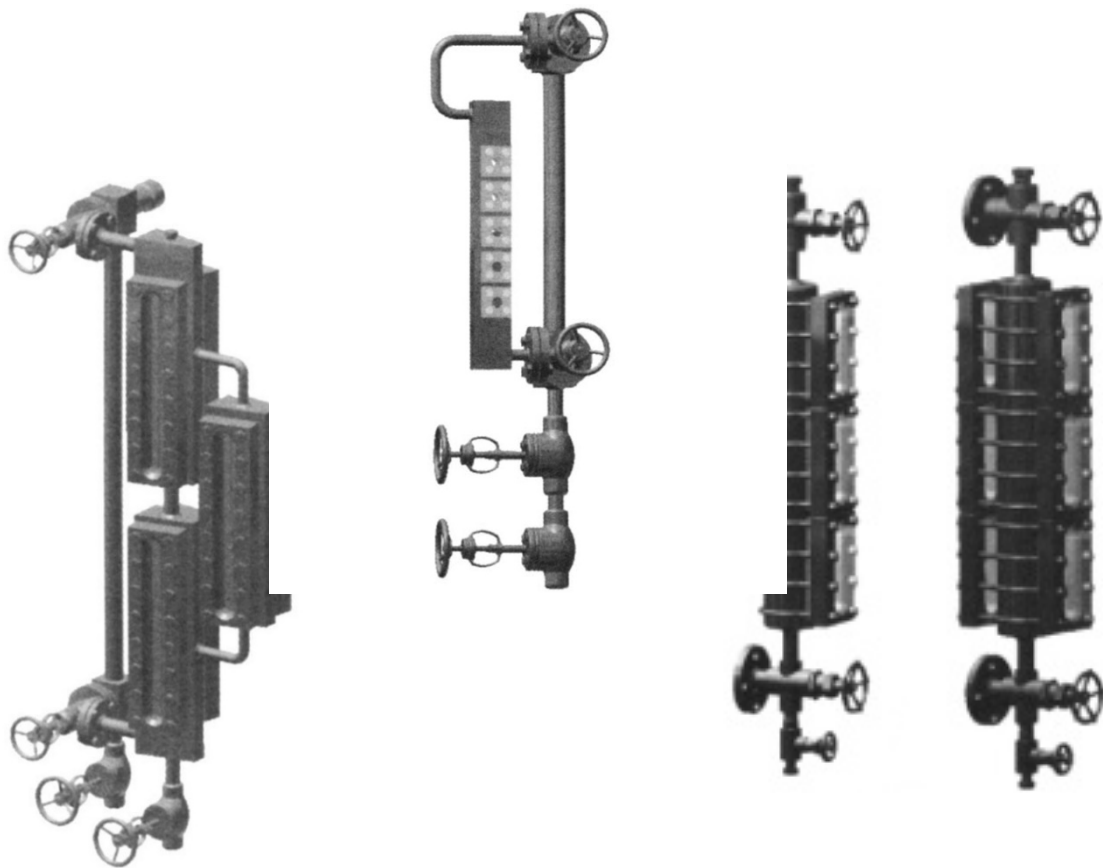

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INSTALLATION & OPERATION MANUAL




ITEM : BOILER DRUM LEVEL GAUGE

MODEL : L500, L510

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1. CAUTION FOR BEFORE & AFTER INSTALLATION

WARNING !!

Do not touch with the bare hand. Otherwise, burn on the hand may result.

Do not approach the Level gauge beyond necessity.

Leakage of steam or heat water may result in a serious burn.

CAUTION !!

Tighten bolts should be carried out according to the instruction manual.

Incorrect tightening order may result in damage to equipment.

Tightening too much may result in damage to the gasket.

1.1 CHECK BEFORE INSTALLATION

Before installation, check that the instrument has not damaged during transport.

Bolt & nut loosening may occur due to vibration during transportation,

so bolt & nut should be tightened before installation.

1.2 CAUTION FOR INSTALLATION


No External force, impact, bending or distortion should be applied to the product.

Care must be taken during handled.

1.3 Before installed in Boiler Drum, Check the C to C has matched.

In case of not match and forcible installation, may occur Level gauge had damaged and leakage.

1.4 Be sure to check there are no foreign substance in the Boiler Drum and Water

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Column, and clean to remove the foreign substances.

At this time, the water should be clean and lukewarm water.

Foreign substance can damage MICA during trial run or operation, caused to wear and shortening the life of level gauge, so must cleaned it before used.

2. INSTALLATION OF DRUM LEVEL GAUGE

2.1 Warming-up with Boiler Drum

2.1.1 At Drain Valve are closed, open the upper / lower Gauge Valve for warming-up the Boiler Drum and Drum Level Gauge slowly.

