Specifications



# variable speed drive ATV12 - 3kW - 3 hp - 3ph - 200..240V - on base plate

ATV12PU30M3

### Main

Main	
Range of product	Altivar 12
Product or component type	Variable speed drive
Product specific application	Simple machine
Mounting mode	Cabinet mount
Communication port protocol	Modbus
Supply frequency	50/60 Hz +/- 5 %
[Us] rated supply voltage	200240 V - 1510 %
Nominal output current	12.2 A
Motor power kW	3 kW
EMC filter	Without EMC filter
IP degree of protection	IP20
Complementary	
Discrete input number	4
Discrete output number	2
Analogue input number	1
Analogue output number	1
Relay output number	1
Physical interface	2-wire RS 485
Connector type	1 RJ45
Continuous output current	12.2 A at 4 kHz
Method of access	Server Modbus serial
Speed drive output frequency	0.5400 Hz
Speed range	120
Sampling duration	20 ms, tolerance +/- 1 ms for logic input 10 ms for analogue input
Linearity error	+/- 0.3 % of maximum value for analogue input
Frequency resolution	Analog input: converter A/D, 10 bits Display unit: 0.1 Hz
Time constant	20 ms +/- 1 ms for reference change



Transmission rate	9.6 kbit/s 19.2 kbit/s 38.4 kbit/s
Transmission frame	RTU
Number of addresses	1247
Data format	8 bits, configurable odd, even or no parity
Communication service	Read holding registers (03) 29 words Write single register (06) 29 words Write multiple registers (16) 27 words Read/write multiple registers (23) 4/4 words Read device identification (43)
Type of polarization	No impedance
4 quadrant operation possible	False
Asynchronous motor control profile	Sensorless flux vector control Voltage/frequency ratio (V/f) Quadratic voltage/frequency ratio
Maximum output frequency	4 kHz
Transient overtorque	150170 % of nominal motor torque depending on drive rating and type of motor
Acceleration and deceleration ramps	S U Linear from 0 to 999.9 s
Motor slip compensation	Preset in factory Adjustable
Switching frequency	216 kHz adjustable 416 kHz with derating factor
Nominal switching frequency	4 kHz
Braking to standstill	By DC injection
Brake chopper integrated	False
Line current	19.0 A at 100 V (heavy duty) 15.9 A at 120 V (heavy duty)
Maximum input current	15.9 A
Maximum output voltage	240 V
Apparent power	6.6 kVA at 240 V (heavy duty)
Maximum transient current	18.3 A during 60 s (heavy duty) 20.1 A during 2 s (heavy duty)
Network frequency	5060 Hz
Relative symmetric network frequency tolerance	5 %
Prospective line Isc	5 kA
Base load current at high overload	12.2 A
Power dissipation in W	Natural: 94.0 W
With safety function Safely Limited Speed (SLS)	False
With safety function Safe brake management (SBC/SBT)	False
With safety function Safe Operating Stop (SOS)	False
With safety function Safe Position (SP)	False
With safety function Safe programmable logic	False
With safety function Safe Speed Monitor (SSM)	False

