## Product datasheet

Specifications

variable speed drive, Easy Altivar 610, 90kW, 125hp, 380 to 460V, IP20

ATV610D90N4

Main

| Range Of Product | Easy Altivar 610 |
| :---: | :---: |
| Product Or Component Type | Variable speed drive |
| Product Specific Application | Fan, pump, compressor, conveyor |
| Device Short Name | ATV610 |
| Variant | Standard version |
| Product Destination | Asynchronous motors Synchronous motors |
| Mounting Mode | Cabinet mount |
| Emc Filter | Integrated conforming to IEC 61800-3 category C3 with 50 m |
| Ip Degree Of Protection | IP20 |
| Type Of Cooling | Forced convection |
| Supply Frequency | $50 . . .60 \mathrm{~Hz}+/-5 \%$ |
| Network Number Of Phases | 3 phases |
| [Us] Rated Supply Voltage | $380 \ldots 460$ V-15... $10 \%$ |
| Motor Power Kw | 90 kW for normal duty 75 kW for heavy duty |
| Motor Power Hp | 125 hp for normal duty 100 hp for heavy duty |
| Line Current | 177.8 A at 380 V (normal duty) 159.9 A at 460 V (normal duty) 155.8 A at 380 V (heavy duty) <br> 138.1 A at 460 V (heavy duty) |
| Prospective Line Isc | 50 kA |
| Apparent Power | 127.4 kVA at 460 V (normal duty) 110.0 kVA at 460 V (heavy duty) |
| Continuous Output Current | 173 A at 2.5 kHz for normal duty 145 A at 2.5 kHz for heavy duty |
| Maximum Transient Current | 190 A during 60 s (normal duty) <br> 218 A during 60 s (heavy duty) |
| Asynchronous Motor Control Profile | Optimized torque mode Variable torque standard Constant torque standard |
| Output Frequency | $0.1 \ldots 500 \mathrm{~Hz}$ |
| Nominal Switching Frequency | 2.5 kHz |
| Switching Frequency | $1 \ldots 8 \mathrm{kHz}$ adjustable |
| Number Of Preset Speeds | 16 preset speeds |


| Communication Port Protocol | Modbus serial |
| :--- | :--- |
| Option Card | Slot A: communication card, Profibus DP V1 |
|  | Slot A: digital or analog I/O extension card |
|  | Slot A: relay output card |

Complementary

| Output Voltage | <= power supply voltage |
| :---: | :---: |
| Motor Slip Compensation | Automatic whatever the load <br> Can be suppressed <br> Adjustable <br> Not available in permanent magnet motor law |
| Acceleration And Deceleration Ramps | Linear adjustable separately from 0.01 to 9000 s S, U or customized |
| Braking To Standstill | By DC injection |
| Protection Type | Thermal protection: motor <br> Motor phase break: motor <br> Thermal protection: drive <br> Overheating: drive <br> Overcurrent between output phases and earth: drive <br> Overload of output voltage: drive <br> Short-circuit protection: drive <br> Motor phase break: drive <br> Overvoltages on the DC bus: drive <br> Line supply overvoltage: drive <br> Line supply undervoltage: drive <br> Line supply phase loss: drive <br> Overspeed: drive <br> Break on the control circuit: drive |
| Frequency Resolution | Display unit: 0.1 Hz <br> Analog input: $0.012 / 50 \mathrm{~Hz}$ |
| Electrical Connection | Control, screw terminal: $0.5 \ldots 1.5 \mathrm{~mm}^{2}$ Line side, screw terminal: $95 . . .120 \mathrm{~mm}^{2}$ Motor, screw terminal: $95 \ldots 120 \mathrm{~mm}^{2}$ |
| Connector Type | 1 RJ45 (on the remote graphic terminal) for Modbus serial |
| Physical Interface | 2-wire RS 485 for Modbus serial |
| Transmission Frame | RTU for Modbus serial |
| Transmission Rate | 4.8, 9.6, 19.2, $38.4 \mathrm{kbit} / \mathrm{s}$ for Modbus serial |
| Type Of Polarization | No impedance for Modbus serial |
| Number Of Addresses | 1... 247 for Modbus serial |
| Method Of Access | Slave |
| Supply | External supply for digital inputs: 24 V DC $(19 \ldots 30 \mathrm{~V}),<1.25 \mathrm{~mA}$, protection type: overload and short-circuit protection Internal supply for reference potentiometer (1 to 10 kOhm ): 10.5 V DC $+/-5 \%,<10$ mA , protection type: overload and short-circuit protection |
| Local Signalling | 2 LEDs for local diagnostic <br> 1 LED (yellow) for embedded communication status <br> 2 LEDs (dual colour) for communication module status <br> 1 LED (red) for presence of voltage |
| Width | 290 mm |
| Height | $\begin{aligned} & 762 \mathrm{~mm} \\ & 922 \mathrm{~mm} \text { with EMC plate } \end{aligned}$ |
| Depth | 323 mm |
| Net Weight | 53 kg |
| Analogue Input Number | 3 |