At this time, steam are inflows rapidly cause to damage MICA can shortened the life of Glass, must inflow slowly.

2.1.2 If the inside of Drum Level Gauge are not clean, open the Drain Valve and inflows steam let the steam and water until clean.

If water column has Drain Valve, used only Water column's Drain Valve.

2.1.3 Perform Heat Tight Bolting when the temperature and pressure are in normal operation state.

To perform Heat Tight Bolting, closed the upper / lower Gauge Valve and open the Drain Valve for remove pressure in Drum Level Gauge.

2.1.4 Disassemble the ILLUMINATOR Case (HOOD).


2.1.5 Tightened the Bolt & Nut of fully pressure removed Drum Level Gauge using Torque Wrench. (Refer to 3.2 Tightening procedure of Bolt & Nut)

2.1.6 After re-tightened Bolt & Nut, open the upper Gauge Valve's hand wheel about 1/4 and open the Drain Valve's hand wheel about 2/3 for warming-up another about 5 min.

2.1.7 After warming-up, closed the upper Gauge Valve and Drain Valve.

2.1.8 Completed warming-up Drum Level Gauge are start the operation as below.

2.1.8.1 Check the upper and lower Gauge Valve are closed.

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2.1.8.2 Open the upper Gauge Valve hand wheel about 1/2 and fill-up the steam to Drum Level Gauge and fully open the upper Gauge Valve.

2.1.8.3 To inflows Boiler Water to inside of Drum Level Gauge open the lower Gauge Valve slowly. At this time, be careful not to operate the ball checker.

2.1.9 After operation of Drum Level Gauge, Check the Bolt & Nut after about 3~4 hours and about 24 hours and if the tightening Bolt torque is insufficient, tightened the Bolt & Nut using Torque Wrench.

2.1.10 If Bolt & Nut are need to re tightened be leakage, closed the upper / lower Gauge Valve and after fully open the Drain Valve to removed pressure inside of Drum Level Gauge and repeat above Para. 2.14 ~ Para. 2.19

2.1.11 After check the normal operation, assemble the ILLUMINATOR Case (HOOD).

2.2 Re installation of Drum Level Gauge in operating Boiler

WARNING !!

**If the temperature and pressure of the operating Boiler Drum are inflows to Drum Level Gauge rapidly, it may cause damage to the product.
(MICA, Glass, Packing Etc.)**


2.2.1 Install the Drum Level Gauge exactly to prevent danger.

2.2.2 Open the upper Gauge Valve hand wheel about 1/4 slowly and get steam into Drum Level Gauge about 2~3 min.

2.2.3 Open the upper Gauge Valve hand wheel more about 1/2 and get inflows the steam about 5 min.

2.2.4 Fully Open the upper Gauge Valve hand wheel and warming-up until the temperature of Drum Level Gauge body become same as the temperature of pipe attached to Boiler Drum.

2.2.5 Warming-up as same state above in 20min~90min for avoid the thermal shock of Glass. At this time, be careful of not apply to over pressure to Drum Level Gauge during inflow steam

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2.2.6 For remove the pressure inside of Drum Level Gauge after warming-up, close the upper Gauge Valve and fully open the Drain Valve. At this time, lower Gauge Valve are completely closed state.

2.2.7 Disassemble the ILLUMINATOR Case (HOOD).

2.2.8 Tightened the Bolt & Nut of fully pressure removed Drum Level Gauge using Torque Wrench. (Refer to 3.2 Tightening procedure of Bolt & Nut)

2.2.9 After re-tightened Bolt & Nut, open the upper Gauge Valve's hand wheel about 1/4 and open the Drain Valve's hand wheel about 2/3 for warming-up another about 5 min.

2.2.10 After warming-up, closed the upper Gauge Valve and Drain Valve.

2.2.11 Completed warming-up Drum Level Gauge are start the operation as below.

2.2.11.1 Check the upper and lower Gauge Valve are closed.

2.2.11.2 Open the upper Gauge Valve hand wheel about 1/2 and fill-up the steam to Drum Level Gauge and fully open the upper Gauge Valve.

2.2.11.3 To inflows Boiler Water to inside of Drum Level Gauge open the lower Gauge Valve slowly. At this time, be careful not to operate the ball checker.

2.2.12 After operation of Drum Level Gauge, Check the Bolt & Nut after about 3~4 hours and about 24 hours and if the tightening Bolt torque is insufficient, tightened the Bolt & Nut using Torque Wrench.

