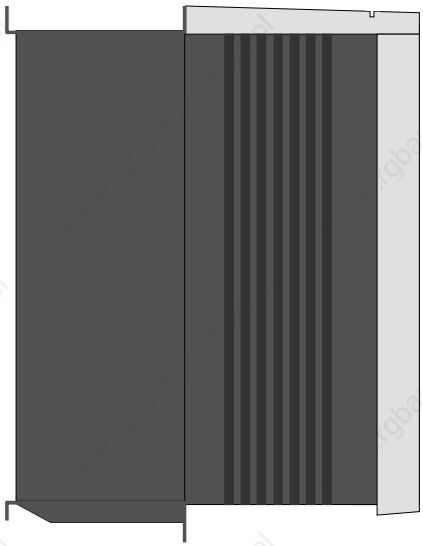
ACS 600

Hardware Manual

This manual includes
- Safety
- Installation
- Maintenance
- Product Information

ACS/ACC/ACP 601 AC Drives
3 to 150 Hp
(2.2 to 110 kW)



voltage of the pulses is approximately 1.35 times the input line voltage with a very short rise time.

The voltage of the pulses can be almost double at the motor terminals, depending on the properties of the cable between the drive and the motor. This in turn can cause additional stress to the motor insulation. The motor manufacturer should be consulted regarding the characteristics of the motor insulation system. Failure of the motor to fulfill the following requirements may shorten its life.

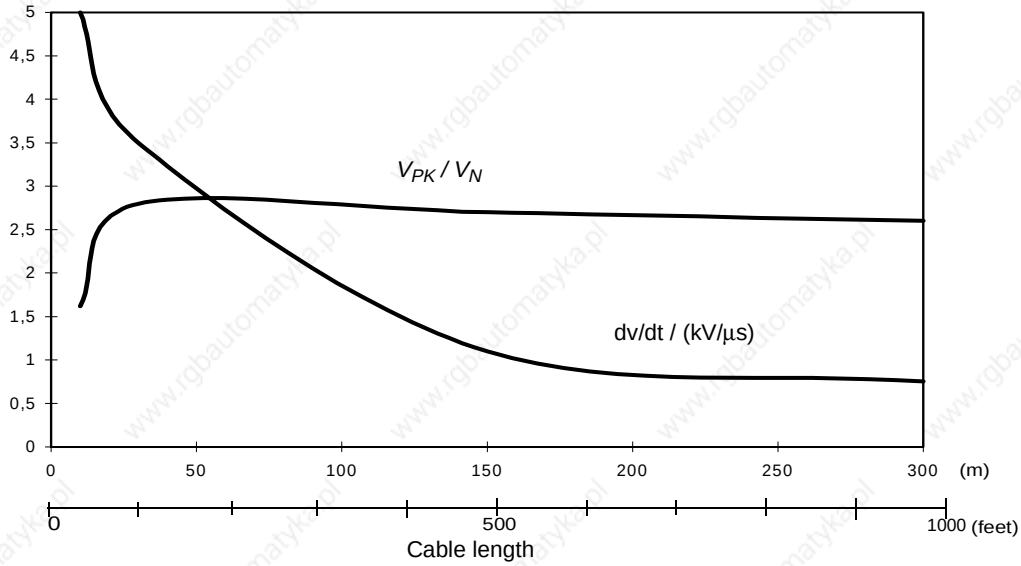
The following table lists the insulation requirements for motors used with ACx 600 AC drives.

Motor Type	Nominal AC Line Voltage	Motor Insulation Requirement
ABB Motors (manufactured from beginning of 1998)	V_N < 500 V	Standard insulation system
	525 V ≤ V_N ≤ 690 V	Standard insulation and dv/dt filter or special insulation system
Random-wound Motors	V_N ≤ 420 V	Motor insulation system must withstand V_{PK} = 1300 V.
	420 V < V_N ≤ 500 V	If motor insulation system withstands V_{PK} = 1600 V and 0.2 µs rise time, a dv/dt filter is not needed. With a dv/dt filter at the output of the ACx 600, motor insulation system must withstand V_{PK} = 1300 V.
	500 V < V_N ≤ 600 V	Motor insulation system must withstand V_{PK} = 1600 V. A dv/dt filter must be used at the output of the ACx 600.
	600 V < V_N ≤ 690 V	Motor insulation system must withstand V_{PK} = 1800 V. A dv/dt filter must be used at the output of the ACx 600.
Form-wound Motors	V_N ≤ 690 V	If motor insulation system withstands V_{PK} = 2000 V and rise time 0.3 µs, no dv/dt filter is needed.

