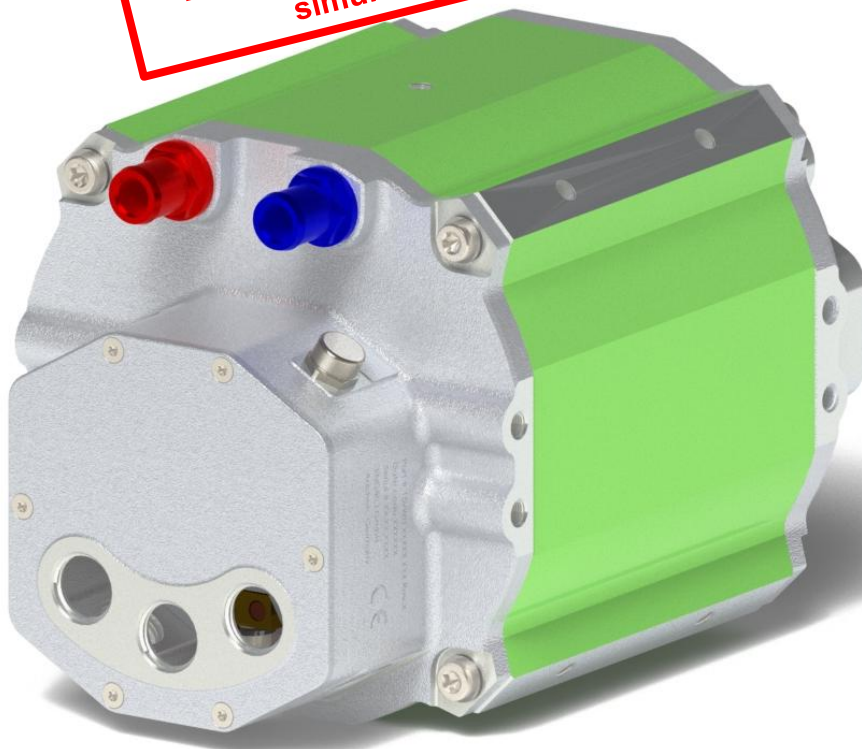


159WH-07056-ABC

water-cooled motor / generator with 28 kW continuous power

This datasheet refers to art.no.: see page 2

PRELIMINARY
simulated data



KEY FEATURES

- permanent magnet synchronous machine
- water-cooled
- high peak power for motor applications
- convincing cost-benefit ratio
- recommended voltage range from 350 V to 450 V
- delivery with controller possible
- various mechanical interfaces available

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Additional Data	5
Available Type Variants	6
Technical Drawings	7
Performance Plots	8
Additional Characteristics	9

Note:

On September 1st , 2024, we transferred our ERP systems to SAP. Due to this change, we are altering our current part numbers. To see how our article numbers and motor naming scheme has changed, please consider the conversion table below:

Article Number Conversion			
Part. No.	Flange	Shaft	Position Sensor
4943540	S1	H1	R
4947084	C1	G1	R

To be noted:

The information in this technical data sheet is based on our current knowledge and experience. Due to the wide range of possible influences during application, they do not exempt the processor and user from carrying out their own tests and trials. Although the suitability for a specific application can be estimated from our information, a legally binding assurance is by no means possible. Depending on the individual case, we recommend consultation with us. Any industrial property rights and applicable laws must be observed by the recipient of our products on his own responsibility.

