4.2 emDrive150

Table 3: emDrive150 technical specifications

emDrive150		min.	typ.	max.	unit
Electrical data					
Input DC link voltage range	emDrive150 – 150_250/60	20		60	V
	emDrive150 – 200_400/60	20		60	V
	emDrive150 – 150_300/125	20		125	V
Input DC link current range	emDrive150 – 150_250/60	0		250	A
	emDrive150 – 200_400/60	0		300	A
	emDrive150 – 150_300/125	0		200	A
Output phase to phase voltage range	emDrive150 – 150_250/60	0		40	V_{RMS}
	emDrive150 – 200_400/60	0		40	V_{RMS}
	emDrive150 – 150_300/125	0		84	V_{RMS}
Output current range	emDrive150 – 150_250/60	0		250	A_{RMS}
	emDrive150 – 200_400/60	0		400	A_{RMS}
	emDrive150 – 150_300/125	0		300	A_{RMS}
Output continuous current	emDrive150 – 150_250/60			150	A_{RMS}
	emDrive150 – 200_400/60			200	A_{RMS}
	emDrive150 – 150_300/125			150	A_{RMS}
Output maximum one minute peak current	emDrive150 – 150_250/60			250	A_{RMS}
	emDrive150 – 200_400/60			400	A_{RMS}
	emDrive150 – 150_300/125			300	A_{RMS}
Output continuous power	emDrive150 – 150_250/60			10	kVA
	emDrive150 – 200_400/60			13	kVA
	emDrive150 – 150_300/125			21	kVA
Output maximum one minute peak power	emDrive150 – 150_250/60			17	kVA
	emDrive150 – 200_400/60			27	kVA
	emDrive150 – 150_300/125			43	kVA
Input DC link capacitance	emDrive150 – 150_250/60		6300		µF
	emDrive150 – 200_400/60		13200		µF
	emDrive150 – 150_300/125		2400		µF
Number of output phases			3		
Switching frequency			16		kHz
Output frequency range		0		1,2	kHz
EMI Y capacitor, DC + and DC – to heat sink			2		µF
Discharge resistor: DC + to DC -			none		
Pre-charge resistor requirements: charge time to 3τ		0,5		1	
Control unit electrical data					
Supply voltage range	emDrive150 – 150_250/60	?		60	V
	emDrive150 – 200_400/60	?		60	V
	emDrive150 – 150_300/125	?		125	V
Supply current range at typ. supply voltage (idle state, PWM disabled)	emDrive150 – 150_250/60	?			A
	emDrive150 – 200_400/60	?			A
	emDrive150 – 150_300/125	?			A
Supply current range at typ. supply voltage (operating, PWM enabled)	emDrive150 – 150_250/60	?			A
	emDrive150 – 200_400/60	?			A
	emDrive150 – 150_300/125	?			A
Protection functions					
DC link voltage measurement range	emDrive150 – 150_250/60			65	V
	emDrive150 – 200_400/60			65	V
	emDrive150 – 150_300/125			130	V
DC link over voltage protection	emDrive150 – 150_250/60			60	V
	emDrive150 – 200_400/60			60	V
	emDrive150 – 150_300/125			125	V
DC link under voltage protection		0			V
DC link voltage measurement resolution			0,1		V

