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TAMAGAWA NEWS

2017.9

Vol. 19

New products

Low Inertia Series Small AC Servo Motor

TBL-iVs Series

Application News

① Railway Related Products

② **ATLAS^{eye} Series** Surveillance Camera System

TAMAGAWA Topics

Excavation! Drawings before Pacific War (Part 2)

~Selector switch for fighter aircraft "Hien"~

Introduction of New Employees

Information

35th Motortech Japan

33rd Space Symposium



Tamagawa



The cover of this edition



80th anniversary from the opening of the whole length of JR Iida line

August 20th: It has been 80 years since the whole length of JR Iida line (Approx. 200 km-long local railway line connecting Toyohashi city in Aichi prefecture and Tatsuno Town in Nagano prefecture) was opened. Iida line was completely opened in 1937 (previous year of Tamagawa's establishment) when four private railway lines (Toyokawa, Houraiji, Sanshin and Ina-denki) from Toyohashi station of Tokaido line to Tatsuno station of Chuo-honsen line were connected. Seven stations of Iida line are listed in the top 100 secluded stations ranking so Iida line is popular for a railway enthusiast.

Taste of Hometown 100% pure cidre - Sparkling wine made from apples - Mashino Winery

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TAMAGAWA Topics

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Taste of Hometown

100% pure cidre (Sparkling wine made from apples) Mashino Winery

Matsukawa town in Minami Shinsyu (Southern part of Nagano prefecture) has over 100 years of history in producing fruits. Mashino winery is located at Mashino area in Matsukawa town where you can see apple orchards throughout.

The winery is recently putting effort into the development of 100% pure



cidre, sparkling wine made from apples. A cidre named "Pionnier (Pioneer in French)" to express deep appreciation for the pioneer was carefully made with some kinds of apples by traditional method (In-bottle secondary fermentation). Its fresh and dry taste goes well with any kind of cooking so you can enjoy it in various situations. Other than "Pionnier", "Mashino cidre" and "Matsukawa cidre Marry" are available as well. Apple still wine is also popular for its soft degustation like surrounded by apples. 100% pure apple juices made from some kinds of apples are super popular. Please

enjoy the taste of literally pure apples.



●Contact **Mashino Winery**

3272 Ohjima, Matukawa town, Shimoina gun, Nagano 399-3304 Japan
FAX.0265-36-5599 Reception time: 9:00-18:00 Monday to Friday (E-mail and phone)
<http://www.mashinowine.com/> E-mail webshop@mashinowine.com

Introduction

Introduction of Group Company

Our company was founded in May 2007 in Iida city, Nagano prefecture as a wholly owned subsidiary company of Tamagawa Seiki that is in charge of engineering division. It is our company's 10th anniversary this year. We currently have 5 branch offices near each laboratory of Tamagawa Seiki and the number of employees is 67, which is four times that of our founding. We are supporting with all our heart so that Tamagawa's engineers and other employees can devote themselves to work.

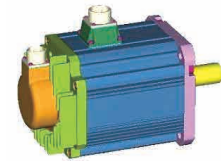
Mainly the technical development and design support for Tamagawa, our business covers a wide range of fields such as 2D and 3D CAD, CAE analysis, CAM, product design, production engineering, quality assurance, software development, translation, ECAD and PC maintenance. We are also in charge of the calibration of measuring instruments, output services by high accuracy 3D printer, development of business applications by using Web technology. Furthermore, we started to dispatch English conversation teacher to group companies from this year. Regarding the calibration of measuring instruments, we recently certified as an accredited calibration body of JCSS registration categories "length and angle" other than general calibration.

As a volunteer activity for local communities, we actively organize environmental improvement activities around the company and have acquired middle rank certification (J-1403-001) within "Local environmental management system, Minami Shinsyu EMS21". In addition to creating ideal workplace environment for employees, we are deepening exchanges among our employees through various events such as cherry blossom viewing, summer festival, company trip and year-end party.

Tamagawa Techno Creation Co. Ltd.



