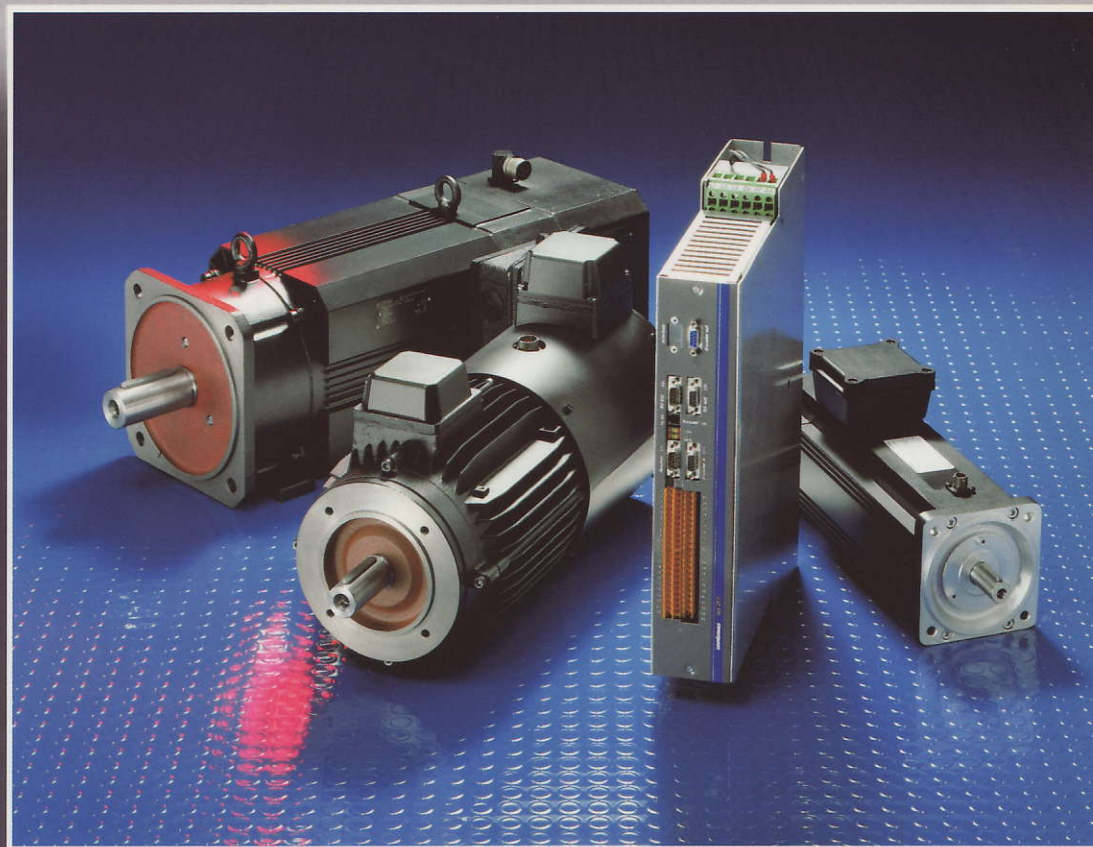


*Digital Servo-Inverters  
for Synchronous and Asyn-  
chronous Servo Motors*

**contraves** digiVEC-Antriebe



# Servo Inverters for CAS, ACD and CAD motor series

## Sizes

The digital ("digi") vector-controlled ("VEC") AC inverters of the digiVEC series make up a modular range currently consisting of three enclosure sizes providing from 4 A to 60 A output current per phase. Higher output currents are available on application.

## Function

The digiVEC unit controls the position, speed or current for synchronous, asynchronous or DC motors at high accuracy. digiVEC operates as standard as a torque, speed or position controller, a follower drive in an electric shaft or a follower drive for several motors mechanically coupled together. Using pulse sequences it can also control stepper motors. digiVEC stores up to 15 sets of parameters which can be activated via digital I/Os. The demands (reference values) can be preset either as analog or digital signals.

