2006

MOTION CONTROL

# ARTDriveS - XVy-EV

...life is motion.

English__Italiano

GEFRAN SIEI

## Le massime prestazioni del Motion Control

I servoazionamenti della famiglia ARTDrive S, serie XVy-EV, offrono un elevato contenuto tecnologico nel campo degli azionamenti per applicazioni Motion Control e grazie ad un potente DSP ad elevata banda passante e ad un stadio di potenza altamente affidabile, sono in grado di fornire eccellenti capacità di controllo per una vasta gamma di servomotori brushless e motori asincroni.
XVy-EV implementa come standard funzioni evolute che lo rendono perfetto per la realizzazione delle più avanzate architetture dei moderni servosistemi industriali.
L'integrazione a bordo drive di software applicativi dedicati, ne permette la totale personalizzazione di prodotto per controlli specifici di macchinari complessi in settori quali: plastica, lavorazione lamiera, tessile, legno, marmo e macchine da stampa, nonché nelle più evolute soluzioni di automazione.
Flessibile e potente, XVy-EV offre due modalità di programmazione che permettono un'intuitiva realizzazione, sia di semplici architetture che di sistemi di controllo complessi.

**Modalità BASIC, fornita come standard, implementa funzioni quali:**

- → Controllo di Coppia e/o Velocità
- → Controllo di Posizione (posizionatore standard e multiposizionatore sequenziale)
- → Funzione Albero Elettrico (Electronic Line Shaft)
- → Ingressi/Uscite digitali configurabili
- → Bus interno "Fast Link" a 3.125 Mbit/sec (fino a 16 drive configurabili in modalità slave)
- → Ingresso CANopen (slave)

**Modalità PLC (opzionale)**
Senza alcun HW aggiuntivo, si accede ad un ambiente di programmazione evoluto compatibile con gli standard IEC61131-3, configurabile secondo le più diffuse modalità di linguaggi standard grazie al potente tool di sviluppo MDPLc.

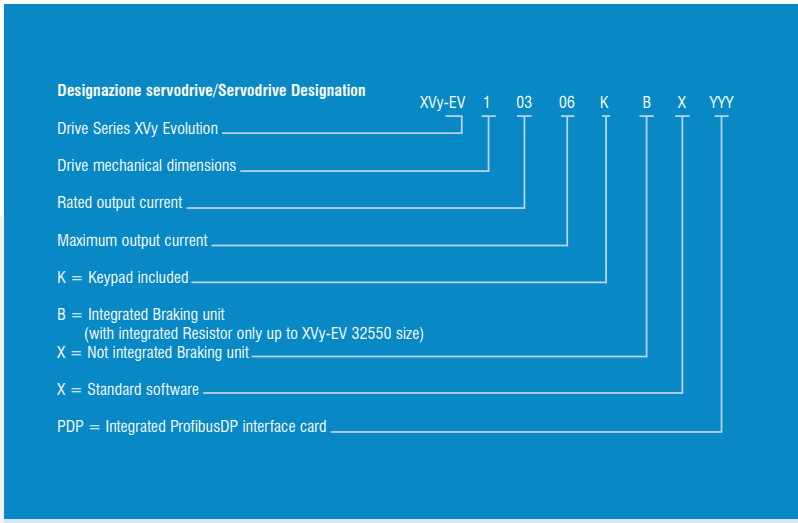
## Maximum Motion Control Performance

As part of the ARTDrive S family, XVy-EV series servodrives offer advanced technology for drives used in Motion Control applications, their high-bandwidth, powerful DSP and highly reliable power stage allows the drives to provide excellent control for a vast range of brushless servomotors and asyncronous motors.
XVy – EV implements next generation functions as a standard, to perfectly meet the most advanced architectures of the most modern industrial servo systems.
The integration in the drive of dedicated application software programs allows for unique customisations, to suit specific controls of complex machineries in sectors such as: working machineries for plastic material, sheet metal, textiles, wood, marble and printing presses, as well as in the most advanced automation solutions.
Flexible and powerful, XVy-EV can offer two programming modes for the intuitive implementation of both simple architectures and complex control systems.

