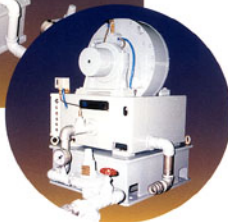
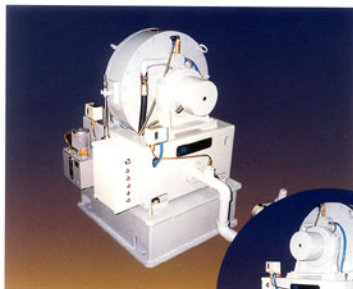


Eddy Current Machine Ass'y



(주)한용기전의 외류식 전기동력계는 안정된 내구성, 뛰어난 성능을 보장합니다. 이는 기계, 전기 전자 전문가 집단의 정확한 구조 및 소재분석이 시행되고, 철저한 기초설계에 의해 조립, 생산된다는 것을 나타내며 각 영역별 정확한 제어가 가능함을 의미합니다.
내구 및 성능을 충분히 얻기 위해서는 채택한 동력계 본체의 성능범위에 시험대상의 Speed, Torque, Power 조건이 일치 하는가에 대한 면밀한 검토가 필요합니다.

사 양(Specification)

No	기 종 Model	흡수마력 Absorption Power		흡수토크 Absorption Torque		최고회전수 Maximum Speed (rpm)	관성 Inertia (Kg.m ²)	제어전원용량 Exciting Power (W)	냉각수량 Cooling Water Volume (l / min)	중량 Weight (Kg)
		KW	PS	Kg.m	Nm					
1	DYTEX-40	40	50	7	68	13,000	0.20	200	20	150
2	DYTEX-70	70	100	24	235	10,000	0.35	400	40	200
3	DYTEX-130	130	180	35	343	9,000	0.55	600	65	500
4	DYTEX-230	230	310	85	833	8,000	2.10	800	100	800
5	DYTEX-400	400	520	180	1764	7,000	5.10	1000	190	1000

공통사항(General Specification)

No	항 목(an Item)	사 양(Specification)	No	항 목(an Item)	사 양(Specification)
1	토크 검출기 (Torque Detector)	- Load Cell Type(2mV/V, ±2%) - 인장, 압축검출	4	안전장치 (Safety Devices)	- 사용자 지정 (User Define)
2	속도검출기 (Speed Detector)	- Contactless Magnetic Pick-Up - Toothed disc with 60 teeth	5	기기 냉각관련 (Machine Cooling)	- Water Cooling System - 0.7Kg/㎖ 이상의 양력 필요 - 30℃ 이하 냉각수 공급 기준
3	제어방식 (Control Method)	- SCR Control	6	윤활 방식 (Lubrication Method)	- Grease윤활(표준형) - Oil 윤활

ef) 1. 상기 표준 사양의 특수제작 가능
2. 본 사양은 제품의 성능향상을 위해 협의변경이 가능합니다.

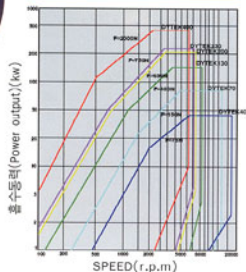
주요특징(Feature)

1. COMPACT한 구조설계
2. 뛰어난 안정성과 편리한 유지보수
3. 완벽한 시스템 확실성
4. 고기능, 고정도, 저가격, 빠른납기
5. 다양한 기종 보유
(특수기종 주문 제작 가능)

적용분야(Apply)

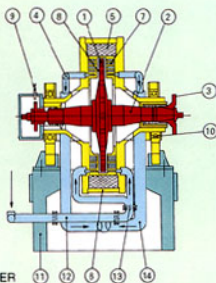
1. 엔진, 사시, 배기시험 분야
2. 부품, 성능시험 분야
3. 연료, 혼합시험 분야
4. 동력전달 장치 시험분야
5. 모터 관련 전문분야
6. 기타 기관 성능시험 분야 등에 적용

성능범위(Performance Range)



