GBK-50M / GBK-110M
Booster

Instructions

Introduction
The GBK-50M and GBK-110M (the Product) are gas booster packages that provide the required gas-pressure supply needed by the Fluke Calibration 8270A and 8370A controller/calibrators.

Both models include a pneumatically driven, piston type, self-cycling gas booster with regulated output to provide the 8270A and 8370A high-pressure supply. The gas booster boosts a lower pressure usually supplied from a bottle, to higher pressure. The high-pressure gas is stored in an accumulator volume to assure stable supply to the 8270A and 8370A.
- GBK-50M has a maximum output pressure of 61 MPa (8850 psi).
- GBK-110M has a maximum output pressure of 124 MPa (18 000 psi).

Contact Fluke
Fluke Corporation operates worldwide. For local contact information, go to our website: www.flukecal.com
To register your product, view, print, or download the latest manual or manual supplement, go to our website.
Fluke Corporation
P.O. Box 9090
Everett, WA 98206-9090

+1-425-446-5500
info@flukecal.com

PN 5007320
July 2018 Rev. 1, 6/21

Fluke Corporation
P.O. Box 9090
Everett, WA 98206-9090
U.S.A.

Fluke Europe B.V.
P.O. Box 1186
5602 BD Eindhoven
The Netherlands

Safety Information

A **Warning** identifies conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

⚠Warning

To prevent personal injury:

- **Read all safety information before you use the Product.**
- **Wear eye protection.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**
- **Carefully read all instructions.**
- **Do not use the Product if it operates incorrectly.**
- **Do not use the Product if it is altered or damaged.**
- **Disable the Product if it is damaged.**
- **Do not attempt to operate the Product above its rated pressure.**
- **Use care when working with this Product. Do not drop the product or strike it with sharp objects.**
- **This Product generates high-pressure gas and is used to regulate a high-gas pressure output. Precautions need to be taken during installation and operation of the Product.**
- **Pressurized equipment is potentially dangerous. The Product generates and controls very high-gas pressures. Do not operate the Product unless you thoroughly familiarize yourself with these instructions. Additional training in general and pressure specific safety procedures will help assure protection from harm or damage to personnel or property.**
- **Do not use oxygen. The Product is not compatible with the use of oxygen. Hydrocarbon elastomers and lubricants are present.**
- **High-pressure liquids and gases are potentially hazardous. Energy stored in these liquids and gases can be released unexpectedly and with extreme force. High-pressure systems should be assembled and operated only by personnel who have been instructed in proper safety practices.**

Symbols

The symbols shown in Table 1 are found in these instructions.

Table 1. Symbols

Symbol	Definition
	WARNING, RISK OF DANGER.
	Consult user documentation.

Unpack the Product

The Product is delivered wrapped in plastic film and secured in a wooden crate. All ports are plugged, the drive air valve is closed, and pressure regulators are set to zero.

1. Remove the Product from the shipping crate and plastic. Take care not to lose or discard the items that are included.
2. Remove all plastic plugs from the fittings and inspect for damage and contamination.
3. Inspect for any missing components or accessories. See Tables 2 and 3. Should any items be missing, contact Fluke Calibration or your local supplier.

Table 2. GBK-50M Parts List

Qty	Description
6	Fitting, 1/4 NPT Male to hand-tight M16x2.0 w/Safety Caps, Steel
3	Hose, Microbore, 2 mm ID, M16F to M16F, 62.7 MPa (9100 PSI), 2 m (6.6 ft), Hand-tight Fittings
1	Hose, Industrial QC, Brass 1/4 Socket x Steel 1/4 Plug, 3/8 in ID, 3 m (10 ft)
1	Fitting, Adapter (Hose Socket), QC x 1/4 NPT Male End, 1/4 Coupling Size, Brass
1	Fitting, Adapter (Hose Plug), QC Stem x 1/4 NPT Male End, 1/4 Coupling Size, Brass
3	Fitting, 1/4-19 BSP Male to hand-tight M16x2.0 w/Safety Caps, Steel
3	Fitting, 7/16-20 SAE Male to hand-tight M16x2.0 w/Safety Caps, Steel