## Mains supply

All controllers are connected to the 3 x 400 V  $\pm$  15%, 45 ... 65 Hz mains supply directly, without a transformer. A version for 3 x 460 V  $\pm$  10%, 45 ... 65 Hz is available on request.

## Encoder

As standard the encoder for the controller is a resolver mounted on the motor shaft. Software is also available for encoders with or without a zero marker or for encoderless control of squirrel cage motors.

## Control characteristics

digiVEC controls each motor with particularly good smooth-running characteristics and high dynamics. Analog signals are converted into digital signals at 12 bit resolution. The operating system runs in real time and provides multitasking.

An adaptive control algorithm compensates for the temperature-dependency of important control parameters. The motor current is always sinusoidal. For this reason speed is very stable and torque is controlled accurately and linearly.

## Synchronous motors

ACD permanently excited synchronous motors (or DC brushless motors) provide perfect true-running characteristics even at lowest speeds. Previously this was only possible with DC servos - up to 0.5% of the actual value.

## Squirrel cage motors

With digiVEC, economically priced CAD asynchronous motors operate as servo drives. They provide full rated torque right from standstill. With digiVEC the squirrel cage motor becomes a dynamic positioning drive.

# **contraves** digiVEC-Drives

## DC motors

digiVEC controls DC motors, supplies the field winding and uses a DC tachometer as the encoder.

## Field weakening

All asynchronous and DC motors can achieve speeds above their rated speed with digiVEC in the field weakening characteristic. In most cases the thermal rating of the motor limits the maximum speed available and not the max. 800 Hz of the inverter final stages.

## Connections

Each digiVEC inverter has 12 digital inputs and 9 digital outputs as well as 2 analog inputs and 3 analog outputs. Within certain limits these can be programmed for special applications outside the standard configuration.

## 8 LEDs

These indicate the automatic tests carried out on the resolver and the resolver cable as well as many other operating conditions on starting.

## Interfaces

An MS-DOS PC - a 386 or faster - is connected to the standard RS 232 interface for configuration, commissioning and diagnostics. PC software for the standard configuration is supplied with the unit.

Several drives can be networked via the RS 485 interface. All digiVEC parameters are adjustable through this interface during operation.

## Ancillary equipment

- ◆ Software for spindle positioning, indexing, winding at constant traction, electronic gear change, dosing pistons with immediate reversing and many other applications.
- ◆ Encoder simulation card to simulate the normal signal from mechanical encoders with any whole number of pulses up to max. 1024 pulses per resolver pole pair. (Standard: Resolver with one pair of poles).
- ◆ Voltage resistance up to max. 460 V for the mains supply.
- ◆ Interface to the CAN bus, to Sercos.
- ◆ Additional card with 24 configurable digital inputs or outputs.

## Technical Data

Mains supply	3 x 400 V, +15% or 3 x 415 V, +10%/-15%, 45 ... 60 Hz 3 x 460 V, ± 10% available on request
Motor voltage	0 ... 0.87 x Umains, max. 800 Hz
Switching frequency	8 kHz up to frame size 16
Ambient temperature	0 ... 45°C
Protection class	IP 20, DIN 40050, IFC 144
Humidity class	F to DIN 40040