**BASIC mode, supplied as standard, implements functions such as:**

- → Torque and/or Speed control
- → Positioning control (standard positioning device and sequential multi-position controller)
- → Electronic Line Shaft function
- → Programmable digital inputs/outputs
- → Internal "Fast Link" bus at 3.125 Mbit/sec (up to 16 drives configurable in slave mode)
- → CANopen interface (slave)

**PLC mode (optional)**
With no requirement for additional HW, offers access to an advanced programming environment compatible with IEC61131-3 standards, which, thanks to the powerful MDPLc development tool, is configurable in accordance with a wide range of standard languages.




## Una risposta completa al mondo Motion

- → Alimentazione: 3 x 230Vac…480Vac, 50/60Hz
- → Potenze disponibili: da 1,5kW (2Hp) a 315kW (450Hp)
- → Range di correnti [Arms]: da 3A a 560A nominali (da 6A a 800A di picco)
- → Frequenza massima di uscita fino a 450Hz (in funzione della potenza)
- → Unità e Resistenza di frenatura integrati fino alla taglia 15kW (20Hp)
- → Unità di frenatura integrata opzionale fino alla taglia 55kW (60Hp)
- → 2 Ingressi analogici differenziali ±10Vdc (11bit + segno)
- → 2 Uscite analogiche ±10Vdc (11bit + segno)
- → Comandi I/O digitali in logica PNP e/o NPN
- → 8 Ingressi digitali
- → 6 Uscite digitali optoisolate
- → 1 Uscita digitali a relè (NC-NO)
- → 1 Ingresso seriale RS485 (protocollo Modbus RTU)
- → 2 Ingressi per bus interno “Fast Link”
- → 1 interfaccia CANopen (slave)
- → 1 Ingresso encoder / resolver
- → 1 Ingresso encoder ausiliario o ripetizione
- → Retroazioni di velocità selezionabili:
  - Encoder incrementale TTL (+5V) + 3 sensori di Hall
  - Encoder sinusoidale 1Vpp + 2 tracce SinCos oppure 3 sensori di Hall
  - 3 sensori di Hall per segnale di posizione Single-Ended
  - Segnale assoluto con 2 tracce SinCos
  - Encoder sinusoidale 1Vpp oppure incrementale TTL (+5V)
  - Resolver 2 poli
- → Tastiera di programmazione con display alfanumerico (KBXV -EV)
- → Tastiera con memoria file parametri drive
- → Grado di protezione standard IP20 (dissipatore per montaggio in IP54 fino alla taglia 32550).
  Grado di protezione IP00 per le taglie 9470670 e 9560800, disponibile anche sui modelli C e CP.

## A comprehensive offer for the world of Motion Control

- → Power supply: 3 x 230Vac…480Vac, 50/60Hz
- → Motor powers range: from 1.5kW (2Hp) up to 315kW (450Hp)
- → Current ratings [Arms]: from 3A up to 560A nominal (from 6A up to 800A of peak)
- → Maximum output frequency up to 450Hz (according to the drive power)
- → Braking Unit and Resistor integrated up to 15kW (20Hp) drive size
- → Optional integrated Braking Unit up to 55kW (60Hp) drive size
- → 2 Differential analog inputs ±10Vdc (11bit + sign)
- → 2 Analog outputs ±10Vdc (11bit + sign)
- → Digital I/O commands in PNP and/or NPN logic
- → 8 Digital inputs
- → 6 Digital output opto-coupled
- → 1 Digital relay output (NC-NO)
- → 1 RS485 serial input (Modbus RTU protocol)
- → 2 Inputs for internal “Fast Link” bus
- → 1 CANopen interface input (slave)
- → 1 Encoder / resolver input
- → 1 Auxiliary encoder input / repeater
- → Selectable speed feedback :
  - Incremental TTL (+5V) encoder + 3 Hall effect sensors
  - Sinusoidal 1Vpp (+5V) encoder + 2 SinCos trackes or 3 Hall effect sensors
  - 3 Hall effect sensors for positioning Single-Ended signal
  - Absolute signal with 2 SinCos trackes
  - Sinusoidal 1Vpp (+5V) or Incremental TTL (+5V) encoder
  - Two pole Resolver
- → Programming keypad with alphanumeric display (KBXV-EV)
- → Keyboard with memory for the drive parameter file
- → IP20 protection degree standard (external heatsink predisposition for IP54 mounting 32550 size).
  IP00 protection degree for sizes 9470670 and 9560800, available also on C and CP models.

