

# Recommendation of Maintenance of Variable speed Controller

**We propose the optimum maintenance plan  
for the customer.**

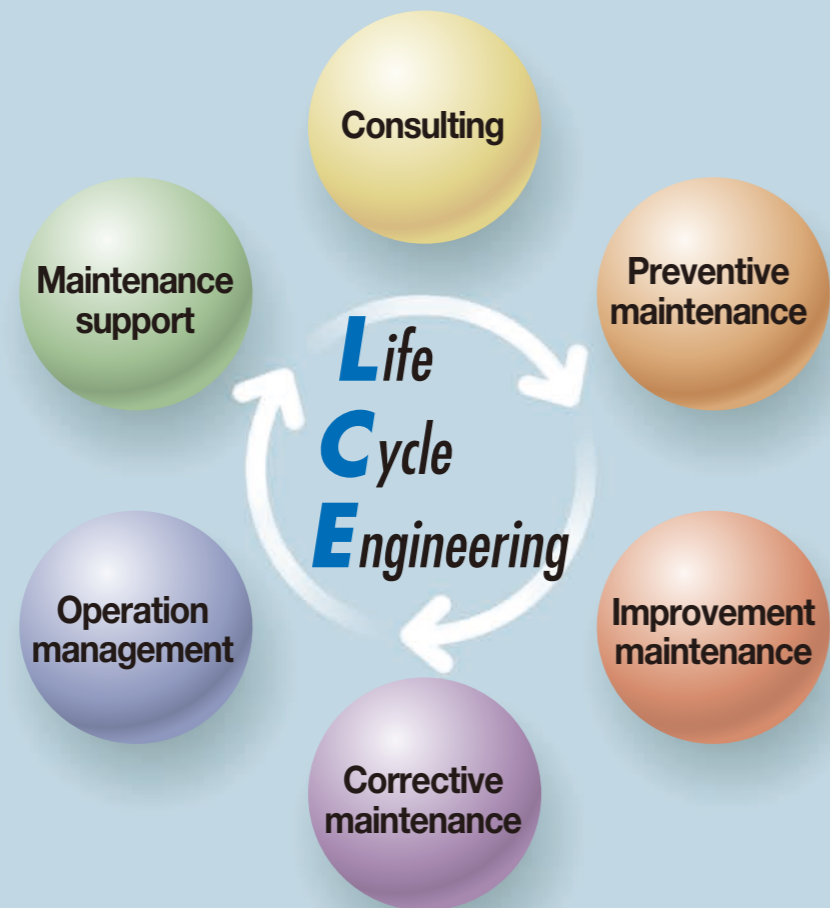


**At Meidensha group,  
we ensure that the customer's  
variable speed controllers facilities  
are maintained in sound condition.**

**We propose life cycle engineering for existing equipment.**

As maintenance professionals, we propose consulting and preventive maintenance based on an investigation of the operating environment and equipment diagnosis.

We provide 24-hour support for reliability by corvective maintenance, operation management, and maintenance support.

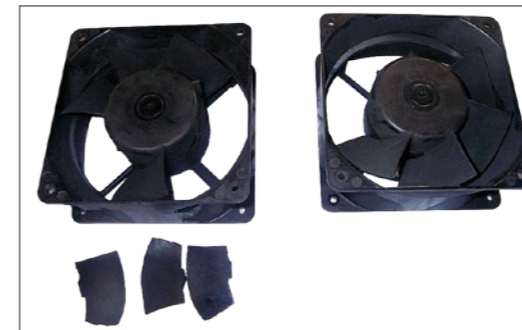


# 1. Necessity of Maintenance

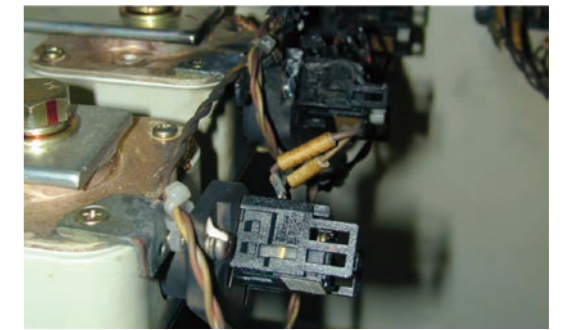
**Electric equipment is at risk of the following types of accidents.**

Recently, technology improvements have greatly increased the reliability of equipment and devices and reduced the number of accidents.

But, preventive maintenance which keeps the operation rate and prolongs the life by performing preventive maintenance and parts replacement is more effective and impotant than corrective maintenance after an accident occurs.



