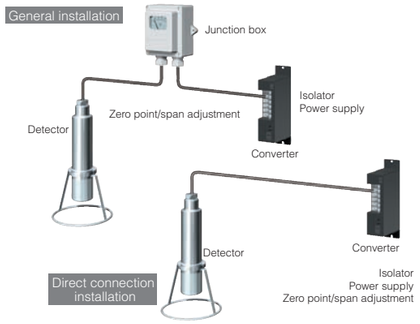
INDEX

Exploring the Limitless Potential of New Endeavors

JFE ADVANTECH offers cutting-edge technology that meets a variety of on-site requirements. We offer an array of high-quality products that contribute to a richer society.

Device Configurations



■ General installation

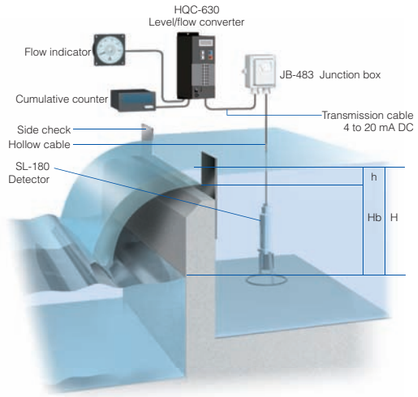
Applicable detectors	Junction box			Converter	
	Without meter		With meter	Indoor installation	Outdoor installation
	−5 to 60°C	−20 to 80°C	0 to 50°C		
SL-180	JB-483S	JB-484S	JB-483M	PSB-180	PSB-230
SL-232	JB-424S	JB-424S	JB-424M	PSB-180	PSB-230
SL-842	JB-424S	JB-424S	–	ALC-640	–
SL-500	JB-453S	JB-454S	JB-453M	PSB-180	PSB-230
SL-600, SL-710	JB-463S	JB-464S	JB-463M	PSB-180	PSB-230
SL-140	JB-643S	JB-644S	–	ALC-640	–

■ Direct connection installation

Applicable detectors	Converter	
	Indoor installation	Outdoor installation
SL-180	PSB-182	PSB-262
SL-500	PSB-182	PSB-252
SL-600, SL-710	PSB-182	PSB-262
SL-312	PSB-380	–
ML-122	MC-122	–

Measurement System with Water Level Detector

Weir- and Parshall Flume-type Flowmeters

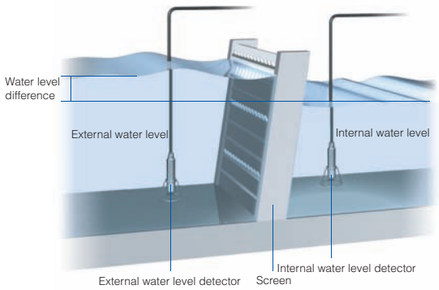


Applications For flow measurement and flow control of open conduit channels in water supply facilities and sewage facilities. For automatic control of pumps, valves, and gates.

- **Accurately detects water heads of 0 m to 0.1 m.**
- **The level/flow converter outputs instantaneous flow and cumulative pulses.**
- **The level/flow converter can make automatic calculations using its flow formula program.**
- **Span can be adjusted on-site.**

Specifications
- 0 to 64,000 m^3/h measuring range
- JIS B-8302 or Strickland conversion modes
- Accuracy: ±0.6% of the span
- Can also be used with Parshall flumes

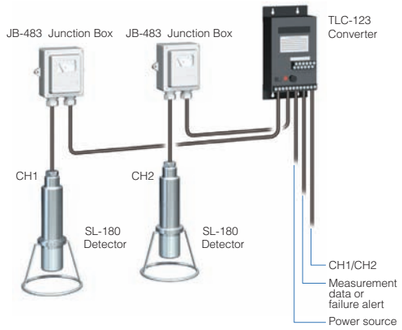
Water-level Difference Measuring System



Applications
- Measures internal and external water level differences of gates and screens.
- Best choice for automatic gate control (open/close) and automatic rubbish removal by detecting water-level differences caused by clogged screens.

- **Sets water level difference, filter constants, and zero point/span in an interactive manner.**
- **Contact output of water level difference (upper/lower limit).**
- **Solar battery allows installation in locations where a power supply is not available.**

Redundant Configuration of Water Level Detector



Applications
- The self-diagnosis function automatically switches between controlling channels of the two water level detectors.
- The ideal backup for water supply facilities and sewage facilities.

- **Automatically detects a fault of the sensor and switches between CH1 and CH2.**
- **Sets abnormal output, filter constants, and zero point/span in an interactive manner.**
- **Built-in fault signal and upper/lower limit alert contact output systems.**

Diagnosable malfunctions
- Broken/short-circuited transmission line
- Sudden changes in input signals
- Unexpected difference between output from two water level detectors

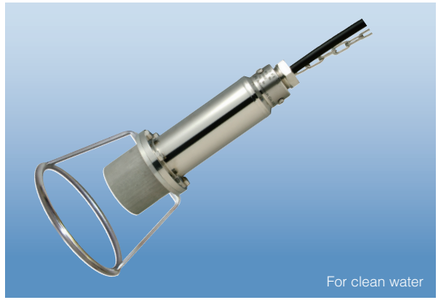
Optical Water Level Meters

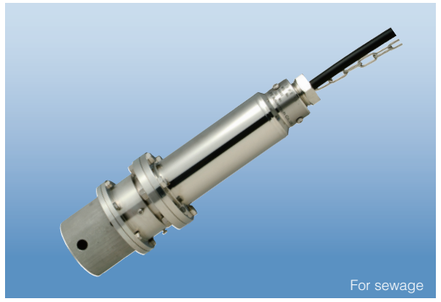
Water Level
m

All optical detection and signal transmission.
The ultimate in lightning and noise protection combined with long-distance transmission.

Optical Water Level Meters

The reliability of fiberoptics applied to water level measurement.


For clean water


For sewage

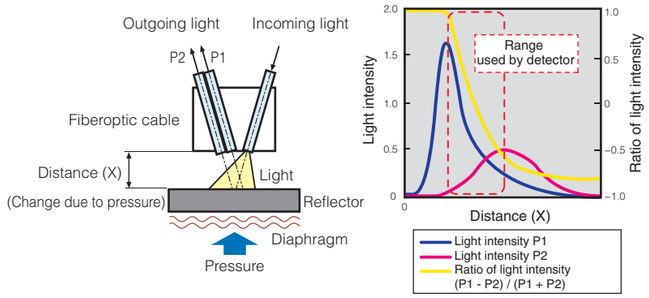
- **Outstanding lightning and noise protection**
  Detector and junction box contain no electronic components or batteries.
- **Detector and junction box connected by fiber optic cable**
  High-precision remote operation.
- **Fiberoptic cable between junction boxes makes long-distance transmission possible**
  Maximum combined cable length of 10 km suits installation locations that are far from control locations.
- **Built-in temperature compensation sensor for higher precision than ever before**
  Integrated temperature compensation sensor (three-core fiber) provides high precision compensation for effects of temperature.

■ Specifications

Model	FL-20B	FL-20C
Application	Clean water	Sewage
Temperature compensation	✓	
No. of fiber cores	6	
Measuring range	Variable range between 0 to 3 m and 0 to 10 m	
Accuracy	±0.3% of full scale	
Hollow fiberoptic cable	8-core. Finished diameter: 12 mm Outer sheath: Flame-retardant aluminum-laminated polyethylene	
Weight	4.3 kg	4.5 kg
Warranty	Two years from shipment	
Repair policy	Must be returned to factory	
Diameter of unit (support)	ϕ95 mm (ϕ180 mm)	

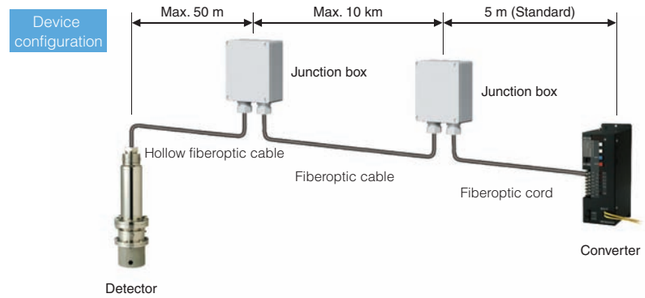
*Model with measuring span of 10 to 40 m and 3-core fiberoptic cable (without temperature compensation) is also available.

Measurement Principle and Device Configuration



Employs a non-contact detection system in which a diaphragm is used to convert pressure into displacement, which is then converted into light intensity. (Patent pending: JPA 2007-33075.)

- Detector senses water pressure by converting direct light intensity. 3-core fiber system. (Patent pending.)
- High-precision diaphragm measures minute displacement with high resolution (several 10's of nm).
- Integrated temperature sensor (3-core fiber system) provides high-precision temperature compensation between −5°C and +50°C.



- Detector and converter are connected only by fiberoptic cable. (Only a single detector may be connected to a single converter at the same time.)

High-precision sludge density meter that automatically compensates for sludge color.

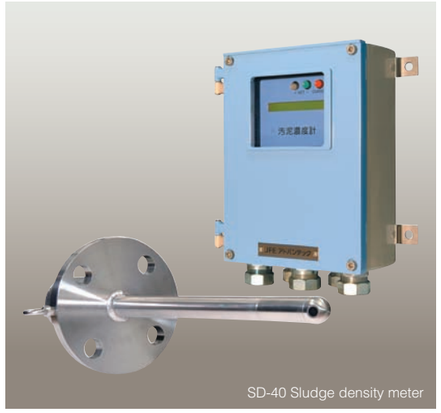
Dual Scattered-Light Sludge Density Meters

Sludge Density
% T.S.

