

## Major installation examples



**Oketo Sluice No. 11** (1.20 m × 1.30 m)  
Orderer: Abashiri Development and Construction Department,  
Hokkaido Regional Development Bureau



**Kotsunagi River Drainage Sluice** (4.70 m × 2.30 m)  
Orderer: Noshiro River and National Highway Office,  
Tohoku Regional Development Bureau



**Futakotama Sluice** (1.00 m × 1.00 m)  
Orderer: Keihin River Office, Kanto Regional Development Bureau



**Motonakago Sluice** (1.20 m × 1.30 m)  
Orderer: Shinanogawa River Office, Hokuriku Regional Development Bureau



**Ushio Sluice** (1.50 m × 1.50 m)  
Orderer: Shizuoka River Office, Chubu Regional Development Bureau



**Noma River Drainage Sluice** (1.60 m × 1.60 m)  
Orderer: Kitaharima Prefectural Bureau, Hyogo Prefecture

## ASAHI PIERLESS GATE

# AUTO GATE

## Balance-type non-powered gate

### Won the Prime Minister Prize

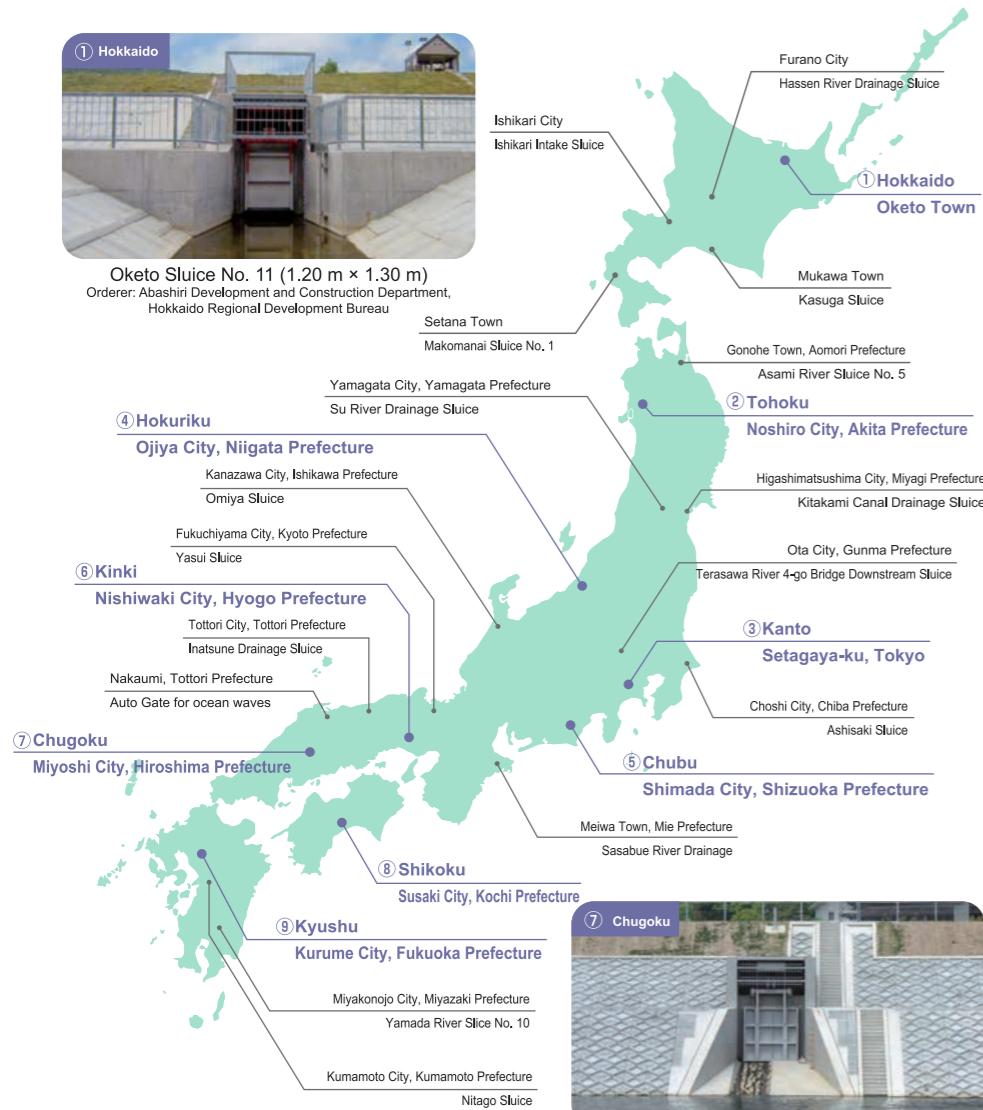
The 5th Manufacturing Japan Grand Prize  
Development of a non-powered automatic gate (auto gate)  
that protects people from flooding