Appearance



3D CAD data of AC servo motor



Output services by 3D printer



10th anniversary of foundation in May 23, 2017

Information

- Address of headquarters : 5121-138 Kiriishi, Kanae, Iida city, Nagano
- Establishment: May 2007
- Capital : 8 million yen
- Employee : 67 persons
- Business : Technical development and design support for Tamagawa Seiki (2D and 3D CAD, CAE analysis, CAM, product design, production engineering, quality assurance, software development, translation, ECAD, PC maintenance etc.), calibration of measuring instruments and output services by 3D printer.

Tour of Iida City and Its Neighborhood No. 19

Ina-dani Dochu Kabuchan Mura

Kabuchan Mura is a theme park where three generations of family can enjoy together and reproducing the atmosphere of Ina-dani (Ina valley) in ancient times.



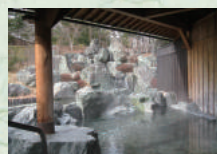
Nagaya-mon (Japanese traditional gate) with thatched roof which is the symbol of this park is waiting for you at the entrance. Inside of the park, there are some historical museums reproducing the atmosphere of Chuma-kaido which was called as "Shio no Michi (salt road)" and displaying commodities used in early Showa era etc. They make adults feel nostalgic and children must feel freshness.

You are able to experience pottery making, ceramics painting and candle making at Togeikan, paper making, plant dyeing and bookmark making at Shinsyu-kogei, Mizuhiki



coaster making and cocoon ball doll making at Silk-kan. You can choose one of four routes and enjoy Yakuyoke-kaiun

(warding off evil and bringing in good fortune) tour anytime. Just feeling dizzy? Is house rotating? "Karakuri-kan" where we can play with traditional toys is very popular for children. As annex, Suisho-zan Spa ~Mangan Jyujyu no Yu~ is the alkaline simple hot spring which is expected to have skin-beautifying effect. Open-air bath made from blue stones of Ohshika village, cave bath decorated with crystal and pure Japanese style house surrounded by Japanese



garden having a pond will make you feel refreshed in mind and body.

Cute accessories, Shinsyu Miso (soybean paste), Mizuhiki-zaiku (ornament made with decorative paper codes), local sake and original products of Kabuchan are available as souvenir.

● Ina-dani Dochu Kabuchan Mura

Open: 9:30 to 17:00 (Middle of Mar. to Nov.)
9:30 to 16:00 (Dec. to middle of Mar.)

Entrance fee: 800 yen for adults, 500 yen for children
Holiday: Tuesday (Open in case of national holiday)

● Suisho-zan Spa ~Mangan Jyujyu no Yu~

Open: 11:00 to 21:00 (reception by 20:00)

Entrance fee: 800 yen for adults, 500 yen for children
Holiday: Tuesday (Open in case of national holiday)

[Information]

Ina-dani Dochu Kabuchan Mura

Address: 386-1 Hakogawa, Iida city, Nagano 395-0243 Japan
TEL.0265-28-1755 (9:00~18:00)
FAX.0265-28-1766 URL: <http://kabuchanmura.jp/>

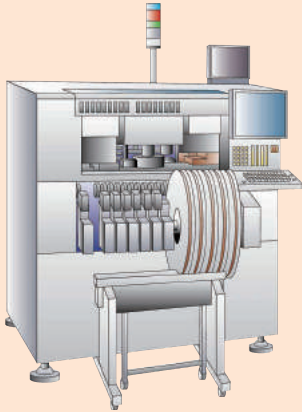
New Release

Low Inertia Series **TBL-iVs Series** Small AC Servo Motor

Low inertia type TBL-iVs Series was added in our AC servo motor lineup.

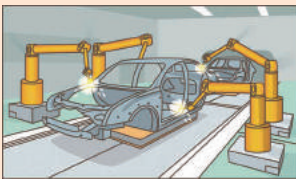
What is low inertia type? (TBL-iVs Series)

Good at quick motions which require excellent acceleration. Suitable for high-frequency motions represented by semiconductor devices.



What is middle inertia type? (TBL-iV Series)

Good at stable rotation at high speed area because of higher rotor inertia value than low inertia type. Suitable for robot or other machines for which stable performance is indispensable.



