

5 Technical Data

5.1 Basic units

5.1.1 General technical data

The following table contains the technical data for all MOVITRAC[®] 31C frequency inverters, independent of size and rated power.

MOVITRAC [®] 31C	all unit sizes
Immunity to interference	complies with EN 61800 - 3
Interference emission with EMC-compliant wiring	conforms with interference suppression level B to EN 55011 and EN 55014 complies with EN 61800 - 3
Ambient temperature ^{*)} ϑ_{amb} Derating Ambient conditions	0°...+45°C P_N -reduction: 3.0% I_N per K up to max. 60°C EN 60721-3-3, class 3K3
Storage temperature ^{**)} $\vartheta_{storage}$	-25°C...+70°C (EN 60721-3-3, class 3K3) FBG keypad: -20°C...+60°C
Enclosure	IP20 (EN 60529 / NEMA1)
Duty type	DB (EN 60149-1-1 and 1-3)
Altitude of installation	$h \leq 1000\text{m}$ I_N -reduction: 1% per 100 m (330 ft) from 1000 m (3300 ft) up to max. 2000 m (6600 ft)

^{*)} Units for $\vartheta_{amb} < 0^\circ\text{C}$ on request.

^{**) In the case of extended storage, connect the unit to the mains supply for at least 5 minutes every 2 years, as otherwise the service life of the unit may be reduced.}

MOVITRAC[®] 31C Unit Family

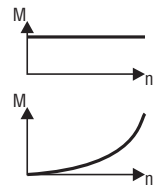


Fig. 26: MOVITRAC[®] 31C Unit Family

5.2 MOVITRAC® 31C...-233 (230 V Units)

5.2.1 Basic units, sizes 0 and 1

MOVITRAC® 31C	005-233-4-00	011-233-4-00	008-233-4-00	015-233-4-00	022-233-4-00
Part number	826 321 3	826 322 1	826 323 X	826 324 8	826 325 6
Size	0		1		
INPUT					
Input voltages Permissible range	V_{in}	$3 \times 230 V_{AC}$ $V_{in} = 200V_{AC}-10\%...240V_{AC}+10\%$			
Input frequency	f_{in}	50 Hz ... 60 Hz ± 5%			
Rated input current (at $V_{in} = 3 \times 230V_{AC}$)	I_{in} 100% 125%	2.8 A _{AC} 3.5 A _{AC}	4.0 A _{AC} 5.0 A _{AC}	3.3 A _{AC} 4.1 A _{AC}	6.7 A _{AC} 8.4 A _{AC} 7.8 A _{AC} 9.8 A _{AC}
OUTPUT					
Rated output power (at $V_{in} = 3 \times 200...240V_{AC}$)	P_N	1.3 kVA	2.0 kVA	1.6 kVA	2.7 kVA 3.4 kVA
Rated output current (at $V_{in} = 3 \times 230V_{AC}$)	I_N	3.2 A _{AC}	4.9 A _{AC}	4.0 A _{AC}	7.3 A _{AC} 8.6 A _{AC}
Cont. output current = 125% $I_N^{(*)}$ (at $V_{in} = 3 \times 230V_{AC}$)	I_{cont}	4.0 A _{AC}	6.1 A _{AC}	5.0 A _{AC}	9.1 A _{AC} 10.8 A _{AC}
Constant load Recommended motor power	P_{Mot}	0.55 kW (0.75 HP)	1.1 kW (1.5 HP)	0.75 kW (1.0 HP)	1.5 kW (2.0 HP) 2.2 kW (3.0 HP)
Variable torque load and constant load without overload Recommended motor power	P_{Mot}	0.75 kW (1.0 HP)	1.5 kW (2.0 HP)	1.1 kW (1.5 HP)	2.2 kW (3.0 HP) 3.0 kW (4.0 HP)
Current limit	I_{max}	Motive: 150% I_N Regenerative: 150% I_N Duration depending on utilization			
Internal current limit		$I_{max} = 20...150\%$ set via menu (P320 / P340)			
Minimum braking resistance value for 4-Q operation	R_{BW}	68 Ω -10%		33 Ω -10%	
Output voltage	V_{out}	Adjustable with parameter P329/P349, however max. V_{in}			
Output frequency resolution base frequency	f_{out} Δf_{out} f_{base}	0...400 Hz, $f_{min} = 0...40$ Hz, $f_{max} = 5...400$ Hz 0.05 Hz over the entire range In steps: 50/60/87/104/120 Hz and continuously: 5...400 Hz			
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz (P325/P345)			
GENERAL					
Power losses at P_N	$P_{lossmax}$	54 W	75 W	70 W	110 W 126 W
Cooling method (DIN 41751) fan cooling forced cooling/required air flow		40 m³/h (24 ft³/min)		•	25 m³/h (15 ft³/min)
Weight		2.4 kg (5.3 lb)	2.5 kg (5.5 lb)	4.5 kg (9.9 lb)	
Dimensions	W×H×D	105 × 188 × 189 mm (4.13 × 7.40 × 7.44 in)		184 × 281 × 170 mm (7.24 × 11.06 × 6.69 in)	