Realization of unmanned gate operation

Countermeasure for tsunamis  
and tidal waves

Use of pierless type to prevent  
the obstruction of scenery

Reduction of costs



## ASAHI PIERLESS GATE

# AUTO GATE

## Balance-type non-powered gate



**ASAHI//NOVEX** CORP.

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<http://www.asahi-inovex.co.jp/ironworks/autogate>



Certifications obtained ISO 9001 ISO 14001 ISO 45001

**ASAHI//NOVEX** CORP.

# AUTO GATE

Balance-type  
non-powered gate

## Proposal for the balance-type non-powered gate, a revolution in the advancement of sluice gates

Thanks to automated operation and a maintenance-free structure, Auto Gate has reduced the cost of public works. This eco-friendly gate does not spoil the surrounding scenery and excels in safety.

### Merits of the balance-type non-powered gate

**Merit 1** Unmanned operation became possible by an automatic gate structure.

The gate automatically opens and closes using a balance weight and float even when the difference in water level is minimal. This automatic gate has been used to realize unmanned operation without a sluice supervisor even in places where a power source such as electricity is unavailable.

**Merit 2** Countermeasure for tsunamis and high waves

Since Auto Gate automatically opens and closes depending on the water level, it eliminates the need for gate operators even in the event of a tsunami or high water and prevents operators from engaging in such dangerous work.

**Merit 3** Pierless gate does not spoil the surrounding scenery.

This pierless structure is perfect for places where importance is placed on riverscapes. It also helps ensure adequate visibility.

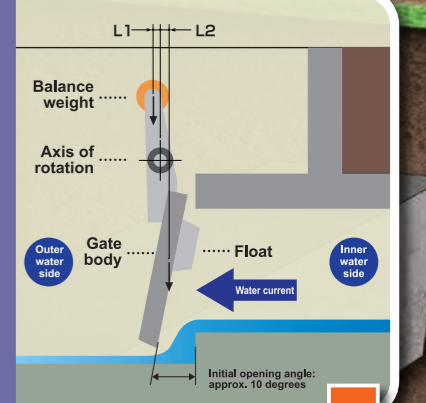
**Merit 4** Reduced costs

The pierless structure does not incur cost for constructing piers and control bridges. The costs can be reduced 30 to 40% by combining the gate and flexible caissons.

### Mechanism behind Auto Gate's automatic operation

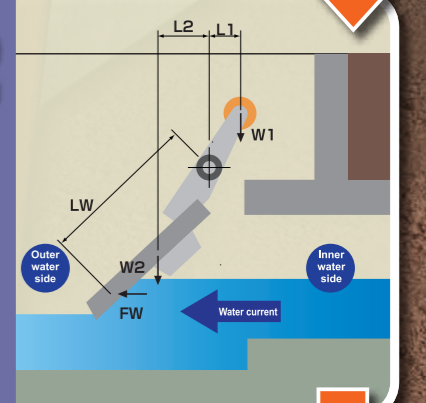
#### Mechanism 1 Normal times

The gate remains stationary where the torque at the center of gravity of the gate body (opening direction) and the torque at the center of gravity of the balance weight (closing direction) are equally balanced.



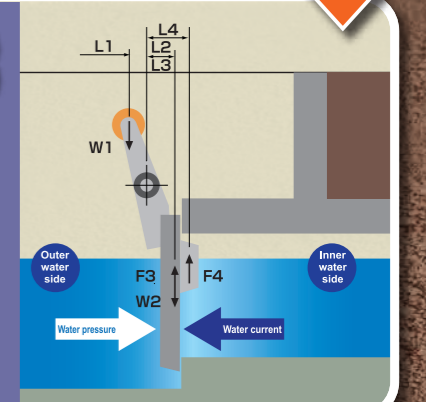
#### Mechanism 2 When inner water is discharged

The balance weight helps the gate to open by principle of leverage downward and the float also helps the gate to open by principle of buoyancy.



#### Mechanism 3 When backflow occurs

When outer water level rises, causing backflow pressure to increase, both the balance weight and the float begin to work to close the gate.