## Uno standard evoluto

- → Doppia modalità di controllo per motori brushless e per motori asincroni
- → Autotaratura del regolatore di corrente
- → 7 Multivelocità programmabili
- → 4 rampe indipendenti programmabili (Acc/Dec e CW/CCW)
- → Ripetizione encoder / encoder ausiliario
- → Funzione Jog
- → Funzione Motopotenziometro
- → Funzione “Speed Draw”
- → Protezione sovraccarico drive mediante algoritmo I x T (per soluzioni ad alta dinamica) ed $I^2T$ (per sovraccarichi standard IEC146)
- → Protezione termica $I^2t$ per motore e resistenza di frenatura
- → Gestione freno di stazionamento motore
- → Funzione “Coast through” e “Power loss stop”
- → Funzione “Helper” via Fast Link
- → Modalità di funzionamento:
  - Coppia e/o Velocità
  - Posizione: posizionatore standard e multiposizionatore sequenziale
  - ELS, Electronic Line Shaft (Albero Elettrico)
- → Controllo motori lineari
- → Gestione Bus di campo: Profibus, CANopen, DeviceNet, Ethernet e Fast Link interno

## An advanced standard

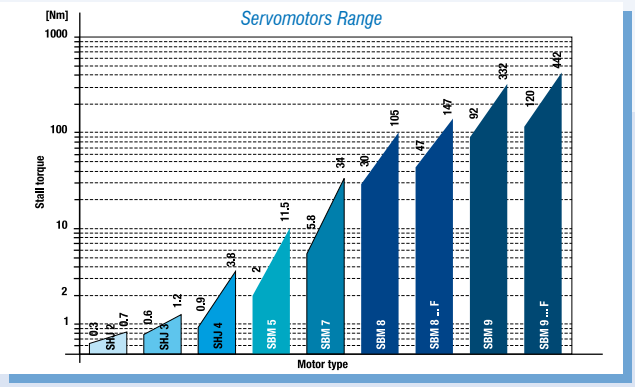
- → Double control for brushless motors and for asyncronous motors
- → Self-tuning of current regulator
- → 7 programmable multispeed
- → 4 independent programmable ramps (Acc/Dec and CW/CCW)
- → Encoder repetition / Auxiliary encoder
- → Jog function
- → Motor potentiometer function
- → “Speed Draw” function
- → Drive overload protection through I x T algorithm (for exceptional performances) and $I^2T$ (for standard overloads IEC146
- → Thermal $I^2t$ protection for motor and braking resistor
- → Motor stationary braking management
- → “Coast through” and “Power loss stop” functions
- → “Helper” function via Fast Link
- → Drive working modes:
  - Torque and/or Speed
  - Position: standard positioning device and sequential multi-position controller
  - ELS, Electronic Line Shaft
- → Linear motors control
- → Field bus management: Profibus, CANopen, DeviceNet, Ethernet and internal Fast Link

## Opzioni

- → Schede di espansione per ripetizione segnali encoder
- → Schede espansione I/O combinabili in funzione delle necessità di macchina
- → Gestione encoder assoluto con protocollo SSI, EnDat 2.2 e Hyperface
- → Interfaccia per bus di campo Profibus-DP e GDNET
- → Kit per comunicazione Fast Link interno
- → Scheda di sicurezza (inibizione lato motore)
- → Tool di sviluppo per Ambiente IEC 61131-3: MDPlc 51.10
- → Chiave di attivazione DeviceNet: CODE DN-XVy
- → SW applicativi normalizzati in modalità PLC

## Options

- → Expansion boards for signal encoder repetition
- → I/O expansion boards useful according to the machine needs
- → Absolute encoder management with SSI, EnDat 2.2 and Hyperface protocols
- → Profibus-DP and GDNET field bus interface
- → Communication kit for internal Fast Link
- → Safety cards (motor side inhibition)
- → Developing tool for IEC 61131-3 standards: MDPlc 51.10
- → Software key enabling for DeviceNet interface: CODE DN-XVy
- → Standardised application SW programs in PLC mode