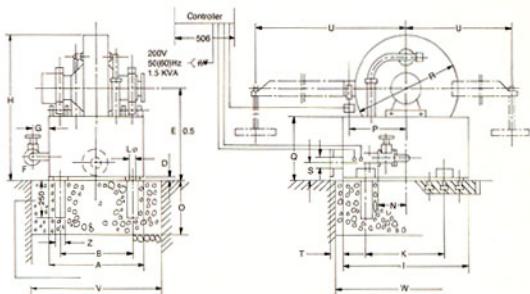
구조 및 원리 (Structure or Principle)

No	Name
1	Rotor
2	Rotor Shaft
3	Coupling Flange
4	Water Outlet with Thermostat
5	Excitation Coil
6	Dynamometer Cover
7	Cooling Chamber
8	Air Gap
9	Speed Pick-up
10	Bearing Hub
11	Base
12	Water Inlet
13	Joint
14	Water Outlet Pipe



• Cross section of
EDDY CURRENT DYNAMOMETER

동력계 치수 (Dimension)



UNIT=mm

DYTEK	A	B	D	E	F	G	H	I	K	L	N	O	P	Q	R	S	T	U	V	W	Z	
40	450	400	21	450	162	110	616	450	400	18	175	400	248	290	332	45	60	1000	690	690	100	0.25
70	450	400	21	450	103	110	664	450	400	23	206	400	248	290	428	100	60	100	690	690	120	0.43
130	540	480	21	500	142	80	758	540	380	23	250	500	294	300	516	120	80	1000	780	780	120	0.50
230	640	580	21	550	118	80	875	680	500	27	280	500	362	330	650	130	20	1000	880	920	150	0.65
400	800	720	21	720	170	90	1112	850	640	27	320	500	448	420	824	190	16	1000	1040	1090	150	1.05

DYNAMOMETER CONTROL SYSTEM

Control Method	Constant Speed	ASR Mode
	Constant Torque	ATR Mode
	Constant Current Control	ACR Mode
	Constant Boost	ABR Mode
	External Control	EXT Mode
Input Signal	RPM	60P/1R
	Torque	2mV/V(ST.100kg)
Output Signal	RPM Output	DC 0~10V/FS
	Torque Output	DC 0~10V/FS
External Setting	Setting Available by EXT Voltage DC 0~10V(for all mode)	
	Setting Available by the Use of an EXT Setting Dial	
Control Accuracy	ASR Mode	±2RPM
	ATR Mode	±0.2%FS
	ACR Mode	±0.5%FS
	ABR Mode	±0.5%FS
	EXT Mode	±0.1%FS
Power Requirement	AC 220V/60Hz, 2KVA, 2P, 3P	

1. Precision Control
Speed : PID Load : PI
2. Precision Digital Display
3. 편리하고 쉬운 조작
4. 오퍼레이터의 편의성을 증대시키기 위한
일체형 설계적용
5. 연구 및 시험 해석용 프로그램 연계를 위
하에 device 장착

The diagram illustrates the Main Control Console system architecture. At the top center is the **Main Control Console**, which includes a **MAIN CONTROLLER** with **SPEED** and **TORQUE** controls, and a **DAQ Board**. To the left, a **Monitoring system(option)** consists of a **모니터 (Monitor)** and a **컴퓨터 (모니터 포함) (Computer (including monitor))**. To the right, a **Printer** is connected to the **DAQ Board**. Below the Main Control Console is an **Interlock / Interface** unit. To the right of this unit is a **T/C, RTD** sensor and a **PRESSURE TRANSDUCER** (labeled **I.S**). Below the Interlock / Interface unit are four colored boxes labeled **OPTION 1** (yellow), **OPTION 2** (orange), **OPTION 3** (purple), and **OPTION 4** (pink). These options are connected to a **RPM FEED Back Control/DY. TORQUE FEED Back** system, which includes an **EDDY CURRENT DYNAMOMETER** and a **LOAD TARGET**. The Main Control Console is also connected to a **PRESSURE/TEMP INDICATING SYSTEM (OPTION)** via a **HWAN WOODS** unit. The Main Control Console is also connected to a **DAQ Board**, which is connected to a **컴퓨터 (모니터 포함) (Computer (including monitor))** and a **Printer**.

