CWY Integrated Primary and Auxiliary Piston Pressure Gauge

The CWY series integrated primary and auxiliary liquid piston pressure gauge combines high-precision measurement with multifunctional operation. Specifically designed for demanding environments such as laboratories and industrial sites , it serves as a standard-setting instrument for metrological verification bodies. It is used to calibrate subordinate piston pressure gauges and can also verify digital pressure gauges, pressure sensors, pressure transmitters, and pressure gauges.

Introduction

1. Principle

Piston-type pressure gauges operate on the principle of hydrostatic equilibrium, achieving high-precision pressure measurement through the balance between the effective area of the piston and the gravitational force of the counterweight.

2. Applicable Scenarios

Suitable as standard pressure instruments for laboratories and national metrology institutes, meeting requirements for traceability and calibration.

3. Product Positioning

Featuring integrated high-precision measurement and multi-functional operation design, suitable for demanding environments including laboratories, industrial sites, and defense applications.

Advantage

1. Piston System

Piston Material: Both piston rod and cylinder are crafted from high-hardness tungsten carbide, offering advantages such as wear resistance, corrosion resistance, and low friction coefficient to ensure long-term stability of instrument performance.

Piston Structure: Features a break-resistant rod design with bearings replacing conventional limit screws, eliminating friction-generated debris and completely resolving piston jamming issues.

Modular Design: Piston assemblies may be submitted for inspection independently without the main unit, reducing maintenance costs. Multiple piston modules and corresponding load cells may share a single base frame.

2. Weight Assembly

Weight loading method: Low-center-of-gravity load cells for ranges of 60 MPa and above; weight loading discs for ranges of 6 MPa and below. Weights can be configured in kg or MPa units according to user requirements.

Weights: Precisely calibrated for local gravitational acceleration. Standard configuration includes 3 sets of weights: 2 kg sets and 1 MPa set. Additional sets can be custom ordered.

3. Base Frame

High-stability structure; employs a thickened load-bearing base plate to direct weight force onto the reinforced base, ensuring stable piston system operation. Optimized anti-deformation footplates provide slip resistance and maintain horizontal precision during weight loading.

Simplified maintenance and safety features; 180mL oil reservoir fitted with a drain port and oil filter at the base. Quick waste oil removal via a rotary screw prevents pipeline blockages. All critical components undergo comprehensive rustproofing to prevent pressure leaks caused by seal failure.

Efficient operational design: both the standard piston and test piston feature shut-off valves to isolate the piston from the piping system. Utilize the leveling bubble on the work surface and three independent levelling knobs to individually adjust the test piston's level.

4. Laser Displacement Indicator

High-precision laser displacement monitoring system; utilizing laser triangulation technology with high-accuracy sensors to capture piston movement trajectories in real time. Measurement precision reaches 0.01mm, with sensitivity far exceeding traditional light projection devices. Dual-channel synchronous

trajectory monitoring covers 0–60mm displacement range (±30mm) for primary and auxiliary pistons. Real-time dual-channel displacement curve comparison enables intuitive assessment of piston operational status. Simultaneously monitors piston rotation duration and descent velocity to precisely evaluate pressure gauge performance stability.

Graphical User Interface: Touchscreen displays displacement curves, rotational speed, and descent velocity in real time. The intuitive interface supports touch-based zooming and data annotation. Built-in piston area calculation eliminates manual conversion errors.

Efficient data management; supports USB export of calibration records or direct printer output, ensuring data traceability. Cross-platform software architecture (e.g., Qt development) compatible with Windows, Linux, and other systems, facilitating functional customization and system integration.

Modular hardware design: both master and test pistons feature quick-release laser displacement brackets for rapid disassembly and calibration. Equipped with signal interfaces (0–5V analogue displacement sensor, rotational speed sensor) for connection to data acquisition units, communicating with the host via RS232 serial port for enhanced expandability.

Specification

Type		CWY-6E		CWY-60E		CWY-600E		CWY-1000E		CWY-1600E		
Range/MPa		0.06~0.6		0.1~6		1~60		1~100		2~160		
Up limit/MPa		0.6		6		60		100		160		
Down limit/MPa		0.06		0.1		1		1		2		
Piston square/cm^2		1		0.5		0.1		0.1		0.05		
Weight	kg	0.6		0.5		1		1		1		
	P/MPa	0.06		0.1		1		1		2		
Weight	Mass/kg	0.1	0.5	0.5	2.5	1	5	1	5	0.5	1	5
	P/MPa	0.01	0.05	0.1	0.5	1	5	1	5	1	2	10
	pieces	4	10	4	11	4	11	4	19	1	4	15
Mass kg		41		63		95		135		80.5		
Medium		A mixture of transformer oil and aviation kerosene				Di(2-ethylhexyl) sebacate						
Piston Thread		M20×1.5										
Accuracy		0.005/0.01/0.02										
Material weights		304 Stainless steel										
Size/mm		730×460×300										

Accessory

Items	Quantity	Note
Device	1 set	
Wheel pod	4 piece	
10mm wrench	1 piece	tools
Pressure relief valve	1 set	
Weights	1 set	data in test report
Piston system and accessory	1set	
Laser range finder	1 个	
Medium	250mL	
O-ring（12×2.5）	50 个	
Test Report	1	
Certificate	1	optional

Package

The instrument is shipped in three separate packages: the main unit, the weight box, and the piston system with laser displacement measurement system.

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