

### 3. INSTALLATION GUIDELINES

#### 3.1. MECHANICAL SPECIFICATION

Figure 3.1.1: Drive dimensions (sizes 3 ... 30)

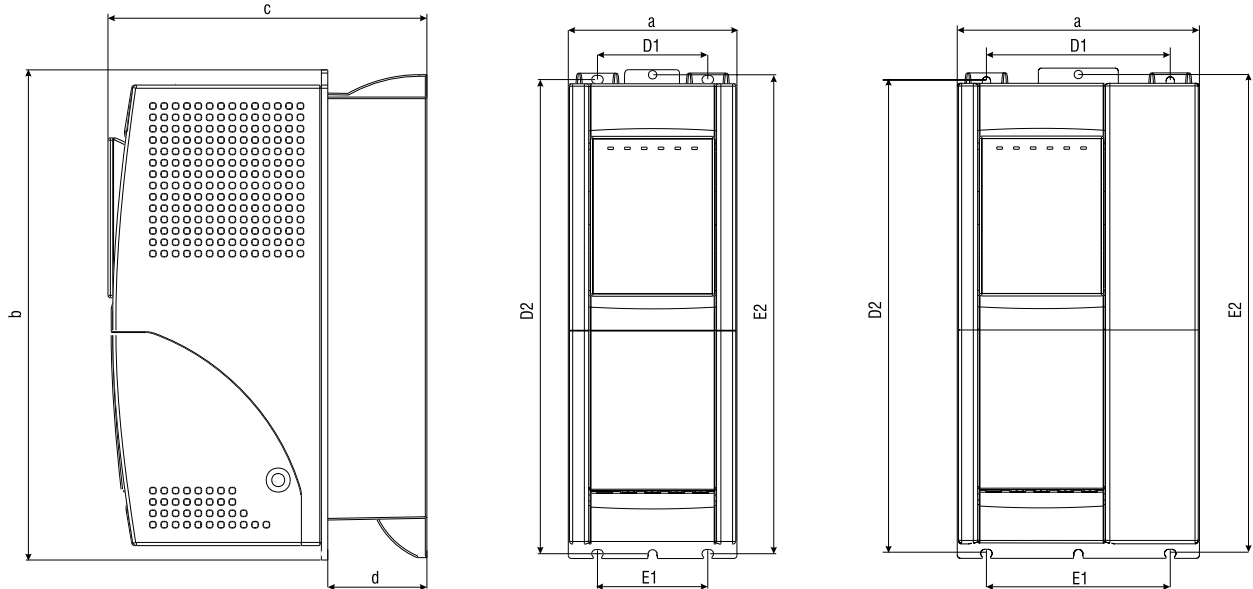


Figure 3.1.2: Mounting methods (sizes 3 ... 30)

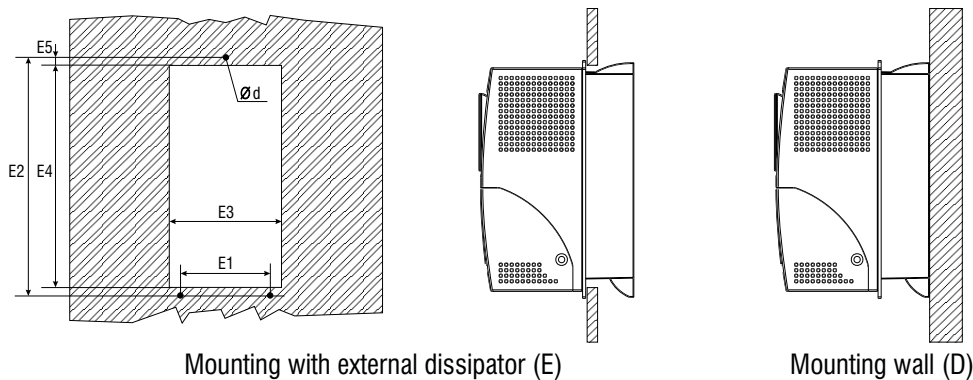


Table 3.1.1: Drive dimensions and Weights (sizes 3 ... 30)

