

EURO TEK



RBT 7000 ATL Brake Tester

Installation, Operation & Calibration Manual

All the product specifications and information in this manual may be changed without notice.

Operators and installers should carefully read this manual before installation and use.

Operators should strictly follow all the instructions during operation and have all equipment maintained periodically.

Any modification, disassembly, or refit that is performed by engineers other than your local service provider to exceed the original usage of the product is forbidden.

In the unlikely event that any damage should be caused to the equipment contract your local service provider as soon as possible.

Although the contents of this manual have been checked with care, errors cannot be fully eliminated. Please contact us if you find any discrepancies.

Safety Signal Legend



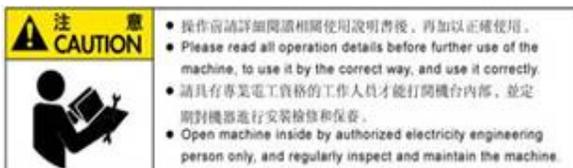
Warning Danger of Electric Shock.



Inspection area Authorized Personnel only



Danger Rotating Machinery



Read instruction Manual Before use

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Preface

The Vehicle Brake Tester for Axle Weight and Brake Force is a tester to inspect the vehicle axle weight and vehicle brake performance. Firstly, the operator drives the vehicle onto the rollers. A signal will be sent to the computer by a force sensor and will show the axle weight on a monitor/display Board in units of kg. When this reading is complete, the rollers automatically start to rotate; the rolling resistance force is obtained before the driver applies the brake. When driver applies the brake, the resistive force from the vehicle's wheels will pass to a gear unit via a Chain connected to the rollers. This force will then pass to a Force Sensor. The force sensor will transfer the brake force into an electronic signal and send to the computer. Once analyzed by the computer, inspection results will be displayed on the monitor/Display Board.

1. Safety Instructions

1.1 Safety Operation Handbook

1. Do not use the equipment if any components are damaged
2. All equipments should be operated by qualified personnel only.
3. Maintenance, adjustment and calibration should be operated by qualified personnel only.
4. Do not exceed the Max capacity of the equipment.
5. Keep the equipment clean.
6. Adjust the longitudinal axle line of the equipment platform so as to parallel to the vehicle driving direction.
7. Vehicle must pass across the equipment slowly.
8. Do not stand on the test equipment, including rollers, 3rd axles and sideslip plates.
9. Shut down the power immediately in case of an emergency.
10. Do not park or maintain vehicles on the equipment platform.
11. During the inspection, do not stand in the designated test area .

1.2 Operation Guideline for Brake Tester

Test Procedures must be carried as specified in the relevant inspection

manual or other VOSA guidance

1. Exit Four-Wheel Drive Mode before inspection starts.
2. Vehicle should drive following the driving direction.
3. The tester starts to work only if the third axle across both sides has been pressed.
4. Keep steering still while inspecting front axle.
5. Do not apply the brake until informed by Monitor/Display Board.
6. While applying brake, do it slowly and gradually.
7. If the brake has been held for more than 10 seconds, rollers will automatically stop rolling. The inspection will be reset.
8. If the motor fails, the system will automatically switch off the power and exit the inspection.
9. Drive slowly while exiting from the tester.
10. Check that the vehicle's tyres conformed with safety standards

2 Range of Applications

2.1 Vehicle Axle-load Weighing

Measure static axle-load of vehicle

2.2 Vehicle Wheel Brake inspection

Wheel resistance force

Wheel brake force

Brake imbalance of two wheel on the same axle

Parking brake force

3. Technical Specifications

Max Wheel Load	2000 kg
Max. measurement of weigh load	1500 kg
Axle-load Measurement Range	0 ~ 3000 kg
Measurement Range	0 ~ 12500 N
Brake force calibration ratio	1 N : 2.0 N
Wheel Diameter	500 ~ 800 mm
Minimum wheel Distance(Inner)	850 mm
Maximum wheel Distance(Outer)	2600 mm
Roller Diameter	Φ245 mm
Roller Length	900 mm
Roller friction Coefficient (Dry/Wet)	> 0.85/0.6
Roller Axle Separation	432 mm
Roller testing Speed	2.5 km/h
Electric Motor Power	4.0 kW × 2
Equipment Dimensions (L×W×H)	2970×830×440 mm
Equipment Weight	840 kg
Power Supply	3 phase 415V + PE/50Hz
Working Temperature	0 ~ 40°C
Application Humidity	≤90%

4. Brake tester Construction

Roller brake tester with weighing unit is composed by follows parts:

- Tester: Roller Bed
Load cell unit, Roller, Gearbox, Motor, transmission chain, Force sensor 7 Roller cover plates
- Control Station:
Cabinet, Monitor, Computer, Keyboard, Mouse, Printer, Main Switch, Control Board, Circuit Board, etc.

5. Installation

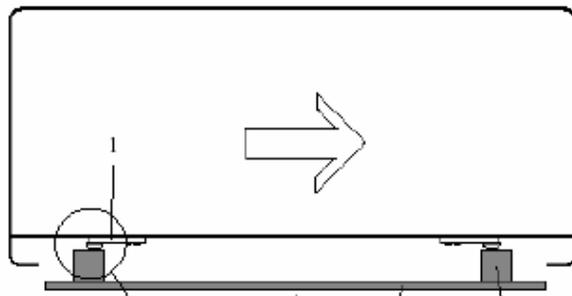
The pit should be constructed with C25 concrete. Follow the instructions of the pit construction map drawing provided by your service provider. Make sure the pit dimensions are correct and the concrete has completely set.

To install the equipment, follow the guidance of the engineers from your service provider. Please carefully check the delivery items against the packing list before installation.

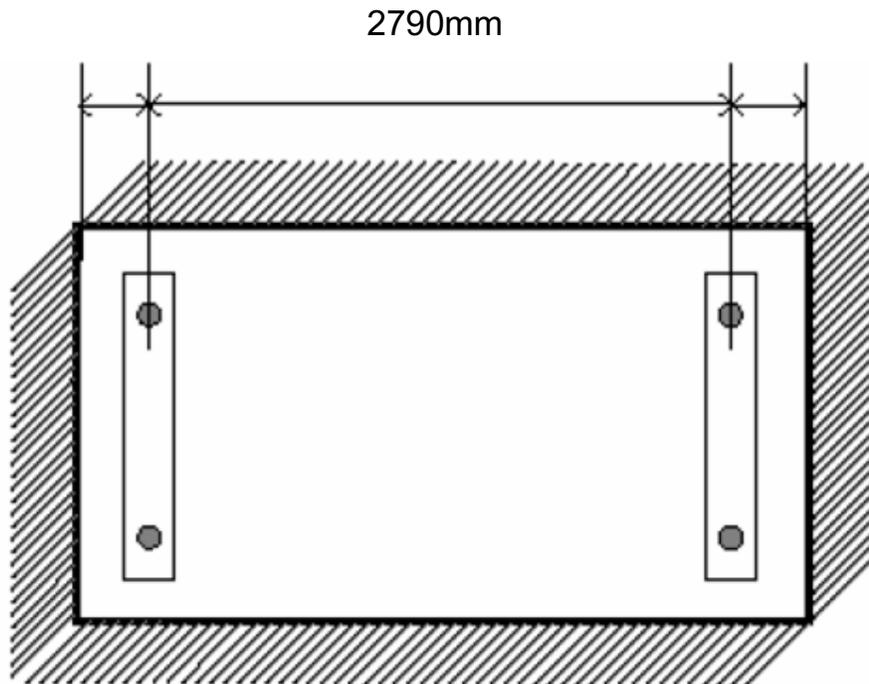
5.1 Equipment Installation

- Check the quality of pit construction; dimension tolerances should respect the requirement of the pit construction map drawing.
- Place the two support bars inside the pit. Adjust the distance between 2 bars (of 2790 mm); make sure the bars are well located in the pit and are also able to match the relative positions of the 4 sensors on the test bench. Then use a gradient meter to adjust the horizontal level of the support bars. Fix the support bars with expandable bolts.