(S1)         With strictly function Safe torque off (STO)       False         With strictly function Safe torque off (STO)       False         With strictly function Safe Direction (SDP)       False         Tightening torque       12 N m         Insulation       Electrical between power and control         Quantity per set       Set of 1         With strictly function Safe bit interesphase Thermal notice protection with the drive by continuous calculation of Pi         With the strictly of set       Set of 1         With the strictly function Safe bit interesphase Thermal notice protection with the drive by continuous calculation of Pi         With the strictly of set       Set of 1         With the strictly function with a drive strictly set set of set		
With safety function Safe torque off (STO)         False           With safety function Safe Direction (SUP)         False           With safety function Safe Direction (SUP)         False           Protection (SUP)         False           Protection (SUP)         Lise apply consolitage Direction (SUP)           Protection (SUP)         Lise apply consolitage Direction (SUP)           Protection type         Lise apply consolitage Direction (SUP)           Protection type         Lise apply consolitage Direction (SUP)           Tightening torque         1.2 N.m           11         Hall mode           Insulation         Electrical between power and control           Quantity per set         Set of 1           With after the mm         Depth           Depth         100.2 mm           Net weight         1.6 kg           Environment         CisA Construction of the structure directing 1 % per 100 m           Operating altitude         <= 1000 m without derating - 100 m	With safety function Safe Stop 1 (SS1)	False
off (STO)       False         With safety function Safely       False         With safety function Safe       False         Direction (SDI)       False         Protection (SDI)       False         Direction (SDI)       False         Insulation       Electical between opper protection is the drive by continuous calculation of i*         Tightning torque       1.2 N m         Insulation       Electical between power and control         Quantity per sol       Sci of 1         With 140 mm       140 mm         Depth       100.2 mm         Net weight       1.8 kg         Environment       Contract derating 1 % per 100 m         Operating abitude       <= 100 m without derating > kg not 00 m         Control       Control         Control       Control         Control       Control         Operating abitude       <= 100 m without derating > kg not 00 m         Contro       Control	With sft fct Safe Stop 2 (SS2)	False
Limited Position (SLP)         False           With safety function Safe         False           Protection type         Line supply underwidinge Overcournet between noter phases Adjuintal function phases and earth Overcournet between noter phases Therman note protection with e three by continuous calculation of Pt           Tightening forque         1.2 N.m           Insulation         Electrical between noter phases Therman note protection with e three by continuous calculation of Pt           Mith and phase loss in three phase Therman note protection with e three by continuous calculation of Pt           Mith and Pt         12 N.m           Quantity por set         Set of 1           With weight         164 mm           Depth         100.2 mm           Nat weight         1.6 kg           Environment         -1000.m without detaing > 1000.m with carrent denaing 1 % per 100 m           Operating position         Vertical + -10 degree           Product certifications         NOM CGN RCM KC           Marking         CE           Electromagnetic compatibility Electromagnetic compatibility Electromagnetic compatibility Electromagnetic compatibility Electromagnetic compatibility Electromagnetic compatibility Electromagnetic compatibility Electromagnetic conterming to ENIEC 61000.41 Reader attach fragment terming t	With safety function Safe torque off (STO)	False
Direction (SD)         Protection type       Line supply overvoltage Community between moter phases Against input phase isas in three phase Against input phase isas input phase isas input phase Against input phase isas input phase isas input phase is an input phase isas input phase Against input phase isas input phase isas input phase is an input phase isas input phase is an input phase isas input phase is an input	With safety function Safely Limited Position (SLP)	False
Line supply undervolage         Overcurrent Netween output phases and earth C-verhealing protection         Tightening torque         12 N/m         Insulation         Electrical between power and control         Quantity per set         Set of 1         Width         140 mm         Height         134 mm         Depth         100 2 mm         Net weight         1.8 kg         Environment         Operating altitude         > 1000 - 3000 m without derating         > 1000 - 3000 m with current derating 1 % per 100 m         Operating position         Vertical + 1:0 degree         Product certifications         NOM CSA         Corr	With safety function Safe Direction (SDI)	False