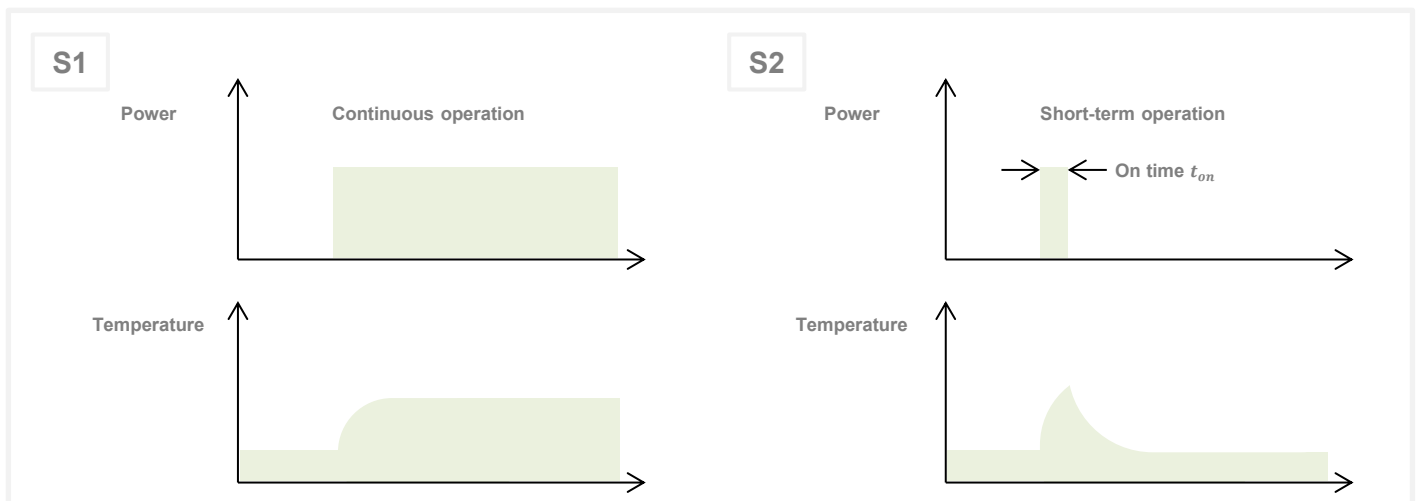
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Characteristic Operating Points¹⁾

		S1	S2	S2	
Feasible operation time	t_{on}	continuous	30 min	60 sec	
Torque ²⁾	T	46	46	88	Nm
Power ²⁾	P	28	28	50	kW
Speed	n	5900	5900	5400	rpm
Phase RMS-current (AC) ³⁾	I_{rms}	87	87	180	A
Battery current (DC) ³⁾	I_{DC}	77	77	147	A
Battery voltage (DC)	U_{DC}	400	400	400	V
Electric frequency	f_{el}	491	491	450	Hz
Efficiency	η_{tot}	94	94	89	%
Power factor	$\cos(\varphi)$	0.79	0.79	0.70	
Cooling	specified in chapter „Additional Data“				

Maximum Operating Range

Torque ^{2) 4)}	T_{max}	91 @ 1000 rpm	Nm
Power ^{2) 4)}	P_{max}	38 @ 4500 rpm	kW
Speed ⁵⁾	n_{max}	8000	rpm
Phase RMS-current (AC) ^{3) 4)}	$I_{rms,max}$	180	A
Battery current (DC) ^{3) 4)}	$I_{DC,max}$	116	A
Battery voltage (DC)	U_{max}	450	V
Electric frequency	f_{el}	666	Hz