Applicable Driver TAD8811 Series

- Easy auto-tuning, parameter setting, wave-form monitor and JOG driving on PC.
- Equipped with easy control functions



Speedy and Powerful

- Alert movement achieved with low inertia and increased acceleration
Max. 20% lower rotor inertia than our conventional products
- Powerful
The peak torque is three and a half times higher than the rated torque.



output [50~750W]
size [□40~80mm]

Low noise and low vibration

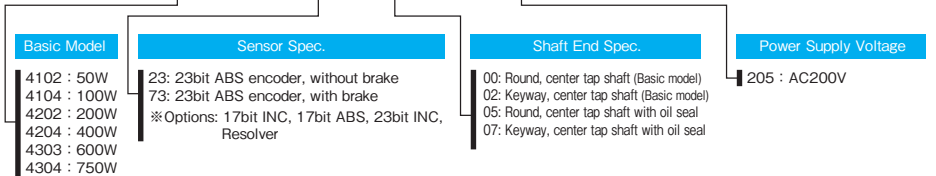
- Realized low vibration by adopting 10-pole and 12-slot motor
- Excellent quietness in the industry's highest class (-5dB compared with our standard product)

Further Advantages

- High accuracy (23bit absolute encoder)
- Receptacle connector type
- Adoption of oil seal having independent sealing performance

