Our Expertise, Your Values

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Tank Terminal Automation

Instrument & Solution

Our expertise , Your values

PNR JOYO PTE LTD

PNR JOYO

Our Expertise, Your Values

A Leading Expert in Liquid Measurement and Control Technologies

Established in 1999, located at BOA Beijing, JOYO M&C is a high-tech company focusing on R&D and manufacturing of measurement & control instruments, integrated automation systems and related equipment for oil terminals, tank farms, refineries and petrochemical complexes.

Based on 20 years experiences in the industry, JOYO M&C developed many products with innovative technologies. Most products and solutions are proven to be of high competence in terms of functions and performances. JOYO M&C was awarded with the Sinopec annual technology innovation awards for its innovative technologies used in its products and solutions for tank-farms and terminals, which facilitate customer operations and solve many problems for customers. JOYO M&C is one of the suppliers for SINOPEC and PETROCHINA for over ten years. Its products are also supplied to oil companies in Russia, Mongolia, Kazakastan, South Aisa, Middle east and other countries in the world.

We are dedicated in creating values for customers with our expertise.

PNRJOYO was form to market + service the ASEAN countries including Taiwan and Korea.

PNRJOYO

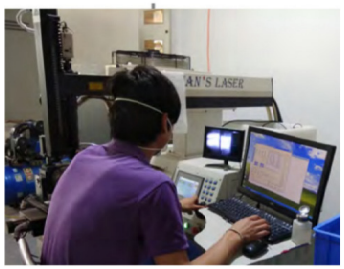
We are dedicated to create value for customers based on our expertise.

PNRJOYO

Production and QC







Quality System

ISO9001 | ISO14001 | OHSAS18000

R&D

30%
R&D Staff

25%
Expenditure

- 30% R&D Staff
- Majoring in Automation Control, Software Engineering, Mechnical Engineering, etc
- R&D Expenditures take over 25% of the total Expendtures annually

R&D Honors

The Patent for Invention of Servo Tank Gauge

Technology Irovation Awards by Sinopec

The Patent of Invention for Density Measurement Device

The Patent for Invention of Liquid Density Sensor

Patent of utility for Loading Monitoring Controller

Patent of utility for Servo Digital Valve

PNR JOYO

WHAT WE DO?

Providing Instruments & Solutions for Product Storage and Transfer

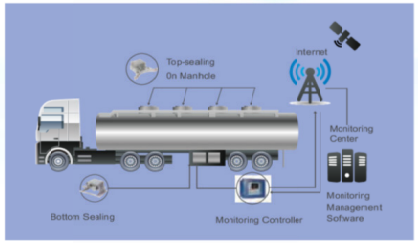
Tank Gauging System and Devices

- Tankage Measurement System
- Servo Tank Gauge
- Multi-spot Thermometer
- Density Meter
- High High Alarming Switch

Loading System and Device

- Servo Digital Control Valve
- Online Pipeline Densitometer
- Batch Loading Controller
- Loading Process Controller
- Billing Terminal

Overfill and Static Protection System



Remote Truck Monitoring System and Device

- Electronic Sealing
- Monitoring Controller
- Truck Mounted tank gauge probe
- Oil, Water,Air Detection

Terminal Automation Solutions

- Tankage Measurement System
- Terminal SCADA System
- Terminal Security System
- Loading/unloading System Fire fighting System

Tankage Measurement Instrument

07 / 08
Servo Tank Gauge BJLM-80H

09
Multi-Spot Thermometer BJZT

10
Tank Front Display TS-I

11/12
High High Alarming Switch
BJTK-1

13 / 14
Portable Density Meter DH-50

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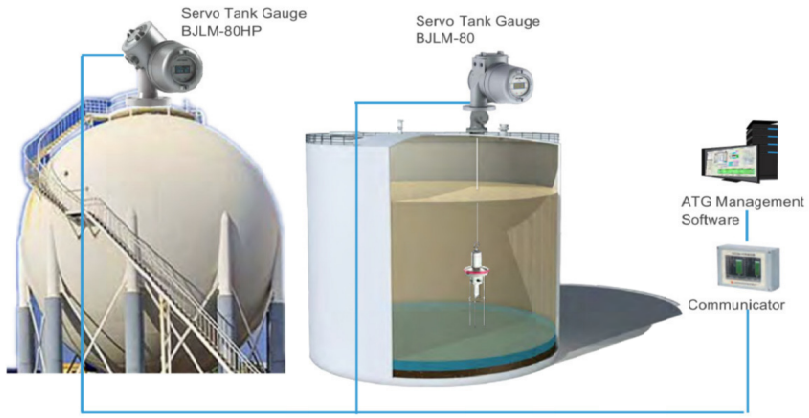
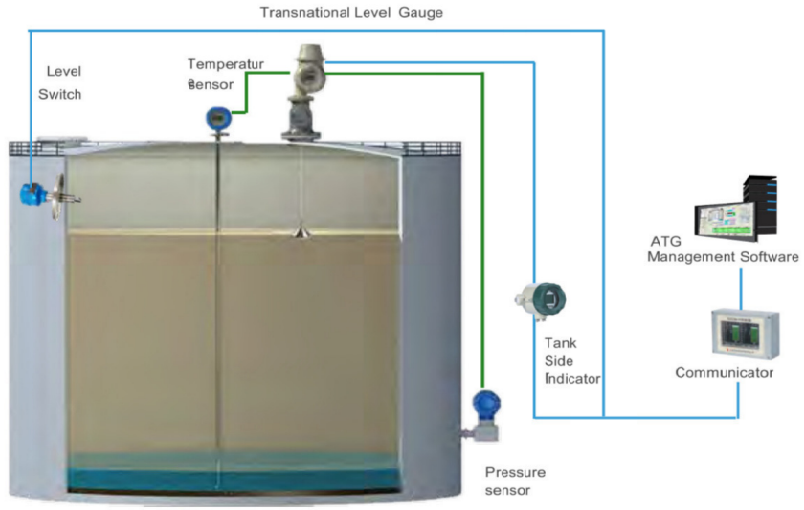
Multifunctional Tank Gauge

with functions of
product level, temperature, density, water level measurement,and volume and mass calculation



