

ATV650D90N4

variable speed drive ATV650 - 90kW/125HP -
380...480V - IP55



Main

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| 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 |
| Mounting mode | Wall mount |
| EMC filter | Integrated EN/IEC 61800-3 category C3 150 m |
| IP degree of protection | IP55 conforming to IEC 60529 IP55 conforming to IEC 61800-5-1 |
| Type of cooling | Forced convection |
| Supply frequency | 50...60 Hz - 5...5 % |
| Network number of phases | 3 phases |
| [Us] rated supply voltage | 380...480 V - 15...10 % |
| Motor power kW | 90 kW normal duty 75 kW heavy duty |
| Motor power hp | 125 hp normal duty 100 hp heavy duty |
| Line current | 156.2 A 380 V normal duty 135.8 A 480 V normal duty 134.3 A 380 V heavy duty 118.1 A 480 V heavy duty |
| Prospective line I _{sc} | 50 kA |
| Apparent power | 112.9 kVA 480 V normal duty 98.2 kVA 480 V heavy duty |
| Continuous output current | 173 A 2.5 kHz normal duty 145 A 2.5 kHz heavy duty |
| Maximum transient current | 190.3 A 60 s normal duty 217.5 A 60 s heavy duty |
| Asynchronous motor control profile | Constant torque standard Variable torque standard Optimized torque mode |
| Synchronous motor control profile | Permanent magnet motor |
| Output frequency | 0.0001...0.5 kHz |
| Speed drive output frequency | 0.1...599 Hz |
| Nominal switching frequency | 2.5 kHz |
| Switching frequency | 2...8 kHz adjustable 2.5...8 kHz with derating factor |
| Safety function | STO (safe torque off) SIL 3 |
| Discrete input logic | 16 preset speeds |
| Communication port protocol | Ethernet Modbus serial Modbus TCP |
| Option card | Communication module Profibus DP V1 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 |

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terminals slot A
 Digital and analog I/O extension module slot A/slot B
 Output relay extension module slot A/slot B
 Communication module Ethernet IP/Modbus
 TCP/MD-Link slot A

Complementary

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| Output voltage | <= power supply voltage |
| Permissible temporary current boost | 1.1 x In 60 s normal duty 1.5 x In 60 s heavy duty |
| Motor slip compensation | Adjustable Automatic whatever the load Can be suppressed Not available in permanent magnet motor law |
| Acceleration and deceleration ramps | Linear adjustable separately from 0.01...9999 s |
| Braking to standstill | By DC injection |
| Protection type | Line supply overvoltage drive Line supply phase loss drive Line supply undervoltage drive Overcurrent between output phases and earth drive Thermal protection motor Thermal protection drive Safe torque off motor Motor phase break motor Safe torque off drive Overheating drive Short-circuit protection drive Motor phase break drive Overspeed drive Break on the control circuit drive Overvoltages on the DC bus drive Overload of output voltage drive |
| Frequency resolution | Display unit Analog input |
| Electrical connection | Removable screw terminals 0.5...1.5 mm ² AWG 20...AWG 16 control Screw terminal 95...120 mm ² AWG 3/0...250 kcmil line side Screw terminal 120 mm ² AWG 4...250 kcmil motor |
| Connector type | RJ45 Ethernet/Modbus TCP on the remote graphic terminal RJ45 Modbus serial on the remote graphic terminal |
| Physical interface | 2-wire RS 485 Modbus serial |
| Transmission frame | RTU Modbus serial |
| Transmission rate | 10/100 Mbit/s Ethernet IP/Modbus TCP 4.8, 9.6, 19.2, 38.4 kbit/s Modbus serial |
| Exchange mode | Half duplex, full duplex, autonegotiation Ethernet/Modbus TCP |
| Data format | 8 bits, configurable odd, even or no parity Modbus serial |
| Type of polarization | No impedance Modbus serial |
| 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 External supply for digital inputs 24 V DC 19...30 V <= 1.25 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 |
| Local signalling | 3 LEDs local diagnostic 3 LEDs dual colour embedded communication status 4 LEDs dual colour communication module status 1 LED red presence of voltage |
| Width | 345 mm |
| Height | 1250 mm |
| Depth | 375 mm |
| Analogue input number | 3 |
| Analogue input type | Software-configurable voltage AI1, AI2, AI3 0...10 V DC 30 kOhm 12 bits Software-configurable current AI1, AI2, AI3 0...20 mA/4...20 mA 250 Ohm 12 bits |
| Discrete input number | 8 |
| Discrete input type | Programmable DI1...DI6 24 V DC 3.5 kOhm |

Programmable as pulse input DI5, DI6 0...30 kHz 24 V DC
Safe torque off STOA, STOB 24 V DC > 2.2 kOhm