Main Rack

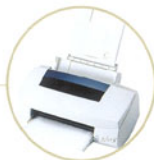


Automation Rack



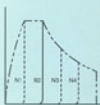
FS Line Consist of

1. Dynamometer Machine Ass'y
2. Dynamometer Sub System
3. Engine Base Ass'y
4. Cooling System
5. Main Control Console
6. Throttle Control System
7. Fuel Consumption Meter
8. Air Flow Meter
9. Lub. Oil Temp. Control System
10. Fuel Temp. Control System
11. Combustion Analysis System
12. Automation System
 - Full Auto Test Sequence Control
 - Data Acquisition Logging & Analysis
 - Measuring & Display
13. Instrument & Console Panel
14. Junction Terminal Box
15. Installation & Training
16. The Others
 - Test Engine
 - Engine Works
 - Metal Type Dyno Base
 - Extensional Measuring Device

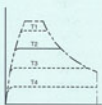


Performance Curve

1. ASR
定速度制御



2. ATR
定Torque制御



3. ACR
定電流制御



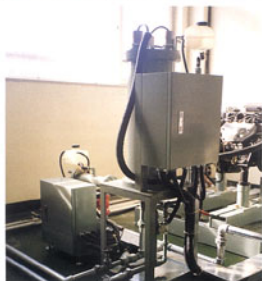
4. ABR
Steep Power





● 냉각수 온도조절 시스템 DYTEK 600

(COOLING WATER TEMPERATURE CONTROL SYSTEM DYTEK 600)



엔진냉각수 온도 조절시스템(Engine Cooling System)

1. Cooling Tank
2. Solenoid V/V On/Off Control
3. Cooling Utility
4. Temp Sensor : 0℃~200℃
5. Thermometer : Cooling Water Temp. at Inlet/Outlet
6. Cooling Water Temperature Device

- 냉각용량(Cooling Capacity): 150KW or more
- 가열용량(Heating Capacity): 15KW or more
- Measuring Range : 0℃~150℃
- Control Range : 60℃~150℃
- Control Accuracy : $\pm 1^\circ\text{C}$ at Control Engine Inlet
 $\pm 3^\circ\text{C}$ at Control Engine Outlet
- Power Supply : 20KW
3 ϕ 220V/60Hz
3 ϕ 380V/60Hz
- Water Cooling Device
- * Max Pressure : 10bar
- Max. Temp. on the Inlet of the Control device
- * Max Water Temp : 30℃
- * Max Pressure : 10bar
- * Required Pressure : 2bar
- Connections to
- * Engine : 1 1/2"
- Cooling Water : 2"
- Circulation Pump
- * Capacity of Back Pressure : 250 l/min
- * Max Pressure Build-up : 1.2bar
- * Max Pressure : 10bar
- * Max Water Temp. : 140℃
- * Power Supply : 1.5KW
(220V/60Hz, 380V/60Hz)

특징

- 엔진기종별 적용용이
- 탁월한 시스템 확장성
- Cell 공간을 고려한 설계 적용
- 정밀급 온도제어
- 편리한 유지보수

가시화 엔진

VISUALIZING THE ENGINE

구 성 - 가시화 ENGINE본체, - 구동시스템, - MIRROR/WINDOW부



사 양 (Specification)

- 엔진부
 - ENGINE : 1.5SOHC
 - 연 진 형 식 : 오버헤드 캠 직렬 4기통
 - 실린더 내경 : 76.5mm
 - 실린더 행정 : 81.5mm
 - 배 기 량 : 1,498cc
 - 압 축 비 : 9.5:1
 - 최 대 출 력 : 93ps/ 5,800rpm
 - 최 대 토 오 크 : 13.9kg · m/3,000rpm
- 가시화 엔진부
 - 연 장 CYLINDER 길이 : 275mm
 - 실린더 내경 : 76.5mm
 - 실린더 행정 : 81.5mm
 - 배 기 량 : 374.5cc
 - 압 축 비 : 9.5:1

특 징 (Feature)

- 정밀한 연소상태 Pick-up가능
- Top Piston WINDOW 기본 장착
- 저진동, 저소음

엔진정반

SURFACE PLATES FOR ENGINE

구 성 - 기초부, - "T" 홈 정반부, - Air bellows 4pcs, - 자동Level Control System



사 양 (Specification)