Traditional Level Gauge



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Servo Tank Gauge

Servo Tank Gauge for Ambient pressure liquid

BJLM-80H

Servo Tank Gauge for high pressure liquid

BJLM-80HP

Functions:

BJLM-80H series Servo Tank Gauges are designed for **ambient and high pressure liquid** tankage measurements, including measuring the **product level, density, temperature, water level, volume and mass quantity** and the oil-water interface of the liquids in tank in a real-time way.

Application:

Mainly used for tankage measurements for:

- Different liquid products, such as light oil products, petrochemicals, liquid chemicals, LPG, edible oil or liquid foods;
- Different type of tanks, such as fixed roof tanks, floating roof tanks, and spherical pressure tanks.

Features:

- Multiple functions are integrated in one unit, with the measurements for level, temperature, density, mass quantity and oil-water interface being precisely conducted in one trip of the floater, no needing for any other auxiliary devices, such as multi-point thermometers, differential pressure transmitters and/or water interface detectors, to be mounted. It significantly reduced error sources, and makes the onsite wiring and installation much simpler and easier;
- With the direct and simultaneous measurements for level, temperature, density and oil-water interface, not only the error sources are remarkably reduced but also the gauging accuracy of the system in overall for the tankage measurement is greatly enhanced;
- The oil-water interface in the tank is measured more accurately by detecting the resistance difference between oil and water instead of using the traditional measurement based on buoyancy detection;
- The wireless communication between the smart floater and the head of the servo tank gauge, together with the specially designed manual gauging cabinet on the top of the dipping well, the floater can be easily taken out of the tank and replaced.
- Available for both volume and mass tankage measurements;

Technical Specifications

	0-23 м (Standard)
Measuring Accuracy for Level	±0.7mm
Measuring Accuracy for O-W Interface	±2.0mm
Measuring Accuracy for Density измерения	±0.3~0.5kg/m3
Measuring Accuracy for Temperature	± 0.1℃
Accuracy for Mass Quantity	± 0.50% (≥ 200t)
	± 0.65% (< 200t)
Sensitivity	±0.1mm
Repeatability	±0.1mm

Communication	
Enraf BPM	RS485 MODBUS
RS 485	HART, 4~20mA+HART

Mechenical Data			
Weight	17.5Kg	Floater Diameter	75mm
Flange	4*3/4 NPT	Floater Height	300mm

Parameters Related to Running Environment	
Operating Pressure	0.2MPa / 5.0MPa for LPG
Ambient Temperature	-40℃-50℃
Explosion Proof Rating	Exd IIC T5Gb, ExiaIIBT5Ga
Protection Class	IP 65

Materials	
Housing	Aluminum/ Stainless Steel

Multi-Spot Thermometer BJZT

Functions:

Designed for the accurate measurement of temperature for the liquid in a tank at multiple spots and calculating the average temperature of the liquid.

Applicaitcn:

Measuring the temperature values at different spots of the liquid in the tank, where the normal floater for a servo tank gauge is installed but no a smart floater available.

Features:

- Rapid response ensures its high accuracy in output;
- Precise structure, quality build and reliable protection ensure its long life span;
- Up to 16 points can be measured;
- It supports RS485 MODBUS, HART protocols;

It can work in a harsh and corrosive environment.

Technical Specification	
Power Supply	24V/DC
Working Current	30mA
Measure Points	6 - 16
Accuracy	± 0,1°C
Communication	RS485 MODBUS, HART
Sensor Model	PT100
Measure Range	-40°C - + 120°C
Work Temperature	-40°C - + 60°C
Max Length	30 Meters
Flange	DN80, PN10, DN50,
Material	PN10 Stainless steel

Tank Side Display TS-1

Functions:

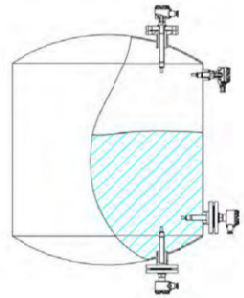
- Tank Side Display TS-1 is a unit installed nearby a tank at its bottom area and used for onsite showing the tank gauging data, such as the real time level, temperature, density, etc.
- Relief the burden of hiking up to the tank top for reading these data.

Technical Specification	
Power supply voltage	24V/DC
Working current	< 4мкА
Ambient temperature	-40°C~ 50°C
Protection class	IP 65
Explosion proof rating	Ex ia IIB T6Ga/Ex ia IIB T4Ga

Vibrating Fork Switch FT-50

Functions

- The Vibrating Fork Switch is designed to enable secure point level measurements as well as high and low level alarms to prevent overfill;
- The vibrating fork technology realize identify the difference of liquid by resonance principal, resonant period is in proportion to the density of liquid;
- When the forks come in contact with a liquid, the resonant period difference between the liquid and air is detected and the device switches and alarms.



