

To the world of infinite ZERO

Ultra-precision auto balancing device

《 ZERO SHIN 》 mounting wheel

Innovative reform, In search of infinite possibilities
Achieve high performance!
For various rotation fields!



world's first!
Achieves ultimate zero-core rotation and
zero-core running

Auto balancing device "ZERO SHIN"



※ Balancer patent

Patent registration No. 4522493 (Japan)

(International Patent registered: USA, China, India, Indonesia, etc.)



By simply replacing the conventional fixed balance rotating part with the auto balancing device "Zero shin", it maintains zero core rotation without deterioration and consumption without the need for electricity, magnetism, and time-consuming correction, and high efficiency and high energy saving operation.

Companies who are having trouble with the runout of the rotating part. We propose the installation of the auto balancing device "Zero shin" to help companies who want to improve safety and driving performance as much as possible.

[Technical features]

1. By simply attaching the auto-balancing device "Zero shin" to the rotating part, the three weights in the balance device instantly balance, eliminating core shake due to fluctuations in the running load and improving running performance.
2. By using the auto balancing device "Zero shin", it is possible to prevent deterioration over time, extend the service life, suppress vibration noise, and as a result, the energy saving effect has been improved by about 30%.
3. By simply replacing the conventional aluminum wheels with aluminum wheels equipped with the auto-balancing device "Zero shin", it is possible to achieve a fuel efficiency improvement of approximately 30%.

[Examples of achievements using technology]

1. Installed on wheel flanges for grinding machines
2. Installed on tooling for machining centers
3. Installed on various types of rotating spindles
4. Installed on chucks for lathes
5. Installed on aluminum wheels
6. Installed on power generators
7. Installed on stabilizers

Example of mounting the auto balancing device "ZERO SHIN"



No electricity, No magnetic power required!

"ZERO SHIN" only needs rotational force

"ZERO SHIN" changes the rotational force into centripetal force and brings the deflection close enough to "zero".



Pursuit of dynamic runout accuracy

Are you looking for static runout with no load?
Or are you looking for dynamic runout accuracy under machining load conditions?

"ZERO SHIN" balances and seeks the center against fluctuations in machining load.



Auto balancing device "ZERO SHIN" mounting running test

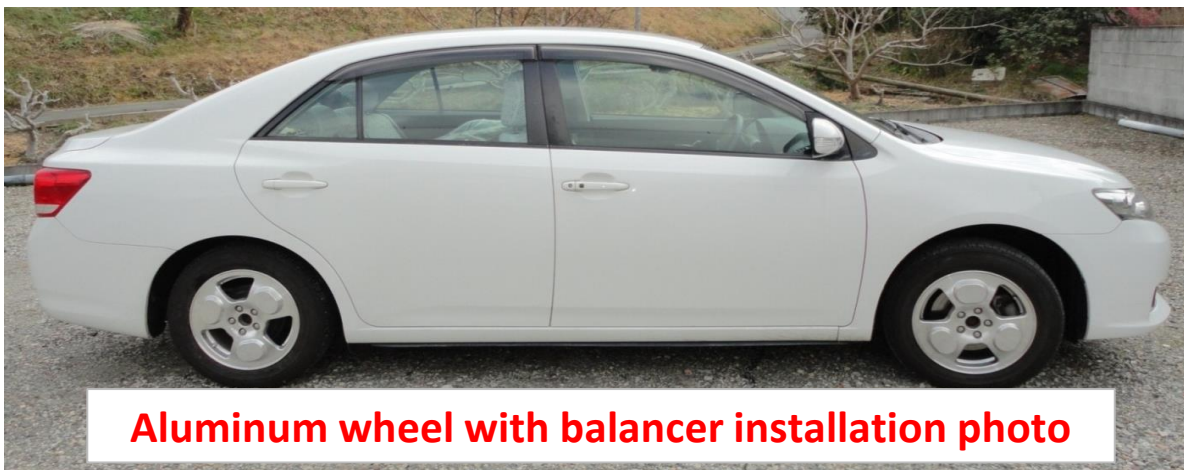
4-wheel balancer built-in integrated aluminum wheel mounting running test

- * Passenger car Toyota 1800cc Allion front-wheel drive 4-seater including driver
- * Mileage Approximately 40km round trip High-speed performance check on general roads and highways
- * First, four people tested twice with normal tires.
- * Next, I replaced it with a balancer-mounted wheel and tested it twice.

The impression of riding is that the normal wheel vibrates greatly when traveling 140 km, and it is impossible to do more.

