

# Off-Highway Electrification

# Rexroth eLION solution portfolio

## Motor EMS1 series



### MOTOR TYPES

- 01 **EMS1-10:**  
100 mm outer radius
- 02 **EMS1-13:**  
130 mm outer radius
- 03 **EMS1-16:**  
160 mm outer radius
- 04 **EMS1-20:**  
200 mm outer radius

### TECHNICAL DATA (@ 700V)

<b>Nominal power</b>	12 ... 229 kW
<b>Maximum power</b>	20 ... 553 kW
<b>Nominal torque</b>	75 ... 1,430 Nm
<b>Maximum torque</b>	165 ... 2,520 Nm
<b>Maximum speed</b>	Up to 6,000 / 12,000 rpm

### CHARACTERISTICS

- ✓ **PMSM-Technology**  
Permanent Magnet Synchronous Motor | with high reluctance torque content
- ✓ **Powerful: high efficiency & compact design**  
Efficiency: up to 97 %
- ✓ **Designed for off-highway machines**  
Ambient temperatures: up to -40 / +100 °C | IP Class: up to IP69K & IP6K9K  
Mechanical resist.: up to Shock 50 g, Vibration 10 g | Resolver feedback
- ✓ **Flexibility: configurable power and torque**  
Scalability in length and windings | Slow- & high-speed versions available
- ✓ **Certifications: CE, UL** | **Cooling: Liquid**
- ✓ **Shaft:** External or internal spline shaft
- ✓ **No export restrictions:** Operation below 600Hz

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## Inverter EDS1 series



### Dimensions

Power Class 1 & 2 – L:387 mm W:272 mm H:110 mm

Power Class 3 – L:487 mm W:272 mm H:110 mm

### TECHNICAL DATA


Power Class		1	2	3
Inverter Type		EDS1-L0200	EDS1-L0400	EDS1-L0600
Voltage level	V <sub>DC</sub>	400 ... 700		
Current	A	I <sub>cont</sub> : 80 I <sub>peak</sub> : 200 @ 10s I <sub>peak</sub> : 160 @ 60s	I <sub>cont</sub> : 160 I <sub>peak</sub> : 400 @ 10s I <sub>peak</sub> : 320 @ 60s	I <sub>cont</sub> : 300 I <sub>peak</sub> : 600 @ 10s I <sub>peak</sub> : 450 @ 60s
Motor Power (@ 700V)	kW	P <sub>cont</sub> 8 ... 55	P <sub>cont</sub> 55 ... 110	P <sub>cont</sub> 110 ... 200

## CHARACTERISTICS

- ✓ **Powerful: high efficiency & compact design:**  
Efficiency: up to 98 % | Modular design for power scaling
- ✓ **Designed for off-highway machines:**  
Ambient temperatures: up to -40 / +85 °C | IP Class: up to IP6K7 and IP6K9K  
Mechanical resist.: up to Shock 50 g, Vibration 7.5 g | Control voltage: 12 V and 24 V
- ✓ **Intelligent:** integrated controller for modular vehicle software and power management
- ✓ **Safe**  
Integrated ISO 13849 safety functions (e.g. Safe Torque Off)  
High Voltage Interlock plugs
- ✓ **Certifications:** CE
- ✓ **Cooling:** Liquid
- ✓ **Communication & connectivity:** CAN, CANopen, Data source for IoT

# Rexroth eLION solution portfolio

## Motor portfolio @ 700V & 65°C

eMachine Configuration		Standard Speed										High Speed					
		n <sub>max</sub> rpm		4.000 – 6.000 (variant dependent)										10.000 – 12.000 (variant dependent)			
		n <sub>nom</sub> rpm		1.000		1.500		2.000		2.500		3.000		4.000		6.000	
BASIC TYPES	Length	M <sub>0</sub> [Nm]	M <sub>S2,60s</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]
<b>EMS1-10</b> 	F	75	165	8	75	12	75	16	75	19	73	23	73	34	81	42	66
	H	106	220	11	102	16	100	21	100	26	101	31	99	43	104	54	86
	J	135	275	13	128	20	126	27	129	33	125	39	123	54	128	66	104
	L	160	330	16	155	24	151	32	153	39	149	47	149	65	154	76	121
<b>EMS1-13</b> 	F	158	335	15	147	22	143	30	145	38	144	45	143	57	136	77	123
	H	218	445	21	202	31	197	41	198	51	195	59	189	77	184	96	152
	J	273	555	27	255	40	254	52	249	63	241	75	238	96	229	112	178
	L	325	665	32	302	47	301	62	296	76	290	89	285	115	274	133	212
<b>EMS1-16</b> 	F	405	650	39	371	57	361	73	350	84	320						
	H	530	865	50	479	72	461	93	442	100	382						
	J	642	1080	60	578	85	543	104	497	115	439						
	L	747	1295	71	676	99	628	117	560	123	469						
<b>EMS1-20</b> 	F	735	1265	72	692	99	631	130	619	144	550						
	H	986	1685	96	915	136	865	168	804	176	672						
	J	1210	2110	116	1112	163	1037	192	915	208	794						
	L	1430	2520	134	1283	190	1209	218	1042	229	875						