Insulation       Electrical between power and control         Quantity per set       Set of 1         Width       140 mm         Height       184 mm         Depth       100.2 mm         Net weight       1.6 kg         Environment       -         Operating altitude       <= 1000 m without derating > 10003000 m with current derating 1% per 100 m         Operating position       Vertical +/- 10 degree         Product certifications       NOM CGA         Circk       UL UL UL GOST RCM         Standards       UL 508C         UL 61000-5.1 ENVICE 61800-5.1 ENVICE 61800-5.1 ENVICE 61800-5.4         Electromagnetic compatibility       Electrical fast transient/burst immunity test level 4 conforming to ENVICE 61000-4.4 Facilitate ratio fragments fevel 3 conforming to ENVICE 61000-4.4 Facilitate ratio-fragments fevel 3 conforming t	Protection type	Line supply undervoltage Overcurrent between output phases and earth Overheating protection Short-circuit between motor phases Against input phase loss in three-phase
Quantity per set     Set of 1       Width     140 mm       Height     184 mm       Depth     100 2 mm       Net weight     1.6 kg       Environment	Tightening torque	1.2 N.m
Width       140 mm         Height       184 mm         Depth       100.2 mm         Net weight       1.6 kg         Environment	Insulation	Electrical between power and control
Height       184 mm         Depth       100.2 mm         Net weight       1.6 kg         Environment	Quantity per set	Set of 1
Depth       100.2 mm         Net weight       1.6 kg         Environment	Width	140 mm
Net weight       1.6 kg         Environment	Height	184 mm
Environment         Operating altitude       <= 1000 m without derating > 10003000 m with current derating 1 % per 100 m         Operating position       Vertical +/- 10 degree         Product certifications       NOM CSA C-Tick UL GOST RCM KC         Marking       CE         Standards       UL 508C UL 508C UL 618000-5-1 EN/IEC 61800-5-1 EN/IEC 61800-5-1 EN/IEC 61800-3         Assembly style       On base plate         Electromagnetic compatibility       Electrical fast transient/burst immunity test level 4 conforming to EN/IEC 61000-4-4 Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic 61000-4-6 Radiated radio-frequency electromagnetic feld immunity test conforming to EN/IEC 61000-4-7 Class 3S2 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3 Maximum acceleration under vibrator load (during operation)       10 m/s <sup>2</sup> at 11 ms         Maximum acceleration under vibrator load (during operation)       10 m/s <sup>2</sup> at 13200 Hz	Depth	100.2 mm
Operating altitude         <= 1000 m without derating > 10003000 m with current derating 1 % per 100 m           Operating position         Vertical +/- 10 degree           Product certifications         NOM CSA C-Tick UL GOST RCM KC           Marking         CE           Standards         UL 508C UL 61800-5-1 EN/IEC 61800-5-1 EN/IEC 61800-5-1 EN/IEC 61800-5-1 EN/IEC 61800-5-1 EN/IEC 61800-3           Assembly style         On base plate           Electromagnetic compatibility operation)         Electrola fast transient/burst immunity test level 4 conforming to EN/IEC 61000-4-4 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-4 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-4 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-4 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-4 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-4 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-11           Environmental class (during operation)         Class 3S2 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3           Maximum acceleration under vibrational stress (during operation)         1.5 mm at 213 Hz  <	Net weight	1.6 kg
> 10003000 m with current derating 1 % per 100 m         Operating position       Vertical +/- 10 degree         Product certifications       NOM CSA CSA C-Tick UL GOST RCM KC         Marking       CE         Standards       UL 508C UL 618000-5-1 EN/IEC 61800-5-1 EN/IEC 61800-5-1 EN/IEC 61800-3         Assembly style       On base plate         Electromagnetic compatibility       Electrical fast transient/burst immunity test level 3 conforming to EN/IEC 61000-4-2 Immunity to conducted disturbances level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-4 Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-4 Environmental class (during operation)         Maximum acceleration under shock impact (during operation)       150 m/s² at 11 ms         Maximum acceleration under vibrational stress (during operation)       10 m/s² at 13200 Hz         Maximum deflection under vibrational stress (during operation)       1.5 mm at 213 Hz	Environment	
Product certifications       NOM CSA C-Tick UL GOST RCM KC         Marking       CE         Standards       UL 508C UL 508C UL 51800-5-1 EN/IEC 61800-5-1 EN/IEC 61800-5-1 EN/IEC 61800-3         Assembly style       On base plate         Electromagnetic compatibility       Electrical fast transient/burst immunity test level 4 conforming to EN/IEC 61000-4-4 Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test even 3 conforming to EN/IEC 61000-4-5 Radiated radio-frequency electronagnetic field immunity test forming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test even 3 Surge immunity test even 3 conforming to EN/IEC 61000-4-5 Radiated radio-frequency electronagnetic field immunity test even 3 Surge immunity test even 3 conforming to EN/IEC 6	Operating altitude	