(*) applies to $f_{PWM} = 4$ kHz

To provide sufficient cooling leave a minimum clearance of 100 mm (4 in) above and below each unit.

Power ratings are based on a default setting of 4 kHz for the PWM frequency (P325/P345).

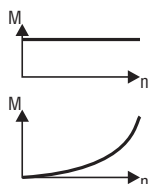
5.2.2 Basic units, sizes 2 and 3

MOVITRAC® 31C		037-233-4-00	055-233-4-00	075-233-4-00
Part number		826 326 4	826 327 2	826 328 0
Size		2	3	
INPUT				
Input voltages Permissible range	V_{in}	$3 \times 230 V_{AC}$ $V_{in} = 200V_{AC}-10\%...240V_{AC}+10\%$		
Input frequency	f_{in}	50 Hz ... 60 Hz $\pm 5\%$		
Rated input current (at $V_{in} = 3 \times 230V_{AC}$)	I_{in} 100% 125%	14.2 A _{AC} 17.8 A _{AC}	19.5 A _{AC} 24.4 A _{AC}	27.4 A _{AC} 34.3 A _{AC}
OUTPUT				
Rated output power (at $V_{in} = 3 \times 200...240V_{AC}$)	P_N	6.4 kVA	8.8 kVA	11.6 kVA
Rated output current (at $V_{in} = 3 \times 230V_{AC}$)	I_N	16 A _{AC}	22 A _{AC}	29 A _{AC}
Cont. output current = 125% $I_N^{*)}$ (at $V_{in} = 3 \times 230V_{AC}$)	I_{cont}	20 A _{AC}	27.5 A _{AC}	36.3 A _{AC}
Constant load Recommended motor power	P_{Mot}	3.7 kW (5.0 HP)	5.5 kW (7.5 HP)	7.5 kW (10 HP)
Variable torque load and constant load without overload Recommended motor power	P_{Mot}	5.5 kW (7.5 HP)	7.5 kW (10 HP)	11 kW (15 HP)
Current limit	I_{max}	Motive: 150% I_N Regenerative: 150% I_N Duration depending on utilization		
Internal current limit		$I_{max} = 20...150\%$ set via menu (P320 / P340)		
Minimum braking resistance value for 4-Q operation	R_{BW}	27 Ω -10%	11 Ω -10%	
Output voltage	V_{out}	Adjustable with parameter P329/P349, however max. V_{in}		
Output frequency resolution base frequency	f_{out} Δf_{out} f_{base}	0...400 Hz, $f_{min} = 0...40$ Hz, $f_{max} = 5...400$ Hz 0.05 Hz over the entire range In steps: 50/60/87/104/120 Hz and continuously: 5...400 Hz		
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz (P325/P345)		
GENERAL				
Power losses at P_N	$P_{lossmax}$	223 W	305 W	390 W
Cooling method (DIN 41751) fan cooling forced cooling/required air flow		50 m³/h (30 ft³/min)	100 m³/h (60 ft³/min)	
Weight		5.9 kg (13 lb)	13 kg (28.7 lb)	
Dimensions	W×H×D	184 × 296 × 218 mm (7.24 × 11.65 × 8.58 in)	220 × 405 × 264 mm (8.66 × 15.94 × 10.39 in)	

*) applies to $f_{PWM} = 4$ kHz

To provide sufficient cooling leave a minimum clearance of 100 mm (4 in) above and below each unit.