80A  
160A  
300A

acc. ECE R85 with starting temperature of 25°C

# Rexroth eLION solution portfolio

## Motor portfolio @ 400V & 65°C

eMachine Configuration		Standard Speed								High Speed			
		n <sub>max</sub> rpm		4.000 – 6.000 (variant dependent)						10.000 – 12.000 (variant dependent)			
		n <sub>nom</sub> rpm		1145		1430		1715		2285		3430	
BASIC TYPES	Length	M <sub>0</sub> [Nm]	M <sub>S2,60s</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]	P <sub>S1</sub> [kW]	M <sub>S1</sub> [Nm]
<b>EMS1-10</b> 	F	70	160	9	72	11	74	13	73	20	83	29	80
	H	100	220	12	97	15	102	18	99	26	109	39	108
	J	125	275	15	125	19	127	22	125	32	134	48	132
	L	150	330	18	149	23	153	27	150	39	164	57	159
<b>EMS1-13</b> 	F	155	335	17	144	22	148	26	147	34	144	50	139
	H	215	445	24	198	30	201	35	196	47	196	68	188
	J	270	555	30	249	37	249	44	247	59	246	84	234
	L	320	665	35	293	45	302	53	297	70	294	100	279
<b>EMS1-16</b> 	F	375	650	43	359	52	350						
	H	485	865	56	466	69	459						
	J	595	1080	67	557	83	555						
	L	705	1295	78	650	95	637						
<b>EMS1-20</b> 	F	715	1265	80	665	96	644						
	H	950	1685	105	876	127	847						
	J	1170	2110	127	1063	159	1060						
	L	1335	2520	148	1232	183	1224						



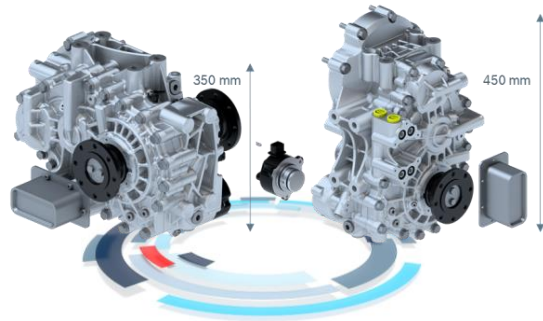
80A  
160A  
300A

acc. ECE R85 with starting temperature of 25°C

# Rexroth eLION solution portfolio

## Gear technology

### eGFZ 9100



- ▶ 1-Speed Gearbox (Dropbox)
- ▶ Ratio: 2 different ratios
- ▶ Flexible design
- ▶ 1 or 2 Output Flange(s)
- ▶ Continuous Power 120 kW
- ▶ Maximum output torque 3.800 Nm

### eGFZ 9200



- ▶ 2-Speed Gearbox (Dropbox)
- ▶ 3 different ratios
- ▶ Weight optimized
- ▶ Fast and smooth gear shift in  $\ll 1$  sec
- ▶ Continuous Power 180 kW
- ▶ Maximum output torque  $\pm 7.650$  Nm

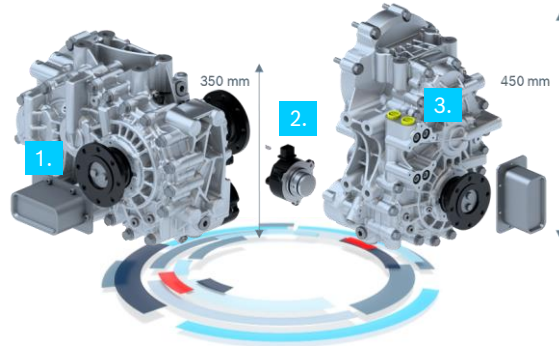
### eGFT 8000 Series



- ▶ Hub-Drive planetary gearbox
- ▶ Compact and robust design, three- or four-stage planetary gearbox
- ▶ Integrated static, hydraulic operated parking brake
- ▶ Output torque from 15.000 to 42.000 Nm

# Rexroth eLION solution portfolio

## ROTATRAC eGFZ9100 2WD / 4WD (1-speed)



- 1. Radiator
- 2. Oil Pump
- 3. Sensor Connection (Speed & Temperature)

