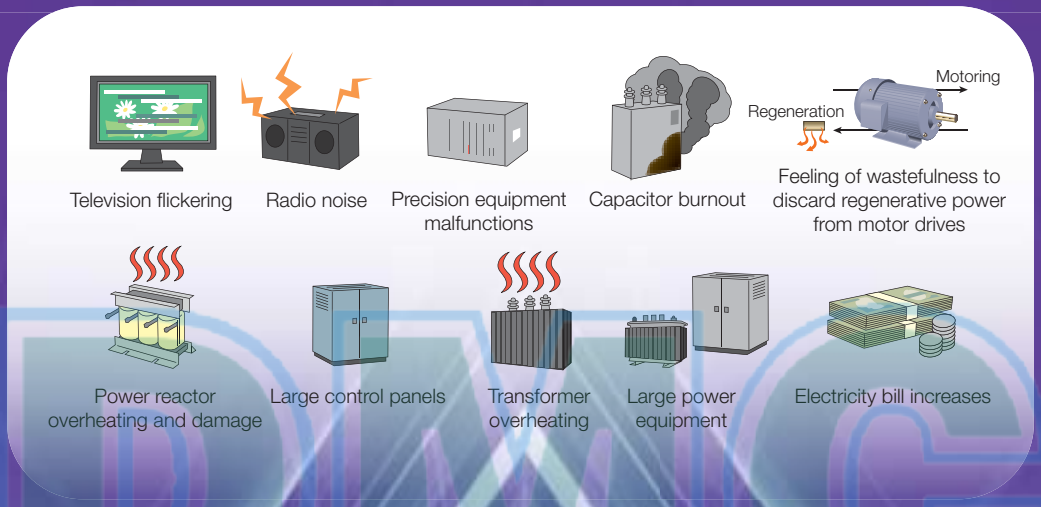
YASKAWA

Have you ever faced these situations?



U1000 can solve all these situation

Drives Motors Controls

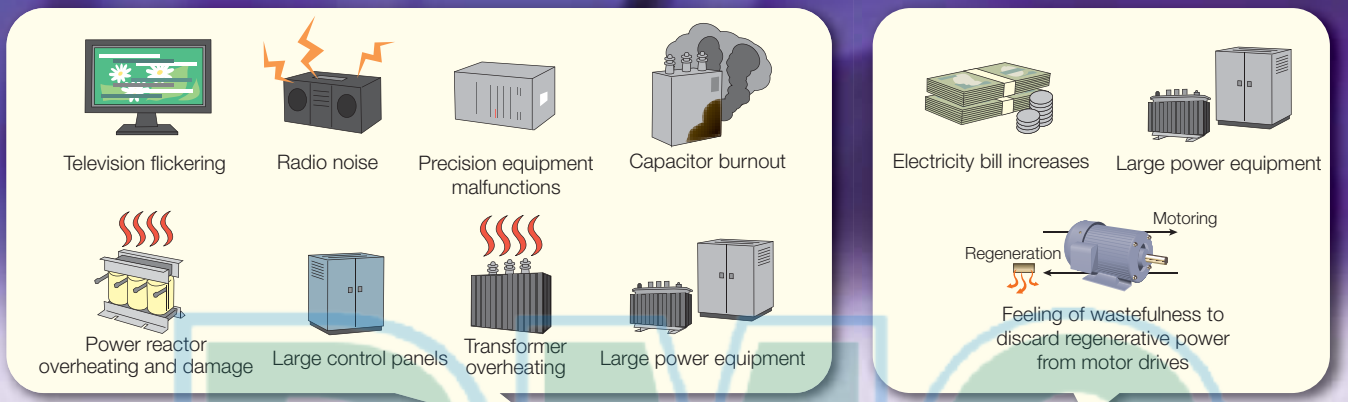
Yaskawa Matrix Converter

U1000

Matrix Innovation

The All-in-one U1000 can achieve " Low Harmonics " and " Power Regeneration " in itself

We were the first company in the world to successfully apply and commercialize converter technology.
We released the further evolution to this in April 2014 – the Yaskawa Matrix Converter U1000.
The U1000 achieves low harmonics and power regeneration in itself by AC-AC direct power conversion.
It has now become possible to solve various problems affecting drive devices.