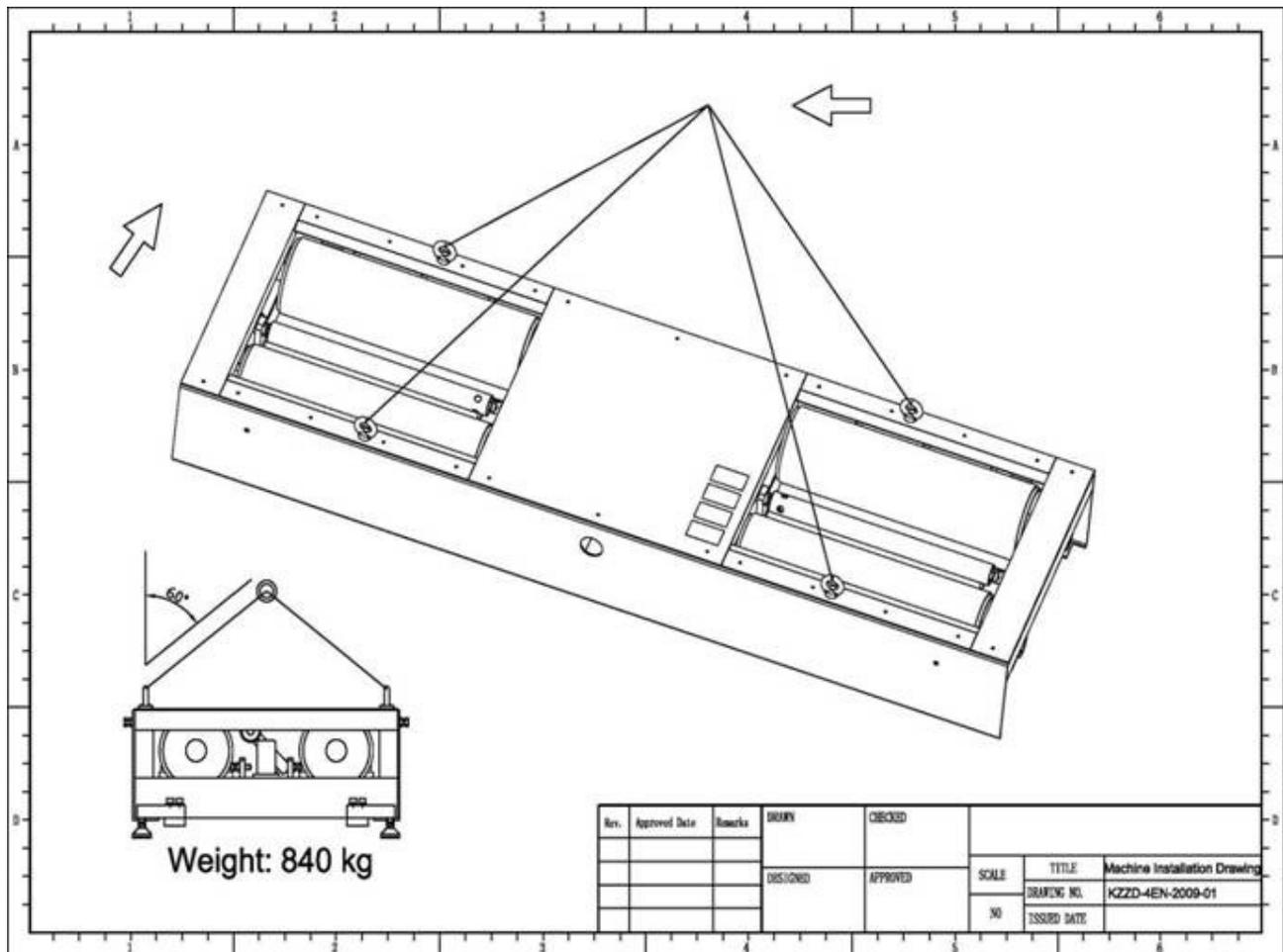
- Check and lock the four load-cells (2 load-cell per side) in the test bench.



- Place the test bench in the pit according to the vehicle driving direction, and make sure the equable distance between the test bench and the pit wall.

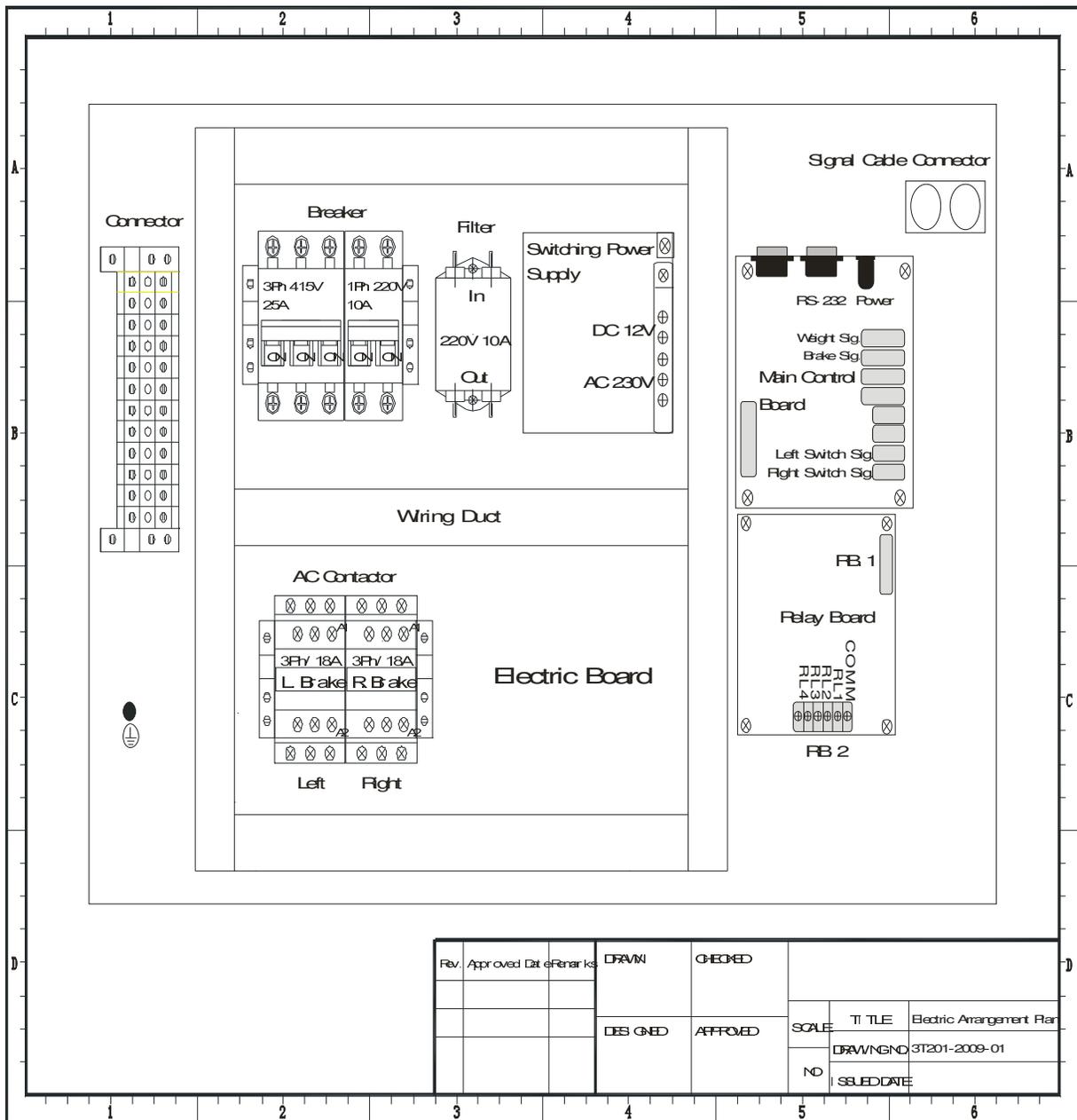


- Remove the Side-Cover Plates and Middle-cover of the bench; check the 4 load-cell sensors are exactly located on the relative support bars
- Butt the Distance Control bolt on the bench against the pit wall; maintenance the distance between Bolt and pit 1 mm, then lock the nuts of the Distance Control bolt.
- Connect the electrical cable and signal cable to the relative connection port in the control cabinet. Bolt back down the Side-Cover Plates & Middle-cover.