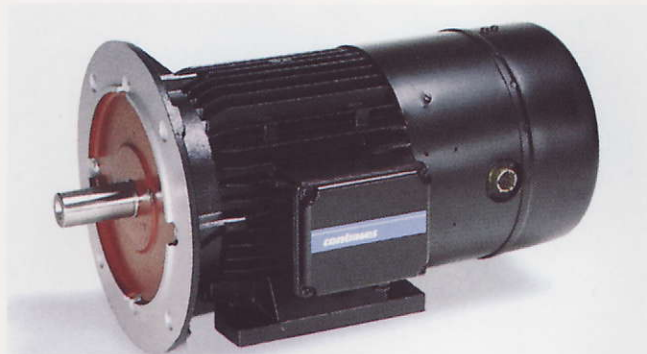
digIVEC size	DAC	4	7	11	18	28	60
Continuous current	A eff.	4	7	11	18	28	60
60 s peak current	A eff.	6	10	15	25	40	84
1 s peak current	A eff.	8	14	22	36	56	96
Mech. motor power to ca.	kW	1.5	2.8	4.2	7.5	12.5	29
Contin. braking power with int. resistor	kW	0.6	0.6	0.6	1.8	1.8	-
Braking power for 3 s	kW	14	14	14	28	28	42
Max. braking current	A	22	22	22	43	43	65
Mains fuse, single units (FF)	A	10	16	25	40	50	80
Current for group fusing (T)	A	6	10	16	25	40	-
Ext. aux. voltage 24V DC/18-24V AC	W	40	40	40	50	50	75
Weight	kg	5	6	6	11	11	-

### Important electrical connections

Terminal I/O	U*	Function	(I = Input, O = Output)
<b>X1</b>			
2	E	24	Left limit switch with time measurement
5	E	24	Right limit switch mark 1 µs
3+4	E	5	Differential input with time measurement mark 1 µs
7-14	A	15	Digital outputs max. 200 mA, to be supplied externally at 30 V
7-9	A	15	Programmable by supplier
10	A	15	Speed = zero
11	A	15	Demand reached
12	A	15	Position reached
13	A	15	Ready (= no error)
14	A	15	Drive running (final stage enabled)
15-22	E	15	8 digital inputs, max. 30 V, Ri = 13 kW
15-18	E	15	Select from max. 15 parameter sets
19	E	15	Read current spindle position
20	E	15	Changeover between speed/position control
21	E	15	Reset
22	E	15	Controller enable
23-28	E	± 10	3 analog differential inputs, Ri = 66 kW
29	E	30	Max. 30 V external supply for terminals 7-14
35	A	± 9.5	Analog torque actual value
36	A	± 9.5	Analog speed actual value

U\* = Voltage preset ex works

## CAD Series

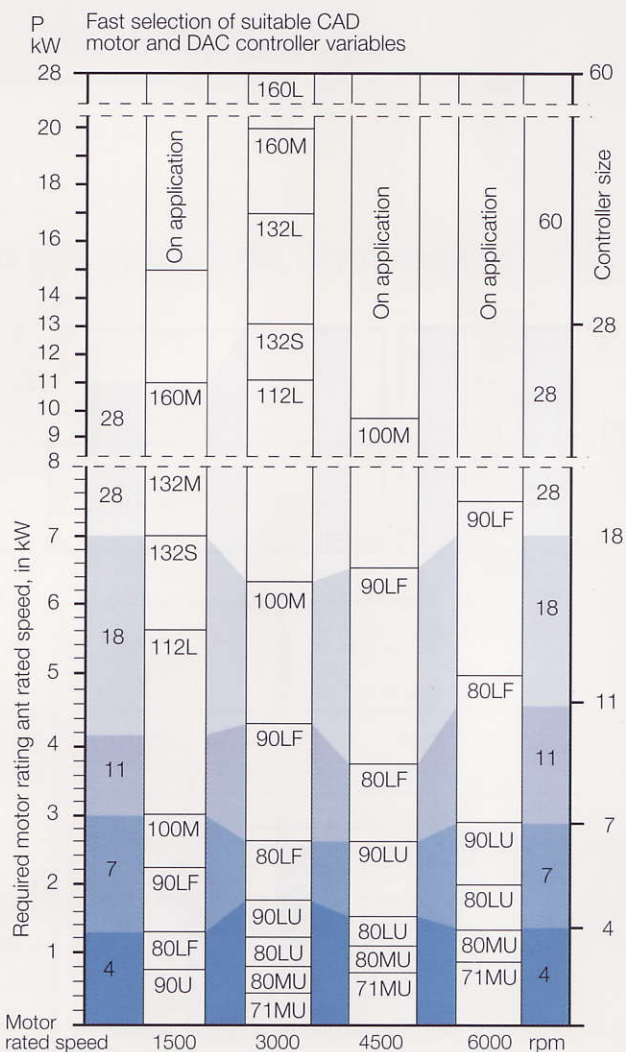


### Standard Asynchronous Motor

Field weakening range with P = constant: 2 x Nrated  
Version: 3F field weakening up to 3 x Nrated