**Type SD-40 detects the density of sludge discharged from sedimentation tank and concentrators, in sewage treatment plants and water works.
It achieves the accurate observation of sludge density, and helps to control the discharge of sludge.**

SD-40 Dual Scattered-Light Sludge Density Meter

Patents registered (No. 3996885 and 4087776)


SD-40 Sludge density meter

Automatic correction according to sludge color
Because the SD-40 automatically corrects for any change in sludge color, it can be used to observe black digested sludge.

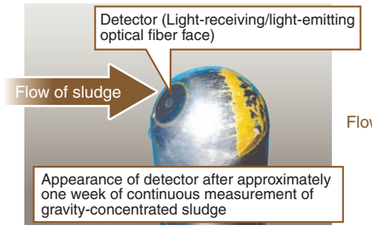
Excellent sludge removal features
The end of the detector is shaped to prevent sludge from adhering to it. In addition, SD-40 is equipped with an automatic clearing mechanism as standard. Thus, the meter is capable of performing stable measurement over a long period.

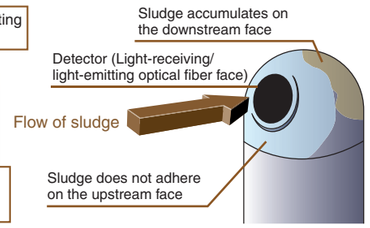
Easy maintenance
The detector can be replaced without stopping the flow of sludge. Bypass piping is not required.

■ Specifications

Model	Detector	SD-40
	Converter	CV-40
Measurement method		Dual scattered-light (with automatic color compensation function)
Sensor construction		Direct-contact fiberoptic system
Measuring range		0 to 8.0% T.S. (Standard)
Measuring accuracy (Repeatability)		±2% of full scale (Bright sludge) ±5% of full scale (Black sludge)
Power source		90 to 110 V AC, 50/60Hz, 15 VA
Operating temperature	Detector	−5°C to +50°C (Do not freeze)
	Converter	−5°C to +50°C
Measurable flow speed		0.03 m/s (bright sludge), 0.30 m/s (black sludge)
Output	Sludge density	4 to 20 mA DC
	Alarm	• Upper/lower limit contact output (2) • Fault contact output (1)
	Control	• Electromagnetic valve control

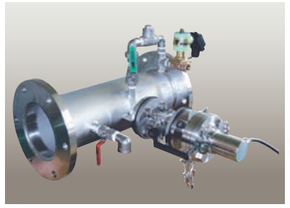
Self-cleaning Design

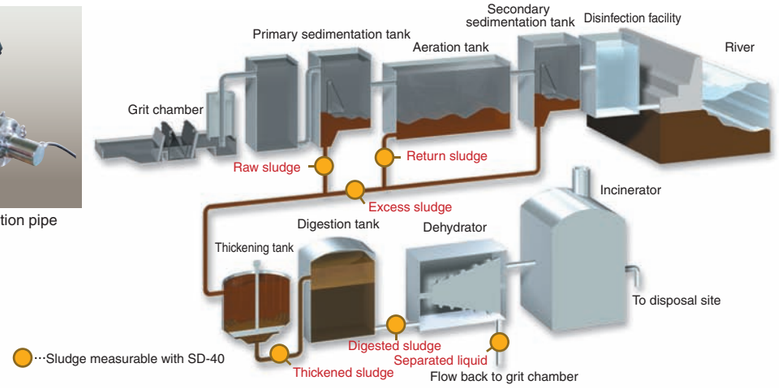




Depending on the strength of the flow, very little sludge adheres to the face of the detector. Therefore, placing the light-receiving/-emitting side of the detection unit on the upstream side improves the device's self-cleaning ability and reduces the accumulation of sludge. Using the water-based automatic cleaning function also helps to prevent sludge accumulation.

Installation Area


Example of detector connection pipe



Accurate detection of back flow in water channels.

Electromagnetic Flow Velocity/Direction Meters

Flow Velocity
m/s

Flow Direction
—

**These devices accurately measure the velocity and direction of flow through sluice gates and pipes.
With their compact design and high-performance features, these units offer excellent value.**

Electromagnetic Flow Velocity/Direction Meters

Patent registered: No. 3623773 NETIS Registration No.: KK-010027-A


FD-10 Flow velocity/direction meter


FD-20 Flow velocity/direction meter

Accurate detection of back flow
Accurately detects back flow in waterways, which is not detectable by water-level monitoring or water-surface monitoring. Makes high-precision measurement possible.

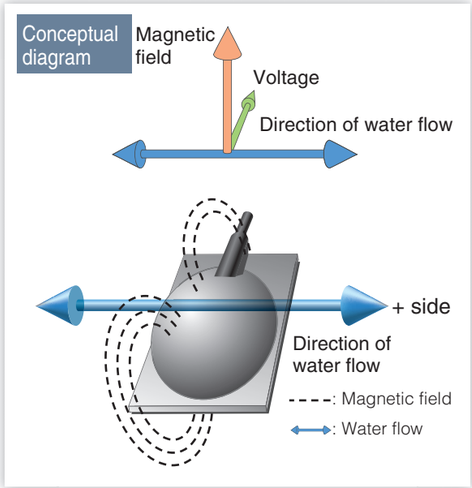
Electromagnetic measuring method
The unit uses an electromagnetic measuring method. In addition, with a unique processing method, the meter can output flow directions accurately.

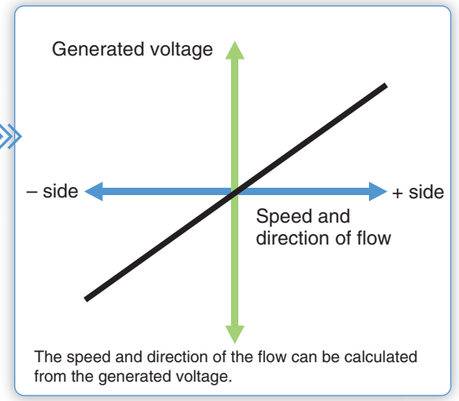
Automatic halt
Water-surface detection prevents data errors caused by air exposure. High reliability is assured.

■ Specifications

		FD-10	FD-20
Measuring range		−1.00 to +1.00 m/s	
Flow velocity outputs		0 to 2 V DC	4 to 20 mA DC
Flow direction outputs		3 contact outputs (forward, stop, reverse)	
Measuring accuracy	Flow direction	±0.5% of full scale	
	Flow velocity	±3% of full scale	±2% of full scale
Water-surface detector		External input	Built-in/external input
Flow velocity display		✗	✓
Threshold of flow direction (m/s)		MIN ±0.02 (Set at factory)	±0.02 to 0.095 (adjustable)

Measurement Principle





When water passes through the magnetic field emitted by the detector, a voltage proportional to the speed at which the water flows is generated, which enables flow speed to be detected.

For flow management in open channels and small rivers.

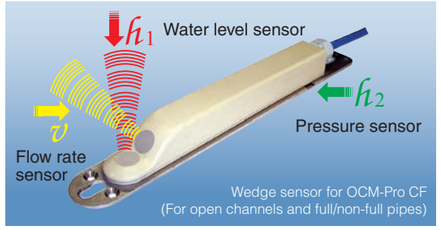
Ultrasonic Flowmeters using Cross Correlation

Flow Velocity m/s | Water Level m | Flow Rate m³/h

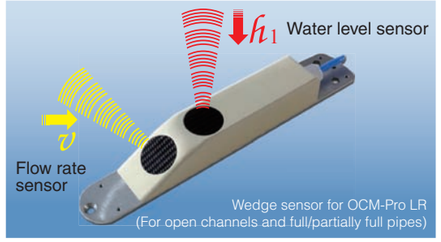
Flow velocity profile measurement provides high-precision flow rate measurement. Ideal for measuring flow rate of both clean and muddy water.

OCM-Pro CF/LR Ultrasonic Flowmeter using Cross Correlation for Channels


OCM-Pro CF/LR Converter



Wedge sensor for OCM-Pro CF
(For open channels and full/non-full pipes)



Wedge sensor for OCM-Pro LR
(For open channels and full/partially full pipes)

Flowmeter designed for use with open channels and full/partially filled pipes.
High-precision flow rate measurement based on flow velocity profile measurement.

Applications
- Sewage systems, sewage pipes, pumping stations, sewage treatment plants
- Factory wastewater channels
- Agricultural channels
- Penstocks for hydroelectric power plants

A single sensor for measuring flow velocity and water level
Measure flow velocity, water level, and water temperature with a single sensor. Installation is simple, with no need to arrange separate instruments for each item to be measured.
Long-range LR model can take measurements in channels as deep as 5 m.

Flow velocity profiles allow higher precision
Calculates flow rate from measurement results of flow velocity distribution for up to sixteen (automatically segmented) levels from the bottom of the channel to the surface. This helps maintain high precision even when flow conditions change.

Simple parameter settings
Measure flow rate simply by setting the profile of the channel to be measured. We've eliminated the hassle of setting sensing criteria.

Includes large capacity data logger function
An entire six months' worth of measurements made at one-minute intervals can be recorded on a 64 MB CompactFlash card.
Removable CompactFlash card makes transferring data easy.