Type		3	5	7	10	15	20	30	
<b>Drive dimensions:</b>									
a	mm (inch)	105.5 (4.1)			151.5 (5.9)		208 (8.2)		
b	mm (inch)	306.5 (12.0)						323 (12.7)	
c	mm (inch)	199.5 (7.8)						240 (9.5)	
d	mm (inch)	62 (2.4)						84 (3.3)	
D1	mm (inch)	69 (2.7)			115 (4.5)		168 (6.6)		
D2	mm (inch)	296.5 (11.6)						310.5 (12.2)	
E1	mm (inch)	69 (2.7)			115 (4.5)		164 (6.5)		
E2	mm (inch)	299.5 (11.7)						315 (12.4)	
E3	mm (inch)	99.5 (3.9)			145.5 (5.7)		199 (7.8)		
E4	mm (inch)	284 (11.2)						299.5 (11.8)	
E5	mm (inch)	9 (0.35)							
Ø d		M5							
<b>Weight</b>	kg (lbs)	3.6 (7.9)	3.7 (8.1)	4.95 (10.9)		8.6 (19)			

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Figure 3.1.3: Drive dimensions (sizes 40-... 300)

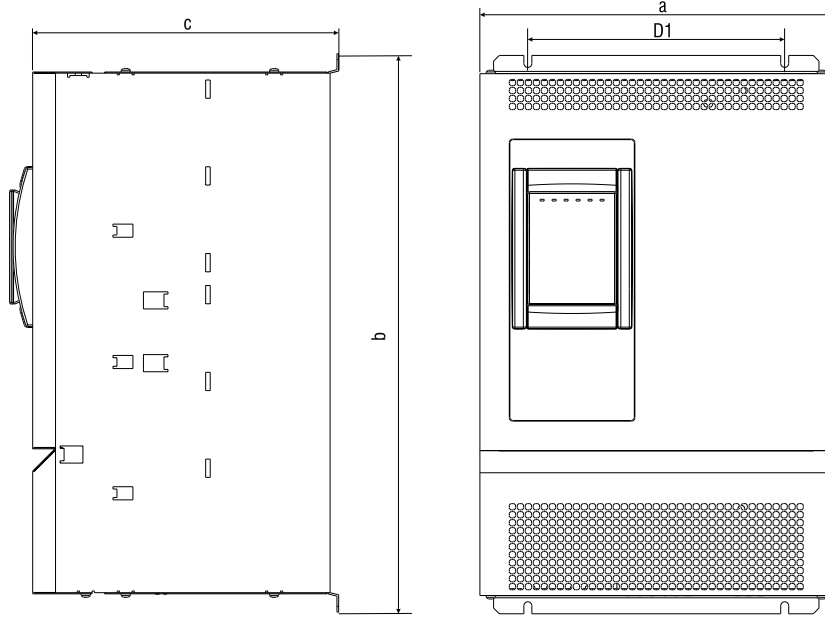


Figure 3.1.4: Mounting methods (sizes 40 ... 300)

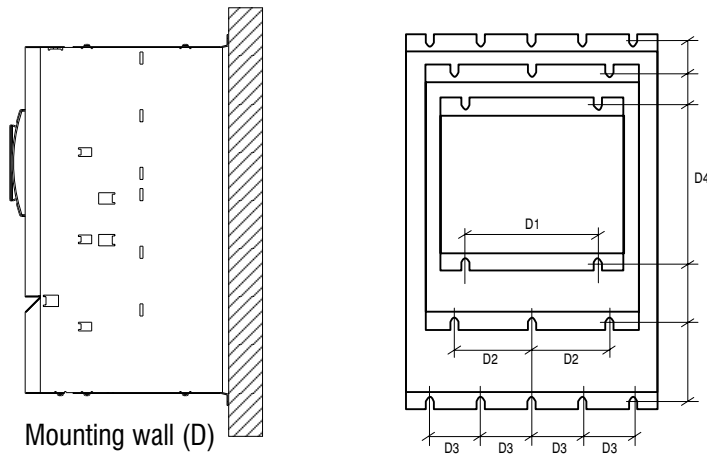
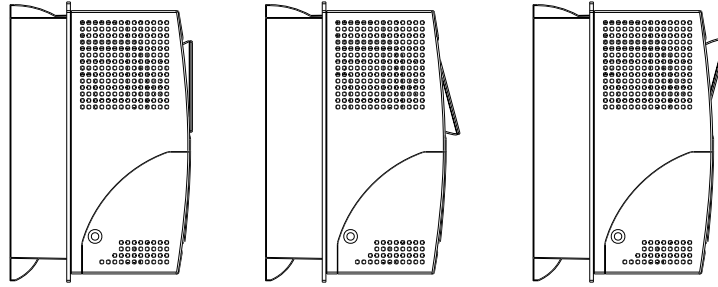


