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ПРОМЫШЛЕННЫЕ ПРИВОДЫ

Техническое описание на

модули

ACS880-604, ACS880-604LC



Brake options

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01
Brake resistor,
SACE15RE13

Brake units

Brake unit handles the energy generated by a decelerating motor. The brake unit connects the brake resistor to the DC bus whenever the voltage in the bus exceeds the limit defined by the control program. Energy consumption by the resistor losses lowers the voltage until the resistor can be disconnected. For ACS880 the brake unit is either built-in as standard or offered as an internal or external option:

Brake resistor

The brake resistors (JBR, SACE, SAFUR) are separately available for ACS880 drive modules. Resistors other than the standard option resistors may be used, provided that the specified resistance value is not decreased and that the heat dissipation capacity of the resistor is sufficient for the drive application.

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01



ACS880 type (frame sizes)	Brake units		
	Built-in as standard	Internal option	External option
-01 (R1 to R4)	X		
-01 (R5 to R9)		X	
-04/04F (R10, R11)		X	
-04XT (2×R10/11)		X	
-11/14/31/34 (R3 to R8, R11)			X ^{*)}
-04/14/34 (n×R8i)			X
-X04			X

^{*)} For more information, please contact your local ABB office.

Brake resistor	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
JBR-03	124	340	77	0.8
SACE08RE44	365	290	131	6.1
SACE15RE22	365	290	131	6.1
SACE15RE13	365	290	131	6.8
SAFUR80F500	600	300	345	14
SAFUR90F575	600	300	345	12
SAFUR125F500	1320	300	345	25
SAFUR200F500	1320	300	345	30

$U_N = 500 \text{ V}$ (range 380 to 500 V)

Nominal ratings					Duty cycle (1min/5min)		Duty cycle (10s/60s)		Noise dB(A)	Air flow (m ³ /h)	Brake unit module type	Brake resistor type	Brake unit type
P_{brmax} (kW)	R_{min} (ohm)	I_{max} (A)	I_{rms} (A)	P_{cont} (kW)	P_{br} (kW)	I_{rms} (A)	P_{br} (kW)	I_{rms} (A)					
Brake unit without brake resistor													
268	2.15	380	101	81	268	331	268	331	64	660	NBRA658	-	ACS880-604-0260-5
403	1.43	571	136	109	317	391	403	498	64	660	NBRA659	-	ACS880-604-0400-5
806	0.72	1142	272	218	634	782	806	996	67	1320	2×NBRA659	-	ACS880-604-0800-5
1208	0.48	1713	408	327	951	1173	1209	1494	68	1980	3×NBRA659	-	ACS880-604-1200-5
1611	0.36	2284	544	436	1268	1564	1612	1992	69	2640	4×NBRA659	-	ACS880-604-1600-5
2014	0.29	2855	680	545	1585	1955	2015	2490	70	3300	5×NBRA659	-	ACS880-604-2000-5
2417	0.24	3426	816	654	1902	2346	2418	2988	71	3960	6×NBRA659	-	ACS880-604-2400-5
Brake unit with the resistor													
268	2	408	45	36	111	137	192	237	66	2500	NBRA658	2×SAFUR125F500	ACS880-604-0260-5
403	1.35	605	67	54	167	206	287	355	66	2500	NBRA659	2×SAFUR200F500	ACS880-604-0400-5
806	0.68	1210	134	108	333	412	575	710	69	5000	2×NBRA659	2×(2×SAFUR200F500)	ACS880-604-0800-5
1208	0.45	1815	201	162	500	618	862	1065	70	7500	3×NBRA659	3×(2×SAFUR200F500)	ACS880-604-1200-5
1611	0.34	2420	268	216	667	824	1150	1420	71	10000	4×NBRA659	4×(2×SAFUR200F500)	ACS880-604-1600-5
2014	0.27	3025	335	270	833	1030	1437	1775	72	12500	5×NBRA659	5×(2×SAFUR200F500)	ACS880-604-2000-5
2417	0.23	3630	402	324	1000	1236	1724	2130	73	15000	6×NBRA659	6×(2×SAFUR200F500)	ACS880-604-2400-5

$U_N = 690 \text{ V}$ (range 525 to 690 V)

Nominal ratings					Duty cycle (1min/5min)		Duty cycle (10s/60s)		Noise dB(A)	Air flow (m ³ /h)	Brake unit module type	Brake resistor type	Brake unit type
P_{brmax} (kW)	R_{min} (ohm)	I_{max} (A)	I_{rms} (A)	P_{cont} (kW)	P_{br} (kW)	I_{rms} (A)	P_{br} (kW)	I_{rms} (A)					
Brake unit without brake resistor													
404	2.72	414	107	119	298	267	404	361	64	660	NBRA669	-	ACS880-604-0400-7
807	1.36	828	214	238	596	534	808	722	64	660	2×NBRA669	-	ACS880-604-0800-7
1211	0.91	1242	321	357	894	801	1212	1083	64	1320	3×NBRA669	-	ACS880-604-1200-7
1615	0.68	1656	428	476	1192	1068	1616	1444	64	1980	4×NBRA669	-	ACS880-604-1600-7
2019	0.54	2070	535	595	1490	1335	2020	1805	64	2640	5×NBRA669	-	ACS880-604-2000-7
2422	0.45	2484	642	714	1788	1602	2424	2166	64	3300	6×NBRA669	-	ACS880-604-2400-7
Brake unit with the resistor													
404	1.35	835	97	54	167	149	287	257	66	2500	NBRA669	2×SAFUR200F500	ACS880-604-0400-7
807	0.68	1670	194	108	333	298	575	514	69	5000	2×NBRA669	2×(2×SAFUR200F500)	ACS880-604-0800-7
1211	0.45	2505	291	162	500	447	862	771	70	7500	3×NBRA669	3×(2×SAFUR200F500)	ACS880-604-1200-7
1615	0.34	3340	388	216	667	596	1150	1028	71	10000	4×NBRA669	4×(2×SAFUR200F500)	ACS880-604-1600-7
2019	0.27	4175	485	270	833	745	1437	1285	72	12500	5×NBRA669	5×(2×SAFUR200F500)	ACS880-604-2000-7
2422	0.23	5010	582	324	1000	894	1724	1542	73	15000	6×NBRA669	6×(2×SAFUR200F500)	ACS880-604-2400-7

Heat loss of section with braking resistors is the same as braking power.

Ratings

P_{brmax}	Maximum short time braking power.
R_{min}	Minimum allowable resistance value for the brake resistor.
E_r	SAFUR resistor nominal braking capacity without forced cooling. Energy pulse that the resistor assembly will withstand (400 s duty cycle). This energy will heat the resistor element from 40 °C to the maximum allowable temperature.
P_{cont}	Maximum continuous braking power. Continuous power (heat) dissipation of the resistor when placed correctly. Energy E_r dissipates in 400 seconds.
I_{max}	Maximum peak current per brake unit during braking. Current is achieved with recommended resistor resistance.
I_{rms}	Corresponding rms current per brake unit during load cycle.
P_{br}	Braking power during corresponding duty cycle: 1 min/5 min = 1 minute braking with power P_{br} and 4 minutes unload. 10 s/60 s = 10 second braking with power P_{br} and 50 seconds unload.