Symbol	Definition
V_N	nominal power line voltage
V_{PK}	peak line to line voltage at motor terminals
Rise time: $\triangle t = 0.8 \cdot V_{PK}/(dv/dt)$	Rise time is line to line voltage change rate at motor terminals (the interval during which the voltage changes from 10 % to 90 % of the whole voltage range) V_{PK} and $\triangle t$ depend on cable length. Read the values of V_{PK} and dv/dt from the diagrams below.

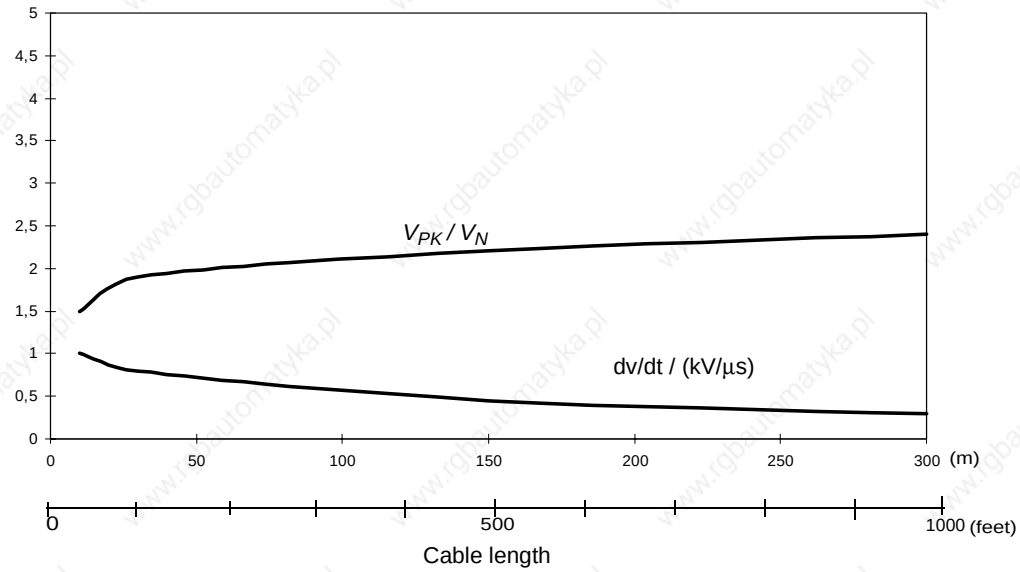
Without Filter

Below is a diagram of V_{PK} and *dv/dt* as a function of cable length when no dv/dt filter is used.



With dv/dt Filter

Below is a diagram of V_{PK} and *dv/dt* as a function of cable length with dv/dt filter at the output of the ACx 600.



Power Factor Correction Capacitors

Power factor correction capacitors and surge absorbers must not be connected between the drive and the motor. These devices are not designed to be used with AC drives, and will degrade motor control accuracy. They can cause permanent damage to the ACx 600 or themselves due to the rapid changes in the ACx 600 output voltage.

If there are power factor correction capacitors in parallel with the ACx

600 make sure that the capacitors and the ACx 600 are not charged simultaneously to avoid voltage surges which might damage the unit.

Output Contactors

If a contactor is used between the output of the ACx 600 and the motor with DTC control mode selected, the output voltage of the ACx 600 must be controlled to zero before the contactor is opened: ACS 600 units via parameter 21.3 (ACP: 10.4), choose COAST. If RAMP is selected, the output of the ACS/ACP 600 must be reduced to zero using Parameter 16.1 by giving zero V DC to the selected digital input. Otherwise the contactor will be damaged. In scalar control the contactor can be opened with ACS/ACC 600 running.

Varistors or RC networks (AC) or diodes (DC) should be used to protect against voltage transients generated by contactor coils. The protective components should be mounted as close as possible to the contactor coils. Protective components should not be installed at the NIOC board terminal block.

EMC

When used with inductive loads (relays, contactors, motors), the relay contacts of ACx 600 must be protected with varistors or RC networks (AC) or diodes (DC) against voltage transients. The protective components should not be installed at the NIOC board terminal block.

Installing control devices (contactors or relays) or control cables other than those of the ACS 600 inside the drive enclosure is not acceptable.

Note: If safety switches, contactors, connection boxes or similar equipment are installed between the drive and the motor, they should be installed in a metal enclosure in a way that the conduit or motor cable shielding runs consistently without breaks from the drive to the motor, so the emission level will be minimized.

Mechanical Installation

CAUTION! The ACx 601 weighs a considerable amount, and should not be handled by the front cover. The unit should only be placed on its back. Exercise appropriate care when maneuvering the unit to avoid damage and injury. Lifting the ACx 601 is much easier and safer with two people working together.

CAUTION! Make sure that dust from drilling does not enter the ACx 600 when installing. Electrically conductive dust inside the unit may cause damage or lead to malfunction.

CAUTION! Do not fasten the ACx 600 by riveting or welding.