The expression was that the wheel with balancer had less vibration even at 150km, and the higher the speed, the less vibration it had and the more stable it was, and the more it ran smoothly.

Overall, it seems that the start, corner, and acceleration also felt different from the normal wheels.



After traveling a mileage of 448km from Tokyo Hachioji to Osaka Hirakata with a balancer-equipped wheel, I refueled the tank with gasoline, and the gasoline consumption was 19.4 liters.

There were two coffee times, one meal break, and a total running time of 8 hours.

Result: The conditions were not good due to the strong wind and snow on the way in the winter climate, but the average fuel consumption value of Allion was 21.1km, which was lower than the old type 24.5km.

However, the actual fuel consumption was 19.4 liters when refueling with full gasoline for a mileage of 448 km.

As a result, the real fuel consumption was 23.09km / h.

Postscript: The number of passengers is one driver. And 4 normal tires and 4 studless tires are placed in the car.

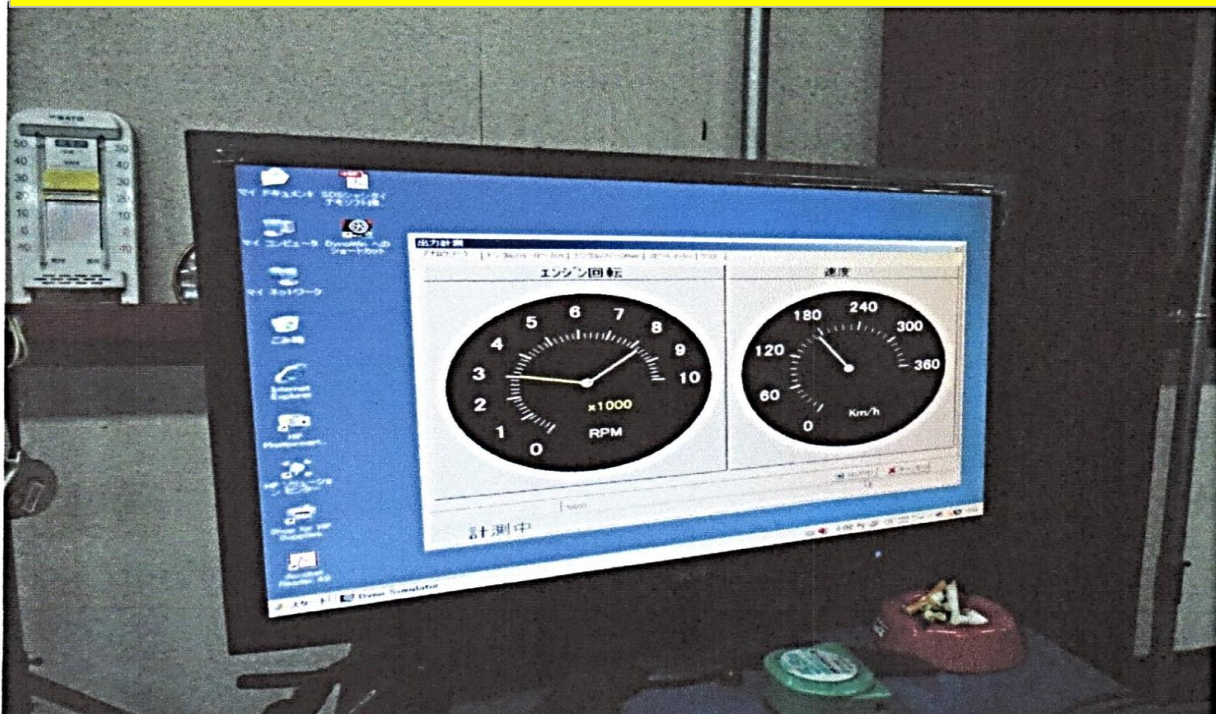
Auto balancing device "ZERO SHIN" installed, roller running test

Test run 1

High-speed camera image at Allion 1800cc
Point movement measurement from 0 to 180km / h