Broken blades of a cooling fan  
(aging deterioration)



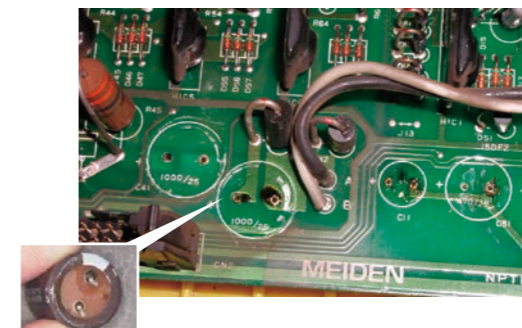
Burning of the fuse section  
(contact failure)



Burning of a thyristor unit (fouling)



Burning of a electrolytic capacitor in the  
main circuit of an inverter (parts life)



Leakage of a electrolytic capacitor  
in a printed circuit (parts life)



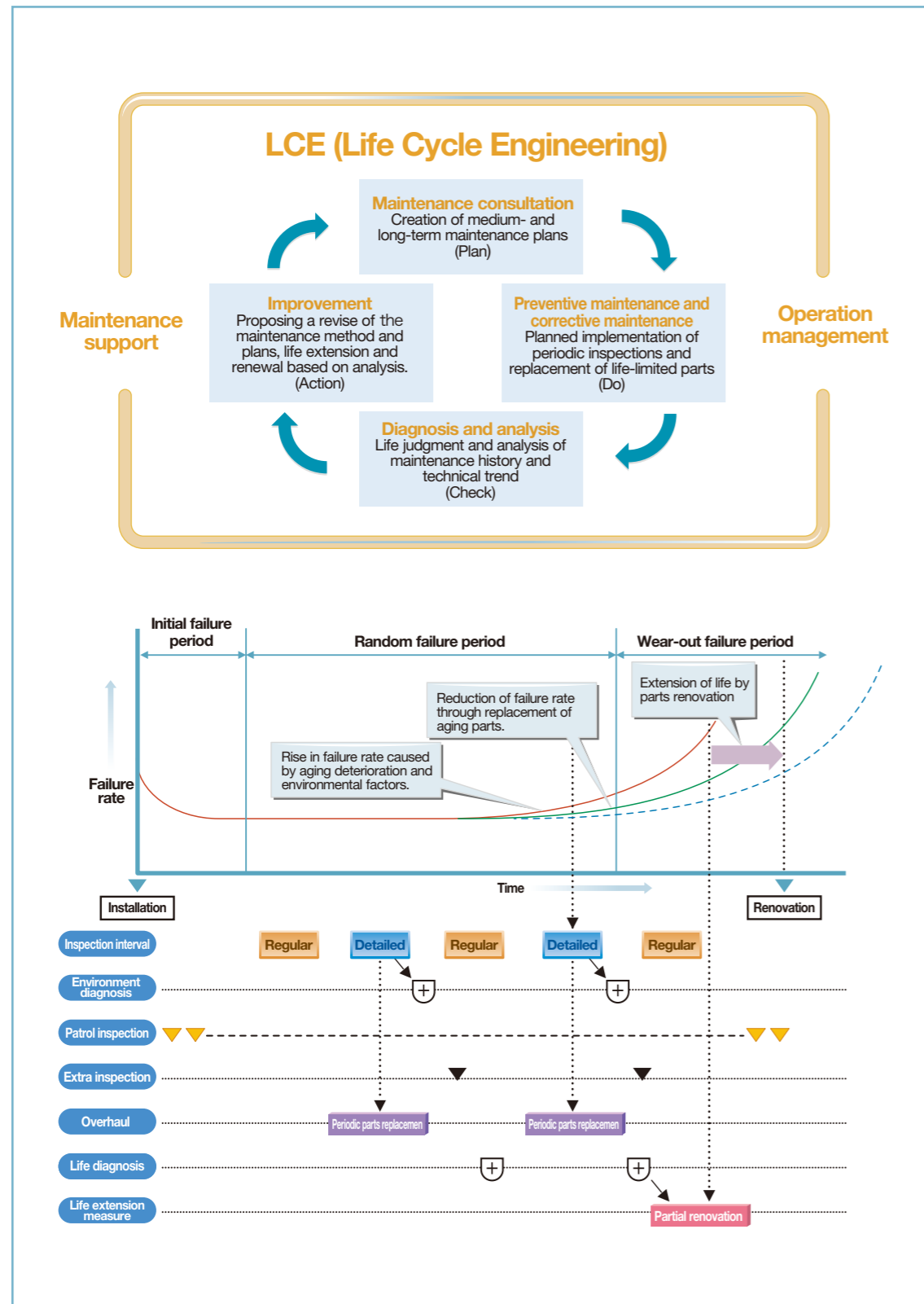
Burning of a printed circuit board  
(capacitor leakage)



## 2. Maintenance process

The accident rate is increasing caused by aging deterioration and environmental conditions.