Application:

- It is applied to secure point level measurements as well as high and low level alarms for liquid tanks;
- It is applied to secure point level measurements as well as high and low level alarms for pipelines;

Technical Specifications	
Liquid density Range	Density > 500g/L
Liquid temperature range	-40℃~+70℃
Working voltage	DC10V~40V
Working currant	≤20mA
Output	Loop Currant; Switching Transistors
Allowed Humidity	90%
IP Class	IP 65
Explosion proof rating	Ex d IIC T6 Gb

High High Alarming Switch BJTK-1

Functions

- The BJTK-1 Level Alarming Switch is specially designed for high high level alarming for liquid tanks to prevent overfill;
- It can realize remote alarming in sound and light via being connected with the PLC alarm controller.

Features:

- Very simple to be installed on the tank roof;
- Proven good performance and high reliability;
- Its on-site inspection interface facilitates the site testing.

Technical Specifications	
Power supply	< 24V/DC
Alarming Signal	Digital output
Contact Rating	1A 24VDC
Installation	Thread, M20X1,5
Explosion Rating	Exd II BT4 Gb
Protection Class	IP 65

Portable Density Meter DH-50

Features:

- Real time density and temperature measurement in high accuracy;
- Compact and portable design, very easy to be taken along with;
- Measurement data can be saved in real time;
- Vertical measurement range is 30+ meters;
- Data can be easily downloaded to a PC;
- Its high performance in reliability and accuracy has been fully proven.

Functions:

- DH-50 portable density meter is used for measuring the temperature and density of the liquid in a tank with the floater being set to stop at preset height points of the liquid.
- The floater height value is real-time displayed on the LCD display of the density meter and up to 20,000 data can be recorded automatically. The data recordings can be transferred to your PC by wireless communication.
- Its portable design makes it very easy to take along to any tank by hand for a measurement

Application:

- Used for density and temperature measurement of product in above ground tank;
- Density and temperature measurement of product loading into the tank truck;
- Density measurement for the product loading from truck into the underground tank in oil stations .

Technical Specification

Measurement Range	0~2000 kg/м³
Measuring Accuracy for Density	± 0,3~0,5 kg/м³
Measuring Accuracy for	-40°C ~ 70°C
TemperatureRepeatability Error	<± 0,1 kg/м³
Allowed Humidity	90%
Working Temperature	-40 °C ~ 70 °C
Temperature Compensation	Automatic
Communication	433MHz wireless communication 90%
Material for the measurement parts	Stainless Steel 316, 3J58, Hastelloy 433MHz
Protection Class	IP68 for sensor, IP65 for other parts
Explosion-Proof Rating	Ex ia IIc T4Ga

Loading System and Equipment

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Batch Loading Controller

18
Loading Process Controller

19 / 20
Self-Service Billing Terminal

21 / 22
Additive Injecting Module

23/24
Overfill and Static Protection Controller
Top loading

25
Overfill and Static Protection Controller
Top loading

26
Overfill and Static Protection Controller
(Bottom Loading)

27
Truck Mounted Overfill Sensor

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Truck Plug 902

29/30
Digital control valve

31/32
Pipe Density Meter

33
Water Content Alarm Sensor

34
Electronic Flow Display

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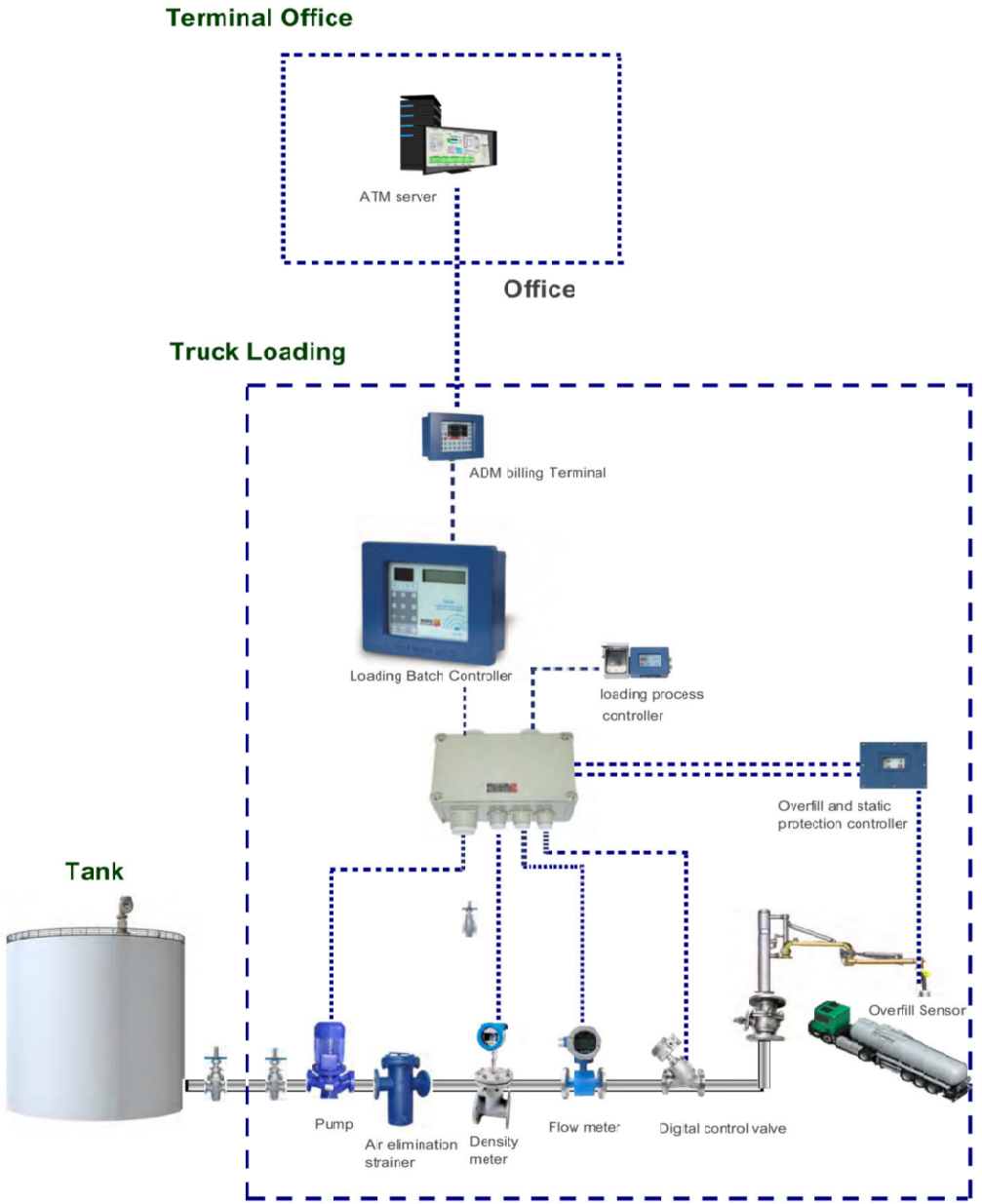

