

2009

MOTION CONTROL

SIEDrive XVy-EV



...life is motion.

English__Italiano

GEFRAN

Le massime prestazioni del Motion Control

I servoazionamenti della famiglia SIEIDrive, 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 SIEIDrive 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 asynchronous 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.



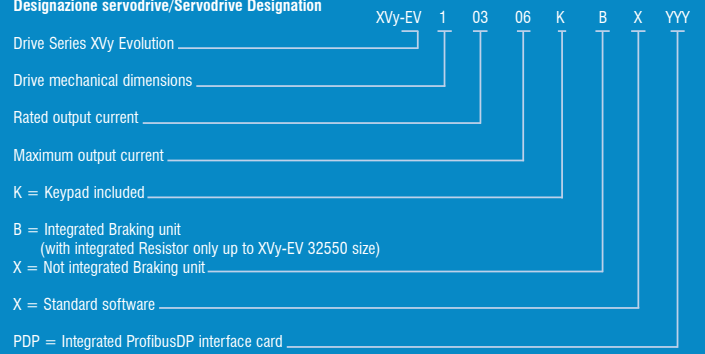
Una risposta completa al mondo Motion

- 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 $\pm 10Vdc$ (11bit + segno)
- 2 Uscite analogiche $\pm 10Vdc$ (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 $\pm 10Vdc$ (11bit + sign)
- 2 Analog outputs $\pm 10Vdc$ (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 tracks or 3 Hall effect sensors
 - 3 Hall effect sensors for positioning Single-Ended signal
 - Absolute signal with 2 SinCos tracks
 - 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.

Designazione servodrive/Servodrive Designation

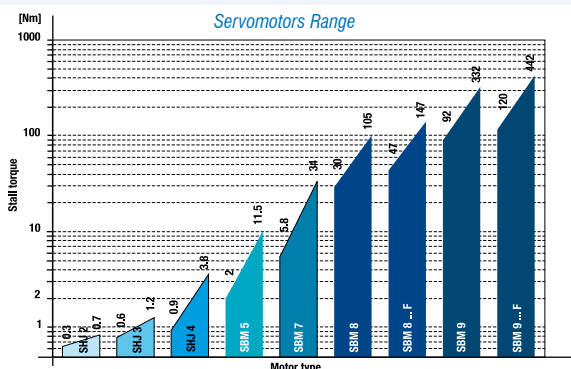


Uno standard evoluto

- 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 I²T (per sovraccarichi standard IEC146)
- Protezione termica I²t 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: posizionario standard e multiposizionario sequenziale
 - ELS, Electronic Line Shaft (Albero Elettrico)
- Controllo motori lineari
- Gestione Bus di campo: Profibus, CANopen, DeviceNet, Ethernet e Fast Link interno

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: MDPIc 51.10
- Chiave di attivazione DeviceNet: CODE DN-XVy
- SW applicativi normalizzati in modalità PLC



An advanced standard

- Double control for brushless motors and for asynchronous 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 I²T (for standard overloads IEC146)
- Thermal I²t 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

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: MDPIc 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

Software di configurazione per PC “E@syDrives”

Il configuratore E@syDrives consente all'utente di configurare e utilizzare i drive della famiglia SIEIDrive 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 μ s
- salvataggio e gestione files di configurazione
- aggiornamento del firmware
- configurazioni on-line ed off-line

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

“E@syDrives” PC configuration software

The E@syDrives pc tool, allows the user to configure and control the drives of SIEIDrive 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 synchronous sampling at 250 μ s
- saving and management of drive file configurations
- drive firmware upgrade
- on-line and off-line configurations