Dimensions for units

Frame size	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
NBRA658	584	334	240	26
NBRA659	584	334	240	26
NBRA669	584	334	240	26

Dimensions for resistors

Frame size	Height mm	Width mm	Depth mm	Weight kg
SAFUR180F460	1320	300	345	32
SAFUR125F500	1320	300	345	25
SAFUR200F500	1320	300	345	30
SAFUR210F575	1320	300	345	27

ACS880-604 3-phase dynamic brake units

$U_N = 400\text{ V}$ (range 380 to 415 V)

Resistor values		Ratings R_{min}								Ratings R_{max}								Brake unit type	Frame size
		No-overload use				Duty cycle (1min/5min)				No-overload use				Duty cycle (1min/5min)					
R_{min}	R_{max}	I_{dc}	I_{rms}	P_{rcont}	I_{max}	I_{dc}	I_{rms}	R_{min}	P_{br}	I_{dc}	I_{rms}	$P_{contmax}$	I_{max}	I_{dc}	I_{rms}	R_{min}	P_{br}		
(ohm)	(ohm)	DC (A)	DC (A)	(kW)	DC (A)	DC (A)	DC (A)	(A)	(kW)	DC (A)	DC (A)	(kW)	DC (A)	DC (A)	DC (A)	(A)	(kW)		
1.7	2.1	781	310	500	370	999	351	640	781	282	500	312	827	291	530	ACS880-604-0500-3	R8i		
1.2	1.4	1171	465	750	555	1499	527	960	1171	424	750	468	1241	436	800	ACS880-604-0750-3	R8i		
1.7	2.1	1562	621	1000	740	1998	702	1290	1562	565	1000	625	1655	581	1060	ACS880-604-1000-3	2xR8i		
1.2	1.4	2342	931	1510	1110	2997	1053	1930	2342	847	1510	937	2482	872	1600	ACS880-604-1510-3	2xR8i		
1.2	1.4	3514	1396	2260	1665	4496	1580	2890	3514	1271	2260	1405	3723	1308	2400	ACS880-604-2260-3	3xR8i		
1.2	1.4	4685	1862	3010	2220	5994	2106	3860	4685	1694	3010	1874	4964	1744	3190	ACS880-604-3010-3	4xR8i		
1.2	1.4	5856	2327	3770	2775	7493	2633	4820	5856	2118	3770	2342	6205	2180	3990	ACS880-604-3770-3	5xR8i		

$U_N = 500\text{ V}$ (range 380 to 500 V)

Resistor values		Ratings R_{min}								Ratings R_{max}								Brake unit type	Frame size
		No-overload use				Duty cycle (1min/5min)				No-overload use				Duty cycle (1min/5min)					
R_{min}	R_{max}	I_{dc}	I_{rms}	P_{rcont}	I_{max}	I_{dc}	I_{rms}	R_{min}	P_{br}	I_{dc}	I_{rms}	$P_{contmax}$	I_{max}	I_{dc}	I_{rms}	R_{min}	P_{br}		
(ohm)	(ohm)	DC (A)	DC (A)	(kW)	DC (A)	DC (A)	DC (A)	(A)	(kW)	DC (A)	DC (A)	(kW)	DC (A)	DC (A)	DC (A)	(A)	(kW)		
2.2	2.6	781	310	630	370	999	351	800	781	284	630	312	835	293	670	ACS880-604-0630-5	R8i		
1.4	1.7	1171	465	940	555	1499	527	1210	1171	430	940	468	1277	449	1030	ACS880-604-0940-5	R8i		
2.2	2.6	1562	621	1260	740	1998	702	1610	1562	568	1260	625	1671	587	1340	ACS880-604-1260-5	2xR8i		
1.4	1.7	2342	931	1880	1110	2997	1053	2410	2342	860	1880	937	2555	898	2060	ACS880-604-1880-5	2xR8i		
1.4	1.7	3514	1396	2830	1665	4496	1580	3620	3514	1289	2830	1405	3832	1347	3080	ACS880-604-2830-5	3xR8i		
1.4	1.7	4685	1862	3770	2220	5994	2106	4820	4685	1719	3770	1874	5110	1795	4110	ACS880-604-3770-5	4xR8i		
1.4	1.7	5856	2327	4710	2775	7493	2633	6030	5856	2149	4710	2342	6387	2244	5140	ACS880-604-4710-5	5xR8i		

$U_N = 690\text{ V}$ (range 525 to 690 V)

Resistor values		Ratings R_{min}								Ratings R_{max}								Brake unit type	Frame size
		No-overload use				Duty cycle (1min/5min)				No-overload use				Duty cycle (1min/5min)					
R_{min}	R_{max}	I_{dc}	I_{rms}	P_{rcont}	I_{max}	I_{dc}	I_{rms}	R_{min}	P_{br}	I_{dc}	I_{rms}	$P_{contmax}$	I_{max}	I_{dc}	I_{rms}	R_{min}	P_{br}		
(ohm)	(ohm)	DC (A)	DC (A)	(kW)	DC (A)	DC (A)	DC (A)	(A)	(kW)	DC (A)	DC (A)	(kW)	DC (A)	DC (A)	DC (A)	(A)	(kW)		
3.0	3.6	781	310	870	370	999	351	1110	781	283	870	312	833	293	920	ACS880-604-0870-7	R8i		
2.0	2.4	1171	465	1300	555	1499	527	1660	1171	425	1300	468	1249	439	1390	ACS880-604-1300-7	R8i		
3.0	3.6	1562	621	1730	740	1998	702	2220	1562	567	1730	625	1665	585	1850	ACS880-604-1730-7	2xR8i		
2.0	2.4	2342	931	2600	1110	2997	1053	3330	2342	850	2600	937	2498	878	2770	ACS880-604-2600-7	2xR8i		
2.0	2.4	3514	1396	3900	1665	4496	1580	4990	3514	1275	3900	1405	3746	1316	4160	ACS880-604-3900-7	3xR8i		
2.0	2.4	4685	1862	5200	2220	5994	2106	6650	4685	1700	5200	1874	4995	1755	5540	ACS880-604-5200-7	4xR8i		
2.0	2.4	5856	2327	6500	2775	7493	2633	8320	5856	2125	6500	2342	6244	2194	6930	ACS880-604-6500-7	5xR8i		

Ratings

Resistor	Description
R_{min}	Minimum allowed resistance value of the brake resistor for one phase of the brake module.
R_{max}	Resistance value of the brake resistor for one phase of the brake module corresponding to the maximum achieved continuous braking power.

Note: Connect one resistor per brake module phase. For example, a brake unit of frame size 2xR8i including two brake modules → 2 x 3 resistors are needed.

Typical ratings for no-overload use

I_{dc}	Total input DC current of brake unit.
I_{rms}	Total rms DC output phase current of brake unit.
I_{max}	Peak brake current (DC) per unit module phase.
$P_{cont,max}$	Maximum continuous braking power per brake unit.