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Batch Loading Controller BJF-880

Functions:

This batch loading ccntroller is designed to control the loading process of the preset volume lcading system running in the inflammable and explosive circumstances in the petroleum, petrcchemical, chemical cr food industry.

Features:

- Touch screen display
- High accuracy in lcading metering;
- High efficiency in loading operations;
- Enhanced safety and security monitoring by smart interlocks;
- Reduced labor costs by smart monitoring;
- 1~4 way batch loading controllers are optional

Technical Specification	
Flow Accumulation Accuracy	±1 pulse
Power Supply	220 B
Communication	RS485 ModBus
IC Card Connector	RS232
Input Mode	Touch Screen Input
Working Temperature	-35°C~+70°C
Flow Pulse Signal	Low Level 0-0.8VDC, High Level 3-24VDC
Flow Pulse Frequency	1~3KHZ
Temperature Signal Input	4-20mA
Alarm Signal Input	On/off
Pump Control Signal Output	220V/AC, 24V/DC
Delivery Accuracy	< 0.2% (by flow)
Data Lasting Time When Power Shuts down	> 6 months
Expl. Proof Rating	Ex d IIB T4 Gb
Dimension of Controller	400mm*280mm*140mm

Loading Process Monitoring Controller KEY-1-T

Functions:

This loading process monitoring controller is designed to monitor all the security related operatons and the operator's standing by at the loading area before and during the self-serviced loading process is going on, including

- Before starting the loading process, automatically checking the equipment status and making sure there is no any problem with the system;
- Inspecting the signals reflecting the status of the related equipment to be involved in the loading process;
- Supervising the driver/operator being in place during the whole loading process;
- When the loading is finished, automatically checking if all the equipment and devices have been put back to their cue places
- before allowing the driver/operator to take away his/her key and drive the truck out of the loading bay

Application:

It is used as one of the most important safety interlock devices of the self-serviced loading system, for real-time monitoring the onsite operations related to the loading process in a terminal or a petrochemical plant, etc.

Features:

- Security is highly ensured by using this monitoring controller during the loading process;
- Voice prompts and alarms are always delivered by the system during all the loading operations to avoid human mistakes. Greatly
- reduced the possibility of a safety accident caused by human mistakes or negligence

Technical Specification	
Voltage	24V/DC
Current	< 150mA
Working Temperature	-20 C ~ +70 C
Ambient Temperature	-40 C ~ +80 C
Relay Output	4 Ways
On/Off Input	7 ways
Explosion Proof Rating	Exd ia Ga, ExdIIBT4 Gb

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ADM Self-Service Billing Terminal ADM-FY880S

Technical Specification	
Working Voltage	24V/DC
Ambient Temperature	-35°C~+80°C
Humidity	10~90%RH
Communication with Batch Loading Controller	RS485 ModBus
Communication with PC/Loading Server	BPM
Explosion-Proof Rating	ExdIIBT4Gb