WARNING! The cooling air flows and space requirements must be fulfilled. Special attention must be paid to cooling if units are installed in confined spaces and user defined cabinets.

Chapter 1 – Introduction

General

The ACS 600 product family of three phase AC drives includes

- the ACS 600 (for most applications)
- the ACP 600 (for positioning, synchronizing and other high-precision control applications)
- the ACC 600 (for crane drive applications)
- the ACS 600 MultiDrive (for multidrive applications)

The application programs are introduced in *Appendix – A*.

Study this manual carefully before installing, commissioning, operating or servicing the drive. We expect that you have a basic knowledge of physical and electrical fundamentals, electrical wiring practices, electrical components and electrical schematic symbols.

Delivery Check

Check that there are no signs of damage. Before attempting installation and operation, check the information on the drive nameplate to verify that the unit is of the correct model.

Nameplate

Each ACx 600 has a nameplate for identification purposes. See Figure 1-1. The nameplate data includes a type code and a serial number, which allow individual recognition of each unit.

Type Code

The ACx 600 Type Code contains information on the properties and configuration of the drive. The Type Code Chart explains the significance of each digit or character in the Type Code.

Frame Size

ACx 600 drives are manufactured in several different chassis sizes that are designated as Frame R2, R3, etc. Drives of several different ratings are manufactured in the same frame. The ACx 600 rating tables on page A-1 in Appendix A list the Frame Size used for each Type Code. The Frame Size is not marked on the nameplate.

Serial Number

The first digit of the serial number refers to the manufacturing plant. The next three digits refer to the units manufacturing year and week, respectively. The remaining digits complete the serial number so that there are no two units with the same serial number.

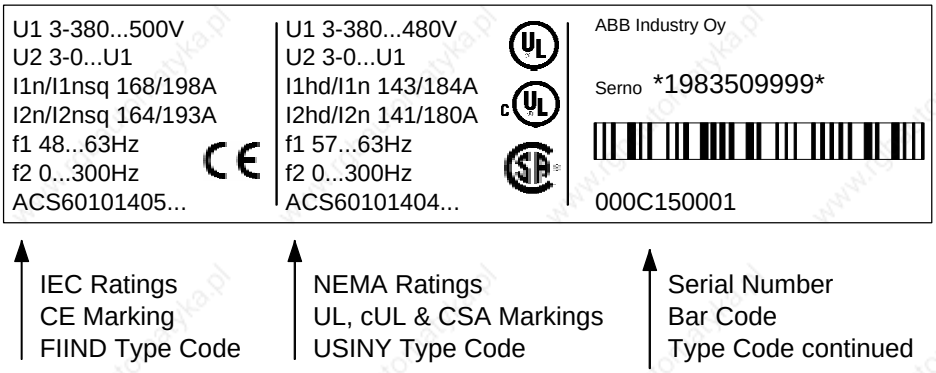


Figure 2-1. ACX 601 Nameplate

ACx 601 Type Code

The meaning of main selections of ACx 601 type code characters is given in the table below. Not all selections are available for all types. More information on selections is available in ACS 600 price list.

Character no.	Meaning	Refer to
Example: ACS60701003000B1200901		
1	**Product Category** A = AC Drive	
2...3	**Product Type** CS = Standard, CC = Crane Drive, CP = MotionControl	
4	**Product Family** 6 = ACS 600	
5	**Input Bridge** 0 = 6-pulse rectifier, 2 = 12-pulse rectifier, 7 = Regenerative 4Q thyristor bridge	
6	**Construction** 1 = Wall mounted, 4 = Module, 7 = Drives-MNS Cabinet	
7...10	**Power Rating (kVA)**	*Appendix A: Ratings*
11	**Voltage Rating** 3 = 380/400/415 VAC 4 = 380/400/415/440/460/480/500 VAC 5 = 380/400/415/440/460/480/500 VAC 6 = 525/550/575/600/660/690 VAC	
12...14	**Option 1, Option 2, Option 3**	
15	**Application Software** x = Languages and Application Macro Options	*Appendix A: Application Programs*
16	**Control Panel** 0 = None, 1 = CDP 312 Control Panel included, 4 = Customer I/O Terminal Block X2, 5 = 1 + 4	

Appendix A – ACS/ACC/ACP 601 Technical Data

IEC Ratings for IP2/22 Enclosures

Below are the IEC ratings for ACS/ACC/ACP 601 with 50 Hz and 60 Hz supplies. ACx = ACS/ACC/ACP. The 690 V series is not available for ACP 600. Symbols are described following the table.