■ Specifications

Model	OCM-Pro CF		OCM-Pro LR
Flow velocity range	−1 m/s to 6 m/s (water level 0.065 m to 1.0 m)		−1 m/s to 6 m/s (water level 0.15 m to 5.0 m)
Flow velocity precision	±1% R.D. (flow velocity of 1 m/s or greater), ±(0.5% R.D. + 5 mm/s) (flow velocity of less than 1 m/s)		
Level measurement	Submerged ultrasonic water level detectors	Pressure sensor	Submerged ultrasonic water level detectors
Level measuring range	0.04 m to 2.0 m	0.005 m to 3.5 m	0.1 m to 5.0 m
Precision of level measurement	±2 mm	±0.5% of full scale	−0.24%/°C ±5 mm of measured value when water temperature ≥ 10°C +0.24%/°C ±5 mm of measured value when water temperature < 10°C
Precision of flow rate measurement	±3% R.D. (In pre-shipment tank test)		

PCM4 Portable Ultrasonic Flowmeter for Small Channels


PCM4 Converter

High-capacity battery for long-term continuous measurement.
For on-site measurement in locations where an external power supply is not available.

Battery powered
Features a high-capacity battery for continuous, long-term flow rate measurement in manholes, channels, and other sites where an external power supply is not available. (Battery life is approximately six weeks on a full charge.)

Outstanding environmental resistance
Converter has an IP67-rated waterproof enclosure that allows installation in manholes and similar hostile environments where high humidity is a concern. (Unit cannot be installed in places where it may be submerged in water.)

Long-term continuous measurement
Can perform continuous measurement for approximately six weeks when using a one-minute measurement interval. This period can be extended by regularly replacing the spare battery.

■ Specifications

Flow velocity range	−1 m/s to 6 m/s (water level 0.065 m to 1.0 m)	
Flow velocity precision	±1% R.D. (flow velocity of 1 m/s or greater), ±(0.5% R.D. + 5 mm/s) (flow velocity of less than 1 m/s)	
Level measurement	Submerged ultrasonic water level sensor	Pressure sensor
Level measuring range	0.04 m to 2.0 m	0.005 m to 3.5 m
Precision of level measurement	±2 mm	±0.5% of full scale
Precision of flow rate measurement	±3% R.D. (In pre-shipment tank test)	

Direct, high-precision measurement of river flow rates.

Small River Flowmeter

Flow Velocity m/s | Water Level m | Flow Rate m³/s

A smaller, more economical system design that utilizes our technological know-how from large-river measurement systems.
Suitable for the flow management of small rivers and water channels in hydroelectric, agricultural, clean water, and other applications.

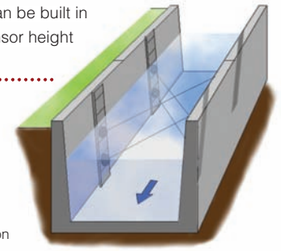
ATENAS Flowmeter for Channels and Small Rivers


Example installation on sloping revetment


Hoist mounting and converter

High-precision flow rate measurement
Optimal system configuration
- Variety of sensor designs for complex flow conditions (Single path, cross-path, and multi-level installation)
- Observe reverse flow
- Optional SIMK ensures high-precision flow rate measurement without the need for system customizations, even in channels with complex profiles

Easy installation, adjustment, and maintenance
Optional hoist mounting (patent pending)
- Sensor height adjustment mechanism
- Sensor angle can be adjusted when installed on sloping revetments
- Submerged water level meter can be built in
- Easy maintenance thanks to sensor height adjustment mechanism


Conceptual illustration of installation

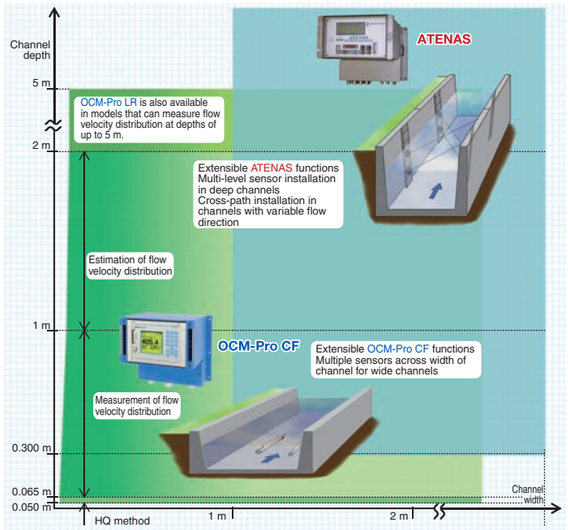
Applicable Applications for OCM-Pro CF and ATENAS Flowmeter for Channels and Small Rivers

OCM-Pro CF
① The graph below indicates model with built-in submerged ultrasonic water level sensor (measurable depth of 2 m).
② Composite data can be obtained by installing up to three sensors across the width of the channel for wide channels or channels where flow velocity is distributed unevenly across the width of the channel. (A typical installation requires one sensor per 2-3 m.)

ATENAS
① Multi-level installation is possible in deep channels. (Regular installations only require a single level.)
② Standard TR-200/8 sensor can be used in channels up to 20 m wide. Wider channels can be covered with additional sensors.

■ Specifications

Flow velocity range	−20 m/s to 20 m/s
Flow velocity precision	±3 cm/s
Level measurement	Submerged level detector (sold separately)
Precision of flow rate measurement	±3% R.D. (Verified on-site)



High-precision, direct measurement of river flow. Central management of low to high water levels.

ATENAS Flow Observation System

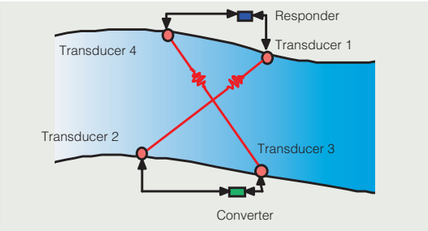
Flow Velocity m/s | Flow Rate m³/s

By enabling high-precision direct measurement of river flow using an optimum design for the application, ATENAS advances water conservation and supply management. ATENAS can be used for ongoing flow observation during flooding as well.

Ministry of Land, Infrastructure, Transport, and Tourism
New Technology Information System
(NETIS)Registration No.: KK-050041-A

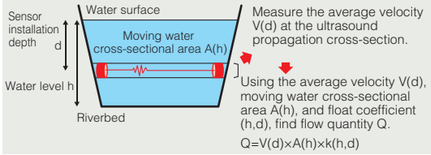
ATENAS Flow Measurement System for Rivers

■ Sensor arrangement example and components (cross-path responder system)



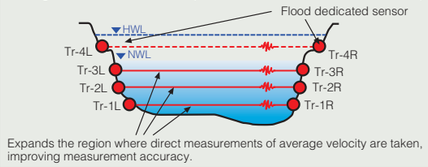
■ Measurement Principle

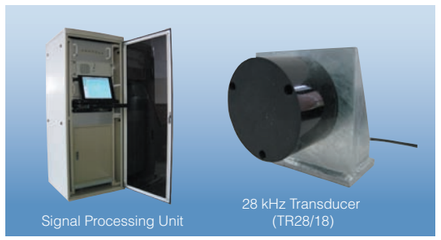
"Ultrasound Propagation Time Difference Method" Utilized phenomenon: Ultrasound velocity changes according to current velocity



■ Multi-path System

(Example with sensor pairs at three levels for low water level management, and one sensor pair at one level for flood observation)





High-precision flow identification

Unlike conventional flow observation methods that employ an HG equation based on water level, ATENAS utilizes our proprietary ultrasound digital processing to directly measure the average river velocity with high accuracy. When the flow calculations are performed using SIMK® (option), ATENAS achieves even higher accuracy, making it possible to achieve high-precision flow measurement even during flooding, something that has been difficult to achieve to date with conventional flow observation methods.

Significantly expanded flow observation range

With the use of low-frequency, high-output ultrasound transducers, ATENAS is unsusceptible to underwater suspended matter and fouling, enabling measurement during flooding as well. The system is capable of accommodating a maximum river width of 1,000 m.

Enhanced support of drift current and partial reverse current

With the use of low-frequency, high-output ultrasound transducers, ATENAS achieves a sensor arrangement with plenty of room to spare, improving accuracy and maximizing the removal effect of drift error. With the sensors arranged on multiple levels (multipath type), ATENAS accommodates deep sea directed drift currents, such as tidal rivers, as well.