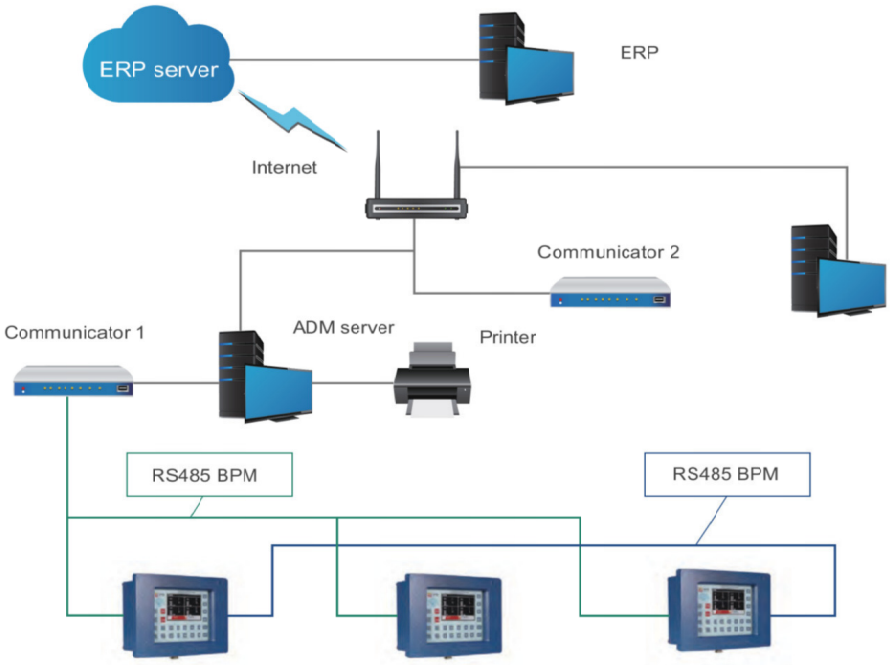
Functions

- This automatic billing terminal is designed for self-serviced billing operations done by the truck drivers or the customers themselves who have already bought the IC card issued by the oil sales company. It can deal with both the billing operations and the loading operations at the loading bay area.
- When processing the billing operations, it reads the IC card of the customer for the ID information of the customer saved in the card, and then sends it to the loading server for verifying the account information of the customer on the ERP system of the oil sales company.
- When the account data is proven legal and valid, it retrieves/downloads the data of oil purchased by this customer, and then the customer is authorized and allowed to start the billing procedures for this trip, and next, launch the loading operations as well.
- This automatic billing terminal supports continuous billing operations, unfreezing frozen bills, merging bills and seals allocations.

Features:

- Touch screen input;
- Supports both billing and loading operations at the loading bay area;
- Self-service operations onsite by the customer/driver him/herself;
- Highly cost effective for both the customer and the oil sales company.

System Architecture



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Additive Filling Module BJAC-I

Functions:

This additive injecting module is designed for and mainly applied in the automatic injection of small amount of additives into a preset formula proportional blending process for oil products.

Features

- Its stainless steel flow meter is suitable for the accurate measurement of high viscosity liquid additives; Its quality solenoid valve ensures the high reliability of the whole system;
- Multiple input & output interfaces ensure its good compatibility with prevailing controllers worldwide;
- Online calibrations are available for the flow meter, and it can be set in a continuous blending mode or a proportional blending mode;
- The accumulated amount and the loaded amount in this trip can be displayed;
- It can alarm in light, sound and alarming output signal;
- Its built-in lightning surge protection module ensures high performance in safety;
- Its skid-mounted structure is easy for installation.

Technical Specification

Accuracy	< 0.2 %
Voltage	220V/AC
Input Signal	A: signal to allow an injection, signal level range: 5~24V/DC; B: signal for the main stream product flow rate; pulse input: low level 0-0.8V/DC; high level 5-24V/DC
Output Signal	A: alarming signal output; mechanical replay passive contact: 0.4A 125VAC, 2A 30VDC B: output signal for pump control; mechanical reply passive contact: 0.4A 125VAC; 2A 30VDC C: additive flow rate output signal; pulse signal, optical coupling output, voltage<30VDC, current < 50mA
Display	LCD Display for accumulated amount, delivery amount and working status, etc.
Indication	3 LED lights indicate the working status, flow meter running status and the addictive signal status
Working Pressure	< 1 MPa
Liquid Viscosity	< 140 cst
Communication	2 RS485 interfaces, one for batch loading controller, the other for management system
Cabling Interface	4x 3/4 NPT, 1X 1/2NPT
Expl. Proof	Ex d ib Gb, Ex d II BT4 Gb
Dimension	380x380x110 (skid-mounted), 9.5Kg

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Overfill and Grounding Monitor BJJY-II-A (Top Loading)

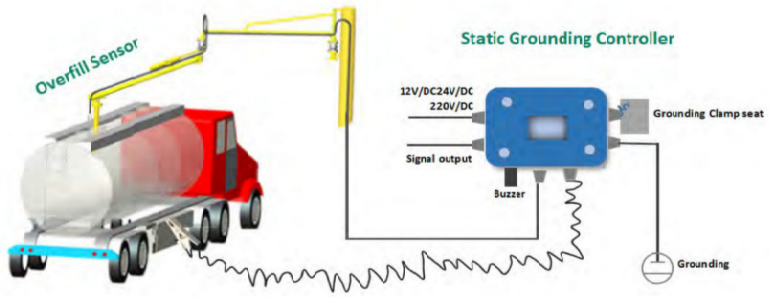
Application

This system is used for overfill and grounding protection during a Top-Loading for truck or rail loading in petro-chemical applications.

Function:

- The system automatically and continuously monitor overfill sensors and grounding status during the loading operation;
- Light indication and alarms provide visual and audible monitor for the overfill status during loading operation, Red light blinking indicate static, Green light blinking indicate status for overfill, Blue light for loading arm position, LED display is displaying grounding resistance of grounding plug and grounding clamp to real time verity grounding status ;
- It will send status signal to loading controller or other automation system, loading will be immediately shut down whenever overfill or grounding is monitored;
- Alarm will remind the operator to put clamp back to the seat after loading is finished to make assurance the safety;

It can optional monitor loading arm position to prevent loading before loading arm put into the tank by using the loading arm balancer installed on the loading arm.