ACx 601 Type	Normal Use					Heavy-duty Use							Frame Size
	Duty Cycle 1/10 min					Duty Cycle 1/10 min		Duty Cycle [1] 2/15 s					
	I_{2N} 9/10min [A]	I_{2Nmax} 1/10min [A]	S_N [kVA]	P_N [kW]	P_N [HP]	I_{2hd} 9/10min [A]	I_{2hdmax} 1/10min [A]	I_{2hd} 13/15s [A]	I_{2hdmax} 2/15s [A]	S_{hd} [kVA]	P_{hd} [kW]	P_{hd} [HP]	
Three-phase supply voltage 380 V, 400 V or 415 V													
ACx 601-0005-3	7.6	8.4	5	3	3	6.2	9.3	6.2	12.4	4	2.2	3	R2
ACx 601-0006-3	11	12	6	4	5	7.6	11	7.6	15.2	5	3	3	
ACx 601-0009-3	15	17	9	5.5	7.5	11	17	11	22	6	4	5	
ACx 601-0011-3	18	20	11	7.5	10	15	23	15	30	9	5.5	7.5	R3
ACx 601-0016-3	24	26	16	11	15	18	27	18	36	11	7.5	10	
ACx 601-0020-3	32	35	20	15	20	24	36	24	48	16	11	15	R4
ACx 601-0025-3	41	45	25	18.5	25	32	48	32	64	20	15	20	
ACx 601-0030-3	47	52	30	22	30	41	62	41	82	25	18.5	25	R5
ACx 601-0040-3	62	68	40	30	40	47	71	47	94	30	22	30	
ACx 601-0050-3	76	84	50	37	50	62	93	62	124	40	30	40	
ACx 601-0060-3	89	98	60	45	60	76	114	76	152	50	37	50	R6
ACx 601-0070-3	112	123	70	55	75	89	134	89	178	60	45	60	
ACx 601-0100-3	147	162	100	75	100	112	168	112	224	70	55	75	R7
ACx 601-0120-3	178	196	120	90	125	147	221	147	294	100	75	100	
Three-phase supply voltage 380 V, 400 V, 415 V, 440 V, 460 V, 480 V or 500 V													
ACx 601-0006-5	7.6	8.4	6	4	5	6.2	9.3	6.2	12.4	5	3	3	R2
ACx 601-0009-5	11	12	9	5.5	7.5	7.6	11	7.6	15.2	6	4	5	
ACx 601-0011-5	15	17	11	7.5	10	11	17	11	22	9	5.5	7.5	
ACx 601-0016-5	18	20	16	11	10	15	23	15	30	11	7.5	10	R3
ACx 601-0020-5	24	26	20	15	15	18	27	18	36	16	11	10	
ACx 601-0025-5	31	34	25	18.5	20	24	36	24	48	20	15	15	R4
ACx 601-0030-5	41	45	30	22	30	31	47	31	62	25	18.5	20	
ACx 601-0040-5	47	52	40	30	30	41	62	41	82	30	22	30	R5
ACx 601-0050-5	58	64	50	37	40	47	71	47	94	40	30	30	
ACx 601-0060-5	65	72	60	45	50	58	87	58	116	50	37	40	
ACx 601-0070-5	84	92	70	55	60	65	98	65	130	60	45	50	R6
ACx 601-0100-5	112	123	100	75	75	84	126	84	168	70	55	60	
ACx 601-0120-5	135	149	120	90	100	112	168	112	224	100	75	75	R7
ACx 601-0140-5	164	180	140	110	125	135	203	135	270	120	90	100	
Three-phase supply voltage 525 V, 550 V, 575 V, 600 V, 660 V or 690 V													
ACx 601-0009-6	7.6	11	9	5.5	7.5	6.2	9	6.2	9	6	4	5.0	
ACx 601-0011-6	11	12	11	7.5	10	7.6	11	7.6	11	9	5.5	7.5	R3
ACx 601-0016-6	15	17	16	11	15	11	17	11	17	11	7.5	10	
ACx 601-0020-6	20	22	20	15	20	15	23	15	23	16	11	15	
ACx 601-0025-6	25	28	25	18.5	25	20	30	20	30	20	15	20	R4
ACx 601-0030-6	28	31	30	22	30	25	38	25	38	25	18.5	25	
ACx 601-0040-6	36	40	40	30	40	28	42	28	42	30	22	30	R5
ACx 601-0050-6	44	48	50	37	50	36	54	36	54	40	30	40	
ACx 601-0060-6	52	57	60	45	60	44	66	44	66	50	37	50	R6
ACx 601-0070-6	65	72	70	55	75	52	78	52	78	60	45	60	
ACx 601-0100-6	88	97	100	75	100	65	98	65	98	70	55	75	R7
ACx 601-0120-6	105	116	120	90	125	88	132	88	132	100	75	100	