Cyclic load (1 min/5 min)

I_{dc}	Total input DC current of brake unit during a period of 1 minute with braking power P_{br} .
I_{rms}	Total rms DC current per brake unit phase during a period of 1 minute with braking power P_{br} .
P_{br}	Short term braking power

Dimensions

Frame size	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
R8i	1397	240	583	125

$U_N = 400 \text{ V}$ (range 380 to 415 V)

Nominal ratings					Duty cycle (1min/5min)		Duty cycle (10s/60s)		Noise	Air flow	Brake unit module type	Brake resistor type	Brake unit type
P_{brmax} (kW)	R_{min} (ohm)	I_{max} (A)	I_{rms} (A)	P_{cont} (kW)	P_{br} (kW)	I_{rms} (A)	P_{br} (kW)	I_{rms} (A)	dB(A)	(m ³ /h)			
Brake unit without brake resistor													
230	1.7	384	109	70	230	355	230	355	64	660	NBRA658	–	ACS880-604-0210-3
353	1.2	545	149	96	303	468	353	545	64	660	NBRA659	–	ACS880-604-0320-3
706	0.6	1090	298	192	606	936	706	1090	67	1320	2×NBRA659	–	ACS880-604-0640-3
1058	0.4	1635	447	288	909	1404	1059	1635	68	1980	3×NBRA659	–	ACS880-604-0960-3
1411	0.3	2180	596	384	1212	1872	1412	2180	69	2640	4×NBRA659	–	ACS880-604-1280-3
1764	0.24	2725	745	480	1515	2340	1765	2725	70	3300	5×NBRA659	–	ACS880-604-1600-3
2117	0.2	3270	894	576	1818	2808	2118	3270	71	3960	6×NBRA659	–	ACS880-604-1920-3
Brake unit with the resistor													
230	1.7	384	65	42	130	200	224	346	66	2500	NBRA658	2×SAFUR210F575	ACS880-604-0210-3
353	1.2	545	84	54	167	257	287	444	66	2500	NBRA659	2×SAFUR180F460	ACS880-604-0320-3
706	0.6	1090	168	108	333	514	575	888	69	5000	2×NBRA659	2×(2×SAFUR180F460)	ACS880-604-0640-3
1058	0.4	1635	252	162	500	771	862	1332	70	7500	3×NBRA659	3×(2×SAFUR180F460)	ACS880-604-0960-3
1411	0.3	2180	336	216	667	1028	1150	1776	71	10000	4×NBRA659	4×(2×SAFUR180F460)	ACS880-604-1280-3
1764	0.24	2725	420	270	833	1285	1437	2220	72	12500	5×NBRA659	5×(2×SAFUR180F460)	ACS880-604-1600-3
2117	0.2	3270	504	324	1000	1542	1724	2664	73	15000	6×NBRA659	6×(2×SAFUR180F460)	ACS880-604-1920-3

ACS880-604LC liquid cooled 1-phase brake units

$U_N = 690 \text{ V}$ (range 525 to 690 V)

Nominal ratings					Duty cycle (1min/5min)		Duty cycle (10s/60s)		Losses	Coolant flow rate ¹⁾	Air flow ²⁾	Module type	Brake resistor type	Type
P_{brmax} (kW)	R_{tot} (ohm)	I_{max} (A)	I_{rms} (A)	P_{brcont} (kW)	P_{br} (kW)	I_{rms} (A)	P_{br} (kW)	I_{rms} (A)	P_{loss} (kW)	(l/min)	(m ³ /h)			
Brake unit without brake resistor														
404	–	414	107	119	298	267	404	361	2.0	1.6	–	NBRW-669C	–	ACS880-604LC-0400-7
807	–	828	214	238	596	534	808	722	4.0	3.2	–	2×NBRW-669C	–	ACS880-604LC-0800-7
1211	–	1242	321	357	894	801	1212	1083	6.0	4.8	–	3×NBRW-669C	–	ACS880-604LC-1200-7
1615	–	1656	428	476	1192	1068	1616	1444	8.0	6.4	–	4×NBRW-669C	–	ACS880-604LC-1600-7
2019	–	2070	535	595	1490	1335	2020	1805	10.0	8.0	–	5×NBRW-669C	–	ACS880-604LC-2000-7
2422	–	2484	642	714	1788	1602	2424	2166	12.0	9.6	–	6×NBRW-669C	–	ACS880-604LC-2400-7

$U_N = 690 \text{ V}$ (range 525 to 690 V)

Nominal ratings					Duty cycle (1min/5min)		Duty cycle (10s/60s)		Coolant flow rate ¹⁾	Air flow ²⁾	Module type	Brake resistor type	Type
P_{brmax} (kW)	R_{tot} (ohm)	I_{max} (A)	I_{rms} (A)	P_{brcont} (kW)	P_{br} (kW)	I_{rms} (A)	P_{br} (kW)	I_{rms} (A)	(l/min)	(m ³ /h)			
Brake unit with the resistor													
404	1.35	835	97	54	167	149	287	257	1.6	1840	NBRW-669C	2×SAFUR200F500	ACS880-604LC-0400-7
807	0.68	1670	194	108	333	298	575	514	3.2	4340	2×NBRW-669C	2×(2×SAFUR200F500)	ACS880-604LC-0800-7
1211	0.45	2505	291	162	500	447	862	771	4.8	6180	3×NBRW-669C	3×(2×SAFUR200F500)	ACS880-604LC-1200-7
1615	0.34	3340	388	216	667	596	1150	1028	6.4	8020	4×NBRW-669C	4×(2×SAFUR200F500)	ACS880-604LC-1600-7
2019	0.27	4175	485	270	833	745	1437	1285	8.0	9860	5×NBRW-669C	5×(2×SAFUR200F500)	ACS880-604LC-2000-7
2422	0.23	5010	582	324	1000	894	1724	1542	9.6	11700	6×NBRW-669C	6×(2×SAFUR200F500)	ACS880-604LC-2400-7

¹⁾ Coolant flow rate is for the brake unit module only.

²⁾ Air flow is for the brake resistor only, which is air-cooled.

ACS880-604LC liquid cooled 3-phase dynamic brake units

$U_N = 690$ V (range 525 to 690 V)

Resistor values		Ratings R_{min}								Ratings R_{max}								Brake unit	Frame size
		No-overload use				Duty cycle (1min/5min)				No-overload use				Duty cycle (1min/5min)					
R_{min}	R_{max}	I_{dc}	I_{rms}	P_{cont}	I_{max}	I_{dc}	I_{rms}	R_{min}	P_{br}	R_{min}	I_{dc}	I_{rms}	P_{cont}	I_{max}	I_{dc}	I_{rms}	R_{min}	P_{br}	R_{min}
(ohm)	(ohm)	DC (A)	DC (A)	(kW)	DC (A)	DC (A)	DC (A)	DC (A)	(kW)	DC (A)	DC (A)	(kW)	DC (A)	DC (A)	DC (A)	DC (A)	DC (A)	(kW)	DC (A)
3.0	3.6	781	310	870	370	999	351	1110	781	283	870	312	833	293	920	ACS880-604LC-0870-7	R8i		
2.0	2.4	1171	465	1300	555	1499	527	1660	1171	425	1300	468	1249	439	1390	ACS880-604LC-1300-7	R8i		
3.0	3.6	1562	621	1730	740	1998	702	2220	1562	567	1730	625	1665	585	1850	ACS880-604LC-1730-7	2xR8i		
2.0	2.4	2342	931	2600	1110	2997	1053	3330	2342	850	2600	937	2498	878	2770	ACS880-604LC-2600-7	2xR8i		
2.0	2.4	3514	1396	3900	1665	4496	1580	4990	3514	1275	3900	1405	3746	1316	4160	ACS880-604LC-3900-7	3xR8i		
2.0	2.4	4685	1862	5200	2220	5994	2106	6650	4685	1700	5200	1874	4995	1755	5540	ACS880-604LC-5200-7	4xR8i		