Features:

- Built to function with all probes designed to the API standard, is compatible with all commonly
- used overfill protection and grounding systems;
- Built in 12V, 24V, 220V voltage selection;
- Built-in lightning surge protection;
- Independent alarming for the electrostatic detection and the overfill protection;
- It can operate as an independent system or conjunction with your existing loading system;
- Self diagnosis function for overfill sensor.

System Composition

Controller module

Overfill sensor

Overfill sensor cable plug

Technical Specification for BJJY-II-A and BJJY-II-B

Display	**3 LED lights**, red for static, one for overfill ,one or laoding arm balance status
Alarming signal output	on/off alarming outputs, optional for normal open and normal close
Voltage	12V/DC, 24V/DC, 220V/AC
Power	< 0,2W
Resistance for static groudning	< 60Ω
Alarming response time	< 1s for static electricity; <0.4s for overfill ;
Ambient temperature	-35°C~70°C
Electrical Interface	3/4 NPT x 2, 1/2 NPT x 2
Protection Class	IP65
Explosion-Proof Rating	ExdiaGa, ExdIIBT6Gb
Dimension	380 x 170x110мм (skid-mounted)

Overfill and Grounding Monitor BJJY-II-A (Top Loading)

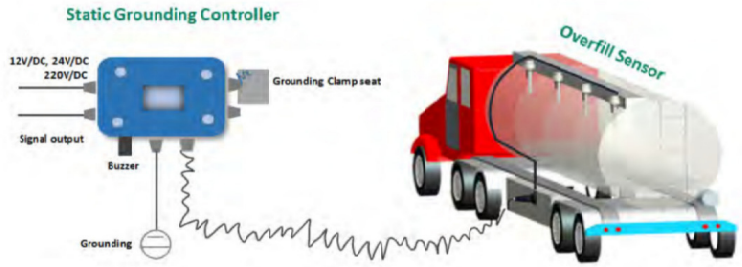
Application

This system is used for overfill and grounding prctection during a Bottom-Loading for truck or rail loading in petro-chemical applications.

Function:

- The system automatically and continucusly monitor overfill senscrs and grounding status during the loading cperation;
- Light indication and alarms provide visual and audible monitor for the overfill status during loading operation, Red light blnking indicate static, Green light blnking indicate status for overfill, LED display is displaying grounding resistance of grounding plug and grounding clamp to real time verity grounding status ;
- It will send status signal to loading controller or other automation system, loading will be immediately shut down whenever overfill or grounding is monitored;
- Alarm will remind the operator to put clamp back to the seat after loading is finished to make assurance the safety;

Optonal permissive and ncn permissive bypass consitions by the buttcn on the truck plug.



Features:

- Built to function with all probes designed to the API standard, is compatible with all commonly
- used overfill protection and grounding systems.
- built in 12V, 24V, 220V voltage selection;
- Built-in lightning surge protection;
- Independent alarming for the electrostatic detection and the overfill prctection;
- It can operate as an independent system or conjunction with your existing loading system;
- Optional permissive and non permissive bypass consiticns by the button on the truck plug;
- Supports up to 12 of 5-wire probes;
- Easy installation for modular skid design

System Composition

Controller module

Overfill sensor

Truck plug

Technical Specification for BJJY-II-A and BJJY-II-B

Display	**2 LED lights indicator**, red indicate static, green indicate overfill
Alarming signal output	on/off alarming outputs, optional for normal open and normal close
Voltage	12V/DC, 24V/DC, 220V/AC
Power	< 0,2W
Resistance for static groudning	< 60Ω
Alarming response time	< 1s for static electricity; <0.4s for overfill;
Ambient temperature	-35°C~70°C
Electrical Interface	3/4 NPT x 2, 1/2 NPT x 2
Protection Class	IP65
Explosion-Proof Rating	ExdiaGa, ExdIBT6Gb
Dimension	380 x 170x110мм (skid-mounted)

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Truck Overfill Sensor BJJY-CZ

Functions:

- This probe is used for detecting the overfill of the truck in loading. it works with the bottom loading overfill alarming system.
- The data generated by this probe is sent to the bottom loading overfill alarming system and loading controller when an overfill is detected, and the loading process will be immediately stopped by the loading controller.

Application:

It is used in the overfill detection and alarming system to monitor the level of the truck tank in loading.

Features:

- More reliable by using photoelectric sensor for detecting the level of the oil in the tank;
- When an overfill or malfunction/error is detected by one of the probes during the loading process, it allows a bypass loading to be activated with a loading going on for the other tank;
- It supports self-checking and self-testing;
- Built-in lightening protection module ensure the system working in a safe condition even in the lightening climate;
- 12V/DC power supply results in a very low power consumption; Simple and easy installation.

Technical Specification Pulse	
Pulse Input/Output	Compatible to European standard Detecting the
Level detection	level of the liquid for overfill alarming
Range	10-300мм
Ambient Temperature	-35°C~70°C
Power Supply	12V/DC
Working Current	<2mкA
Weight	< 1Kg (Aluminium)
Cable outlet	2 x M20 x 1.5
Explosion Proof Rating	ExiaIIBT4Ga

Truck Plug 902

Functions:

It is used for connection between overfill protection and earthing monitoring system and overfill probe, and provide light indication for each tank status.

Application:

It is used in the wire connections between the overfill and grounding protection system and the truck for the loading operation.

Features:

- API standard design;
- Built-in grounding sensor;
- Visible light indication for each tank status;
- Have permissive overfill bypass functions.

