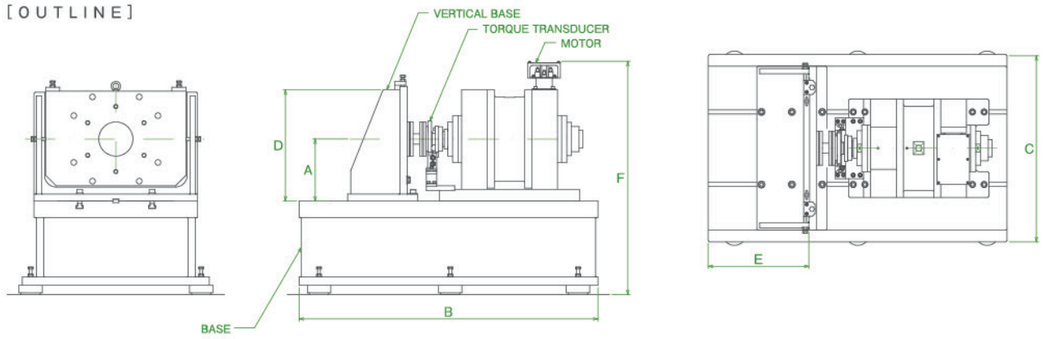
High Speed Motor Evaluation System

EMoTS-01

[OUTLINE]



[Machine specification]

EMoTS-03		50H	100H	200H
MOTOR POWER	kW	50	100	200
RATED SPEED	rpm	4,800	4,800	4,800
MAXIMUM SPEED	rpm	20,000	20,000	20,000
RATED TORQUE	Nm	100	200	447
OVER LOAD TORQUE (1min)	Nm	150	300	670
ROTOR INERTIA	kgm2(J)	0.0422	0.0725	0.1300
COOLING		OIL COOLING		
FRAME		300S	300Z	300L
AXIS HEIGHT (MINIMUM) A	mm	220	220	220
BASE LENGTH (typical) B	mm	1,400	1,400	1,800
BASE WIDTH (typical) C	mm	800	800	1,000
VERTICAL HEIGHT (typical) D	mm	600	600	800
WORK SPACE (typical) E	mm	500	500	600
MACHINE HEIGHT (typical) F	mm	1,000	1,000	1,200
MACHINE WEIGHT (typical)	kg	800	1,000	1,400
INVERTER PANNEL LENGTH G	mm	3,200	4,000	4,800
INVERTER PANNEL HEIGHT H	mm	2,000	2,000	2,200
INVERTER PANNEL WIDTH J	mm	800	800	800
INVERTER PANNEL WEIGHT	mm	1,800	2,000	3,000
XFMR PANNEL LENGTH	mm.	800	1,100	1,500
XFMR PANNEL HEITH	mm	1,600	1,600	1,800
XFMR PANNEL WIDTH	mm	700	800	900
XFMR PANNEL WEIGHT	kg	400	800	1,200
OIL COOLING UNIT LENGTH	mm	800	800	1,200
OIL COOLING UNIT HEIGHT	mm	1,200	1,200	1,500
OIL COOLING UNIT WIDTH	mm	900	900	900
OIL COOLLING UNIT DRY WEIGHT	kg	300	300	600
EFFECTIVE TANKAGE	L	90L	90L	180L
INTAKE POWER	kW	20	40	70
MONITOR PANNEL		DIN RACK (700L*900H*700W)		

[Electric and control specification]

		50S	100S	200S
REGEN				
Rated power	kW	55	110	220
Rated current	ADC	85	170	339
Over load current (1min.)	ADC	128	225	510
Output voltage		Input AC voltage * 1.1 ～ 1.8		
Input power factor		0.95		
Input power source		AC3φ200V～460V±10%、50/60Hz		
BATT-SIM				
Rated power	kW	55	110	220
Rated current	ADC	85	170	339
Over load current (1min.)	ADC	128	225	510
Output voltage		12VDC to BUS voltage		
Current response		Less than 5ms		
Voltage response		Less than 100ms		
INV-SIM				
Rated power	kW	50	100	200
Rated current	Arms	63	127	250
Output voltage		600Vrms maximum		
Switching freq.		Standard 10kHz (maximum 16kHz)		
Sampling freq.		Switching freq. *1 or *2		
Encoder input		Line driver (ABZ), resolver		
Maximum fundamental freq.		1,000Hz		

* Please contact us when Customizing of size, rated value, special specification or special function is required.