Model Designation

T S M N E



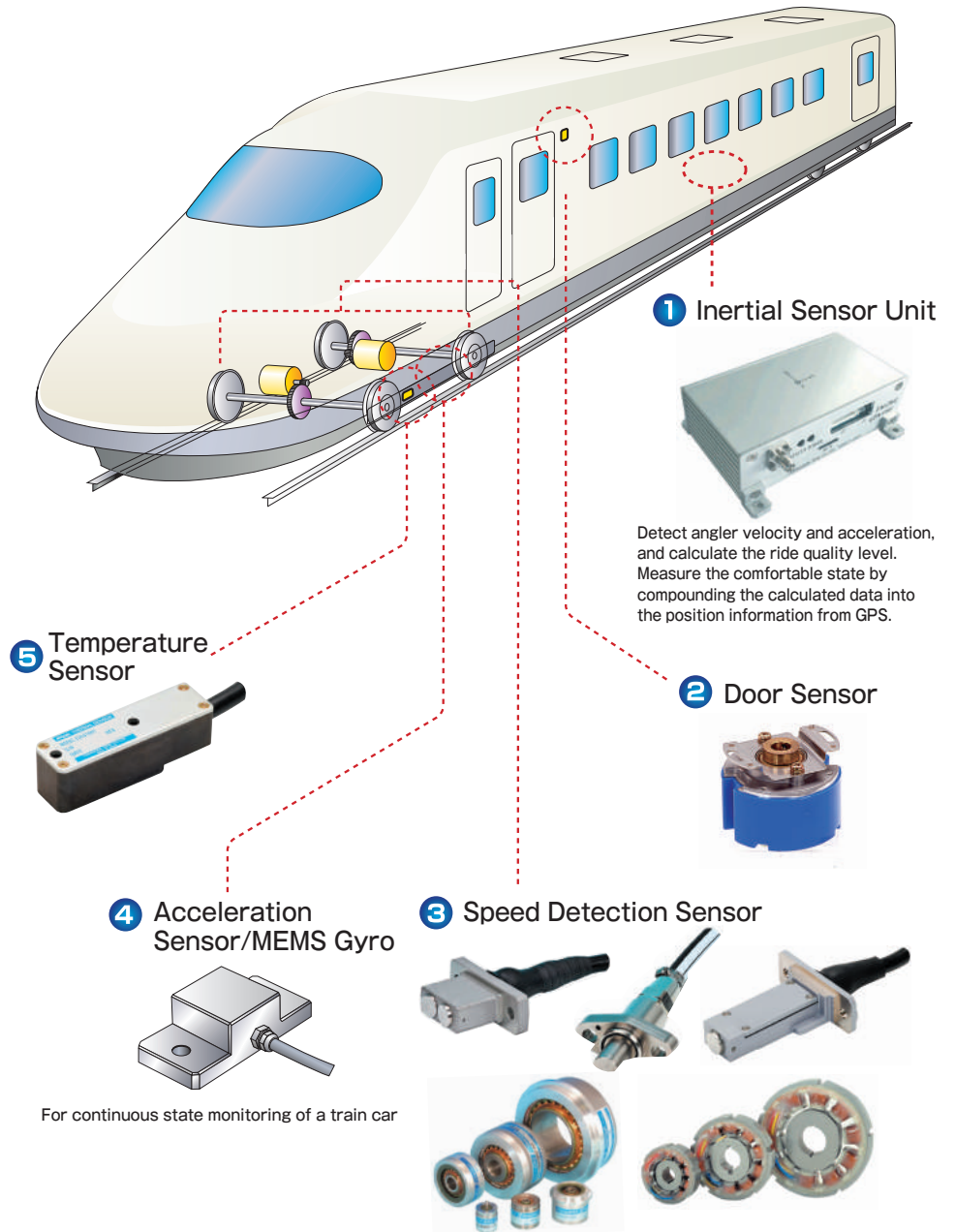
Basic Specifications


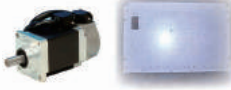


Mounting Flange [mm]	Model	Voltage [V]	Output [W]	Torque		Current ^{※3}		Speed		Rotor Inertia [10 ⁻⁴ kgm ²]		Mass [kg]	
				Rated	Max	Rated	Max	Rated	Max	Standard	With brake ^{※2}	Standard	With brake
□40	TSM4102	AC200	50	0.159	0.56	0.8	2.5	3,000	6,000	0.019	0.029	0.4	0.6
	TSM4104		100	0.318	1.11	0.9	2.9			0.035	0.044	0.5	0.7
□60	TSM4202	AC200	200	0.64	2.24	1.8	6.0	3,000	6,000 ^{※1}	0.15	0.24	0.9	1.5
	TSM4204		400	1.27	4.46	2.8	9.3			0.27	0.39	1.3	1.9
□80	TSM4303	AC200	600	1.91	6.69	4.6	15.2	3,000	6,000 ^{※1}	0.71	0.97	2.2	3.0
	TSM4304		750	2.39	8.36	5.1	17.1			0.86	1.13	2.5	3.3

※1 Combination with our driver.
 ※2 Including inertia of brake.
 ※3 The current in the table is calculated value with basic model.
 It is increased in case of a motor with oil seal.

It was more than 20 years ago when our speed control sensor was adopted as railway related products. After then, the attitude control technic (vehicle height sensor to detect inclination angle, sensor for damping control and abnormality detect and monitoring sensor recently) which Tamagawa is proud of has been used for railway not only in Japan but also all over the world. Other than the train car, our motion control technic is also applied to platform fence or crossing gate. Regarding the products continuously used, we have been making many improvements such as downsizing and increase variation to meet customer requirements. It is expected that Iida city in Nagano prefecture where our headquarters is located will become a rare place because the linear Chuo Shinkansen which is planned opening in 2027 will run across the JR Iida line having many secluded stations (see page 1).

Application Examples



<p>Platform Fence</p> 	<p>Adopted for the driving and control system of open/close door in the platform fence</p>  <p>AC Servo Motor Driver</p>	<p>Crossing Gate</p> 	<p>Adopted for the control system of crossing gate bar</p>  <p>AC Servo Motor Driver</p>
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Application News

ATLAS-eye is the 24-hour day and night surveillance camera system from short to long distance. Its market is not limited to monitoring system but is expanding into information communication and tourism.

We introduce hear the ATLAS technical seminar which was held in March and June and application examples of recent date.

The purpose of the seminar was to have customers experience and use the ATLAS-eye. The participants were lectured about outline of the seminar at No.3 plant in Matsukawa town and visited the production facilities. Then traveling to Achi village which was selected as No.1 place where we can see the most beautiful shining stars in 2006 by ministry of the environment, the video shooting event in three different time zoon (day time, evening and night time) was performed.

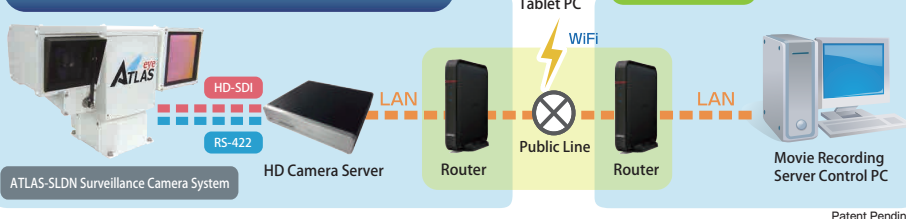
Nagano-Pref.



