

Brake resistor sizing

Brake chopper

The brake chopper is built-in as standard for the ACS380. It not only controls braking, but also supervises system status and detects failures such as brake resistor and resistor cable short-circuits, chopper short-circuit, and calculated resistor over-temperature.

Control of the mechanical brake

Mechanical brake control is integrated into the ACS380 machinery drives. It uses state machine logic to control brake opening, closing, holding, wait and delay to integrate complex brake operation into the application.

Brake resistor

The brake resistors are separately available for the ACS380. Resistors other than the standard option resistors may be used, provided that the specified resistance value is within the specified limits and that the heat dissipation capacity of the resistor is sufficient for the drive application (see hardware manual). No separate fuses in the brake circuit are required if the conditions for e.g., the mains cable is protected with fuses and no mains cable/fuse overrating takes place.

Internal brake chopper					
	Frame	P_{BRcont} (Hp)	R_{min} (ohm)	R_{max} (ohm)	P_{BRmax} (Hp)
1-phase $U_N = 200...240\text{ V}$ (200, 208, 220, 230, 240 V)					
ACS380-040x-02A4-1	R0	0.33	33	468	0.5
ACS380-040x-03A7-1	R0	0.5	33	316	0.74
ACS380-040x-04A8-1	R1	0.75	33	213	1.1
ACS380-040x-06A9-1	R1	1	33	145	1.5
ACS380-040x-07A8-1	R1	2	33	97	2.2
ACS380-040x-09A8-1	R2	2	33	70	3.0
ACS380-040x-12A2-1	R2	3	20	47	4.4
1-phase $U_N = 200...240\text{ V}$ (200, 208, 220, 230, 240 V)					
ACS380-04xx-02A4-2	R1	0.33	39	474	0.5
ACS380-04xx-03A7-2	R1	0.5	39	319	0.74
ACS380-04xx-04A8-2	R1	0.75	39	217	1.1
ACS380-04xx-06A9-2	R1	1	39	145	1.5
ACS380-04xx-07A8-2	R1	1.5	39	105	2.2
ACS380-04xx-09A8-2	R1	2	20	71	3
ACS380-04xx-12A2-2	R2	2	20	52	4.4
ACS380-04xx-17A5-2	R3	3	16	38	6
ACS380-04xx-25A0-2	R3	5	16	28	8
ACS380-04xx-032A-2	R4	7.5	3	20	11
ACS380-04xx-048A-2	R4	10	3	14	15
ACS380-04xx-055A-2	R4	15	3	10	22
3-phase $U_N = 380...480\text{ V}$ (380, 400, 415, 440, 460, 480 V)					
ACS380-040x-01A8-4	R0	0.5	99	933	.74
ACS380-040x-02A6-4	R1	0.75	99	628	1.1
ACS380-040x-03A3-4	R1	1	99	428	1.5
ACS380-040x-04A0-4	R1	1.5	99	285	2.2
ACS380-040x-05A6-4	R1	2	99	206	3
ACS380-040x-07A2-4	R1	2	53	139	4.4
ACS380-040x-09A4-4	R1	3	53	102	6
ACS380-040x-12A6-4	R2	5	32	76	8
ACS380-040x-17A0-4	R3	7.5	32	54	11
ACS380-040x-25A0-4	R3	10	23	39	15
ACS380-040x-032A-4	R4	15	6	29	22
ACS380-040x-038A-4	R4	20	6	24	30
ACS380-040x-045A-4	R4	25	6	20	37
ACS380-040x-050A-4	R4	30	6	20	44

Braking resistors

Dynamic Braking Using the Built-in Braking Chopper (Transistor)

All ACS380 drives include a built-in brake chopper for use with a braking resistor to perform dynamic braking. No separate option kits need to be selected, no additional panel space is required, no additional installation time is needed to assemble a brake chopper. No separate fuses in the brake circuit are required if the mains cable is protected with fuses and no mains cable/fuse overrating takes place.