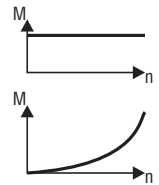
Power ratings are based on a default setting of 4 kHz for the PWM frequency (P325/P345).



5.3 MOVITRAC® 31C...-503 (400/500 V Units)

5.3.1 Basic units, size 0

MOVITRAC® 31C		005-503-4-00	007-503-4-00	011-503-4-00	014-503-4-00
Part number		826 078 8	826 079 6	826 080 X	826 374 4
INPUT					
Input voltages Permissible range	V _{in}	3 x 380 V _{AC} / 400 V _{AC} / 415 V _{AC} / 460 V _{AC} / 480 V _{AC} / 500 V _{AC} V _{in} = 380V _{AC} -10%...500V _{AC} +10%			
Input frequency	f _{in}	50 Hz ... 60 Hz ± 5%			
Rated input current (at V _{in} = 3×400V _{AC})	I _{in} 100% 125%	1.6 A _{AC} 1.9 A _{AC}	1.9 A _{AC} 2.4 A _{AC}	2.4 A _{AC} 2.9 A _{AC}	3.5 A _{AC} 4.4 A _{AC}
OUTPUT					
Rated output power (at V _{in} = 3×380...500V _{AC})	P _N	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA
Rated output current (at V _{in} = 3×400V _{AC})	I _N	2.0 A _{AC}	2.5 A _{AC}	3.2 A _{AC}	4.0 A _{AC}
Cont. output current = 125% I _N [*] (at V _{in} = 3×400V _{AC})	I _{cont}	2.5 A _{AC}	3.1 A _{AC}	4.0 A _{AC}	5.0 A _{AC}
Constant load Recommended motor power	P _{Mot}	0.55 kW (0.75 HP)	0.75 kW (1.0 HP)	1.1 kW (1.5 HP)	1.5 kW (2.0 HP)
Variable torque load and constant load without overload Recommended motor power	P _{Mot}	0.75 kW (1.0 HP)	1.1 kW (1.5 HP)	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)
Current limit	I _{max}	Motive: 150% I _N Regenerative: 150% I _N Duration depending on utilization			
Internal current limit		I _{max} = 20...150% set via menu (P320 / P340)			
Minimum braking resistance value for 4-Q operation	R _{BW}	200 Ω -10%			
Output voltage	V _{out}	Adjustable with parameter P329/P349, however max. V _{in}			
Output frequency resolution base frequency	f _{out} Δf _{out} f _{base}	0...400 Hz, f _{min} = 0...40 Hz, f _{max} = 5...400 Hz 0.05 Hz over the entire range In steps: 50/60/87/104/120 Hz and continuously: 5...400 Hz			
PWM frequency	f _{PWM}	Adjustable: 4/8/12/16 kHz (P325/P345)			
GENERAL					
Power losses at P _N	P _{lossmax}	46 W	54 W	68 W	75 W
Cooling method (DIN 41751) fan cooling forced cooling/required air flow		•	•	40 m³/h (24 ft³/min)	
Weight		2.4 kg (5.3 lb)		2.5 kg (5.5 lb)	
Dimensions	W×H×D	105 × 188 × 189 mm (4.13 × 7.40 × 7.44 in)			



*) applies to $f_{PWM} = 4$ kHz

To provide sufficient cooling leave a minimum clearance of 100 mm (4 in) above and below each unit.

Power ratings are based on a default setting of 4 kHz for the PWM frequency (P325/P345).

For $V_{mains} = 3 \times 500 V_{AC}$ the permissible input and output currents are reduced by 20 % compared to the rated values.