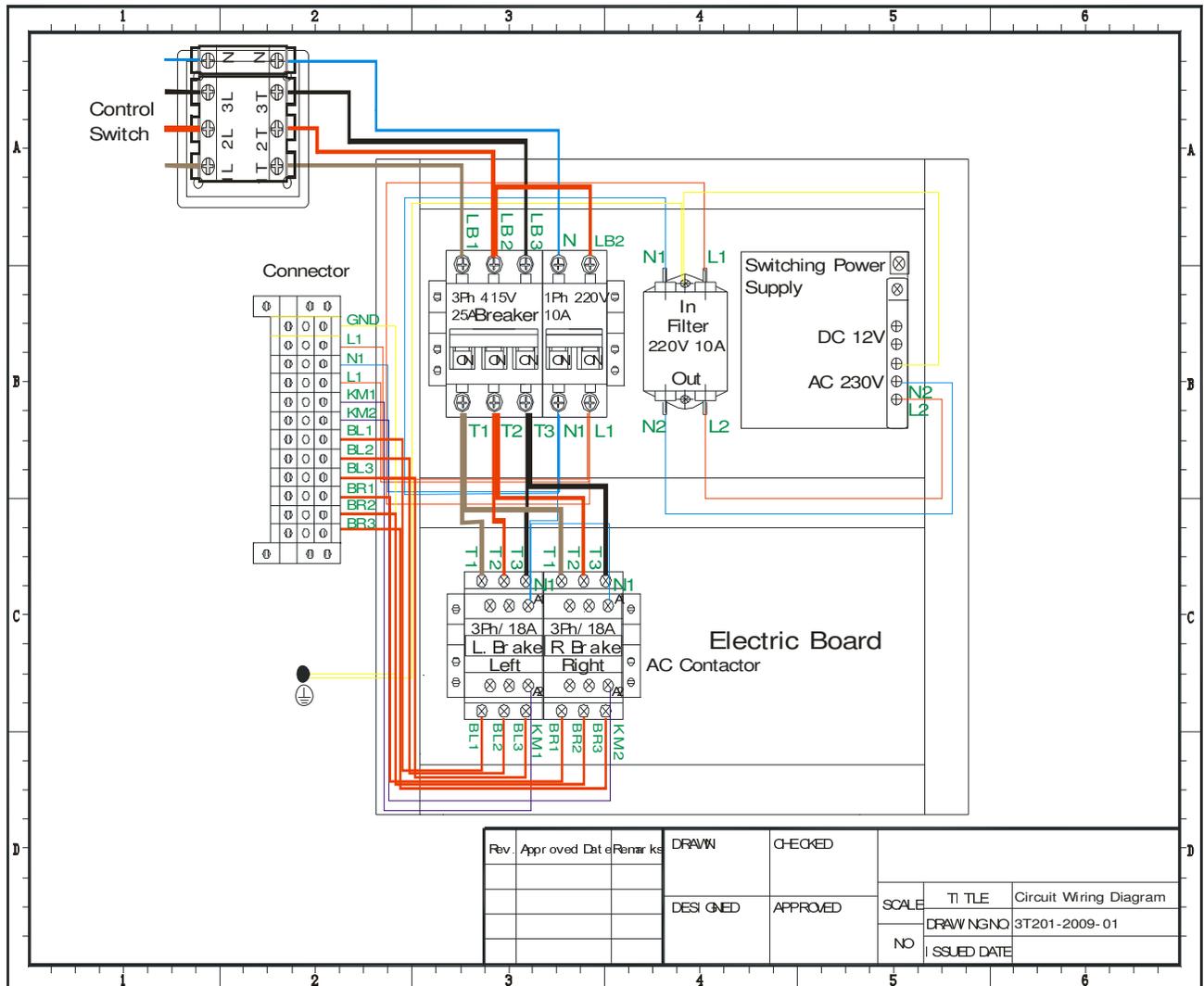


5.2 Electrical

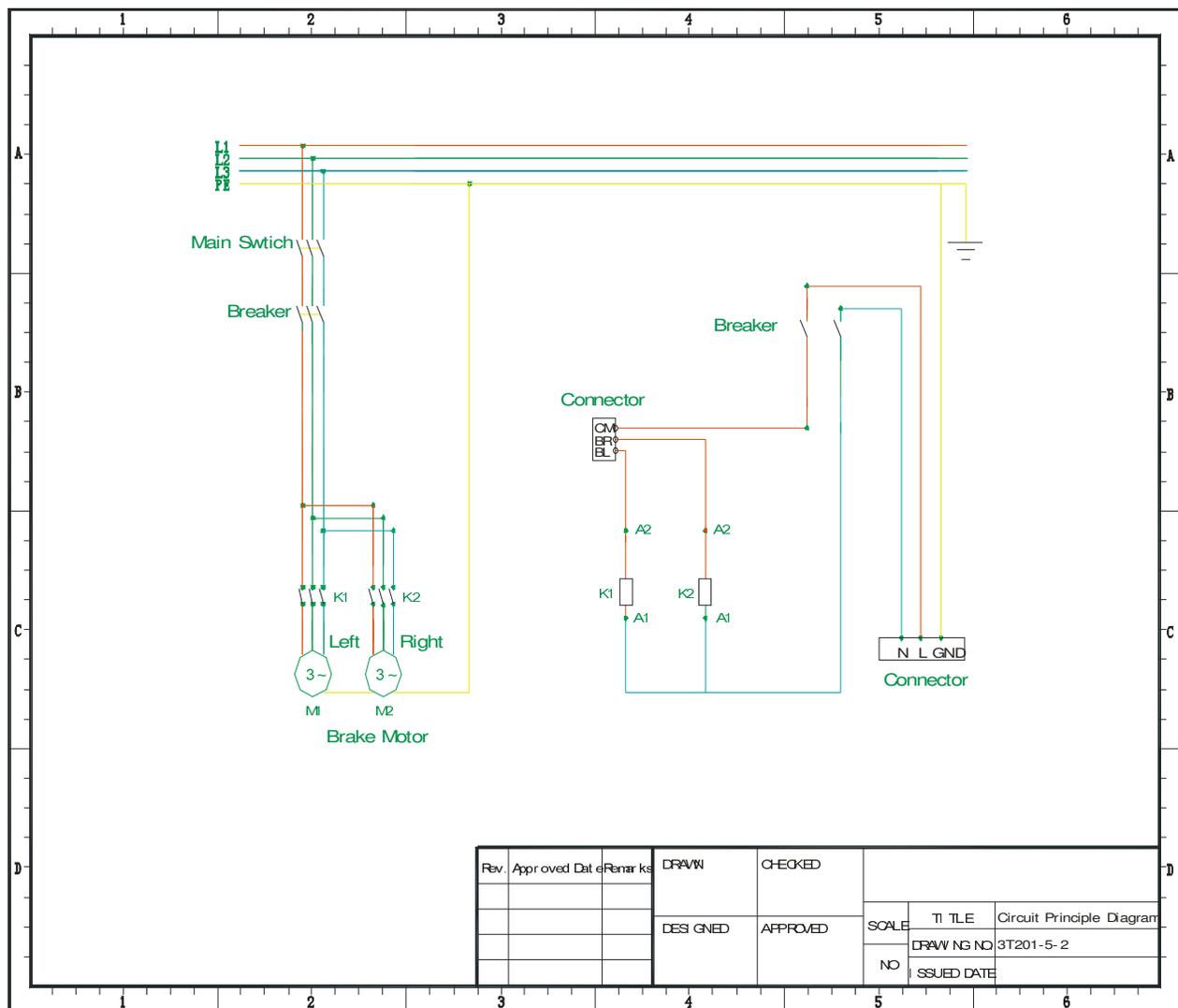
Layout map



(3). Circuit Wring Diagram :



Circuit Diagram



5.3 Installation of control Panel

The control Panel can be sited on the left or right hand side of the test bench at a distance of approx 2-3 meters.

Connect the Test bed power cables and the signal cables to din type connector in the Control Panel

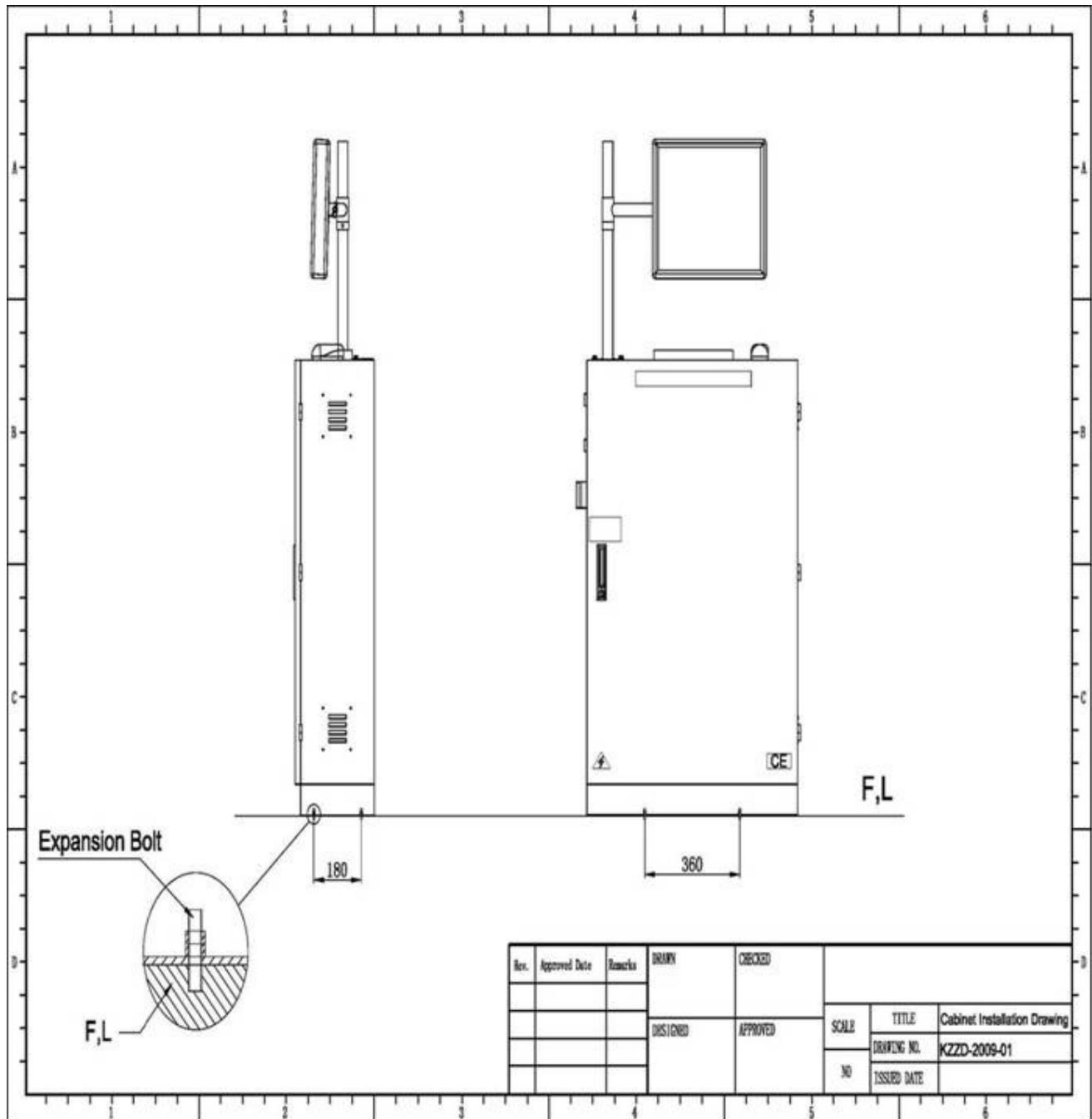
Connect the mains supply cable to a suitable power supply

Warning



Isolate electrical power before any electrical installation!