Table 3.1.2: Drive dimensions and Weights (sizes 40 ... 300)

Type		40	55	70	80	100	125	160	190	230	300		
<b>Drive dimensions:</b>													
a	mm (inch)	309 (12.1)			376 (14.7)		509 (20)						
b	mm (inch)	489 (18.2)			564 (22.2)		741 (29.2)	909 (35.8)			965 (38)		
c	mm (inch)	268 (10.5)	308 (12.1)				297.5 (11.7)			442 (17.4)			
D1	mm (inch)	225 (8.8)											
D2	mm (inch)				150 (5.9)								
D3	mm (inch)						100 (3.9)						
D4	mm (inch)	475 (18.7)			550 (21.6)		725 (28.5)	891 (35)		947 (37.3)			
Ø		M6											
Weight	kg	18	22	22.2	34	34	59	75.4	80.2	86.5	109		
	lbs	39.6	48.5	48.9	74.9	74.9	130	166.1	176.7	190.6	240.3		

Figure 3.1.5: Keypad positioning



To allow a comfortable viewing angle, the keypad can be oriented on three different positions.

### 3.2. WATTS LOSS, HEAT DISSIPATION, INTERNAL FANS AND MINIMUM CABINET OPENING SUGGESTED FOR THE COOLING

The heat dissipation of the Drives depends on the operating state of the connected motor. The table below shows values that refer to operation at default switching frequency (see section 2.3.2, “AC Input/Output Connection”), Tamb <40°C, typ. motor power factor and nominal continuous current.

Table 3.2.1: Heat dissipation and Required Air Flow

Type	3	5	7	10	15	20	30	40	55	70	80	100	125	160	190	230	300	
<b>P<sub>V</sub> Heat dissipation:</b>																		
@U <sub>LN</sub> =400Vac <sup>1)</sup>	[W]	77.5	104.0	138.3	233.6	327.4	373	512	658	864	1100	1250	1580	1950	2440	2850	3400	4400
@U <sub>LN</sub> =460Vac <sup>1)</sup>	[W]	72.0	96.3	126.7	215.6	300.8	340	468	582	780	1000	1100	1390	1750	2200	2560	3050	3950
<sup>1)</sup> f <sub>sw</sub> =default; I <sub>2</sub> =I <sub>2N</sub>																		
<b>Airflow of fan:</b>																		
Internal fan	[m <sup>3</sup> /h]	11	11	11	11	11	30	30										
Heatsink fans	[m <sup>3</sup> /h]	30	30	30	2x30	2x30	2x79	2x79	80	170	340	650	975	1820				

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**NOTE!** ALL THE DRIVES HAVE INTERNAL FANS.

**NOTE!** HEAT DISSIPATION LOSSES REFER TO DEFAULT SWITCHING FREQUENCY

Table 3.2.2: Minimum cabinet opening suggested for the cooling

Type	3	5	7	10	15	20	30	40	55	70	80	100	125	160	190	230	300	
<b>Minimum cooling opening:</b>																		
Control section cm <sup>2</sup> (sq.inch)	31 (4.8)			36 (5.6)			2x150 (2x 23.5)		2x200 (2x31)		2x370 (2x57.35)		2x620 (2x96.1)			2 x 1600 (2 x 248)		
Heatsink cm <sup>2</sup> (sq.inch)	36 (5.6)		72 (11.1)		128 (19.8)													

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### 3.2.1 Cooling fans power supply

Sizes 3 to 100

Power supply (+24VAC) for these fans are provided from the internal drive power supply unit.