- The balance weight installed above the gate creates a mechanism with small gating power. Accordingly, the gate opens and closes automatically even when there is little water-level fluctuation.
- The axis of rotation is set above and in front of the gate body. This helps keep the gate open even under the initial condition when the water level is low, so water discharge is not hindered even when the water is shallow.
- A float is installed on the inner water side of the gate body. Accordingly, if the inner and outer water levels rise simultaneously, buoyancy acts along with the weight to quickly close the gate.

# AUTO GATE

Balance-type  
non-powered gate

The balance-type non-powered gate achieves various effects.

Non-powered sluice gates, countermeasures for tsunamis, and consideration for scenery

Renovation of a conventional lift-type gate to a non-powered Auto Gate



New non-powered sluice that does not spoil the surrounding scenery



Non-powered gate as a countermeasure for tsunamis and tidal waves (sluice equipment at the river mouth)

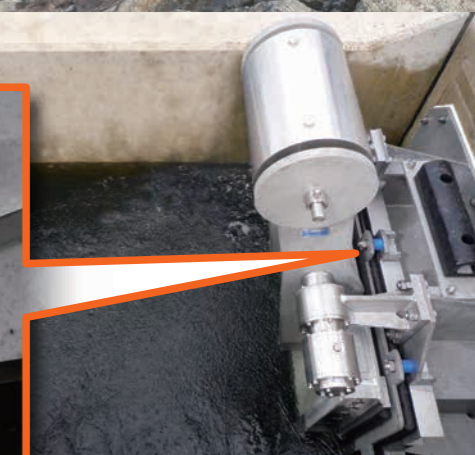
Auto Gate is installed in front of the existing slide gate as gate equipment used as a countermeasure for tsunamis.



Auto Gate is open at normal times, but is automatically and effortlessly closed by the action of a balance weight if the water level suddenly rises due to a tsunami or torrential rain. In addition, when the outer water level lowers, the gate automatically opens to discharge the inner water, protecting gate operators against dangerous work.

Countermeasures for ocean waves (installed on coasts)

When installed on a coast, the gate body of Auto Gate is shaken by ocean waves. Measures are taken to reduce damage to the gate body and noise from clashing between the gate body and the door stopper.



Various optional functions can be added to Auto Gate in accordance with on-site needs.

## Emergency gating devices

A hydraulic cylinder or hydraulic power unit (e.g., manual, electric or engine type) can be installed in accordance with on-site needs.



Hydraulic cylinder



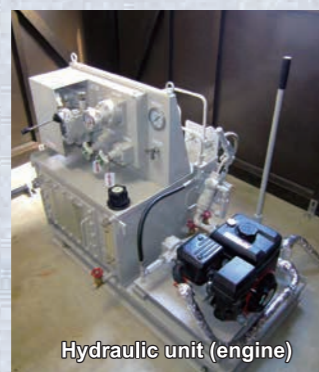
Hydraulic unit  
(manual all-purpose product)



Hydraulic unit  
(manual all-purpose product)



Hydraulic unit (manual)



Hydraulic unit (engine)



Hydraulic unit (electric)



Control board

## Measuring devices (solar power)

The opening of Auto Gate can be displayed using solar power alone (commercial power source unnecessary).



Transmitter



Rotating warning light  
(for confirmation of full closure)



Opening meter



Solar panel



Cabinet



Display board (self-sup-  
porting type)



Display board  
(wall-hanging type)

