL14b-2	71	0.55	S1-100%	2840	1.85
MRSL14c-2	71	0.75	S1-100%	2762	2.59
MRSL18a-2	80	1.5	S1-100%	2867	5.00
MRSL18b-2	80	1.85	S1-100%	2825	6.25
MRSL18c-2	80	2.2	S1-100%	2774	7.57
MRSL20b-2	90	3	S1-100%	2878	9.95
MRSL20c-2	90	4	S1-100%	2819	13.55

### MRSL Series, 4-poles, 3-phase

MRSL14a-4	71	0.37	S1-100%	1421	2.49
MRSL14b-4	71	0.55	S1-100%	1370	3.83
MRSL14c-4	71	0.75	S1-100%	1278	5.60
MRSL18a-4	80	1.1	S1-100%	1416	7.42
MRSL18b-4	80	1.5	S1-100%	1369	10.46
MRSL18c-4	80	1.85	S1-100%	1301	13.58
MRSL20a-4	90	2.2	S1-100%	1441	14.58
MRSL20b-4	90	3	S1-100%	1414	20.26
MRSL20c-4	90	4	S1-100%	1364	28.00

### MRSL Series, 6-poles, 3-phase

MRSL14a-6	71	0.18	S1-100%	925	1.86
MRSL14b-6	71	0.25	S1-100%	873	2.73
MRSL18a-6	80	0.75	S1-100%	920	7.78
MRSL18b-6	80	1.1	S1-100%	827	12.70
MRSL20b-6	90	1.5	S1-100%	868	16.50

For MRSL14: size IEC63 on request.  
For MRSL18 and MRS20: size IEC100 on request.  
Specifications 8-pole motor on request.



Custom-made design

**WORM GEAR MOTOR**

<b>WRSH2</b>	<b>T<sub>n</sub><sup>(1)</sup> [Nm]</b>	20	20	20	20	20	20	20	20	20
	<b>i</b>	3.6	8.4	10.3	12.7	15	18.5	37	40	

<b>MOTOR</b>		<b>n2 [RPM]</b>	389	167	136	110	93	76	38	35
<b>n1 [RPM]</b>	<b>P [W]</b>	<b>[Nm]</b>	3.8	8.3	9.5	12	13	16	24	27
1400 1400 1400	180 250		5.3	11	13	17	18	22	34	38

<b>MOTOR</b>		<b>n2 [RPM]</b>	778	333	272	220	187	151	76	70
<b>n1 [RPM]</b>	<b>P [W]</b>	<b>[Nm]</b>	1.9	4.1	4.7	6.0	6.3	7.8	12	14
2800 2800 2800	180 250		2.6	5.7	6.6	8.3	8.8	11	17	19

<b>WRSH3</b>	<b>T<sub>n</sub><sup>(1)</sup> [Nm]</b>	55	80	80	80	80	80	80	80	80	80	80	75	70	60
	<b>T<sub>n</sub><sup>(2)</sup> [Nm]</b>	35	50	60	60	60	70	65	65	60	55	45	45	40	
	<b>i</b>	4.75	6.67	9.67	13.5	15	21	25	28	30	38	50	60	75	

<b>MOTOR</b>		<b>n2 [RPM]</b>	295	210	145	104	93	67	56	50	47	37	28	23	19
<b>n1 [RPM]</b>	<b>P [W]</b>	<b>[Nm]</b>	5.0	6.7	9.3	12	13	16	18	18	21	24	26	29	31
1400 1400 1400 1400 1400 1400 1400 1400	180 250 370 550 750 900 1100 1500		6.9	9.3	13	17	18	23	26	25	29	33	37	40	43
			10	14	19	25	27	33	38	37	42	49	54	59	64
			15	21	28	37	41	50	56	56	63	73	81	88	96
			21	28	39	50	55	68	77	76	86	99	110	120	130
			25	34	46	61	66	81	92	91					
			30	41	57	74	81	99							
			41	56	77	101	111								