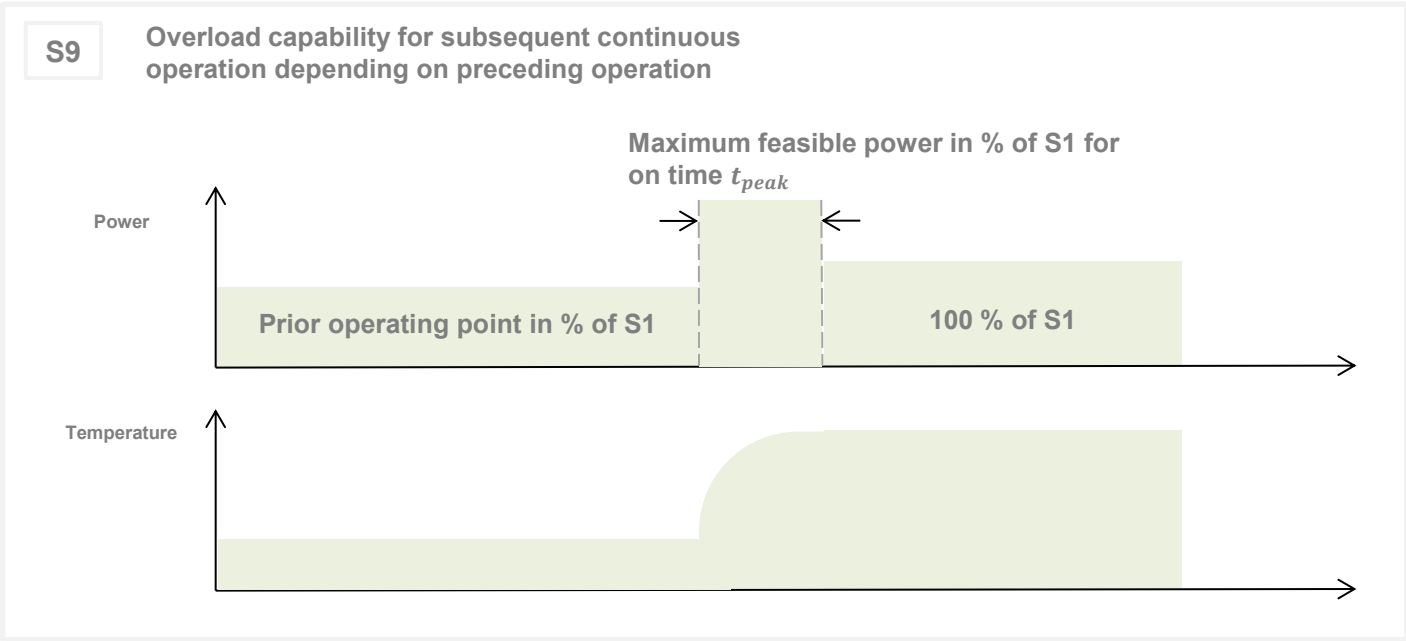


- 1) Defined Range only valid for a power factor of 1 at DC input
- 2) Torque / Power rating is dependent on rotor temperature
- 3) The cables must not exceed a temperature of 140 °C at any time. Temperature and service life depend on the installation condition.
- 4) Peak rating for max. 60 sec on time
- 5) Higher speeds available upon request. A detailed discussion of the functional safety concept of the vehicle is required.

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S9 Operating Points ¹⁾ Maximum Feasible Power in % of S1						
U _{nom} = 400 V		Prior operating point in % of S1				
		0 %	25 %	50 %	75 %	100 %
On time t _{peak}	30s	140 %	140 %	130 %	120 %	100 %
	180s	110 %	110 %	110 %	100 %	100 %
	420s	100 %	100 %	100 %	100 %	100 %

1) Cooling conditions as specified in chapter "Additional Data"



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Electrical Data						
Number of phases					3	
Number of pole pairs					5	
Maximum stationary short circuit current ¹⁾		97 A (RMS) @ 20 °C @ ≥ 1400 rpm				
Maximal efficiency					93	%
T/I constant (I<I _{nom})					0.529	Nm/A _{rms}
U/n constant (AC) at temperature 20 °C		rms:	36.83	peak:	53.05	V/(1000rpm)
Ke constant (AC) at temperature 20 °C		rms:	0.35	peak:	0.51	V/(rad*s ⁻¹)
Additional Data						
Rotor moment of inertia					0,006	kg*m²
Allowed range of ambient temperature					-20 ... +85	°C
Maximal motor temperature					146	°C
Temperature monitoring					KTY 84-130	
Cooling	Advised medium (OAT Coolants)	water/glycol - 50/50 - TL 774-D/F - VIN 878389 - MAN 324 SNF - MTL 5048				
	Flow rate				6	l/min
	Inlet temperature				45	°C
	Pressure drop				< 0.15	bar
	Maximum pressure				2	bar
	Cooling channel volume				0.53	l
Connectors						
Power terminals		Prepared for M8 cable lugs; 3x M20 cable glands (not included)				
Signal connectors		Deutsch DTM04-08PA				
Cooling connectors		inner Ø 12 mm, outer Ø 19 mm				
Certifications						
Type approval		CE, EN 60034				
Salt spray test		ISO 9227				
Protection grade		ISO 20653 IP6K9K ²⁾				
Vibrations		ISO 16750-3				
Customs tariff number		85015230				

1) Simulated

2) Please note that the IP6K9K rating is only valid if the machine is installed with suitable cable glands and an appropriate sealed interface at the drive side of the motor (flange and/or shaft). Please contact ENGIRO for further questions.

