

Variable Frequency Drive, 3-/3- 400 V, 4.1 A, 1.5 kW

Powering Business Worldwide*

Part no. DC1-344D1NN-A66N Article no. 169457 Catalog No. DC1-344D1NN-A66N

Technical data

General			
Standards			Specification for general requirements: IEC/EN 61800-2 EMC requirements: IEC/EN 61800-3 Safety requirements: IEC/EN 61800-5-1
Certifications			CE, UL, cUL, c-Tick, UkrSepro, EAC
Production quality			RoHS, ISO 9001
Climatic proofing	ρ_{W}	%	< 95%, average relative humidity (RH), non-condensing, non-corrosive
Ambient temperature			
operation (150 % overload)	8	°C	-10 - +40
Storage	8	°C	-40 - +60
Mounting position			Vertical
Altitude		m	0 - 1000 m above sea level Above 1000 m: 1% derating for every 100 m max. 4000 m
Degree of Protection			IP66/NEMA 4X
Protection against direct contact			BGV A3 (VBG4, finger- and back-of-hand proof)
Main circuit			
Supply			
Rated operational voltage	U _e		400 V AC, 3-phase 480 V AC, 3-phase
Mains voltage (50/60Hz)	U_{LN}	V	380 (-10%) - 480 (+10%)
Input current (150% overload)	I _{LN}	Α	5.6
System configuration			AC supply systems with earthed center point
Supply frequency	f_{LN}	Hz	50/60
Frequency range	f _{LN}	Hz	48 - 62
Mains switch-on frequency			Maximum of one time every 30 seconds
Power section			
Function			Frequency inverter with internal DC link and IGBT inverter
Overload current (150% overload)	lι	Α	6.15
max. starting current (High Overload)	I _H	%	175
Note about max. starting current			for 2 seconds every 20 seconds
Output voltage with V _e	U ₂		400 V AC, 3-phase 480 V AC, 3-phase
Output Frequency	f ₂	Hz	0 - 50/60 (max. 500)
Switching frequency	f _{PWM}	kHz	16 adjustable 4 - 32 (audible)
Operation Mode			U/f control Speed control with slip compensation
Frequency resolution (setpoint value)	Δf	Hz	0.1
Rated operational current			
At 150% overload	l _e	Α	4.1
Note			Rated operational current at a switching frequency of 16 kHz and an ambient air temperature of +40 $^{\circ}\text{C}$
Power loss			
Heat dissipation at rated operational current I_{e} =150 $\%$	P_V	W	76.5
Efficiency	η	%	94.9
Maximum leakage current to ground (PE) without motor	I _{PE}	mA	4.65
Fitted with			7-digital display assembly
Frame size			FS1
Motor feeder			

