

2. INSPECTION PROCEDURES, COMPONENTS IDENTIFICATION AND STANDARD SPECIFICATIONS

2.1. DELIVERY INSPECTION PROCEDURES

2.1.1. General

A high degree of care is taken in packing the Flexmax Drives and preparing them for delivery. They should only be transported with suitable transport equipment (see weight data). Observe the instructions printed on the packaging. This also applies when the device is unpacked and installed in the control cabinet.

Upon delivery, check the following:

- the packaging for any external damage
- whether the delivery note matches your order.

Open the packaging with suitable tools. Check whether:

- any parts were damaged during transport
- the device type corresponds to your order

In the event of any damage or of an incomplete or incorrect delivery please notify the responsible sales offices immediately.

The devices should only be stored in dry rooms within the specified temperature ranges .

Note!

A certain degree of moisture condensation is permissible if this arises from changes in temperature (see section 2.3.1, “Permissible Environmental Conditions”). This does not, however, apply when the devices are in operation. Always ensure that there is no moisture condensation in devices that are connected to the power supply!

2.1.2. Drive type designation




The main technical characteristic of the Flexmax Drive are showed in the product code and in the nameplate.



2.1.3. Nameplate

Check that all the data stated in the nameplate enclosed to the drive correspond to what has been ordered.

Figure 2.1.3.1: Identification nameplate

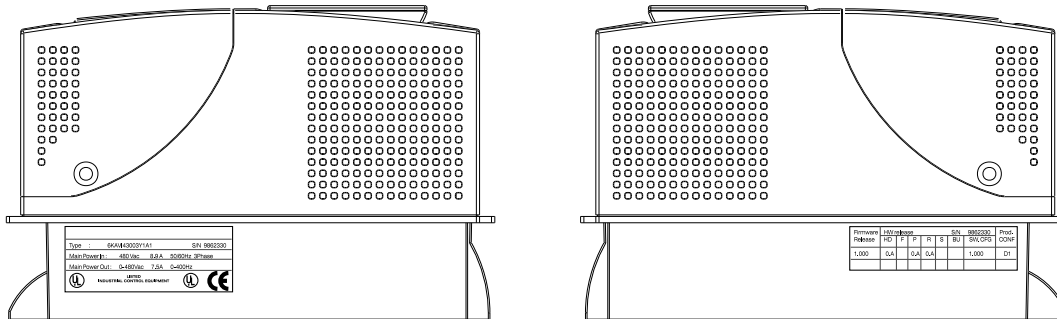
POWERTEC	
Type : XVy 7-14	S/N 9862330
Main Power In :	480 Vac 8.9 A 50/60Hz 3Phase
Main Power Out :	0-480Vac 7.5A 0-400Hz
	LISTED INDUSTRIAL CONTROL EQUIPMENT  

Type: Drive model S/N: Serial number
 Main Power In: Power supply voltage - AC Input current - Frequency
 Main Power Out: Output voltage - Output current - Output frequency

Figure 2.1.3.2: Firmware & Card revision level nameplate

Firmware Release	HW release					S/N BU	S/N 9862330 SW. CFG	Prod. CONF
	D	F	P	R	S			
1.100	0.A	0.A	0.A				1.100	D1