Table 3. GBK-110M Parts List

Qty	Description
2	Fitting, 1/4 NPT Male to hand-tight M16x2.0 w/Safety Caps, Steel
1	Hose, Microbore, 2 mm ID, M16F to M16F, 62.7 MPa (9100 PSI), 2 m (6.6 ft), Hand-tight Fittings
1	Hose, Industrial QC, Brass 1/4 Socket x Steel 1/4 Plug, 3/8 in ID, 3 m (10 ft)
1	Fitting, Adapter (Hose Socket), QC x 1/4 NPT Male End, 1/4 Coupling Size, Brass
1	Fitting, Adapter (Hose Plug), QC Stem x 1/4 NPT Male End, 1/4 Coupling Size, Brass
1	High-Pressure Supply Hose, 2.4 m (8 ft)
1	High-Pressure Test Hose, 1.8 m (6 ft)
4	Gland Nut
4	Collar

Site Requirements

Two sources of compressed gas are required to operate the Product:

- Shop drive air supply to power the booster
- High-pressure gas that the booster compresses to higher pressures

Due to the different flow rate and cleanliness requirements for each of these supplies, they should come from two separate sources. Fluke Calibration recommends that hazardous gases not be used.

Shop Air Drive Supply

The shop air drive supply powers the booster. The booster high-pressure output is approximately 75 times (GBK-50M) or 152 times (GBK-110M) the drive air supply assuming that the test gas supply pressure is high enough. For example, for a 700 kPa (100 psi) drive air supply, the GBK-50M will generate a maximum pressure of 52.5 MPa (7500 psi) whereas a GBK-110M booster will generate 106.4 MPa (15 200 psi) of output pressure.

Note

Because the booster package includes an accumulator and high-pressure regulator, it is preferable to generate the highest pressure that can be achieved and regulate it down to the appropriate supply pressure for the 8270A or 8370A range to which the booster is connected. The higher the pressure in the accumulator and upstream of the high-pressure regulator, the greater the reserve of high pressure to assure a stable supply of pressure to the 8270A or 8370A.

- Recommended Flow Rate: up to 2280 L/min (81 cfm) Free Air Delivery (FAD). FAD is at 20 °C and 101 kPa absolute (70 °F and 14.7 psia). Flow rate at booster's typical inlet pressure of 700 kPa (100 psi) is up to 330 L/min (11.6 cfm).
- Cleanliness: Not critical, system includes a filter
- Humidity: 20 % to 50 % RH. Do not use dry gas or hazardous gases. Dry drive air will prematurely wear the booster seals.

High-pressure Gas Supply

High-pressure product gas is boosted and supplied to the 8270A or 8370A SUPPLY port.
High-pressure instrument gas supply requirements are:

- Pressure: Minimum recommended supply pressure is 4 MPa (600 psi) for the GBK-50M and 7 MPa (1000 psi) for the GBK-110M. Lower supply pressures, >2 MPa (300 psi) for the GBK-50M and 4 MPa (600 psi) for the GBK-110M, could be used for test excursions to lower pressures and minimal volumes. Avoid continuous booster cycling (due to low-supply pressures) that exceeds 2-3 minutes. Maximum allowable supply pressure is 41 MPa (6000 psi).
- Flow rate: 140 slm@0 °C (5 scfm@32 °F) minimum
- Gas quality: Use clean, dry, non-corrosive instrument-grade gases only. Fluke Calibration recommends filtration of 10 micron with a dew point of -20 °C to 5 °C. Inlet gas temperature should be between 10 °C and 47 °C.