MDPlc...Intelligenza integrata in IEC 61131-3

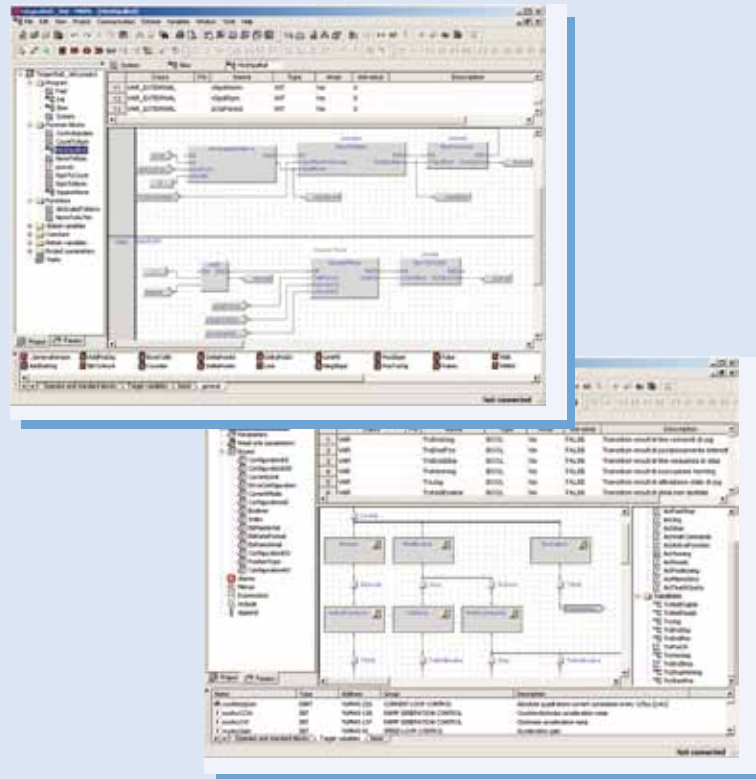
L'ambiente di sviluppo "Motion Drive Programmable Logic Controller", MDPlc, è uno strumento per lo sviluppo di architetture applicative complesse direttamente implementabili sui servozionamenti XVy-EV.

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.



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 XVy-EV 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.

GDNETTM
Gefran Deterministic Network

Modbus

DeviceNet

PROFIBUS

CANopen

Fast Link

Drive Type - XVy-EV		10306	10408	10612	20816	21020	21530	32040	32550	43366	43570	44590	455110	570140	5100180	55100180
U _{LN} AC Input voltage (1)	Vrms	230 V -15% ... 480 V +10%, 3Ph														
FLN AC Input frequency	Hz	50/60 Hz ±5%														
In AC Input current for continuous service, IEC 146 class 1:																
- Connection with 3-phase choke																
@ 230V _{AC}	Arms	2.9	4	5.5	7.0	9.5	14	18.2	25	33	39	55	69	84	98	98
@ 400V _{AC}	Arms	3.3	4.5	6.2	7.9	10.7	15.8	20.4	28.2	35	44	62	77	94	110	110
@ 460V _{AC}	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																
@ 230V _{AC}	Arms	4.4	6.8	7.9	13.1	15.5	21.5	27.9	35.4	(2)						
@ 400V _{AC}	Arms	4.8	7.4	9	14.3	16.9	24.2	30.3	40	(2)						
@ 460V _{AC}	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
PN Output power for continuous service (recommended motor output), IEC 146 class 1:																
@ U _{LN} =230V _{AC} ; 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} =400V _{AC} ; 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} =460V _{AC} ; 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	0.5	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	8	4	4
f _{sw} switching frequency (Higher)	kHz	16	16	16	16	16	16	16	16	16	16	16	16	16	8	8
Derating factor:																
K _v at 460/480V _{AC}		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			
FLN AC Input frequency	Hz	50/60 Hz ±5%													
In AC Input current for continuous service, IEC 146 class 1:															
- Connection with 3-phase choke															
@ 230V _{AC}	Arms	122	122	158	192	192	231	231	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
@ 400V _{AC}	Arms	137	137	177	216	216	242	242	309	362	(6)	520 (6)	(7)	600 (7)	
@ 460V _{AC}	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	
PN Output power for continuous service (recommended motor output), IEC 146 class 1:															
@ U _{LN} =230V _{AC} ; f _{sw} =default	kW	37	37	55	55	55	75	75	90	100	125	125	160	160	
@ U _{LN} =400V _{AC} ; f _{sw} =default	kW	75	75	90	110	110	132	132	160	200	250	250	315	315	
@ U _{LN} =460V _{AC} ; 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 460/480V _{AC}		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 V_{dc}
- (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 (T_{sink} < 45°C).
- (6) 550A_{DC} @ 600V_{DC} for XVy-EV ...-DC version
- (7) 650A_{DC} @ 600V_{DC} 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)
- I²T 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. 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. 0.2 - 5-6-2009



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