Long-term safe operation becomes possible by repeating the following main processes during the whole life cycle.



## 3. Recommendation of a Maintenance Contract (1/3)

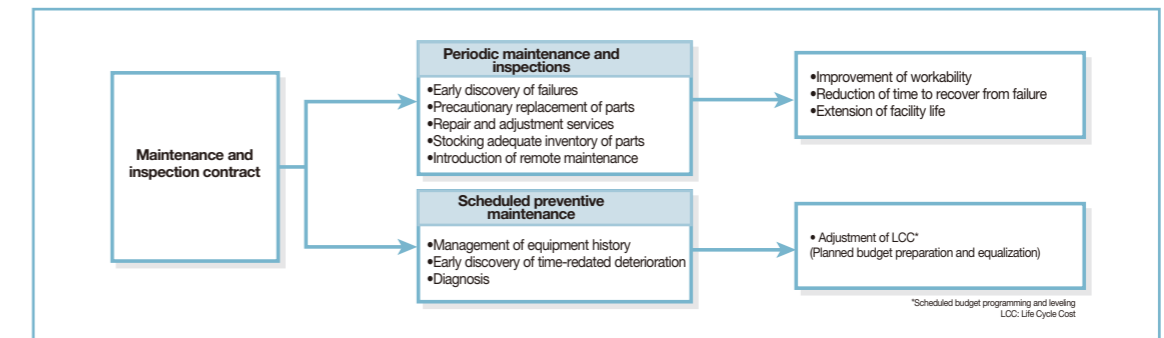
For long-term stable operation of your facilities

In order to assure a long-term and safe operation of your facilities without any problems, we are able to undertake maintenance and inspection services on your behalf.

In order to optimize maintenance service to your facility operation plan, we strongly recommend that you complete the maintenance and inspection contract so that inspection and repair services can be accomplished promptly and most efficiently.

### Advantages of a maintenance and inspection contract signed with our company.

- ① Assured inspection and adequate replacement of parts can be carried out in consideration of time-related deterioration.
- ② Deterioration symptoms can be discovered at early stage. Predictive measures are taken to avoid failures.
- ③ Supplementary parts (authentic) can be furnished promptly.
- ④ Professional engineers offer proposals for repairs and improvements, and provide timely technical support.
- ⑤ Life cycle cost can be reduced.



### Contents of the maintenance inspections

Inspection item	Patrol inspection	Regular inspection	Detailed inspection	Standard cycle
Environment evaluation	○	○	○	Once/year
External appearance inspection	○	○	○	
Cleaning	—	○	○	
Tightening confirmation	—	○	○	
Insulation resistance measurement	—	○	○	
Power supply voltage measurement	—	○	○	
Waveform measurement for various parts	—	○	○	
Operation confirmation	—	○	○	
Automatic control system confirmation	—	○	○	
Set value confirmation	—	○	○	
Electric interlock test (protective interlock)	—	○	○	Once/3 years
Protective circuit operation confirmation	—	○	○	
Element check	—	—	○	
Indicating instrument calibration check	—	—	○	
Protective relay test	—	—	○	

Note: Patrol inspections are performed by our company for customers where the equipment cannot be stopped easily.

# 3. Recommendation of Maintenance Contract (2/3)

## Periodic inspection cycle and recommended renovation interval

Part name	Replacement interval	Remarks
Cooling fan	2 to 3 years	Earlier replacement is required when the ambient temperature is high.
Electrolytic capacitors	5 to 7 years	The life varies greatly according to the ambient temperature and ripple current.
Relays, contactors, circuit breakers	—	Decided based on investigation.
Printed circuit boards	Approx. 10 years	Changes according to temperature, ambient environment, and installed parts. (Decided based on investigation.)
Fuses	5 to 10 years	As the current magnitude causes element deterioration, early replacement is required.

Note 1. The table applies for general usage conditions (average ambient temperature 30°C, operation time max. 12 h/day).  
 Note 2. For detailed setting of parts replacement intervals, refer to the operating instructions, etc.