## Major installation results

2001	Tohoku Regional Development Bureau	New construction of Tawara Maki(俵巻) drainage sluice gate	2.00m×2.00m	1 gate
2004	Tohoku Regional Development Bureau	Equipment construction of Okawa Bata(大川反) drainage sluice gates	3.00m×2.75m	2 gates
2005	Kinki Regional Development Bureau	Construction of Yasui(安井) gutter pipe installation and others	2.00m×2.00m	1 gate
2006	Chugoku Regional Development Bureau	Renovation of the small water gate in Sendaigawa River(千代川)	1.70m×1.80m	1 gate
2007	Ibaraki Prefectural Government	National project for supporting wide area rivers: Drainage and gutter pipe renovation	2.25m×1.25m	1 gate
2008	Hokkaido Development Bureau	Environmental improvement project on Ishikarigawa River(石狩川); New construction of the mechanical equipments in Ishikarigawa River's water intake facility	4.00m×3.00m	1 gate
2009	Tohoku Regional Development Bureau	Construction of Kotsunagi(小繋) sluice gate in Yonesirogawa River(米代川): <Kotsunagi sluice gate>	4.70m×2.30m	1 gate
2009	Kanto Regional Development Bureau	Embankment construction in Bessho(別所)	1.20m×1.20m	2 gates
2009	Hyogo Prefectural Government	National river project by special emergency acts for severe disaster countermeasures in Nomagawa River(野間川)	1.60m×1.60m	1 gate
2010	Chubu Regional Development Bureau	Embankment, riverbank reinforcement and construction works for gutter pipes in Ushio(牛尾), Oigawa River(大井川): <Ushio gutter pipe>	1.50m×1.50m	1 gate
2010	Gunma Prefectural Government	National general grant for social capital development, division NO.3	1.00m×1.00m	4 gate
2011	Yamagata Prefectural Government	National maintenance subsidy project for wide area rivers of FY2011: Drainage and sluice gate construction in Sukawa River(須川)	1.50m×1.50m	1 gate
2012	Kyushu Regional Development Bureau	New construction of gutter pipe gates and other works in Haizuka(灰塚), Kosegawa River(巨瀬川)	2.60m×2.10m	2 gates
2012	Miyazaki Prefectural Government	Prefectural independent project of FY2012, revision NO.110-24-03-4: Construction of a sluice gate outside Sin Beppugawa River(新別府川)	3.00m×3.00m	1 gate
2013	Saitama Prefectural Government	Improvement works by national general grant for social capital development for rivers: <gate construction>	2.10m×2.10m	1 gate
2014	Tohoku Regional Development Bureau	Sluice gate construction in Kawai(河井) area, Mogamigawa river(最上川) upstream: <Kawai drainage sluice gates>	3.20m×2.10m	2 gates
2014	Wakayama Prefectural Government	Governmental port coast maintenance project of FY2014 NO.5-2-3 and FY2015 NO.5-3: Coastal maintenance works for ports in Urakami Port Coast(浦神港海岸)	2.50m×2.00m	1 gate
2014	Shimane Prefectural Government	Prefectural independent project: Emergency river maintenance works for Gozugawa River(牛頭川), constructions in the lower part of Ochiai Bashi Bridge(落合橋) and sluice gate of Hiraikegawa River(平池川)	3.10m×1.50m	1 gate
2015	Hokkaido Development Bureau	Improvement works of Sarugawa River(沙流川): Construction for mechanical equipment renewal and other works on Tomigawa River's (富川) sluice gate D	4.50m×2.50m	2 gates
2015	Fukushima Prefectural Government	Fishing port construction by governmental regrant on sluice gate: <Hamakawa(浜川) sluice gate>	5.40m×2.80m	1 gate
2015	Shizuoka Prefectural Government	Governmental river project for earthquake and storm surge countermeasure of FY2015(NO.27-K2530-011)(Disaster prevention and safety grant): Appurtenant works for the second-rank river, Niinogawa River(新野川): <Sluice gate construction of Ochiaigawa River(落合川)>	4.40m×2.40m	1 gates
2016	Hokuriku Development Bureau	Kaesa(替佐) embankment and new construction of sluice gate	1.60m×1.50m	1 gate
2016	Iwate Prefectural Government	Post-disaster construction and damage repairs in Yado fishing port and coast(宿漁港海岸): <NO.23disasters-639 Seawall machinery and equipment construction>	4.50m×3.40m	2 gates
2016	Chiba Prefectural Government	Coastal infrastructure maintenance works(Reconstruction): <Gutter pipe gate construction in Yasashigawa River(矢掛川)>	4.50m×2.70m	4 gates
2017	Ibaraki Prefectural Government	National support project for wide area rivers(NO.27-05-692-0-002): River improvement works on Ookitagawa River(大北川) (Part2)	2.50m×2.25m	1 gate
2018	Kanto Development Bureau	Improvement works in Funatama(船玉) and Isayama(伊佐山) area on the left bank of Kinugawa River(鬼怒川) in FY2018	3.00m×2.50m	1 gate
2019	Kyusyu Development Bureau	Emergency measures construction for machinery equipments in the jurisdiction of Kikuchigawa River(菊池川) in FY2019	2.50m×2.25m	1 gate
2020	Chugoku Development Bureau	Improvement works for the equipments and other works of liogawa River(飯尾川)'s NO.1 sluice gate in FY2020	3.00m×3.00m	1 gate
2021	Chubu Development Bureau	New construction of sluice gate equipments of Kakogawa River(加古川) in Daimon(大門) area	3.10m×3.10m	1 gate
2022	Chugoku Development Bureau	Embankment and riverbank reinforcement construction of Sabagawa River(佐波川), Sano(佐野) area in FY2022	2.70m×2.10m	1 gate