Maximum speed: Max. 9000 rpm depending on size

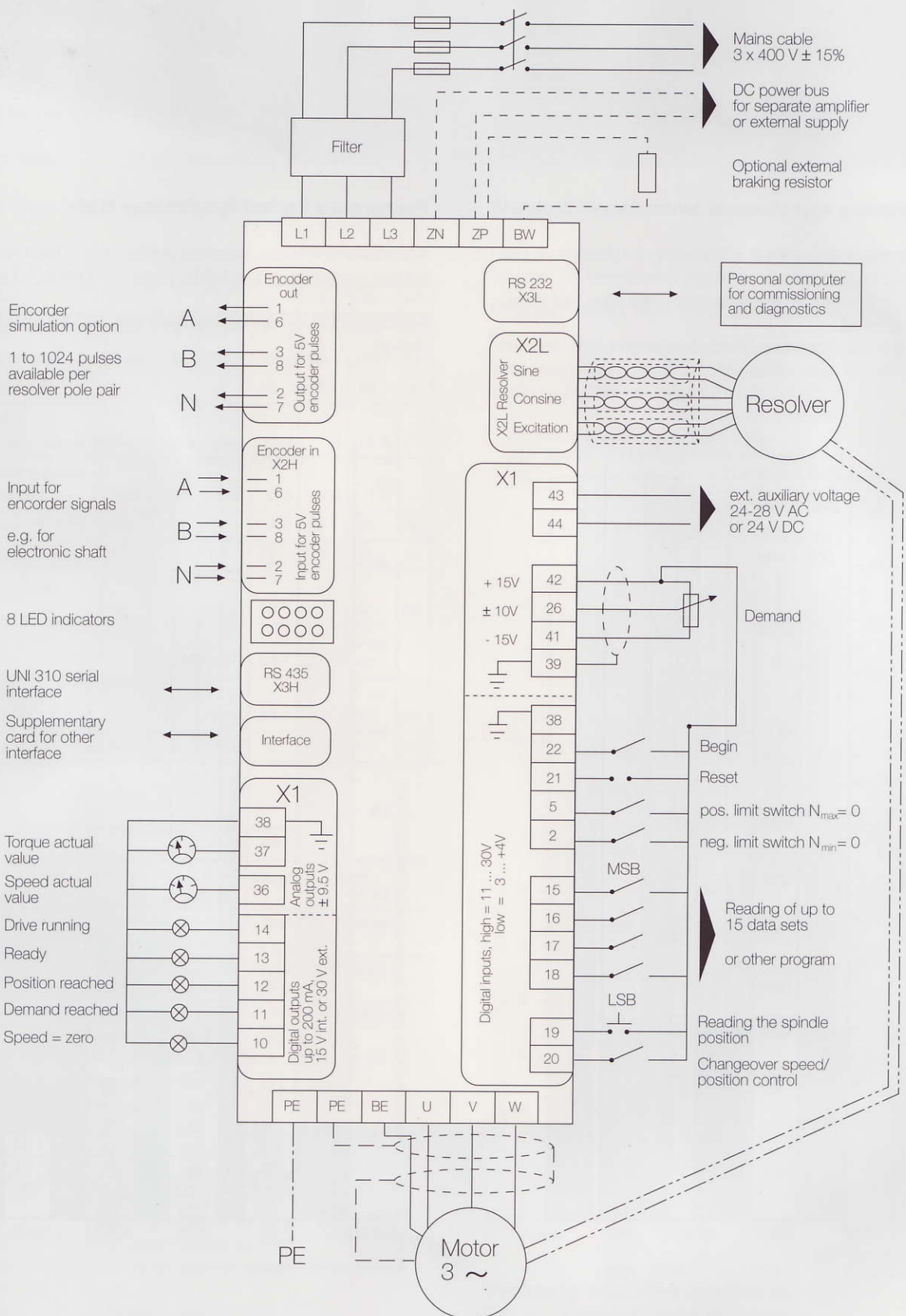
Features: High overload capacity, extremely robust construction, protection class IP 54, insulation class F, self-ventilation available on request, economically priced.