Dimensions

	Type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
Brake unit	NBRW-669C	583.5	326	192	29
Brake unit	SAFUR200F500	1320	300	345	32

Ratings

Nominal ratings

P_{brmax}	Maximum short-term (1 min every 10 mins) braking power.
R_{tot}	Total brake resistor resistance of the whole brake unit.
I_{max}	Maximum peak current of the whole brake unit.
I_{rms}	Corresponding rms current per brake unit during load cycle.
P_{brcont}	Maximum continuous power rating.

Cyclic load (1 min/5 min)

P_{br}	Maximum braking power, allowed for 1 minute every 5 minutes.
I_{rms}	Total rms current during a period of 1 minute with braking power P_{br} .

Cyclic load (1 min/5 min)

P_{br}	Total rms current during a period of 10 seconds with braking power P_{br} .
I_{rms}	Maximum braking power, allowed for 10 seconds every 60 seconds

Losses

P_{loss}	Power loss conducted to coolant and emitted to air.
------------	---

Standard interface and extensions for plug-in connectivity

—
01 Control unit ZCU
—
02 Example of a typical drive modules input/output connection diagram. Variations may be possible. For further information, please see the ACS880 user manual.

ACS880 drive modules offer a wide range of standard interfaces including extensive selection of I/O connections, Safe Torque Off (STO) and a galvanically isolated RS485 link that can be configured as either Modbus RTU or high-speed drive-to-drive link.

In addition, the drive control unit (ZCU/BCU) has three option slots that can be used for extensions, including communication protocol adapters, input/output extension modules, feedback modules, and a safety functions module. For I/O extensions, see page 81.

External control unit BCU-X2 is used with all parallel connected modules, such as $n \times R8i$, $n \times DxT$, -04XT and 04FXT.



Control connections	Description
2 analog inputs (XAI)	Current input: -20 to 20 mA, R_{in} : 100 ohm Voltage input: -10 to 10 V, $R_{in} > 200$ kohm Resolution: 11 bit + sign bit
2 analog outputs (XAO)	0 to 20 mA, $R_{load} < 500$ ohm Frequency range: 0 to 300 Hz Resolution: 11 bit + sign bit
6 digital inputs (XDI)	Input type: NPN/PNP (DI1 to DI5), NPN (DI6) DI6 (XDI:6) can alternatively be used as an input for a PTC thermistor.
Digital input interlock (DIIL)	Input type: NPN/PNP
2 digital inputs/outputs (XDIO)	As input: 24 V logic levels: "0" < 5 V, "1" > 15 V R_{in} : 2.0 kohm Filtering: 0.25 ms As output: Total output current from 24 V DC is limited to 200 mA Can be set as pulse train input and output
3 relay outputs (XRO1, XRO2, XRO3)	250 V AC/30 V DC, 2 A
Safe torque off (XSTO)	For the drive to start, both connections must be closed
Drive-to-drive link (XD2D)	Physical layer: EIA-485
Built-in Modbus	EIA-485
Assistant control panel/PC tool connection	Connector: RJ-45

Relay outputs		XRO1, XRO2, XRO3		
Ready 250 V AC/30 V DC 2 A	NO COM NC	13 12 11		
Running 250 V AC/30 V DC 2 A	NO COM NC	23 22 21		
Faulted(-1) 250 V AC/30 V DC 2 A	NO COM NC	33 32 31		
External power input		XPOW		
24 V DC, 2 A	GND	2		
	+24VI	1		
Reference voltage and analog inputs		J1, J2, XAI		
AI1/AI2 current/voltage selection	AI1:U AI1:I AI2- AI2+	AI2:U AI2:I 7 6		
By default not in use. 0(4) to 20 mA, $R_{in} = 100 \text{ ohm}$	AI2-	7		
Speed reference 0(2) to 10 V, $R_{in} > 200 \text{ kohm}$	AI1-	5		
Ground	AI1+	4		
-10 V DC, $R_L 1 \text{ to } 10 \text{ kohm}$	AGND	3		
10 V DC, $R_L 1 \text{ to } 10 \text{ kohm}$	-VREF	2		
	+VREF	1		
Motor current 0 to 20 mA, $R_L < 500 \text{ ohm}$	AGND	4		
Motor speed rpm 0 to 20 mA, $R_L < 500 \text{ ohm}$	AO2	3		
	AGND	2		
	AO1	1		
Drive-to-drive link		J3, XD2D		
Drive-to-drive link termination	ON <input type="checkbox"/> OFF			
	Shield	4		
Drive-to-drive link or built-in Modbus	BGND	3		
	A	2		
	B	1		
Safe torque off		XSTO		
Safe torque off. Both circuits must be closed for the drive to start.	IN2	4		
	IN1	3		
	SGND	2		
	OUT	1		
Digital inputs		XDI		
By default not in use	DI6	6		
Constant speed 1 select (1=on)	DI5	5		
Acceleration and deceleration select	DI4	4		
Reset	DI3	3		
Forward (0)/Reverse (1)	DI2	2		
Stop (0)/Start (1)	DI1	1		
Digital input/outputs		XDIO		
Output: Running	DIO2	2		
Output: Ready	DIO1	1		
Ground selection		XD24		
Digital input/output ground	DIOGND	5		
+24 V DC 200 mA	+24VD	4		
Digital input ground	DICOM	3		
+24 V DC 200 mA	+24VD	2		
Digital interlock	DIIL	1		
Safety functions module connection		X12		
Control panel/PC connection		X13		
Memory unit connection		X205		