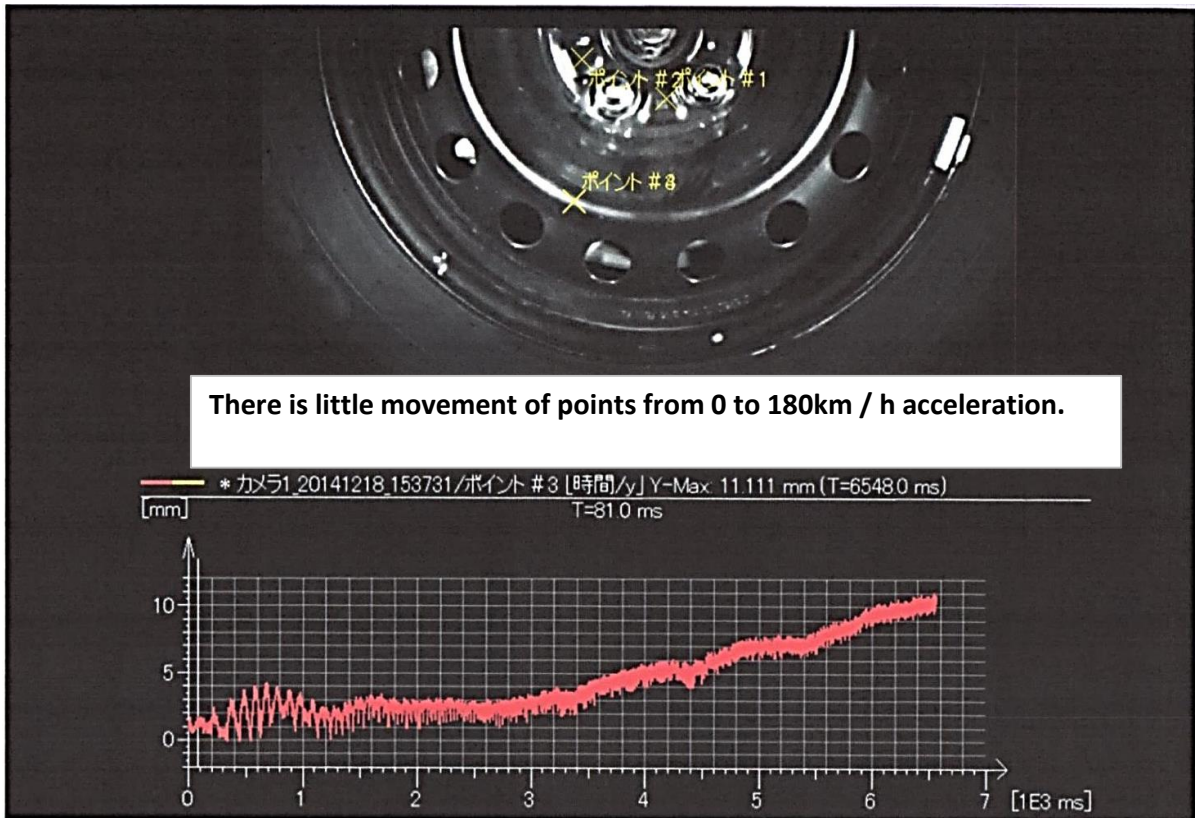
0-180km / h tachometer and speedometer image



Equipped with auto balancing device "ZERO SHIN" High-speed camera image of roller running