- Size : 200×4000×400(사용자 지정가능)
- 표면정도 : $\pm 1.5\text{mm}$ (Flatness of Surface)
- 1Set of Plywood Plates
- 1Set of Pneumatic tubes and fitting
- Concrete block type foundation

특 징 (Feature)

- 공진주파수에 따른 신속한 진동흡수
- 시험 Data 신뢰도 향상 및 시험자의 안전성 확보
- 충수에 관련없이 Dyno시험실 구축 가능
- 설치 공간적인 제약성 극복
- 엔진시험 건물 수명연장

트로틀 컨트롤 시스템 2010

THROTTLE CONTROL SYSTEM 2010

구 성 DC MOTOR / Gear Head / Control Panel Unit / Cable Assembly



항목 · 단위 Item · unit	형명 Model	2010-10	2010-15
모터용량 Motor Capacity	W	DC SERVO100	DC SERVO150
최대조작각도 Max. Operation Angle	deg	90	90
최대파워 Max Power	kgf.m	1.0	2.0
Accuracy	%(FS)	0.3%	0.3%

특징

- 안정된 조작과 빠른 응답성, 강력한 파워 보유
- 편리한 유지 보수/부품별 교체 가능
- COMPACT한 설계

연료소모량계 2020

FUEL CONSUMPTION METER 2020

구 성 Actuator / Fuel Tank / Control Panel Unit / Fuel Line Ass'y



액츄에이터형식 Actuator Type	부피식 Volumetric
제어방법 Control Method	마이크로 Microm
측정범위 Range	0cc~1800cc min or more
사용온도범위 Ambient op. Temp. Range	15℃~30℃
제어정도 Accuracy	0.1%
Recommended Filtration	400Mesh
Measuring	l/h, ml/min, g/sec

특징

- 연속시험 가능 Instantaneous Flow Measuring
- 정밀급 연료량 제어
- 편리한 연료공급 및 유지보수

공기량 측정장치 2030

AIR FLOW METER 2030

구 성 Laminar Flow Element / Digital Manometer



형식 Type	Laminar Flow Element
역추예이팅정도 Act. Accuracy	$\pm 0.30\%$ Master Calibration
마노메터 정도 Manometer Accuracy	$\pm 0.20\%$ FS ± 1 digit

특 징

- 안정된 조작과 높은 신뢰성
- 편리한 유지보수

오일온도 조절장치 2040

OIL TEMPERATURE CONTROL SYSTEM 2040

구 성 Reserve Tank / Oil Pump / Utility / Digital Indicator



제어온도 범위 Control Range	70~130℃
용 량 Exchange Capacity	12,000kcal/h
제어 정도 Control Accuracy	$\pm 2^\circ\text{C}$ (FS)

특 징

- 폭넓은 시험대상
- 편리한 유지 보수
- 각종 유체에 대한 내구성 강화
- 정밀급 온도제어

INTERLOCK SYSTEM

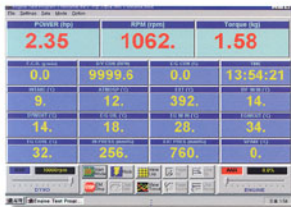


특 징

- 편리한 사용자위주 설계적용
- 편리한 입출력
- 편리한 유지 보수
- Electric Sequence
- Alarm Monitoring
- Filtering
- CH Amplification
- Encoder Signal Input

Automation System DYTEK 5000

Full Auto Test Sequence Module DYTEK 5100



특징

1. Windows 95 기반의 완벽한 Multi Tasking 구현
2. 편리한 User Interface 채택
3. Real Time Scanning & Graphic
4. 편리한 화면편집 / 운영환경 / Error 경보기능
5. 완벽한 한글화로 Operator 편의성 증대
6. 정밀한 보안시스템 제공
7. 사용자 편의성 증대를 위한 Module 방식 설계적용

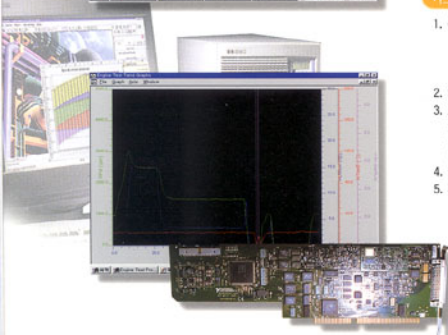


Output

- CH Text Sheet
- Graph Output
- Real Time Trend
- Log Data View

하드웨어 사양(Hard Ware Specification)