emDrive150		min.	typ.	max.	unit
Protection functions - continue					
Over current protection: primary protection (adjustable)	emDrive150 – 150_250/60			250	A_{RMS}
	emDrive150 – 200_400/60			400	A_{RMS}
	emDrive150 – 150_300/125			300	A_{RMS}
Over current protection: secondary protection (adjustable)	emDrive150 – 150_250/60			300	A_{RMS}
	emDrive150 – 200_400/60			500	A_{RMS}
	emDrive150 – 150_300/125			400	A_{RMS}
Output current measurement range	emDrive150 – 150_250/60	0		650	A_{RMS}
	emDrive150 – 200_400/60	0		1000	A_{RMS}
	emDrive150 – 150_300/125	0		650	A_{RMS}
Output current measurement resolution			0,25		A_{RMS}
DC link capacitors temperature protection - power derating point			75		°C
MOS-FET temperature protection - power derating point			110		°C
Motor over temperature protection (only if sensor connected)				140	°C
Motor temperature sensor input type	KTY 84-130		0,6		kΩ
	KTY 84-210		2		kΩ
	NTC		10		kΩ
Insulation					
DC + to heat sink, DC – to heat sink	emDrive150 – 150_250/60		100		V
	emDrive150 – 200_400/60		100		V
	emDrive150 – 150_300/125		250		V
DC + to logic level, DC – to logic level	emDrive150 – 150_250/60		100		V
	emDrive150 – 200_400/60		100		V
	emDrive150 – 150_300/125		250		V
Logic level to heat sink	emDrive150 – 150_250/60		100		V
	emDrive150 – 200_400/60		100		V
	emDrive150 – 150_300/125		250		V
Isolation resistance: DC + to heat sink, DC – to heat sink		100			MΩ
Protective class			I		
Mechanical data					
Weight			1,6		kg
Height			53		mm
Width			200		mm
Length			150		mm
Power contacts tightening torque (M6)		4,5	5,0	5,5	Nm
Chassis mounting screws tightening torque (M6 x 40 or longer)		8		12	Nm
Cooling data					
Power dissipation	emDrive150 – 150_250/60			300	W
	emDrive150 – 200_400/60			650	W
	emDrive150 – 150_300/125			770	W
Environmental data					
Operating ambient temperature with power derating		0		65	°C
Storage ambient temperature		-40		85	°C
Enclosure protection level			IP54		
Operating altitude				2000	m

4.3 emDrive500

Table 4: emDrive500 technical specifications

emDrive500		min.	typ.	max.	unit
Electrical data					
Input DC link voltage range		30		125	V
Input DC link current range		0		800	A
Output phase to phase voltage range		0		84	V_{RMS}
Output current range		0		800	A_{RMS}
Output continuous current				500	A_{RMS}
Output maximum one minute peak current				800	A_{RMS}
Output continuous power				62	kVA
Output maximum one minute peak power				110	kVA
Input DC link capacitance			14500		µF
Number of output phases			3		
Switching frequency			16		kHz
Output frequency range		0		1,2	kHz
EMI Y capacitor, DC + and DC – to heat sink			3		µF
Discharge resistor: DC + to DC -			none		
Pre-charge resistor requirements: charge time to 3τ		0,5		1	
Control unit electrical data					
Supply voltage range		9		30	V
Supply current range at typ. supply voltage (idle state, PWM disabled)			?		A
Supply current range at typ. supply voltage (operating, PWM enabled)			?		A
Protection functions					
DC link voltage measurement range				135	V
DC link over voltage protection				125	V
DC link under voltage protection		0			V
DC link voltage measurement resolution			0,1		V
Over current protection: primary protection (adjustable)				800	A_{RMS}
Over current protection: secondary protection (adjustable)				900	A_{RMS}
Output current measurement range		0		1000	A_{RMS}
Output current measurement resolution			0,25		A_{RMS}
DC link capacitors temperature protection - power derating point			75		°C
MOS-FET temperature protection - power derating point			100		°C
Motor over temperature protection (only if sensor connected)				140	°C
Motor temperature sensor input type	KTY 84-130		0,6		kΩ
	KTY 84-210		2		kΩ
	NTC		10		kΩ
Insulation					
DC + to heat sink, DC – to heat sink			250		V
DC + to logic level, DC – to logic level			250		V
Logic level to heat sink			250		V
Isolation resistance: DC + to heat sink, DC – to heat sink		100			MΩ
Protective class			I		
Mechanical data					
Weight			4,9		kg
Height			65		mm
Width			280		mm
Length			205		mm
Power contacts tightening torque (M8)		18	20	22	Nm
Chassis mounting screws tightening torque (M6 x 40 or longer)		8		12	Nm