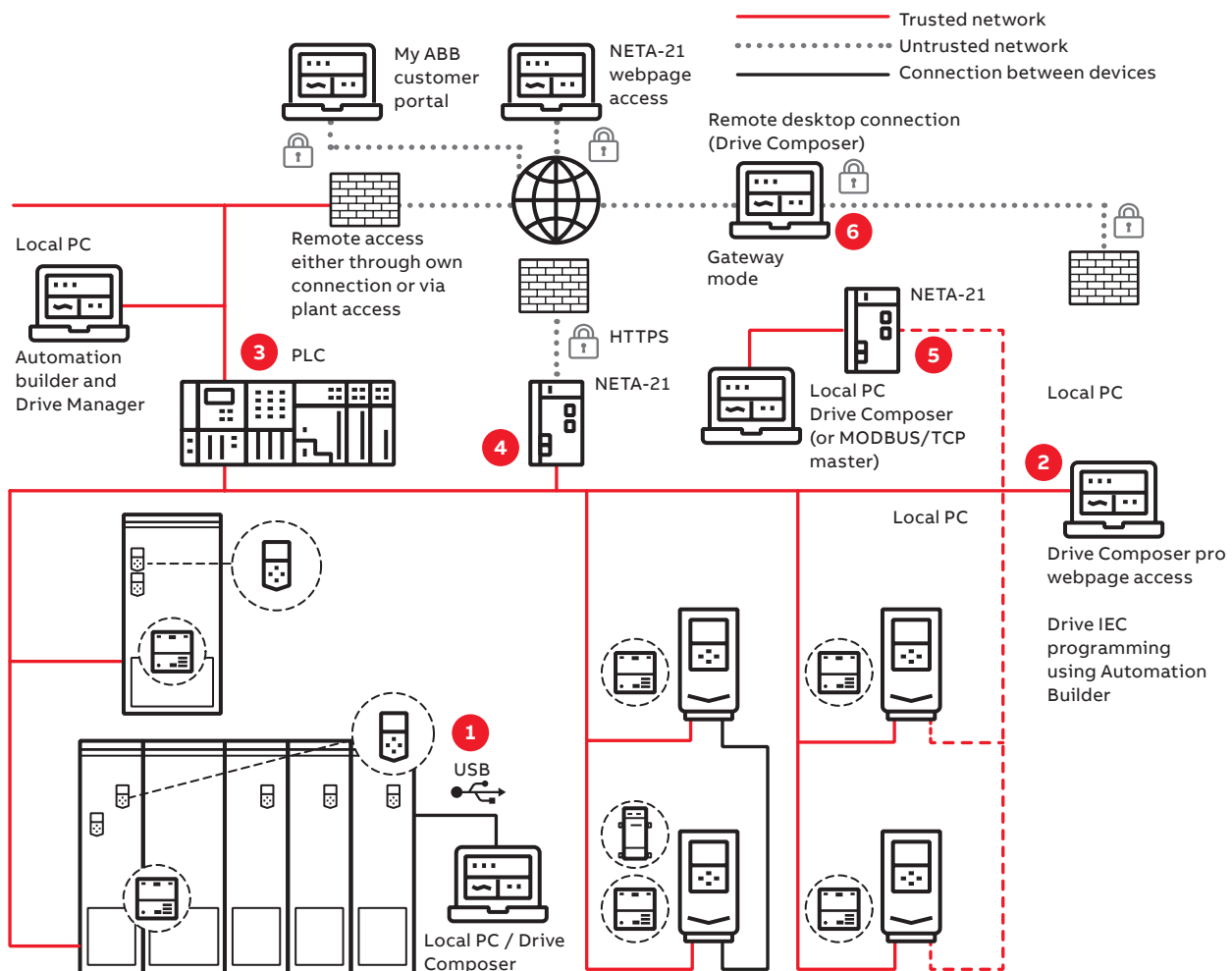
Communication and connectivity

Fast and reliable communication

The **F-series fieldbus adapter modules** are flexible, plug-in adapters that provide fast and simple universal connectivity to all major controllers. Universal connectivity means ABB low voltage drives connect to automation controllers and communication networks, allowing users to choose the best network to meet their needs.

- Reduces mechanical and electrical cost
- Decrease in downtime
- Increase in productivity
- Diminished start-up costs
- Lower maintenance and diagnostic costs
- Quick access to networked drives with PC-based start-up and maintenance software tools
- Reductions in wiring costs compared to traditional I/O connections

Industrial automation plant – different network possibilities and their secure deployment



1. Local connections (point-to-point serial communication, e.g. USB) or
2. Shared (with control) upper-level physical fieldbus network (e.g., PROFINET) using Ethernet tool communication and/or
3. Communicating also through PLC system using Drive Manager device tool or
4. NETA-21 remote monitoring tool web interface or
5. NETA-21 acting as a gateway between or
6. Third-party remote desktop connection.

Connectivity to automation systems

—
01
ACS880 is compatible with many communication protocols
—
02
Input/output extension modules

Communication protocol adapters

ACS880 industrial drives are compatible with a wide range of communication protocols. The drive comes with a Modbus RTU fieldbus interface as standard.

The ACS880 supports two different communication connections simultaneously and offers the possibility for redundant communication. PROFIsafe (functional safety over PROFINET) is also supported.

Communication protocol adapters

Option code	Ordering code for loose item	Communication protocol	Adapter
+K451	68469341	DeviceNet™	FDNA-01
+K454	68469325	PROFIBUS DP, DPV0/DPV1	FPBA-01
+K457	68469376	CANopen®	FCAN-01
+K458	3AUA0000031336	Modbus RTU	FSCA-01
+K462	3AUA0000094512	ControlNet	FCNA-01
+K469	3AUA0000072069	EtherCAT®	FECA-01
+K470	3AXD5000019239	POWERLINK	FEPL-02
+K491	3AXD5000049964	Modbus/TCP	FMBT-21
+K492	3AXD50000192779	PROFINET IO	FPNO-21 ¹⁾
+K490	3AXD50000192786	EtherNet/IP	FEIP-21
+Q986	3AXD50000112821	PROFIsafe safety functions module	FSPS-21

¹⁾ For the PROFIsafe to work the PROFINET adapter module (FPNO-21) and the safety functions module FSO-12 (+Q973) or FSO-21 (+Q972) are required. The FPNO-21 adapter module enables PROFINET system redundancy S2 allowing the drive to establish connection with two control PLCs in a redundant manner.



01

02

Input/output extension modules

Standard input and output can be extended by using optional analog and digital input/output extension modules. The modules are easily installed in the extension slots located on the drive.

If there are not enough I/O extension slots in the drive, the FEA-03 module can increase the number of slots. The FEA-03 has two option slots for digital I/O extensions and speed feedback interface modules. The connection to the control unit is via an optical fiber link, and the adapter can be mounted on a DIN rail (35 × 7.5 mm).

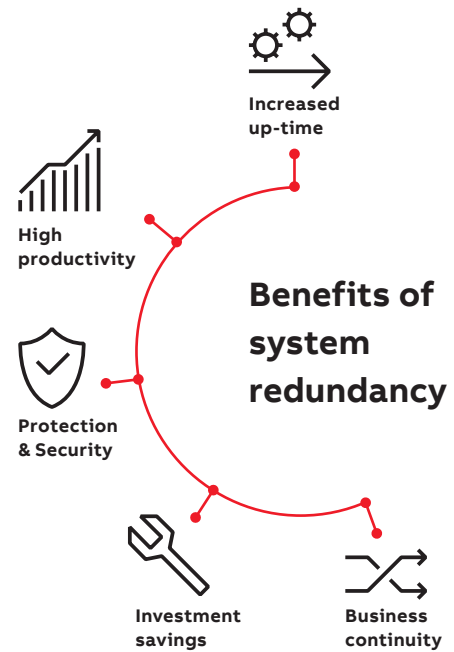
Analog and digital input/output extension modules

Option code	Ordering code for loose item	Description	I/O module
+L501	68805368	4×DI/O, 2×RO	FIO-01
+L500	68805384	3×AI (mA/V), 1×AO (mA), 2×DI/O	FIO-11
+L515	3AUA0000108669	2×F-type option extension slots	FEA-03
+L525	3AUA0000141436	2×AI (mA/V), 2×AO (mA)	FAIO-01
+L526	3AUA0000141438	3×DI (up to 250 V DC or 230 V AC), 2×RO	FDIO-01

PROFINET S2 system redundancy for ABB drives

System redundancy is a high-priority requirement in process industry and infrastructure installations where the system must be operational even during component breakdowns and malfunctioning. The interruption of a continuous production process could potentially lead to large financial losses or safety hazards. Thanks to the new PROFINET S2 system redundancy of ABB drives, the unwanted downtime can be minimized. This leads to better process control with improved productivity.

