

How can efficiency, power quality and high process availability be combined?



With the proven air-cooled
ROBICON Perfect Harmony drives.

Answers for industry.

SIEMENS

ROBICON Perfect Harmony

Air-Cooled Proven Performance



The ROBICON Perfect Harmony Air-Cooled medium voltage variable frequency drives (VFDs) from Siemens are designed to provide maximum versatility, efficiency and process availability.

The ROBICON Perfect Harmony air-cooled GenIIIe and GenIV deliver outstanding core characteristics and significant competitive advantages – such as high-power quality input and output, along with high availability.

Adding to the versatility of the ROBICON Perfect Harmony drive is available forced-air-cooling on the GenIIIe and GenIV. Redundant blowers are an option for all air-cooled units.

These fully integrated Variable Frequency Drive systems in a single lineup include the isolation transformer, power electronics, and control and cooling systems. There is no customer site cabling required to connect the assembled sections, and access to all components is easy. The control panel swings out for access to power and motor connections, and cells can be pulled out easily when maintenance is required.

Features and Benefits

The ROBICON Perfect Harmony air-cooled VFD at a glance

- Reliable Air-Cooled design
- Clean power input (meets IEEE-519)
- 0.95 power factor throughout speed range
- Near perfect sinusoidal output allows retrofit to existing motors
- Multi-level PWM technology means no special motor is required
- Can be applied to induction, synchronous and wound rotor motors
- Control drive tool (Windows interface)
- Proven Perfect Harmony topology
- High-availability options for advanced cell bypass (ProToPS)
- Option for redundant blowers



Advanced Cell Bypass

The Advanced Cell Bypass feature enables the ROBICON Perfect Harmony air-cooled drives to remain operational in the event of a cell failure by bypassing a faulted cell. Depending on the process requirement and the Variable Frequency Drive configuration, a cell fault could have minimal or no impact on the process; the motor output power quality remains within defined guidelines.

ProToPS Process-First Mentality

ROBICON Perfect Harmony's Process Tolerant Protection Strategy (ProToPS) provides a hierarchical system of warnings that keep ROBICON Perfect Harmony air-cooled drives on line and in control of your process. Drive trips and process interruptions only occur in extreme circumstances. ProToPS allows time for the operator to evaluate a VFD disturbance and respond appropriately to avoid system shutdown.

Technical Data at a glance:



Specification

Line supply connection

- Line voltage: 2.3 to 13.8 kV +10% / -5%
- Frequency: 50/60 Hz +/- 2.5/3.0 Hz
- Line power factor: > 0.95
- Top or bottom cable entry

Motor connection

- Motor voltages:
 - GenIV 2.3 to 6.6 kV
 - GenIIIe 2.3 to 7.2 kV
- Top or bottom cable entry

Power quality

- Converter efficiency (without transformer): > 98.5%
- Total VFD system efficiency: > 96.5%

Auxiliary voltage

- 380 V / 50 Hz, 400 V / 50 Hz, 415 V / 50 Hz*
- 460 V / 60 Hz, 480 V / 60 Hz*

Line-side rectifier

- Integrated isolation transformer with aluminum or optional copper windings
- Minimum 18-pulse diode rectifier without regenerative feedback

Motor-side inverter

- Multi-level PWM topology
- LV-IGBT power cells

Cooling

- Forced-air-cooled with optional redundant fans

Degree of protection

- NEMA 1 / IP21, optional up to IP42

Environmental conditions

- Temperature: 0–40°C (32–104°F), up to 50°C (122°F) with derating
- Installation altitude: up to 1000 m (3300 ft) and up to 4000 m (13,200 ft) with derating
- Humidity: < 95% without moisture condensation

* others are optionally available



Safety features (not complete)

- Short circuit and ground fault protection
- Over-current, over- and under-voltage protection
- Loss of line voltage protection
- Over-temperature protection (VFD and motor)
- Over-speed and stall protection (motor)
- Monitoring of cooling circuit
- Self-diagnosis of control and power cells

Control

- V/Hz control without speed encoder
- Vector control with and without speed encoder (optional)
- Speed accuracy: +/- 0.1% with speed encoder, +/- 0.5% without speed encoder
- Torque accuracy: +/- 2%
- Field weakening range 1:3
- Maximum output frequency: 330 Hz (above 167 Hz with derating)

Control I/O

- Analog inputs: 3*
- Analog outputs: 2*
- Digital inputs: 20*
- Digital outputs: 16*
- Speed encoder (optional)
- Communication: Modbus, optional: DeviceNet, PROFIBUS, Control Net*