5.3.2 Basic units, size 1

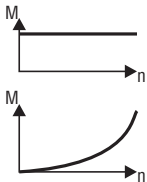
MOVITRAC® 31C		008-503-4-00	015-503-4-00	022-503-4-00	030-503-4-00
Part number		826 332 9	826 333 7	826 334 5	826 335 3
INPUT					
Input voltages Permissible range	V _{in}	3 x 380 V _{AC} / 400 V _{AC} / 415 V _{AC} / 460 V _{AC} / 480 V _{AC} / 500 V _{AC} V _{in} = 380V _{AC} -10%...500V _{AC} +10%			
Input frequency	f _{in}	50 Hz ... 60 Hz ± 5%			
Rated input current (at V _{in} = 3×400V _{AC})	I _{in} 100% 125%	2.0 A _{AC} 2.5 A _{AC}	3.5 A _{AC} 4.4 A _{AC}	5.0 A _{AC} 6.3 A _{AC}	6.7 A _{AC} 8.4 A _{AC}
OUTPUT					
Rated output power (at V _{in} = 3×380...500V _{AC})	P _N	1.8 kVA	2.8 kVA	3.8 kVA	5.1 kVA
Rated output current (at V _{in} = 3×400V _{AC})	I _N	2.5 A _{AC}	4.0 A _{AC}	5.5 A _{AC}	7.3 A _{AC}
Cont. output current = 125% I _N ^{*)} (at V _{in} = 3×400V _{AC})	I _{cont}	3.1 A _{AC}	5.0 A _{AC}	6.9 A _{AC}	9.1 A _{AC}
Constant load Recommended motor power	P _{Mot}	0.75 kW (1.0 HP)	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)	3.0 kW (4.0 HP)
Variable torque load and constant load without overload Recommended motor power	P _{Mot}	1.1 kW (1.5 HP)	2.2 kW (3.0 HP)	3.0 kW (4.0 HP)	4.0 kW (5.0 HP)
Current limit	I _{max}	Motive: 150% I _N Regenerative: 150% I _N Duration depending on utilization			
Internal current limit		I _{max} = 20...150% set via menu (P320 / P340)			
Minimum braking resistance value for 4-Q operation	R _{BW}	47 Ω -10%			
Output voltage	V _{out}	Adjustable with parameter P329/P349, however max. V _{in}			
Output frequency resolution base frequency	f _{out} Δf _{out} f _{base}	0...400 Hz, f _{min} = 0...40 Hz, f _{max} = 5...400 Hz 0.05 Hz over the entire range In steps: 50/60/87/104/120 Hz and continuously: 5...400 Hz			
PWM frequency	f _{PWM}	Adjustable: 4/8/12/16 kHz (P325/P345)			
GENERAL					
Power losses at P _N	P _{lossmax}	65 W	85 W	105 W	130 W
Cooling method (DIN 41751) fan cooling forced cooling/required air flow		•	•	25 m³/h (15 ft³/min)	
Weight		4.5 kg (9.9 lb)			
Dimensions	W×H×D	184 × 281 × 170 mm (7.24 × 11.06 × 6.69 in)			

*) applies to $f_{PWM} = 4$ kHz

To provide sufficient cooling leave a minimum clearance of 100 mm (4 in) above and below each unit.

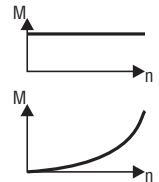
Power ratings are based on a default setting of 4 kHz for the PWM frequency (P325/P345).

For $V_{mains} = 3 \times 500 V_{AC}$ the permissible input and output currents are reduced by 20 % compared to the rated values.