The table continues on the next page

Rating table continued

ACx 601 Type	Pump and Fan Use (Squared Load)				
	I_{2Nsq} [A]	S_N [kVA]	P_N [kW]	P_N [HP]	*Frame SIze*
Three-phase supply voltage 380 V, 400 V or 415 V					
ACx 601-0005-3	7.6	5	3	3	R2
ACx 601-0006-3	11	6	4	5	
ACx 601-0009-3	15	9	5.5	7.5	
ACx 601-0011-3	18	11	7.5	10	R3
ACx 601-0016-3	24	16	11	15	
ACx 601-0021-3	41	20	15	20	R4
ACx 601-0026-3	47	25	18.5	25	
ACx 601-0031-3	62	30	22	30	R5
ACx 601-0041-3	76	40	30	40	
ACx 601-0051-3	89	50	37	50	
ACx 601-0061-3	112	60	45	60	R6
ACx 601-0071-3	124	70	55	75	
ACx 601-0101-3	178	100	75	100	R7
ACx 601-0121-3	200	120	90	125	
Three-phase supply voltage 380 V, 400 V, 415 V, 440 V, 460 V, 480 V or 500 V					
ACx 601-0006-5	7.6	6	4	5	R2
ACx 601-0009-5	11	9	5.5	7.5	
ACx 601-0011-5	15	11	7.5	10	
ACx 601-0016-5	18	16	11	10	R3
ACx 601-0020-5	24	20	15	15	
ACx 601-0026-5	41	25	18.5	20	R4
ACx 601-0031-5	47	30	22	30	
ACx 601-0041-5	58	40	30	30	R5
ACx 601-0051-5	65	50	37	40	
ACx 601-0061-5	84	60	45	50	
ACx 601-0071-5	112	70	55	60	R6
ACx 601-0101-5	124	100	75	75	
ACx 601-0121-5	164	120	90	100	R7
ACx 601-0141-5	200	140	110	125	

Current ratings are for drives in IP 20/21 enclosures. For drives in IP 54 enclosures, see page A-4. For output current temperature derating, see page A-3.

The current ratings are the same regardless of the supply voltage within one voltage range. The rated current of the ACx 60x must be higher than or equal to the rated motor current to achieve the rated motor power given in the table.

***Note 1:** The maximum allowed motor shaft power is limited to 1.5 · P_{hd}. If the limit is exceeded, the motor torque and the I_{hdmax} 2 s current is automatically restricted. The function protects the input bridge of the ACS 600 against overload.*

***Note 2:** The load capacity (current and power) decreases if the installation site altitude exceeds 1000 meters (3300 ft.), or if the ambient temperature exceeds 40 °C (104 °F(35 °C/95 °F for ACx 601-0120-03 units).*

***Note 3:** The Pump and Fan rating is not to be used with du/dt filters.*

Usually dv/dt filters are needed at the output of 525 V to 690 V units with random wound motors. No dv/dt filters are usually required with form wound motors.

Normal use (10 % overload capacity):

I_{2N}	rated RMS output current
I_{2Nmax}	short term rms overload current (allowed for one minute every 10 minutes).
S_N	rated apparent output power
P_N	typical motor power. The power ratings in kW apply to most IEC 34 motors. The power ratings in HP apply to most four pole NEMA rated motors.

Heavy-duty use (50 % or 100 % overload capacity):

I_{2hd}	rated RMS output current
I_{2hdmax}	rms overload current (allowed for one minute every 10 minutes or 2 seconds every 15 seconds) Maximum current depends on parameter setting, refer to Firmware Manual.
S_{hd}	rated apparent output power
P_{hd}	typical motor power. The power ratings in kW apply to most IEC 34 motors. The power ratings in HP apply to most four pole NEMA rated motors..

Pump and Fan use (squared load): no overload capacity

I_{2Nsq}	rated RMS output current
S_N	rated apparent output power
P_N	typical motor power. The power ratings in kW apply to most IEC 34 motors. The power ratings in HP apply to most four pole NEMA rated motors.

ACx 601 Type	Fuses							
	A	A^2s	V	Manufacturer	Type DIN 43620	Size	Type DIN 43653	Size
ACx 601-0040-6	50	770	660	Bussmann	170M1564	000	170M1364	000/80
ACx 601-0050-6	63	1450	660	Bussmann	170M1565	000	170M1365	000/80
ACx 601-0060-6	100	4650	660	Bussmann	170M1567	000	170M1367	000/80
ACx 601-0070-6	100	4650	660	Bussmann	170M1567	000	170M1367	000/80
ACx 601-0100-6	125	8500	660	Bussmann	170M1568	000	170M1368	000/80
ACx 601-0120-6	200	28000	660	Bussmann	170M1570	000	170M1370	000/80

Note: Fuses from other manufacturers can be used if they meet the ratings given in the table. Only ultra rapid fuses guarantee the proper protection for the rectifier semiconductors. The fuses recommended in the table are UL recognized.

Example For ACS 601-0120-3, the recommended fuses for the input bridge protection are 400 A ultrarapid fuses.

