Product data sheet
Characteristics

ATV650D45N4U
Variable speed drive, Altivar Process ATV600, ATV650, 45 kW, 400...480 V, IP55

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Main

Range of Product	Altivar Process ATV600
Product or Component Type	Variable speed drive
Product Specific Application	Process and utilities
Device short name	ATV650
Variant	Standard version
Product destination	Asynchronous motors Synchronous motors
EMC filter	Integrated 164.04 ft (50 m) EN/IEC 61800-3 category C2 Integrated 492.13 ft (150 m) EN/IEC 61800-3 category C3
IP degree of protection	IP55IEC 60529 IP55IEC 61800-5-1
[Us] rated supply voltage	380...480 V
Degree of protection	UL type 12 UL 508C
Type of cooling	Forced convection
Supply frequency	50...60 Hz - 5...5 %
[Us] rated supply voltage	380...480 V - 15...10 %
Motor power kW	37 KW heavy duty) 45 kW normal duty)
Maximum Horse Power Rating	50 Hp heavy duty 60 hp normal duty
Line current	69.1 A 480 V normal duty) 67.1 A 380 V heavy duty) 59 A 480 V heavy duty) 79.8 A 380 V normal duty)
Prospective line Isc	50 kA
Apparent power	49.1 KVA 480 V heavy duty) 57.4 kVA 480 V normal duty)
Continuous output current	72 A 4 kHz heavy duty 87 A 4 kHz normal duty
Maximum transient current	111.8 A 60 s heavy duty) 96.8 A 60 s normal duty)
Asynchronous motor control profile	Variable torque standard Constant torque standard Variable torque standard
Synchronous motor control profile	Synchronous reluctance motor Permanent magnet motor
Speed drive output frequency	0.1…500 Hz
Nominal switching frequency	4 kHz
Switching frequency	4...12 kHz with derating factor 2...12 kHz adjustable
Safety function	STO (safe torque off) SIL 3
Discrete input logic	16 preset speeds

Communication Port Protocol	Modbus TCP Modbus serial Ethernet
Option card	Slot A communication module, PROFINET Slot A communication module, DeviceNet Slot A communication module, Modbus TCP/ EtherNet/IP Slot A communication module, CANopen daisy chain RJ45 Slot A communication module, CANopen SUB-D 9 Slot A communication module, CANopen screw terminals Slot A/slot B digital and analog I/O extension module Slot A/slot B output relay extension module Slot A communication module, Ethernet IP/Modbus TCP/MD-Link Communication module, BACnet MS/TP Communication module, Ethernet Powerlink Slot A communication module, Profibus DP V1

Complementary

Mounting Mode	Wall mount
Phase	3 phase
Discrete output number	0
Discrete output type	Relay outputs R1A, R1B, R1C 250 V AC 3000 mA Relay outputs R1A, R1B, R1C 30 V DC 3000 mA Relay outputs R2A, R2C 250 V AC 5000 mA Relay outputs R2A, R2C 30 V DC 5000 mA Relay outputs R3A, R3C 250 V AC 5000 mA Relay outputs R3A, R3C 30 V DC 5000 mA
Output voltage	<= power supply voltage
Permissible temporary current boost	1.5 x In 60 s heavy duty) 1.1 x In 60 s normal duty)
Motor slip compensation	Automatic whatever the load Adjustable Can be suppressed Can be suppressed
Acceleration and deceleration ramps	Linear adjustable separately from 0.01...9999 s
Physical interface	Ethernet 2-wire RS 485
Braking to standstill	By DC injection
Protection type	Safe torque off motor Motor phase break motor Thermal protection drive Safe torque off drive Overheating drive Overcurrent between output phases and earth drive Overload of output voltage drive Short-circuit protection drive Motor phase break drive Overvoltages on the DC bus drive Line supply overvoltage drive Line supply undervoltage drive Line supply phase loss drive Overspeed drive Break on the control circuit drive Thermal protection motor
Transmission Rate	10, 100 Mbits 4800 bps, 9600 bps, 19200 bps, 38.4 Kbps
Frequency resolution	Analog input 0.012/50 Hz Display unit 0.1 Hz
Transmission frame	RTU
Electrical connection	Line side screw terminal 35...50 mm² Motor screw terminal 35...50 mm² Control removable screw terminals 0.5...1.5 mm² AWG 20...AWG 16
Connector type	RJ45 on the remote graphic terminal)Modbus serial RJ45 on the remote graphic terminal)Ethernet/Modbus TCP
Data format	8 bits, configurable odd, even or no parity
Type of polarization	No impedance
Exchange mode	Half duplex, full duplex, autonegotiation Ethernet/Modbus TCP