Installation and Setup

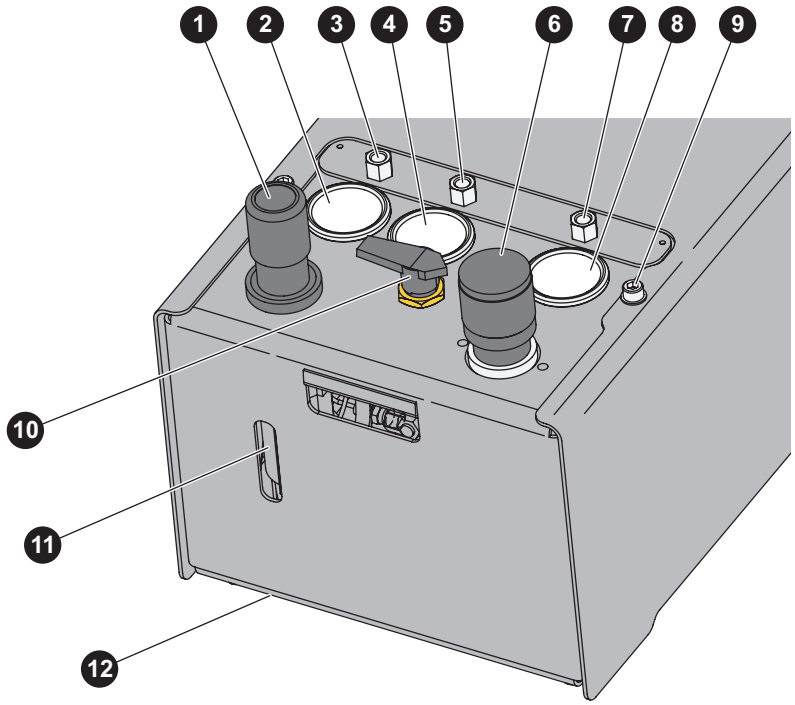
Product installation depends on the specific application.
Consider these factors when you determine where to locate the Product:

- The high pressure being generated and associated safety concerns
- The source of gas supplies (drive air supply and high-pressure instrument gas supply)
- Noise level
- Access to the unit for operation of the regulators and valve
- Point of use of output pressure

Note

Numerical references in this section refer to Table 4 or Table 5, depending on the model.

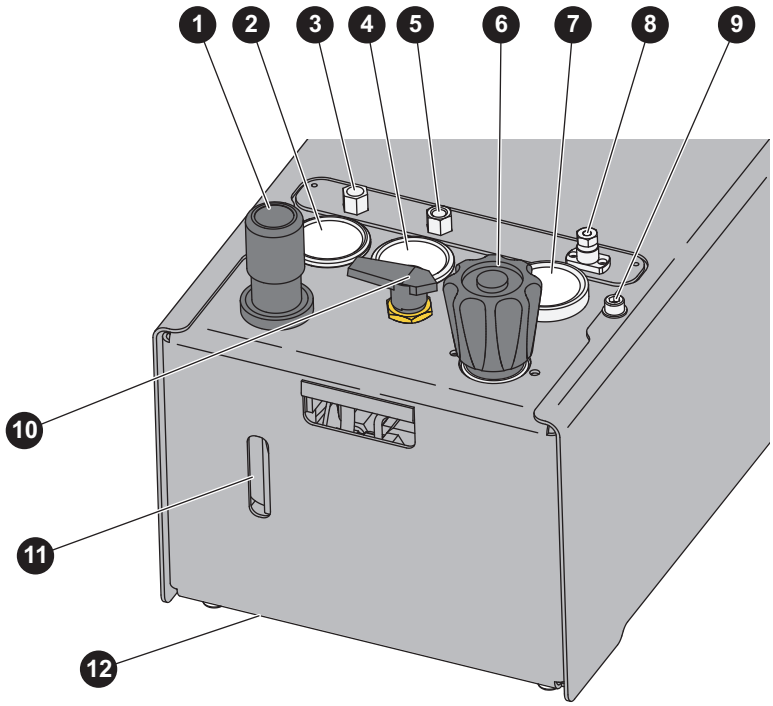
Table 4. GBK-50M



lez001.eps

No.	Description	No.	Description
1	Drive air supply regulator	7	HIGH PRESSURE OUT port
2	Regulated booster drive pressure gauge	8	High-pressure gas output gauge
3	DRIVE port	9	Cover screw (2 locations)
4	Test gas supply pressure gauge	10	Booster drive air shut-off valve (booster ON/OFF)
5	SUPPLY port	11	Drive air supply filter (inside)
6	High-pressure gas output regulator	12	Drive air filter bowl drain valve (inside)