Use the following tables to select the correct brake resistor for your application. Either compact CR type resistors (for smaller drives) or standard enclosed resistor packages are available. For more information regarding the selection of other braking resistors and the limits of the built-in brake chopper, see the ACS380 Hardware Manual 3AXD50000029274.

Single phase 200-240V applications, stopping duty only Type CR Resistors (Available for the small HP drives as listed below)

Duty Cycle		3sec on/27sec off			10sec on/50sec off		
ACS380-040x-	HP	CR Part No.	Ohms	Watts	CR Part No.	Ohms	Watts
02A4-1	0.33	P14494-CR-02	200	100	P14494-CR-02	200	100
03A7-1	0.5	P14494-CR-04	100	100	P14494-CR-04	100	100
04A8-1	0.75	P14494-CR-04	100	100	P14494-CR-04	100	100
06A9-1	1	P14494-CR-04	100	100	P14494-CR-11	100	150
07A8-1	1.5	P14494-CR-06	50	100	P14494-CR-12	50	150
09A8-1	2	P14494-CR-06	50	100	P14494-CR-18	50	200
12A2-1	3	P14494-CR-26	40	300	P14494-CR-34	40	400
Duty Cycle		30sec on/180sec off			60sec on/180sec off		
ACS380-040x-	HP	CR Part No.	Ohms	Watts	CR Part No.	Ohms	Watts
02A4-1	0.33	P14494-CR-02	200	100	P14494-CR-02	200	100
03A7-1	0.5	P14494-CR-04	100	100	P14494-CR-11	100	150
04A8-1	0.75	P14494-CR-11	100	150	P14494-CR-16	100	200
06A9-1	1	P14494-CR-11	100	150	P14494-CR-22	100	300
07A8-1	1.5	P14494-CR-18	50	200	P14494-CR-32	50	400
09A8-1	2	P14494-CR-24	50	300	P14494-CR-41	45	500
12A2-1	3	P14494-CR-34	40	400			

Notes: To determine resistor type, dimensions and weights refer to Resistor Technical Data Tables

Braking resistors

Standard Enclosed Resistor Packages

Duty Cycle		3sec on/27sec off			10sec on/50sec off		
ACS380-040x-	HP	Enclosed Res		Enclosed Res			
		Part No.	Ohms	Watts	Part No.	Ohms	Watts
02A4-1	0.33	P14494-19	75	300	P14494-19	75	300
03A7-1	0.5	P14494-19	75	300	P14494-19	75	300
04A8-1	0.75	P14494-24	45	300	P14494-24	45	300
06A9-1	1	P14494-24	45	300	P14494-24	45	300
07A8-1	1.5	P14494-31	35	300	P14494-31	35	300
09A8-1	2	P14494-31	35	300	P14494-31	35	300
12A2-1	3	P14494-31	35	300	P14494-31	35	300

Duty Cycle		30sec on/180sec off			60sec on/180sec off		
ACS380-040x-	HP	Enclosed Res		Enclosed Res Part			
		Part No.	Ohms	Watts	No.	Ohms	Watts
02A4-1	0.33	P14494-19	75	300	P14494-19	75	300
03A7-1	0.5	P14494-19	75	300	P14494-19	75	300
04A8-1	0.75	P14494-24	45	300	P14494-24	45	300
06A9-1	1	P14494-24	45	300	P14494-24	45	300
07A8-1	1.5	P14494-31	35	300	P14494-32	35	820
09A8-1	2	P14494-31	35	300	P14494-32	35	820
12A2-1	3	P14494-32	35	820	P14494-32	35	820

Notes: To determine resistor type, dimensions and weights refer to Resistor Technical Data Tables

Braking resistors

Three phase 200-240 V applications, stopping duty only
Type CR resistors (available for the small Hp drives as listed below)