<b>MOTOR</b>		<b>n2 [RPM]</b>	589	420	290	207	187	133	112	100	93	74	56	47	37
<b>n1 [RPM]</b>	<b>P [W]</b>	<b>[Nm]</b>	2.5	3.4	4.7	6.3	6.8	8.5	9.8	9.6	11	13	14	15	16
2800 2800 2800 2800 2800 2800 2800 2800	180 250 370 550 750 900 1100 1500		3.5	4.8	6.6	8.7	9	12	14	13	15	18	20	21	22
			5.2	7.1	9.8	13	14	17	20	20	22	26	30	32	32
			7.8	11	15	19	21	26	30	29	33	39	44	47	48
			11	14	20	26	28	35	41	40	45	53	60	64	65
			13	17	24	31	34	43	49	48	54	64	72	77	78
			16	21	29	38	42	52	60	59	66	78	88	95	
			21	29	40	52	57	71	82	80	91	107			

(1) T<sub>n</sub> is nominal output torque for 5000h. (2) T<sub>n</sub> is nominal output torque for 15000h and allows a short incidental overload of 100%.



## PLANETARY GEARBOX (PRS80)

PRS80	$T_{n^{(1)}} [Nm]$	1 Stage				2 Stages								
		i	3	4	5	8	9	12	15	16	20	25	32	40
		60	75	75	35	85	80	75	80	80	75	80	75	35

MOTOR		$n_2 [RPM]$													
$n_1 [RPM]$	P [W]		467	350	280	175	156	117	93	88	70	56	44	35	22
1400	180	[Nm]	3.5	4.7	5.9	9.4	10	14	17	18	23	29	37	46	74
	250		4.9	6.5	8.2	13	14	19	24	26	32	40	51	64	103
370	7.3		9.7	12	19	21	28	36	38	47	59	76	95		
550	11		14	18	29	32	42	53	56	71	88	113	141		
750	15		20	25	39	43	58	72	77	96	120	154			
900	18		24	29	47	52	69	87	92	115					

PRS80	$T_{n^{(1)}} [Nm]$	3 Stages								
		i	60	80	100	120	160	200	256	320
		75	80	80	75	80	75	80	75	35

MOTOR		$n_2 [RPM]$									
$n_1 [RPM]$	P [W]		23	18	14	12	9	7	5	4	3
1400	180	[Nm]	66	88	111	133	177	221	283	354	566
	250		92	123	153						
	370		136								

(1)  $T_n$  is nominal output torque.  $T_n$  allows a short incidental overload of 50%. Other motor speeds on request.



## PLANETARY GEARBOX (PRS120)

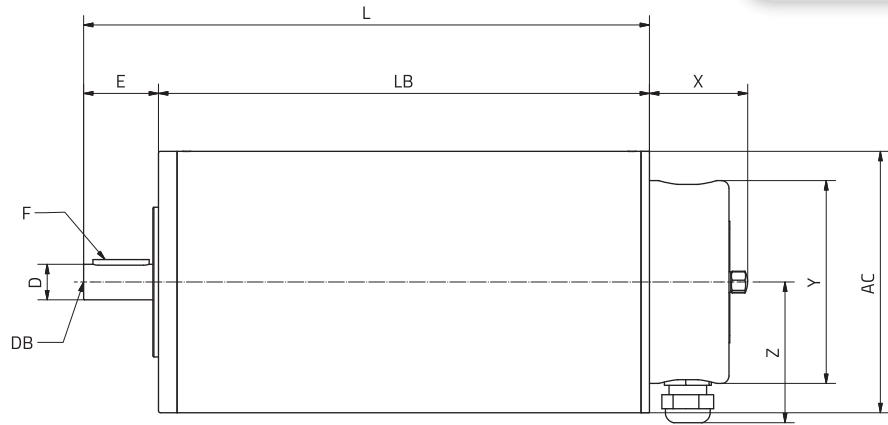
PRS120	$T_{n^{(1)}} [Nm]$	1 Stage				2 Stages								
		75	105	130	80	140	170	150	170	170	150	170	150	80
	i	3	4	5	8	9	12	15	16	20	25	32	40	64