■ Specifications

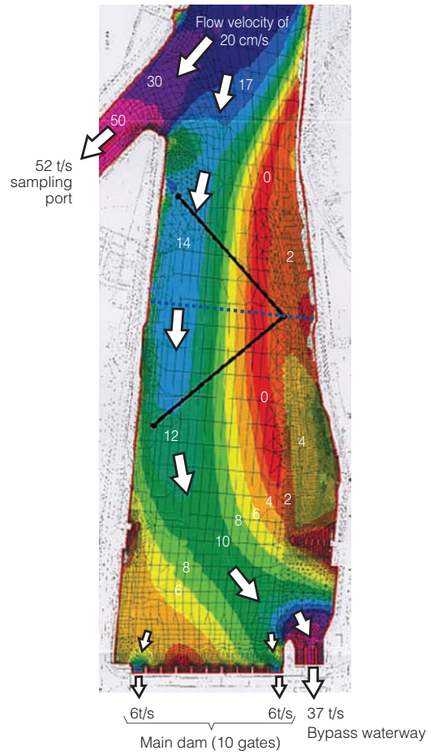
Applications	Rivers	
Converter	FTT-200	FTT-28
Applicable river (channel) widths	10 to 50 m	30 to 1,000 m
Frequency	200 kHz	28 kHz
Max. output	2 kW	2 kW
Sensor placement	Max. 8 levels (Single-path: 8 depths. Cross-path: 4 depths.)	Max. 8 levels (Single-path: 8 depths. Cross-path: 4 depths.)
Flow velocity range	−10 m/s to +10 m/s	−10 m/s to +10 m/s
Data storage	Built-in data logger (2 years' worth of data as standard)	
Interface	VGA monitor, mouse/keyboard, USB (x4), RS-232C (x2), Ethernet (x2)	
Inputs	Analog (4 to 20 mA, x4)	
Outputs	Analog (4 to 20 mA, x2) Contact outputs (x2), Open collector (x2)	
Operating environment	0°C to +50°C (No condensation)	+5°C to +35°C (No condensation)
Power source	12 V DC	90 to 260 V AC 50/60 Hz
Supported transducers	TR-200/5	TR-28/18
Frequency	200 kHz	28 kHz
Max. output	2 kW	2 kW
Dimensions	ø107×h68 mm	ø183×h142 mm
Weight	2.0 kg	8.4 kg
Dimensions of hemispherical housing	ø340×h170 mm	ø440×h220 mm

Example installation

High-precision Method Based on River Velocity Distribution Analysis

High-precision correction method using SIMK analysis® based on FEM analysis (finite element method)

Velocity Distribution Diagram Based on SIMK Analysis®



A tool that further enhances the accuracy of measured flow

This tool determines correction coefficients from the cross-sectional velocity distribution found by SMK analysis® based on numeric simulation. By applying the correction coefficients to the data measured by the river flow meter, the instrument measures flow with even greater accuracy.

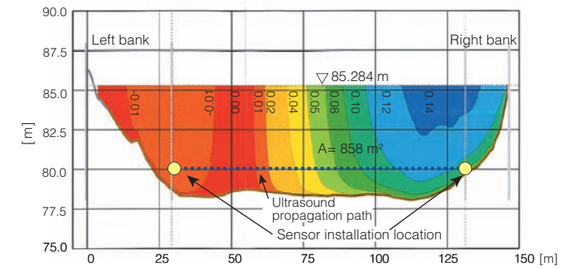
Prediction of flood velocity distribution

This instruments simulates various flow states in advance, including floods never experienced, and determines the optimum correction coefficient for each flow. The instrument does not require combination with (adjustment using) existing flow observation techniques, making observation immediately after flow meter installation possible.

Elimination of adjustment work after installation

This instrument determines correction coefficients in advance through numeric simulation, allowing you to execute flow observations immediately after installation without performing any adjustment work.

■ Example of Cross-sectional Velocity Distribution Derivation (dotted area in figure below)



(SIMK and SIMK analysis are registered trademarks of JFE Advantech.)

Sediment Movement Observation System

Continually measures flow and turbidity, measuring the suspended sediment required for comprehensive sediment control. Utilizes pit load cells, making bed load measurement possible as well.

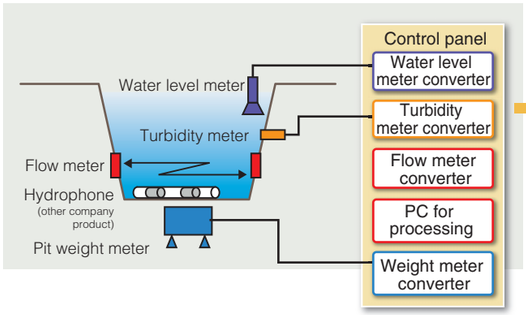
Measuring Transported Sediment Volume

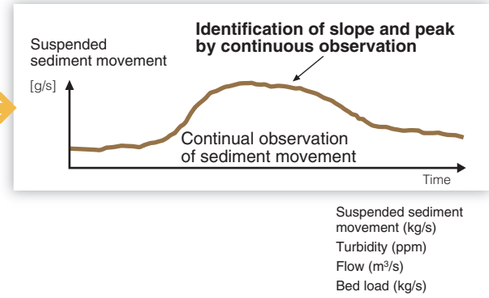
Calculating Suspended Sediment Movement

The suspended sediment movement (flux) is obtained by multiplying the suspended sediment content by the flow quantity (measured).

V(t) = D(t) x Q(t)D(t) – Turbidity x Conversion coefficient

(turbidity function: From sampled water analytical data)
[V: Suspended sediment movement, D: Suspended sediment content, Q: Flow quantity, D: Suspended sediment content [g/ℓ].

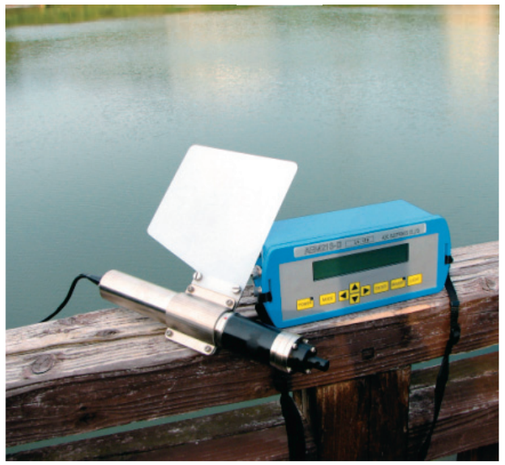




Simple Flow Velocity Measurement at Target Depth

Direct Reading Electromagnetic Current Meter

Flow Velocity m/s | Direction ° | Depth m | Temperature °C



This direct reading flow velocity/direction meter features a dual-axis electromagnetic flow velocity sensor and built-in compass. Depth and temperature sensors included as standard, it can be used in a variety of locations from the ocean to rivers, lakes, swamps, and dams. Measurement data is recorded along with calendar data for easy data processing with a PC.

Measurement	Flow Velocity	Direction	Depth	Temperature
Measuring range	0 to 2.5 m/s	0 to 359.9°	0 to 50 m	–5 to 40°C
Accuracy	±1 cm/s /±2%	±2%	±0.3% FS	±0.02°C

For Basic Flow Velocity Measurement in Rivers and Waterways in General

Electromagnetic Current Meter

Flow Velocity m/s

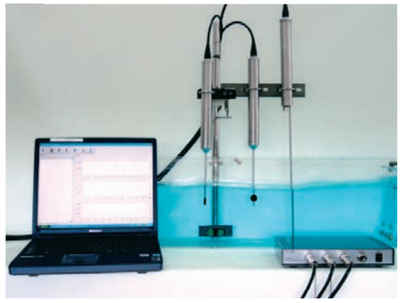
A portable, single-axis electromagnetic current meter designed for simple, accurate measurement of flow velocity in rivers and waterways in general. Less susceptible to malfunction than propeller-based models, and very easy to handle and maintain. Measurement data is recorded along with calendar data for easy data processing with a PC, so you can throw away your field notebook. An optional vane set ensures stable measurements can be obtained from bridges and other high places.

Measurement	Flow Velocity
Measuring range	0 to 5 m/s
Accuracy	±5 mm/±2%

Accurate Support for Hydrographical Experiments

Electromagnetic Current Meter and Water Level Meter for Laboratory Use

Flow Velocity m/s | Water Level mm | Wave Height mm



An electromagnetic flow velocity sensor for laboratory use with a proven track record of 30 years. With a fast sampling rate and digital output, this sensor is not easily affected by electromagnetic noise. Up to four different sensors can be connected to its compact interface, and data can be simultaneously recorded on a single PC.

Measurement	Dual-axis flow velocity	Triple-axis flow velocity	Water level/ Wave height
Measuring range	±2.5 m/s per axis	±2.5 m/s per axis	300/600 mm
Accuracy	±2%/0.5 cm/s	±2%/0.5 cm/s	±0.5% FS

Autonomous Water Sampling System

CTD with Multiple Water Samplers

Depth m | Temperature °C | Salinity — | Turbidity FTU | Chlorophyll µg/L

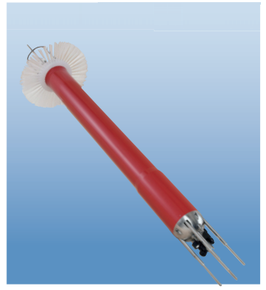
This is a compact, autonomous water sampler containing ten two-liter (standard) capacity bottles. The system is CTD controlled and is designed for deployment in coastal waters. As it has a built-in rechargeable battery and memory unit, the system requires no signal cable, meaning it can be easily deployed from a small boat using a winch capable of lifting 100 kg. Measurements can be made based on depth or time triggers.

Measurement	Depth	Temperature	Conductivity	Salinity	Turbidity	Chlorophyll
Measuring range	0 to 300/1000 m	–5 to 40°C	0 to 60 mS/cm	0 to 40	0 to 1000 FTU	0 to 400 µg/L
Accuracy	±0.3% FS	±0.01°C	±0.01 mS/cm	±0.02	±0.3 FTU/±2%	±1% FS

Turbulence Ocean Microstructure Acquisition Profiler

TurboMAP

Turbulent Shear S^{-1} | Temperature °C | Conductivity S/m | Depth dbar | Triaxial Acceleration G | Fluorescence ppb | Turbidity ppm



Turbulent microstructure is an important factor related to the great ocean conveyor and small-scale simulations. It is an area of oceanic research that has gained a lot of attention in recent years. TurboMAP is a freefall/bottom-up profiler developed in conjunction with Tokyo University of Marine Science and Technology and the University of Victoria in Canada.