The values I_{1N} and I_{1hd} for ACS 601-0120-3 are 175 A and 145 A respectively. 1.1 · 175 A = 192.5 A and 1.5 · 145 A = 217 A. Normal fuses with nominal currents higher than 192.5 A or 217 A can be used to protect the input cable; thus, 200 A or 250 A fuses are selected depending on the use (normal or heavy-duty, respectively).

Cable Entries

Power and motor cable terminal sizes and tightening torques for the ACS/ACC/ACP 601 with cable diameters accepted by the rubber glands are given below. All power wiring must be rated for 60 °C minimum.

ACx 600 Type	U1,V1,W1 / U2,V2,W2			Ground (PE)	
	Maximum WIre Size	Cable Ø mm 2)	Tightening Torque	Maximum WIre Size	Cable Ø mm
ACx 601-0005-3/0006-5	6mm² #10 AWG	14...20	1.5...1.8 Nm 13-18 lb.-in.	6mm² #10 AWG	10...14
ACx 601-0006-3/0009-5		14...20			10...14
ACx 601-0009-3/0011-5		14...20			10...14
ACx 601-0009-6/0011-6	10mm² #8 AWG	14...20		10mm² #8 AWG	10...14
ACx 601-0011-3/0016-5/0016-6		14...20			10...14
ACx 601-0016-3/0020-5/0020-6		14...20			10...14
ACx 601-0020-3/0025-5/0025-6	16mm² #6 AWG	14...20		16mm² #6 AWG	10...14
ACx 601-0025-3/0030-5/0030-6		14...20			10...14
ACx 601-0030-3/0040-5/0040-6	Cu 35mm² #2 AWG Al 50mm² #1 AWG	20...26	8Nm 5.9 lb.-ft.	35mm² #2 AWG	10...14
ACx 601-0040-3/0050-5/0050-6		20...26			10...14
ACx 601-0050-3/0060-5		20...26			10...14
ACx 601-0060-3/0070-5/0060-6	70mm² #00 AWG	26...35			10...14
ACx 601-0070-3/0100-5/0070-6		26...35			10...14
ACx 601-0100-3/0120-5/0100-6	1)		30 Nm 22 lb.-ft.	70mm² #00 AWG	
ACx 601-0120-3/0140-5/0120-6					

1)The terminals are 10mm (13/32") bolts for attaching ring lugs (lugs not furnished).

2)IEC version. Range of cable diameters accepted by gland plate holes. For USA version conduit plate drawings, see pages B-9 and B-10.

Enclosures, Space Requirements

The cabinets, degrees of protection and free space requirements of ACx 600 types are given below.

ACx 600 Type	*Enclosure*	*Degree of Protection*[2)]	*Space above*	*Space below*	*Space on left/right*	*Space in front/ back*
601	wall-mounted metal frame	IP 22 /IP 54[1)]	12in / 300mm	12in / 300mm	2/2in 50/50mm	0.8/0in 20/0mm

1) not for ACP 601 units

2) The degrees of protection is specified by listing the IEC standard IP (Ingress Protection) number. The first digit of the IP number specifies the protection against solid objects and dirt. The second digit specifies the protection against liquids. IP 00 s an open chassis. NEMA 1 enclosures are comparable to approximately IP 20 and IP 33. NEMA 3R enclosures are comparable to IP 32. NEMA 12 and NEMA 13 enclosures are cmparable to IP 54 to IP 65. NEMA 4 enclosures are comparable to IP 65 or 66.

	First digit of IP number (protection against solid objects)	**Second digit of IP number (protection against liquids)**
0	Not protected	Not protected
1	Protected against solid objects larger than 50 mm (2 in.) dia.	Protected against dripping water
2	Protected against solid objects larger than 12 mm (1/2 in.) dia.	Protected against downward sprays of water up to 15 degrees from vertical.
3	Protected against solid objects larger than 2.5 mm (0.1 in.) dia.	Protected against downward sprays of water up to 60 degrees from vertical.
4	Protected against solid objects larger than 1.0 mm (0.04 in.) dia.	Protected against light sprays or splashing water from all directions - water shall not enter the enclosure in harmful quantities.
5	Dust protected - dust shall not enter the enclosure in sufficient quantity to interfere with satisfactory operation of equipment.	Protected against low pressure sprays of water from all directions - water shall not enter the enclosure in harmful quantities.
6	Dust tight	Protected against heavy seas on shipdecks or strong sprays of water from all directions - water shall not enter the enclosure in harmful quantities.

Heat DIssipation Requirements

ACx 601 drives are self-cooled. The table below gives the heat dissipated into the hot air exhausted from the drives. If the drives are installed in a confined space, the heat must be removed from the area by ventilation or air conditioning equipment.