### Options for ACD, CAD and CAS motors

- TH = Thermistor temperature monitor
- Bi = Bimetallic switch temperature monitor
- BR = Parking brake 24V DC venting
- SS = Shaft seal
- SE = Non-standard shaft end
- NK = Smooth shaft end without adjustment spring
- FT = Increased motor true-running accuracy

# Block diagram and connections of the inverter



Encoder simulation option  
1 to 1024 pulses available per resolver pole pair

Input for encoder signals  
e.g. for electronic shaft

8 LED indicators

UNI 310 serial interface

Supplementary card for other interface

Torque actual value  
Speed actual value  
Drive running  
Ready  
Position reached  
Demand reached  
Speed = zero

Mains cable  
3 x 400 V ± 15%

DC power bus  
for separate amplifier  
or external supply

Optional external  
braking resistor

Personal computer  
for commissioning  
and diagnostics

ext. auxiliary voltage  
24-28 V AC  
or 24 V DC

Demand

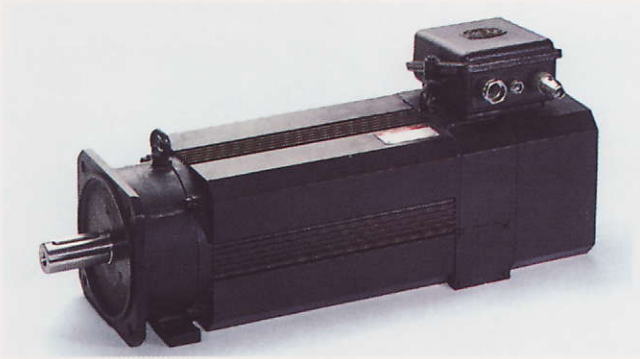
Begin  
Reset  
pos. limit switch  $N_{max}=0$   
neg. limit switch  $N_{min}=0$