Note				
Note 150 % Overload Note 150 % Overload P	Note			
Note	Note			Overload cycle for 60 s every 600 s
Note	Note			at 400 V, 50 Hz
150 % Overload maximum permissible cable length l maximum permissible cable length l m screened; 90 screened, with motor choke: 100 unscreened; 75 unscre	150 % Overload	P	kW	1.5
maximum permissible cable length	Note			at 440 - 480 V, 60 Hz
Apparent power Apparent power at rated operation 400 V S kVA 2.84 Apparent power at rated operation 490 V S kVA 3.41 Braking function Standard braking torque DC braking torque minimum external braking resistance Switch-on threshold for the braking transistor Control section Reference voltage V 10 VDC (max. 10 mA) Analog inputs Digital inputs Digital inputs Digital inputs Relevance filed bus (built-in) Assigned switching and protective elements Power Wiring UL (Class CC or J) 150 % overload (CT/H _H , at 50 °C) Motor feeder 150 % overload (CT/H _H , at 50 °C) Motor feeder 150 % overload (CT/H _H , at 50 °C) Motor feeder 150 % overload (CT/H _H , at 50 °C) May 2.84 Ala (Apparent power at rated operation 400 V S kVA 2.84 Analog inputs School Sc	150 % Overload	P	HP	2
Apparent power at rated operation 400 V S KVA Apparent power at rated operation 480 V S KVA 3.41 Braking function Standard braking torque DC braking torque minimum external braking resistance Switch-on threshold for the braking transistor DC braking torque minimum external braking resistance Switch-on threshold for the braking transistor DC Ung V 309 V DC Control section Reference voltage Us V 10 V DC (max. 10 mA) Analog inputs Analog outputs Digital inputs Digital inputs Digital outputs Release outputs Interface/field bus (built-in) Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % UL (Class CC or J) 150 % overload (CT/H _H , at 50 °C) Motor feeder ISO % overload (CT/H _H , at 50 °C) DX-LM3-005	maximum permissible cable length	I	m	screened, with motor choke: 100 unscreened: 75
Apparent power at rated operation 480 V Braking function Standard braking torque DC braking torque minimum external braking resistance Rmin	Apparent power			
Braking function Standard braking torque DC braking torque minimum external braking resistance Rmin	Apparent power at rated operation 400 V	S	kVA	2.84
Standard braking torque DC braking torque minimum external braking resistance Rmin	Apparent power at rated operation 480 V	S	kVA	3.41
DC braking torque minimum external braking resistance Rmin Q 10 Switch-on threshold for the braking transistor UDC V 390 V DC Control section Reference voltage Us V 10 V DC (max. 10 mA) Analog inputs Analog outputs Digital inputs Analog outputs Digital outputs Digital outputs Digital outputs Digital outputs Relay outputs Interface/field bus (built-in) Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % UL (Class CC or J) 150 % overload (CT/I _H , at 50 °C) Motor feeder 150 % overload (CT/I _H , at 50 °C) A minimum external braking resistance Rmin Q 10 10 10 10 10 10 10 10 10 10	Braking function			
minimum external braking resistance Switch-on threshold for the braking transistor Upc V 390 V DC Control section Reference voltage Us V 10 V DC (max. 10 mA) Analog inputs Analog outputs Liparameterizable, 0 - 10 V DC, 0/4 - 20 mA Analog outputs In parameterizable, 0 - 10 V DC In param	Standard braking torque			max. 30 % M _N
Switch-on threshold for the braking transistor Control section Reference voltage Us V 10 V DC (max. 10 mA) 1, parameterizable, 0 - 10 V DC, 0/4 - 20 mA Analog outputs Digital inputs Power Wiring IEC (Type B, gG), 150 % UL (Class CC or J) 150 % overload (CT/I _H , at 50 °C) Motor feeder 150 % overload (CT/I _H , at 50 °C) V 390 V DC 390 V DC 10 V DC (max. 10 mA) 10 V DC (max. 10 vA) 10 V DC (max. 10 vA) 10 V DC (max. 10 vA) 10 V DC (max. 1	DC braking torque			adjustable to 100 %
Control section Reference voltage Us V 10 V DC (max. 10 mA) 2, parameterizable, 0 - 10 V DC, 0/4 - 20 mA Analog inputs Analog outputs 1, parameterizable, 0 - 10 V Digital inputs 4, parameterizable, 2 4 V DC Digital outputs 1, parameterizable, N/O, 6 A (250 V, AC-1) / 5 A (30 V, DC-1) Interface/field bus (built-in) Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % UL (Class CC or J) 150 % overload (CT/I _H , at 50 °C) Motor feeder 150 % overload (CT/I _H , at 50 °C) DX-LM3-005	minimum external braking resistance	R _{min}	Ω	10