Servo Digital Control Valve DV80

Functions:

This servo digital control valve is designed to used for flow control or quantitative loading. It is able to turn on and shut off automatically. It has small resistance to liquid flow, suitable for flow control for all sorts of high viscosity fluids. It has obtained several patents in China.

Application:

- It is suitable for used in the situation when liquid flow control/regulation or frequently valve switch is required, or suitable for used in quantitative loading process.
- It is suitable for used in the situation when proactive opening of the valve is needed while no any fluid pressure loss is required, and is particularly suitable for situation that valve working rely on its own pressure (gravity) in quantitative loading process.
- It is also an ideal upgrade alternation for numeric controlled electro-hydraulic valve, especially suitable for used in the liquid, such as wax, which is easily frozen in the winter.

Features:

- Self-contained piston valve switch controlled by stepper motor, to ensure high reliability
- Long life span of over million times of switching;
- It is able to precisely and easily control liquid flow due to the linear regulation of the valve opening;
- Valve working process is free from effect by the viscosity of the liquid.
- The valve is made of stainless steel, while the sealing ring is made of Teflon engineering plastic.
- The materials are designed to be able to resistant to acid, alkali, and various chemical solvents;
- Proactive switching, free from effect by the liquid pressure, with small fluid resistance.
- No noise during the its working and stop working.
- Automatically shut down when the power is off.

Model

Model	Norminal Diameter	Pressure Level
DV80-05D	50	PN16/PN25/CLASS 150
DV80-08D	80	PN16/PN25/CLASS 150
DV80-10D	100	PN16/PN25/CLASS 150
DV80-15D	150	PN16/PN25/CLASS 150
DV80-20D	200	PN16/PN25/CLASS 150

Technical Specification

Power Supply	19 ~ 38V/DC, 24V/DC, 220V±20%/AC
Switching speed	Fully close to fully open: <3.2S Fully open to fully close: <3.2S
Power consumption	Valve acting: <20W Valve remains closed: <2W
Control Mode	- Switch control; - 4~20mA control; - RS485 Modbus control;
Working Temperature	- 40°C ~ 85°C
Electrical Interfac	2 x 3/4NPT
Valve Casing Material	304 Stainless steel

Pipe Online Density Meter DM-50

Function

DM-50 Density meter is designed for the online measurement of liquid density and temperature in real time. It receives the pulse signals from the flow meter and calculates the volume totalization and weight of the liquid. It can also convert the value of the visual density into that of the standard density.

Application

- for measuring the density of the liquid in a tank;
- for measuring the online density of the product being loaded via a pipeline;
- for measuring the submarines' water density;
- for chemical and petrochemical process controls;
- for pharmaceutical industry process controls;
- for water and sewage treatment process controls;
- for alcohol production flow;
- for measuring the density of the aviation fuel, etc.

Features:

- Applied for both a flowing liquid and a static liquid;
- Proven to be high performance and reliability;
- Realize continuous online measurements for the density and temperature of a liquid;
- Both density and temperature are displayed;
- Easy installation and free of regular cleaning and maintenance;

Technical Specification	
Measurement Range	0~2000 kg/м³
Accuracy of Measuring Density	± 0,3~0.5 kg/м³
Accuracy of Measuring Temperature	± 0,1°C(-5°C~+45°C) ± 0,3°C(-40°C~+85°C)
Repeatability Error	± 0,1 kg/м³
Working Temperature	-40°C ~ 70°C
Working Current	40mA
Calibration Stability	<±0.1kg/m3 (each year)
Temperature Compensation	Automatic
Communication	RS 485 ModBus
Material in Liquid	Stainless Steel 316, 3J58, Hastelloy Alloy
Protection Class	IP68 for sensor, IP65 for other parts
Explosion-Proof Rating	Ex ia IIc T4Ga

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Electronic Flow Display LM-I

Functions

- This module real-time accumulates the pulse data acquired from the mechanical flow meter, and displays the accumulated volume and the flow rate on the site;
- Shutdown data protection is available;
- The signals can be transmitted to remote spots.

Applications:

Electronic Flow Display LM-I is designed for acquiring the accumulated flow data from a mechanical flow meter and transmitting the data to a remote spot.

Technical Specification	
Voltage	24V/DC
Power Consumption	0,1Вт
Signal Input	Pulse
Signal Voltage Range	Low level 0-0.7V/DC; high level 3-24V/DC RS485
Data Input	RS 485 RTU protocol
Onsite Display	LCD display for flow rate and accumulated amount
Cable Outlet	1/2 NPT X 2
Protection Class	IP 65
Lightening Protection	triple lightening protection
Data Shutdown Protection	>12 years
Explosion Proof Rating	ExcIIBT4Gb