Sizes 125 to 300

Power supply for these fans is externally connected by the user. AC Input voltage is connected at the power terminal strip:

- PX-125: 0.8A@115V/60Hz, 0.45A@230V / 50Hz
- PX-160 ... PX-230: 1.2A@115V/60Hz, 0.65A@230V / 50Hz
- PX-300: 1.65A@115V/60Hz, 0.70A@230V / 50Hz

Figure 3.2.1: UL type fans connections on PX-160, PX-190 and PX-230 sizes

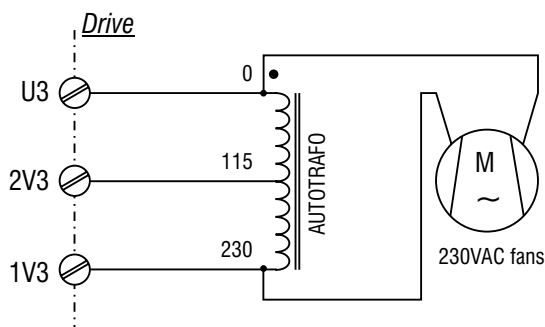


Figure 3.2.2: UL type fans connections on PX-125 and PX-300 sizes

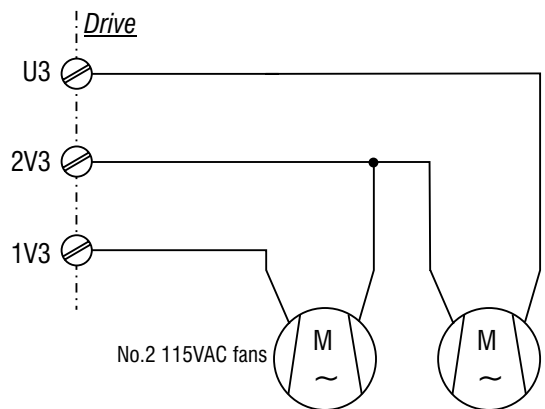
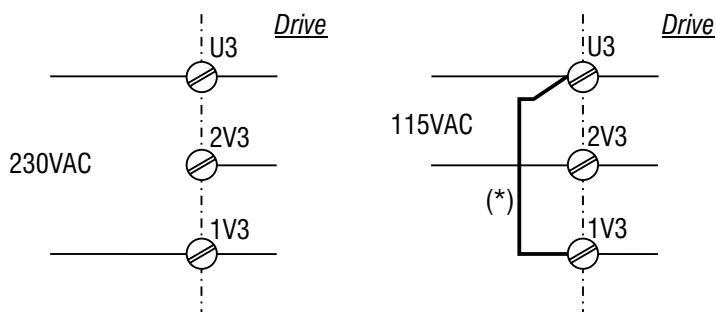


Figure 3.2.3: Example for external connection



(\*) Only for PX-125 and PX-300 drives

**NOTE!**

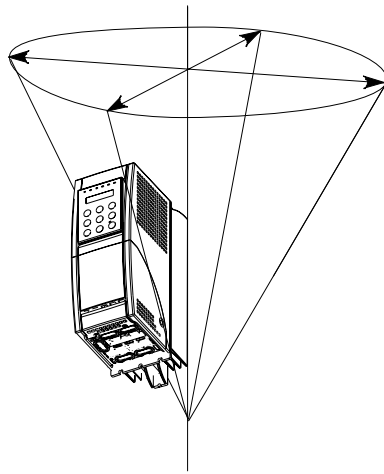
An internal fuse (2.5A 250VAC slo-blo) for PX-160, PX-190 and PX-230 sizes is provided. On PX-125 and PX-300 sizes the fuse must be mounted externally.

### 3.3. INSTALLATION MOUNTING CLEARANCE

**NOTE!**

The dimensions and weights specified in this manual should be taken into consideration when the device is mounted. The technical equipment required (carriage or crane for large weights) should be used. Improper handling and the use of unsuitable tools may cause damage.