emDrive500					
Cooling data					
Required coolant flow			5		l/min
Coolant temperature - power derating point			60		°C
Pressure drop @ 5 l/min @ 25 °C			0,3		bar
Operating pressure				2	bar
Coolant quantity of integrated cooling			60		cm^3
Power dissipation to coolant				TBD	kW
Coolant mixture	distilled water	50			%
	glycol			50	%
Environmental data					
Operating ambient temperature, derating for $T_{Coolant}$ > 60 °C		-20		65	°C
Storage ambient temperature		-40		85	°C
Enclosure protection level			IP54		
Operating altitude				2000	m

4.4 emDriveH300

Table 5: emDriveH300 technical specifications

emDriveH300 and emDriveH300A		min.	typ.	max.	unit
Electrical data					
Input DC link voltage range		100		450	V
Input DC link current range		0		400	A
Output phase to phase voltage range		0		302	V_{RMS}
Output current range		0		450	A_{RMS}
Output continuous current				300	A_{RMS}
Output maximum one minute peak current				450	A_{RMS}
Output continuous power				120	kVA
Output maximum one minute peak power				180	kVA
Input DC link capacitance			1000		µF
Number of output phases			3		
Switching frequency			16		kHz
Output frequency range		0		1,2	kHz
EMI Y capacitor, DC + and DC – to heat sink			220		nF
Discharge resistor: DC + to DC -		220		270	kΩ
Self-discharge time from 450 V to	- 60 V			150	s
	- 10 V			300	s
	- 0 V			30	min
Pre-charge resistor requirements: charge time to 3τ		0,5		1	s
Control unit electrical data					
Control power supply range		10		30	V
Supply current range at typ. supply voltage (idle state, PWM disabled)		0,17		0,5	A
Supply current range at typ. supply voltage (operating, PWM enabled)		0,75		2,4	A
Protection functions					
DC link voltage measurement range				520	V
DC link over voltage protection				450	V
DC link under voltage protection		0			V
DC link voltage measurement resolution			0,125		V
Over current protection: primary protection (adjustable)				450	A_{RMS}
Over current protection: secondary protection (adjustable)				550	A_{RMS}
Output current measurement range		0		1000	A_{RMS}
Output current measurement resolution			0,25		A_{RMS}
DC link capacitors temperature protection - power derating point			75		°C
IGBT module die temperature protection - power derating point			110		°C
Motor over temperature protection (only if sensor connected)				140	°C
Motor temperature sensor input type	KTY 84-130		0,6		kΩ
	KTY 84-210		2		kΩ
	NTC		10		kΩ
Insulation					
DC + to heat sink, DC – to heat sink			2,5		kV
DC + to logic level, DC – to logic level			2,5		kV
Logic level to heat sink			0,5		kV
Isolation resistance: DC + to heat sink, DC – to heat sink		500			MΩ
Protective class			I		

emDriveH300 and emDriveH300A		min.	typ.	max.	unit
Mechanical data					
Weight			7,5		kg
Height			127		mm
Width			244		mm
Length			228		mm
Power contacts tightening torque (M6 nut)		4,5	5	5,5	Nm
Chassis mounting screws tightening torque (M8 x 40 or longer)		15		25	Nm
Water fitting tightening torque		65	70	75	Nm
Self-taping cover screws tightening torque (2,5 x 10 mm)				0,8	Nm
Cable gland tightening torque (M25)				12	Nm
Cooling data					
Required coolant flow			10		l/min
Coolant temperature - power derating point			60		°C
Pressure drop @ 10 l/min @ 25 °C			0,1		bar
Operating pressure				1	bar
Coolant quantity of integrated cooling			85		cm^3
Power dissipation to coolant		0,5		4,5	kW
Coolant mixture	distilled water	50			%
	glycol			50	%
Environmental data					
Operating ambient temperature, derating for $T_{Coolant}$ > 60 °C		-20		65	°C
Storage ambient temperature		-40		85	°C
Enclosure protection level			IP54		
Operating altitude emDriveH300				2000	m
Operating altitude emDriveH300A only				4000	m
Maximal vertical velocity emDriveH300A only		-10		10	m/s