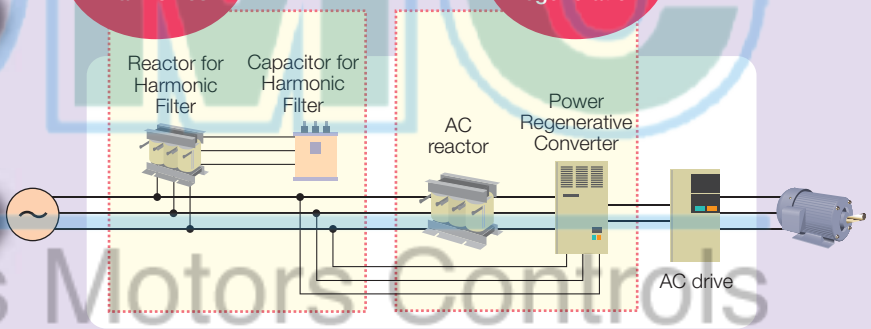


Two issues

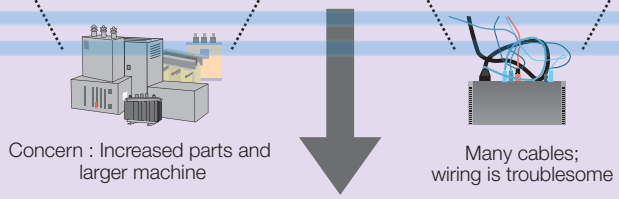
Point 1 Low Harmonics

Point 2 Power Regeneration

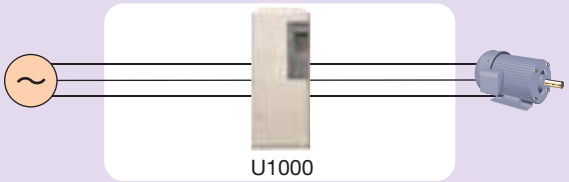
AC drive solution



Further concerns



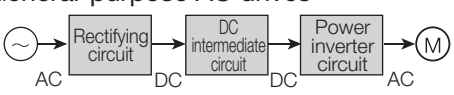
Try the all-in-one U1000



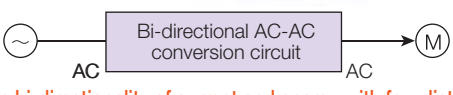
AC-AC direct power conversion can solve your concerns

Achieve " Low Harmonics " and " Power Regeneration "

General-purpose AC drives

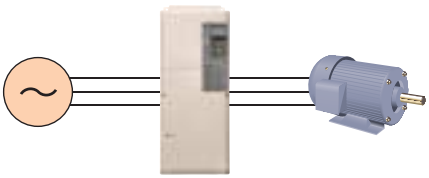


U1000



Achieve bi-directionality of current and energy with few distortions

U1000 Applications



Cooling towers

Building air conditioning

Pumps

Fans

Compressors

Medical equipment

Data centers

Conveyors

Escalators

Low Harmonics

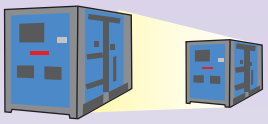
Harmonic current is generated in building air conditioning and compressors due to distortions in the input power when the inverter performs a power conversion. This may cause failure in nearby equipment and facilities. By AC-AC direct power conversion the U1000 perform a sine wave almost same as the commercial power's one without special devices.

■ Power Current Waveform Samples

AC drive without reactor		AC drive with DC reactor		U1000 (In low harmonics mode)	
Current distortion	Power factor	Current distortion	Power factor	Current distortion	Power factor
88%	0.75	33%	0.9	5%	0.98

Generator Applications

It is essential to install private generators in case of a power failure in facilities such as data centers that operate all year round and hospitals where many pieces of medical equipment are running. Vibrations and heat generation in the coils occur when harmonic components get into the generator. Therefore, the capacity of the generator has to be four times that of the inverter as a countermeasure when driven by such a device. This means capital investment becomes very expensive. The U1000 is low harmonics, so it is possible for the capacity of the generator to be about half that of the inverter. This results in it being cheaper to introduce this technology because capital investment is cheaper.



Generator capacity : About a 50% reduction

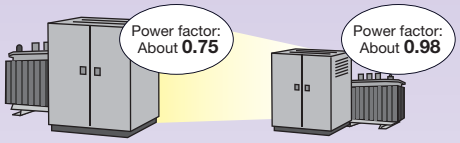
Weight : About a 60% reduction

Installation area : About a 50% reduction

Power Factor Improvement

The power factor is the value which indicates the efficiency of the AC power used by electric equipment. If the power factor is poor, more power than the actual power consumption is required; there has to be a certain margin in power equipment. The U1000 achieves a high power factor because it is low harmonics. It is possible to downsize the capacity of power equipment.

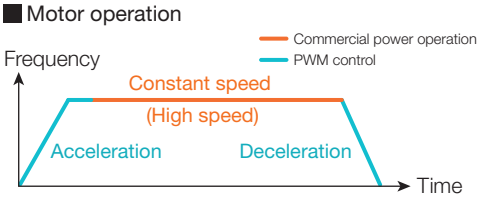
Power equipment capacity : About a 20% reduction



■ Commercial power operation

A human sensor escalator stops when no-one is on it, but speeds up when someone approaches it and then switches to “constant speed” operation when it reaches a predetermined speed. Normally, this entire process is performed by a variable speed drive called “PWM control.” However, the U1000 can switch to “commercial power operation” during “constant speed” operation that matches the power frequency. This makes it possible to achieve a reduction in energy loss and noise.