2.2.13 If Bolt & Nut are need to re tightened be leakage, closed the upper / lower Gauge Valve and after fully open the Drain Valve to removed pressure inside of Drum Level Gauge and repeat above Para. 2.2.8 ~ Para. 2.2.12


2.2.14 After check the normal operation, assemble the ILLUMINATOR Case (HOOD).

3. MAINTENANCE AND REPAIR OF DRUM LEVEL GAUGE

3.1 Assembly and disassembly of Port Glass

Port type are located at both side of Gauge Body. Each Port's components are same.

Fig. 1 are shows the parts periodically repair and maintenance.

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(For the period of parts, refer to lifecycle of parts.)

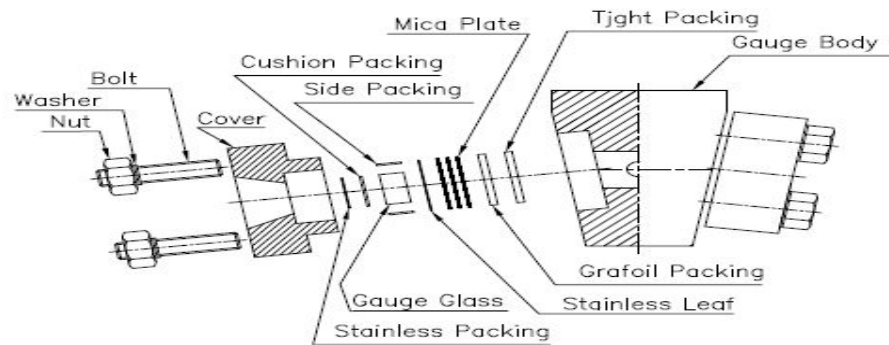


Fig. 1

- 3.1.1 When repair and maintenance of Level Gauge, must change the Gasket and MICA are new one.
- 3.1.2 If Glass surface are not has scratch and damage, Glass can be reused with cleaned clearly. At this time, cleaning with lukewarm.
- 3.1.3 After disassembly, sealing area at gasket attached surface are wipe with wire brush. At this time be careful of not be scratch and damage in surface, use the smooth wire brush. be careful of damage of surface may cause leak.

3.2 Tightening procedure of Bolt & Nut


Tightening Bolt & Nut are most important component in repair and maintenance of Drum Level Gauge, Bolt & Nut loosening may occur due to vibration during transportation, so Bolt & Nut should be tightened should be performed by familiarizing below procedure before installation.

Bolt & Nut are tightened must using Torque Wrench.

3.2.1 After Bolt & Nut are tightened with hand, Bolting refer as below procedure.

- Multi-Port Type Two Color Level Gauge (3.2.2 ~ 3.2.3)
- Transparent Type Two Color Level Gauge (3.2.4 ~ 3.2.5)

3.2.2 Tightening procedure of Bolt & Nut (Multi-Port Type Two Color Level Gauge)

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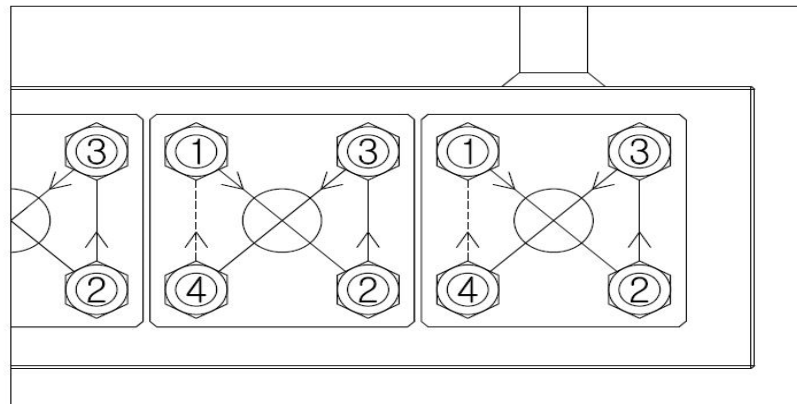
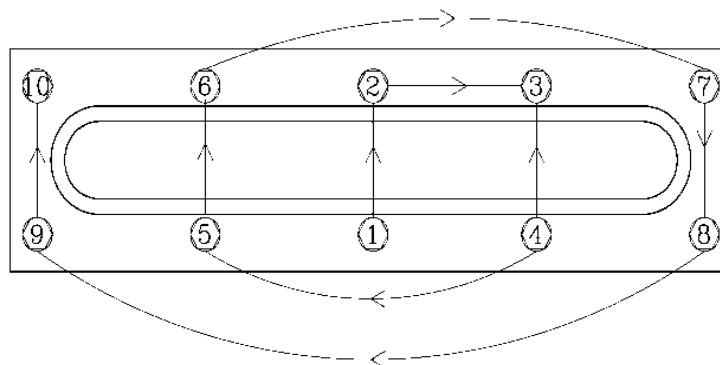


Fig. 2

Tight the Bolt & Nut refer to procedure of Fig. 2. When bolting in 3~4 times refer to procedure of Fig. 2.