1. Control Computer
 - CPU : PENTIUM II 400
 - RAM : 64MB
 - HDD : 8.4GB
2. Printer - A4 Inkjet / A3 Inkjet / A4 Laser etc.,
3. Automation, Measurement Devices.,
 - Plug-in Type NI SEG DAQ Board
 - PXI / VXI Module
 - Signal Conditioning
4. Interlock System
5. Utility & Electric



Automatic program operation, automatic control measurement indication and modification of program operation data(throttle open degree, rotational speed, horse power, torque, measuring points etc..)

- Measured Value

A) Dynamometer load, rotational speed, fuel consumption, throttle open degree

B) Exhaust gas temp, suction air temp, cooling water temp at inlet/outlet dynamometer in/out, cooling water flow rate, lub Oil temp. etc., intake air flow rate

Manual or auto pilot selection

Dyno control(ASR, ATR)

Engine control selection

(AAR, ASR, ATR, ABR-option)

Throttle angle control

SFC measurement

All displays of other Measurement

- Performance curve

- HORSE POWER(Calculations) CURVE

- TORQUE, FUEL CONSUMPTION ratio, RPM(SPEED) CURVE

- FUEL CONSUMPTION VS ROTATIONAL SPEED CURVE

- FUEL CONSUMPTION VS TORQUE CURVE

- Load Target performance sheet(Full channel Display)

- Real time display for Channel Transform

(Enhanced Graphics)

- Total data output: Monitor, Printer, Plotter etc.,

엔진성능데이터

ENGINE PERFORMANCE TEST SHEET(Calculation, Measurement)

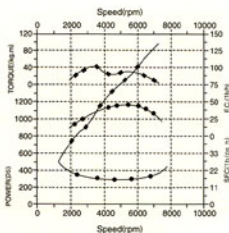
Date	1999-01-15	Cycle:	4
Time: 13:24:41~13:26:09(00:01:28)		Cylinder:	4
Operator	H.W.	Ext. Vol:	1.468
Temperature(°C)	15	Throttle Min(mm):	0
Humidity(%)	40	Max(mm):	100
Engine:	Sedan	Pully Size:	30
Oil:	SF	Gear Ratio:	5
Fuel:	Gasoline	Mode: Speed Time(sec)	10

Step	시험시간	출력 (PS)	회전수 (rpm)	토크 (Kg.m)	연비량 (g/sec)	대기압 (mmHg)	대기온도 (°C)	습도 (%)	연료온도 (°C)	수정토크 (Kg.m)	BSFC (g/ps.h)	수정계수
0	16:09:22	0.3	2796	0.05	0.698	756.4	19.2	20.5	18.7	0.05	8183.91	0.988
1	16:09:55	26.8	2698	7.1	1.529	756.4	19.2	20.3	19	6.77	205.7	0.989
2	16:10:19	49.4	2597	13.58	2.469	756.4	19.2	20.2	19.2	12.96	179.97	0.989
3	16:10:44	51.7	2499	14.78	2.545	756.4	19.1	20.3	19.3	14.1	177.4	0.989
4	16:11:05	52.9	2405	15.77	2.607	756.3	19.2	20.4	19.4	15.05	177.52	0.99
5	16:11:21	53.7	2300	16.5	2.621	756.3	19.1	20.4	19.3	15.84	175.85	0.99
6	16:11:45	52.9	2204	17.18	2.603	756.3	19.1	20.6	19.4	16.4	177.2	0.989
7	16:12:03	51.5	2101	17.52	2.524	756.3	19.2	20.6	19.3	16.72	176.3	0.989
8	16:14:02	50.4	1993	18.05	2.469	756.3	19.2	20.8	19	17.23	176.46	0.989
9	16:14:18	48.7	1892	18.37	2.393	756.4	19.2	20.8	19	17.53	177.05	0.988
10	16:14:36	47	1798	18.64	2.281	756.3	19.2	20.9	19	17.79	174.74	0.988
11	16:14:50	44.8	1698	18.81	2.132	756.3	19.2	20.8	18.9	17.95	171.28	0.988
12	16:15:06	40.8	1587	18.52	1.919	756.4	19.2	21	19	17.67	169.2	0.989
13	16:15:21	38.4	1509	17.91	1.713	756.4	19.3	21	19	17.09	160.79	0.988