| Analogue Input Type | AI1, Al2, Al3 software-configurable voltage: $0 \ldots 10 \mathrm{~V}$ DC, impedance: 30 kOhm , resolution 12 bits <br> Al1, Al2, Al3 software-configurable current: $0 . . .20 \mathrm{~mA}$, impedance: 250 Ohm, resolution 12 bits <br> AI2, Al3 software-configurable temperature probe or water level sensor |
| :---: | :---: |
| Discrete Input Number | 6 |
| Discrete Input Type | DI1...DI6 programmable as logic input, 24 V DC ( $<=30 \mathrm{~V}$ ), impedance: 3.5 kOhm DI5, DI6 programmable as pulse input: $0 \ldots 30 \mathrm{kHz}, 24 \mathrm{~V}$ DC ( $<=30 \mathrm{~V}$ ) |
| Input Compatibility | DI1...DI6: logic input level 1 PLC conforming to IEC 61131-2 DI5, DI6: pulse input level 1 PLC conforming to IEC 65A-68 |
| Discrete Input Logic | Positive logic (source): DI1...DI6 configurable logic input, < 5 V (state 0), > 11 V <br> (state 1) <br> Negative logic (sink): DI1...DI6 configurable logic input, > 16 V (state 0), < 10 V (state <br> 1) <br> Positive logic (source): DI5, DI6 configurable pulse input, < 0.6 V (state 0 ), $>2.5 \mathrm{~V}$ (state 1) |
| Analogue Output Number | 2 |
| Analogue Output Type | Software-configurable current AQ1, AQ2: $0 . . .20 \mathrm{~mA}$, resolution 10 bits Software-configurable voltage AQ1, AQ2: $0 . . .10 \mathrm{~V}$ DC impedance 470 Ohm, resolution 10 bits |
| Sampling Duration | $\begin{aligned} & 5 \mathrm{~ms}+/-0.1 \mathrm{~ms} \text { (Al1, Al2, AI3) - analog input } \\ & 2 \mathrm{~ms}+/-0.5 \mathrm{~ms} \text { (DI1...DI6)configurable - discrete input } \\ & 5 \mathrm{~ms}+/-1 \mathrm{~ms} \text { (DI5, DI6)configurable - pulse input } \\ & 10 \mathrm{~ms}+/-1 \mathrm{~ms} \text { (AQ1, AQ2) - analog output } \end{aligned}$ |
| Accuracy | +/- 0.6 \% Al1, $\mathrm{Al} 2, \mathrm{Al} 3$ for a temperature variation $60^{\circ} \mathrm{C}$ analog input <br> $+/-1 \%$ AQ1, AQ2 for a temperature variation $60^{\circ} \mathrm{C}$ analog output |
| Linearity Error | $\mathrm{Al} 1, \mathrm{Al} 2, \mathrm{Al} 3:+/-0.15 \%$ of maximum value for analog input AQ1, AQ2: +/- 0.2 \% for analog output |
| Relay Output Number | 3 |
| Relay Output Type | Configurable relay logic R1: fault relay NO/NC electrical durability 100000 cycles Configurable relay logic R2: sequence relay NO electrical durability 100000 cycles Configurable relay logic R3: sequence relay NO electrical durability 100000 cycles |
| Refresh Time | Relay output (R1, R2, R3): 5 ms (+/-0.5 ms) |
| Minimum Switching Current | Relay output R1, R2, R3: 5 mA at 24 V DC |
| Maximum Switching Current | Relay output R1, R2, R3 on resistive load, cos phi $=1: 3 \mathrm{~A}$ at $250 \mathrm{~V} A C$ <br> Relay output R1, R2, R3 on resistive load, cos phi $=1: 3 \mathrm{~A}$ at $30 \mathrm{~V} D$ <br> Relay output R1, R2, R3 on inductive load, cos phi $=0.4$ and $\mathrm{L} / \mathrm{R}=7 \mathrm{~ms}: 2 \mathrm{~A}$ at 250 <br> V AC <br> Relay output R1, R2, R3 on inductive load, cos phi $=0.4$ and $\mathrm{L} / \mathrm{R}=7 \mathrm{~ms}: 2 \mathrm{~A}$ at 30 V DC |
| Isolation | Between power and control terminals |
| Insulation Resistance | > 1 MOhm 500 VDC for 1 minute to earth |
| Environment |  |
| Noise Level | 78 dB conforming to 86/188/EEC |
| Power Dissipation In W | 1745 W (forced convection) at 380 V , switching frequency 2.5 kHz 199 W (natural convection) at 380 V , switching frequency 2.5 kHz |
| Volume Of Cooling Air | $295 \mathrm{~m} 3 / \mathrm{h}$ |
| Operating Position | Vertical $+/-10$ degree |
| 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> $1.2 / 50 \mu \mathrm{~s}-8 / 20 \mu \mathrm{~s}$ 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 |
| Pollution Degree | 2 conforming to IEC 61800-5-1 |