Table 5. GBK-110M



lez002.eps

No.	Description	No.	Description
1	Drive air supply regulator	7	High-pressure gas output gauge
2	Regulated booster drive pressure gauge	8	HIGH PRESSURE OUT Port
3	DRIVE port	9	Cover screw (2 locations)
4	Test gas supply pressure gauge	10	Booster drive air shut-off valve (booster ON/OFF)
5	SUPPLY port	11	Drive air supply filter (inside)
6	High-pressure gas output regulator	12	Drive air filter bowl drain valve (inside)

To install the Product, (see Tables 4 and 5):

1. Place the Product in the selected location.
2. Close both regulators, (1) and (6). Rotate the regulator counter-clockwise until no spring force is felt.

Note

The drive adjust regulator (1) has a stop that prevents continued counter-clockwise rotation. It also has a locking mechanism to prevent accidental adjustment. To unlock, pull the knob up.

3. Close the booster drive shutoff valve (10).
4. Connect shop drive air supply to the 1/4 in. NPT female DRIVE port (3) with supplied industrial hose and quick-connects. Use PTFE tape on NPT threads.

⚠ Warning

To prevent personal injury, make sure that maximum input pressure to the booster drive adjust regulator (❶) is below 1.7 MPa (250 psi). Pressures above this level may result in a failure that could damage the instrument and/or cause personal injury.

5. Connect the test gas supply to the 1/4 in. NPT female SUPPLY port (❺) with supplied microbore hose (with hand-tight connectors) and 1/4 NPT fittings, to the facility instrument gas supply. Use PTFE tape on NPT threads.

⚠ Warning

To prevent personal injury, make sure that maximum input pressure to the SUPPLY port (❺) is 41 MPa (6 000 psi) as shown by the supply pressure gauge (❹). Pressure above this level may result in a failure that could damage the instrument and/or cause personal injury.

Note

Pressure that is present at the SUPPLY IN port (❺) is present at the inlet port of the high-pressure adjust regulator (❻). To prevent gas pressure from reaching the HIGH PRESSURE OUT port (❽), make sure that the high-pressure adjust regulator is closed (backed off).

6. For the 8270A Pressure Controller, attach a 1/4 NPT Male to hand-tight M16x2.0 fitting to the HIGH PRESSURE OUT port (❽) and the applicable NPT, SAE, or BSP to hand-tight fitting to the high-pressure SUPPLY port of the Pressure Controller. Use PTFE tape on NPT threads. Attach the supplied microbore hose (with hand-tight connectors) to the two fittings.
7. For the 8370A Pressure Controller, connect the HIGH PRESSURE OUT port (❽) to the high-pressure SUPPLY port of the Pressure Controller with the supplied high-pressure hose, collars, and glands. The hose-end fittings, gland nuts, and collars are DH500 connections (cone and threaded connections compatible with Autoclave F250C and HIP HF4).
    a. Slide the gland nut over the threaded center of the hose end fitting.
    b. Screw the collar onto the threaded center of the hose end fitting, left-hand, counter-clockwise thread.
    c. Install the hose.
    d. Torque the gland nuts to 15 N · m (11 lbf · ft).
8. For the 8270A Pressure Controller, attach a NPT, SAE, or BSP hand-tight fitting to the TEST port of the Pressure Controller. Attach a NPT, SAE, or BSP to hand-tight fitting to the TEST port of the Device Under Test (DUT). Use PTFE tape on NPT threads. Attach the supplied microbore hose (with hand-tight connectors) to the fittings to connect the TEST ports of the Pressure Controller and the DUT.