CSA C-Tick UL GOST RCM KC       C-Tick UL GOST         Marking       CE         Standards       UL 508C UL 61800-5-1 EN/IEC 61800-5-1 EN/IEC 61800-3         Assembly style       On base plate         Electromagnetic compatibility Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-4 Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-2 Immunity to conducted disturbances level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-3 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-3 Ultass 3C3 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3         Maximum acceleration under vibrational stress (during operation)       10 m/s² at 11 ms         Maximum deflection under vibratory load (during       1.5 mm at 213 Hz	Operating position	Vertical +/- 10 degree
Standards       UL 508C UL 618000-5-1 EN/IEC 61800-3         Assembly style       On base plate         Electromagnetic compatibility       Electrical fast transient/burst immunity test level 4 conforming to EN/IEC 61000-4-4 Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-2 Immunity to conducted disturbances level 3 conforming to EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-6 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-11         Environmental class (during operation)       Class 3C3 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3         Maximum acceleration under vibrational stress (during operation)       150 m/s² at 11 ms         Maximum deflection under vibrational stress (during operation)       10 m/s² at 13200 Hz	Product certifications	CSA C-Tick UL GOST RCM
UL 618000-5-1 EN/IEC 61800-5-1 EN/IEC 61800-3         Assembly style       On base plate         Electromagnetic compatibility       Electrical fast transient/burst immunity test level 4 conforming to EN/IEC 61000-4-4 Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-2 Immunity to conducted disturbances level 3 conforming to EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic field immunity test level 5 conforming to EN/IEC 61000-4-5 Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-11         Environmental class (during operation)       Class 3C3 according to IEC 60721-3-3 Class 3S2 according to IEC 60721-3-3         Maximum acceleration under vibrational stress (during operation)       150 m/s <sup>2</sup> at 11 ms         Maximum deflection under vibrational stress (during       10 m/s <sup>2</sup> at 13200 Hz         Maximum deflection under vibratory load (during       1.5 mm at 213 Hz	Marking	CE
Electromagnetic compatibility       Electrical fast transient/burst immunity test level 4 conforming to EN/IEC 61000-4-4         Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-2       Immunity to conducted disturbances level 3 conforming to EN/IEC 61000-4-6         Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-5       Surge immunity test level 3 conforming to EN/IEC 61000-4-5         Environmental class (during operation)       Class 3C3 according to IEC 60721-3-3         Maximum acceleration under shock impact (during operation)       150 m/s² at 11 ms         Maximum acceleration under vibrational stress (during operation)       10 m/s² at 13200 Hz         Maximum deflection under vibratory load (during       1.5 mm at 213 Hz	Standards	UL 618000-5-1 EN/IEC 61800-5-1
Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-2         Immunity to conducted disturbances level 3 conforming to EN/IEC 61000-4-6         Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-5         Surge immunity test level 3 conforming to EN/IEC 61000-4-6         Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-5         Voltage dips and interruptions immunity test conforming to EN/IEC 61000-4-11         Environmental class (during operation)       Class 3C3 according to IEC 60721-3-3         Maximum acceleration under shock impact (during operation)       150 m/s² at 11 ms         Maximum acceleration under vibrational stress (during operation)       10 m/s² at 13200 Hz         Maximum deflection under vibratory load (during       1.5 mm at 213 Hz	Assembly style	On base plate
operation)       Class 3S2 according to IEC 60721-3-3         Maximum acceleration under shock impact (during operation)       150 m/s² at 11 ms         Maximum acceleration under vibrational stress (during operation)       10 m/s² at 13200 Hz         Maximum deflection under vibratory load (during       1.5 mm at 213 Hz	Electromagnetic compatibility	Electrostatic discharge immunity test level 3 conforming to EN/IEC 61000-4-2 Immunity to conducted disturbances level 3 conforming to EN/IEC 61000-4-6 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to EN/IEC 61000-4-3 Surge immunity test level 3 conforming to EN/IEC 61000-4-5
shock impact (during operation)         Maximum acceleration under vibrational stress (during operation)       10 m/s² at 13200 Hz         Maximum deflection under vibratory load (during       1.5 mm at 213 Hz	Environmental class (during operation)	
vibrational stress (during operation) Maximum deflection under 1.5 mm at 213 Hz vibratory load (during	Maximum acceleration under shock impact (during operation)	150 m/s² at 11 ms
vibratory load (during	Maximum acceleration under vibrational stress (during operation)	10 m/s² at 13200 Hz
	Maximum deflection under vibratory load (during operation)	1.5 mm at 213 Hz