MOTOR		$n_2$ [RPM]													
$n_1$ [RPM]	P [W]		467	350	280	175	156	117	93	88	70	56	44	35	22
1400 1400 1400 1400 1400 1400	370	[Nm]	7.3	9.7	12	19	21	28	36	38	47	59	76	95	152
	550		11	14	18	29	32	42	53	56	71	88	113	141	226
	750		15	20	25	39	43	58	72	77	96	120	154	192	
	900		18	24	29	47	52	69	87	92	115	144	185	231	
	1100		22	29	36	58	63	85	106	113	141	176	226		
	1500		29	39	49	79	87	115	144	154	192	240	308		

PRS120	$T_{n^{(1)}} [Nm]$	3 Stages								
		170	170	170	150	170	150	170	150	80
	i	60	80	100	120	160	200	256	320	512

MOTOR		$n_2$ [RPM]									
$n_1$ [RPM]	P [W]		23	18	14	12	9	7	5	4	3
1400 1400 1400	370	[Nm]	136	182	227	273	363	454	582	727	1163
	550		203	270							
	750		276								

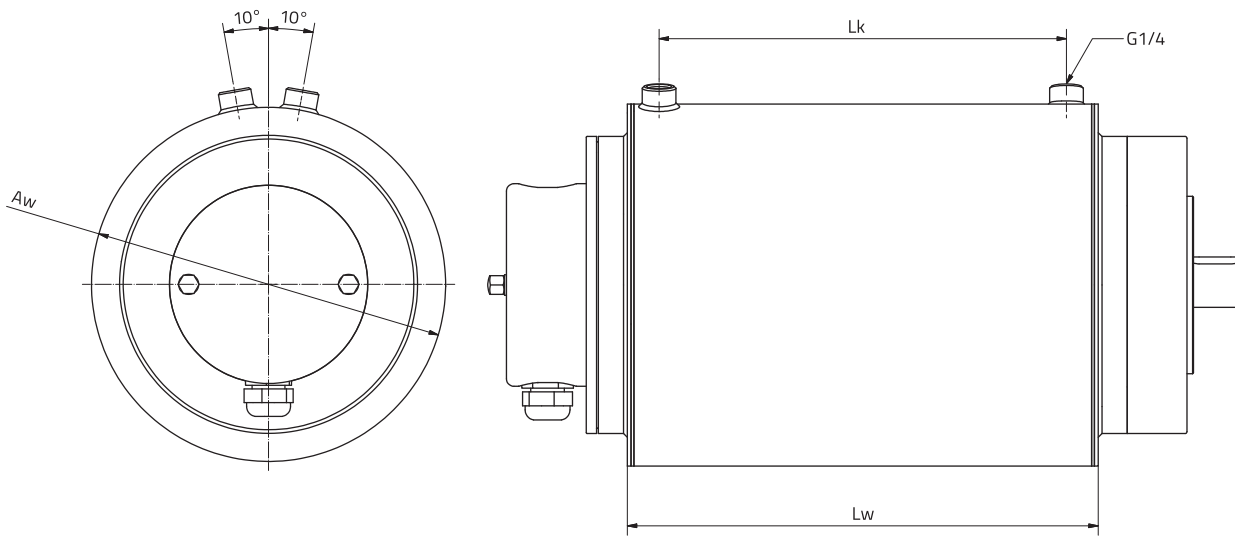
(1)  $T_n$  is nominal output torque.  $T_n$  allows a short incidental overload of 50%. Other motor speeds on request.



**MOTOR**

Type	IEC Size	L	LB	AC Ø	D Ø	E	F	X	Y Ø	Z	DB DIN332-D	Flange	Weight [kg]
MRS14	71	239	209	114.3	14	30	5x20	53	108	75	M5	B5	12
												B14a	11
												B14b	11.5
MRS18	80	302.5	262.5	139.7	19	40	6x30	53	108	75	M6	B5	21.5
												B14a	20.5
												B14b	21
MRS20	90	370.5	320.5	159	24	50	8x40	53	108	75	M8	B5	32.5
												B14a	30
												B14b	31

All dimensions are in mm. Keyway according to DIN 6885.