엔진성능 곡선도

ENGINE PERFORMANCE CURVE

Date: 1999-01-15
Time: 13:24:41
Engine Model: Sedan
Operator: H.W.
No. of Cylinder: 4
Cylinder Bore: 75.5mm
Cylinder Stroke: 82.0mm
Fuel Name: Gasoline
Spec. WT: 1
Dry Temp: 15°C
Humidity: 40%
File Name: COILFUELDATE/SPEED.S

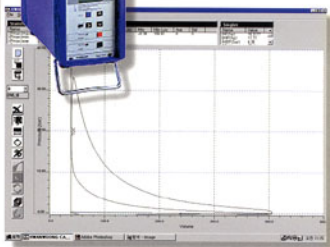
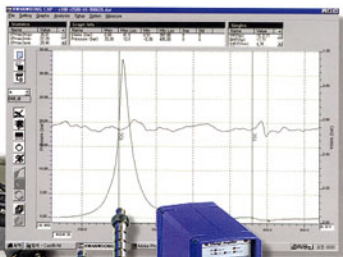
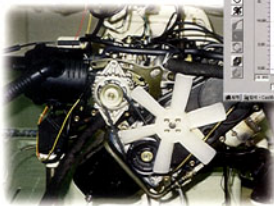


엔진 연소 해석장치 DYTEK 5200

COMBUSTION ANALYSIS SYSTEM

특징 (Feature)

- Windows 통합환경
- 편리한 사용자 중심 운영환경
- 고압과 저압 동시 취득 가능
- 편리한 DATA 통합 관리 채택



Engine Combustion Analysis System

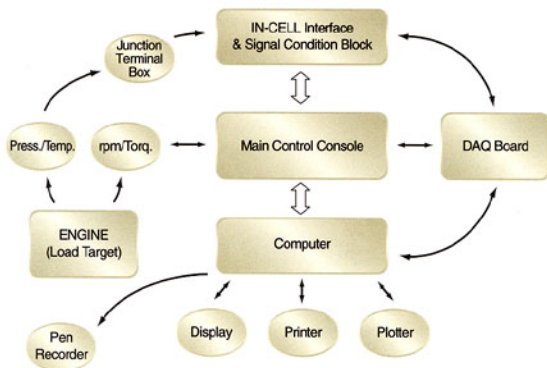
1) Hardware

- Pressure Transducer (Cylinder Pressure)
- Charge Amplifier
- Rotary Encoder (TDC Pickup)
- DAQ Board
- In-Cell Interface & Signal Condition Block
- Accessories : Sensor Bracket/Cooling Line
- Engine Construction Work
 - Cylinder Head Work
 - Bracket Work
 - Sensor Installation Work
- Computer System

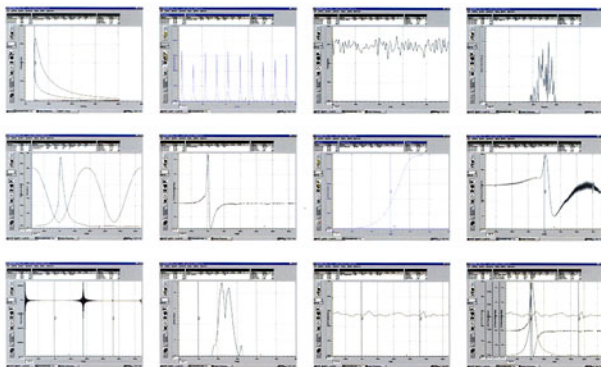
2) Combustion Analysis & Control Software (DYTEK 5200)

- Total S/W Package for Dynamometer
- Real Time Scanning & Graphic Display
- Real Time Measuring
- Pointing Zoom (Free Scale)
- Pressure Graphs
- Crank Angle Cylinder Pressure
- Crank Angle Intake
- Crank Angle Based Graphs: P- θ , P-V Curve, $dp/d\theta$, $dQ/d\theta$, $x-\theta$, Poly- θ
- Statistical Service: IMEP Cycle, Pmax/Pmin Cycle, Pmax-Hist, Pmin-Hist, θ Cycle

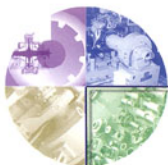
구성도(BLOCK Diagram)



외면구성 (Display)



● 샤시 동력계(CHASSIS DYNAMOMETER)



DYTEK 6000

차량샤시, 배기가스 분석, 성능 및 차량내구시험 등에 필요한
폭넓은 운영환경 제공!