EM01e rev.0 2015.12

Technical Support
Mechatronics and Measuring instruments

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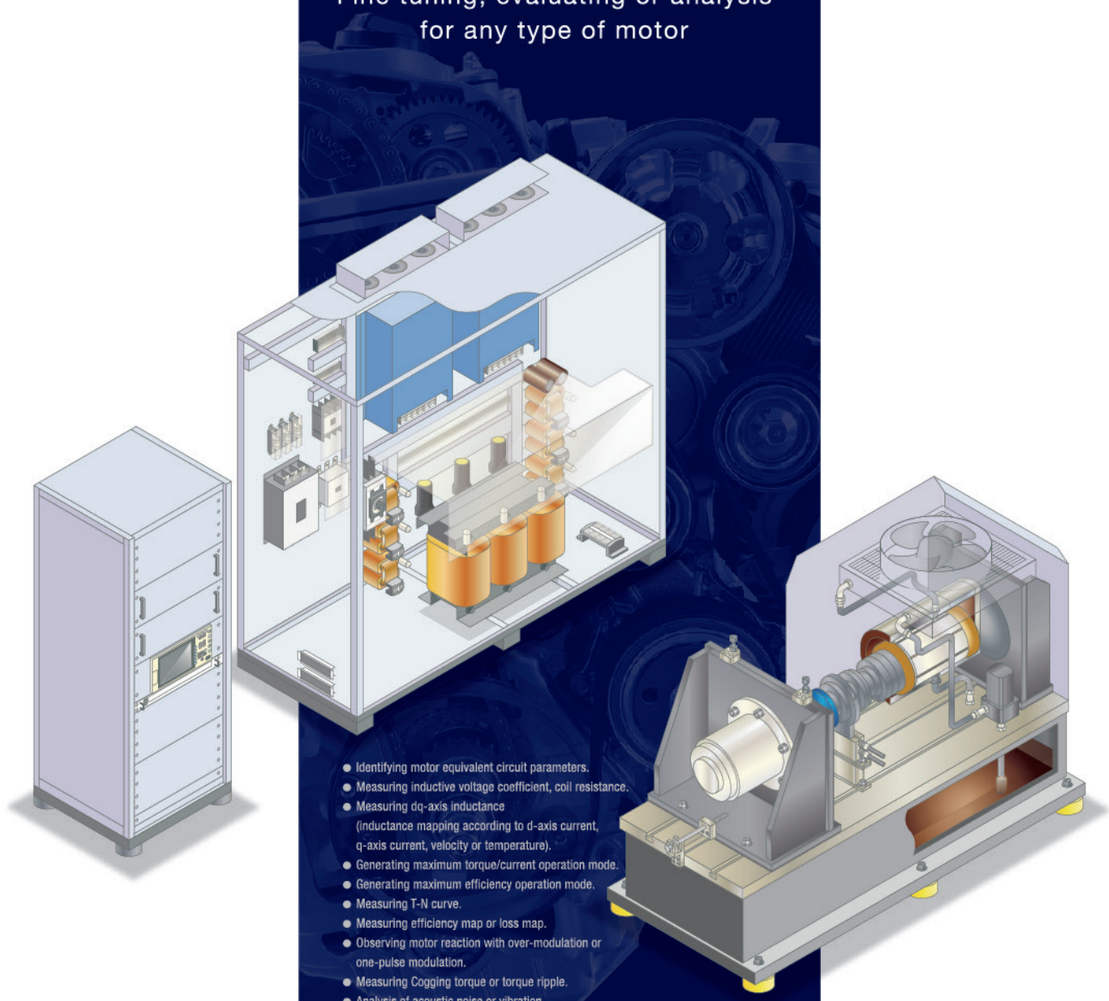
Electric Motor Testing System

High Speed Motor Evaluating System

(High speed dyno, Regenerating rectifier, Battery-simulator, Inverter-simulator, Integrated controller)

EMoTS-01

Fine tuning, evaluating or analysis for any type of motor



- Identifying motor equivalent circuit parameters.
- Measuring inductive voltage coefficient, coil resistance.
- Measuring dq-axis inductance (inductance mapping according to d-axis current, q-axis current, velocity or temperature).
- Generating maximum torque/current operation mode.
- Generating maximum efficiency operation mode.
- Measuring T-N curve.
- Measuring efficiency map or loss map.
- Observing motor reaction with over-modulation or one-pulse modulation.
- Measuring Cogging torque or torque ripple.
- Analysis of acoustic noise or vibration.
- Measuring motor data in high or low temperature.
- Measuring total efficiency with program operation.