PROFINET system redundancy S2 is now available for ABB drives with the optional PROFINET interface module FPNO-21. It allows the drive to establish connection with two control PLCs in a redundant manner.



PROFINET IO
2 ports interface module.
Certified according to
Conformance Class B (CC-B)

SNTP Time synchronization

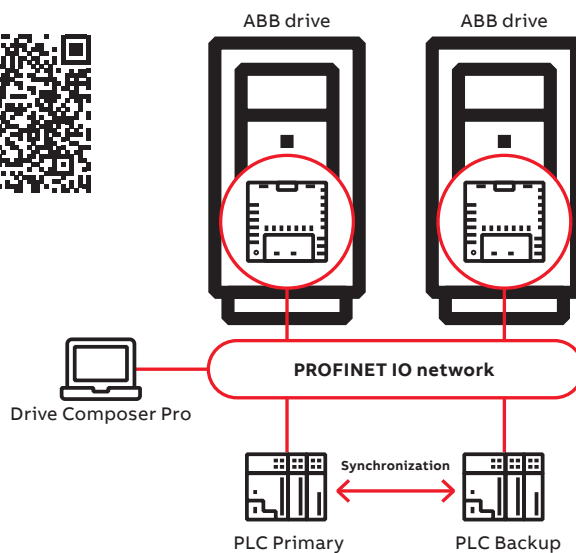


Ethernet tool network
PROFINET IO at the same time
with Drive Composer pro

PROFINET Shared Device
PROFIsafe support with FSO-12/-21
safety functions module

F

PROFINET S2 system redundancy



Feedback interface and DDCS communication options

—
01
FEN-01 TTL encoder
interface module
—
02
FDCO-01 DDCS
communication module

Speed feedback interfaces for precise process control

ACS880 drives can be connected to various feedback devices, such as HTL pulse encoders, TTL pulse encoders, absolute encoders and resolvers. The optional feedback module is installed in the option slot on the drive. It is possible to use two feedback modules at the same time, either of the same type or different types*).

*) Excluding FSE-31.



—
01

Feedback interface modules

Option code	Ordering code for loose item	Description	Feedback module
+L517	68805422	2 inputs (TTL pulse encoder), 1 output	FEN-01
+L518	68805830	2 inputs (SinCos absolute, TTL pulse encoder), 1 output	FEN-11
+L516	68805848	2 inputs (Resolver, TTL pulse encoder), 1 output	FEN-21
+L502	68978955	1 input (HTL pulse encoder), 1 output	FEN-31
+L521	3AXD5000023272	Pulse encoder interface for functional safety (for more details see section "Safety options")	FSE-31

DDCS communication option modules

The FDCO-0X optical DDCS communication options are add-on modules on the ACS880 industrial drives control unit. The modules include connectors for two fiber optic DDCS channels. The FDCO-0X modules make it possible to perform master-follower and AC800 M communication. Alternative way for drive to drive communication is to use the standard RS485 connection.



—
02

Optical communication modules

Option code	Ordering code for loose item	Description	Module
+L503	3AUA0000107392	Optical DDCS (10 Mbd/10 Mbd)	FDCO-01
+L508	3AUA0000107393	Optical DDCS (5 Mbd/10 Mbd)	FDCO-02

NETA-21


NETA-21 connects the drive to the cloud via the Internet or local Ethernet network.

The remote data helps you to base your decisions on solid facts and run your operations better and safer.

Remote monitoring helps you to recognize early signs of potential failures and react before a problem occurs. You can also remotely access the data from ABB drives to analyze and find the root cause of a problem.

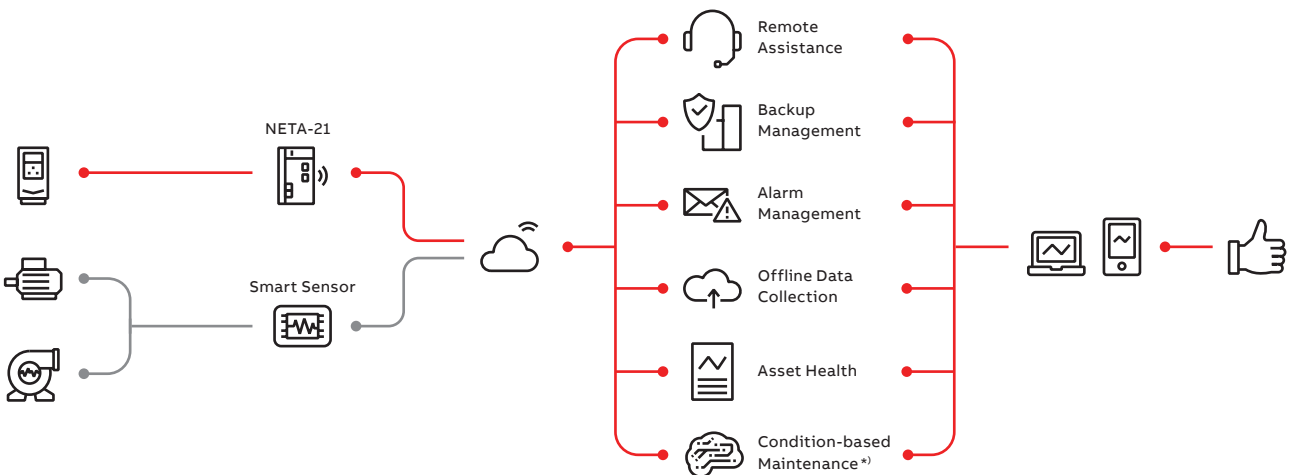
With remote access you can analyze and optimize drive information anywhere, even in sites that are difficult to access, or when site visit is not possible.