Electrical Panel Dimensions



5.4 Equipment Adjustment

The Control Software should be installed in the MS Windows 2000 Professional or higher grade version.

Use the attached installation CD to install the software by execute the "SETUP.exe" file, and then follow the indication of installation guide.

Test bench Adjustment

turn to main switch, and then individually the Left and Right AC contractors to check the rotation of Electrical Motors. In case of the wrong turning direction of Motor, please turn off the main power supply and then exchange the 2 connection poles of fire cables inside the Motor cable box.

Test of the signal voltage

Item	Sensor signal voltage(V)	Signal voltage of control board(V)	Prox. sensor(V) (main control board)
Axle-load	7.4 ~ 7.6	0.3 ~ 0.8	—
Brake tester	7.4 ~ 7.6	1.15 ~ 1.35	Close : 0.30 ~ 0.35 Open : 3.70 ~ 3.90

Note:

Close

The speed sensor does not face the hole; The Axle of the position sensor is released

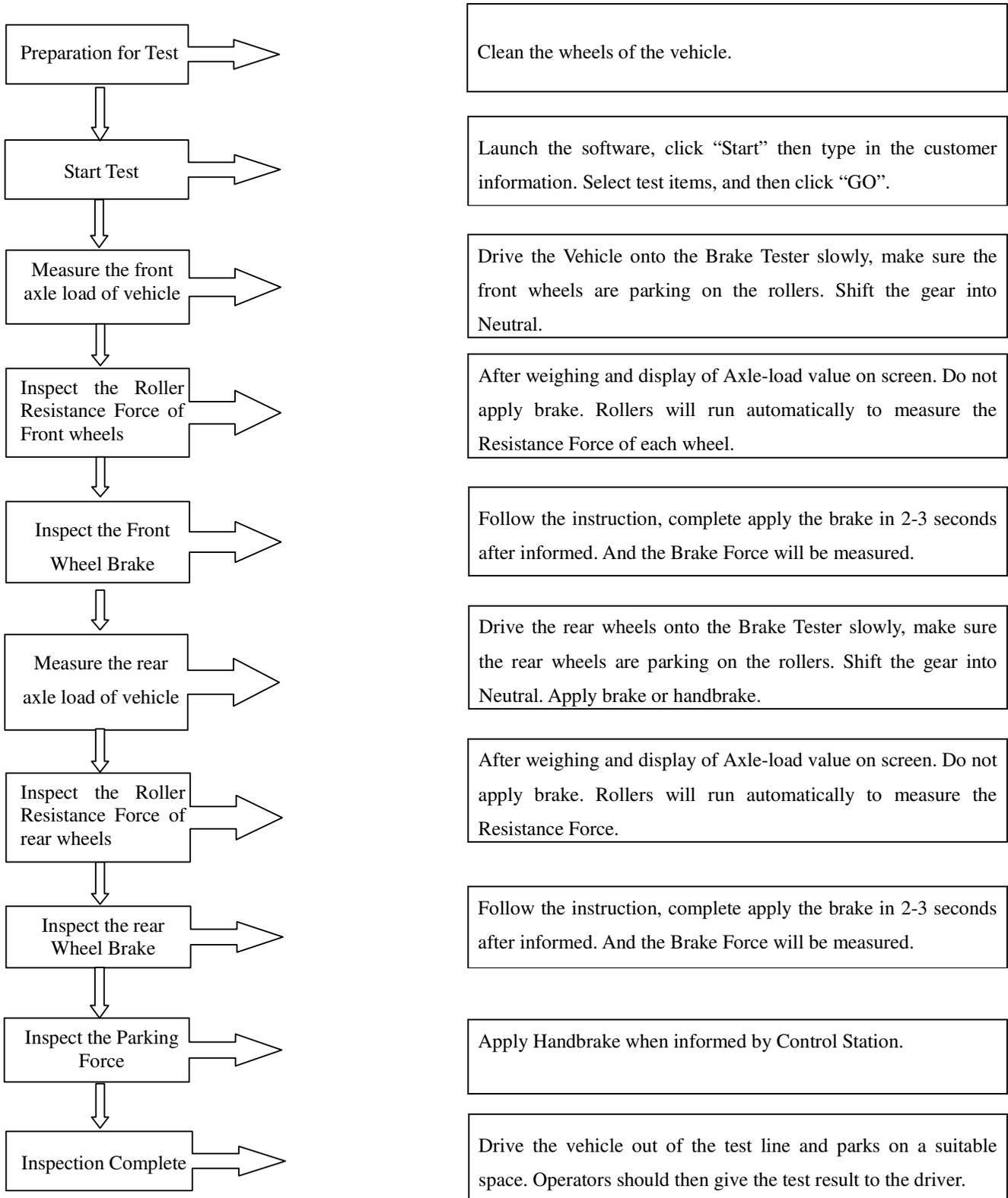
Open:

The 3rd Axle is pressed for position sensor and The speed sensor is facing hole.

Control software Adjustment:

Launch and start the control software, then press "F8-Configuration" to monitor the communication port data and relative parameters.

6.1 Auto Operation Flow Chat



6.2 Operation Process

Switch on the equipment power supply. Check the tyres pressure and look out for any abnormalities.

Any problems should be rectified before entering the brake Tester.



Launch the software, click “F2-Vehicle” to enter the login interface, input the vehicle Registration manufacturer and Model these fields are mandatory next enter the owner’s information, and then select the class of vehicle and fuel type etc

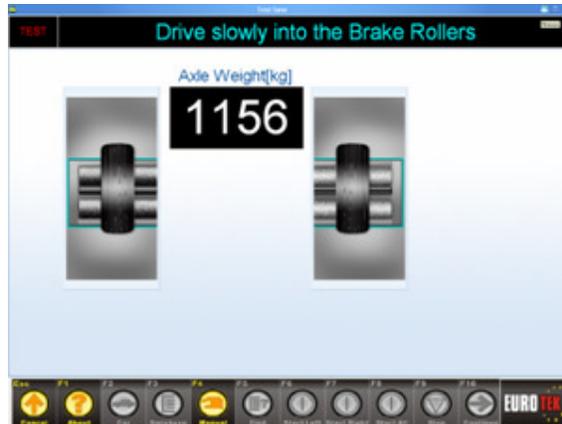
The system will automatically save the all inspection data after a completed inspection process. If the vehicle information or data has been previously entered then, use

F5-Query to search the exist data will be loaded

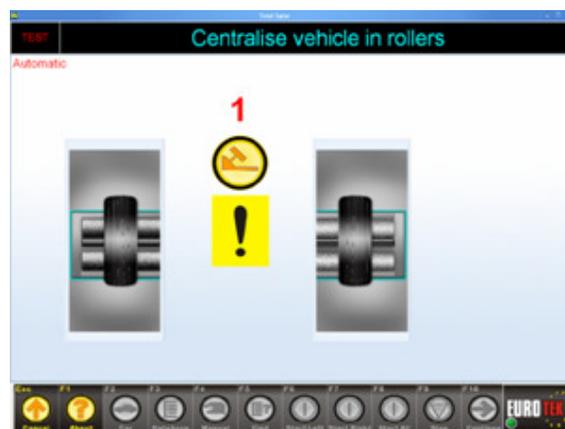
Press F10-Continue” begin the Test



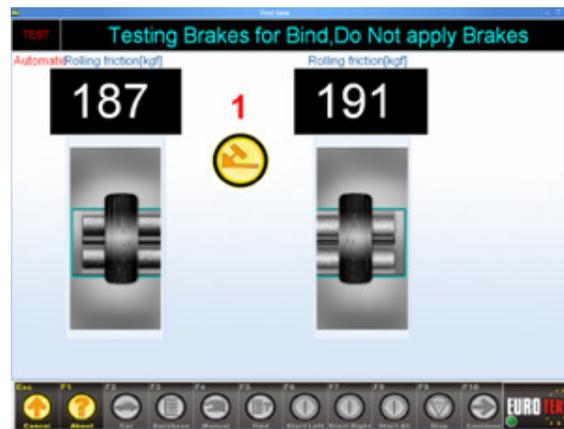
Drive slowly the front wheel on the brake tester bench, until the 2 wheels of vehicle are well located on the rollers set, the system will indicate to measure axle weight on the screen the weight of Axle will be measured.