**WATER COOLED MOTOR**

Type	Lw	Lk	Aw Ø
MRSL14	169	135	139.7
MRSL18	217	183	159
MRSL20	252	218	193.7

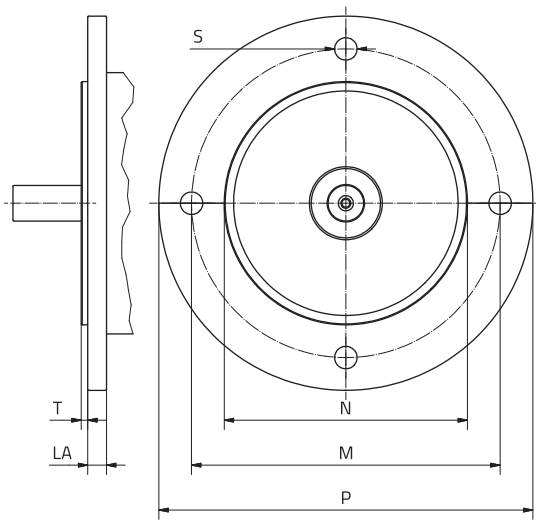
All dimensions are in mm.

**BRAKE/ENCODER**

Type	LB
MRS14	+ 88.5
MRS18	+ 88.5
MRS20	+ 95

Diameter = AC. LB increases with above mentioned values.

# DIMENSIONS

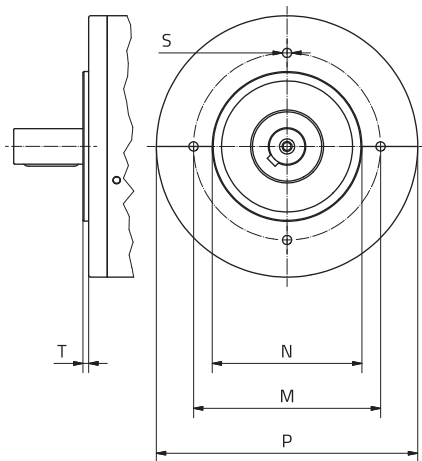


## IEC FLANGE

### B5

IEC Size	P Ø	M Ø	N Ø	S Ø	T	LA
71	160	130	110h6	9	3.5	9
80	200	165	130h6	12	3.5	10
90	200	165	130h6	12	3.5	10
100	250	215	180h6	15	4	14.5

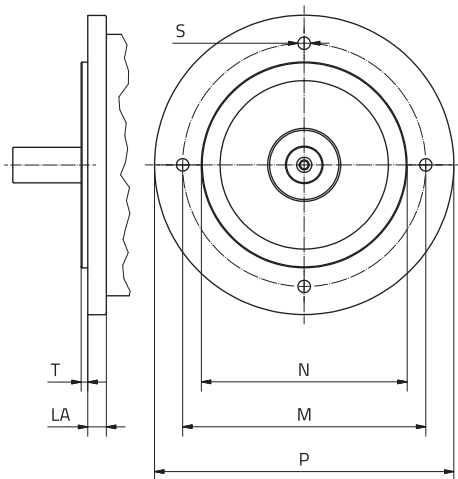
All dimensions are in mm.