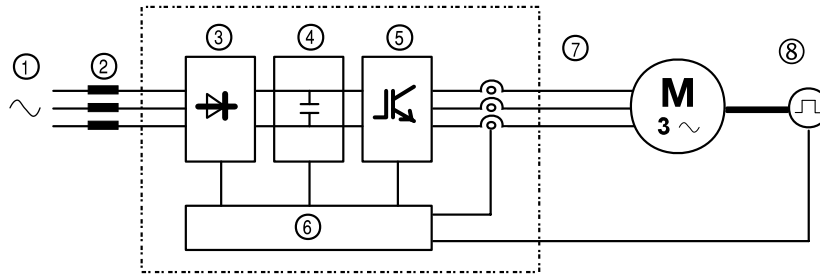
Figure 2.1.3.3: Nameplates position



2.2. COMPONENT IDENTIFICATION

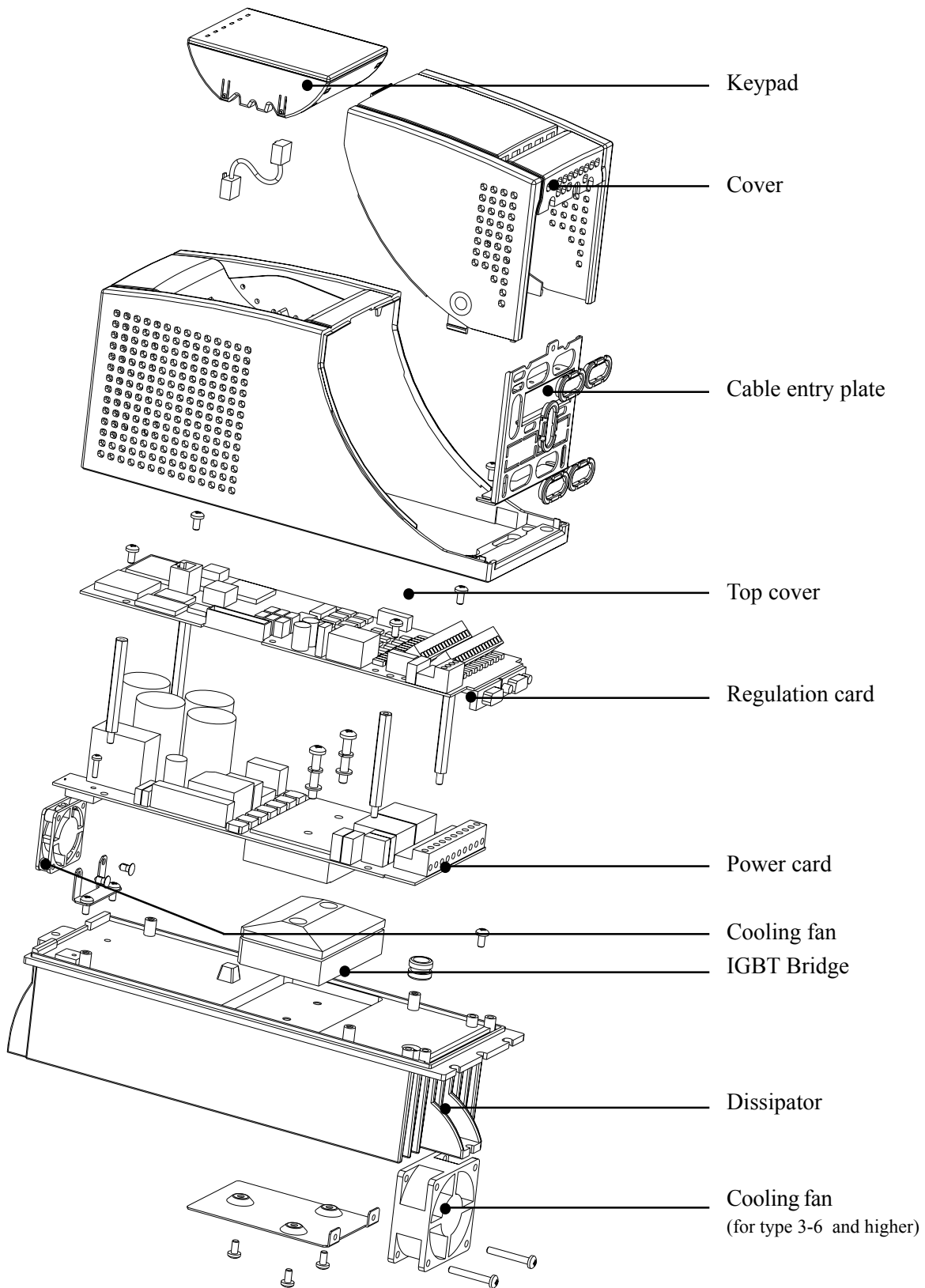
A Flexmax Drive converts the constant voltage and frequency of a three-phase power supply into a direct voltage and then converts this direct voltage into a new three-phase power supply with a variable voltage and frequency. This variable three-phase power supply can be used for infinitely variable adjustment of the speed of brushless servomotors.