Reference voltage Us V 10 V DC (max. 10 mA) 2, parameterizable, 0 - 10 V DC, 0/4 - 20 mA 1, parameterizable, 0 - 10 V Digital inputs 1, parameterizable, 0 - 10 V A, parameterizable, max. 30 V DC Digital outputs 1, parameterizable, max. 30 V DC 1, parameterizable, 24 V DC Relay outputs 1, parameterizable, N/O, 6 A (250 V, AC-1) / 5 A (30 V, DC-1) Interface/field bus (built-in) Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % UL (Class CC or J) 150 % overload (CT/l _H , at 50 °C) Motor feeder 150 % overload (CT/l _H , at 50 °C) DX-LM3-005	Switch-on threshold for the braking transistor	U _{DC}	V	390 V DC
Analog inputs 2, parameterizable, 0 - 10 V DC, 0/4 - 20 mA Analog outputs 1, parameterizable, 0 - 10 V Digital inputs 4, parameterizable, max. 30 V DC Digital outputs 1, parameterizable, max. 30 V DC 1, parameterizable, 24 V DC Relay outputs 1, parameterizable, N/O, 6 A (250 V, AC-1) / 5 A (30 V, DC-1) Interface/field bus (built-in) Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % FAZ-BG/3 UL (Class CC or J) A 6 DX-LN3-006 Motor feeder 150 % overload (CT/I _H , at 50 °C) DX-LN3-005	Control section			
Analog outputs Digital inputs A, parameterizable, 0 - 10 V A, parameterizable, max. 30 V DC Digital outputs A, parameterizable, max. 30 V DC 1, parameterizable, 24 V DC Relay outputs Interface/field bus (built-in) Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % FAZ-B6/3 UL (Class CC or J) A 6 150 % overload (CT/I _H , at 50 °C) Motor feeder 150 % overload (CT/I _H , at 50 °C) DX-LM3-005	Reference voltage	U_s	V	10 V DC (max. 10 mA)
Digital inputs Digital outputs Relay outputs Relay outputs Interface/field bus (built-in) Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % UL (Class CC or J) 150 % overload (CT/l _H , at 50 °C) A parameterizable, Max. 30 V DC 1, parameterizable, 24 V DC 1, parameterizable, N/O, 6 A (250 V, AC-1) / 5 A (30 V, DC-1) OP-Bus (RS485)/Modbus RTU, CANopen® FAZ-B6/3 FAZ-B6/3 A 6 DX-LN3-006	Analog inputs			2, parameterizable, 0 - 10 V DC, 0/4 - 20 mA
Digital outputs Relay outputs Interface/field bus (built-in) Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % UL (Class CC or J) 150 % overload (CT/I _H , at 50 °C) Assigned control of CT/I _H , at 50 °C) A parameterizable, 24 V DC 1, parameterizable, N/O, 6 A (250 V, AC-1) / 5 A (30 V, DC-1) OP-Bus (RS485)/Modbus RTU, CANopen® FAZ-B6/3 A 6 DX-LN3-006	Analog outputs			1, parameterizable, 0 - 10 V
Relay outputs 1, parameterizable, N/O, 6 A (250 V, AC-1) / 5 A (30 V, DC-1) Interface/field bus (built-in) Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % UL (Class CC or J) A 6 DX-LN3-006 Motor feeder 150 % overload (CT/I _H , at 50 °C) DX-LM3-005	Digital inputs			4, parameterizable, max. 30 V DC
Interface/field bus (built-in) Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % UL (Class CC or J) A 6 150 % overload (CT/I _H , at 50 °C) Motor feeder 150 % overload (CT/I _H , at 50 °C) DX-LM3-005	Digital outputs			1, parameterizable, 24 V DC
Assigned switching and protective elements Power Wiring IEC (Type B, gG), 150 % UL (Class CC or J) A 6 150 % overload (CT/I _H , at 50 °C) Motor feeder 150 % overload (CT/I _H , at 50 °C) DX-LM3-005	Relay outputs			1, parameterizable, N/O, 6 A (250 V, AC-1) / 5 A (30 V, DC-1)
Power Wiring IEC (Type B, gG), 150 % FAZ-B6/3 UL (Class CC or J) A 6 150 % overload (CT/I _H , at 50 °C) DX-LN3-006 Motor feeder DX-LN3-005 150 % overload (CT/I _H , at 50 °C) DX-LM3-005	Interface/field bus (built-in)			OP-Bus (RS485)/Modbus RTU, CANopen®
IEC (Type B, gG), 150 % FAZ-B6/3 UL (Class CC or J) A 6 150 % overload (CT/I _H , at 50 °C) DX-LN3-006 Motor feeder DX-LM3-005	Assigned switching and protective elements			
UL (Class CC or J) A 6 150 % overload (CT/I _H , at 50 °C) DX-LN3-006 Motor feeder DX-LM3-005	Power Wiring			
150 % overload (CT/I _H , at 50 °C) Motor feeder 150 % overload (CT/I _H , at 50 °C) DX-LN3-006 DX-LN3-006	IEC (Type B, gG), 150 %			FAZ-B6/3
Motor feeder 150 % overload (CT/I _H , at 50 °C) DX-LM3-005	UL (Class CC or J)		Α	6
150 % overload (CT/I _H , at 50 °C) DX-LM3-005	150 % overload (CT/I _H , at 50 °C)			DX-LN3-006
	Motor feeder			
150 % overload (CT/I _H , at 50 °C) DX-SIN3-010	150 % overload (CT/I _H , at 50 °C)			DX-LM3-005
	150 % overload (CT/I _H , at 50 °C)			DX-SIN3-010