Duty Cycle		3sec on/27sec off			10sec on/50sec off		
ACS380-040x-	HP	Enclosed Res		Enclosed Res			
		Part No.	Ohms	Watts	Part No.	Ohms	Watts
02A4-2	0.33	P14494-CR-02	200	100	P14494-CR-02	200	100
03A7-2	0.5	P14494-CR-04	100	100	P14494-CR-04	100	100
04A8-2	0.75	P14494-CR-04	100	100	P14494-CR-04	100	100
06A9-2	1	P14494-CR-04	100	100	P14494-CR-11	100	150
07A8-2	1.5	P14494-CR-06	50	100	P14494-CR-12	50	150
09A8-2	2	P14494-CR-06	50	100	P14494-CR-18	50	200
12A2-2	3	P14494-CR-12	50	150	P14494-CR-24	50	300
17A5-2	3	P14494-CR-54	18	300	P14494-CR-54	18	300
25A0-2	5	P14494-CR-54	18	300	P14494-CR-56	18	500
032A-2	7.5	P14494-CR-55	18	400			

Duty Cycle		30sec on/180sec off			60sec on/180sec off		
ACS380-040x-	HP	Enclosed Res		Enclosed Res Part			
		Part No.	Ohms	Watts	No.	Ohms	Watts
02A4-2	0.33	P14494-CR-02	200	100	P14494-CR-02	200	100
03A7-2	0.5	P14494-CR-04	100	100	P14494-CR-11	100	150
04A8-2	0.75	P14494-CR-11	100	150	P14494-CR-16	100	200
06A9-2	1	P14494-CR-16	100	200	P14494-CR-22	100	300
07A8-2	1.5	P14494-CR-18	50	200	P14494-CR-32	50	400
09A8-2	2	P14494-CR-24	50	300	P14494-CR-41	45	500
12A2-2	3	P14494-CR-33	45	400			
17A5-2	3	P14494-CR-55	18	400			

Notes: To determine resistor type, dimensions and weights refer to Resistor Technical Data Tables

Braking resistors

Standard Enclosed Resistor Packages

Duty Cycle		3sec on/27sec off			10sec on/50sec off		
ACS380-040x-	HP	Enclosed Res		Watts	Enclosed Res		Watts
		Part No.	Ohms		Part No.	Ohms	
02A4-2	0.33	P14494-19	75	300	P14494-19	75	300
03A7-2	0.5	P14494-19	75	300	P14494-19	75	300
04A8-2	0.75	P14494-24	45	300	P14494-24	45	300
06A9-2	1	P14494-24	45	300	P14494-24	45	300
07A8-2	1.5	P14494-24	45	300	P14494-24	45	300
09A8-2	2	P14494-24	45	300	P14494-24	45	300
12A2-2	3	P14494-24	45	300	P14494-24	45	300
17A5-2	3	P14494-31	35	300	P14494-31	35	300
25A0-2	5	P14494-39	21	400	P14494-40	21	750
032A-2	7.5	ABB-48431-060	11	409	ABB-48431-061	11	704
048A-2	10	ABB-48431-061	11	704	ABB-48431-062	11	931
055A-2	15	P14494-56	10	720	P14494-57	10	1250

Duty Cycle		30sec on/180sec off			60sec on/180sec off		
ACS380-040x-	HP	Enclosed Res		Watts	Enclosed Res		Watts
		Part No.	Ohms		Part No.	Ohms	
02A4-2	0.33	P14494-19	75	300	P14494-19	75	300
03A7-2	0.5	P14494-19	75	300	P14494-19	75	300
04A8-2	0.75	P14494-24	45	300	P14494-24	45	300
06A9-2	1	P14494-24	45	300	P14494-24	45	300
07A8-2	1.5	P14494-24	45	300	P14494-25	45	800
09A8-2	2	P14494-24	45	300	P14494-25	45	800
12A2-2	3	P14494-25	45	800	P14494-25	45	800
17A5-2	3	P14494-32	35	820	P14494-32	35	820
25A0-2	5	P14494-40	21	750	P14494-41	21	1050
032A-2	7.5	ABB-48431-062	11	931	ABB-48431-064	11	1584
048A-2	10	ABB-48431-063	11	1213	ABB-48431-066	11	2475
055A-2	15	P14494-58	10	1800	P14494-59	10	3600

Notes: To determine resistor type, dimensions and weights refer to Resistor Technical Data Tables

Braking resistors

Single phase 380-480V applications, stopping duty only Type CR Resistors (Available for the small HP drives as listed below)