## Accessori

- → Servomotori brushless serie SHJ e SBM con potenze fino a 442Nm
- → Filtri EMC dedicati (in conformità alla direttiva CEE - EN 61800-3:2004)
- → Induttanze di Ingresso e di Uscita (normalizzate tutta la gamma)
- → Kit per remotaggio tastiera di programmazione
- → Kit linea seriale RS485 per collegamento con PC

## Accessories

- → SHJ and SBM brushless servomotor series with powers up to 442Nm
- → Dedicated EMC filters (in compliance with CEE - EN 61800-3:2004)
- → Input and Output chokes (standardized for the whole line)
- → Remote programming keypad kit
- → RS485 serial line kit for PC connection

## Software di configurazione per PC "E@syDrives"

Il configuratore E@syDrives consente all'utente di configurare e utilizzare i drive della famiglia ARTDriveS tramite PC.

La struttura dei menu suddivisa in pagine HTML offre un semplice interfacciamento, permettendo facili e veloci procedure di messa in servizio, ottimizzazione e diagnostica.

- → comunicazione seriale con il drive mediante protocollo Modbus
- → gestione in rete multidrop fino a 32 unità
- → funzione "wizard" per una messa in servizio intuitiva e completa
- → lettura e scrittura di tutti i parametri / comandi
- → configurazione mediante indice numerico dei parametri
- → lettura dinamica di tutte le variabili di sistema
- → pannello di controllo degli I/O
- → tool di configurazione per "data base motori personalizzato"
- → finestra e buffer degli allarmi (codice, descrizione ed istante)
- → funzione SoftScope: oscilloscopio software con campionamento sincrono a 250$\mu$s
- → salvataggio e gestione files di configurazione
- → aggiornamento del firmware
- → configurazioni on-line ed off-line

## "E@syDrives" PC configuration software

The E@syDrives pc tool, allows the user to configure and control the drives of ARTDriveS family through the PC

Using a simple HTML structure menu, the configurator offers an intuitive interface with the drive as well as fast and easy start-up procedures, optimisation of the system and diagnostics.

- → serial communication via Modbus protocol
- → multidrop configuration up to 32 units
- → "wizard" function, for an intuitive and complete commissioning
- → reading and writing of all the parameters / commands
- → configuration through parameters numeric index
- → complete reading of the system variables
- → I/Os control panel
- → configuration tool for "customised motor database"
- → window and buffer of drive alarms (code, description and time)
- → SoftScope function: digital scope software with syncronous sampling at 250$\mu$s
- → saving and management of drive file configurations
- → drive firmware upgrade
- → on-line and off-line configurations

## MDPlc…Intelligenza integrata in IEC 61131-3

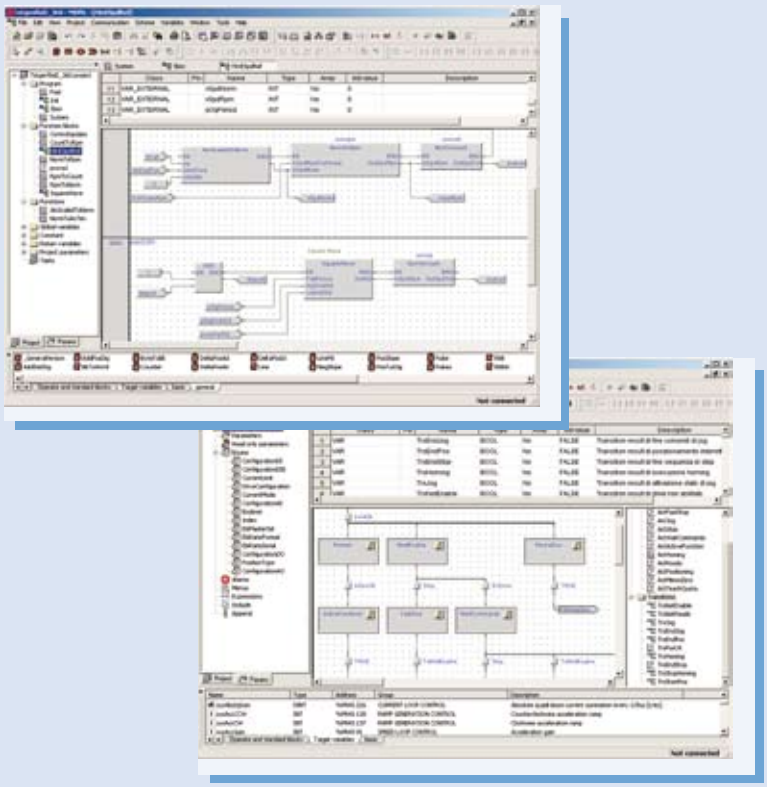
L'ambiente di sviluppo "Motion Drive Programmable Logic Controller", MDPlc, è uno strumento per lo sviluppo di architetture applicative complesse direttamente implementabili sui servoazionamenti ARTDriveS.