3.2.3 Bolting Torque are refer as below.


- 1 Times : 200 kgf/cm
- 2 Times : 400 kgf/cm
- 3 Times : 600 kgf/cm
- 4 Times : 650 kgf/cm



3.2.4 Tightening procedure of Bolt & Nut (Transparent Type Two Color Level Gauge)

Fig. 3

Tight the Bolt & Nut refer to procedure of Fig. 3. When bolting in 3~4 times refer to procedure of Fig. 3.

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3.2.5 Bolting Torque are refer as below.

1 Times : 200 kgf/cm

2 Times : 400 kgf/cm

3 Times : 500 kgf/cm

3.2.6 At first tightening, between gap of Gauge Cover and Body should be remained same.

3.2.7 At first tightening, check that the Level Gauge Body is in a straight line in the longitudinal direction.

3.2.8 Be careful not to break the glass when tightening Bolt & Nut.

3.3 When disassemble Level Gauge, must remove internal pressure of Level Gauge. Gauge Valve are closed and Drain Valve are open state.

3.4 Maintenance cycle of parts


Maintenance cycle of Level Gauge is determined of replacement cycle of MICA and Gasket.

Glass can damage from damage and wear of Mica and Gasket, Foreign substance and scratch of MICA and Gasket surface may occur wear out faster.

Our recommended maintenance cycle are 3 month and may can use in 6 month by operating conditions. According to operating condition, check the broken and leak before recommended maintenance cycle and need to change of consumable components(MICA, Gasket and Glass)

3.5 When leakage occurred.

When leakage from damage of MICA, broken of glass, broken of gaskets and broken of Gauge Valve are occurred closed the upper / lower Isolation Valve immediately. Closed the upper / lower Gauge Valve and open the Drain Valve for remove the internal pressure. After remove the internal pressure repair the damaged parts.

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4. TWO-COLOR ILLUMINATOR

When color distinction are occur by move of Two-color Glass by when installed Boiler Drum, external shock, shock during transportation and other unknown impact, check the below.

4.1 Use the Adjust Screw in the ILLUMINATOR Case (Hood) to adjust the filter glass Left and Right to match the color. (See Fig. 4)

4.2 Check that the Drum Level Gauge Body and ILLUMINATOR Case (Hood) are installed in a straight line in Up, Down, Right and Left

4.3 Check if the positions of the parts (Lens, Lens Bracket, Lamp, Filter Glass, etc.) inside the ILLUMINATOR Case (Hood) are wrong.

4.4 Check if the light is too dark due to damage to the lamp or there is a stain on the Filter Glass..

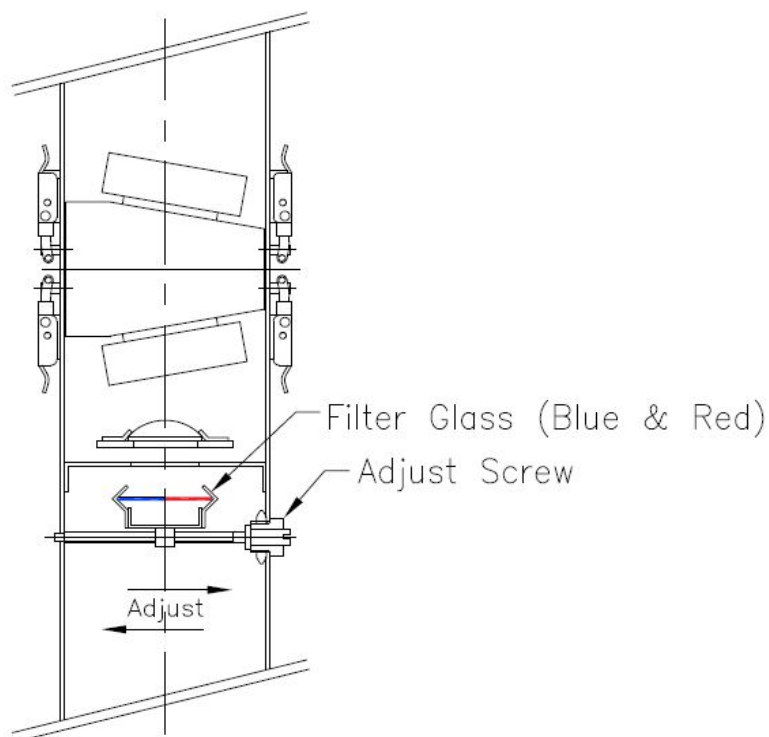


Fig. 4