Figure 2.2.1: Basic Setup of Flexmax Drive



- | | |
|--------------------------------|---|
| 1 AC Input supply voltage | |
| 2 AC Mains choke | (see section 4.7.1) |
| 3 Three-phase rectifier bridge | Converts the alternating current into direct current using a three phase full wave bridge. |
| 4 DC intermediate circuit | With charging resistor and smoothing capacitor.
Direct voltage (U_{DC}) = $\sqrt{2}$ x Mains voltage (U_{LN}) |
| 5 IGBT inverter | Converts direct voltage to a variable three-phase alternating voltage with variable frequency. |
| 6 Configurable control section | Modules for open-loop and closed-loop control of the power section. This is used for processing control commands, reference values and actual values. |
| 7 Output voltage: | Three-phase, variable alternating voltage. |
| 8 Feedback | For speed feedback (see section 3.4.2). |

Figure 2.2.2: Drive view & components



2.3. STANDARD SPECIFICATIONS

2.3.1. Permissible environmental conditions

Table 2.3.1.1: Environmental specification

E N V I R O N M E N T	T _A Ambient temperature	[°C]	0 ... + 40; + 40...+ 50 with derating	
		[°F]	32 ... + 104; + 104...+ 122 with derating	
	Installation location	Pollution degree 2 or better (free from direct sunlight, vibration, dust, corrosive or inflammable gases, fog, vapour oil and dripped water, avoid saline environment)		
	Degree of protection	IP20 (NEMA 1)		
		IP54 (NEMA 12) for the cabinet with externally mounted heatsink (size type 3 to 30)		
	Installation altitude	Up to 1000 m above sea level; for higher altitudes a current reduction of 1.2% for every 100 m of additional height applies .		
	Temperature:	operation ¹⁾	0...40°C (32°...104°F)	
		operation ²⁾	0...50°C (32°...122°F)	
		storage	-25...+ 55°C (-13...+ 131°F), class 1K4 per EN50178	
			-20...+ 55°C (-4...+ 131°F), for devices with keypad	
		transport	-25...+ 70°C (-13...+ 158°F), class 2K3 per EN50178	
			-20...+ 60°C (-4...+ 140°F), for devices with keypad	
	Air humidity:	operation	5 % to 85 %, 1 g/m ³ to 25 g/m ³ without moisture condensation or icing (Class 3K3 as per EN50178)	
		storage	5% to 95 %, 1 g/m ³ to 29 g/m ³ (Class 1K3 as per EN50178)	
		transport	95 % ³⁾ 60 g/m ⁴⁾	
			A light condensation of moisture may occur for a short time occasionally if the device is not in operation (class 2K3 as per EN50178)	
Air pressure:	operation	[kPa]	86 to 106 (class 3K3 as per EN50178)	
		[kPa]	86 to 106 (class 1K4 as per EN50178)	
	storage	[kPa]	86 to 106 (class 1K4 as per EN50178)	
		[kPa]	70 to 106 (class 2K3 as per EN50178)	
S T A N D A R D	Climatic conditions	IEC 68-2 Part 2 and 3		
	Clearance and creepage	EN 50178, UL508C, UL840 degree of pollution 2		
	Vibration	IEC68-2 Part 6		
	EMC compatibility	EN61800-3 (see "EMC Guidelines" instruction book)		
	Approvals	CE, UL, cUL		

avy:2000

- ¹⁾ Parameter **Ambient temp** = 40°C (104°)
 Ambient temp = 0 ... 40°C (32°...104°F)
 Over 40°C: - current reduction of 2% of rated output current per K
 - remove front plate (better than class 3K3 as per EN50178)
- ²⁾ Parameter **Ambient temp** = 50°C (122°F)
 Ambient temp = 0 ... 50°C (32°...122°F)
 Current derated to 0.8 rated output current
 Over 40°C (104°): removal of the top cover (better than class 3K3 as per EN50178)
- ³⁾ Greatest relative air humidity occurs with the temperature @ 40°C (104°F) or if the temperature of the device is brought suddenly from -25 ...+30°C (-13°...+86°F).
- ⁴⁾ Greatest absolute air humidity if the device is brought suddenly from 70...15°C (158°...59°F).

Disposal of the Device

The Flexmax Drive can be disposed as electronic scrap in accordance with the currently valid national regulations for the disposal of electronic parts.

The plastic covers of the Drives (up to size PX-30) are recyclable: the material used is >ABS+PC< .