MDPlc consente quindi una totale personalizzazione del drive in funzione dei requisiti di sistema, operando in modo intuitivo e flessibile grazie ad una potente interfaccia grafica di programmazione.

Caratteristica fondamentale di MDPlc, è di generare il codice applicativo direttamente in linguaggio macchina, destinato al drive attraverso la compilazione dell'applicativo eseguito tramite linguaggi PLC, tutti conformi allo standard internazionale IEC 61131-3.

- → Instruction List (IL)
- → Structured Text (ST)
- → Ladder Diagram (LD)
- → Function Block Diagram (FBD)
- → Sequential Flow Chart (SFC)

MDPlc oltre a disporre di blocchi funzione composti o predefiniti, consente la generazione di librerie personalizzate con template dedicati.



GDNET™ Gefran Deterministic Network

Modbus

DeviceNet

PROFIBUS

CANopen

Fast Link

## MDPlc…Intelligence integrated in IEC 61131-3 format

The development environment " Motion Drive Programmable Logic Controller", MDPlc, is a tool for the development of high level applications based on the ARTDriveS brushless servodrives.

MDPlc allows a complete personalization of the drives according to the application requirements using a friendly and intuitive mode, thanks to a and powerful graphic programming interface.

The primary feature of MDPlc is ability to create an application code for the drives in assembly language, by compiling the application written in the MDPlc environment with PLC languages in compliance with the IEC 61131-3 international standard.

- → Instruction List (IL)
- → Structured Text (ST)
- → Ladder Diagram (LD)
- → Function Block Diagram (FBD)
- → Sequential Flow Chart (SFC)

For each language the MDPlc environment supplies the user with libraries of basic functions and commands, as defined in the IEC 61131-3 standard.