ACx 601 Type	**Heat Dissipation**	
	Watts	**BTU/Hr**
ACx 601-0005	150	512
ACx 601-0006	180	615
ACx 601-0009	270	922
ACx 601-0011	330	1130
ACx 601-0016	480	1640
ACx 601-0020	600	2050
ACx 601-0025	750	2560
ACx 601-0030	900	3070
ACx 601-0040	1200	4100
ACx 601-0050	1500	5120
ACx 601-0060	1800	6150
ACx 601-0070	2100	7170
ACx 601-0100	3000	10200
ACx 601-0120	3600	12300
ACx 601-0140	4200	14300

Cooling Air Flow Requirements

Cooling air flow requirements are given below**.**

ACx 601	Flow m^3/h	Flow ft^3/h
ACx 601-0005-3/0006-5	40	25
ACx 601-0006-3/0009-5	40	25
ACx 601-0009-3/0011-5	40	25
ACx 601-0011-3/0016-5/0009-6/0011-6	60	35
ACx 601-0016-3/0020-5/0016-6/0020-6	60	35
ACx 601-0020-3/0025-5/0025-6	70	40
ACx 601-0025-3/0030-5/0030-6	100	60
ACx 601-0030-3/0040-5/0040-6	260	155
ACx 601-0040-3/0050-5/0050-6	260	155
ACx 601-0050-3/0060-5	260	155
ACx 601-0060-3/0070-5/0060-6	280	165
ACx 601-0070-3/0100-5/0070-6	280	165
ACx 601-0100-3/0120-5/0100-6	660	390
ACx 601-0120-3/0140-5/0120-6	660	390

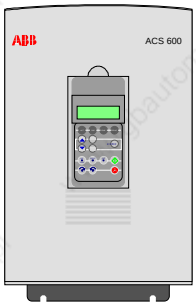
Cooling Air Duct

Heat dissipations and cooling air flows of ACx 601 in a cooling air duct installation are below.

Degree of protection	Heat Dissipation		Degree of protection	Cooling Air Flow Out	
	Heatsink	Front Section		Heatsink	Front Section
IP 22	85 % of ACx 600 losses	15 % of ACx 600 losses	IP 22	80 % of air flow	20 % of air flow
IP 54	90 % of ACx 600 losses	10 % of ACx 600 losses	IP 54	100 % of air flow	0 % of air flow

Dimensions and Weights

Dimensions and weights of the wall-mounted ACS/ACC/ACP 601 units are given below.



ACS 601 Type			Height mm/in	Width mm/in	Depth mm/in	Weight kg/lb
0005-3	0006-5		420/16.5	220/8.7	292/11.5	14/31
0006-3	0009-5		420/16.5	220/8.7	292/11.5	14/31
0009-3	0011-5		420/16.5	220/8.7	292/11.5	14/31
0011-3	0016-5	0009-6/0011-6	420/16.5	260/10.2	298/11/7	17.5/39
0016-3	0020-5	0016-6/0020-6	420/16.5	260/10.2	298/11.7	17.5/39
0020-3	0025-5	0025-6	526/20.7	306/12.0	310/12.2	25/55
0025-3	0030-5	0030-6	526/20.7	306/12.0	310/12.2	25/55
0030-3	0040-5	0040-6	715/27.8	306/12.0	360/14.2	35/77
0040-3	0050-5	0050-6	715/27.8	306/12.0	360/14.2	35/77
0050-3	0060-5		715/27.8	306/12.0	360/14.2	35/77
0060-3	0070-5	0060-6	715/27.8	306/12.0	432/17.0	50/110
0070-3	0100-5	0070-6	715	306/12.0	432/17.0	50/110
0100-3	0120-5	0100-6	860/33.9	480/18.9	428/16.9	88/194
0120-3	0140-5	0120-6	860/33.9	480/18.9	428/16.9	88/194

Input Power Connection

Voltage (U_1):
380/400/415 VAC 3-phase ± 10 % for 400 VAC units
380/400/415/440/460/480/500 VAC 3-phase ± 10 % for 500 VAC units
525/550/575/600/660 VAC 3-phase ± 10 % for 690 VAC units
690 VAC 3-phase ± 5 % for ACx 607 units

Short Circuit Capability: The rated short time withstand current of ACx 600 is 50 kA 1s.

Frequency: 48 to 63 Hz, maximum rate of change 17 %/s

Imbalance: Max. ± 3 % of nominal phase to phase input voltage

Fundamental Power Factor (cos φ_1): 0.97 (at nominal load)

Motor Connection

Voltage (U_2): 0 to U_1, 3-phase symmetrical

Frequency: DTC mode: 0 to 3.2 · f_{FWP} . Maximum frequency 300 Hz.

$$f_{FWP} = \frac{U_{Nmains}}{U_{Nmotor}} \cdot f_{Nmotor}$$

f_{FWP}: Frequency at field weakening point; U_{Nmains}: Mains voltage;

The EMC Directive defines the requirements for immunity and emissions of electrical equipment used in European Economic Area. The EMC product standard EN 61800-3 covers the requirements stated for drives.