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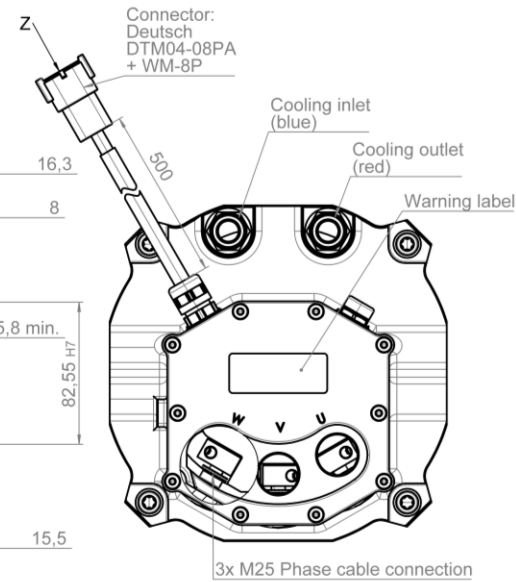
Available Type Variants			
Flange	Shaft	Pos. sensor	Weight (kg)
S1 SAE J744 82-2 (A) flange, Ø82,55 mm hydraulic pump	H1 Shaft with internal spline, ANSI B92.1 9T 16/32 DP 30° flat root side fit, Tol. Class 5	R Resolver	≈ 23 kg
C1 SAE J744 101-2 (B) flange, Ø101,6 mm hydraulic pump	G1 Hollow shaft with internal splines, 13T ANSI B 92.1	R Resolver	≈ 23 kg

Other individual combinations are also possible on request.

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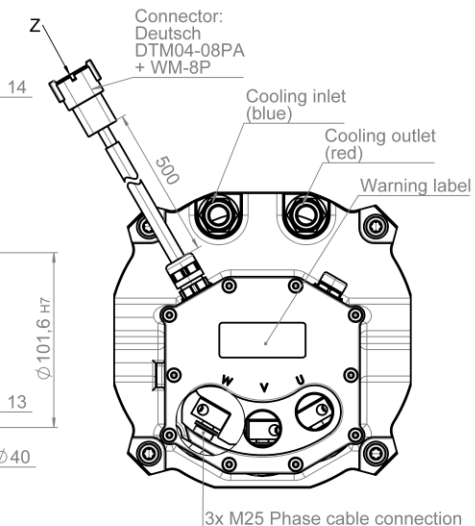
Flange Type S1