| Drive Type - XVy-EV | | 10306 | 10408 | 10612 | 20816 | 21020 | 21530 | 32040 | 32550 | 43366 | 43570 | 44590 | 455110 | 570140 | 5100180 | 5S100180 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $U_{LN}$ AC Input voltage *(1)* | Vrms | 230 V -15% ... 480 V +10%, 3Ph | | | | | | | | | | | | | | |
| $F_{LN}$ AC Input frequency | Hz | 50/60 Hz ±5% | | | | | | | | | | | | | | |
| $I_N$ AC Input current for continuous service, IEC 146 class 1: | | | | | | | | | | | | | | | | |
| - Connection with 3-phase choke | | | | | | | | | | | | | | | | |
| @ 230VAC | Arms | 2.9 | 4 | 5.5 | 7.0 | 9.5 | 14 | 18.2 | 25 | 33 | 39 | 55 | 69 | 84 | 98 | 98 |
| @ 400VAC | Arms | 3.3 | 4.5 | 6.2 | 7.9 | 10.7 | 15.8 | 20.4 | 28.2 | 35 | 44 | 62 | 77 | 94 | 110 | 110 |
| @ 460VAC | Arms | 2.9 | 3.9 | 5.4 | 6.5 | 9.3 | 13.8 | 17.8 | 24.5 | 39 | 37 | 53 | 66 | 82 | 96 | 96 |
| - Connection without 3-phase choke | | | | | | | | | | | | | | | | |
| @ 230VAC | Arms | 4.4 | 6.8 | 7.9 | 13.1 | 15.5 | 21.5 | 27.9 | 35.4 | | | | *(2)* | | | |
| @ 400VAC | Arms | 4.8 | 7.4 | 9 | 14.3 | 16.9 | 24.2 | 30.3 | 40 | | | | *(2)* | | | |
| @ 460VAC | Arms | 4.2 | 6.4 | 7.8 | 12.1 | 14.7 | 21 | 26.4 | 34.8 | | | | *(2)* | | | |
| Inverter output power *(3)* | kVA | 2.1 | 3.1 | 4.2 | 5.5 | 7.6 | 10.3 | 14.1 | 20.1 | 22.9 | 27 | 36.7 | 45 | 55.4 | 67.2 | 67.2 |
| $P_N$ Output power for continuous service (recommended motor output), IEC 146 class 1: | | | | | | | | | | | | | | | | |
| @ $U_{LN}$=230VAC; $f_{SW}$=default | kW | 0.75 | 1.1 | 1.5 | 2.2 | 3 | 4 | 5.5 | 7.5 | 9 | 11 | 18.5 | 22 | 22 | 30 | 30 |
| @ $U_{LN}$=400VAC; $f_{SW}$=default | kW | 1.5 | 2.2 | 3 | 4 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 55 |
| @ $U_{LN}$=460VAC; $f_{SW}$=default | Hp | 2 | 3 | 3 | 5 | 7.5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 75 |
| $U_2$ Max output voltage | Vrms | 0.98 x $U_{LN}$ (AC Input voltage) | | | | | | | | | | | | | | |
| $f_2$ Max output frequency | Hz | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 450 | 400 | 400 | 400 |
| Rated output current | | | | | | | | | | | | | | | | |
| 0Hz | Arms | 3 | 4.5 | 6 | 8 | 8.6 | 12 | 16 | 21 | 26 | 31 | 40 | 50 | 63 | 76 | 76 |
| from 3Hz | Arms | 3 | 4.5 | 6 | 8 | 11 | 15 | 20.3 | 29 | 33 | 39 | 53 | 65 | 80 | 97 | 97 |
| Maximum output current *(4)* | Arms | 6 | 9 | 12 | 16 | 22 | 30 | 41 | 58 | 66 | 71 | 97 | 118 | 146 | 177 | 177 |
| Overload duration *(5)* | Sec | 1 | 1 | 1 | 0.9 | 0.9 | 0.5 | 0.9 | 0.9 | 0.9 | 0.9 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| $f_{SW}$ switching frequency (Default) | kHz | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 4 | 4 | 4 |
| $f_{SW}$ switching frequency (Higher) | kHz | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 8 | 8 | 8 |
| Derating factor: | | | | | | | | | | | | | | | | |
| $K_V$ at 460/480VAC | | 0.87 | 0.87 | 0.87 | 0.87 | 0.96 | 0.87 | 0.93 | 0.90 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| $K_T$ for ambient temperature | | 0.8 @ 50°C (122°F) | | | | | | | | | | | | | | |
| $K_F$ for switching frequency | | 0.7 for higher $f_{SW}$ | | | | | | | | | | | | | | |
| Dimensions (width) | mm | 105.5 | 105.5 | 105.5 | 151.5 | 151.5 | 151.5 | 208 | 208 | 309 | 309 | 309 | 309 | 376 | 376 | 309 |
| | [inch] | [4.1] | [4.1] | [4.1] | [5.9] | [5.9] | [5.9] | [8.2] | [8.2] | [12.1] | [12.1] | [12.1] | [12.1] | [14.7] | [14.7] | [12.1] |
| Dimensions (length) | mm | 306.5 | 306.5 | 306.5 | 306.5 | 306.5 | 306.5 | 323 | 323 | 489 | 489 | 489 | 489 | 564 | 564 | 639 |
| | [inch] | [12.0] | [12.0] | [12.0] | [12.0] | [12.0] | [12.0] | [12.7] | [12.7] | [19.2] | [19.2] | [19.2] | [19.2] | [22.2] | [22.2] | [25.2] |
| Dimensions (depth) | mm | 199.5 | 199.5 | 199.5 | 199.5 | 199.5 | 199.5 | 240 | 240 | 268 | 268 | 308 | 308 | 308 | 308 | 328 |
| | [inch] | [7.8] | [7.8] | [7.8] | [7.8] | [7.8] | [7.8] | [12.5] | [12.5] | [10.5] | [10.5] | [12.1] | [12.1] | [12.1] | [12.1] | [12.9] |
| Weight | kg | 3.6 | 3.7 | 3.7 | 4.95 | 4.95 | 4.95 | 8.6 | 8.6 | 18 | 18 | 22 | 22.2 | 34 | 34 | 31.4 |
| | [lbs] | [7.9] | [8.1] | [8.1] | [10.9] | [10.9] | [10.9] | [19] | [19] | [39.6] | [39.6] | [48.5] | [48.9] | [74.9] | [74.9] | [69.2] |