The ACx 601 drives comply with the EMC Directive in industrial low-voltage network, public low-voltage network (restricted distribution) and IT networks (ungrounded power) with the following provisions:

Industrial Low-Voltage Network

1. It is ensured that no excessive emission is propagated to neighboring low-voltage networks. In some cases, the natural suppression in transformers and cables is sufficient. If in doubt, the ACx 600 can be equipped with EMC filtering (refer to Table A-1) or the supply transformer with static shielding between the primary and secondary windings can be used.
2. The ACx 601 is installed with motor and control cables as specified in this manual.

Note: It is recommended to equip the ACx 600 with the EMC filtering if there is equipment sensitive to conducted emission connected to the same supply transformer as the ACx 600.

*Table A-1 The EMC filtering of the ACx 600 units is marked in the type code as follows. * du/dt Filters + EMC Filters, ** du/dt Filters + No EMC Filters, *** EMC Cabinet with EMC Filters.*

ACS 600 Type	**Type Code**		
	Character no.	EMC Filter Selections	No EMC Filter Selections
ACS/ACC/ACF/ACP 601	ACxxxxxxxxxxxxxxxxxxx 20	0	9
ACS/ACC/ACF/ACP 604	ACxxxxxxxxxxxxxxxxxxx 20	0	9
ACS/ACC/ACF/ACP 607 (55 to 630 kW)	ACxxxxxxxxxxxxxxxxxxx 20	0, 3*	5**, 9
ACS/ACC 607 (630 to 3000 kW)	ACxxxxxxxxxxxxxxxxxxxxxxxxx... 26	1, 2***	0,
ACS 600 MultiDrive Supply Section	ACA63xxxxxxxxxxxx... 16	1, 2***	0
Drive Section	ACA610xxxxxxxxxxx... 16	1	0

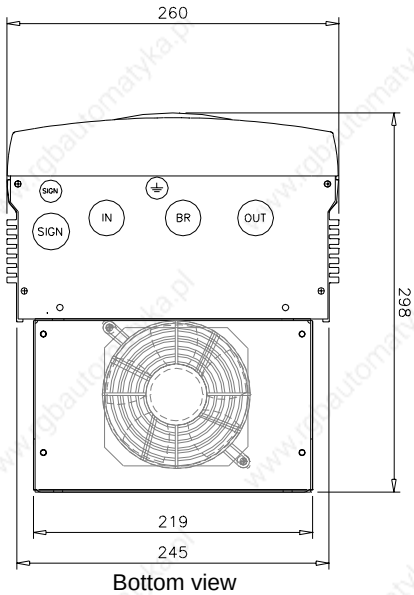
Appendix B – ACS/ACC/ACP 601 Dimensional Drawings

The following drawing package is effective from 5/10/98.

Gland Plate Holes (IEC Units)

Frame	R2 ACx = ACS/ACC/ACP	R3 ACx = ACS/ACC/ACP	R4 ACx = ACS/ACC/ACP	R5 ACx = ACS/ACC/ACP	R6 ACx = ACS/ACC/ACP	R7 ACx = ACS/ACC/ACP
Hole	ACx 601-0005-3 ACx 601-0006-3 ACx 601-0009-3 ACx 601-0006-5 ACx 601-0009-5 ACx 601-0011-5 mm	ACx 601-0009-6 ACx 601-0011-3/-6 ACx 601-0016-3 ACx 601-0016-5/-6 ACx 601-0020-5/-6 mm	ACx 601-0020-3 ACx 601-0025-3/-6 ACx 601-0025-5 ACx 601-0030-5/-6 mm	ACx 601-0030-3 ACx 601-0040-3 ACx 601-0050-3 ACx 601-0040-5/-6 ACx 601-0050-5/-6 ACx 601-0060-5 mm	ACx 601-0060-3/-6 ACx 601-0070-3 ACx 601-0070-5/-6 ACx 601-0100-5 mm	ACx 601-0100-3/-6 ACx 601-0120-3 ACx 601-0120-5/-6 ACx 601-0140-5 mm
SIGN	23	23	29	29	29	29
IN/OUT	29	29	37	37	48	60
BR	29	29	29	37	37	60
⏚	23	23	23	23	23	29

Frame R3



Bottom view

TYPE (ACx = ACS/ACC/ACP)	WEIGHT
ACx 601-0011-3	17.5 kg
ACx 601-0016-3	17.5 kg
ACx 601-0016-5	17.5 kg
ACx 601-0020-5	17.5 kg
ACx 601-0009-6/0011-6	17.5 kg
ACx 601-0009-6/0020-6	17.5 kg