Measurement	Measuring range	Accuracy
Horizontal Flow Velocity Vertical Shear	0 to 10 S^{-1}	5%
Ultra-fast response temperature	−5 to 45°C	$\pm 1\times10^{-2}$°C
Platinum response temperature	−5 to 45°C	$\pm 5\times10^{-2}$°C
Conductivity (Salinity)	0 to 7 S/m	$\pm 5\times10^{-3}$ S/m
Water pressure (depth) L-shaped model	0 to 500 dbar	±0.2% FS
Water pressure (depth) 9 model	0 to 200 dbar	±0.2% FS
Acceleration in X/Y/Z axes	±2 G	±1% FS
Fluorescence	0 to 100 ppb	0.5 ppb/±1%
Turbidity	0 to 100 ppm	1 ppm/±2%

Submerged Microscopic Imaging System

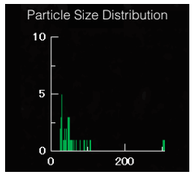
Particle Counter

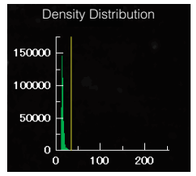
Visual Imaging of Plankton and Automatic Measurement of Suspended Particle Distribution

Particle Size µm

This is a measurement system that records zooplankton, phytoplankton, and suspended matter, and uses image processing technology to automatically measure their shapes and numbers. The system's compact size makes it ideal for use in a variety of environments from the worksite to the laboratory.
The system employs a dark-field measurement system suited to high-contrast/microstructure measurement. Measurement specimens flow along a tube (flow cell) between the lens and the light source and are captured as a series of still images when the specimen passes in front of the lens.

Measurable particle size	Approx. 10 µm to 500 µm
Max. storage capacity	9,999 images
Max. depth	100 m
Image analysis speed	Approx. 5 images/s





For Measuring Water Quality Data by Depth

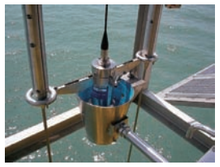
Automatic Water Quality Measurement System

Automatic, detailed measurement of water quality in vertical columns

We manufacture automatic water quality measurement systems that automatically raise and lower a water quality sensor using a winch and then transmit measurement data after measuring water quality at various depths.

- Detailed, automatic measurement of water quality in vertical columns.
- Measurements are made using a single sensor, so there is no error between instruments.
- Having a spare water quality sensor makes it possible to respond quickly in the event of a problem.
- Aerial standby system prevents data from deteriorating due to biofouling.

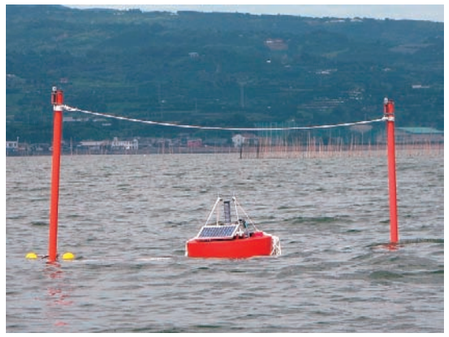
■Raft-mounted winch system



Prompt Notification of Water Quality Data

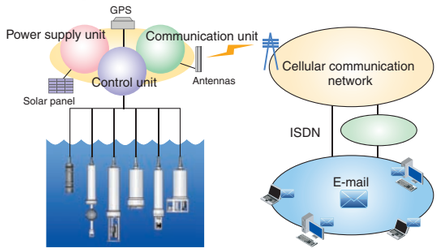
AQUA-Mail System

AQUA-Mail System provides prompt notification of water quality data



The AQUA-Mail system can automatically send water quality data to a preset e-mail address using a local cellular communication networks. As the system is powered by solar batteries, it can be installed on a buoy, aquaculture raft, or fish cage and connected to digital sensors to easily monitor water quality in fish farms, dams, and similar locations. It can be combined with an automatic water quality measurement system to create a total water monitoring system.

■AQUA-Mail System Configuration

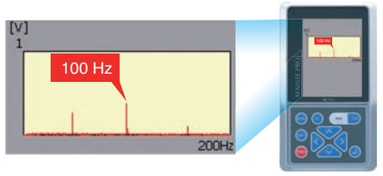


Dielectric Deterioration/Information Management

Partial Discharge
—

**Catch dielectric deterioration in electrical equipment early on.
Operation couldn't be easier — simply hold the sensor to the target and press the switch.**

AE-210 AE Diagnostic System for Dielectric Deterioration



As shown above, when the AE-210 system is used to measure equipment that has partially discharged, the discharge component is apparent in the FFT graph as a marked spike that is twice the power supply frequency.

Recipient of the 50th Shibusawa Award (Shared group entry with Tokyo Electric Power Company) Patents registered (No. 3756473 and 3756486)

Description

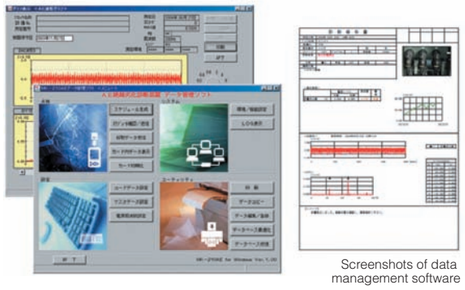
The AE-210 system is operated by holding the dedicated sensor against a live power line terminal, switch, isolating switch, transformer, or other live electrical equipment, and pressing the measurement switch. The system measures and analyzes the signal of the subsequent partial discharge, and based on this, produces a spectral display that indicates the state of dielectric deterioration.

Built-in battery for on-site diagnosis
The system is completely battery operated and can be used at the measurement site without a 100 V AC power supply.
(The system can also be operated with a 100 V AC power supply.)

Digitalize partial discharge and check it on a graph
The ability to digitalize diagnostic indicators lets you make quantitative judgments.

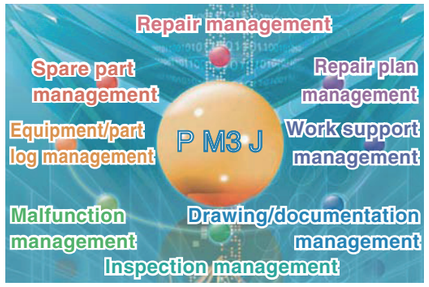
Safe and easy-to-operate sensor unit
Dedicated sensor unit with integrated preamplifier can be operated easily even when wearing thick insulating gloves.

Easy-to-use data management software included as standard
Dedicated management software with a diagnostic report output function is included as standard. This lets you manage measurement data easily with your PC.



Screenshots of data management software

PM3J Equipment Information Management System



Create a database of all information related to equipment maintenance and management

View accumulated data
Information regarding operation/malfunctions and analytical results for equipment and devices can be accumulated and used to easily create daily, monthly, or yearly reports.

Link related information
Display information on repairs, malfunctions, and inspections for selected equipment or devices. Equipment logbook data can also be entered for use by the PM3J system.

Search for necessary information easily
Historical data for malfunctioning equipment and frequency of occurrence on a monthly or yearly basis can be displayed in list or graph format. Inspection data can be displayed in chronological order making it easier to judge the state of the equipment.

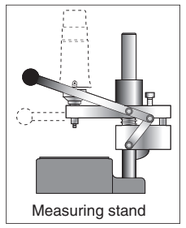
Handy Hardness Tester

Hardness HV | Hardness HRC | Hardness HS | Hardness HBW

The SONOHARD® Handy Hardness Tester measures hardness effectively by positioning a vibrating rod with diamond indenter on a material and applying a constant load.

SONOHARD SH-21 (with Static Calculation, Output Features, and a Motorized Probe)

■ Measuring stand (optional)
When mounted on the measuring stand, the tester can be used as a stationary hardness tester. This compact, lightweight stand (2.5 kg) can be carried around on-site.



This high-performance hardness tester is equipped with four hardness scales. It provides highly accurate measurements with simple operation.

Applications
- Evaluation of carburizing, standard quenching and high-frequency quenching
- Weld hardness measurement for welded structures (tanks, hulls, bridges, steel towers, etc.)
- Hardness measurement for gear tooth flank (narrow area)
- Measurement of decline in hardness over time in equipment and buildings
- 100% online inspection of components (engine valves, rack bars, crankshafts, bearings, etc.)

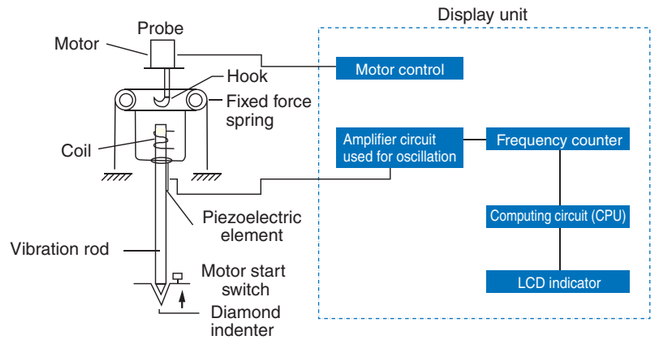
Four scales
Can indicate the hardness values in four scales — HV, HRC, HS, and HBW. Also gives digital readout of Vickers hardness in just one operation.

Upper and lower limit setting
Sounds an alarm to notify you when the allowable limits of a workpiece have been exceeded. An alarm signal can also be output (optional).

Designed for handheld use
Handheld design provides ease of use at the worksite. Improved display offers enhanced visibility.