Design verification as per IEC/EN 61439

2001g.: 1011110a11011 ao por 120, 211 01 100			
Technical data for design verification			
Rated operational current for specified heat dissipation	In	Α	4.1
Heat dissipation per pole, current-dependent	P _{vid}	W	0
Equipment heat dissipation, current-dependent	P _{vid}	W	76.5
Static heat dissipation, non-current-dependent	P _{vs}	W	0
Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-10
Operating ambient temperature max.		°C	40
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects			Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation			Meets the product standard's requirements.
10.2.5 Lifting			Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact			Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions			Meets the product standard's requirements.

10.3 Degree of protection of ASSEMBLIES	Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances	Meets the product standard's requirements.
10.5 Protection against electric shock	Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components	Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections	Is the panel builder's responsibility.
10.8 Connections for external conductors	Is the panel builder's responsibility.
10.9 Insulation properties	
10.9.2 Power-frequency electric strength	Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage	Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material	Is the panel builder's responsibility.
10.10 Temperature rise	The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating	Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility	Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function	The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 6.0

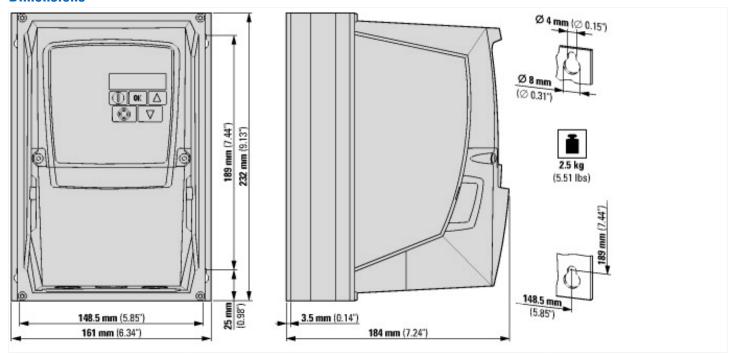
Low-voltage industrial components (EG000017) / Frequency converter =< 1 kV (EC0018	57)	
Electric engineering, automation, process control engineering / Electrical drive / Station	c frequency converte	er / Static frequency converter = < 1 kv (ecl@ss8.1-27-02-31-01 [AKE177011])
Mains voltage	V	380 - 480
Mains frequency		50/60 Hz
Number of phases input		3
Number of phases output		3
Max. output frequency	Hz	500
Max. output voltage	V	400
Rated output current I2N	Α	4.1
Max. output at quadratic load at rated output voltage	kW	1.5
Max. output at linear load at rated output voltage	kW	1.5
With control unit		Yes
Application in industrial area permitted		Yes
Application in domestic- and commercial area permitted		Yes
Supporting protocol for TCP/IP		No
Supporting protocol for PROFIBUS		No
Supporting protocol for CAN		Yes
Supporting protocol for INTERBUS		No
Supporting protocol for ASI		No
Supporting protocol for KNX		No
Supporting protocol for MODBUS		Yes
Supporting protocol for Data-Highway		No
Supporting protocol for DeviceNet		No
Supporting protocol for SUCONET		No
Supporting protocol for LON		No
Supporting protocol for PROFINET IO		No
Supporting protocol for PROFINET CBA		No
Supporting protocol for SERCOS		No
Supporting protocol for Foundation Fieldbus		No
Supporting protocol for EtherNet/IP		No
Supporting protocol for AS-Interface Safety at Work		No
Supporting protocol for DeviceNet Safety		No
Supporting protocol for INTERBUS-Safety		No
Supporting protocol for PROFIsafe		No
Supporting protocol for SafetyBUS p		No
Supporting protocol for other bus systems		No
Number of HW-interfaces industrial Ethernet		0