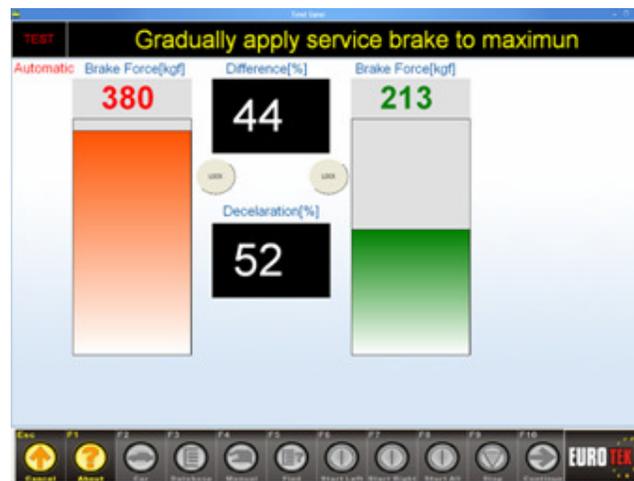
The rollers will now spin to centralize the vehicle in the roller test bed



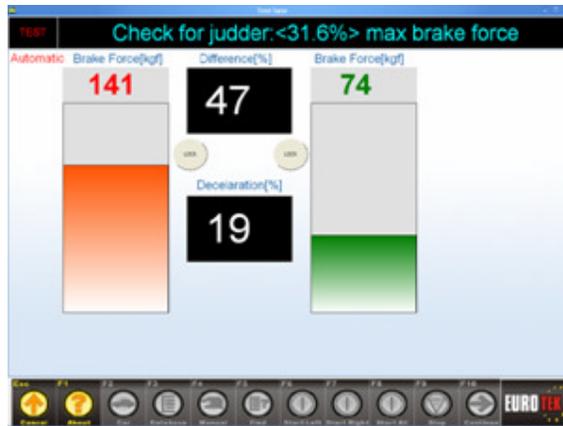
After axle Centralising the vehicle the system will indicate to inspect the brake force. Do not apply any brake movement (neither pedal brake nor hand brake) and shift gear to Neutral position when the rollers start to rotate, it is in the operation of Wheel resistance measurement. The tester should examine for Judder & Bind After the wheel resistance measurement is completed, the System will indicate the driver to apply brake force slowly to the limit or until lock out is achieved. Then the front wheels brake force will be measure and displayed. The rollers will automatically shut-off.



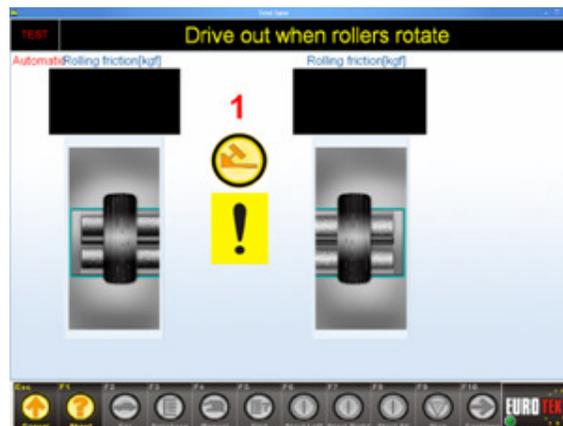
The system will then begin brake efficiency test and the tester will be asked to slowly depress the service brake



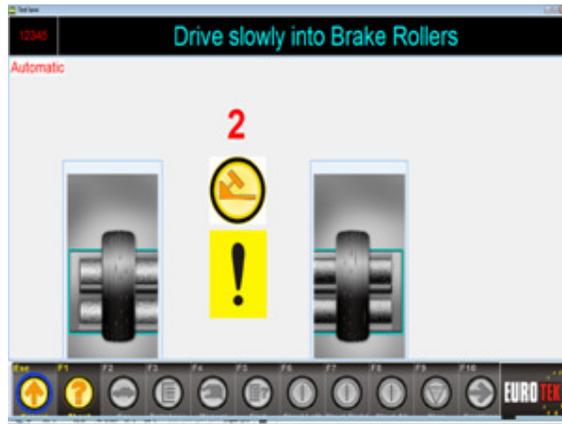
The test sequence then checks for judder the brakes are applied upto 75% of the maximum brake force as recorded in the previous test



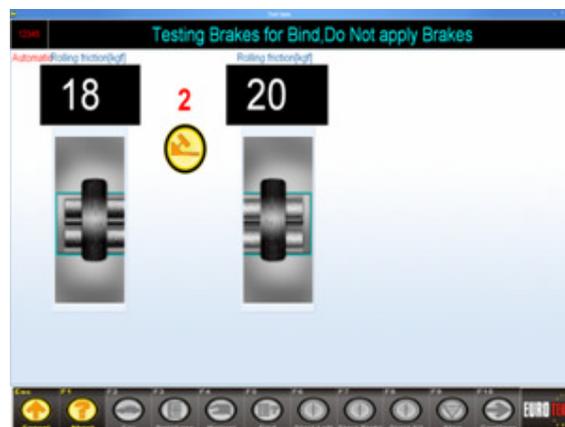
After the front axle has been inspected the system will indicate that you drive the front wheels out of the rollers, and then drive the rear wheels on the rollers set.



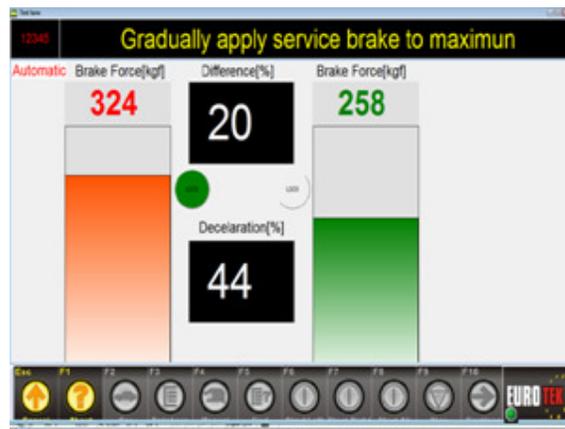
Drive rear wheels into brake roller



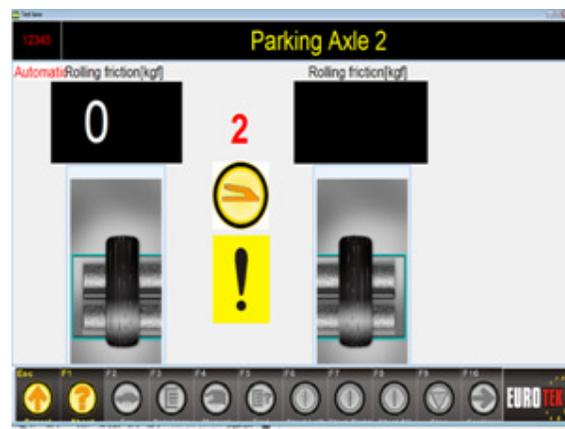
After axle weighting, the System will allow the operator to check for bind etc. Do not apply any brake movement (neither pedal brake nor park brake) The rollers start and Wheel resistance measurement is recorded



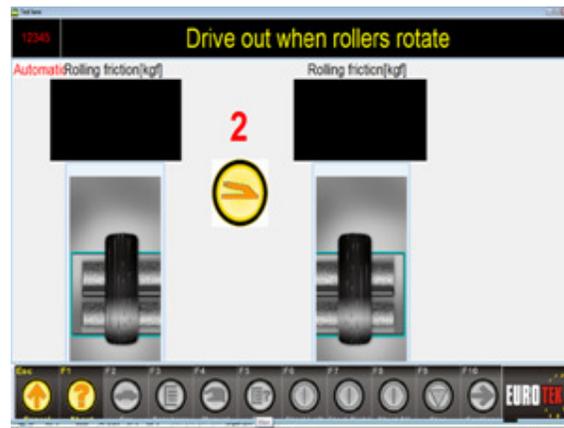
After the wheel resistance measurement is completed
The System will indicate the operator to apply brake force slowly to the limit
The rear wheels brake force will be measured and displayed.
The rollers will automatically shut-off after a preset or if wheel lock is achieved



After inspected the rear brake force, follow the instruction “Apply Park Brake” to fully apply the handbrake. Then the Parking Force will be measured and displayed.



After testing the parking force, rollers will automatically run to assist the vehicle drives the rear wheels out of the test bench. Park the vehicle in a suitable place



6.3 Result data and print

Click “F3-Job”to enter the Data base management menu, use the vehicle Registered No. searching blank to find the required vehicle.



Click the required vehicle as soon as the vehicle is found and displayed on the screen, the detail result data of the vehicle will appear.