ATLAS^{eye} Series Surveillance Camera System

System Configuration Example

24-hour surveillance with near-infrared LED illuminator



Patent Pending

Major Products

ATLAS-P Series (Small size)



ATLAS-PLDN/PDN

- 30x zoom modular camera

ATLAS-S Series (Middle size, Block camera type)



ATLAS-SALDN/SADN

- 22 to 32x zoom lens
- Super high-sensitivity camera can be installed



ATLAS-SLDN/SDN

- 20x zoom modular camera

ATLAS-M Series (Large size)



ATLAS-MLDN/MDN

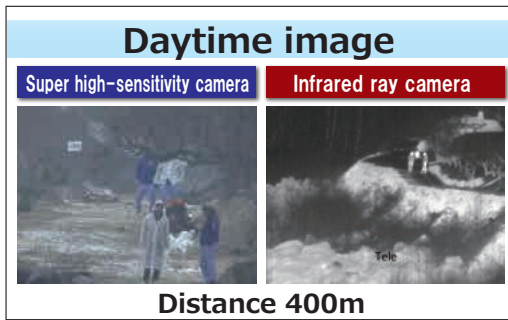
- 40 to 60x zoom lens
- Super high-sensitivity camera can be installed

ATLAS Technical Seminar

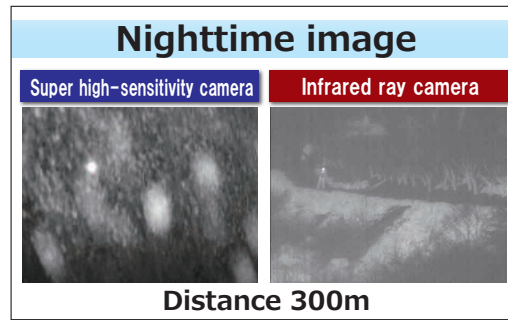


Installed three kinds of cameras (ATLAS-PLDN, super high-sensitivity camera and infrared ray camera) on a bridge across the Hontani River in Achi village in Nagano prefecture and compare the recorded movies for four points 100 to 400m from the filming position in the day time, evening and night time. The seminar in March was held under the severe condition of snowfall from the evening but it was a good opportunity to verify the effectiveness of infrared camera.

<Sample Images>



Super high-sensitivity camera can recognize even the color of a person while the infrared ray camera only catches the atmosphere of a person 400m away from the filming position.



The super high-sensitivity camera couldn't monitor the objective point due to the snowfall but the atmosphere of a person and geographical features was recognized by the infrared ray camera.

1st seminar March 1st 2017 Participant: 5 peoples from 5 companies

Weather: Cloudy turning to snow



Day time / Filming by ATLAS-PLDN



Night time / Filming in the snow

2nd seminar June 27th 2017 Participant: 7 peoples from 2 companies

Weather: Cloudy



Outline explanation



Production site in No.3 plant

Application Examples

River Monitoring System

Nanbu town in Aomori etc.

Since the motor and angle sensor produced in Hachinohe area in Aomori are installed in the ATLAS-eye series, it was approved by "Let's buy Aomori project" and 7 pieces were introduced as river monitoring cameras in Aomori prefecture.



Live camera image is distributed from web page of Nanbu town.

Monitoring system for express way

Shin-tomei Expressway, Metropolitan Inter-City Expressway

Adopted as monitoring camera for express way by Central and East Nippon Expressway Company. 90 pieces are under operation on Shin-tomei Expressway and Metropolitan Inter-City Expressway.



"Space Study Summer Camp"

Shirabiso Highlands in Nagano prefecture

An event for children from Iida, Nagoya and environs, which was planned by educational committee of Iida to attract their interest in space and held in August. The live cameras were set in Shirabiso Highlands and children used them for the observation of the starry heavens.