Shaft Type H1


 ANSI B92.1 Tol. class 5
 Flat root side fit
 9T - 16/32 - 30°

Flange Type C1

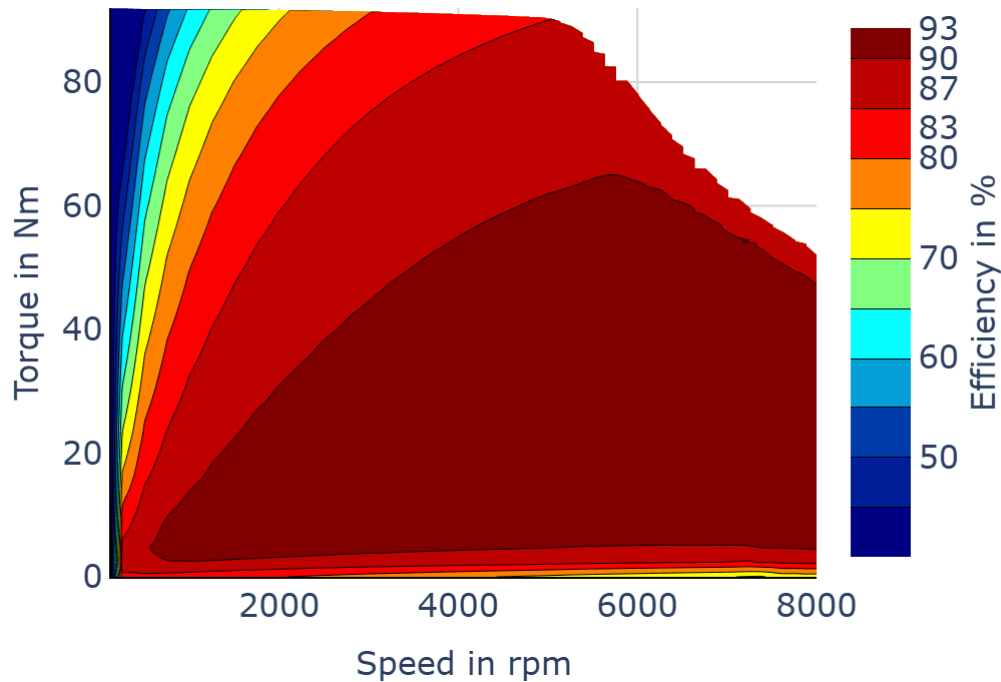
Shaft Type G1


 ANSI B92.1 Tol. class 5
 Flat root side fit
 13T - 16/32 - 30°

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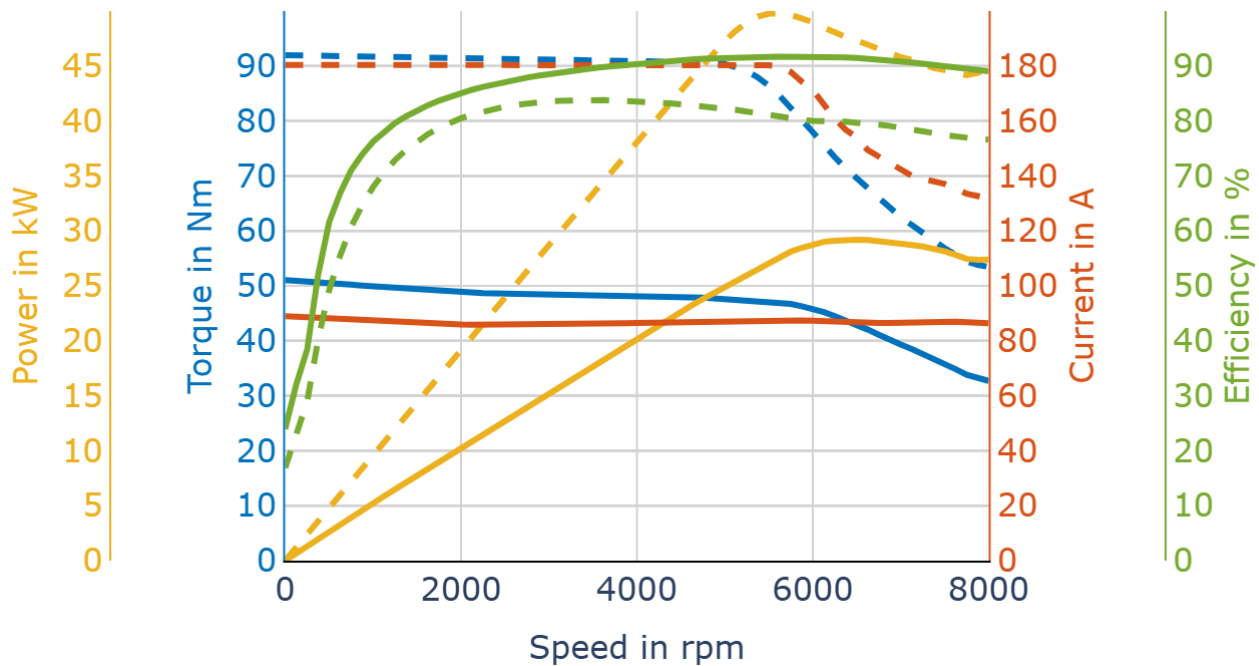
400 V