Electromagnetic emission	Radiated emissions environment 1 category C2 conforming to EN/IEC 61800-3 216 kHz shielded motor cable Conducted emissions conforming to EN/IEC 61800-3
Vibration resistance	1 gn (f = 13200 Hz) conforming to EN/IEC 60068-2-6 1.5 mm peak to peak (f = 313 Hz) - drive unmounted on symmetrical DIN rail - conforming to EN/IEC 60068-2-6
Shock resistance	15 gn conforming to EN/IEC 60068-2-27 for 11 ms
Relative humidity	595 % without condensation conforming to IEC 60068-2-3 595 % without dripping water conforming to IEC 60068-2-3
Noise level	0 dB
Pollution degree	2
Ambient air transport temperature	-2570 °C
Ambient air temperature for operation	-1040 °C without derating 4060 °C with current derating 2.2 % per °C
Ambient air temperature for storage	-2570 °C

# Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Weight	2.2 kg
Package 1 Height	24.8 cm
Package 1 width	19.5 cm
Package 1 Length	26.7 cm
Unit Type of Package 2	P06
Number of Units in Package 2	12
Package 2 Weight	39.4 kg
Package 2 Height	73.5 cm
Package 2 width	60 cm
Package 2 Length	80 cm

# Offer Sustainability

REACh Regulation	REACh Declaration
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration
WEEE	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

# **Contractual warranty**

Warranty

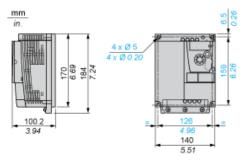
18 months

Dimensions Drawings

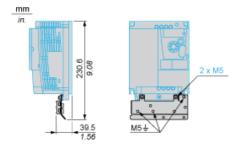
# ATV12PU30M3

#### Dimensions

### Drive without EMC Conformity Kit



### Drive with EMC Conformity Kit

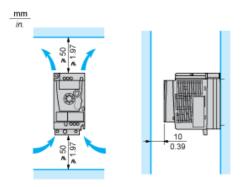


Mounting and Clearance

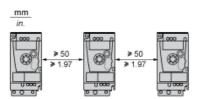
# ATV12PU30M3

### **Mounting Recommendations**

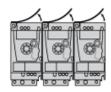
### **Clearance for Vertical Mounting**



#### Mounting Type A

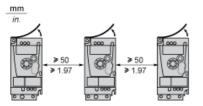


### Mounting Type B



Remove the protective cover from the top of the drive.

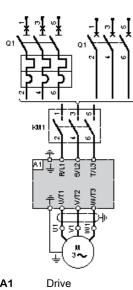
#### Mounting Type C



Remove the protective cover from the top of the drive.

Connections and Schema

Three-Phase Power Supply Wiring Diagram



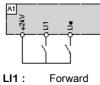


A1 KM1 Contactor (only if a control circuit is needed) Circuit breaker Q1

**Connections and Schema** 

### **Recommended Schemes**

### 2-Wire Control for Logic I/O with Internal Power Supply



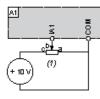
LI• : Reverse A1 : Drive

3-Wire Control for Logic I/O with Internal Power Supply



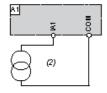
LI• : Reverse A1 : Drive

### Analog Input Configured for Voltage with Internal Power Supply



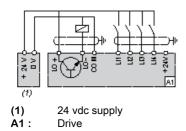
(1) A1 : 2.2 k $\Omega...10$  k $\Omega$  reference potentiometer Drive

### Analog Input Configured for Current with Internal Power Supply

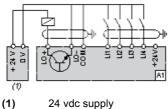


(2) A1 : 0-20 mA 4-20 mA supply Drive

#### Connected as Positive Logic (Source) with External 24 vdc Supply



#### Connected as Negative Logic (Sink) with External 24 vdc supply

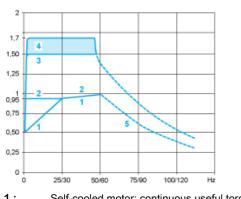


(1) A1 : Drive

# ATV12PU30M3

**Performance Curves** 

### **Torque Curves**



- 1: Self-cooled motor: continuous useful torque (1)
- 2: Force-cooled motor: continuous useful torque
- 3: Transient overtorque for 60 s 4: Transient overtorque for 2 s
- 5: Torque in overspeed at constant power (2)
- For power ratings ≤ 250 W, derating is 20% instead of 50% at very low frequencies.
- (1) (2) The nominal motor frequency and the maximum output frequency can be adjusted from 0.5 to 400 Hz. The mechanical overspeed capability of the