2.3.2. AC Input/Output Connection

The Flexmax Drive must be connected to an AC mains supply capable of delivering a symmetrical short circuit current (at 480V +10% Vmax) lower or equal to the values indicated on following table. For the use of an AC input choke see chapter 4.7.1.

No external connection of the regulator power supply to the existing AC Input supply is required since the power supply is taken from the DC Link circuit. When commissioning, set the **Mains voltage** parameter to the value of the AC Input voltage concerned. This automatically sets the threshold for the Undervoltage alarm at the appropriate level. All Flexmax drives are capable of operation at 480 vac, therefore cannot be damaged by connection to lower voltages down to 208. After connection, simply select in the menu the proper line voltage under “Drive Parameters”

Note! In some cases AC Input chokes, and possibly noise suppression filters should be fitted on the AC Input side of the device. See chapter “Chokes/Filters”.

Adjustable Frequency Drives and AC Input filters have ground discharge currents greater than 3.5 mA. EN 50178 specifies that with discharge currents greater than 3.5 mA the protective conductor ground connection (PE1) must be fixed type.

Table 2.3.2.1: AC Input/Output specifications

Type PX-		3	5	7	10	15	20	30	40	55	70	80	100	125	160	190	230	300			
U_2 Max output voltage	[V]	0.92 x U_{LN} (AC Input voltage)																			
f_2 Max output frequency	[Hz]	450									400										
I_{2N} Rated output current :																					
@ U_{LN} =460Vac; f_{SW} =default (continuous)	[A]	2.6	3.8	5.0	9.5	13	19	26	34	46	57	70	85	116	140	170	200	247			
f_{SW} switching frequency (Default)	[kHz]	8									4										
f_{SW} switching frequency (Higher)	[kHz]	16						16			8						--				
lovid for 1 minute 150% (at 460 vac)	[A]	3.9	5.7	7.5	14.3	19.5	28.5	39.0	51.0	69.0	85.5	105.0	127.5	174.0	210.0	255.0	300.0	370.5			
@ U_{LN} =200 to 400Vac; f_{SW} =default (contin)	[A]	3	4.4	5.9	10.9	14.8	21.8	29.7	39	53	66	80	98	133	160	196	235	284			
Derating factors:																					
K_T for ambient temperature		0.8 @ 50°C (122°F)																			
K_F for switching frequency		0.7 for higher f_{SW}																			
No Line Inductor Derate		No derate but recommended									Derate to 0.7 of nominal continuous for no inductor										
U_{LN} AC Input voltage	[V]	230 V -15% ... 480 V +10%, 3Ph																			
AC Input frequency	[Hz]	50/60 Hz ±5%																			
I_N AC Input current for continuous service :																					
- Connection with 3-phase reactor																					
@ 230Vac	[A]	2.9	4	5.5	9.5	14	18.2	25	39	55	69	84	98	122	158	192	220	n.a.			
@ 400Vac	[A]	3.3	4.5	6.2	10.7	15.8	20.4	28.2	44	62	77	94	110	137	177	216	247	309			
@ 460Vac	[A]	2.9	3.9	5.4	9.3	13.8	17.8	24.5	37	53	66	82	96	120	153	188	214	268			
- Connection without 3-phase reactor																					
@ 230Vac	[A]	4.4	6.8	7.9	15.5	21.5	27.9	35.4	For these types an external inductance is needed. Use without an inductor requires derating (see derate above) and will result in short capacitor life.												
@ 400Vac	[A]	4.8	7.4	9	16.9	24.2	30.3	40	Testing for short periods without inductor is acceptable.												
@ 460Vac	[A]	4.2	6.4	7.8	14.7	21	26.4	34.8													
Max short circuit power without line reactor (Z_m in=1%)	[kVA]	270	380	500	850	1200	1700	2250	3200	4200	5500	6400	7900	9800	12800	14500	17300	22400			
Overvoltage threshold	[V]	820 V_{DC}																			
Undervoltage threshold	[V]	230 V_{DC} (for 230 V_{AC} mains), 400 V_{DC} (for 400 V_{AC} mains), 460 V_{DC} for 460 V_{AC} mains)																			
Braking IGBT Unit (standard drive)		Standard internal (with external resistor); Braking									Option internal (with external			External braking unit (optional)							