Reading of up to  
15 data sets  
or other program

Reading the spindle  
position  
Changeover speed/  
position control

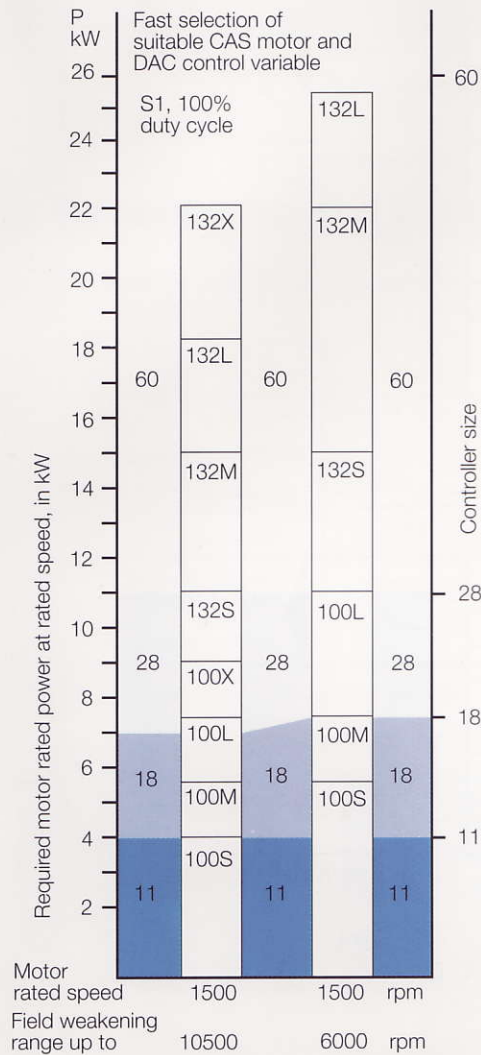
Motor  
3 ~

## CAS Series



### Field Weakening Asynchronous Motor

Field weakening range with P = constant: 5 x Nrated  
 Max. speed: 10,500 rpm  
 Applications: Winders, lifting equipment, machine tool main drives, presses etc.  
 Features: Slim design and relatively low weight

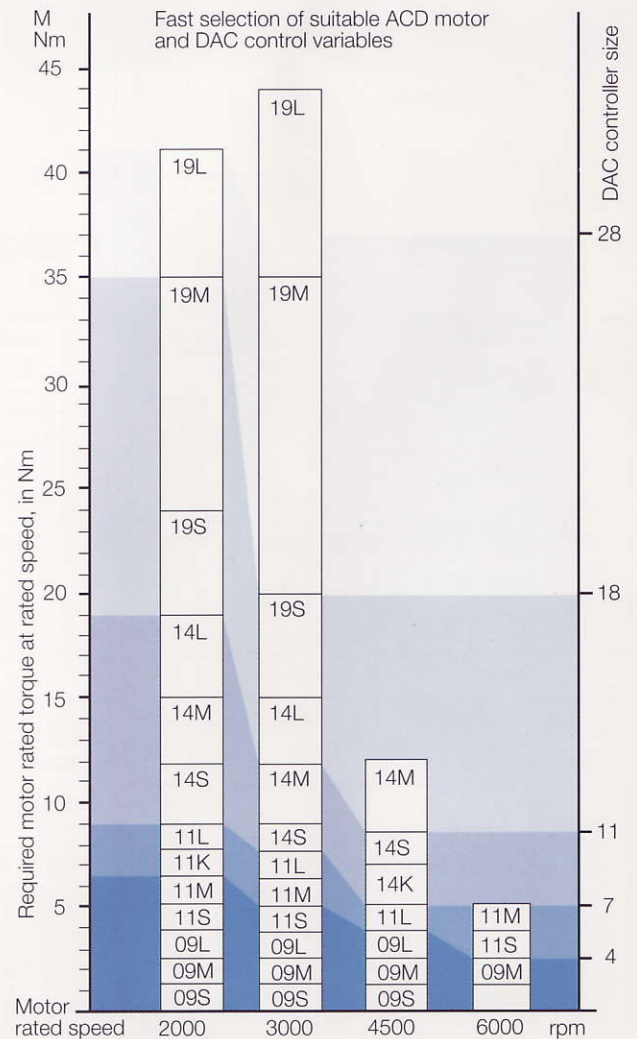


## ACD Series



### Permanently Excited Synchronous Motor

Applications: Robots, handling equipment, in feed drives, cutting machines, press feeds, particularly up to 10 Nm  
 Features: High dynamics, relatively slim and lightweight design