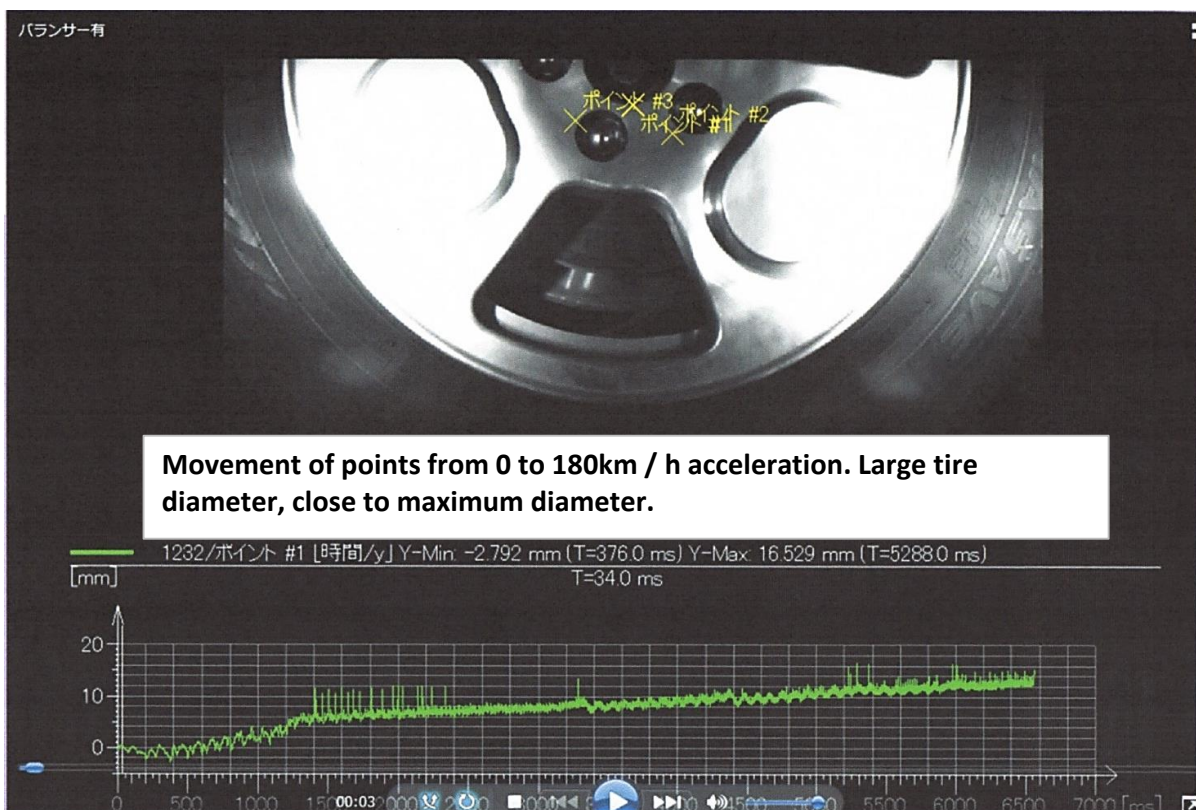
Test run 2

No balancer



Test run 3

With balancer



World's first!

shocking! "ZERO SHIN" wheel running result



[Driving data]

<Case of driving on general roads>

Demonstration of driving with Toyota Allion 1500cc. Departure from Sonenji Temple, Hirakata City, Osaka Prefecture. Cross the mountain in the direction of Ujitawara via Route 307. Arrived in Otsu City, Shiga Prefecture (around Lake Biwa). The total distance is 218.8km with a two-day round trip.

After that, when I filled up the gasoline, I got 11.38 liters. When you calculate the actual fuel consumption, how! The result is the same as the fuel consumption value in the catalog.

Compared to the listed JC08 mode 19.2km / L, the actual fuel consumption is the same as 19.226km / L. Also, despite the 5km traffic jam on the way, good results were obtained.

<Case of highway driving>

In the same car, take the expressway from the Keihan Expressway Hirakata Higashi Interchange on 6/17 (Sat.), get off at the Fukui Kita Interchange on the Hokuriku Expressway, and drive a little on the general road to the 8th Ramen Parking Lot, round trip 396.1. Demonstration of running km.

On the way, there was an accident at the place past the Meishin Expressway Yokaichi Interchange, and there was a traffic jam of 8km. It takes an hour to pass, and I get on the highway after 10 o'clock. Arrived at the 8th ramen parking lot in Fukui around 13:50. It took 3 hours and 50 minutes.

After the meal, we left at around 14:10. The return was smooth, and I arrived at the office around 17:00, which took 2 hours and 50 minutes.

When the gasoline is full (16.86 liters refueling) and the actual fuel consumption is calculated, it is 23.49km / L. Considering the traffic jams on the way, the result was overwhelming.

[postscript]

The temperature inside the vehicle is always set to 26 ° C. In addition, the outside air temperature was 28 ° C to 30 ° C, and there were many sunny days.

Actual operation data for 2 years when the auto balancing device "ZERO SHIN" is installed

January 2016-March 26, 2018

Actual fuel consumption table of Toyota 1500cc Allion with 15 inch aluminum foil with balancer

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Travel date	1/6	1/11	1/23	2/4	2/12	2/22	2/27	3/9	3/17	3/22	3/28	4/8	4/14	4/21	5/8	5/17	5/27	6/7
Average fuel economy km/ℓ	19.4	20.5	17.7	17.2	17.8	20.8	21.4	20.2	21.0	21.7	19.8	20.5	21.2	18.6	19.3	18.2	20.2	17.7
Mileage m	816.8	811.4	719.9	696.1	457.5	838.2	953.6	735.5	930.8	838.6	571.0	794.9	842.4	594	776.2	678.3	849.7	660.1
Gasoline amount ℓ	43.01	43.0	41.4	44.02	26	44.21	43.21	39.72	43.7	38.63	33.0	39.0	45.0	34.0	49.39	33.7	44.0	38.5
Real fuel economy km/ℓ	18.99	18.87	17.39	15.81	17.60	18.96	22.07	18.52	21.30	21.71	17.30	20.38	18.72	17.47	15.72	20.13	19.31	17.15