* additional using optional modules

Standards

- NEMA, CE, UL, CSA

Selection of additional options

- ProToPS process-tolerant protection system
- Redundant fans
- Advanced cell bypass
- EMC filter
- Anti-condensation heater
- Increase of protection class up to IP42
- Keyed interlock systems
- Duct flanged for connection to an external exhaust system
- Additional I/O modules
- Serial communication with various bus systems
- Control and display instruments in the door
- Ethernet and/or RS232 port connectors
- PT100 monitoring (motor windings and bearings)
- Distribution class surge arrestors (transformer)
- Input and output earthing switch
- Choke for long cable lengths

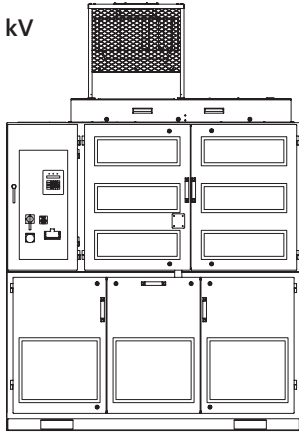
Motor voltage 3.3 kV								
Output current [A]	Type rating [kVA]	Shaft output		Transformer [kVA]	Order number (MLFB)	Generation	No. of cells	Outline
		[kW]	[hp]					
40	225	189	254	300	6SR4102-0[A33-0][[]]0	GenIV	9	A
70	400	331	444	450	6SR4102-0[B34-5][[]]0	GenIV	9	A
100	570	473	634	700	6SR4102-0[C37-0][[]]0	GenIV	9	A
140	800	662	887	900	6SR4102-0[D38-7][[]]1	GenIV	9	A
200	1140	970	1300	1500	6SR4102-0[E41-5][[]]0	GenIV	9	A
260	1485	1261	1690	1750	6SR4102-0[F41-7][[]]0	GenIV	9	A
315	1800	1527	2047	2250	6SR3102-1[G42-2][[]]0	GenIIIe	9	B
375	2140	1818	2437	2500	6SR3102-1[H42-5][[]]0	GenIIIe	9	B
500	2855	2424	3250	3500	6SR3102-1[J43-5][[]]0	GenIIIe	9	B

Motor voltage 4.0/4.16 kV								
Output current [A]	Type rating [kVA]	Shaft output		Transformer [kVA]	Order number (MLFB)	Generation	No. of cells	Outline
		[kW]	[hp]					
40	275	229	307	400	6SR4102-0[A34-0][[]]0	GenIV	9	A
70	480	401	538	600	6SR4102-0[B36-0][[]]0	GenIV	9	A
100	690	573	768	800	6SR4102-0[C38-0][[]]0	GenIV	9	A
140	965	802	1075	1100	6SR4102-0[D41-1][[]]0	GenIV	9	A
200	1385	1175	1576	1750	6SR4102-0[E41-7][[]]0	GenIV	9	A
260	1800	1528	2048	2250	6SR4102-0[F42-2][[]]0	GenIV	9	A
315	2265	1925	2581	3000	6SR3102-3[G43-0][[]]0	GenIIIe	12	B
375	2700	2292	3073	3500	6SR3102-3[H43-5][[]]0	GenIIIe	12	B
500	3600	3056	4097	5000	6SR3102-3[J45-0][[]]0	GenIIIe	12	B
660	4755	4034	5408	6000	6SR3102-3[K46-0][[]]0	GenIIIe	12	B

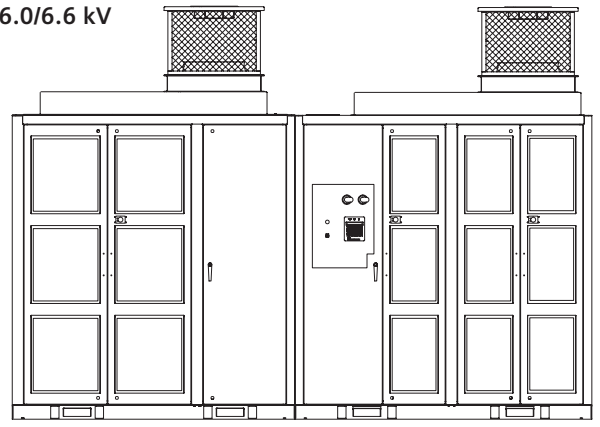
Motor voltage 6.0 kV								
Output current [A]	Type rating [kVA]	Shaft output		Transformer [kVA]	Order number (MLFB)	Generation	No. of cells	Outline
		[kW]	[hp]					
40	415	344	461	500	6SR4102-2[A35-0][[]]0	GenIV	15	C
70	725	602	807	900	6SR4102-2[B38-7][[]]0	GenIV	15	C
100	1035	860	1152	1250	6SR4102-2[C41-2][[]]0	GenIV	15	C
140	1450	1203	1613	1750	6SR4102-2[D41-7][[]]0	GenIV	15	C
200	2075	1763	2363	2500	6SR4102-2[E42-5][[]]0	GenIV	15	C
260	2700	2292	3073	3500	6SR4102-2[F43-5][[]]0	GenIV	15	C
315	3270	2777	3722	4000	6SR3102-5[G44-0][[]]0	GenIIIe	15	B
375	3895	3306	4432	5000	6SR3102-5[H45-0][[]]0	GenIIIe	15	B
500	5195	4408	5909	6000	6SR3102-5[J46-0][[]]0	GenIIIe	15	B
660	6855	5818	7800	8000	6SR3102-5[K48-0][[]]0	GenIIIe	15	B