Duty Cycle		3sec on/27sec off			10sec on/50sec off		
ACS380-040x-	HP	CR Part No.	Ohms	Watts	CR Part No.	Ohms	Watts
01A8-4	0.5	P14494-CR-01	500	125	P14494-CR-01	500	125
02A6-4	0.75	P14494-CR-01	500	125	P14494-CR-01	500	125
03A3-4	1	P14494-CR-02	200	100	P14494-CR-02	200	100
04A0-4	1.5	P14494-CR-02	200	100	P14494-CR-09	200	150
05A6-4	2	P14494-CR-03	150	100	P14494-CR-15	150	200
07A2-4	2	P14494-CR-04	100	100	P14494-CR-16	100	200
09A4-4	3	P14494-CR-11	100	150	P14494-CR-22	100	300
12A6-4	5	P14494-CR-24	50	300	P14494-CR-40	50	500
17A0-4	7.5	P14494-CR-32	50	400			
25A0-4	10	P14494-CR-38	23	500			

Duty Cycle		30sec on/180sec off			60sec on/180sec off		
ACS380-040x-	HP	CR Part No.	Ohms	Watts	CR Part No.	Ohms	Watts
01A8-4	0.5	P14494-CR-01	500	125	P14494-CR-01	500	125
02A6-4	0.75	P14494-CR-01	500	125	P14494-CR-07	500	150
03A3-4	1	P14494-CR-09	200	150	P14494-CR-14	200	200
04A0-4	1.5	P14494-CR-14	200	200	P14494-CR-20	200	300
05A6-4	2	P14494-CR-21	150	300	P14494-CR-29	150	400
07A2-4	2	P14494-CR-22	100	300	P14494-CR-57	100	500
09A4-4	3	P14494-CR-30	100	400			

Notes: To determine resistor type, dimensions and weights refer to Resistor Technical Data Tables

Braking resistors

Standard Enclosed Resistor Packages

Duty Cycle		3sec on/27sec off			10sec on/50sec off		
ACS380-040x-	HP	Enclosed Res			Enclosed Res		
		Part No.	Ohms	Watts	Part No.	Ohms	Watts
01A8-4	0.5	P14494-11	250	300	P14494-11	250	300
02A6-4	0.75	P14494-11	250	300	P14494-11	250	300
03A3-4	1	P14494-11	250	300	P14494-11	250	300
04A0-4	1.5	P14494-13	200	300	P14494-13	200	300
05A6-4	2	P14494-15	150	300	P14494-15	150	300
07A2-4	2	P14494-19	75	300	P14494-19	75	300
09A4-4	3	P14494-19	75	300	P14494-19	75	300
12A6-4	5	P14494-24	45	300	P14494-25	45	800
17A0-4	7.5	P14494-25	45	800	P14494-25	45	800
25A0-4	10	P14494-32	35	820	P14494-33	35	1200
032A-4	15	ABB-41154	22	900	ABB-44471	22	1455
038A-4	20	ABB-41154	22	900	ABB-44472	22	1904
045A-4	25	ABB-48431-063	11	1213	ABB-48431-066	11	2475
050A-4	30	ABB-48431-064	11	1584	ABB-48431-066	11	2475

Duty Cycle		30sec on/180sec off			60sec on/180sec off		
ACS380-040x-	HP	Enclosed Res			Enclosed Res		
		Part No.	Ohms	Watts	Part No.	Ohms	Watts
01A8-4	0.5	P14494-11	250	300	P14494-11	250	300
02A6-4	0.75	P14494-11	250	300	P14494-11	250	300
03A3-4	1	P14494-11	250	300	P14494-11	250	300
04A0-4	1.5	P14494-13	200	300	P14494-14	200	600
05A6-4	2	P14494-15	150	300	P14494-16	150	600
07A2-4	2	P14494-19	75	300	P14494-20	75	600
09A4-4	3	P14494-20	75	600	P14494-21	75	1000
12A6-4	5	P14494-25	45	800	P14494-26	45	1260
17A0-4	7.5	P14494-26	45	1260	P14494-27	45	1920
25A0-4	10	P14494-33	35	1200	P14494-35	35	2500
032A-4	15	ABB-44472	22	1904	ABB-48431-008	22	3168
038A-4	20	ABB-48431-007	22	2426	ABB-48431-009	22	5632
045A-4	25	ABB-48431-067	11	3564	ABB-48431-069	11	6875
050A-4	30	ABB-48431-067	11	3564	ABB-48431-069	11	6875