Technical Support
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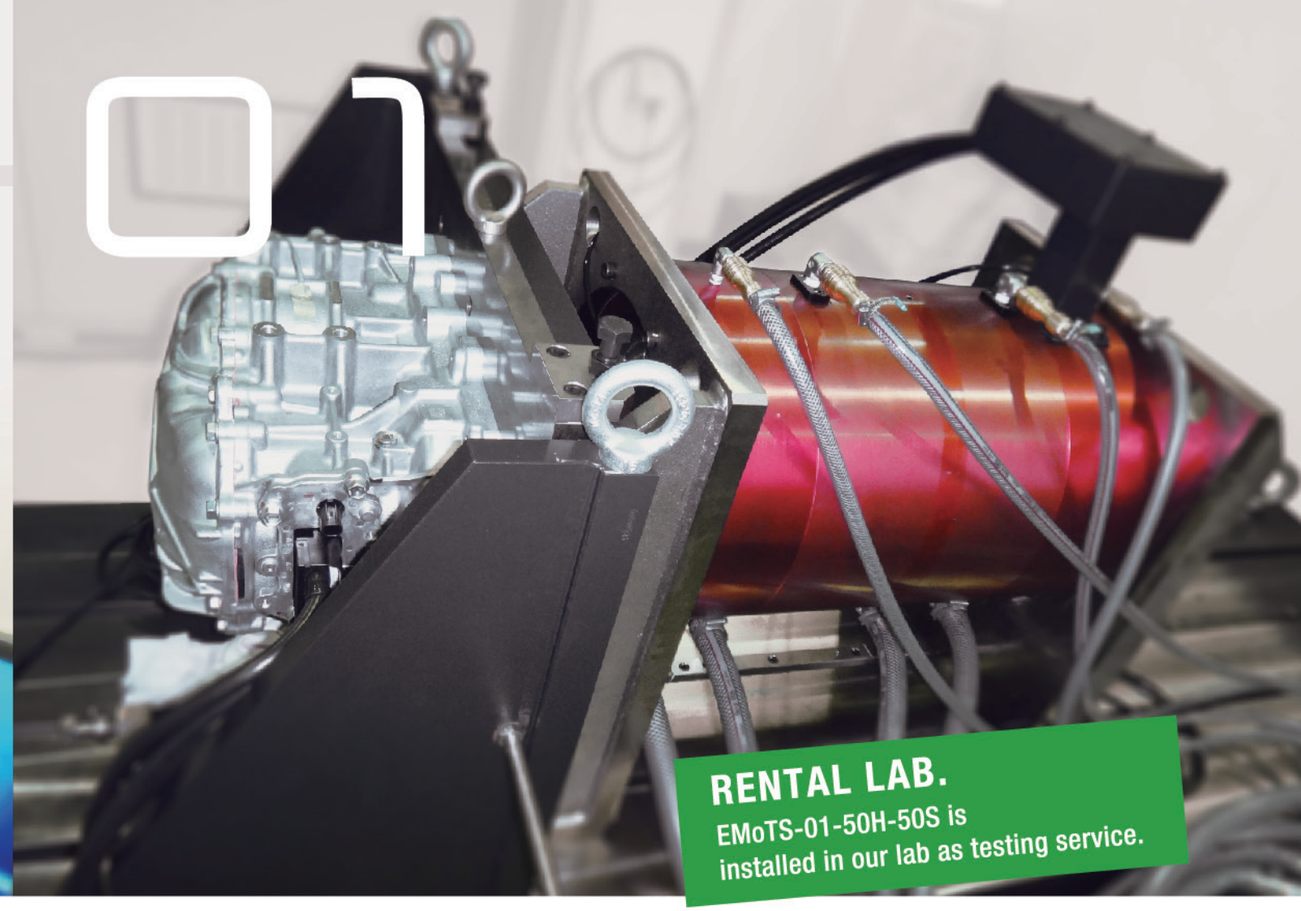
EMoTS-01

Finding the maximum performance for any motor!
High speed motor evaluating system.
It is "EMoTS-01".

EMoTS-01 is consist of high-speed dyno and high-bandwidth inverter controlled by **LabVIEW** with high-speed serial communication. Any motor can be run safely, speedy and conveniently then can be evaluated. Maximum performance, T-N curve or efficiency map can be detected. Technical Support can design and build machine part, motor, inverter, power electronics and control/monitor software by ourselves. Then our products can be customized according to test condition one by one. EMoTS-01 can reproduce test condition in detail and in fine. EMoTS-01 can easily synchronize with other test facility.



