

# Product Datasheet

## Characteristic

# ATV320D15N4B

variable speed drive, Altivar Machine  
ATV320, 15kW, 380 to 500V, 3 phases,  
book



### Main

|                              |                                                                                                                                                                                                                                                               |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Range of product             | Altivar Machine ATV320                                                                                                                                                                                                                                        |
| product or component type    | Variable speed drive                                                                                                                                                                                                                                          |
| Product specific application | Complex machines                                                                                                                                                                                                                                              |
| variant                      | Standard version                                                                                                                                                                                                                                              |
| Format of the drive          | Book                                                                                                                                                                                                                                                          |
| mounting mode                | Wall mount                                                                                                                                                                                                                                                    |
| Communication port protocol  | Modbus serial<br>CANopen                                                                                                                                                                                                                                      |
| Option card                  | Communication module, CANopen<br>Communication module, EtherCAT<br>Communication module, Profibus DP V1<br>Communication module, PROFINET<br>Communication module, Ethernet Powerlink<br>Communication module, EtherNet/IP<br>Communication module, DeviceNet |
| [Us] rated supply voltage    | 380...500 V - 15...10 %                                                                                                                                                                                                                                       |
| Nominal output current       | 33.0 A                                                                                                                                                                                                                                                        |
| Motor power kW               | 15.0 kW for heavy duty                                                                                                                                                                                                                                        |
| EMC filter                   | Class C3 EMC filter integrated                                                                                                                                                                                                                                |
| IP degree of protection      | IP20                                                                                                                                                                                                                                                          |

### Complementary

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|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discrete input number  | 7                                                                                                                                                                                                                                    |
| Discrete input type    | STO safe torque off, 24 V DC, impedance: 1.5 kOhm<br>DI1...DI6 logic inputs, 24 V DC (30 V)<br>DI5 programmable as pulse input: 0...30 kHz, 24 V DC (30 V)                                                                           |
| Discrete input logic   | Positive logic (source)<br>Negative logic (sink)                                                                                                                                                                                     |
| Discrete output number | 3                                                                                                                                                                                                                                    |
| Discrete output type   | Open collector DQ+ 0...1 kHz 30 V DC 100 mA<br>Open collector DQ- 0...1 kHz 30 V DC 100 mA                                                                                                                                           |
| Analogue input number  | 3                                                                                                                                                                                                                                    |
| Analogue input type    | AI1 voltage: 0...10 V DC, impedance: 30 kOhm, resolution 10 bits<br>AI2 bipolar differential voltage: +/- 10 V DC, impedance: 30 kOhm, resolution 10 bits<br>AI3 current: 0...20 mA (or 4-20 mA, x-20 mA, 20-x mA or other patterns) |

|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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|                                                      | by configuration), impedance: 250 Ohm, resolution 10 bits                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Analogue output number                               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Analogue output type                                 | Software-configurable current AQ1: 0...20 mA impedance 800 Ohm, resolution 10 bits<br>Software-configurable voltage AQ1: 0...10 V DC impedance 470 Ohm, resolution 10 bits                                                                                                                                                                                                                                                                                                                                                |
| Relay output type                                    | Configurable relay logic R1A 1 NO electrical durability 100000 cycles<br>Configurable relay logic R1B 1 NC electrical durability 100000 cycles<br>Configurable relay logic R1C<br>Configurable relay logic R2A 1 NO electrical durability 100000 cycles<br>Configurable relay logic R2C                                                                                                                                                                                                                                   |
| Maximum switching current                            | Relay output R1A, R1B, R1C on resistive load, cos phi = 1: 3 A at 250 V AC<br>Relay output R1A, R1B, R1C on resistive load, cos phi = 1: 3 A at 30 V DC<br>Relay output R1A, R1B, R1C, R2A, R2C on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 250 V AC<br>Relay output R1A, R1B, R1C, R2A, R2C on inductive load, cos phi = 0.4 and L/R = 7 ms: 2 A at 30 V DC<br>Relay output R2A, R2C on resistive load, cos phi = 1: 5 A at 250 V AC<br>Relay output R2A, R2C on resistive load, cos phi = 1: 5 A at 30 V DC |
| Minimum switching current                            | Relay output R1A, R1B, R1C, R2A, R2C: 5 mA at 24 V DC                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Method of access                                     | Slave CANopen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 4 quadrant operation possible                        | True                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Asynchronous motor control profile                   | Voltage/frequency ratio, 5 points<br>Flux vector control without sensor, standard<br>Voltage/frequency ratio - Energy Saving, quadratic U/f<br>Flux vector control without sensor - Energy Saving<br>Voltage/frequency ratio, 2 points                                                                                                                                                                                                                                                                                    |
| Synchronous motor control profile                    | Vector control without sensor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Transient overtorque                                 | 170...200 % of nominal motor torque                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Maximum output frequency                             | 0.599 kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Acceleration and deceleration ramps                  | Linear<br>U<br>S<br>CUS<br>Ramp switching<br>Acceleration/deceleration ramp adaptation<br>Acceleration/deceleration automatic stop with DC injection                                                                                                                                                                                                                                                                                                                                                                      |
| Motor slip compensation                              | Automatic whatever the load<br>Adjustable 0...300 %<br>Not available in voltage/frequency ratio (2 or 5 points)                                                                                                                                                                                                                                                                                                                                                                                                           |
| Switching frequency                                  | 2...16 kHz adjustable<br>4...16 kHz with derating factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Nominal switching frequency                          | 4 kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Braking to standstill                                | By DC injection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Brake chopper integrated                             | True                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Line current                                         | 47.3 A at 380 V (heavy duty)<br>33.3 A at 500 V (heavy duty)                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Maximum input current                                | 47.3 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Maximum output voltage                               | 500 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Apparent power                                       | 28.8 kVA at 500 V (heavy duty)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Network frequency                                    | 50...60 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Relative symmetric network frequency tolerance       | 5 %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Prospective line Isc                                 | 22 kA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Base load current at high overload                   | 4 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Power dissipation in W                               | Fan: 452.0 W at 380 V, switching frequency 4 kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| With safety function Safely Limited Speed (SLS)      | True                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| With safety function Safe Stop 1 (SS1)               | True                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| With sft fct Safe Stop 2 (SS2)                       | False                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| With safety function Safe torque off (STO)           | True                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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| With safety function Safely Limited Position (SLP) | False                                                                                                                                                                                      |
| With safety function Safe Direction (SDI)          | False                                                                                                                                                                                      |
| Protection type                                    | Input phase breaks: drive<br>Overcurrent between output phases and earth: drive<br>Overheating protection: drive<br>Short-circuit between motor phases: drive<br>Thermal protection: drive |
| Width                                              | 180 mm                                                                                                                                                                                     |
| Height                                             | 404.0 mm                                                                                                                                                                                   |
| Depth                                              | 232.0 mm                                                                                                                                                                                   |
| net weight                                         | 6.9 kg                                                                                                                                                                                     |