Flexible measurement
This tester can measure in any direction, enabling effective checking under a variety of conditions.

Measurement Principle



When the vibrating rod is applied to a soft-surfaced test sample with identical qualities and at a fixed force, it makes a deep indentation and gets locked into the groove. Due to this, the resonance frequency increases. Conversely, it does not get locked in when used on hard test samples and the resonance frequency drops. The test sample's hardness can be calculated using the correlation between this deviation and the tested hardness.

A wide selection of types for a variety of applications

Load Cells

Force
N

Leveraging our original technology to contribute to the ever-evolving world of factory automation. We have used our expertise gained in the steel industry to develop load cells that excel in tough environments.

Load Cells


Load tester

Load cells made with highly reliable technology developed to withstand the demanding environmental conditions found in the steel industry. Our extensive product lineup meets a wide range of needs.

Developed and manufactured in-house
Our load cells are the product of years of experience and painstaking development. They can be used for special applications as well as for measurement.

Varied product lineup
We offer a variety of load cells including general compression, tensile, plate, and bearing models. Choose the type that best suits your requirements.

Built-in Constrainer Type DF/DF-KE

Typical applications: Platform weighers, hopper scales

- Waterproof, all stainless-steel load cell
- Built-in constrainer requires no cross bracing
- Compact size facilitates equipment design. Flameproof models also available.

Patent number : 3745107

Accuracy: 1/1000 to 1/2000 class

High Precision Compression Type ZR/ZR-KE

Typical applications: Truck scales, platform weighers, hopper scales

- Z-curve shearing compression type
- Self stabilizing design ensures high accuracy.
- Flameproof types are also available. (Flameproof construction: Exd IIB T4)

Accuracy: 1/3000 to 1/5000 class

Built-in Constrainer Type CB

Typical applications: Hopper weigher

- Built-in constrainer requires no cross bracing
- Popular HR load cell built in
- Available in a wide product line up to high-capacity 490-kN (50-tf) rating.

Patent number : 2539460

Accuracy: 1/500 to 1/1000 class

General Purpose Compression Type HR

Typical applications: Hopper weighers, crane scales

- Compact rectangular cylinder compression type
- Waterproof, hermetically sealed structure contains nitrogen gas.
- Self-stabilizing design with lateral load release mechanism maintains high accuracy.

Patent number : 2774384, 2742138

Accuracy: 1/500 to 1/1000 class

High Precision Compression Type HRII

Typical applications: Truck scales, platform weighers, hopper scales

- Compact rectangular cylinder compression type
- High-precision model.
- Self stabilizing design ensures high accuracy.

Patent number : 2774384

Accuracy: 1/3000 to 1/5000 class

High Precision Compression Type IR

Typical applications: Truck scales, platform weighers, hopper scales

- Compact design ensures ease of installation.
- Self stabilizing design ensures high accuracy.
- Hermetically sealed structure is highly reliable.

Patent number : 2774384

Accuracy: 1/3000 to 1/5000 class

Sheave Bearing Type BH

Typical applications: Crane scales, crane overload detectors

- Compression-type bearing for crane sheave bearings and similar applications.
- Designed for off-center loads and inclined loads.
- Minimal size with direct inserting of shaft

Accuracy: 1/500 to 1/1000 class

Tensile Type CT

Typical applications: Crane scales, crane overload detectors

- Tensile type with compact rectangular cylinder
- Features a safety factor of 5.
- The best choice for detection of crane overload

Patent number : 2515743

Accuracy: 1/1000 class

Plate Type TM-H/TM-V

Typical applications: Tension meters, force measurement

- Designed for installation under a bearing.
- Accurately detects horizontal or vertical load and accurately measures tensile strength.
- Durable, all stainless-steel construction for severe environments.

Accuracy: 1/500 class

Compact Compression Type KM

Typical applications: Hopper weighers, force measurement

- Compact, lightweight compression model.
- All stainless-steel construction for excellent corrosion resistance.
- Lineup includes low-capacity rated models

Accuracy: 1/300 to 1/500 class

Built-in constrainer requires no cross bracing

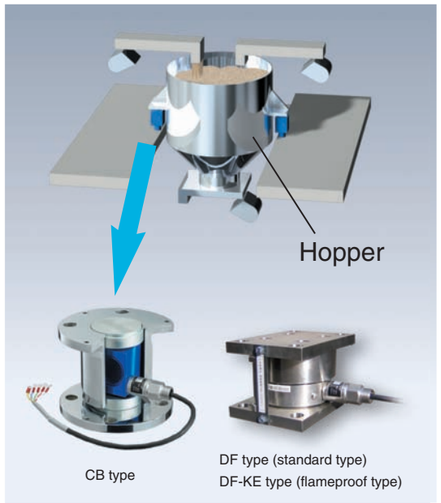
Hopper Weighers

Weight
t

Weight
kg

This weigher can be easily installed in a hopper for faster construction by adopting our prominent load cells with built-in constrainer.

Hopper Weighers



The weigher employs a constrainer which is safe for horizontal seismic coefficient of 1.0.

New innovative mounting bracket
The hopper mounting bracket has built-in constrainer. Since the hopper weigher does not require mechanisms such as a cross brace or check rods, the space required for the hopper can be reduced, thereby facilitating installation.

Highly earthquake-resistant design
The constrainer is designed to be safe for a seismic factor of 1.0. Ideal for installation in earthquake-prone regions.

Available with a high-precision hopper scale and in flameproof configurations
Equipped with a high-precision load cell, the scale can also be used as a hopper scale. A flameproof model is also available.

Large Horizontal Load Capacity

Given a seismic coefficient (K), the horizontal force produced by an earthquake (F) is proportional to the total weight of the hopper (Wt). The type and number of brace sets used to ensure that the hopper weigher can withstand this horizontal force must satisfy the following conditional formula:

$$F = Wt \times K < fa \times n$$

(Horizontal force < Permissible horizontal load)

Where
- Wt = Total weight (tare weight + maximum weight)
- K = Seismic coefficient (0.2 to 1.0)
- fa = Permissible horizontal load of constrainer
- n = Number of constrainers used (normally 3 or 4)

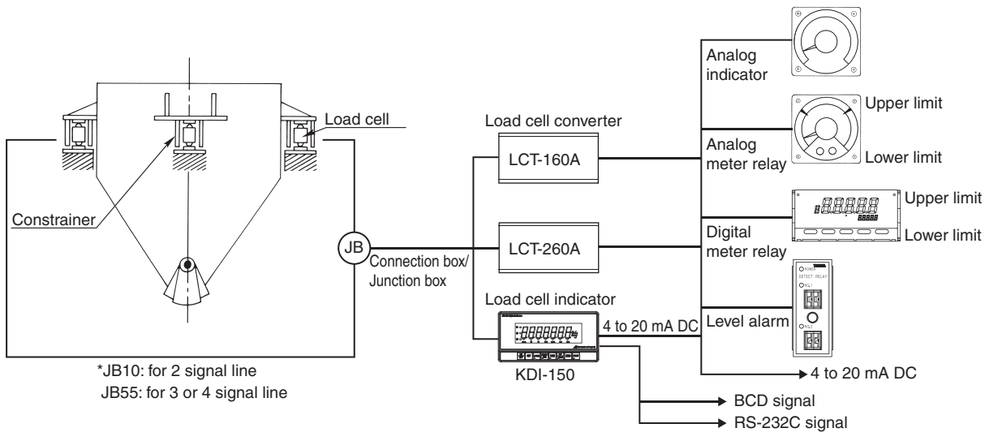
■ Specifications for CB type

Model	CB-1	CB-2-5	CB-2-10	CB-3-10	CB-3-20	CB-3-30	CB-4
Load cell type	HR-2	HR-5	HR-10	HR-10	HR-20	HR-30	HR-50
Rated load	19.6 kN	49 kN	98.1 kN	98.1 kN	196 kN	294 kN	490 kN
	2 tf	5 tf	10 tf	10 tf	20 tf	30 tf	50 tf
Permissible horizontal load	39.2 kN			98.1 kN			157 kN
	4 tf			10 tf			16 tf

■ Specifications for DF-type and DF-KE type

Model	DF-200LA	DF-500LA	DF-1	DF-2	DF-5	DF-10
Model (flameproof)	DF-200LA-KE	DF-500LA-KE	DF-1-KE	DF-2-KE	DF-5-KE	DF-10-KE
Rated load	1960 N	4900 N	9.81 kN	19.6 kN	49 kN	98.1 kN
	200 kgf	500 kgf	1 tf	2 tf	5 tf	10 tf
Permissible horizontal load	7.8 kN				15.7 kN	31.4 kN
	0.8 tf				1.6 tf	3.2 tf

System Configuration



*JB10: for 2 signal line
JB55: for 3 or 4 signal line

Scales designed to be suspended by a crane hook

Crane Scales

Weight t | Weight kg

This scale (with built-in battery) can also be operated remotely with the Handheld Display Unit (Type-L). We offer a wide product line with 500 kg to 30 metric ton capacities.

ATHW Series Waterproof Compact Crane Scale

A top class Japanese-made crane scale with IP65 rated dustproof and waterproof construction.

Top class Japanese-made crane scale with dustproof and waterproof construction (IP65 rated).
Wireless handheld display unit lets you use the ATHW series indoors or outdoors.