### B14a

IEC Size	P Ø	M Ø	N Ø	S Ø	T	LA
71	105	85	70h6	M6	2.5	x
80	120	100	80h6	M6	3	x
90	140	115	95h6	M8	3	x
100	160	130	110h6	M8	3.5	x

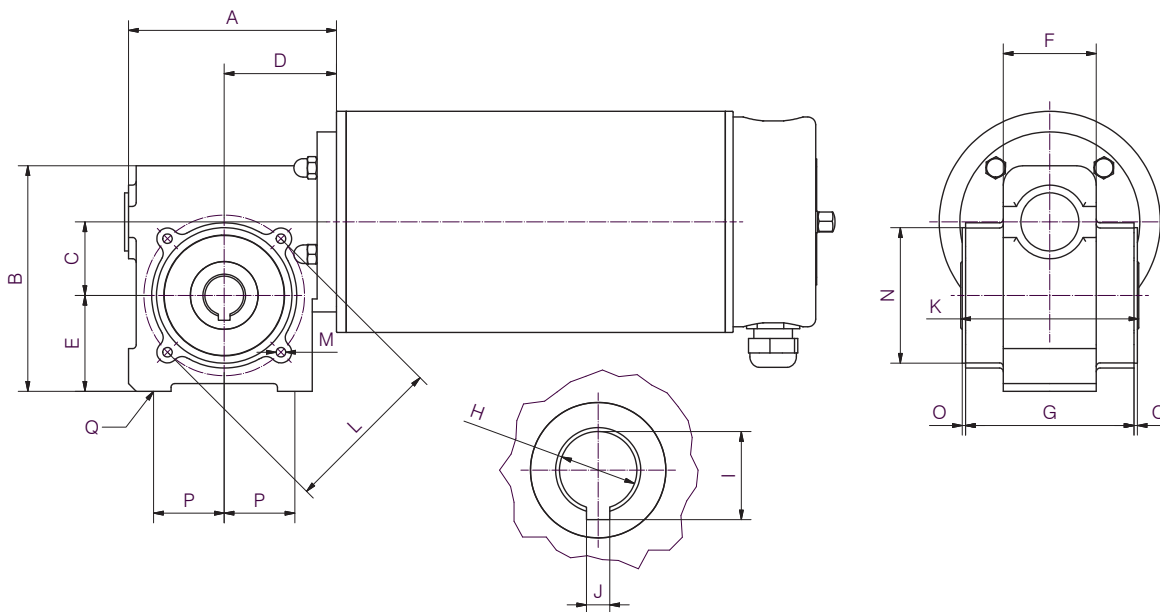
All dimensions are in mm.



### B14b

IEC Size	P Ø	M Ø	N Ø	S Ø	T	LA
71	140	115	95h6	M8	3	8
80	160	130	110h6	M8	3.5	8
90	160	130	110h6	M8	3.5	10
100	200	165	130h6	M10	3.5	12

All dimensions are in mm.