## Plan for energy saving and high-frequency countermeasures

Item	Conventional type	Converter THYFREC CV210S + inverter
Main circuit	Connection diagram 	Connection diagram 
	Rectifying Inverting	Diode IGBT + diode
Control method	Rectifying Inverting	No control Approximated sine-wave PWM control
	Rectifying Inverting	PWM control for near sinusoidal wave approximation Approximated shine-wave PWM control
Input power factor	Approx. 0.85	Nearly 1 (0.95 or more)
Braking method	Nil or dynamic control (motor energy consumed through a resistor)	Dynamic power recovery (motor energy fed back to the source)
Input current waveform		

## Customer Center

**Every day of the year**  
 • We respond to inquiries concerning our delivery of products and failure information to the customer 24/7. (Japan domestic only)

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 E-mail Customercenter@mb.meidensha.co.jp



## Substitute equipment plan

	Conventional model	Substitute model		Conventional model	Substitute model
General-purpose (simple type) (AC)	THYFREC T80M	THYFREC	(AC) Only for textile machine.	THYFREC V100	THYFREC
	THYFREC VT83S	VT240S		THYFREC V200	VT630/VT630MS
	THYFREC VT86S			THYFREC V300	
	THYFREC VT87SS			THYFREC V400	
	THYFREC VT200S			THYFREC V400MS	
	THYFREC VT210S, SA			THYFREC V500	
	THYFREC VT110S			THYFREC V500MS	
	THYFREC VT230S, SE			THYFREC VT600	
General series (DC)	THYL70M, C	THYL 300C	General purpose with optional functions (AC)	THYFREC C200	THYFREC
	THYL70S	Change to AC		THYFREC T100, 200, 300, 400	VT310/VT240S
	THYL70U	THYFREC		THYFREC G100, 200, 300	
	THYL80M	VT310/VT240S		THYFREC VT83C, U	
	THYL83C			THYFREC VT88U	
	THYL83U			THYFREC VT87K	
	THYL89U			THYFREC VT400U	
	SF Motor	New SF unit		THYFREC VT300	

## Guide for selecting peripheral equipment

Part name	Function
Circuit breakers or fuses for wiring	Must be installed to protect the wiring of inverters and peripheral equipment.
Electromagnetic contactors	Installed for operation interlock. When a braking unit is used and a DBR overload is detected, let an electromagnetic contactor trip for DBR protection or let a wiring circuit breaker with a trip coil trip.
Line noise filters (ferrite core) (Note 1)	Reduces inverter-generated noise. Effective for frequencies from 10 kHz to 10 MHz. Effective for improving the input power factor and reducing high frequencies.
AC reactors (ACL)	Effectiveness is increased by combined use with a DC reactor. When the capacity of the power supply exceeds the inverted capacity by more than 10 times, this must be required for coordination with the power supply.
Input-side noise filters (Note 1)	Reduces noise generated by an inverter. Effective for the wide frequency range from 100 kHz to 30 MHz. Only for the input side.
Input-side radio noise filters (CR filters) (Note 1)	Reduces inverter-generated noise. Effective for the AM radio frequency band. Only for the input side.
High power factor converters	The high frequencies of the power supply are reduced greatly and the power factor also is made nearly 1. As a power supply regeneration function is provided, this helps save more energy.
DC reactors (DCL)	Effective for improving the input power factor and reducing high frequencies. The effect is larger than that of an AC reactor and the size is smaller.
Damping brake units (DBU)	This is the braking circuit unit used for braking the motor by generating electric power. Depending on the applied voltage and the motor capacity, the models V23-DBU-L1 to 4 or V23-DBU-H1 to 4 are used. Used together with a braking resistor, a large braking capacity is obtained. For 018L or lower and 022H or lower, the braking circuit is built into the inverter unit as standard.
Thermal relays	This is used to protect the braking resistor. Required when an external resistor is used with 018L or lower and 022H or lower.
Damping brake resistances (DBR)	Increases the braking capacitor of the inverter, and is used when rapid deceleration or rapid stop is required. Used in combination with the braking unit.
Surge absorbers	This surge filter suppresses surge voltage from the inverter. In the case of a 400 V system, when the motor is not an inverter motor with strengthened insulation, surge voltage from the inverter may deteriorate the motor insulation. Use is recommended when a motor without strengthened insulation like a commercial motor is used with a 400 V system or when the wiring is long (over 20 m).
Output-side noise filters (Note 2)	Reduces inverter-generated noise. Has the effect of reducing noise radiating from wiring. Only for the output side.
Line noise filters (ferrite core) (Note 2)	Reduces inverter-generated noise. Has the effect of reducing unwanted radiation noise and transmission noise.

Note 1: Combined use is even more effective.  
 Note 2: Combined use is even more effective.  
 \* For details of peripheral equipment, refer to the separate pamphlet "Guide to selecting inverter peripheral equipment".

Note: From documentation of 1 February 2005.



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