## Environment

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating position                                               | Vertical +/- 10 degree                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Product certifications                                           | CE<br>ATEX<br>NOM<br>GOST<br>EAC<br>RCM<br>KC                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| marking                                                          | CE<br>ATEX<br>UL<br>CSA<br>EAC<br>RCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Standards                                                        | IEC 61800-5-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Electromagnetic compatibility                                    | Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2<br>Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3<br>Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4<br>1.2/50 $\mu$ s - 8/20 $\mu$ s surge immunity test level 3 conforming to IEC 61000-4-5<br>Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6<br>Voltage dips and interruptions immunity test conforming to IEC 61000-4-11 |
| Environmental class (during operation)                           | Class 3C3 according to IEC 60721-3-3<br>Class 3S2 according to IEC 60721-3-3                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Maximum acceleration under shock impact (during operation)       | 150 m/s <sup>2</sup> at 11 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Maximum acceleration under vibrational stress (during operation) | 10 m/s <sup>2</sup> at 13...200 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Maximum deflection under vibratory load (during operation)       | 1.5 mm at 2...13 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Permitted relative humidity (during operation)                   | Class 3K5 according to EN 60721-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Volume of cooling air                                            | 156.0 m <sup>3</sup> /h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Overvoltage category                                             | III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Regulation loop                                                  | Adjustable PID regulator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Speed accuracy                                                   | +/- 10 % of nominal slip 0.2 T <sub>n</sub> to T <sub>n</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Pollution degree                                                 | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Ambient air transport temperature                                | -25...70 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ambient air temperature for operation                            | -10...50 °C without derating<br>50...60 °C with derating factor                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Ambient air temperature for storage                              | -25...70 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## Packing Units

|                              |           |
|------------------------------|-----------|
| Unit Type of Package 1       | PCE       |
| Number of Units in Package 1 | 1         |
| Package 1 Height             | 23.000 cm |
| Package 1 Width              | 42.000 cm |
| Package 1 Length             | 27.100 cm |
| Package 1 Weight             | 8.777 kg  |
| Unit Type of Package 2       | S06       |

|                              |           |
|------------------------------|-----------|
| Number of Units in Package 2 | 4         |
| Package 2 Height             | 75.000 cm |
| Package 2 Width              | 60.000 cm |
| Package 2 Length             | 80.000 cm |
| Package 2 Weight             | 47.430 kg |

Offer Sustainability

|                            |                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Sustainable offer status   | Green Premium product                                                                                                       |
| REACH Regulation           | Reference contains Substances of Very High Concern above the threshold                                                      |
| EU RoHS Directive          | Pro-active compliance (Product out of EU RoHS legal scope)                                                                  |
| Mercury free               | Yes                                                                                                                         |
| China RoHS Regulation      | X                                                                                                                           |
| RoHS exemption information | Yes                                                                                                                         |
| Environmental Disclosure   | ENVPEP1709006EN                                                                                                             |
| Circularity Profile        | ENVEOLI1709006EN_V1                                                                                                         |
| 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                                                                                               |