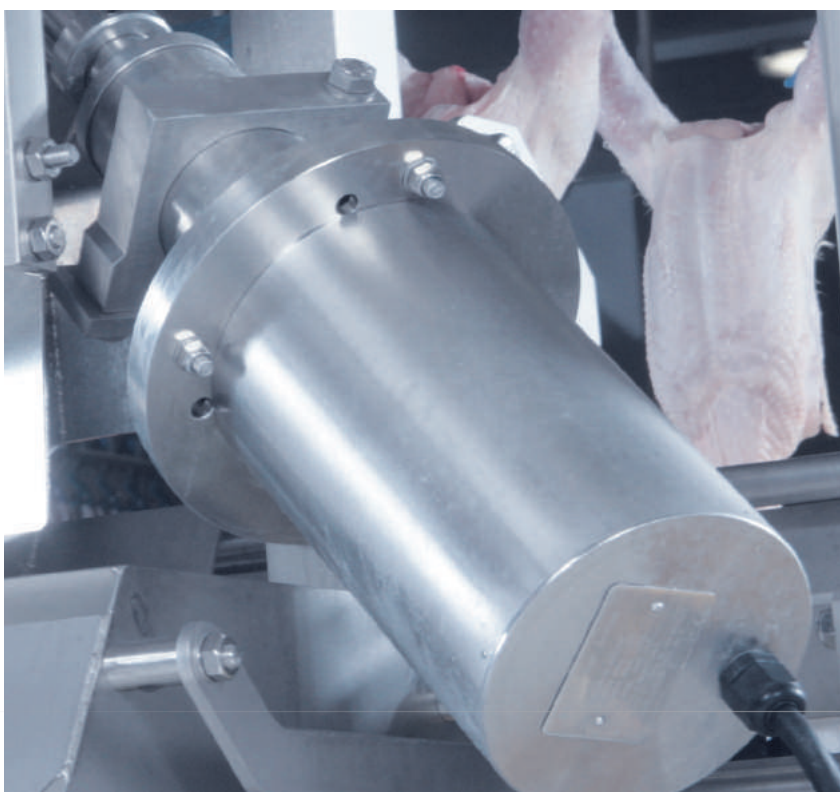


## WORM GEAR MOTOR

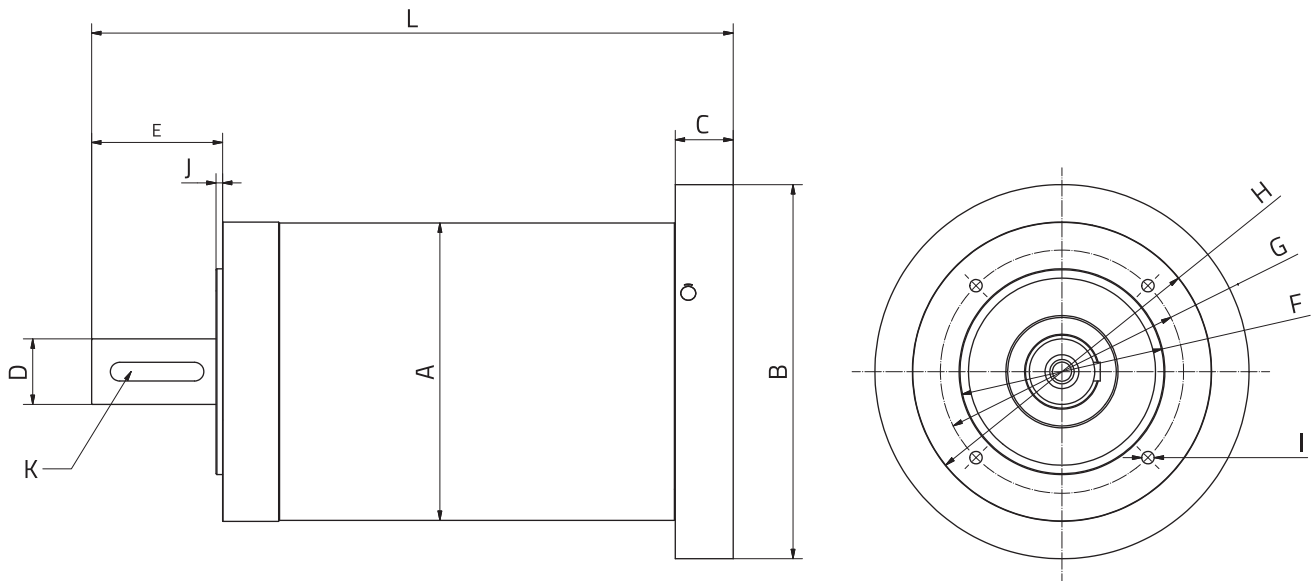
Type	A	B	C	D	E	F	G	H ∅	I
WRSH2	109.5	116.5	38	58	49.5	48	43.5	STD. 20	22.8
WRSH3	139	153	53	72.5	65	55	48.5	STD. 25	28.3

Type	J	K	L ∅	M	N ∅	O	P	Q	Weight [kg]
WRSH2	6	92	83	M6	70h6	1.75	36.5	M8	4
WRSH3	8	102	95	M8	80h6	2.5	40	M10	7

All dimensions are in mm. Keyway according to DIN 6885.