Motor voltage 6.6 kV								
Output current [A]	Type rating [kVA]	Shaft output		Transformer [kVA]	Order number (MLFB)	Generation	No. of cells	Outline
		[kW]	[hp]					
40	455	378	507	600	6SR4102-2[A36-0][[]]0	GenIV	15	C
70	800	662	887	900	6SR4102-2[B38-7][[]]0	GenIV	15	C
100	1140	946	1268	1500	6SR4102-2[C41-5][[]]0	GenIV	15	C
140	1600	1324	1775	2000	6SR4102-2[D42-0][[]]0	GenIV	15	C
200	2285	1939	2600	3000	6SR4102-2[E43-0][[]]0	GenIV	15	C
260	2970	2521	3380	3500	6SR4102-2[F43-5][[]]0	GenIV	15	C
315	3600	3055	4095	5000	6SR3102-7[G45-0][[]]0	GenIIIe	18	B
375	4285	3636	4875	5000	6SR3102-7[H45-0][[]]0	GenIIIe	18	B
500	5715	4849	6500	7000	6SR3102-7[J47-0][[]]0	GenIIIe	18	B
615	7040	5968	8000	8000	6SR3102-7[K48-0][[]]0	GenIIIe	18	B

A: GenIV_4.0/4.16 kV

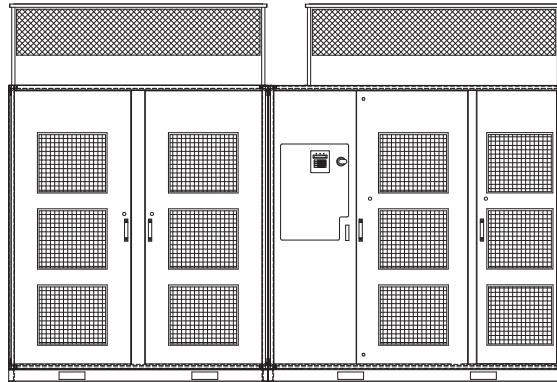


C: GenIV_6.0/6.6 kV



Output Voltage	Motor		System Cabinet Sizing							
			Cabinet Length		Cabinet Height ¹⁾		Cabinet Depth		Blower Cage Height	
	[kW]	[hp]	mm	inch	mm	inch	mm	inch	mm	inch
4.0/4.16 kV	148–814	200–1100	1676	66	2184	86	1067	42	610	24
	925–1665	1250–2250	2083	82	2184	86	1143	45	851	33.5
6.0/6.6 kV	222–925	300–1250	4166	164	2289	90.1	1143	45	638	25.1
	1110–2590	1500–3500	4166	164	2289	90.1	1143	45	638	25.1

B: GenIIIe



Output Voltage	Motor		System Cabinet Sizing							
			Cabinet Length		Cabinet Height ¹⁾		Cabinet Depth		Blower Cage Height	
	[kW]	[hp]	mm	inch	mm	inch	mm	inch	mm	inch
3.3 kV	1295–1850	1750–2500	4369	172	2324	91.5	1270	50	648	25.5
	2220–2960	3000–4000	4775	188	2324	91.5	1270	50	673	26.5
4 kV	1480–1850	2000–2500	4877	192	2324	91.5	1270	50	673	26.5
	2220–2960	3000–4000	5283	208	2324	91.5	1270	50	673	26.5
	3700–4440	5000–6000	5893	232	2324	91.5	1270	50	724	28.5
6 kV	1665–1850	2250–2500	5893	232	2324	91.5	1372	54	724	28.5
	2220–2960	3000–4000	6299	248	2324	91.5	1372	54	724	28.5
	3700–4440	5000–6000	6909	272	2324	91.5	1372	54	724	28.5
	5180	7000	6909	272	2527	99.5	1372	54	724	28.5
6.6 kV–7.2 kV	1850	2500	5893	232	2324	91.5	1372	54	724	28.5
	2220–2960	3000–4000	6299	248	2324	91.5	1372	54	724	28.5
	3700–4440	5000–6000	6909	272	2324	91.5	1372	54	724	28.5
	5180–5920	7000–8000	6909	272	2527	99.5	1372	54	724	28.5

¹⁾ Height without blowers

Dimensions may vary depending on manufacturing location

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