■ Product line

Capacity	For general use			Capacity	For commercial transactions		
	Standard	With handheld display unit	Minimum graduation		Standard	With handheld display unit	Minimum graduation
500 kg	ATHW-05B	ATHW-05BPL	0.2 kg	500 kg	ATHW-05M	ATHW-05MPL	0.5 kg
1000 kg	ATHW-1B	ATHW-1BPL	0.5 kg	1000 kg	ATHW-1M	ATHW-1MPL	1 kg
1500 kg	ATHW-1.5B	ATHW-1.5BPL	0.5 kg	2000 kg	ATHW-2M	ATHW-2MPL	1 kg
2000 kg	ATHW-2B	ATHW-2BPL	1 kg	3000 kg	ATHW-3M	ATHW-3MPL	1 kg
3000 kg	ATHW-3B	ATHW-3BPL	1 kg				

*B: Model for general use, P: Battery-powered model, L: Includes handheld display unit
*We intend to add large models with a capacity of 5 metric tons or more to the lineup in the future.

ATH Series Crane Scale

The ultimate solution among Japanese-made crane scales, this innovation allows you to see the weight right in your hands.

Good visibility for outdoor use
LCD screen features largest character display size in class (45 mm) for easy viewing indoors and outdoors.

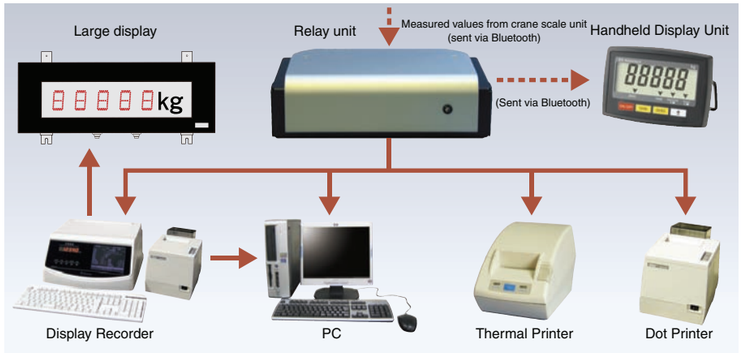
The measured weight is displayed on the Handheld Display Unit.
In addition to offering remote control functions, the Handheld Display Unit also displays the weight wirelessly.

■ Product line

Capacity	For general use			For commercial transactions		
	Standard	With handheld display unit	Minimum graduation	Standard	With handheld display unit	Minimum graduation
500 kg	ATH-05B	ATH-05BL	0.2 kg	ATH-05M	ATH-05ML	0.5 kg
1000 kg	ATH- 1B	ATH- 1BL	0.5 kg	ATH- 1M	ATH- 1ML	1 kg
2000 kg	ATH- 2B	ATH- 2BL	1 kg	ATH- 2M	ATH- 2ML	2 kg
3000 kg	ATH- 3B	ATH- 3BL	1 kg	ATH- 3M	ATH- 3ML	2 kg
5 t	ATH- 5B	ATH- 5BL	2 kg	ATH- 5M	ATH- 5ML	5 kg
10 t	ATH-10B	ATH-10BL	5 kg	ATH-10M	ATH-10ML	10 kg
20 t	ATH-20B	ATH-20BL	10 kg	ATH-20M	ATH-20ML	20 kg
30 t	——	ATH-30BL	20 kg	——	——	——

*Please contact us for information regarding capacities exceeding 30 metric tons.

Wireless Unit (Optional)



This system makes it possible to use Bluetooth to send weight data from the ATH crane scale or waterproof ATHW crane scale to a printer for printing or to a PC or display recorder for collating.

*The relay unit is not required if only using a crane scale with a handheld display unit.

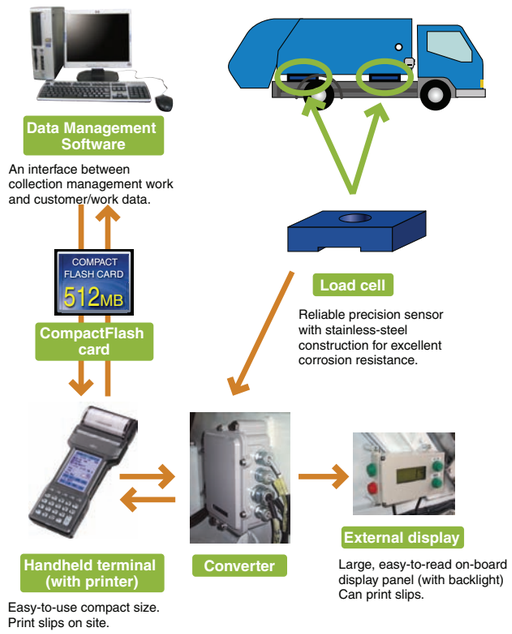
Advanced system efficiently supports collection work

On-board Weighing Management System

Weight kg

A weighing system that employs thin load cells. A slope correction function ensures accurate weights can be obtained anywhere. Handheld terminal provides a mobile data collection management system.

On-board Weighing Management System



Applications Garbage trucks, sanitation trucks, flatbed trucks, detachable body trucks, etc.

Suited to on-board mounting
High-precision load cells turn your vehicle into a weighing system.
Thin cell profile minimizes vehicle height increases.
Correction function cancels out weighing errors caused by slope of road.

Designed to meet your needs
Supports a variety of different weighing methods including single, multiple, or mixed item types.
Incorporates a wide variety of functions including collection fee management, collection route management, and barcode printing.
User-friendly operation. Manage clients and results on a PC.

Reliable and extremely durable system components

■ Specifications

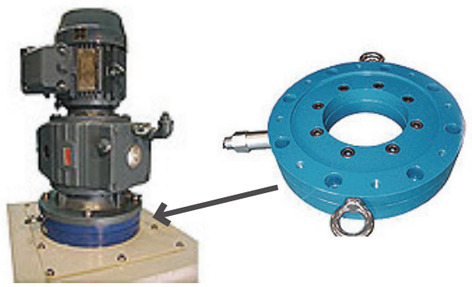
Applicable vehicles	2 to 4 t trucks (Consult JFE Advantech regarding systems for heavier vehicles)
Weighing system	Load cell
System configuration	Load cells (x4), inclinometers (x2), on-board load cell converter, handheld terminal, external display, in-cabin printer
Accuracy	0.5%
Functions	Slope correction, master data entry software
Temperature	−20 to 50°C (Handheld terminal: −5 to 50°C)
Humidity	20 to 80%
Waterproof/Splashproof specifications	JIS D0203 (External display), JIS Splashproof Type II (Handheld terminal)

Accurate detection of output shaft torque reaction force from electric motors

Flange Torquemeter

Torque kN•m

Flanged Torquemeter



Applications Torque control in agitators, etc.

Simple construction enables easy installation on vertical motors.
Offers space savings compared to conventional coupling-type torquemeters.
Maintenance free. Contains no bearings or other rotating parts.

■ Specifications

Rated capacity (RL)	0.1/0.25/0.5/1.0/2.5/5.0 kN•m
Overall precision	±0.2% RO (non-linear + hysteresis)
Permissible overload	300% of RL
Operating temperature range	−10 to +60°C
Allowable temperature range	−20 to +70°C
Flameproof specifications	ia II CT4
Waterproof construction	IP67
Supplied cable	3 m long

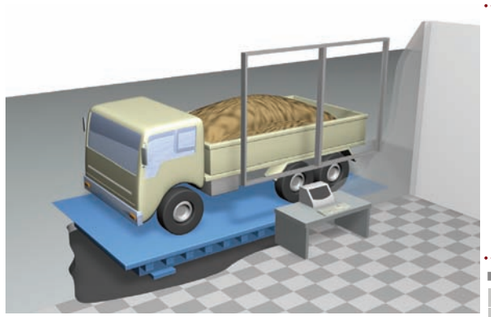
Advanced data processing functions to support logistics

Truck Scales

Weight t | Weight kg

These scales accommodate various requirements such as easy measuring and multiple applications of measurement data. With a variety of data-processing systems, they provide a user-friendly measuring system.

KMT Series Pit Scale



Excellent versatility
The pit scale is the most popular type. It supports a variety of applications across a wide measuring range.

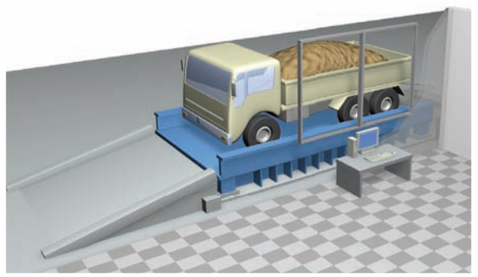
No restrictions on the approach
Because the load surface is at ground level, there are no restrictions on the approach.
The truck scale can be installed and used with ease.

Ease of maintenance
Precision load cells achieve excellent accuracy and ease of maintenance. Reduce the hassle associated with maintenance inspections.

■ Specifications

Capacity	20 to 100 t
Minimum graduation	10, 20, 50 kg
Loading platform dimensions	2.7 × 6.5 m, 3.0 × 7.5 m, 3.0 × 8.0 m, 3.0 × 10.5 m, 3.0 × 12.0 m, 3.0 × 15.0 m, 3.0 × 18.0 m, 3.5 × 15.0 m, 3.5 × 18.0 m *Custom sizes are available.

KMG Series Mount-type Truck Scale



Excellent value
On-ground installation makes for ease of installation. No drainage facilities are required.