| Vibration Resistance | 1.5 mm peak to peak (f= $2 \ldots 13 \mathrm{~Hz}$ ) conforming to IEC 60068-2-6 <br> $1 \mathrm{gn}(\mathrm{f}=13 \ldots 200 \mathrm{~Hz}$ conforming to IEC 60068-2-6 |
| :--- | :--- |
| Shock Resistance | 15 gn for 11 ms conforming to IEC 60068-2-27 |
| Relative Humidity | $5 \ldots 95 \%$ without condensation conforming to IEC 60068-2-3 |
| Ambient Air Temperature For <br> Operation | $-15 \ldots 45^{\circ} \mathrm{C}$ (without derating) |
| $45 \ldots 60^{\circ} \mathrm{C}$ (with derating factor) |  |

## Sustainability 달en

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Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.
Learn more about Green Premium >
Guide to assess a product's sustainability >


Transparency RoHS/REACh

## Resource performance

Upgradeable Through Digital Modules
And Upgraded Components

## Well-being performance

( Mercury Free
(V) Rohs Exemption Information

Yes

## Certifications \& Standards

| Reach Regulation | REACh Declaration |
| :--- | :--- |
| Eu Rohs Directive | Pro-active compliance (Product out of EU RoHS legal scope) |
| China Rohs Regulation | China RoHS declaration |
| Environmental Disclosure | Product Environmental Profile |
| Weee | The product must be disposed on European Union markets following specific waste <br> collection and never end up in rubbish bins |
| Circularity Profile | End of Life Information |

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Dimensions Drawings

Dimensions

IP20 Drives


Drawings from left to right: rear view, right side view with top cover, right side view without top cover
IP20 Drives With EMC Plate

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Drawings from left to right: rear view, right side view with top cover.

Mounting and Clearance

Clearances


- Mount the device in a vertical position $\left( \pm 10^{\circ}\right)$. This is required for cooling the device.
- Do not mount the device close to heat sources.
- Leave sufficient free space so that the air required for cooling purposes can circulate from the bottom to the top of the drive


## Mounting Types

Mounting Type A: Individual IP21

$\mathbf{a} \geq=110 \mathrm{~mm}$ (4.33 in.)
Mounting Type B: Side by Side IP20 (Possible, 2 Drives Only)


Mounting Type C: Individual IP20

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$a \geq=110 \mathrm{~mm}$ (4.33 in.)

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Connections and Schema

Single or Three-phase Power Supply - Diagram With Line Contactor

(1) Line chokes
(2) See control block wiring diagram

A1 : Drive
KM1 : Line Contactor
Q2, Q3 : Circuit breakers
S1, S2: Pushbuttons
T1 : Transformer for control part

(1) Digital Input
(2) Analog Output
(3) Analog Input

R1A, R1B, R1C : Fault relay output
R2A, R2C : Sequence relay output
R3A, R3C : Sequence relay output

## Sensor Connection

It is possible to connect either 1 or 3 sensors on terminals Al 2 or Al 3 .


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Performance Curves

Derating Curves


In: Nominal Drive Current
SF: Switching Frequency