Simulated Efficiency of Motor Application

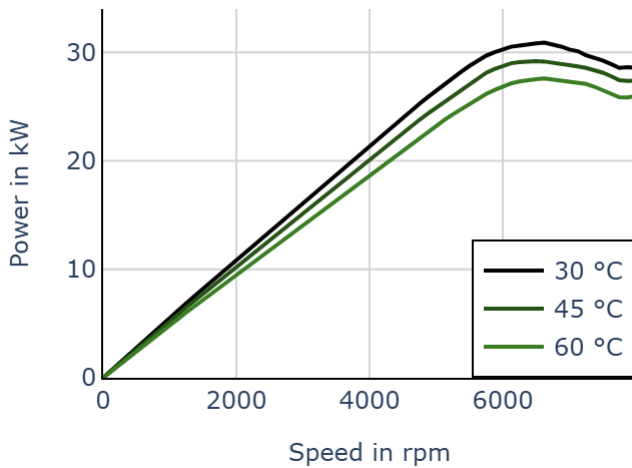
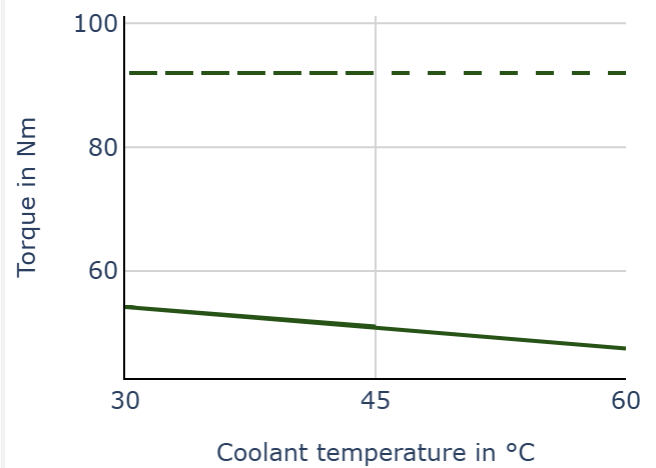
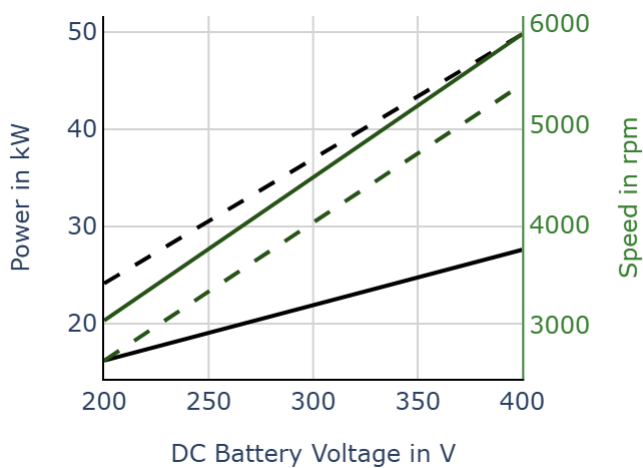
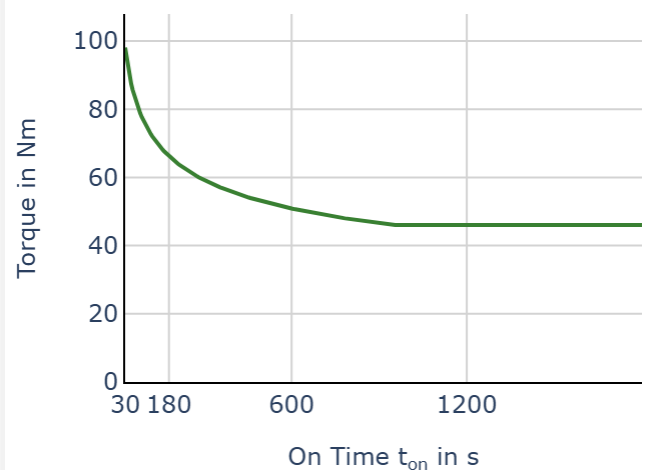
(electric machine only; $U_{\text{nom}} = 400 \text{ V}$)

400 V

Simulated Characteristic Motor Parameters

solid lines: S1 continuous; dashed lines: S2 (60 sec) maximum
(cooling as specified in chapter "Additional Data")

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Simulated Nominal Power at Different
Coolant Temperatures – $U_{nom} = 400\text{ V}$ Simulated Available Torque
at Different Coolant Temperatures ¹⁾Simulated Power and Corner Speed
over Battery Voltage¹⁾
(45 °C Coolant Temperature)Torque over Feasible Maximum On Time,
S2 Operation Cycles
(45 °C Coolant Temperature)

1) solid lines: continuous; dashed lines: maximum;

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