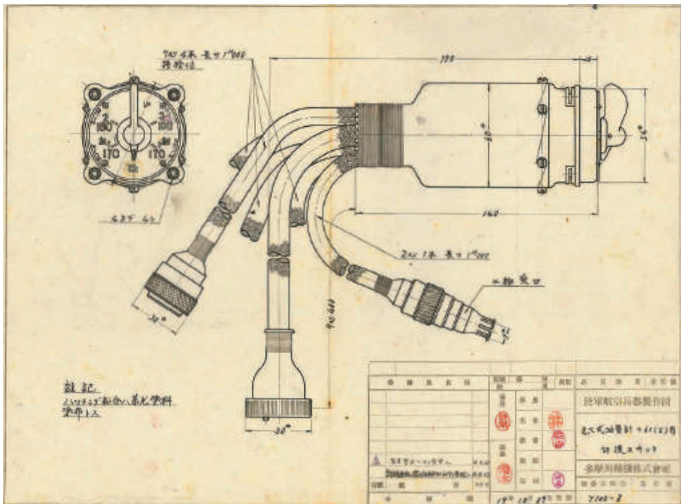




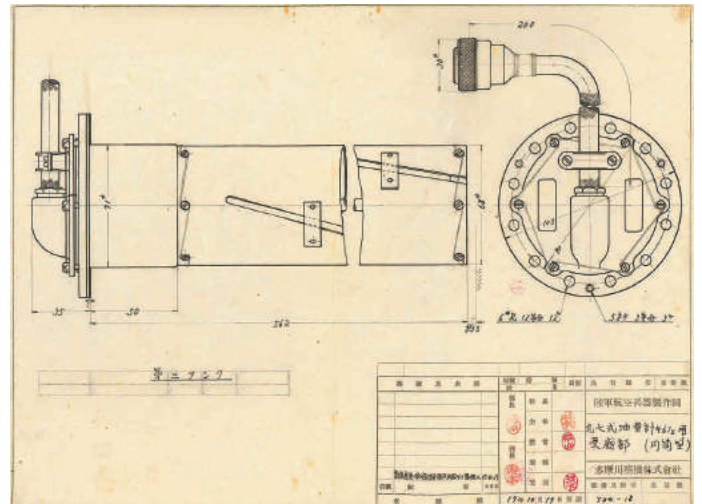
Excavation! Drawings before Pacific War <Part 2>

~Selector switch for fighter aircraft "Hien"~

Last year, 70 to 80 parts drawings of the former Japanese Army's fighter aircraft were found when we dismantled old company house. This time, we introduce the drawings of "the selector switch for 97 type oil gauge" and "the sensory part (cylinder type) for army type 3 fighter 2 (Ki 61-II) which was commonly known as "Hien".



<Drawing 1> Selector Switch of 97 Type Oil Gauge



<Drawing 2> Sensory Part (Cylinder Type)

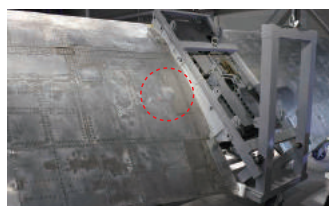
The Army Type 3 Fighter 2 had four fuel tanks. The selector switch (Drawing 1) was used to switch the four fuel tanks and indicate remaining amount of fuel on an oil gauge. Two fuel tanks were inside of both wings and remaining two were both front and back of the cockpit. The fuel loading quantity had been changed sometimes but we can read it was 600 liters in total from this drawing.

The sensory part of three fuel tanks was lever type* but one at the back of cockpit was cylinder type (Drawing 2) which was often used for deep fuel tank and measured the fuel amount by the float in the cylinder going up and down with spiral rotation according to the increase and decrease of the oil level. Furthermore, there was an ingenious contrivance to prevent the leakage of the fuel. The junction from inside and outside of the tank had an intercepted structure, so the rotational movement of the float was transmitted by magnets installed both inside and outside of the tank.

Other than four fuel tanks, the "wooden drop tank" to be dropped when the fuel became empty was also attached under the wing. Since the fuel in this tank was firstly used during the flight, the remaining amount of this tank was not indicated by oil gauge.