| Drive Type - XVy-EV | | 6125230 | 6S125230 | 7145290 | 7190350 | 7S190350 | 7230420 | 7S230420 | 8280400 | 8350460 | 9470670 | 9470650-C | 9560800 | 9560650-CP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $U_{LN}$ AC Input voltage *(1)* | Vrms | 230 V -15% ... 480 V +10%, 3Ph | | | | | | | 400 V -15% ... 480 V +10%, 3Ph | | | | | |
| $F_{LN}$ AC Input frequency | Hz | 50/60 Hz ±5% | | | | | | | | | | | | |
| $I_N$ AC Input current for continuous service, IEC 146 class 1: | | | | | | | | | | | | | | |
| - Connection with 3-phase choke | | | | | | | | | | | | | | |
| @ 230VAC | Arms | 122 | 122 | 158 | 192 | 192 | 231 | 231 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| @ 400VAC | Arms | 137 | 137 | 177 | 216 | 216 | 242 | 242 | 309 | 362 | *(6)* | 520 *(6)* | *(7)* | 600 *(7)* |
| @ 460VAC | Arms | 120 | 120 | 153 | 188 | 188 | 210 | 210 | 268 | 316 | *(6)* | 468 *(6)* | *(7)* | 540 *(7)* |
| - Connection without 3-phase choke | | *(2)* | | | | | | | | | | | | |
| Inverter output power *(3)* | kVA | 86.6 | 86.6 | 110 | 132 | 132 | 159 | 159 | 194 | 242 | 326 | 326 | 388 | 388 |
| $P_N$ Output power for continuous service (recommended motor output), IEC 146 class 1: | | | | | | | | | | | | | | |
| @ $U_{LN}$=230VAC; $f_{SW}$=default | kW | 37 | 37 | 55 | 55 | 55 | 75 | 75 | 90 | 100 | 125 | 125 | 160 | 160 |
| @ $U_{LN}$=400VAC; $f_{SW}$=default | kW | 75 | 75 | 90 | 110 | 110 | 132 | 132 | 160 | 200 | 250 | 250 | 315 | 315 |
| @ $U_{LN}$=460VAC; $f_{SW}$=default | Hp | 100 | 100 | 125 | 150 | 150 | 175 | 175 | 200 | 250 | 300 | 300 | 350 | 350 |
| $U_2$ Max output voltage | Vrms | 0.98 x $U_{LN}$ (AC Input voltage) | | | | | | | | | | | | |
| $f_2$ Max output frequency | Hz | 400 | 400 | 400 | 400 | 200 | 400 | 200 | 400 | 400 | 200 | 200 | 200 | 200 |
| Rated output current **(3)** | | | | | | | | | | | | | | |
| 0Hz | Arms | 99 | 99 | 127 | 156 | 156 | 170 | 170 | 250 | 250 | 420 | 420 | 500 | 500 |
| from 3Hz | Arms | 125 | 125 | 159 | 190 | 190 | 230 | 230 | 280 | 350 | 470 | 470 | 560 | 560 |
| Maximum output current *(4)* | Arms | 228 | 228 | 290 | 347 | 347 | 420 | 420 | 400 | 400 | 670 | 560 | 800 | 560 |
| Overload duration *(5)* | Sec | 1 | 1 | 1 | 1 | 0.5 | 1 | 0.5 | 1 | 1 | 1 | 1 | 1 | 1 |
| $f_{SW}$ switching frequency (Default) | kHz | 4 | 4 | 4 | 4 | 2 | 4 | 2 | 4 | 4 | 4 | 2 | 2 | 2 |
| $f_{SW}$ switching frequency (Higher) | kHz | 8 | 8 | 8 | 8 | 2 | 8 | 2 | 4 | 4 | 4 | 2 | 2 | 2 |
| Derating factor: | | | | | | | | | | | | | | |
| $K_V$ at 460/480VAC | | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.97 | 0.97 |
| $K_T$ for ambient temperature | | 0.8 @ 50°C (122°F) | | | | | | | | | | | | |
| $K_F$ for switching frequency | | 0.7 for higher $f_{SW}$ | | | | | | | | | | | | |
| Dimensions (width) | mm | 509 | 309 | 509 | 509 | 309 | 509 | 309 | 509 | 509 | 726.5 | 776 | 726.5 | 776 |
| | [inch] | [20] | [12.1] | [20] | [20] | [12.1] | [20] | [12.1] | [20] | [20] | [28.55] | [30.6] | [28.55] | [30.6] |
| Dimensions [length] | mm | 741 | 789 | 909 | 909 | 789 | 909 | 789 | 965 | 965 | 1443 | 1091 | 1443 | 1091 |
| | [inch] | [29.2] | [31] | [35.8] | [35.8] | [31] | [35.8] | [31] | [38] | [38] | [56.71] | [43] | [56.71] | [43] |
| Dimensions [depth] | mm | 297.5 | 378 | 297.5 | 297.5 | 378 | 297.5 | 378 | 442 | 442 | 481 | 450 | 481 | 450 |
| | [inch] | [11.7] | [14.9] | [11.7] | [11.7] | [14.9] | [11.7] | [14.9] | [17.4] | [17.4] | [18.9] | [17.7] | [18.9] | [17.7] |
| Weight | kg | 59 | 36.2 | 75.4 | 80.2 | 42.2 | 86.5 | - | 109 | 109 | 193 | 155 | 193 | 155 |
| | [lbs] | [130] | [79.8] | [166.1] | [176.7] | [93] | [190.6] | [-] | [240.3] | [240.3] | [425.3] | [341.7] | [425.3] | [341.7] |