Click "Graphic" to show the data graphic and press "F4-Print" to print out the data.



Printed Test report

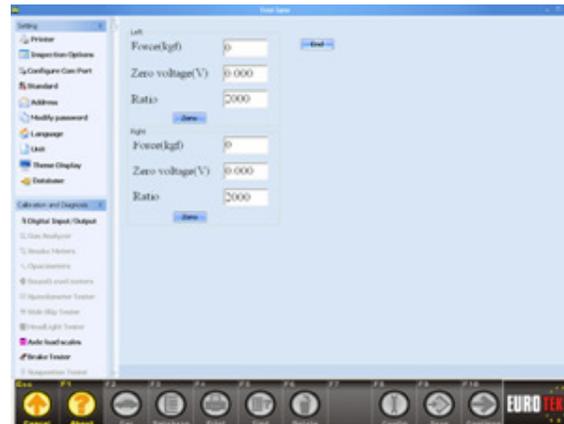
MOT Test Results		EUROTEK	
Date: 02.02.2010 19:47:30			
Eurotek 28 Rembrandt road Tel: 0175 3342700 CBM3 NJL Fax: 0175 3349700			
Device: EUROTEK		Version: 3.0.0.1	
Builder ver:	Model	Version	Manufacturer
	3.0		EUROTEK
Vehicle category: Class IV		No Lock Pass	
Manufacturer/Model: No Lock Pass		Val Reg No: TEST 1	
Date of first registration: 12.02.2009		Mileage: 0	
Brake results			
Measurement	Unit	Axis1	Axis2
Axis test mode		Automatic	Automatic
Axis weight	kg	1126	1094
Service brake	Unit	Axis1	Axis2
Brake force left	kgf	180.4	172.4
Brake force right	kgf	172.4	180.4
Brake force difference	%	5.8	20.2
Brake force axle	kgf	352.8	420.1
Road friction left	kgf	8.2	8.2
Road friction right	kgf	14.3	14.3
Road friction	kgf	22.4	22.4
Parking brake	Unit	Axis1	Axis2
Brake force left	kgf	—	183.0
Brake force right	kgf	—	172.4
Brake force axle	kgf	—	360.5
Assessment		Axis1	Axis2
Head left #	pass	pass	pass
Head right #	pass	pass	pass
Sideler left #	pass	pass	pass
Sideler right #	pass	pass	pass
Increase rate #	pass	pass	pass
Decrease rate #	pass	pass	pass
Summary results	Unit	Limit	Value
Vehicle gross weight	kg	0	0
Total mass weight	kg	2212	2212
Service brake total brake force	kgf	1135.1	1135.1
Service brake efficiency on total mass weight	%	50	51.0
Parking brake total brake force	kgf	360.5	360.5
Parking brake efficiency on total mass weight	%	16	16.3
Brake force difference	%	25	2.8
Brake Bands	Pass		
Comments			
Explanation	* indicates wheel Lock # Manual operation		

5.5 Equipment Calibration

Brake tester calibration

Follow the instruction diagram below to install the calibration kit, make sure the well positioning the calibration bars and no force applying to the load-cell sensor.

Start the software and enter the sub-menu by click the “F8-Configuration”, select the item of brake force calibration.



Press “start” to continue.

Make sure there is no force applying to the load-cell sensor, and then click “Zero” to set the Zero point value for load-cell sensor.

Add load (force) by using calibration kit to the load-cell(in appropriate force measurement range 2000-5000N) , verify the display value of the screen using the conversion table the display is exceed the error tolerance, please use the Ratio value to adjust the Display value until the correct.

The calibration method for both side of load-cell sensors are the same.

Press “End” to complete the calibration process.

Calibration of weight unit

Start the software and enter the sub-menu by click the “F8-Configuration”, select the item of Weight calibration



Press start to continue.

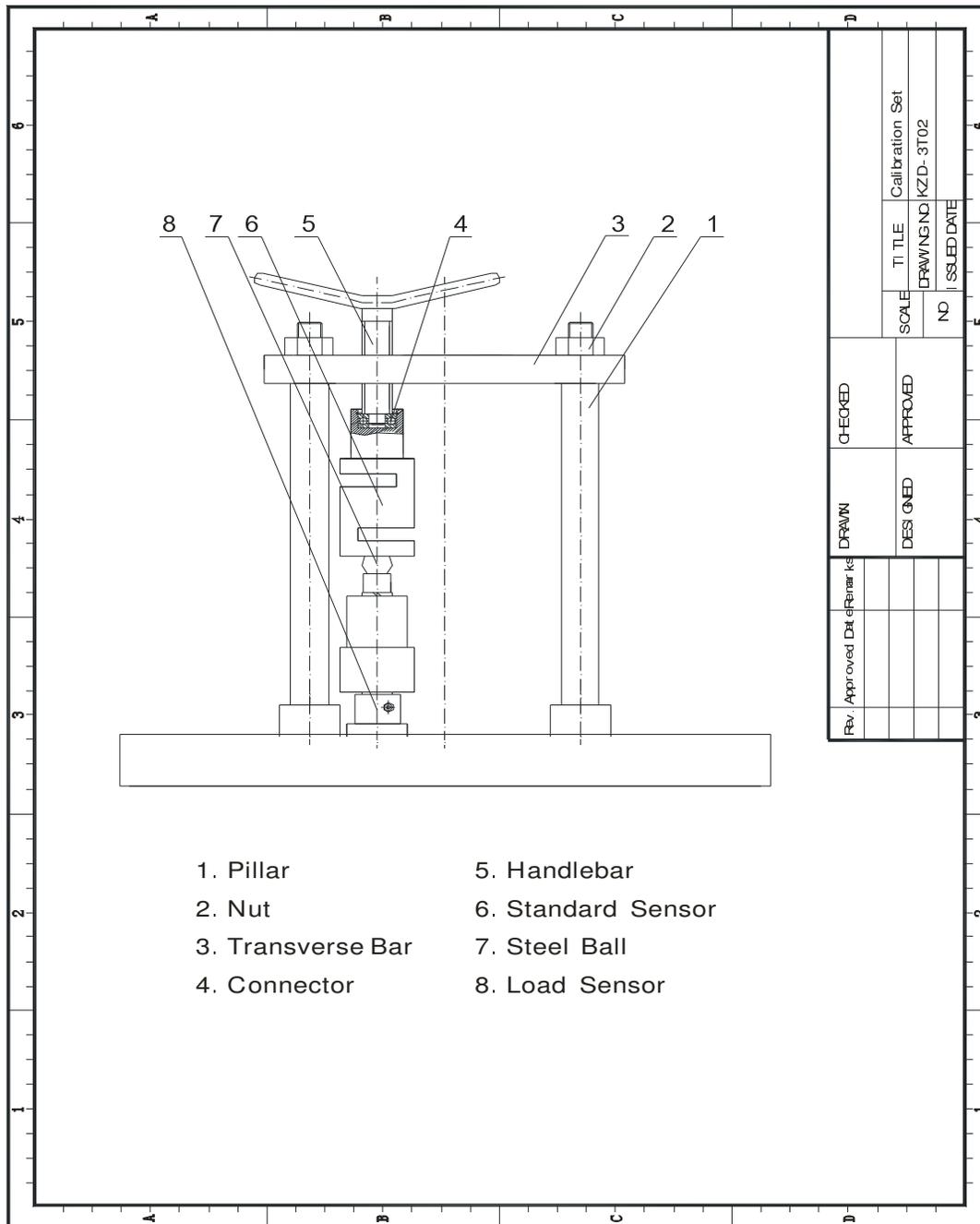
Make sure there is no force applying to the sideslip plate, and then click “Zero” to set the Zero point value for sideslip sensor.

Add load (Known Weights) directly to the tester bench (in appropriate measurement range 2000-5000 N) , verify the display value of the screen(Display value = Added Known Weight in kg).

If the display is exceed the error tolerance, please use the “Ratio”value to adjust the Display value until the correct.

.Press “End” to complete the calibration process.

Calibration Set Drawing



7. Maintenance

7.1 General maintenance

- Keep the equipment surface and roller set clean.
- Periodically check the axletree of equipment and change if damage to bearing.
- Check the screws of axletrees, sensors and the third axle monthly.
- Check monthly and add lubrication to the chain
- Add lubrication in ball bearing and track every six months.
- Add bearing lubrication every six months.
- The gear lubrication should be replaced yearly (90# or above gear oil).
- Calibrate the equipment yearly.