Number of addresses	1…247 Modbus serial
Method of access	Slave Modbus TCP
Supply	Internal supply for reference potentiometer (1 to 10 kOhm) 10.5 V DC +/- 5 %, <10 mA overload and short-circuit protection Internal supply for digital inputs and STO 24 V DC 21…27 V), <200 mA overload and short-circuit protection External supply for digital inputs 24 V DC 19…30 V), <1.25 mA overload and short-circuit protection
Local signalling	For embedded communication status 3 LEDs (dual colour) For communication module status 4 LEDs (dual colour) For presence of voltage 1 LED (red) For local diagnostic 3 LEDs
Width	11.42 in (290 mm)
Height	35.83 in (910 mm)
Depth	13.39 in (340 mm)
Net Weight	110.23 lb(US) (50 kg)
Analogue input number	3
Analogue input type	AI1, AI2, AI3 software-configurable voltage 0...10 V DC 31.5 kOhm 12 bits AI1, AI2, AI3 software-configurable current 0...20 mA 250 Ohm 12 bits AI2 voltage analog input - 10...10 V DC 31.5 kOhm 12 bits
Discrete input number	8
Discrete input type	DI7, DI8 programmable as pulse input 0…30 kHz, 24 V DC <= 30 V)
Input compatibility	DI5, DI6 discrete input level 1 PLC IEC 65A-68 STOA, STOB discrete input level 1 PLC EN/IEC 61131-2 DI1...DI6 discrete input level 1 PLC EN/IEC 61131-2
Discrete input logic	Positive logic (source) DI1...DI8), < 5 V, > 11 V Negative logic (sink) DI1...DI8), > 16 V, < 10 V
Analogue output number	2
Analogue output type	Software-configurable voltage AQ1, AQ2 0...10 V DC 470 Ohm 10 bits Software-configurable current AQ1, AQ2 0...20 mA 10 bits Software-configurable current DQ-, DQ+ 30 V DC Software-configurable current DQ-, DQ+ 100 mA
Sampling duration	5 Ms +/- 1 ms DI5, DI6) - discrete input 5 Ms +/- 0.1 ms AI1, AI2, AI3) - analog input 10 Ms +/- 1 ms AO1) - analog output 2 ms +/- 0.5 ms DI1...DI4) - discrete input
Accuracy	+/- 1 % AO1, AO2 for a temperature variation 60 °C analog output +/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input
Linearity error	AO1, AO2 +/- 0.2 % analog output AI1, AI2, AI3 +/- 0.15 % of maximum value analog input
Relay output number	3
Relay output type	Configurable relay logic R2 sequence relay NO 100000 cycles Configurable relay logic R3 sequence relay NO 100000 cycles Configurable relay logic R1 fault relay NO/NC 100000 cycles
Refresh time	Relay output R1, R2, R3)5 ms +/- 0.5 ms)
Minimum switching current	Relay output R1, R2, R3 5 mA 24 V DC
Maximum switching current	Relay output R1, R2, R3 resistive, cos phi = 1 3 A 30 V DC Relay output R1, R2, R3 inductive, cos phi = 0.4 7 ms 2 A 250 V AC Relay output R1, R2, R3 inductive, cos phi = 0.4 7 ms 2 A 30 V DC Relay output R1, R2, R3 resistive, cos phi = 1 3 A 250 V AC
Isolation	Between power and control terminals
Maximum output frequency	500 kHz
Maximum Input Current per Phase	79.8 A
Quantity per Set	1
Enclosure mounting	Wall mounted

Environment

Insulation resistance	> 1 MOhm 500 V DC for 1 minute to earth
Noise level	69.7 dB 86/188/EEC
Operating position	Vertical +/- 10 degree
Maximum THDI	<48 % from 80...100 % of load IEC 61000-3-12
Electromagnetic compatibility	Radiated radio-frequency electromagnetic field immunity test level 3 IEC 61000-4-3 Electrical fast transient/burst immunity test level 4 IEC 61000-4-4 1.2/50 µs - 8/20 µs surge immunity test level 3 IEC 61000-4-5 Conducted radio-frequency immunity test level 3 IEC 61000-4-6 Electrostatic discharge immunity test level 3 IEC 61000-4-2
Pollution degree	2 EN/IEC 61800-5-1
Vibration resistance	1 gn 13…200 Hz)IEC 60068-2-6 1.5 mm peak to peak 2…13 Hz)IEC 60068-2-6
Shock resistance	15 gn 11 ms IEC 60068-2-27
Relative humidity	5…95 % without condensation IEC 60068-2-3
Ambient air temperature for operation	104…122 °F (40…50 °C) with derating factor) 5…104 °F (-15…40 °C) without derating)
Ambient Air Temperature for Storage	-40…158 °F (-40…70 °C)
Operating altitude	1000...4800 m with current derating 1 % per 100 m <= 3280.84 ft (1000 m) without derating
Standards	Environment 1 category C2 EN/IEC 61800-3 Environment 2 category C3 EN/IEC 61800-3 EN/IEC 61800-5-1 IEC 61000-3-12 IEC 60721-3 IEC 61508 IEC 13849-1 UL 508C
Product Certifications	ATEX INERIS Bureau Veritas ABS DNV-GL UL TÜV ATEX INERIS
Marking	CE
Standards	EN/IEC 61800-3 environment 1 category C2 EN/IEC 61800-3 environment 2 category C3 EN/IEC 61800-5-1 IEC 61000-3-12 IEC 60721-3 IEC 61508 IEC 13849-1 UL 508C
Overvoltage category	III
Regulation loop	Adjustable PID regulator
Noise level	69.7 dB
Pollution degree	3

Ordering and shipping details

Category	22207-ATV630 FRAMES 5 & 6
Discount Schedule	CP4E
GTIN	3606480906909
Returnability	No

Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Height	25.20 in (64.0 cm)
Package 1 Width	17.01 in (43.2 cm)
Package 1 Length	43.39 in (110.2 cm)
Package 1 Weight	145.51 lb(US) (66.0 kg)

Offer Sustainability

Sustainable offer status	Green Premium product
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
REACh Regulation	REACh Declaration
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration
Mercury free	Yes
China RoHS Regulation	China RoHS Declaration
RoHS exemption information	Yes
Environmental Disclosure	Product Environmental Profile
Circularity Profile	End Of Life Information
WEEE	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.
Upgradeability	Upgraded components available