***(1)*** *For DC versions: rectified voltage supply up to 700 VDC*
***(2)*** *For these types an external inductance is mandatory.*
***(3)*** *Continuous at 400 V.*
***(4)*** *Overload at 400 V and with a default switching frequency.*
***(5)*** *Minimum achievable overload duration, which increases automatically for temperature less than 20°C (Tsink <45°C).*
***(6)*** *550ADC @ 600VDC for XVy-EV ...-DC version*
***(7)*** *650ADC @ 600VDC for XVy-EV ...-DC version*

**Note:** The XVy-EV drive manages two different overload algorithms according to the application:

- IxT algorithm dedicated to high-dynamics solutions where the overload can reach up to 200% of the rated current **(values shown in this table, default setting)**
- $I^2xT$ algorithm dedicated to applications where a limited overload is required for a longer period of time (limit = 136% In Class 1 for 60s every 300s).

Please refer to the user guide for more details.

### Environmental Condition

| | |
|---|---|
| **Enclosures** | IP20.<br>IP00 for sizes 9470670 and 9560800, available also on C and CP models |
| **Ambient temperature** | 0 ...40°C, +40°C…+50°C with derating |
| **Altitude** | Max 2000 m. (up to 1000 m without current limitation) |

### Normative and marks

| | |
|---|---|
| **CE** | in compliance with CEE directives, for low voltage devices. |
| **UL, cUL** | in compliance with American and Canadian market directives. |
| **EMC** | in compliance with CEE - EN 61800-3:2004 electromagnetic compatibility directive, using optional filters. |

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Rev. 0.0 - 14-9-2006
1S9I85