7.2 Maintenance for testers

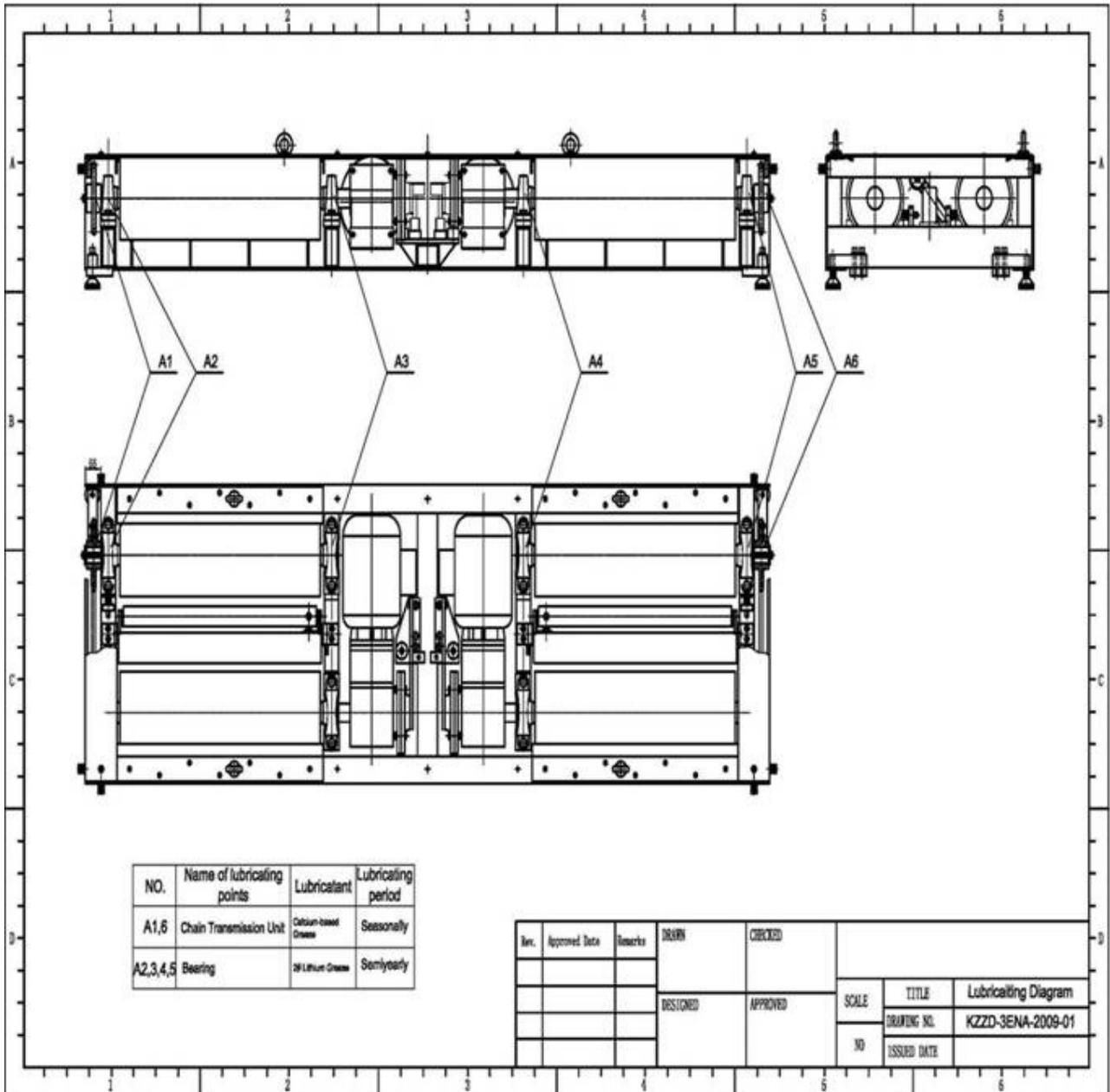
Control unit

1	Clean dirt in the cabinet	Monthly
2	Clean dirt in the cabinet filter	Monthly
3	Check the connection of all wires	Monthly
4	Antivirus Check.	Monthly

Vehicle Brake tester

1	Check the condition of all the bolts and nuts	Monthly
2	Clean the rollers and get rid of any tyre remains	Monthly
3	Check the condition of roller	Monthly
4	Check the position of chain, add lubricant	Seasonally
5	Check the position between sensor holder and the steel ball	Seasonally
6	Check the condition of all wires	Semester
7	Add lubricant to the bearing	Semester

Lubricating Diagram



8 Troubleshooting

8.1 Tester Bed

Problem		Cause	Solution
Incorrect Axle Load of tester		1.Screw of sensor not hold tight	Check and tighten the screw
		2.Sensor damaged	Check and change sensor
		3.Pressure can not spear on weight sensor averagely	Adjust the Seat-Screw of sensor
The parts of tester not working properly	Motor not running	1.Power supply abnormal	Check the power supply cable
		2.Fuse broken	Change relative fuse
	Motor still running	1.Large distance between the Distance Sensor and the third axle	Adjust the distance to 3mm
		2.Sensor wire not finely connecting	Check the sensor wire
		3.Distance Sensor damaged	Change the Sensor
	Noise	1. Sensor seat not in touch with the steel ball.	Adjust the screw to get in touch the steel ball
Unacceptable error range of test result of the Brake Tester		1.Sensor screw not hold tight	Tighten the screw
		1. Sensor seat not in touch with the steel ball.	Adjust the screw to get in touch the steel ball
		3. The phase of Motor power supply is in incorrect order.	Correct the connection

8.2 Control System

Problem	Cause	Solution
Communication error	1. Main control board no power	Check the power supply
	2. Communication port setting is wrong	Check the setting in the “control.ini”
	3. Communication cable loosed	Check the Communication cable
	4. Communication cable wrong	Check the Communication cable
	5. Communication port damaged	Change the main control board

8.3 Trouble-shooter for 3rd axle sensors in Brake tester

Definition:

- 1) **Speed sensor (3rd roller switch):** detect the turning speed of the 3rd axle (speed of the car wheel).
- 2) **Position sensor (3rd axle switch):** detect whether car’s wheel is on the roller. Both sensors are the **same type** but in deferent function.

1. Problem and Cause :

Problem A : Vehicle on the roller, tester’s motors do not start, neither for rollers.

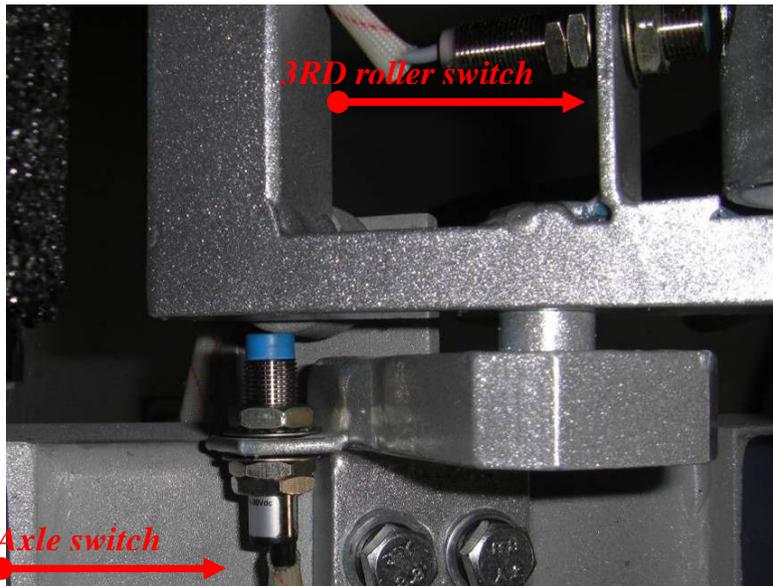
Cause: Position Sensor has problem, because of malfunction or bad adjustment of distance (sensor too close to reference object)

Problem B :Vehicle on the roller, motor starts, but one side of roller runs or runs only for a short while. Two kind of problem: 1) motor starts (roller runs) but get stop immediatly, check the speed sensor of the problem side; 2) motor star, but roller run less than 3 seconds, check also the speed sensor of problem side.

Cause : **Speed sensor** has problem because of malfunction or bad adjustment.

2. How to adjust the sensors:

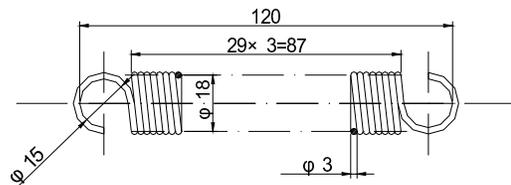
Distance between sensor head and reference object should be **2.5-3.0mm**, not too close, neither to far.



9 Parts list

Item	Specification	Installation	Life cycle	Remark
Spring	$\Phi 18 \times 3 \times 120(L)$	Brake tester 3rd Axle	10 000times	Pic.1
Rubber	$\Phi 30 \times 25(L)$	Sideslip tester	20 000times	Pic.2

Drawing :



(Pic.1)



(Pic.2)

10 Transport and storage

10.1 Instructions of transport

This equipment with packaging should respect the safety instructions to transport, avoiding any serious impact, leakage and contact with acid or alkaline matter.

Caution during Transport :

Suspend the middle part of the machine, and ensure that the sling could bear the weight of the machine.

Put down the suspender on the ground slowly, otherwise will damage the equipment.

Make sure that the equipment does not incline too much, and prevent it from impact

The equipment should be fixed well when transporting.