	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Travel date	6/21	7/3	7/5	7/6	7/9	7/15	7/19	7/29	8/3	8/5	8/11	8/20	9/7	9/18	9/20	9/23	10/6	10/17
Average fuel economy km/ℓ	18.4	21.2	18.1	23.8	22.6	18.9	23.0	17.9	17.5	22.1	19.9	17.3	18.9	21.3	18.7	24.7	17.7	17.1
Mileage m	593.6	900.3	551.5	675.9	863.5	384.5	925.7	716.4	276.7	858.5	775.2	724.0	761.3	927.3	234.4	871.9	753.6	295.1
Gasoline amount ℓ	34.0	43.51	32.02	29.01	39.4	20.5	42.01	46.0	16.0	38.0	43.01	41.51	46.3	44.52	11.7	37.2	47.01	17.21
Real fuel economy km/ℓ	17.46	20.69	17.22	23.30	21.92	18.76	22.04	15.57	17.29	22.59	18.02	17.44	16.44	20.83	20.03	23.44	16.03	17.14

	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Travel date	10/25	11/5	11/16	12/1	12/16	12/11	12/17	12/29	1/9	2/20	3/7	3/23	3/31	4/5	4/20	5/9	5/31	6/14
Average fuel economy km/ℓ	22.3	18.3	17.8	17.2	18.7	22.4	20.5	18.5	19.8	19.8	20.8	18.4	18.9	21.3	18.7	18.5	17.6	18.9
Mileage m	962.1	766.9	724.1	673.2	377.1	716.3	726.4	591.7	811.5	868.9	823	781.5	548.4	784.9	793.4	786.8	743.2	805.2
Gasoline amount ℓ	44.9	43.0	46.0	39.0	21.01	33.7	38.61	32.5	42.79	44.3	41.71	45.7	38	38.52	42.52	47	42.3	47.6
Real fuel economy km/ℓ	21.43	17.83	15.74	17.26	17.95	21.26	18.81	18.21	18.96	19.61	19.73	17.10	14.43	20.38	18.66	16.74	16.0	17.1

	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Travel date	6/17	6/18	6/26	7/1	7/11	7/11	7/18	7/31	8/8	8/11	8/26	9/6	9/17	9/26	10/3	10/9	10/19	10/30
Average fuel economy km/ℓ	17.8	21.3	18.3	22.4	24.4	18.7	18.2	19.3	17.3	21.3	19.7	18.5	20.8	19.4	22.2	20.5	20.0	20.2
Mileage m	218.8	396.1	446.9	288.3	602.8	524.5	372.3	832	306.9	767.7	853.7	806.4	909.6	815.8	1013.2	684.6	761.9	777.8
Gasoline amount ℓ	11.38	16.86	23.23	15.31	24.41	29.25	20.87	46.09	17.87	37.57	45.46	46.5	47.1	45.4	46.78	34.59	40.75	39.14
Real fuel economy km/ℓ	19.23	23.49	19.24	18.83	24.69	17.93	17.84	18.05	17.17	20.43	18.78	17.34	19.31	17.97	21.66	19.79	16.03	17.14

	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Travel date	11/7	11/20	12/1	12/13	12/26	12/27	1/9	1/20	2/3	2/14	2/22	3/5	3/15	3/26				
Average fuel economy km/ℓ	21.5	20.2	21.1	18.7	18.1	23.4	19.8	21.2	18.5	19.3	21.6	21.8	20.20	19.2				
Mileage m	696.9	841.6	810	759.5	588.4	658.1	781.9	889.3	781.8	788.6	971.7	915.0	863.4	842.1				
Gasoline amount ℓ	34.23	43.67	38.89	44.41	33.61	29.5	40.77	44.14	43.85	43.26	45.25	43.72	43.64	47.03				
Real fuel economy km/ℓ	20.36	19.27	20.83	17.10	17.51	22.31	19.18	20.15	17.83	18.23	21.47	20.93	19.78	17.91				

	total	Average value up to 3/26
Average fuel economy km/ℓ	1705.6	19.83
Mileage m	61506.6	715.19
Gasoline amount ℓ	3246.05	37.74
Real fuel economy km/ℓ	1628.68	18.95



Compared to the JC08 mode value of 18km / L, the two-year average of actual fuel consumption is 18.95km / L, which is almost the same.