- The module comes with a built-in web server and requires no Flash/Java plugins
- In the absence of a customer local area network, it can be connected via a mobile network router (either Ethernet or USB network adapter)
- One module can be connected to several drives at the same time

NETA-21 ^{*)}	Ordering code	Description
	3AUA0000094517	2 x panel bus interface max. 9 drives 2 x Ethernet interface SD memory card
	+K496	Connectivity for wired remote monitoring with NETA-21
	+K497	Connectivity for wireless remote monitoring with 4G modem and NETA-21

^{*)} Following options available for ACS880-07, -17 and -37

Customers can configure powertrains and customize the digital service plan



^{*)} Not available for all connectivity devices

Safety options

—
01
ACS880 drive with FSO-21, FSE-31 and FENA-21

Integrated safety

Integrated safety reduces the need for external safety components, simplifying configuration and reducing installation space. The safety functionality is a built-in feature of the ACS880, with safe torque off (STO) as standard. The STO function corresponds to an uncontrolled stop in accordance with stop category 0 of EN 60204-1. Additional safety functions can be commissioned with the optional and compact safety functions module. ACS880 drives offer functional safety with or without encoder. The drive's functional safety is designed in accordance with EN/IEC 61800-5-2 and complies with the requirements of the European Union Machinery Directive (2006/42/EC).

The safety functions are certified by TÜV Nord and comply with the highest performance requirements (SIL 3/PL e) in machinery safety.¹⁾

The safety functions module can also be ordered separately and installed afterwards to the drive.

PROFIsafe safety functions module, FSPS-21, with integrated PROFIsafe, and PROFINET IO connection supports STO and SS1-t safety functions. Since the functions are automatically configured, no additional safety settings are required in the drive.

Safety functions modules, FSO-12 and FSO-21, support a wide range of safety functions. Configuration of the functions is done with the Drive Composer pro PC tool, which provides an easy-to-use graphical user interface. Larger safety systems can be built using PROFIsafe over PROFINET connection between a safety PLC (such as AC500-S) and the ACS880 drive.

Safety function modules

Option code ²⁾	Ordering code for loose item	Description	Safety module
+Q973	3AXD50000016771	Safety functions module FSO-12	FSO-12
+Q972+L521	3AXD50000023987 + 3AXD50000023272	Safety functions module FSO-21 and encoder FSE-31	FSO-21+FSE-31
+Q971	—	ATEX-certified safe disconnection function, EX II (2) GD	
+Q982	—	PROFIsafe safety communication to be used together with FSO-12 or FSO-21: forces to select a functional safety module and PROFINET adapter, FPNO-21	FSO-12 or FSO-21 +FPNO-21
+Q986 ³⁾	3AXD50000112821	PROFIsafe safety functions module FSPS-21	FSPS-21
+L536	3AXD50000024934	Thermistor protection module FPTC-01	FPTC-01
+L537+Q971	3AXD50000024924	ATEX-certified thermistor protection module FPTC-02, Ex II (2) GD	FPTC-02

¹⁾ Thermistor modules comply with SIL 2 / PL c.

²⁾ Plus codes are valid for ACS880-01/11/31/04/04F and -14/34 frame R11.

³⁾ Please contact your local ABB office to check availability.



—
01

The connection is achieved by adding a PROFINET adapter, FPNO-21, to the drive.

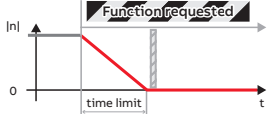
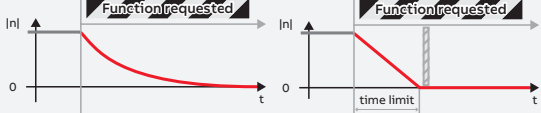
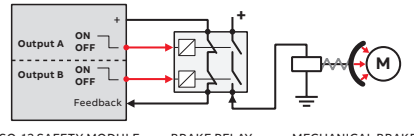
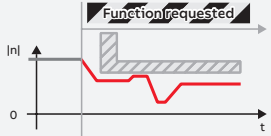

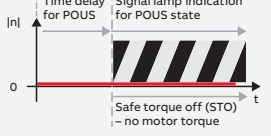
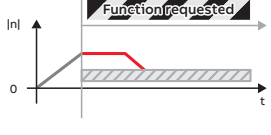
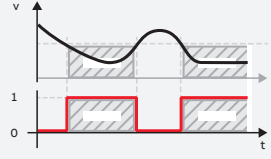
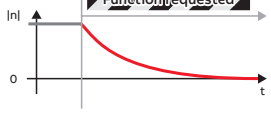
Supported safety functions:

- Encoderless: SS1-t, SS1-r, SLS, SBC, SMS, SSE, POUS, STO
- With encoder (requires FSO-21 + FSE-31): SDI, SSM, SS1-t, SS1-r, SLS, SBC, SMS, SSE, POUS, STO

Pulse encoder interface module, FSE-31, provides safe encoder data to the safety functions module, and can simultaneously be used as a feedback device for the drive. FSE-31 requires an FSO-21 safety functions module and supports HTL encoders.

Thermistor protection modules, FPTC-01 and FPTC-02

Safe temperature monitoring (STM) can be achieved by using FPTC thermistor protection modules.¹⁾

Safety function	Description	Supported functions			
		FSPS-21 (SS1-t)	FSO-12 without encoder (SS1-t) (SS1-r)	FSO-21 + FSE-31 + HTL encoder (SS1-t) (SS1-r)	
Safe stop 1 SS1-t SS1-r	Brings the machine to a stop using a monitored deceleration ramp. It is typically used in applications where the machinery motion needs to be brought to a stop (stop category 1) in a controlled way before switching over to the no-torque (STO) state	x	x	x	
Safe stop emergency SSE	Can be configured to, upon request, either activate STO instantly (category 0 stop), or first initiate motor deceleration and then, once the motor has stopped, activate the STO (category 1 stop).		x	x	
Safe brake control SBC	Provides a safe output for controlling the motor's external (mechanical) brakes, together with STO.		x	x	 FSO-12 SAFETY MODULE BRAKE RELAY MECHANICAL BRAKE
Safely-limited speed SLS	Ensures that the specified speed limit of the motor is not exceeded. This allows machine interaction to be performed at slow speed without stopping the drive. The safety function module comes with four individual SLS settings for speed monitoring.		x	x	
Safe maximum speed SMS	Monitors that the speed of the motor does not exceed the configured maximum speed limit.		x	x	
Prevention of unexpected start-up POUS	Ensures that the machine remains stopped when people are in the danger area.		x	x	
Safe direction SDI	Ensures that rotation is allowed only in the selected direction (available only with FSO-21 and FSE-31).			x	
Safe speed monitor SSM	Provides a safe output signal to indicate whether the motor speed is between user-defined limits (available only with FSO-21).			x	
Safe torque off STO	Brings the drive safely to a no-torque state, i.e. switches off the drive output to the motor, motor speed then coasts to a stop. ACS880 has safe torque off as standard.	x	x	x	

EMC – electromagnetic compatibility

Each ACS880 model can be equipped with a built-in filter to reduce high-frequency emissions.

What is EMC?

EMC stands for electromagnetic compatibility. It is the ability of electrical/electronic equipment to operate without problems in an electromagnetic environment.

Likewise, the equipment must not disturb or interfere with any other product or system in its locality. This is a legal requirement for all equipment taken into service within the European Economic Area (EEA).