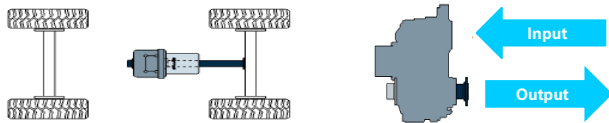
### TECHNICAL DATA

<b>Continuous Power</b>	<b>kW</b>	120
<b>Maximum output torque</b>	<b>Nm</b>	3800
<b>Maximum input speed</b>	<b>rpm</b>	16000
<b>Ratio</b>		2.5 / 2.7 / 3.0 / 3.4 / 3.8 4.0 / 4.6 / 5.0 / 6.0
<b>Weight</b>	<b>Kg</b>	~35
<b>Output Flange</b>		1 or 2

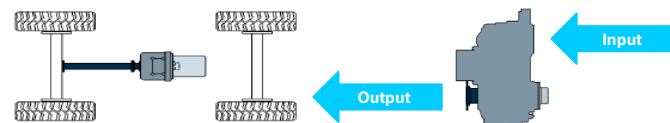
### CHARACTERISTICS

- ✓ Efficiency and NVH optimized
- ✓ Compact design and high-power density
- ✓ Minimum installation effort, flexible alignment
- ✓ Different cardan shaft flanges for one or two driven axles
- ✓ For high-speed electric motors: e.g., Bosch Rexroth EMS1-13
- ✓ **Optional:** Integrated 24V oil pump and Heat Exchanger
- ✓ **Optional:** Adapted motor flange
- ✓ **Optional:** speed and temperature sensors

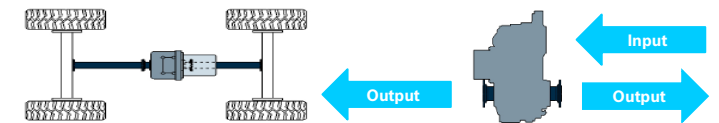
#### U-Shape (2-Wheel-Drive)



#### S-Shape (2-Wheel-Drive)



#### Z-Shape (4-Wheel-Drive)



# Rexroth eLION solution portfolio

## ROTATRAC eGFZ9200 2WD / 4WD (2-speed)



### TECHNICAL DATA

<b>Continuous Power</b>	<b>kW</b>	180 kW
<b>Maximum input speed</b>	<b>rpm</b>	14000 rpm
<b>Maximum input torque</b>	<b>Nm</b>	±630 Nm
<b>Maximum output torque</b>	<b>Nm</b>	±7650 Nm
<b>3 Ratios possible (1<sup>st</sup> / 2<sup>nd</sup>)</b>		8.4 / 3.5
		9.6 / 4.0
		11.9 / 5.0

### CHARACTERISTICS

- ✓ High efficiency up to 97 % and NVH optimized
- ✓ Compact design and high-power density
- ✓ Weight optimized 94 kg
- ✓ Integrated oil filter system
- ✓ Minimum installation effort; flexible alignment
- ✓ Different cardan shaft flanges for one or two driven axles
- ✓ Fast and smooth gear shift in << 1 sec
- ✓ Interruption of power during shifting; no drag losses of friction discs
- ✓ For high-speed electric motors: e.g., Bosch Rexroth EMS1-13
- ✓ Optional: Integrated 24V oil pump and heat exchanger
- ✓ Optional: Speed and temperature sensors



# Rexroth eLION solution portfolio

## ROTATRAC eGFT 8000 Series



### TECHNICAL DATA

Type	Output Torque (Nm)	Gear Ratio
eGFT8110	10,000	33.8
eGFT8120	15,000	59.4 / 75.2 / 81.8 / 100.3 / 113.9 / 122.4
eGFT8130	20,000	81.3 / 101.1 / 122.6 / 158.3
eGFT8140	30,000	283.1 / 321.7 / 376.9 / 429.1
eGFT8150	42,000	102.5 / 112.4 / 131.4 / 160.6

### CHARACTERISTICS

- ✓ Compact and robust, three- or four-stage planetary gearbox
- ✓ Input speeds up to 14,000 rpm
- ✓ Integrated static, hydraulic operated parking brake
- ✓ Optional mechanical disconnection
- ✓ Optional wheel studs
- ✓ For high-speed electric motors

Bosch Rexroth → EMS1-10

→ EMS1-13

→ EMS1-16

Bosch → SMG220

- ✓ Different motor connections

# Rexroth eLION solution portfolio

## Rounding off a complete solution



**Onboard  
Charger (OBC)**



**Power Distribution  
Unit (PDU)**



**DC/DC  
Converter**



**HV & LV  
Electric Cables**