Auto balancing device "ZERO SHIN" Image with and without mounting

October, 2014 Yoshiday

Running test with or without adhesion of 3-point balancer device to aluminum wheels

Central circuit 18 laps (50.472km) driving comparison test run



Auto balancing device "ZERO SHIN" 3-point weight attached photo

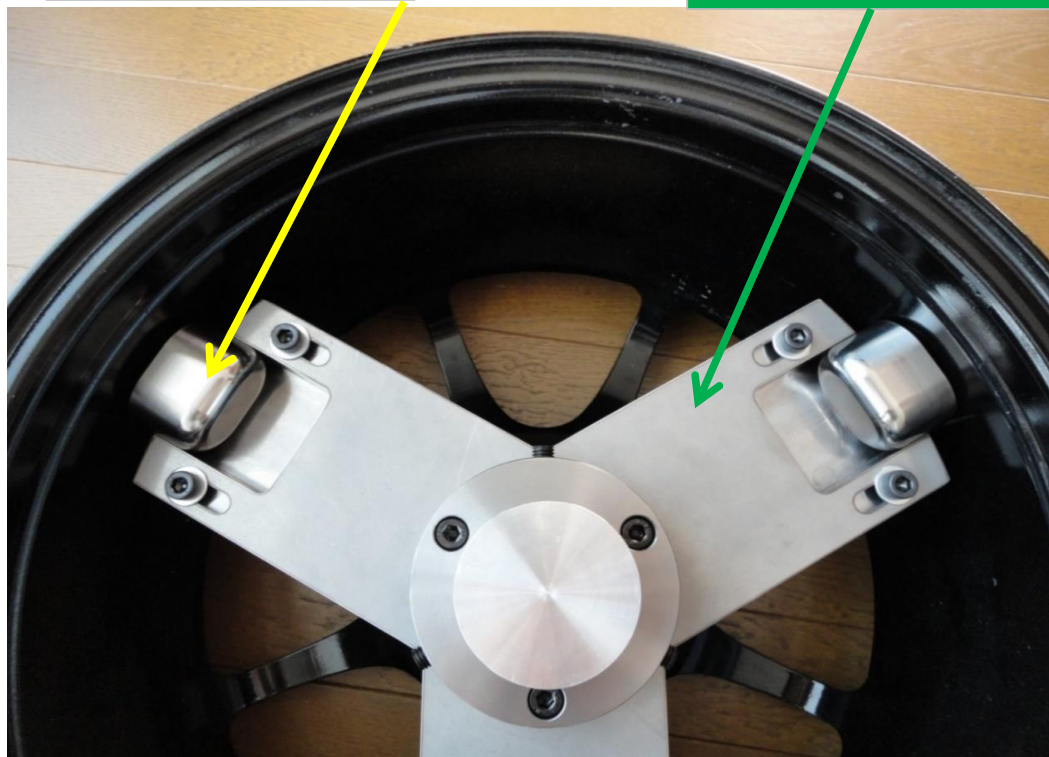
March 2014 Yoshiday

3-point balancer pasting type



3-point balancer

Mounting jig



Auto balance device "zero core" mounting test run data

No1-1



October 10, 2014

Report

Equipped with a 3-point balancer, test run at Central Park

Implementation date: October 7, 2014

Implementation car: Honda Fit 1500CC

Balancer mass: @ 500g x 12 = 6Kg

Circuit driving: 18 laps

Result

- Total running time from engine ON to OFF: ST 34 minutes 59 seconds 55.0
AB 34 minutes 39 seconds 49.7
- Total mileage: ST 49.5km AB 49.4km
- Driving meter fuel consumption: ST 4.3km / ℓ AB 4.3km / ℓ

Impressions of participants

- ① When AB was installed, the running noise during running felt small overall, and changes were seen. (Many participants)
- ② AB felt a little heavy at the start of driving. (Chairman A)
- ③ AB is good for high-speed corner driving and smooth. (Chairman A)
- ④ At low speed corners, AB and ST are the same. (Chairman A)
- ⑤ AB felt that there was little vibration during driving. (Chairman A)
- ⑥ I thought the fuel economy would improve, but it didn't change. (Same for meters)

ARI LLC impressions and future efforts (Yamamoto)

- ① Initially, it was said that the cushioning effect of the tape would eliminate the balancer centripetal effect when adhering the balancer bottom surface and the wheel body with double-sided tape. In reality, I felt a little heavy at the start, and there was little change in the running sound, so I felt that the structure was not such that the running vibration was directly transmitted to the balancer body in the mounted state.
- ② When installing the balancer, we devised a special jig so that both ends of the balancer body bite into the wheel body and can be installed so as to approach the integrated type. Install and verify. Even with this bonding method, it is necessary to verify the mounting result status after running. (Checking the balancer mounting marks on the wheel, etc.)
- ③ This time, in order to check the fuel consumption, it is necessary to drive accurately from the on to the off of the engine. I thought the balancer would take some time

<Continued on the next page>

Auto balance device "zero core" mounting test run data

No1-2



<Continued from the previous page>

from turning the engine on to off, but the result was quite short, and it seems that the change in tire diameter during driving had an effect. I think it needs to be verified.