### Options for CAD and CAS motors

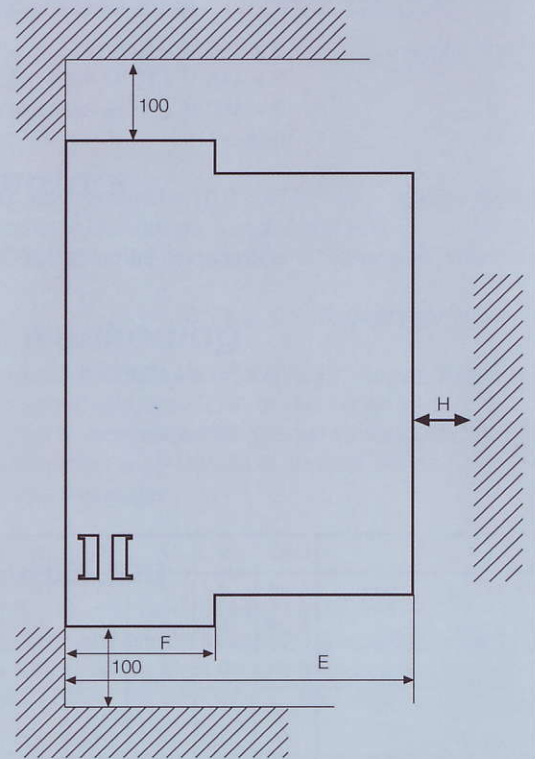
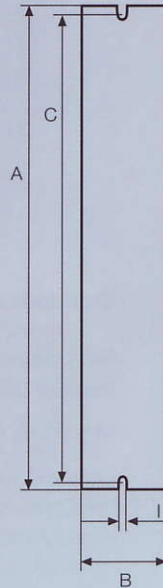
- F = Externally ventilated
- E = Self-ventilated
- U = Not ventilated
- B3 = Foot mounting
- B35 = Foot and flange mounting

- B5 = Flange mounting B5  
(rotating through 90 degrees each)
  - B14 = Flange mounting B14  
(rotating through 90 degrees each)
  - KR = Terminal box at right
  - KO = Terminal box at top
  - KL = Terminal box at left
- } Please always advise for B3 and B35

## Inverter Dimensions and Weights

Type	A	B	C	D
DAC	400	69.5	386	33.8
4	E	F	G	H
7	288	124	100	60
11	I	Weight		
	6.3	5 kg		

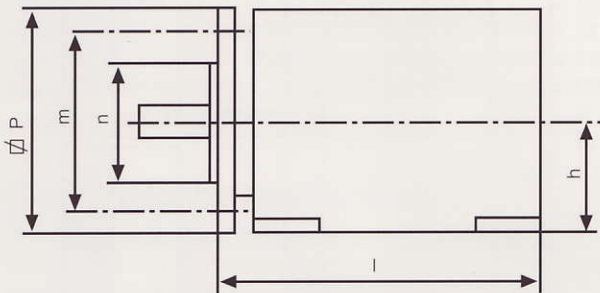
Type	A	B	C	D
DAC	400	69.5	386	33.8
4	E	F	G	H
7	288	124	100	60
11	I	Weight		
	6.3	5 kg		



DAC 60

Dimensions on request

## Main Dimensions and Weights of Motors



Motor CAS	h	Length l	Flange P/M/N	Shaft end ø x length	Weight kg
100 S	100	530	202/215/180	38 x 80	58
100 M		590			70
100 L		700			92
100 X		740			100
132 S	132	592	266/300/250	42 x 110	114
132 M		652			140
132 L		692			174
132 X		762			182

Motor ACD	Length l	Flange □/m/n	Shaft end ø x length	Weight kg
09 S	210	90/100/80	14 x 30	4
09 M	245			5
09 L	280			6
11 S	266	118/130/110	19 x 40	9
11 M	301			11
11 L	336			13
14 K	277	145/165/130	24 x 50	13
14 S	312			17
14 M	347			21
14 L	382			24
19 S	352	195/215/180	32 x 58	37
19 M	422			49
19 L	492			62

Motor CAD	Length l			h	Flange B5 P/m/n	Shaft end ø x length	Weight kg
	external	self	none				
71 M	304	274	240	71	160/130/110	14 x 30	7.5
80 S	346	296	260	80	200/165/130	19 x 40	9.5
80M	346	296	260	80			10.5
80L	346	296	260	80			13
90 L	371	333	297	90	200/165/130	24 x 50	17
100 M	417	363	327	100	250/215/180	28 x 60	25
112 L	436	385	334	112	250/215/180	28 x 60	40
132 S	464	437	366	132	300/265/230	38 x 80	55
132 M	502	475	404	132	300/265/230	38 x 80	71
160 M				160	350/300/250	42 x 110	109
160L				160			129

**contraves drives**

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