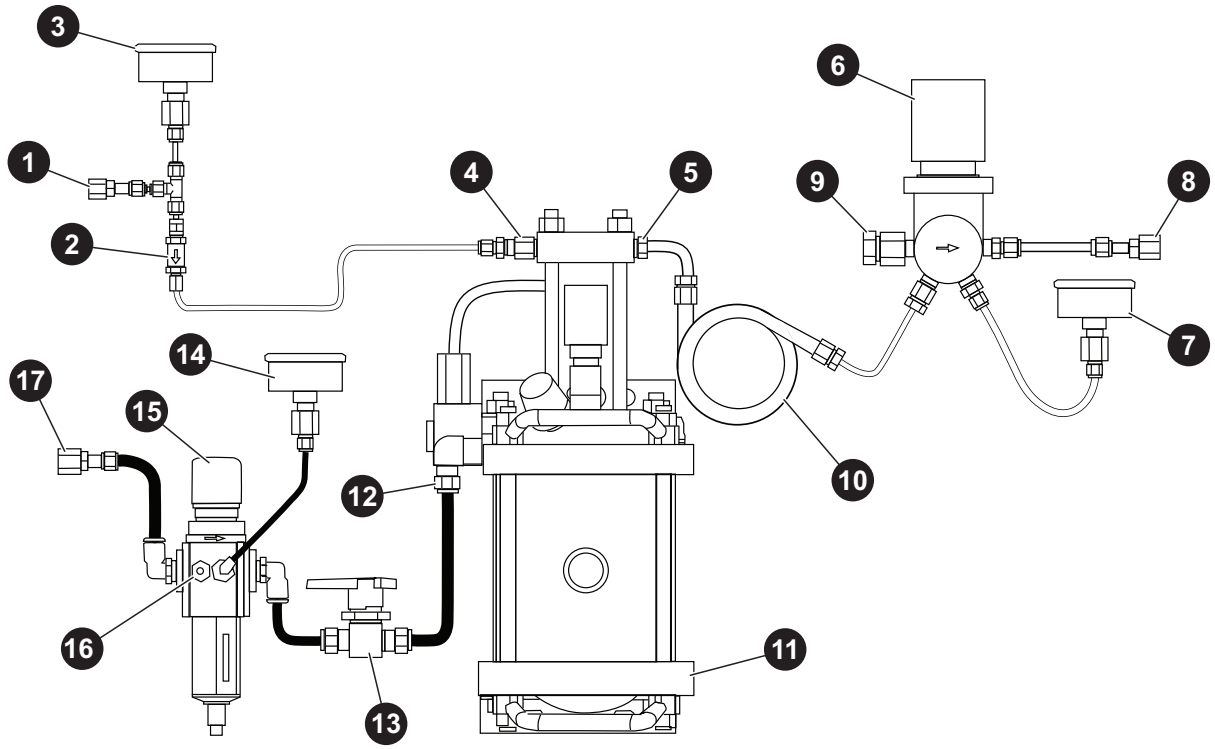
9. For the 8370A Pressure Controller, connect the TEST port of the Pressure Controller to the TEST port of the DUT with the supplied high-pressure hose, collars, and glands (similar to step 7).