- ④ The same is relevant, but a way to see the total mileage. Why is the balancer 100m shorter? What is the mileage taken from? Does the shape of the tire change when I drive? Confirmation is required. The effect of changes in the tire shape (maximum diameter) with and without runout. In general, ST has a large running vibration, so the tire diameter is unstable and fluctuates greatly, and the distance from the ground to the center of the rotation axis becomes short. As a result, the turning radius of the tire becomes smaller, and the absolute mileage and running time become longer than the assumed mileage and running time. On the contrary, in AB, since the distance from the ground to the center of the rotating shaft is large on average because the balance is made against the fluctuation of the traveling load, the traveling vibration is small, and the absolute traveling distance and the traveling time are shortened. The result is as shown.
- ⑤ Check how to take the gasoline consumption of the driving meter.
- ⑥ The method of checking the fuel consumption this time is also important, but it is more important to compare the actual running time from the start to the goal with the actual fuel consumption. Comparing the high-speed running of ST and AB, it goes without saying that ST cannot run as fast as AB (general car), and is there such a problem in running this racing car? I think it's pretty close to the best run, but it's a bit hard to think of, so you need to think about it.
- ⑦ Finally, three laps in Allion. The average fuel consumption changes from 22.2km / ℓ before riding to 19.2km / ℓ after driving. The maximum speed is 150km / h. In addition, it took 1 minute 55 seconds to run one lap, and from 1 minute 39 seconds of the fit, it took 16 seconds more to make a lap. In addition, the indoor auto air conditioner is not turned off and is normally set from 26 degrees to 22 degrees, so it is necessary to confirm the relationship.
- ⑧ Regardless of the underspring problem, I felt that the best results would be obtained if the integrated balancer was fitted to the fit.

Currently, wheels with balancer for Allion

Wheel weight: 7kg Balancer weight: 3kg Total weight: 10kg

Currently, "fit" wheels with adhesive balancer

Wheel weight: 3 kg Balancer weight: 1.5 kg Total weight: 4.5 kg

-That's all-

World's first!

**Aluminum wheel equipped with auto
balancing device "ZERO SHIN"**

Shocking driving results! 

**30% or more fuel efficiency
improvement results**

1800cc plug-in Prius "ZERO SHIN" installed running



JC08 mode 37.2km / L. Achieved total actual fuel consumption of 37.6km / L for 400km driving

※ Balances against fluctuations in operating rotation load, and reduces rotation shaft
runout to zero as much as possible.

**Installation example of auto balancing device
"ZERO SHIN"**

After installing the same tires, compare " mileage, real fuel consumption " data for each point

With the zero-core wheel installed, the actual mileage is shorter than the actual distance, and the actual fuel consumption is equivalent to the JC08 value.