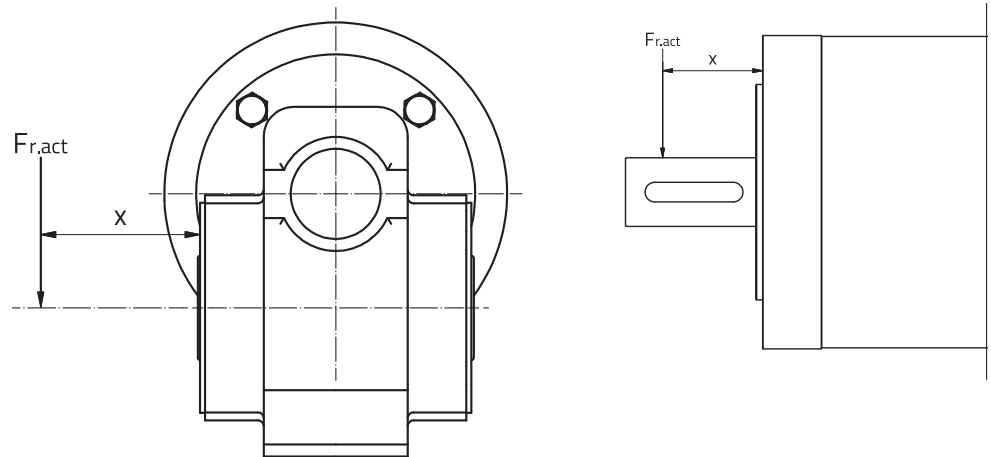
## DIMENSIONS



## PLANETARY GEARBOX

Type	i	L	A ∅	B ∅	C	D ∅	E	F ∅	G ∅	H ∅	I	J	K	Input Flange	Weight [kg]
PRS80	3..8	216.5												IEC 71 B14b	8
	9..64	234	101.5	160	24	20	40	70	85	105	M8	2.5	6x30	IEC 80 B14b	9
	60..512	251.5													10
PRS120	3..8	286.5												IEC 80 B5	20
	9..64	314	159	200	31	35	70	110	130	160	M8	3.5	10x50	IEC 90 B5	23
	60..512	341.5													26

All dimensions are in mm. Keyway according to DIN 6885.



## MAXIMUM RADIAL FORCE

RPM	10	25	40	55	70	85	100	200	300	400	500	600	700	800
WRSH2	2.84	2.02	1.69	1.5	1.36	1.26	1.18	0.89	0.74	0.65	0.59	0.54	0.5	0.47
WRSH3	5.34	3.85	3.25	2.89	2.65	2.46	2.32	1.78	1.51	1.35	1.23	1.14	1.07	1.01
PRS80	7.50	5.52	4.72	4.25	3.92	3.67	3.48	2.76	2.41	2.19	2.04	1.91	1.82	1.74
PRS120	13.78	10.15	8.68	7.81	7.20	6.75	6.39	5.08	4.43	4.03	3.74	3.52	3.34	3.20

Values are in kN, at 20mm distance.

Fa = 0.25 \* Fr with combined Fa/Fr OR 0.5 \* Fr without Fr.

## Radial and Axial forces

The values listed in the table are calculated for speeds between 10 and 800 r / min. The maximum load allowed is for a lifecycle of 15000 hours and should not be exceeded.

### Radial Load (Fr)

When calculating the radial load, the point of application for the radial force Fr is taken at the point 20 mm from the unit (see figure). When the radial force applies on the shaft from a different distance, the actual radial force has to be calculated with the highlighted formula.

### Axial load (Fa)

The allowed value for the axial load Fa is 0.25 \* Fr when the force is in combination with a radial load Fr and the allowed value is 0.5 \* without radial load.

### Calculating Fr,act

$$Fr,act = Fr * \frac{a}{b + x}$$

	a	b
WRSH2	76	56
WRSH3	98.5	78.5
PRS80	45	25
PRS120	47.5	27.5

**ABI B.V.**

A. Hofmanweg 60  
2031 BL Haarlem  
The Netherlands

Phone: +31(0)23 531 92 92  
Fax: +31(0)23 532 65 99  
info@abi.nl

**www.abi.nl**

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