샤시 동력계(CHASSIS DYNAMOMETER) DYTEK 6000

DYTEK DYNAMOMETER

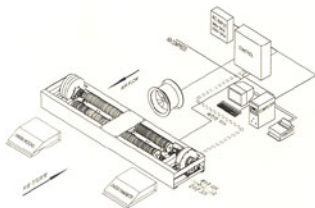
특징

- 미국 E.P.A 규정에 만족하는 배기가스 측정, 인증 및 일반성능측정 연구용으로 적용 가능한 고내구성, 고정도, 사용자 편의성 보유
- User중심 설계로 기계, 전기, 전자의 전 부분에 걸쳐 손쉬운 제어환경 제공.
- System확장 및 응용이 용이하다.
- 빠른 A/S관리 및 추후 기술지원
- 강제수냉방식으로 장시간 운용가능

구성

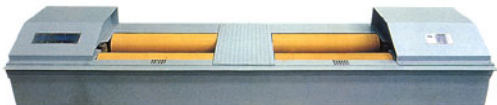
· NOTE

1. LIFT SYSTEM : AIRLINE, (85 TO 125 PSI)
2. 사용전원
 - AIR FLOW : AC 380V 3P
 - COMPUTER etc., : AC 220V 2P
3. CHASSIS DYNAMOMETER SIZE : 4000×900×380



1. 구동 Roller Set
2. 동력흡수장치
3. Lift 장치
4. 관성구원장치
5. 차륜이탈 방지 장치
6. Fan 장치
7. 공압공급장치
8. 주제어장치
9. 컴퓨터 SYSTEM 및 운용 Program

DYTEK 6000



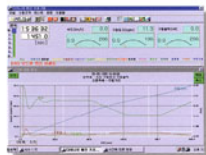
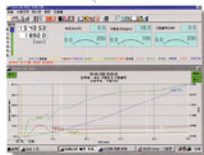


Mode driven

- LA4-Mode
- FTP-75Mode

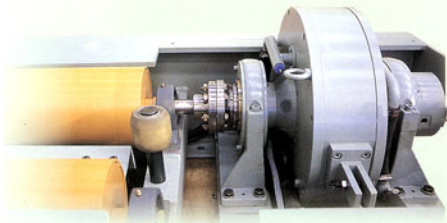
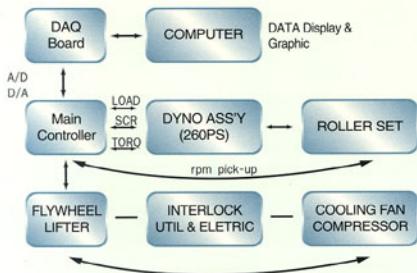


- ASM
- 사용자 설계운전Mode
(PATTERN Mode by User)



제어개념도(BLOCK DIAGRAM)

DYTEK 6000



DYTEK 6000 APPLICATION

- Measurement of Vehicle's Driving Force
- Measurement of Engine Speed, Torque or Power
- Measurement of Speed & Torque
- Test of Various Driving Modes, Possible User-Program
- Various Measurement Devices for Temperature & Pressure
- Input of Various Specifications of Vehicles
- Other System for Client's Requirement
- Auto Calibration of Chassis Dynamometer
- Option : Emission Test / SFC



Specification

- Horsepower : 260ps
- Roller : ϕ 220 Twin Roller
- Controls : Dig/Analog data Acquisition/Printer interface
- Lift : Air-driven between-roller lift with integrated lock
- Frame : Double welded structural steel frame
- Axle Weight : 3,175kg
- Ship Weight : 1,000kg
- Size : 4,000mm $\times$ 900mm $\times$ 380mm
Subject to Change