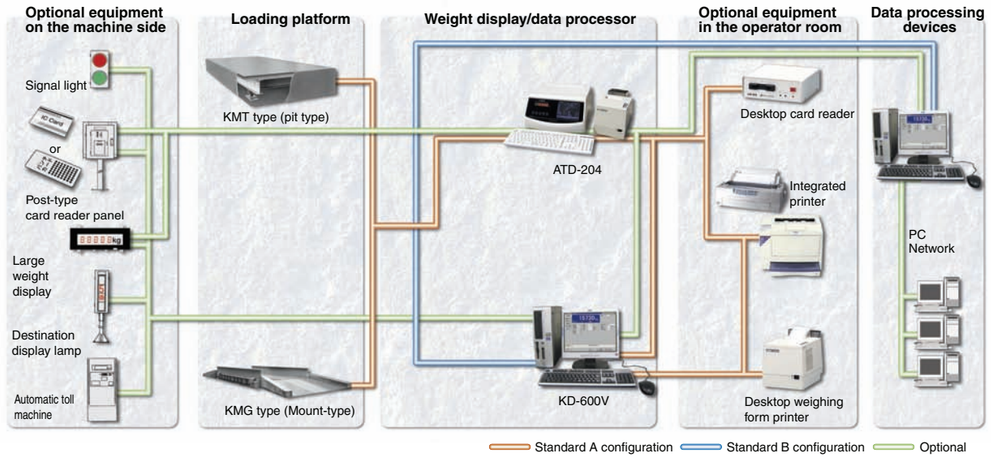
Safety features
A safety guard is provided to ensure safe and accurate measurement.

Ease of maintenance
Precision load cells achieve excellent accuracy and ease of maintenance. Reduce the hassle associated with maintenance inspections.

■ Specifications

Capacity	20 to 80 t
Minimum graduation	10, 20, 50 kg
Loading platform dimensions	2.7 × 6.5 m, 3.0 × 7.5 m, 3.0 × 8.0 m, 3.0 × 10.5 m, 3.0 × 12.0 m, 3.0 × 15.0 m *Custom sizes are available.

System Configuration



For weighing raw materials during transport on a belt conveyor

Conveyor Scale

Weight t/h | Weight kg/h

This advanced belt conveyor-type constant feeder weighs various products and raw materials in particle or powdered form during conveyor transport

KW-LU Series Belt Weigher

This under-mounted load detection platform provides accurate weighing by minimizing errors that occur from belt tension fluctuations.

Under-mounted load detection platform

- **Low displacement minimizes errors caused by belt tension fluctuations.**
- **Compact structure enables entire system to be installed under conveyor, and saves floor space.**
- **Rigid frame eliminates effects of bending.**
- **Equipped with load cell protection unit for operation under overload conditions.**

■ Specifications

Model	LU(D)-40	LU(D)-120	LU(D)-240	LU(D)-450
Belt width	400 to 900 mm	750 to 1200 mm	750 to 1200 mm	900 to 1800 mm
Accuracy	±0.5 to 1.0% of full scale			

Integrator

- **Integrated load cell power supply supports up to four load cells.**
- **Built-in microcomputer enables assistance in setting of zero-weight point and span.**
- **Digital processing maintains high accuracy.**
- **Zero-point adjustment can be performed outside unit.**

■ Specifications

Model	ERM-400SP/400SL Integrator
Load signal	Load cell input (0 to 30 mV) or 4 to 20 mA
Velocity signal	0 to 120 Hz pulses
Integration display	9-digit LCD display
Outputs	Instant transport volume signal, load factor signal, integration value pulse output, and control signal

KC-V Series Constant Feeder

This constant feeder continuously supplies a fixed volume of raw materials, additives, or other materials.

Applications For production processes such as steel, ceramics, power, chemicals, fertilizer, and food

■ Specifications

Control method	Maintains fixed volume through continuous control of conveyor speed.
Belt width	400 to 2000 mm
Weighing capacity	0.1 to 1500 t/h
Control range	1:5 (standard specification)
Weighing accuracy	±1/200 of full scale
Control accuracy	±1/100 of full scale
State of weighed substance	Ranging from powders to blocks
Controller	ERM-400DP/ 400DL Integrated Controller for integration and control of transported quantities

Weighing System

Weight t | Weight kg

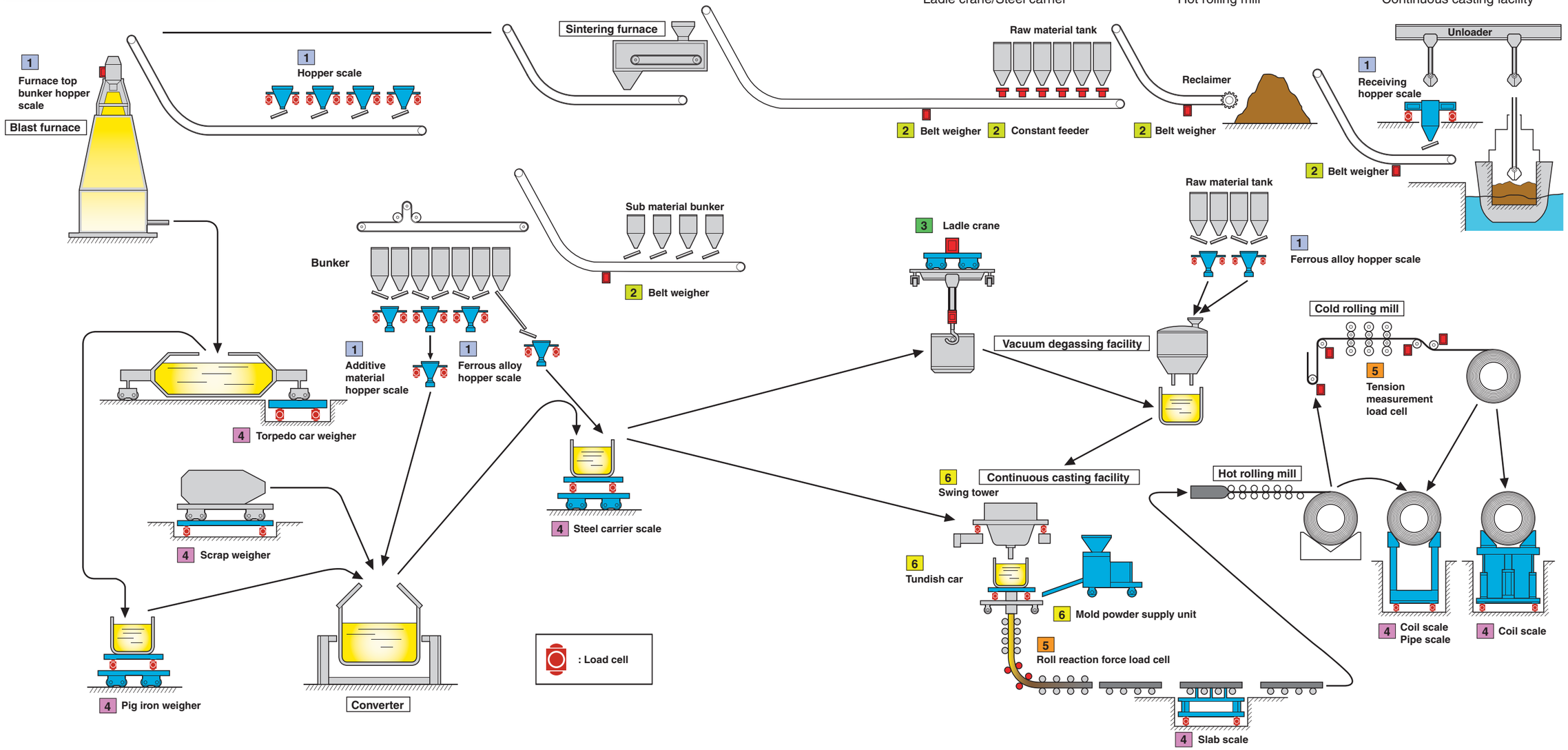
Automating each process achieves smooth and consistent process management.
Our unique technology affords a rational and efficient system.

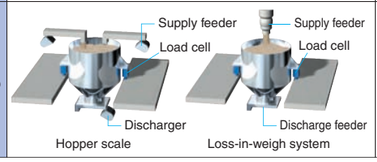
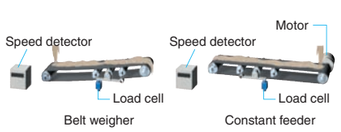
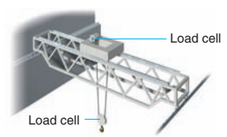

Ladle crane/Steel carrier

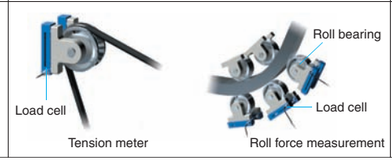

Hot rolling mill


Continuous casting facility

Weighing Devices Used for Iron and Steel Processes



	1 Hopper-type Weigher	2 Conveyor Scale	3 Crane-type Weigher
Unit Name	Hopper weigher Hopper scale Hopper-type continuous fixed-volume feeder Packer scale Flexible container scale	Belt weigher Conveyor-type continuous fixed-volume feeder (Constant feeder)	Crane scales Direct-reading crane scale Crane overload detector
Figure			

	4 Platform Weigher	5 Force Measurement	6 Special Weigher
Unit Name	Coil scale Pipe scale Platform weigher Truck scale	Tension meter Roll force measurement Torque reaction force measurement Tensile measurement	Swing tower molten steel weigher Tundish weigher Mold powder supply unit
Figure			Please contact us for information on other special-purpose weighers.