■ Motor operation

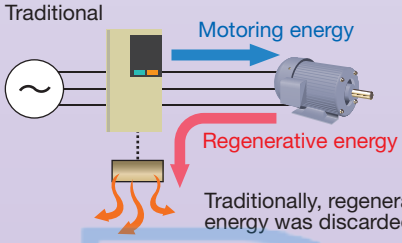


DMC Drives Motors Controls

Power Regeneration

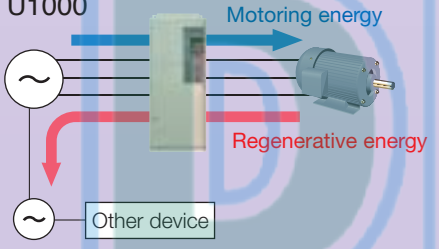
When a motor turns, power is consumed; when a motor is turned, power is generated by the braking force. This power that has been generated is called “regenerative power.” Devices that frequently perform a lifting movement (e.g. cranes) and devices that turn motors by loads (e.g. dynamometers) generate a large amount of regenerative power. However, this regenerative power was traditionally discarded as heat by braking resistors. The U1000 makes it possible to restore this regenerative power to be a source of power that can be used through the bi-directionality of energy. This contributes to energy saving.

Traditional

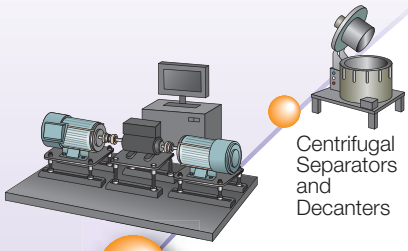


Traditionally, regenerative energy was discarded as heat.

U1000



The U1000 makes it possible to turn the motor and restore the regenerative energy as a source of power to be reused in other devices.



Centrifugal Separators and Decanters

Dynamometers

Slitters

Winders and Rewinders

Presses

Monorails and cable cars

Elevators

Please take a look at our U1000 promotional video.

Automated Vertical Storage System

Stacking Cranes (Automated Warehouses)

Cranes

Automatic Parking System

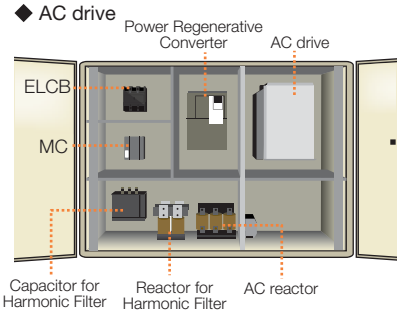
DMC Drives Motors Controls

What is good for U1000!

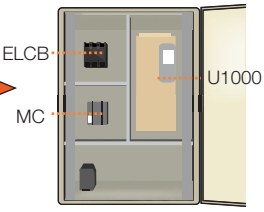
The U1000 is capable of realizing various functions in one machine. None of the peripheral equipment required with inverters is needed. This means it is possible to build simple systems. It is possible to downsize control panels by about 50%. You can also achieve space saving, wire saving and high efficiency in drive devices!

■ Control Panel Configuration Example

◆ AC drive



◆ U1000



Footprint: About a 70% reduction + Volume: About a 50% reduction + Wiring: About a 70% reduction + Power loss: About a 50% reduction

Standard Specifications

200 V Class

ND: Normal Duty, HD: Heavy Duty

Model CIMR-U 2A			0028	0042	0054	0068	0081	0104	0130	0154	0192	0248
Rated Input/Output	Rated Input Current *1 A	ND	25	38	49	62	74	95	118	140	175	226
		HD	20	25	38	49	62	74	95	118	140	175
	Rated Input Capacity *2 kVA	ND	12	17	22	28	34	43	54	64	80	103
		HD	9	12	17	22	28	34	43	54	64	80
	Rated Output Current *3 *4 A	ND	28	42	54	68	81	104	130	154	192	248
		HD	22	28	42	54	68	81	104	130	154	192
	Overload Tolerance		HD Rating: 150% of rated output current for 60 s, ND Rating: 120% of rated output current for 60 s (Derating may be required for repetitive loads)									
	Carrier Frequency		4 kHz (User adjustable up to 10 kHz. Derating may be required.)									
	Max. Output Voltage		Depends on input voltage									
	Max. Output Frequency		400 Hz									
Power	Rated Voltage/Rated Frequency		Three-phase AC power supply: 200 to 240 Vac 50/60 Hz									
	Allowable Voltage Fluctuation		-15% to +10%									
	Allowable Frequency Fluctuation		±3% (Frequency fl uctuation rate : 1 Hz/100 ms or less)									
	Allowable Power Voltage Imbalance between Phases		less than 2%									
Harmonic Current Distortion Rate *5			5% or less (IEEE 519)									
Input Power Factor			0.98 or more (for rated load)									