Water Content Alarm Sensor-1

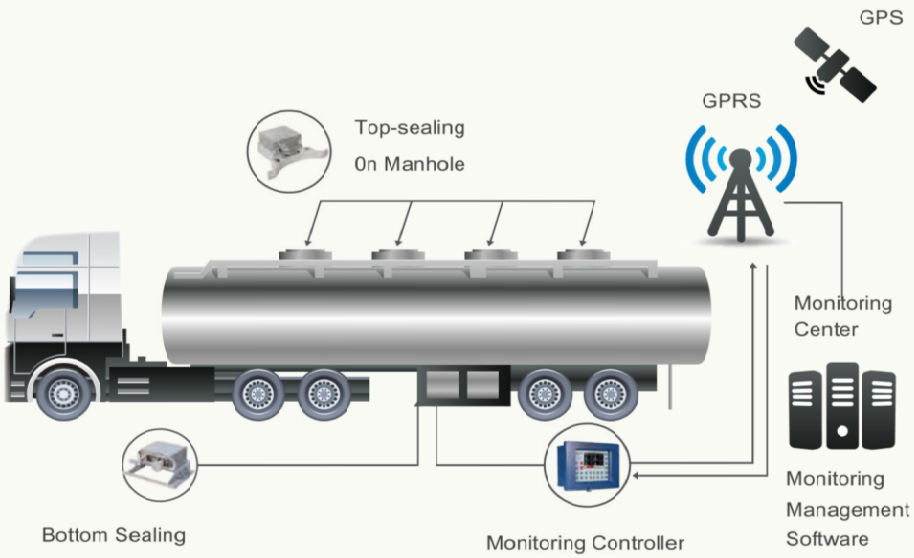
Functions:

- This sensor is used for detecting water content in the oil to avoid water to be downloaded/unloaded from a truck or pipeline into the terminal tanks or vice versa.
- When a water content exceeding the preset value is detected, it gives an alarm to the loading controller for a pause of the operation or to make a further inspection on the product loaded.

Application:

- Water content online monitoring for truck loading/unloading process;
- Water content online monitoring for railcar loading/unloading process;
- Water content online monitoring for pipeline downloading operations;
- Water content online monitoring for the refueling process in a gas station

Technical Specification	
Voltage	24V DC
Power	0,1 Вт
Measurement Range	0-50%
Measurement Accuracy	0,1%, 0,5%, 1%
Alarm Output	4-20 мкА
Contact Rating	1A 24V/DC, 0.5A 220V/AC
Display On-Site	LCD display
Light Indicator	lights for in-operation status and alarming
Cable Outlet	1/2 NPT
Pipeline Installation	G1 1/4, M27X1,5
Probe Length	50-200mm
Working Temperature	-40~70°C
Protection Class Lightening	IP 65
Lightening Protection	triple lightening protection
Explosion-Proof Rating	Ex d IIB T6 Gb



Remote Truck Monitoring System and Device

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Electronic Sealing SEAL-III

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Electronic Sealing Monitoring Controller BJTC-II

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Truck-mounted level probe TL-I

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Electronic Sealing Monitoring Controller YQS-I

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Electronic Sealing SEAL-III

Function:

Seal-III electronic sealing is installed on the tank truck to conduct the locking /unlocking operations of the inlets/outlets of the tank, including the man hole on the top of the tank, to prevent oil thieving or other illegal operations onto the truck tank upon the controls of the monitoring controller locally or remotely via the monitoring center.

Features:

- Automatic locking/unlocking under the control of the sealing controller;
- Real-time self-checking the locking status;
- Immediate alarming while illegal status being detected.

Technical Specification	
Voltage	12V/DC
Temperature	-40°C~ 80°C
Communication	RS485 MODBUS
Life Span	100000 times
Protection Class	IP 65
Explosion Proof Rating	ExiaIIBT4Ga

Electronic Sealing Monitoring Controller BJTC-II

Function

- This sealing monitoring controller is used on the tank truck where electronic sealing and level probes have been installed.
- It hosts the communications between the electronic sealing devices, level probes and the remote monitoring center, and
- Realizes the local control and management of the tank gauging and sealing components on the truck by the remote center.

Technical Specification	
Power Supply	12, 24 V/DC
Working current	< 150mA
Communication	GPRS, RS485
Working Temperature	-40°C~+70°C
Protection Class	IP65
Explosion Proof Rating	Ex d ia Ga, Ex d IIB T4 Gb

Truck-mounted level probe TL-I

Functions:

- This level probe is mainly used for the level measurement on a tank-truck, and is integrated with the function of overfill alarming.
- With this probe being installed in the tank, you no longer need to open the manhole to check the level in the tank, and, as a resut,
- The oil vaporization is kept much less than before.

Features:

- Simple installation;
- High reliability;
- API standard interface ready for International uses.

Voltage	12V/DC
Current	<8 mA
MeasuringTemperature Range	-40°C~80°C
Level Measurement Range	0-494 mm
Level Measure Accuracy	1mm
Communication	RS 485 ModBus
Working Temperature	-40°C~80°C
Storage Temperature	-50°C~100°C
Protection Class	IP65
Explosion Proof Rating	ExiaIIBT4Ga

Terminal Automation Solutions

- Tank Gauging And Inventory Management
- Truck Loading System
- Remote truck montitoring system
- SCADA System
- Security Monitoring System
- Fire Fighting System

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TAS Solution

Accuracy, efficiency, security and visualization of the operations are always the key concerns of the terminal owners. Based on 20 years of industrial experiences in TAS related business and close co-operations with prevailing customers in the petrochemical sector, such as Sinopec, CNPC, etc., JOYO M&C has designed and successfully implemented various kind of solutions on terminal automation systems for multiple customers, including those covering the ATG and tank-farm inventory monitoring systems, truck loading/unloading control systems, oil-tanker/rail-car loading/unloading systems, inflammable gas detecting and alarming systems, CCTVs, access control systems, border fencing and alarming systems, remote electronic seal monitoring system, integrated terminal information platforms and integrated security monitoring platforms, etc. Our solutions have benefited our customers with a lot of true values and made their daily performances in both overall safety, security, delivery efficiency and accuracy greatly enhanced and improved. Consequently, their productivity in overall has been significantly increased with higher accuracy in inventory management, better planning in daily operations and quicker responses in accidents.

System Architecture