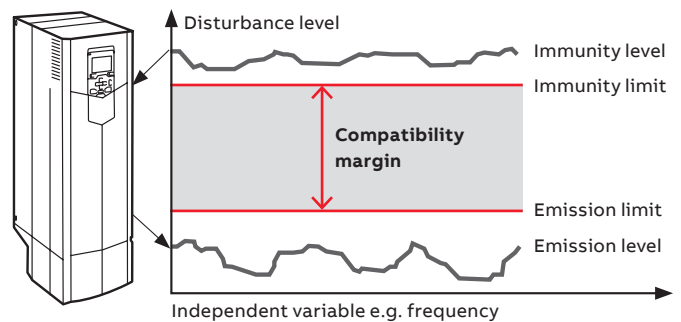
Installation environments

A power drive system (PDS) can be connected to either industrial or public power distribution networks. The environment class depends on the way the PDS is connected to power supply.

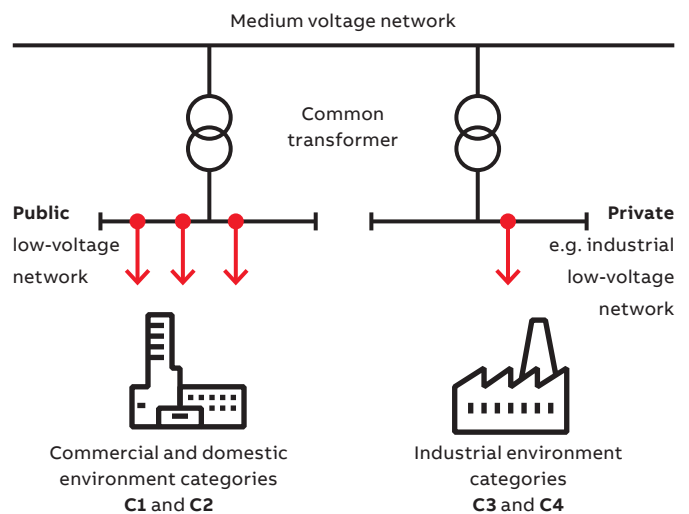
The **1st environment** includes domestic premises. It also includes establishments directly connected without an intermediate transformer to a low voltage power supply network that supplies buildings used for domestic purposes.

The **2nd environment** includes all establishments directly connected to public low voltage power supply networks.

Immunity and emission compatibility



Installation environments



The product standard EN 61800-3 divides PDSs into four categories according to the intended use

C1 – 1st environment

- Household appliances
- Usually plug connectable to any wall outlet
- Anyone can connect these to the network
- Examples: washing machines, TV sets, computers, microwave ovens, etc.

C2 – 1st environment

- Fixed household and public appliances
- Need to be installed or operated by a professional
- Examples: elevators, rooftop fans, residential booster pumps, gates and barriers, supermarket freezers, etc.

C3 – 2nd environment

- Professional equipment
- Needs to be installed or operated by a professional
- In some rare cases, may also be pluggable
- Examples: any equipment for industrial usage only, such as conveyors, mixers, etc.

C4 – 2nd environment

- Professional equipment
- Needs to be fixed installation and operated by a professional
- Examples: paper machines, rolling mills, etc.

Comparison of EMC standards

EN 61800-3, product standard	EN 61800-3, product standard	EN 55011, product family standard for industrial, scientific and medical (ISM) equipment	EN 61000-6-4, generic emission standard for industrial environments	EN 61000-6-3, generic emission standard for residential, commercial and light-industrial environments
Category C1	1 st environment, unrestricted distribution	Group 1. Class B	Not applicable	Applicable
Category C2	1 st environment, restricted distribution	Group 1. Class A	Applicable	Not applicable
Category C3	2 nd environment, unrestricted distribution	Group 2. Class A	Not applicable	Not applicable
Category C4	2 nd environment, restricted distribution	Not applicable	Not applicable	Not applicable

Selecting an EMC filter

Drive type	Voltage (V)	Frame sizes	1 st environment, restricted distribution, C2, grounded network (TN) Option code	2 nd environment, C3, grounded network (TN) Option code	2 nd environment, C3, ungrounded network (IT) Option code	2 nd environment, C4, grounded network (TN) ⁴⁾
ACS880-01	208 to 240		R1 to R8	+E202	+E200	–
ACS880-01	380 to 500	R1 to R9	+E202	+E200	+E201 ¹⁾	As standard
ACS880-01	525 to 690	R3 to R9	–	+E200	+E201 ¹⁾	As standard
ACS880-04	380 to 500	R10, R11	+E202	+E200	+E201	As standard
ACS880-04	525 to 690	R10, R11	–	+E200	+E201	As standard
ACS880-04	380 to 690	nxD8T+ nXR8i	Not for 690 V. Only for 1xD8T ²⁾	As standard ³⁾	As standard ³⁾	As standard
ACS880-04F	380 to 690	R11	–	+E200	+E201	As standard
ACS880-04XT	380 to 500	2xR10/11	ARFI-10	+E200	+E201	As standard
ACS880-04XT	525 to 690	2xR10/11	–	+E200	+E201	As standard
ACS880-04FXT	380 to 500	nXR11	ARFI-10	+E200	+E201	As standard
ACS880-04FXT	525 to 690	nXR11	–	+E200	+E201	As standard
ACS880-11	380 to 500	R3 to R8	+E202 (not available for R6)	+E200	+E201	As standard
ACS880-31	380 to 500	R3 to R8	+E202 (not available for R6)	+E200	+E201	As standard
ACS880-14	380 to 690	R11	+E202	+E200	–	As standard
ACS880-14	380 to 690	2xR8i	Not for 690 V. Only for 1xR8i ²⁾	As standard ³⁾	As standard ³⁾	As standard
ACS880-34	380 to 690	R11	+E202	+E200	–	As standard
ACS880-34	380 to 690	2xR8i	Not for 690 V. Only for 1xR8i ²⁾	As standard ³⁾	As standard ³⁾	As standard
ACS880-104	380 to 690	R1 to nXR8i	–	As standard ³⁾	As standard ³⁾	As standard
ACS880-204	380 to 690	R1i to R4i, R6i, nXR8i	Not for 690 V. Only for sizes up to 1xR8i ²⁾	As standard ³⁾	As standard ³⁾	As standard
ACS880-304	380 to 690	DxD, nxDXT	Not for 690 V. Only for 1xD8T ²⁾	As standard ³⁾	As standard ³⁾	As standard
ACS880-104LC	525 to 690	nXR8i	–	As standard ³⁾	As standard ³⁾	As standard
ACS880-904	380 to 690	nXR8i	–	As standard ³⁾	As standard ³⁾	As standard
ACS880-204LC	525 to 690	nXR8i	–	As standard ³⁾	As standard ³⁾	As standard
ACS880-304LC	525 to 690	nxD8D, nxD8T	–	As standard ³⁾	As standard ³⁾	As standard

¹⁾ 2nd environment, C4: ACS880-01, 380 to 500 V, frame sizes R1 to R5. ACS880-01, 690 V, frame sizes R3 to R6.

²⁾ For Category C2 optional equipment is needed, and the drive must be installed according to the instructions given in the manuals.

³⁾ For Category C3 no optional equipment is needed, but the drive must be installed according to the instructions given in the manuals.

⁴⁾ For Category C4 no optional equipment is needed, but the drive must be installed according to the instructions given in the manuals. EMC plan required.

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