Operation

Note

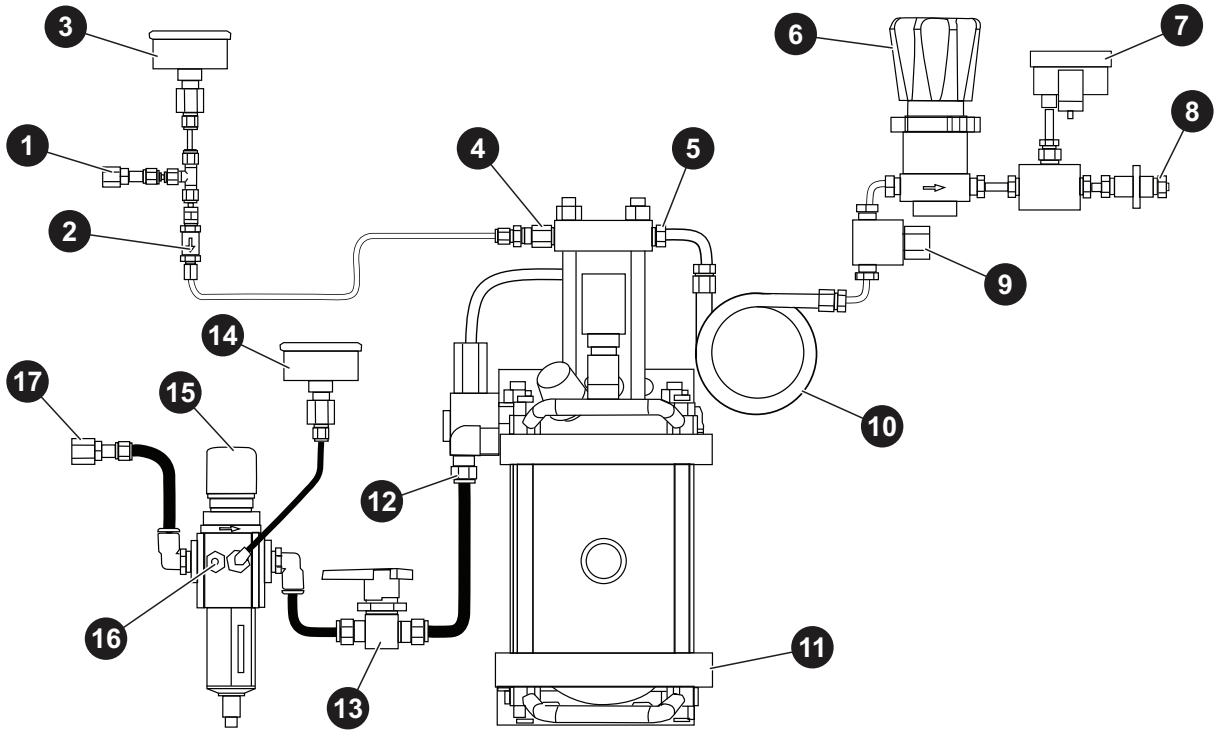
Numerical references in this section refer to Table 6 or Table 7, depending on the model.

Table 6. System Schematic GBK-50M



No.	Description	No.	Description
1	SUPPLY port	10	High-pressure gas accumulator
2	Test gas filter	11	Gas booster
3	Test gas supply pressure gauge	12	Drive air connection to booster
4	Test gas supply connection to booster	13	Drive air shut-off valve (booster on/off)
5	High-pressure gas raw output from booster	14	Regulated drive air pressure gauge
6	High-pressure gas regulator	15	Drive air filter/regulator
7	High-pressure regulated gas output gauge	16	Drive pressure relief valve
8	HIGH PRESSURE OUT port	17	DRIVE port
9	Burst disk		

Table 7. System Schematic GBK-110M



No.	Description	No.	Description
1	SUPPLY Port	10	High-pressure gas accumulator
2	Test gas filter	11	Gas booster
3	Test gas supply pressure gauge	12	Drive air connection to booster
4	Test gas supply connection to booster	13	Drive air shut-off valve (booster on/off)
5	High-pressure gas raw output from booster	14	Regulated drive air pressure gauge
6	High-pressure gas regulator	15	Drive air filter/regulator
7	High-pressure regulated gas output gauge	16	Drive pressure relief valve
8	HIGH PRESSURE OUT Port	17	DRIVE port
9	Burst disk		

Booster Drive Shutoff Valve

The booster drive shutoff valve (13) is a ball-type, 90 ° turn valve. Use the booster drive shutoff valve to prevent flow of regulated drive air to the booster. Consider this valve an ON/OFF switch for the booster.

Accumulator

The accumulator on the booster is a high-pressure hose which serves as a reservoir of high-pressure gas so the gas boosted to high pressure can be stored. This helps to provide a continuous flow of high-pressure gas to the pressure controller.

Drive Air Regulator/Filter

The drive air pressure regulator (15) is a self-venting type of regulator with an outlet pressure control range of 0 MPa to 1 MPa (150 psi). There is a pressure relief valve which opens at approximately 830 kPa (120 psi). Fluke Calibration recommends the drive air pressure to be set to 810 kPa (118 psi). Maximum inlet pressure is 1.7 MPa (250 psi). Pull out the control knob to make adjustments and push in to lock into position and prevent accidental changes.