*Figure 3.3.1: Max. Angle of Inclination*



The maximum angle of inclination is 30°

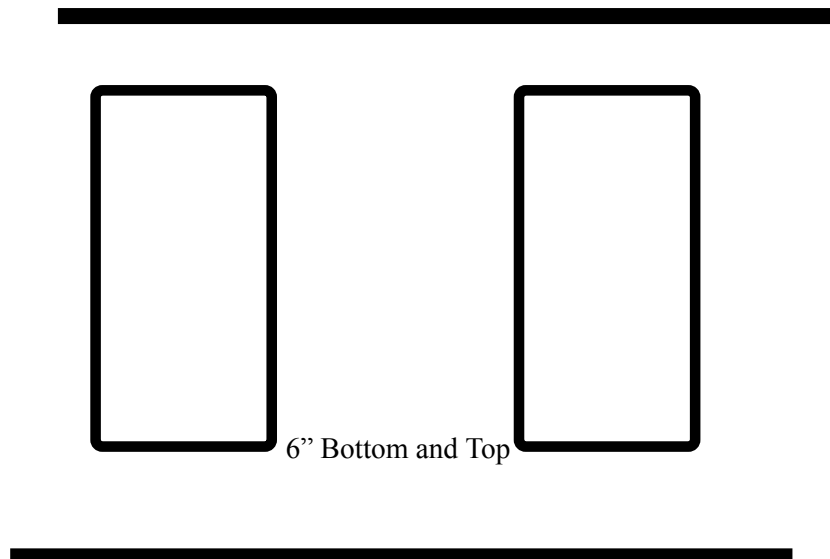
**NOTE!**

The Drives must be mounted in such a way that the free flow of air is ensured. The clearance to the device must be at least 150 mm (6 inches). A space of at least 50 mm (2 inches) must be ensured at the front.

On size PX-300 the top and bottom clearance must be at least 380 mm (15 inches), on front and sides must be ensured a space of at least 140 mm (5.5 inches).

Devices that generate a large amount of heat must not be mounted in the direct vicinity of the drive.

*Figure 3.3.2: Mounting Clearance*



**NOTE! FASTENING SCREWS SHOULD BE RE-TIGHTENED AFTER A FEW DAYS OF OPERATION.**

### 3.4. MOTORS AND ENCODERS

The Flexmax Drives are designed for the field oriented regulation of brushless servomotors. A sinusoidal encoder, digital encoder or resolver can be used for feedback in proportion to speed.

#### 3.4.1. Motors

##### What motor data is required for connecting the drive?

Nameplate specifications

- Motor rated voltage
- Motor rated current
- Number of poles
- Motor rated speed

##### Motor protection

Thermistors

PTC thermistors according to DIN 44081 or 44082 fitted in the motor can be connected directly to the drive via terminals 78 and 79. In this case the resistor (1Kohm) mounted between the terminals 78 and 79 has to be removed.

Temperature-dependent contacts in the motor winding

Temperature-dependent contacts “Klixon” type can disable the drive via the external relay control or can be reported as an external fault on the drive (using terminal 15). They can also be connected to terminals 78 and 79 in order to have a specific motor-overheat error signal. In this case connect the existing 1 Kohm resistor in series to the wiring, note that one side of the resistor must be connected directly to terminal 79.

##### **NOTE!**

The motor PTC interface circuit (or klixon) has to be considered and treated as a signal circuit. The connections cables to the motor PTC must be made of twisted pairs with a shield, the cable route should not be parallel to the motor cable or be separated by at least 20 cm.

#### 3.4.2. Feedback Devices

One of seven types of encoder may be connected to the XE connector (high density 15-pole socket, fitted on drive) or on XFR connector on EXP-BRS board:

- **DEHS:** 5V digital incremental encoder with  $A / \bar{A}$ ,  $B / \bar{B}$ ,  $C / \bar{C}$  and three Hall sensor digital position signals. motors)
- **SESC:** 5V sinusoidal incremental encoder with  $A / \bar{A}$ ,  $B / \bar{B}$ ,  $C / \bar{C}$  and two sin/cos traces for absolute position.
- **SEHS:** 5V sinusoidal incremental encoder with  $A / \bar{A}$ ,  $B / \bar{B}$ ,  $C / \bar{C}$  and three Hall sensor digital position signals.
- **RES:** two pole resolver. This is the standard Powertec device.
- **ABSM:** absolute encoder multiturn

Encoders are used to feed back a speed signal to the regulator. The encoder/resolver should be coupled to the motor shaft with a backlash free connection. The advantage of the Powertec resolver is that there is zero compliance and no coupling.

Optimal regulation results are ensured when using sinusoidal encoders or resolvers. Digital encoders (rotary encoders) may also be used.

The encoder cable can be made of twisted pairs with an overall shield, which connects to ground on the Drive side. Avoid connecting the shield on the motor side. In particular cases where the cable length is more than 100 meters (328 feet), (high electromagnetic noise), it may be useful to use a cable with a shield on each conductor pair, which can be connected to the common point (0V). The overall shield must always be grounded.

Some types of sinusoidal encoders may require installation with galvanic isolation from the motor frame and shaft.

*Table 3.4.2.1: Recommended cable section and length for the connection of encoders*

Cable section [mm <sup>2</sup> ]	0.22	0.5	0.75	1	1.5
Max Length m [feet]	27 [88]	62 [203]	93 [305]	125 [410]	150 [492]

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