*1 : Assumes operation at the rated output current. This value may fluctuate based on the power supply side impedance, as well as the input current, power supply transformer, and wiring conditions
*2 : The rated input capacity is calculated by multiplying the power line voltage (240 V) by 1.1.
*3 : The rated output current of the drive should be equal to or greater than the motor rated current.
*4 : This value assumes a carrier frequency of 4 kHz. Increasing the carrier frequency requires a reduction in current.
*5 : When the harmonic current distortion rate is 5% or less, the maximum output voltage is calculated by multiplying input power voltage by 0.87. You must also change the parameter from the default setting.

400 V Class

Model CIMR-U 4A			0011	0014	0021	0027	0034	0040	0052	0065	0077	0096	0124	0156	0180	0216	0240	0302	0361	0414	0477	0590	0720 *6	0900 *6	0930 *6
Rated Input/Output	Rated Input Current *1 A	ND	10	13	19	25	31	36	47	59	70	87	113	142	164	197	218	275	329	377	434	537	655	819	846
		HD	8.7	10	13	19	25	31	36	47	59	70	87	113	142	164	197	218	275	329	377	434	537	655	819
	Rated Input Capacity *2 kVA	ND	9	12	17	22	28	33	43	54	64	80	103	130	150	180	200	251	300	344	396	490	598	748	773
		HD	8	9	12	17	22	28	33	43	54	64	80	103	130	150	180	200	251	300	344	396	490	598	748
	Rated Output Current *3 *4 A	ND	11	14	21	27	34	40	52	65	77	96	124	156	180	216	240	302	361	414	477	590	720	900	930
		HD	9.6	11	14	21	27	34	40	52	65	77	96	124	156	180	216	240	302	361	414	477	590	720	900
	Overload Tolerance		HD Rating: 150% of rated output current for 60 s, ND Rating: 120% of rated output current for 60 s (Derating may be required for repetitive loads)																						
	Carrier Frequency		CIMR-UA4 0011 to 4 0414 : 4 kHz (User adjustable up to 6 kHz. Derating may be required.) CIMR-UA4 0477 to 4 0930 : 3 kHz																						
	Max. Output Voltage		Depends on input voltage																						
	Max. Output Frequency		400 Hz																						
Power	Rated Voltage/Rated Frequency		Three-phase AC power supply: 380 to 480 Vac 50/60 Hz																						
	Allowable Voltage Fluctuation		-15% to +10%																						
	Allowable Frequency Fluctuation		±3% (Frequency fl uctuation rate : 1 Hz/100 ms or less)																						
	Allowable Power Voltage Imbalance between Phases		less than 2%																						
Harmonic Current Distortion Rate *5			5% or less (IEEE 519)																						
Input Power Factor			0.98 or more (for rated load)																						

*1 : Assumes operation at the rated output current. This value may fluctuate based on the power supply side impedance, as well as the input current, power supply transformer, and wiring conditions
*2 : The rated input capacity is calculated by multiplying the power line voltage (480 V) by 1.1.
*3 : The rated output current of the drive should be equal to or greater than the motor rated current.
*4 : This value assumes a carrier frequency of 4 kHz. Increasing the carrier frequency requires a reduction in current.
*5 : When the harmonic current distortion rate is 5% or less, the maximum output voltage is calculated by multiplying input power voltage by 0.87. You must also change the parameter from the default setting.

U1000 Dimensions mm

Voltage Class		200 V Class										400 V Class																					
Model CIMR-UA*A		0028	0042	0054	0068	0081	0104	0130	0154	0192	0248	0011	0014	0021	0027	0034	0040	0052	0065	0077	0096	0124	0156	0180	0216	0240	0302	0361	0414	0477	0590	0720	0900	0930
U1000 Drive	Width (W)	250	264				264		415		490	250						264			264		415		490			695		1070		1210		
	Height (H)	480	650				816		990		1132	480						650			816		990		1132			1132		1595		1835		
	Depth (D)	360	420				450		403		450	360						420			450		403		450			450		445		445		
U1000 Standard Configuration Devices (Harmonic Filter Module)	Width (W)	—																														700		
	Height (H)	—																														1350		
	Depth (D)	—																														432		

*: This number indicates the voltage class (2:200 V class, 4:400 V class).
Note: Optional IP20/NEMA1, UL Type1 kit is required for Enclosed Wall-Mounted (IP20/NEMA1, UL Type1) models.

Drives Motors Controls

U1000

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DMC
Drives Motors Controls

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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice for ongoing product modifications and improvements.

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