4.5 emDriveUH170

Table 6: emDriveUH170 technical specifications

emDriveUH170 and emDriveUH170A		min.	typ.	max.	unit
Electrical data					
Input DC link voltage range		100		850	V
Input DC link current range		0		200	A
Output phase to phase voltage range		0		570	V_{RMS}
Output current range		0		250	A_{RMS}
Output continuous current				170	A_{RMS}
Output maximum one minute peak current				250	A_{RMS}
Output continuous power				170	kVA
Output maximum one minute peak power				250	kVA
Input DC link capacitance			400		µF
Number of output phases			3		
Switching frequency			16		kHz
Output frequency range		0		1,2	kHz
EMI Y capacitor, DC + and DC – to heat sink			47		nF
Discharge resistor: DC + to DC -		1		2,2	MΩ
Self-discharge time from 850 V to	- 60 V			190	s
	- 10 V			320	s
	- 0 V			15	min
Pre-charge resistor requirements: charge time to 3τ		1		2	s
Control unit electrical data					
Control power supply range		10	12	30	V
Supply current range at typ. supply voltage (idle state, PWM disabled)			?		A
Supply current range at typ. supply voltage (operating, PWM enabled)			?		A
Protection functions					
DC link voltage measurement range				1040	V
DC link over voltage protection				850	V
DC link under voltage protection		0			V
DC link voltage measurement resolution			0,250		V
Over current protection: primary protection (adjustable)				250	A_{RMS}
Over current protection: secondary protection (adjustable)				275	A_{RMS}
Output current measurement range		0		500	A_{RMS}
Output current measurement resolution			0,12		A_{RMS}
DC link capacitors temperature protection - power derating point			75		°C
IGBT module die temperature protection - power derating point			110		°C
Motor over temperature protection (only if sensor connected)				140	°C
Motor temperature sensor input type	KTY 84-130		0,6		kΩ
	KTY 84-210		2		kΩ
	NTC		10		kΩ
Insulation					
DC + to heat sink, DC – to heat sink			2,5		kV
DC + to logic level, DC – to logic level			2,5		kV
Logic level to heat sink			0,5		kV
Isolation resistance: DC + to heat sink, DC – to heat sink		500			MΩ
Protective class			I		

emDriveUH170 and emDriveUH170A		min.	typ.	max.	unit
Mechanical data					
Weight			7,5		kg
Height			127		mm
Width			244		mm
Length			228		mm
Power contacts tightening torque (M6 nut)		4,5	5	5,5	Nm
Chassis mounting screws tightening torque (M8 x 40 or longer)		15		25	Nm
Water fitting tightening torque		65	70	75	Nm
Self-taping cover screws tightening torque (2,5 x 10 mm)				0,8	Nm
Cable gland tightening torque (M25)				12	Nm
Cooling data					
Required coolant flow			10		l/min
Coolant temperature - power derating point			60		°C
Pressure drop @ 10 l/min @ 25 °C			0,1		bar
Operating pressure				1	bar
Coolant quantity of integrated cooling			85		cm^3
Power dissipation to coolant		?		?	kW
Coolant mixture	distilled water	50			%
	glycol			50	%
Environmental data					
Operating ambient temperature, derating for $T_{Coolant}$ > 60 °C		-20		65	°C
Storage ambient temperature		-40		85	°C
Enclosure protection level			IP54		
Operating altitude emDriveUH170				2000	m
Operating altitude emDriveUH170A only				4000	m
Maximal vertical velocity emDriveUH170A only		-10		10	m/s