Number of HW-interfaces RS-232 Number of HW-interfaces RS-425 Number of HW-interfaces RS-485 Number of HW-interfaces serial TTY Number of HW-interfaces serial TTY Number of HW-interfaces uses serial TTY Number of HW-interfaces uses uses uses uses uses uses uses u			
Number of HW-interfaces RS-422 0 Number of HW-interfaces RS-485 1 Number of HW-interfaces serial TTY 0 Number of HW-interfaces USB 1 Number of HW-interfaces parallel 0 Number of HW-interfaces other 0 With optical interface No With PC connection Yes Integrated breaking resistance No 4-quadrant operation possible No Type of converter U converter Degree of protection (IP) IP66 Height mm 232 Width mm 161 Depth mm 184 Relative symmetric net frequency tolerance % 10	Number of HW-interfaces PROFINET		0
Number of HW-interfaces RS-485 Number of HW-interfaces serial TTY Number of HW-interfaces USB Number of HW-interfaces USB Number of HW-interfaces parallel Number of HW-interfaces other O With optical interface With PC connection With PC connection Integrated breaking resistance 4-quadrant operation possible Type of converter Degree of protection (IP) Height Mm Degree of protection (IP) Height Relative symmetric net frequency tolerance 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Number of HW-interfaces RS-232		0
Number of HW-interfaces serial TTY 0 Number of HW-interfaces USB 1 Number of HW-interfaces parallel 0 Number of HW-interfaces other 0 With optical interface No With PC connection Yes Integrated breaking resistance No 4-quadrant operation possible No Type of converter U converter Degree of protection (IP) IP66 Height mm 332 Width mm 161 Depth mm 184 Belative symmetric net frequency tolerance % 10	Number of HW-interfaces RS-422		0
Number of HW-interfaces USB Number of HW-interfaces parallel Number of HW-interfaces other With optical interface With PC connection With PC connection Integrated breaking resistance 4-quadrant operation possible Type of converter Degree of protection (IP) Height Height Depth Relative symmetric net frequency tolerance 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Number of HW-interfaces RS-485		1
Number of HW-interfaces parallel Number of HW-interfaces other With optical interface With PC connection With PC connection Integrated breaking resistance 4-quadrant operation possible No Type of converter U converter Degree of protection (IP) Height Mm 232 Width Depth Relative symmetric net frequency tolerance 0 0 0 0 0 0 0 0 0 0 0 0 0	Number of HW-interfaces serial TTY		0
Number of HW-interfaces other With optical interface With PC connection Wes Use Use Use Use Use Use Use Use Use U	Number of HW-interfaces USB		1
With optical interface With PC connection We selection We s	Number of HW-interfaces parallel		0
With PC connection Integrated breaking resistance Integrated	Number of HW-interfaces other		0
Integrated breaking resistance 4-quadrant operation possible No Type of converter Degree of protection (IP) Height Height Depth Relative symmetric net frequency tolerance No	With optical interface		No
4-quadrant operation possible Type of converter Degree of protection (IP) Height Midth Depth Relative symmetric net frequency tolerance No Converter U converter IP66 Ho 322 Midth Mm 161 Mm 184 No Converter IP66	With PC connection		Yes
Type of converter U converter Degree of protection (IP) IP66 Height mm 332 Width mm 161 Depth mm 184 Relative symmetric net frequency tolerance % 10	Integrated breaking resistance		No
Degree of protection (IP) IP66 Height mm 232 Width mm 161 Depth mm 184 Relative symmetric net frequency tolerance % 10	4-quadrant operation possible		No
Height mm 232 Width mm 161 Depth mm 184 Relative symmetric net frequency tolerance % 10	Type of converter		U converter
Width mm 161 Depth mm 184 Relative symmetric net frequency tolerance % 10	Degree of protection (IP)		IP66
Depth mm 184 Relative symmetric net frequency tolerance % 10	Height	mm	232
Relative symmetric net frequency tolerance % 10	Width	mm	161
	Depth	mm	184
Relative symmetric net current tolerance % 10	Relative symmetric net frequency tolerance	%	10
	Relative symmetric net current tolerance	%	10

Approvals

Product Standards	UL 508C; CSA-C22.2 No. 14; IEC/EN61800-3; IEC/EN61800-5; CE marking
UL File No.	E172143
UL Category Control No.	NMMS, NMMS7
CSA File No.	UL report applies to both US and Canada
North America Certification	UL listed, certified by UL for use in Canada
Specially designed for North America	No
Suitable for	Branch circuits
Max. Voltage Rating	3~ 480 V AC IEC: TN-S UL/CSA: "Y" (Solidly Grounded Wey)
Degree of Protection	IEC: IP66

Dimensions



Additional product information (links)

IL04020013Z DC1 variable frequency drives (FS1 - FS3, IP66)

IL04020013Z DC1 variable frequency drives (FS1 ftp://ftp.moeller.net/DOCUMENTATION/AWA_INSTRUCTIONS/IL04020013Z2016_07.pdf - FS3, IP66)

MN04020003Z DC1 variable frequency drives, I	nstallation manual
MN04020003Z Frequenzumrichter DC1, Handbuch - Deutsch	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020003Z_DE.pdf
MN04020003Z DC1 variable frequency drive, manual - English	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020003Z_EN.pdf
MN04020003Z Frekvenční měnič DC1, manuál - čeština	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020003Z_CZ.pdf
MN04020003Z Convertitori di frequenza DC1, manuale - italiano	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020003Z_IT.pdf
MN04020004Z DC1 variable frequency drives, F	Parameters manual
MN04020004Z DC1 variable frequency drives, Parameters manual - Deutsch	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020004Z_DE.pdf
MN04020004Z DC1 variable frequency drives, Parameters manual - English	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020004Z_EN.pdf
CA04020001Z-DE Sortimentskatalog: Antriebstechnik effizient gestalten, Motoren starten und steuern	http://www.eaton.eu/DE/ecm/groups/public/@pub/@europe/@electrical/documents/content/pct_1095238_de.pdf