5.3.3 Basic units, size 2

MOVITRAC® 31C		040-503-4-00	055-503-4-00	075-503-4-00
Part number		826 336 1	826 337 X	826 338 8
INPUT				
Input voltages Permissible range	V_{in}	3 x 380 V _{AC} / 400 V _{AC} / 415 V _{AC} / 460 V _{AC} / 480 V _{AC} / 500 V _{AC} $V_{in} = 380V_{AC} - 10\% \dots 500V_{AC} + 10\%$		
Input frequency	f_{in}	50 Hz ... 60 Hz $\pm$ 5%		
Rated input current (at $V_{in} = 3 \times 400V_{AC}$)	I_{in} 100% 125%	8.8 A _{AC} 11 A _{AC}	10.7 A _{AC} 13.4 A _{AC}	13.8 A _{AC} 17.3 A _{AC}
OUTPUT				
Rated output power (at $V_{in} = 3 \times 380 \dots 500V_{AC}$)	P_N	6.6 kVA	8.3 kVA	11 kVA
Rated output current (at $V_{in} = 3 \times 400V_{AC}$)	I_N	9.6 A _{AC}	12 A _{AC}	16 A _{AC}
Cont. output current = 125% $I_N^{*)}$ I_{cont} (at $V_{in} = 3 \times 400V_{AC}$)		12 A _{AC}	15 A _{AC}	20 A _{AC}
Constant load Recommended motor power	P_{Mot}	4.0 kW (5.0 HP)	5.5 kW (7.5 HP)	7.5 kW (10 HP)
Variable torque load and constant load without overload Recommended motor power	P_{Mot}	5.5 kW (7.5 HP)	7.5 kW (10 HP)	11 kW (15 HP)
Current limit	I_{max}	Motive: 150% I_N Regenerative: 150% I_N Duration depending on utilization		
Internal current limit		$I_{max} = 20 \dots 150\%$ set via menu (P320 / P340)		
Minimum braking resistance value for 4-Q operation	R_{BW}	47 Ω -10%		
Output voltage	V_{out}	Adjustable with parameter P329/P349, however max. V_{in}		
Output frequency resolution base frequency	f_{out} Δf_{out} f_{base}	0...400 Hz, $f_{min} = 0 \dots 40$ Hz, $f_{max} = 5 \dots 400$ Hz 0.05 Hz over the entire range In steps: 50/60/87/104/120 Hz and continuously: 5...400 Hz		
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz (P325/P345)		
GENERAL				
Power losses at P_N	$P_{lossmax}$	190 W	230 W	310 W
Cooling method (DIN 41751) fan cooling forced cooling/required air flow		50 m ³ /h (30 ft ³ /min)		
Weight		5.9 kg (13 lb)		
Dimensions	W×H×D	184 × 296 × 218 mm (7.24 × 11.65 × 8.58 in)		



*) applies to $f_{PWM} = 4$ kHz

To provide sufficient cooling leave a minimum clearance of 100 mm (4 in) above and below each unit.

Power ratings are based on a default setting of 4 kHz for the PWM frequency (P325/P345).

For $V_{mains} = 3 \times 500 V_{AC}$ the permissible input and output currents are reduced by 20 % compared to the rated values.