ADVANTAGE

For evaluating of high-efficiency motor, flat motor, SR motor, axial motor or claw motor. For EOL inspection of motor production line.

- **Maximum speed : 20,000rpm**
- **Bus-voltage : 850VDC maximum**
- **Synchronizing control of DC-bus voltage, INV-SIM and high-speed dyno (speed and torque).**
- **EMoTS-01 can run with just only electric power and cooling water.**
- **Low space factor, low initial or running cost, low acoustic noise (less than 74dB, typical) and convenient operation.**

OPTION

25,000rpm high-speed option.
Measuring cogging torque or torque ripple with EMoTS-02(Super low speed dyno).
Acoustic noise or vibration reduction technology or NVH (sleeve bearing, noise isolation box, isolation dumper between machine and floor).
Electrical XYZ movable table, high low temperature test chamber, oil chamber or fly wheel.
Hgh-speed swing or tilting bench, vertical bench or bench in vacuum atmosphere.
Hydraulic control, lubrication or cooling oil supply system or oil supply to rotating object via slip ring.
JIG or coupling for customer motor for tested.
Additional tooling for customer motor for tested
(oil intake hole, thermo couple hole or tapping hole...)

【MONITOR AND CONTROL】

Manual, automatic or remote operation/interlock/monitoring/logging

Graphic analysis of acoustic noise or vibration, thermo-graph, FFT analysis

EOL inspection

【MACHINE TOOLING ON TEST PIECE】

Automatic test piece engage/dis-engage system

Cutting out test piece from mass-production assy or Jig design and build.

Machine tooling for sensor built in test piece

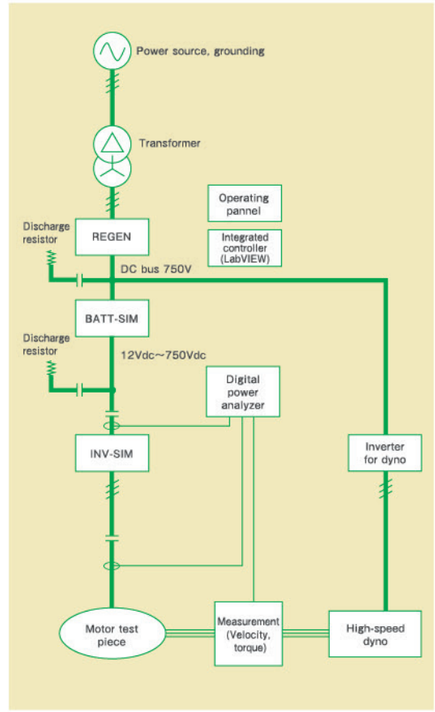
EQUIPMENTs

- ○ Integrated controller
- ○ Regenerating rectifier
- ○ Battery-simulator
- ○ Inverter-simulator
- ○ High speed dyno

Several equipments of EMoTS-01 can be supplied according to customer test condition or atmosphere though maximum performance can be executed with complete system.

ex) 1. REGEN and BATT-SIM
2. REGEN, INV-SIM and High-speed dyno.
3. All equipments without INV-SIM because customer test pieces are INV and MOTOR.

■MEASURE ITMES

ITEMS		DETAIL
Fundamental items	Motor velocity (rpm)	from encoder on dyno or motor test piece.
	Torque (Nm)	from troque transducer
	Motor phase current (Arms)	
	Motor phase voltage (Vrms)	
	Inverter input voltage (VDC)	
	Inverter input current (ADC)	
Derivative items	Motor power (kW)	Calculating with motor velocity and torque
	Motor input electric power (kW)	Calculating with motor phase current and voltage
	Motor efficiency (%)	Calculating with motor power and motor electric input power
	Motor loss (kW)	Calculating with motor power and motor electric input power
	Motor copper loss (kW)	Calculating with motor coil resistance and motor phase current
	Motor iron loss (%)	Calculating with motor machine loss and copper loss
	Inverter input electric power (kW)	Calculating with inverter input current and voltage
	Inverter output electric power (kW)	Calculating with motor phase current and voltage.
	Inverter efficiency (%)	Calculating with Inverter input power and output power
	Inverter loss (kW)	Calculating with Inverter input power and output power
	Total efficiency (%)	Calculating with motor power and inverter input power
	Total loss (kW)	Calculating with motor power and inverter input power
Other inputs	Motor thermistor temp. (K)	from motor winding temp. sensor
	Thermo couple (K)	Logging 16ch as standard.

■ARCHITECTURE