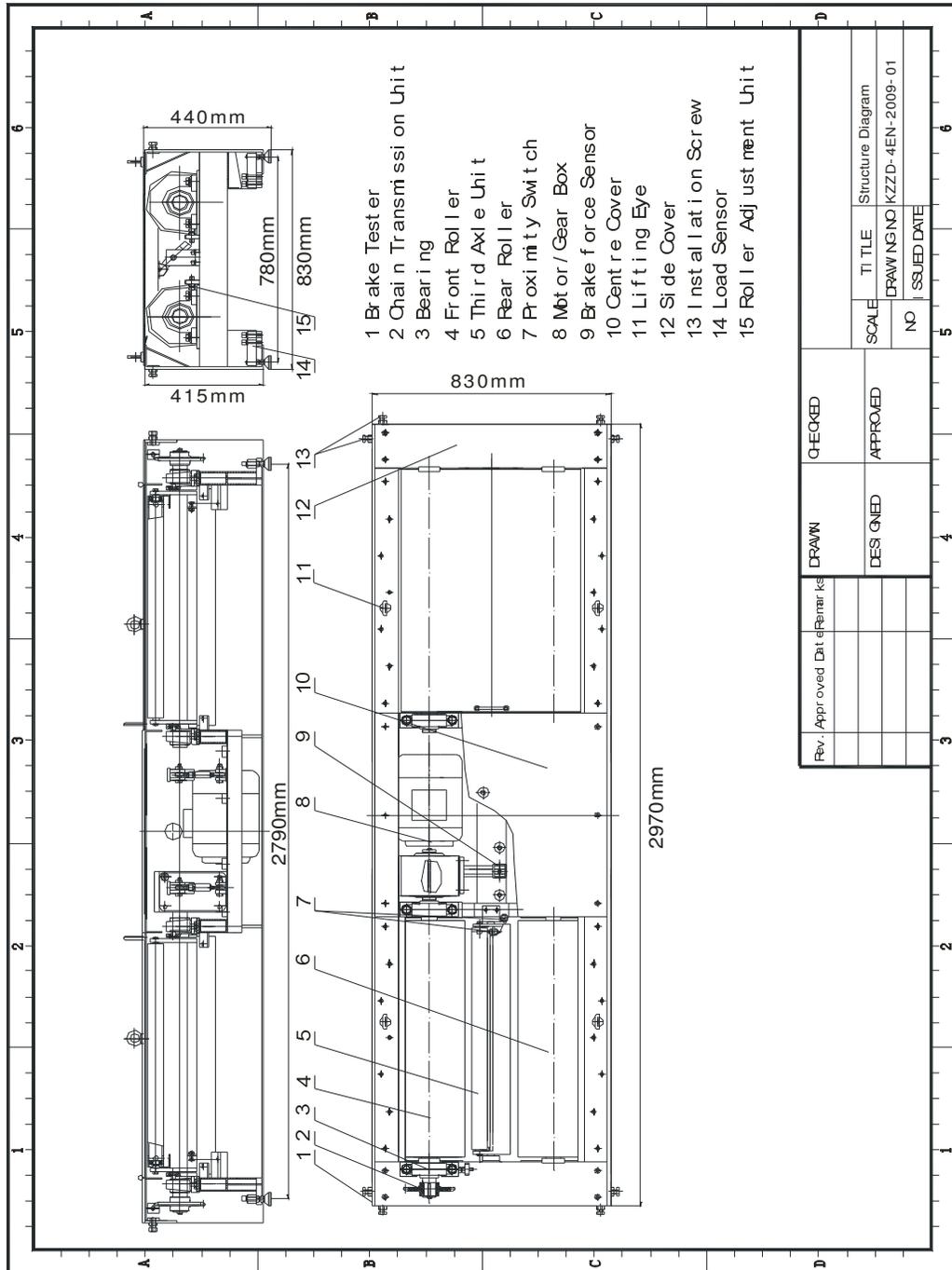
The material of packing case should be fumigated wood or export board.

10.2 Storage instrument:

The main material of the equipment is metal, you should storage it in the place where can prevent damp, acid, alkaline, and heat.

11. Appendix

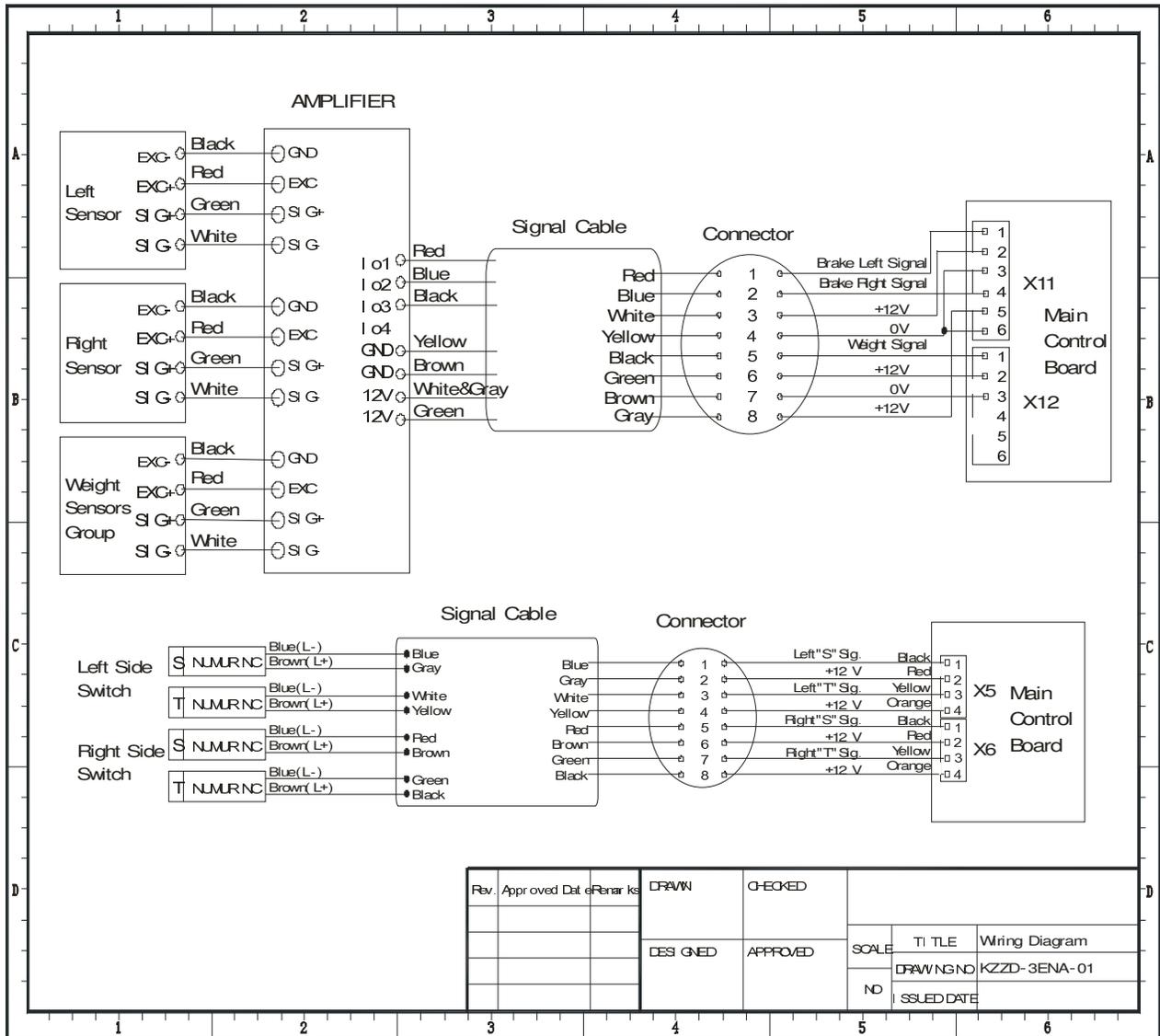
11structure diagram



11.4 Main components list

	SN	Name	Type	Qty.
Machine	1	Motor	Y2-112M 4.0 kW	2
	2	Brake Force Sensor	YZC-516 1t	2
	3	Load Sensor	YZC-320 2t	4
Control Cabinet	1	Control Switch	3LD2203-0TK53	1
	2	Breaker	OSMC32N3C25	1
	3	Breaker	OSMC32N2C10	1
	4	Filter	A2IL-10A	1
	5	AC Contactor	LC1-D18M7C	4
	6	DC Power	S-40-12	1

11.3 sensor wiring diagram



Spare Parts

	SN	Name	Type	Qty.
Machine	1	Motor	Y2-112 3.0 kW	2
	2	Sensor	YZC-320 2t	6
Control Cabinet	1	Control Switch	3LD2203-0TK53	1
	2	Breaker	OSMC32N3C25	1
	3	Breaker	OSMC32N2C10	1
	4	Filter	A2IL-10A	1
	5	AC Contactor	LC1-D18M7C	4
	6	DC Power	S-40-12	1

Calibration Table

Class VII		
Kgf		Newtons
100		490
200		980
300		1470
400		1960
500		2450
600		2940
800		3920
900		4410
1000		4900
1100		5390
1200		5880