5.3.4 Basic units, size 3

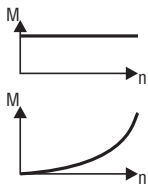
MOVITRAC® 31C		110-503-4-00	150-503-4-00	220-503-4-00
Part number		826 308 6	826 309 4	826 310 8
INPUT				
Input voltages Permissible range	V_{in}	3 x 380 V _{AC} / 400 V _{AC} / 415 V _{AC} / 460 V _{AC} / 480 V _{AC} / 500 V _{AC} $V_{in} = 380V_{AC} - 10\% \dots 500V_{AC} + 10\%$		
Input frequency	f_{in}	50 Hz ... 60 Hz ± 5%		
Rated input current (at $V_{in} = 3 \times 400V_{AC}$)	I_{in} 100% 125%	20 A _{AC} 24 A _{AC}	27 A _{AC} 33 A _{AC}	39 A _{AC} 49 A _{AC}
OUTPUT				
Rated output power (at $V_{in} = 3 \times 380 \dots 500V_{AC}$)	P_N	17 kVA	23 kVA	33 kVA
Rated output current (at $V_{in} = 3 \times 400V_{AC}$)	I_N	24 A _{AC}	33 A _{AC}	47 A _{AC}
Cont. output current = 125% $I_N^{(*)}$ (at $V_{in} = 3 \times 400V_{AC}$)	I_{cont}	30 A _{AC}	41 A _{AC}	58 A _{AC}
Constant load Recommended motor power	P_{Mot}	11 kW (15 HP)	15 kW (20 HP)	22 kW (30 HP)
Variable torque load and constant load without overload Recommended motor power	P_{Mot}	15 kW (20 HP)	22 kW (30 HP)	30 kW (40 HP)
Current limit	I_{max}	Motive: 150% I_N Regenerative: 150% I_N Duration depending on utilization		
Internal current limit		$I_{max} = 20 \dots 150\%$ set via menu (P320 / P340)		
Minimum braking resistance value for 4-Q operation	R_{BW}	18 Ω -10%		15 Ω -10%
Output voltage	V_{out}	Adjustable with parameter P329/P349, however max. V_{in}		
Output frequency resolution base frequency	f_{out} Δf_{out} f_{base}	0...400 Hz, $f_{min} = 0 \dots 40$ Hz, $f_{max} = 5 \dots 400$ Hz 0.05 Hz over the entire range In steps: 50/60/87/104/120 Hz and continuously: 5...400 Hz		
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz (P325/P345)		
GENERAL				
Power losses at P_N	$P_{lossmax}$	430 W	580 W	800 W
Cooling method (DIN 41751) fan cooling forced cooling/required air flow		100 m³/h (60 ft³/min)	230 m³/h (135 ft³/min)	
Weight		13 kg (28.7 lb)		
Dimensions	W×H×D	220 × 405 × 264 mm (8.66 × 15.94 × 10.39 in)		

*) applies to $f_{PWM} = 4$ kHz

To provide sufficient cooling leave a minimum clearance of 100 mm (4 in) above and below each unit.

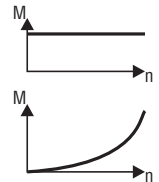
Power ratings are based on a default setting of 4 kHz for the PWM frequency (P325/P345).

For $V_{mains} = 3 \times 500 V_{AC}$ the permissible input and output currents are reduced by 20 % compared to the rated values.



5.3.5 Basic units, size 4

MOVITRAC® 31C		300-503-4-00	370-503-4-00	450-503-4-00
Part number		826 329 9	826 330 2	826 331 0
INPUT				
Input voltages Permissible range	V_{in}	3 x 380 V _{AC} / 400 V _{AC} / 415 V _{AC} / 460 V _{AC} / 480 V _{AC} / 500 V _{AC} $V_{in} = 380V_{AC} - 10\% \dots 500V_{AC} + 10\%$		
Input frequency	f_{in}	50 Hz ... 60 Hz $\pm$ 5%		
Rated input current (at $V_{in} = 3 \times 400V_{AC}$)	I_{in} 100% 125%	56 A _{AC} 70 A _{AC}	69 A _{AC} 86 A _{AC}	84 A _{AC} 105 A _{AC}
OUTPUT				
Rated output power (at $V_{in} = 3 \times 380 \dots 500V_{AC}$)	P_N	42 kVA	52 kVA	64 kVA
Rated output current (at $V_{in} = 3 \times 400V_{AC}$)	I_N	61 A _{AC}	75 A _{AC}	92 A _{AC}
Cont. output current = 125% $I_N^{*)}$ I_{cont} (at $V_{in} = 3 \times 400V_{AC}$)		76 A _{AC}	93 A _{AC}	115 A _{AC}
Constant load Recommended motor power	P_{Mot}	30 kW (40 HP)	37 kW (50 HP)	45 kW (60 HP)
Variable torque load and constant load without overload Recommended motor power	P_{Mot}	37 kW (50 HP)	45 kW (60 HP)	55 kW (75 HP)
Current limit	I_{max}	Motive: 150% I_N Regenerative: 150% I_N Duration depending on utilization		
Internal current limit		$I_{max} = 20 \dots 150\%$ set via menu (P320 / P340)		
Minimum braking resistance value for 4-Q operation	R_{BW}	12 Ω -10%	10 Ω -10%	8.2 Ω -10%
Output voltage	V_{out}	Adjustable with parameter P329/P349, however max. V_{in}		
Output frequency resolution base frequency	f_{out} Δf_{out} f_{base}	0...400 Hz, $f_{min} = 0 \dots 40$ Hz, $f_{max} = 5 \dots 400$ Hz 0.05 Hz over the entire range In steps: 50/60/87/104/120 Hz and continuously: 5...400 Hz		
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz (P325/P345)		
GENERAL				
Power losses at P_N	$P_{lossmax}$	1000 W	1200 W	1500 W
Cooling method (DIN 41751) fan cooling forced cooling/required air flow		230 m ³ /h (135 ft ³ /min)		
Weight		19 kg (41.9 lb)		20 kg (44.1 lb)
Dimensions	W×H×D	220 × 555 × 264 mm (8.66 × 21.85 × 10.39 in)		