Notes: To determine resistor type, dimensions and weights refer to Resistor Technical Data Tables

Braking resistors

Technical data

Part Number	Ohms	Watts	Enclosure	Dimensions WxDxH (in)	Weight (lb)
ABB-41154	22	900	GCE3	12W x 10D x 5H	13
ABB-44471	22	1455	GCE4	12W x 13D x 5H	16
ABB-44472	22	1904	GCE5	12W x 16D x 5H	18
ABB-48431-007	22	2426	GCE6	19W x 10D x 5H	20
ABB-48431-008	22	3168	GCE8	19W x 13D x 5H	25
ABB-48431-009	22	5632	GCE9	26.5W x 10D x 5H	23
ABB-48431-060	11	409	GCE1	12W x 5D x 5H	7
ABB-48431-061	11	704	GCE2	12W x 7D x 5H	10
ABB-48431-062	11	931	GCE3	12W x 10D x 5H	13
ABB-48431-063	11	1213	GCE3	12W x 10D x 5H	13
ABB-48431-064	11	1584	GCE4	12W x 13D x 5H	16
ABB-48431-066	11	2475	GCE6	19W x 10D x 5H	17
ABB-48431-067	11	3564	GCE6	19W x 10D x 5H	19
ABB-48431-069	11	6875	GCE12	26.5W x 13D x 5H	28
P14494-11	250	300	GCE1	12W x 5D x 5H	7
P14494-13	200	300	GCE1	12W x 5D x 5H	7
P14494-14	200	600	GCE2	12W x 7D x 5H	10
P14494-15	150	300	GCE1	12W x 5D x 5H	7
P14494-16	150	600	GCE2	12W x 7D x 5H	10
P14494-19	75	300	GCE1	12W x 5D x 5H	7
P14494-20	75	600	GCE2	12W x 7D x 5H	10
P14494-21	75	1000	GCE3	12W x 10D x 5H	13
P14494-24	45	300	GCE1	12W x 5D x 5H	7
P14494-25	45	800	GCE2	12W x 7D x 5H	10
P14494-26	45	1260	GCE3	12W x 10D x 5H	13
P14494-27	45	1920	GCE5	12W x 16D x 5H	18
P14494-31	35	300	GCE1	12W x 5D x 5H	7
P14494-32	35	820	GCE2	12W x 7D x 5H	10
P14494-33	35	1200	GCE3	12W x 10D x 5H	13
P14494-35	35	2500	GCE8	19W x 13D x 5H	24
P14494-39	21	400	GCE1	12W x 5D x 5H	7
P14494-40	21	750	GCE2	12W x 7D x 5H	10
P14494-41	21	1050	GCE3	12W x 10D x 5H	13
P14494-56	10	720	GCE2	12W x 7D x 5H	10
P14494-57	10	1250	GCE3	12W x 10D x 5H	13
P14494-58	10	1800	GCE5	12W x 16D x 5H	18
P14494-59	10	3600	GCE6	19W x 10D x 5H	19