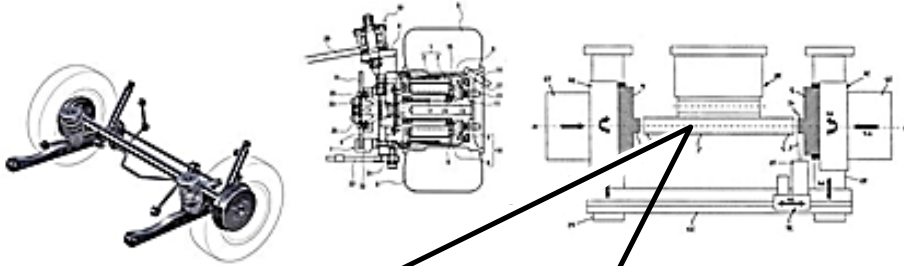


"Toyota Plug-in Prius" 1800cc standard equipment. Charging-less fuel economy comparison			
It's past 9 am on the day. Gasoline full tank start. Enter from Hirakata East IN and take a break at Shizugatake S			
Mileage	Average fuel economy	Average speed	weather. Outdoor temperature
119.5km	38.3km/ℓ	80~100km/h	cloudy. Sunny later 10° ~13°
Installed tires: 195 / 65R15 Φ635 Circumferential length 1993.9 cm			
From Shizugatake S, get off at Fukui Kita IN and go to No. 8 Ramen Parking Lot			
Mileage	Average fuel economy	Average speed	weather. Outdoor temperature
202.5km	31.7km/ℓ	80~100km/h	Sunny 13° ~ 18°
Depart from the 8th ramen parking lot. From Fukui Kita IN to Nanjo S (lunch break)			
Mileage	Average fuel economy	Average speed	weather. Outdoor temperature
238.2km	31.1km/ℓ	80~100km/h	Sunny 18°
From Nanjo S to Yokaichi S			
Mileage	Average fuel economy	Average speed	weather. Outdoor temperature
343.5km	30.7km/ℓ	80~100km/h	Sunny 18°
Get off at Hirakata East IN from Yokaichi S. Full tank refueling at the stand			
Mileage	Average fuel economy	Average speed	weather. Outdoor temperature
403.5km	31.3km/ℓ	80~100km/h	Sunny 18°
Indoor set temperature: 25 ° Real fuel economy: 30.498km / ℓ			

"Toyota Plug-in Prius" 1800cc ZERO SHIN equipment. Charging-less fuel economy comparison			
It's past 9 am on the day. Gasoline full tank start. Enter from Hirakata East IN and take a break at Shizugatake S			
Mileage	Average fuel economy	Average speed	weather. Outdoor temperature
119.4km	31.5km/ℓ	80~100km/h	Sunny 21°
Installed tires: 195 / 65R15 Φ635 Circumferential length 1993.9 cm			
From Shizugatake S, get off at Fukui Kita IN and go to No. 8 Ramen Parking Lot			
Mileage	Average fuel economy	Average speed	weather. Outdoor temperature
202.4km	33.4km/ℓ	80~100km/h	Sunny 25°
Depart from the 8th ramen parking lot. From Fukui Kita IN to Nanjo S (lunch break)			
Mileage	Average fuel economy	Average speed	weather. Outdoor temperature
238.0km	32.6km/ℓ	80~100km/h	Sunny 24°
From Nanjo S to Yokaichi S			
Mileage	Average fuel economy	Average speed	weather. Outdoor temperature
342.8km	32.1km/ℓ	80~100km/h	Sunny 26°
Get off at Hirakata East IN from Yokaichi S. Full tank refueling at the stand			
Mileage	Average fuel economy	Average speed	weather. Outdoor temperature
403.3km	33.0km/ℓ	80~100km/h	Sunny 28°
Indoor set temperature: 25 ° Real fuel economy: 36.49 km/ℓ			

Proposal for installation of auto balance device "ZERO SHIN"

Directly linked to energy saving, environment, safety and stability of automobiles
Application to electric vehicles. etc, further improve fuel efficiency



All possibilities for axes of rotation

- Increased bearing wear time
- Expansion of maintenance cycle
- Lubricant reduction
- Vibration reduction due to uneven wear
- Extended life due to uniform wear of bearings
- **Shaking of the handle due to vibration is reduced**
- **Mitigating the danger of driving**
- **Indoor quietness**
- **Improves fuel economy by about 30%**
- **Engine load reduction**
- **Car vibration noise reduction**
- **Stability at high speeds**
- **Extension of life due to uniform wear of tires**



Realization of high-speed stable running of high-speed railway vehicles



Reduction of wheel uneven wear and rail damage when driving on curves



※ Some images are quoted from the internet.

Proposal for balance improving with auto balancing device "ZERO SHIN"

The auto balancing device "ZERO SHIN" takes the dynamic balance, which is impossible with the conventional fixed balance, without adjusting the balance, and improves the rotation core shake.

We propose the world's first auto balancing device "ZERO SHIN" that solves various problems of various rotating parts and extends energy saving, resource saving, life, processing accuracy, etc.!

[Various industrial fields required]

To car rotation axis



To railroad rotation axis



To ship rotation axis



To aluminum wheels



To wheels and shafts



To propeller shaft



To wind power



To aircraft engine



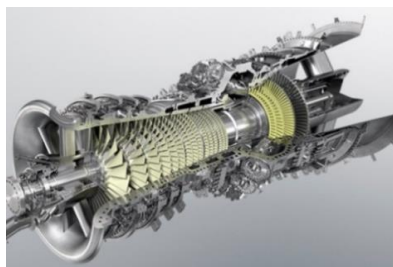
To generator



To the rotating part



To engine shaft



To rotating shaft



※Some images are quoted from the internet.



Auto balancing device

(オートバランス装置)

Reform of the innovation

(革新の改革)

Infinite possibility

(無限の可能性)

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