*) applies to $f_{PWM} = 4$ kHz

To provide sufficient cooling leave a minimum clearance of 100 mm (4 in) above and below each unit.

Power ratings are based on a default setting of 4 kHz for the PWM frequency (P325/P345).

For $V_{mains} = 3 \times 500 V_{AC}$ the permissible input and output currents are reduced by 20 % compared to the rated values.

5.4 MOVITRAC® 31C electronics data

MOVITRAC® 31C		General electronic data	
Voltage supply for setpoint input	X2:31	+10V _{DC} +5%/-0%, I _{max} = 3mA Reference voltages for setpoint pot.	
Setpoint input n2	X2:34 X2:35	n2 = 0...+10V / -10V...+10V Resolution: 9 Bit $\triangleq$ 20 mV, sample time: 5 ms R _i = 40k Ω (external voltage supply) R _i = 20k Ω (supplied by X2:31)	n2 = 0...20 mA / 4...20 mA Resolution: 8 Bit $\triangleq$ 0.08 mA Sample time: 5 ms
Internal setpoints		n11/n12/n13 or n21/n22/n23 = 0...400 Hz	
Frequency ramp generator time ranges at $\Delta f_{out} = 50$ Hz		1. ramp t11/t21 up: 0.0...2000 s down: 0.0...2000 s 2. ramp t12/t22 up=down: 0.0...2000 s Rapid stop Ramp t13/t23 down: 0...9.95 s Motor. pot. t4 up: 2...60 s down: 2...60 s	
Auxiliary voltage output		V = 24 V _{DC} , current rating I _{max} = 250 mA	
External voltage supply		V _N = 24 V _{DC} -15% / +20% (range 19.2...30 V _{DC}) According to EN 61131-2 Basic unit without options: I _E * 200 mA Basic unit with options: I _{E_max} * 600 mA	
Binary inputs		Electrically isolated via opto-coupler (EN 61131-2)	R _i $\approx$ 3.0 k Ω sample time: 5 ms I _E $\approx$ 10 mA SPS compatible
Signal level		+13...+30 V $\triangleq$ "1" = contact closed -3...+5 V $\triangleq$ "0" = contact open	According to EN 61131-2
Control functions	X2:41 X3:42/43/47/X14:48/49	Fixed assigned to "CW/stop" → menu P60_	
Binary outputs		R _i $\approx$ 100 Ω	SPS compatible, response time: 5 ms
Signal level		"0" = 0 V "1" = 24 V	Important: Do not apply an external voltage!
Control functions	X3:61 X3:62	Binary output fixed assigned to "/Brake", I _{max} = 150mA (short-circuit proof) Binary output → menu P61_, I _{max} = 50mA (short-circuit proof)	
Measurement output		R _i $\approx$ 330 Ω , I _{max} = 3 mA, sample time: 10 ms, max.cable length: 10 m (33 ft)	
Signal level		5 V-TTL, PWM pulsed with 100 Hz	
Control functions	X2:65	Measurement output → menu P634	
Reference terminals	X2:0 0V10 X3:30/X14:30 0V24 X3:60/X14:60 Bezug	Reference potential for analog signals and terminal X2:31 Reference potential for binary signals Reference for binary inputs X3:41/42/43/47 and X14:48/49	
Permissible cable section		Single core: 0.20...2.5 mm ² (AWG24...12) Double core: 0.20...1 mm ² (AWG24...17)	