Army Type 3 Fighter "Hien" 2 on display at the Kakamigahara Aerospace Science Museum



Sensory part mounting hole on the upper surface of the wing

By the way, the Army Type 3 Fighter was the only liquid-cooled engine fighter in Japan. There were two types; type 1 having "Ha-40" engine which was a domestically production of German liquid-cooled engine DB601 and type 2 being equipped with "Ha-140" engine which was an improved version of "Ha-40". However it was also a fighter having difficulty in manufacturing and maintenance for Japanese technical capacity of these days and causing troubles incessantly.



Woody drop tank

The existing Army Type 3 Fighter in the picture had been restored by Kawasaki Industry at Gifu factory since 2015 and had been displayed at the Kakamigahara Aerospace Science Museum as it is (Measuring instruments, fuselage, wings and engine separately) during restoration. It will be reassembled by March 2018 when the museum is reopened after renovation and displayed with full-size model of first prototype of Zero fighter.



"The Newest Japanese Army Fighter Aircraft" from "Koku Asahi" published in January 1945

Note: The drawing of sensory part (lever type) was appeared in previous Tamagawa News Vol.18. Cooperation: Japan Aeronautic Association, Kakamigahara Aerospace Science Museum

Next time

Next time, we will introduce drawings of our underground factory which was remained at the conceptual stage during Pacific War.

Introduction of New Employees

This year, three new employees entered Tamagawa Trading on April 1st. They started to work for Japanese customers in each sales office. Thank you very much for your support.



From left: Haruki Kubota (Kita-kanto office), Moemi Hashizume (Kanagawa office), Ryota Kumagai (Nagoya office)

Science Handwork Class for Children

The science handwork class for children takes place quarterly at Iida City Museum. Some local companies and technical high school are in charge of the class by turns. On June 3rd, we held a class named "Run a car by handmade 3-pole motor" targeting forth to sixth-year elementary school children and young employees of Mototronics laboratory were joined as teachers or staffs.

This is the 24th year of this class which is still popular as we have some employees who participated in the same class in their childhood.

It is not so easy for elementary school children to have enough torque to run a car even if the motor can easily rotate. All teachers and staffs pre-study the assembly kit every time before the class in order not to make children feel regrettable.

Children, teachers and staffs, all who like Monozukuri (making things by hand) could communicate each other through the try and error.



Information

Events & Exhibitions

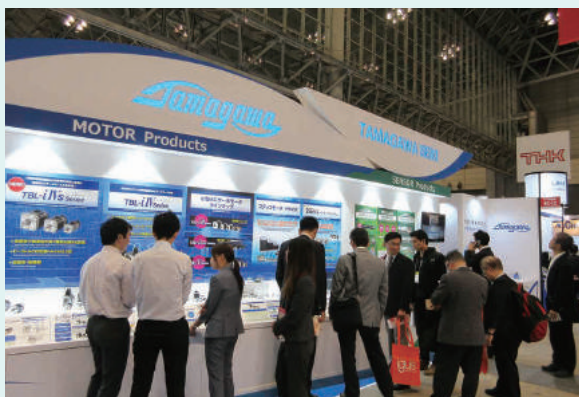
01 TECHNO-FRONTIER2017 35th Motortech Japan

Date: April 19th (Wed) – 21st (Fri)
Venue: Makuhari Messe

This exhibition which introduces newest motor related products, technology and applied products was held at Makuhari Messe and Tamagawa arranged 4 booths in single row with floor space of 12m (W) x 3m (D).

This year, we showed AC Servo Motor "TBL-iIVs Series" for the first time and introduced its features such as low inertia, high torque and high acceleration. While the 2-phase stepping motor drivers "AU9290" and "AU9300" were compared by a demo machine, we also exhibited full lineup of motor and sensor; two-wire stepping motor system, rotary encoder, brushless resolver, MEMS IMU etc.

We continue our business activities based on the customer's opinions and requests we could receive at this exhibition.



Full view of our booth



02 33rd Space Symposium

Date: April 3rd (Mon) – 6th (Thu)
Venue: The Broadmoor Hotel
(Colorado Springs, Colorado USA)

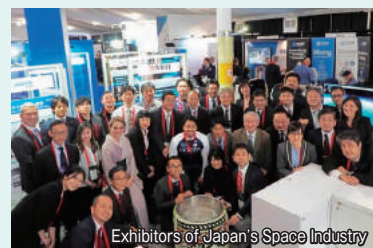
The space symposium is an event (Exhibition and symposium) where leading companies of space industry in USA and space related companies in other countries developing market in USA join together to exchange information and build up business network.