The regulator also includes a filter and a filter bowl drain tap. Always adjust the regulator from a lower pressure to a higher pressure. This is due to the tendency of a pressure regulator to drift in the opposite direction of the pressure adjustment. Adjusting the regulator in this way helps to avoid an overpressure condition due to regulator drift.

High-Pressure Regulator

The high-pressure regulator (6) is a venting type regulator with an outlet pressure control range of 1.4 MPa to 70 MPa (200 psi to 10 000 psi) for the GBK-50M and 3 MPa to 124 MPa (450 psi to 18 000 psi) for the GBK-110M.

Always adjust the regulator from a lower pressure to a higher pressure. This is due to the tendency of a pressure regulator to drift in the opposite direction of the pressure adjustment. Adjust the regulator in this way to help avoid an overpressure condition due to regulator drift.

Gauges

The gauges are:

- The booster drive pressure gauge (14) indicates the pressure set by the drive air regulator (15).
- The test gas supply gauge (3) indicates the pressure connected to the SUPPLY port (1).
- The high-pressure gauge (7) indicates the pressure set by the high pressure regulator (6) and present at the HIGH PRESSURE OUT port.

Output Equal to or Less than the Supply Pressure

Use this section to set the High-Pressure Output equal to or less than the Supply:

Note

Make sure to read, understand, and complete the instructions in the previous sections before you continue.

It is not necessary to operate the gas booster when setting pressures up to the value of the test gas supply. Test gas supply pressure is always present at the inlet of the high-pressure regulator whenever it is supplied to the Product.

Increase Pressure

1. Rotate the high-pressure gas regulator counter-clockwise, until no spring force is felt.
2. Apply instrument gas to the SUPPLY port.

⚠Warning

To prevent personal injury, make sure that the supply does not exceed 40 MPa (6000 psi). Pressures above this range can result in a failure that could damage the Product and/or cause personal injury.

3. Make sure that the high-pressure output is connected to the high-pressure gas point of use. If using the Product with an 8270A or 8370A Pressure Controller, place the controller in Measure or Vent mode so that there is no gas flow while setting the regulator.
4. Rotate the high-pressure gas regulator clockwise until the desired pressure is indicated on the high-pressure gauge. To correctly set the pressure, gas flow must not occur. If flow is present in the circuit when the regulator is adjusted, the pressure increases when flow is reduced. If the setpoint is exceeded, refer back to this section.

Decrease Pressure

Note

The high-pressure adjust regulator is a venting type. You can regulate pressure down without gas flow through the regulator.

1. Rotate the high-pressure gas regulator counter-clockwise to adjust the pressure down. Adjust until a pressure below the setpoint is achieved as indicated on the high-pressure gauge.
2. Set the pressure to the final setpoint: on the high-pressure gauge, rotate the high-pressure gas regulator clockwise until the indicator shows the final setpoint.

Set High-Pressure Output Greater than Supply Pressure

Note

Make sure to read, understand, and complete the instructions (especially Installation*) in the previous sections before you continue.*

You can do an emergency shut-down of the gas booster pump at any time by closing the booster drive shutoff valve. This stops generation of gas pressure by the pump but does not necessarily reduce pressure at the HIGH PRESSURE OUT port.

Set the Booster Drive Pressure

1. Close the booster drive air shutoff valve.
2. Rotate the high-pressure gas regulator counter-clockwise until no spring force is felt.
3. Calculate the required drive air pressure needed to generate the desired high pressure (drive air powers the booster pump.)

   To calculate the appropriate regulator setting:
   Divide the desired maximum output pressure by the booster ratio of 75 or 152 for the GBK-50M or GBK-110M, respectively. For example, if using a GBK-110M for a maximum output pressure of 80 MPa (12 000 psi), divide 80 by 152. This yields 0.53 MPa (77 psi) gauge which is the pressure that the booster drive adjust regulator should be set to.