Braking resistors

Technical data

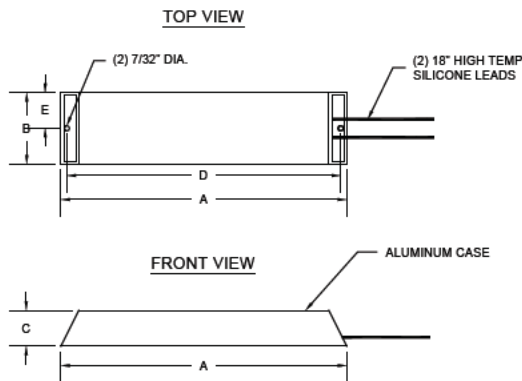
Part Number	Ohms	Watts	Enclosure	Dimensions WxDxH (in)	Weight (lb)
P14494-CR-01	500	100	CR100	6W x 1.5D x 0.75H	1
P14494-CR-02	200	100	CR100	6W x 1.5D x 0.75H	1
P14494-CR-03	150	100	CR100	6W x 1.5D x 0.75H	1
P14494-CR-04	100	100	CR100	6W x 1.5D x 0.75H	1
P14494-CR-06	50	100	CR100	6W x 1.5D x 0.75H	1
P14494-CR-07	500	150	CR150	9W x 1.5D x 0.75H	1
P14494-CR-09	200	150	CR150	9W x 1.5D x 0.75H	1
P14494-CR-11	100	150	CR150	9W x 1.5D x 0.75H	1
P14494-CR-12	50	150	CR150	9W x 1.5D x 0.75H	1
P14494-CR-14	200	200	CR200	6W x 3D x 1.5H	2
P14494-CR-15	150	200	CR200	6W x 3D x 1.5H	2
P14494-CR-16	100	200	CR200	6W x 3D x 1.5H	2
P14494-CR-18	50	200	CR200	6W x 3D x 1.5H	1
P14494-CR-20	200	300	CR300	9W x 3D x 1.5H	3
P14494-CR-21	150	300	CR300	9W x 3D x 1.5H	3
P14494-CR-22	100	300	CR300	9W x 3D x 1.5H	3
P14494-CR-24	50	300	CR300	9W x 3D x 1.5H	3
P14494-CR-26	40	300	CR300	9W x 3D x 1.5H	3
P14494-CR-29	150	400	CR400	12W x 3D x 1.5H	4
P14494-CR-30	100	400	CR400	12W x 3D x 1.5H	4
P14494-CR-32	50	400	CR400	12W x 3D x 1.5H	4
P14494-CR-33	45	400	CR400	12W x 3D x 1.5H	4
P14494-CR-34	40	400	CR400	12W x 3D x 1.5H	4
P14494-CR-38	23	500	CR500	15W x 3D x 1.5H	5
P14494-CR-40	50	500	CR500	15W x 3D x 1.5H	5
P14494-CR-41	45	500	CR500	15W x 3D x 1.5H	5
P14494-CR-54	18	300	CR300	9W x 3D x 1.5H	3
P14494-CR-55	18	400	CR400	12W x 3D x 1.5H	4
P14494-CR-56	18	500	CR500	15W x 3D x 1.5H	5
P14494-CR-57	100	500	CR500	15W x 3D x 1.5H	5

Braking resistors

Technical data

Type CR Case Resistors

Wattage	Dimension (in)				
	A	B	C	D	E
100	6	1-1/2	3/4	5-1/2	3/4
150	9	1-1/2	3/4	8-1/2	3/4
200	6	3	1-1/2	5-1/2	1-1/2
300	9	3	1-1/2	8-1/2	1-1/2
400	12	3	1-1/2	11-1/2	1-1/2
500	15	3	1-1/2	14-1/2	1-1/2



Type GCE Enclosure Dimensions and Coil Options

Part No.	Max. No. WR Cols	Max No. SXR, VR or ER	Dimensions (in)				
			A	B	C	D	E
GCE1	1	(1) Size 2	12	5	5	10-1/2	---
GCE2	2	(2) Size 2	12	7	5	10-1/2	4-1/2
GCE3	3	(3) Size 2	12	10	5	10-1/2	7-1/2
GCE4	4	(4) Size 2	12	13	5	10-1/2	10-1/2
GCE5	5	(5) Size 2	12	16	5	10-1/2	13-1/2
GCE6	6	(3) Size 5	19	10	5	17-1/2	7-1/2
GCE8	8	(4) Size 5	19	13	5	17-1/2	10-1/2
GCE9	9	(3) Size 7	26-1/2	10	5	25	7-1/2
GCE12	12	(4) Size 7	26-1/2	13	5	25	10-1/2