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| Input compatibility | Level 1 PLC EN/IEC 61131-2 DI1...DI6 discrete input Level 1 PLC IEC 65A-68 DI5, DI6 discrete input Level 1 PLC EN/IEC 61131-2 STOA, STOB discrete input |
| Discrete input logic | Positive logic (source) DI1...DI6 < 5 V > 11 V Negative logic (sink) DI1...DI6 > 16 V < 10 V Positive logic (source) DI5, DI6 < 0.6 V > 2.5 V Positive logic (source) STOA, STOB < 5 V > 11 V |
| Analogue output number | 2 |
| Analogue output type | Software-configurable voltage AO1, AO2 0...10 V DC 470 Ohm 10 bits Software-configurable current AO1, AO2 0...20 mA 10 bits |
| Sampling duration | 2 ms +/- 0.5 ms DI1...DI4 discrete input 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 |
| Accuracy | +/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input +/- 1 % AO1, AO2 for a temperature variation 60 °C analog output |
| Linearity error | +/- 0.15 % of maximum value analog input AI1, AI2, AI3 +/- 0.2 % analog output AO1, AO2 |
| Relay output number | 3 |
| Relay output type | Configurable relay logic R1 fault relay NO/NC 100000 cycles Configurable relay logic R2 sequence relay NO 100000 cycles Configurable relay logic R3 sequence relay NO 100000 cycles |
| Refresh time | 5 ms +/- 0.5 ms R1, R2, R3 relay output |
| Minimum switching current | 5 mA 24 V DC R1, R2, R3 relay output |
| Maximum switching current | 3 A 250 V AC resistive 1 R1, R2, R3 relay output 3 A 30 V DC resistive 1 R1, R2, R3 relay output 2 A 250 V AC inductive 0.4 7 ms R1, R2, R3 relay output 2 A 30 V DC inductive 0.4 7 ms R1, R2, R3 relay output |
| Isolation | Between power and control terminals |
| Specific application | Utility |
| IP degree of protection | IP55 |
| Discrete and process manufacturing | Building - HVAC compressor centrifugal Food and beverage processing other application Mining mineral and metal fan Mining mineral and metal pump Oil and gas fan Water and waste water other application Building - HVAC screw compressor Food and beverage processing pump Food and beverage processing fan Food and beverage processing atomization Oil and gas electro submersible pump (ESP) Oil and gas water injection pump Oil and gas jet fuel pump Oil and gas compressor for refinery Water and waste water centrifuge pump Water and waste water positive displacement pump Water and waste water electro submersible pump (ESP) Water and waste water screw pump Water and waste water lobe compressor Water and waste water screw compressor Water and waste water compressor centrifugal Water and waste water fan Water and waste water conveyor Water and waste water mixer |
| Power range | 55...100 kW 380...440 V 3 phases 55...100 kW 480...500 V 3 phases |
| Motor starter type | Variable speed drive |

Environment

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| insulation resistance | > 1 mOhm 500 V DC for 1 minute to earth |
| noise level | 69.9 dB 86/188/EEC |
| operating position | Vertical +/- 10 degree |
| THDI | <= 48 % from 80...100 % of load IEC 61000-3-12 |
| electromagnetic compatibility | 1.2/50 µs - 8/20 µs surge immunity test level 3 IEC 61000-4-5 Electrical fast transient/burst immunity test level 4 IEC 61000-4-4 |

Electrostatic discharge immunity test level 3 IEC 61000-4-2
 Radiated radio-frequency electromagnetic field immunity test level 3 IEC 61000-4-3
 Conducted radio-frequency immunity test level 3 IEC 61000-4-6

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| pollution degree | 2 EN/IEC 61800-5-1 |
| vibration resistance | 1.5 mm peak to peak 2...13 Hz IEC 60068-2-6 1 gn 13...200 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 | -15...40 °C without derating 40...50 °C with derating factor |
| ambient air temperature for storage | -40...70 °C |
| operating altitude | <= 1000 m without derating 1000...4800 m with current derating 1 % per 100 m |
| environmental characteristic | Chemical pollution resistance class 3C3 EN/IEC 60721-3-3 Dust pollution resistance class 3S3 EN/IEC 60721-3-3 |
| standards | EN/IEC 61800-3 EN/IEC 61800-3 environment 1 category C2 EN/IEC 61800-3 environment 2 category C3 UL 508C EN/IEC 61800-5-1 IEC 61000-3-12 IEC 60721-3 IEC 61508 IEC 13849-1 |
| product certifications | ATEX INERIS ATEX zone 2/22 CSA TÜV UL REACH DNV-GL |
| marking | CE |

Offer Sustainability

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| Sustainable offer status | Green Premium product |
| RoHS (date code: YYWW) | Compliant - since 1502 - Schneider Electric declaration of conformity |
| REACH | Reference not containing SVHC above the threshold |
| Product environmental profile | Available |
| Product end of life instructions | Available |