We had a booth of 1.9m (W) x 2.7 m (D) inside of "Japan's Space Industry" organized by JAXA and JETRO together with nine other Japanese companies (Mitsubishi Heavy Industries and NEC etc.). The reaction wheel, the demo machine of the stepping motor for Venus Climate Orbiter AKATAUKI and the high-accuracy angle sensor being received JAXA Chief Director Award were displayed and we introduced past results to over 80 companies or organizations which visited our booth. We could have B to B meeting with same companies and the communication with them is continued now.

By making use of the domestic and international network built up by this event, we expand positive business activities in space industry.



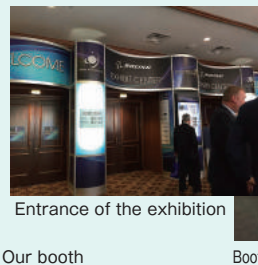
Japan's Space Industry



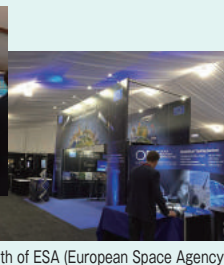
Exhibitors of Japan's Space Industry



Our booth



Entrance of the exhibition



Booth of ESA (European Space Agency)

Information of Exhibitions

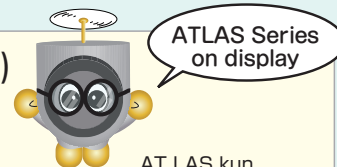
We will exhibit at following exhibitions and awaiting for your visit.

- Security & Safety Trade Expo 2017 (RISCON TOKYO)

Date: October 11th (Wed) – 13th (Fri) / Venue: Tokyo Big Sight

- International Robot Exhibition 2017

Date: November 29th (Wed) – December 2nd (Sat) / Venue: Tokyo Big Sight



AT LAS kun

Information

Introduction of Club Activities

Our company has various hobby circles where employees who like similar activities intermingle together beyond the department, position and generation. We introduce one aspect of employees different from work.

Japanese Drum Club “Uh-ho-ho”

Leader / Hidekazu Sonohara (Production Engineering Dept., No.2 Plant)

Why did you start this activity?

Two member of local Japanese drum club originally worked in our company. They hoped to play the Japanese drum with peoples outside their district and organized the club.

Please tell us details of activity.

We practice every Saturday evening in the gymnasium of our No.2 plant. As places for the performance, we have participated “Tamagawa Summer Festival”, “Iida Ringon (A big summer event in Iida city)”, “Ina-dani Cultural and Art Festival” in the fall and some wedding ceremonies of colleagues. Two initial members teach the technique of drumming and we are practicing several pieces of repertory.

Please talk about members.

We currently have ten members who were gathered mainly from employees of No.2 plant, almost forcibly (lol). Since there are some

members from outside the company, we are widely recruiting new members.

The funny club name, where did it come from?

We had some candidates but finally named with the wish to be energetic like a gorilla. (“Uh-ho-ho” is hooting sounds of gorilla). Or I just look like a gorilla?

What is the pleasure of the club activity?

It is perfectly pleasant when the perfect performance is finished with big applause.

Please give us last message.

We are always looking for new members. Will you play with us? Both women and beginners are welcome. The taste of beer after the performance is exceptional!!

At Tamagawa Summer Festival, with a powerful performance resonating through the core of body, the sound of drums, bells and whistles

reverberated in the hall enhancing the atmosphere of the festival. As the interview was held just after the performance, he was talking with a sense of fulfillment while becoming sweaty.



Tamagawa Summer Festival July 15, 2017

More than 400 employees, their families or former employees participated in this annual festival.



Numerous shops such as authentic charcoal grilled yakitori, fried noodles, roast meat, ice shavings, cotton candy and yo-yo fishing are lined up, and the cheerleading by local girls' high school students was also livening up the atmosphere in the hall as well as the performance of Japanese drum club “Uh-ho-ho”.



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