Note

Fluke Calibration recommends having the high pressure generated by the booster be significantly higher than the desired high-pressure output of the Product. The benefits are storing high-pressure gas to assure a constant high-pressure output when needed and minimizing output fluctuation in the regulator. The disadvantage is that an overpressure condition could occur at the output if the operator improperly sets the high pressure adjust regulator.

4. Rotate the drive air regulator clockwise until the desired pressure is indicated on the booster drive gauge.

⚠ Caution

Maximum shop drive air pressure to the DRIVE port of the drive air regulator should not exceed 1.7 MPa (250 psi) in the GBK-50M and the GBK-110M. Pressure in excess of this range may result in an overpressure condition on the inlet side of the high-pressure adjust regulator.

5. Open the booster drive shut-off valve. The booster begins to operate when the valve is opened. Exhausting gas noise may startle the operator. Be prepared for this operation.

Increase Pressure

1. Make sure that the high-pressure output is connected to the high-pressure gas point of use. If using the Product with an 8270A or 8370A Pressure Controller, place the controller in Measure or Vent mode so that there is no gas flow while setting the regulator.
2. Rotate the high-pressure regulator clockwise until the desired pressure is indicated on the high-pressure gauge. To correctly set the pressure, gas flow must not occur. If flow is present in the circuit when the regulator is adjusted, the pressure increases when the flow is reduced.

Decrease Pressure

Note

The high-pressure adjust regulator is a venting type. Therefore, it is possible to regulate pressure down without gas flow through the regulator.

1. Rotate the high-pressure regulator counter-clockwise until a pressure below the setpoint is achieved as indicated on the high-pressure gauge.
2. Rotate the high-pressure regulator clockwise until the desired pressure is indicated on the high-pressure gauge to set the pressure to the final setpoint.

Maintenance and Adjustments

Note

Numerical references in this section refer to Tables 6 and 7, depending on the model.

Product maintenance is explained in this section.

Drain Drive Air Filter Bowl

⚠ Warning

To prevent personal injury, do not open the tap on the filter bowl with the system at full pressure.

When there is visible liquid accumulation, open the tap (18) on the filter bowl (12) and drain the liquid. Reduce pressure before you open the tap. Replace the filter element when it is visibly dirty.

Troubleshooting

General Information

Note

Numerical references in this section refer to Tables 6 and 7, depending on the model.

Several predictable problems can arise with Product booster package use. They are described and addressed in this section.

⚠ Warning

Fluke Calibration recommends that those performing troubleshooting procedures described in this section become familiar with the system. Please see the introductory WARNING, *Installation*, and *Operation* for important information.

Booster Will Not Run

The booster is a pneumatically-operated pump. The reciprocating action is caused by an imbalance of forces within the pump due to the opposing drive air pressure and the test gas supply that is being boosted. If the booster does not operate, it means that all forces are equal or that the pistons are seized.

- Check that the booster drive shutoff valve (4) is open. If not, fully open the valve.
- Check that drive air pressure supply is actually present at the DRIVE port (1). If not, ensure gas is supplied at the proper pressure and flow value (see *Site Requirements*).
- Check that the booster drive adjust regulator (2) is set to a pressure of 0.15 MPa (20 psig) or higher and that minimum drive air flow requirements are met (see *Site Requirements*).
- Check that the high-pressure adjust regulator (6) is not closed. If closed, set it to the desired pressure; see Setting High Pressure Output Equal to or Less than the Supply Pressure, Increase Pressure or Setting High Pressure Greater than the Supply Pressure, Increase Pressure.
- Check that there are no gas leaks in the drive air circuit. Repair any leaks.
- Check that gas is not continuously venting from the booster exhaust muffler (14). If gas is venting through the muffler, see *Gas Continuously Vents Through Exhaust Muffler.*
- Check that the booster is not in a stall state. If booster is stalled, determine reason and remedy. A stall state occurs when the pressure in the high-pressure section of the booster is equal to the pressure in the low-pressure section times the booster ratio (152:1). A stall can only occur if the high pressure circuit is plugged.

Booster Runs Too Slowly

A slow-running booster can be confused with the problem described in *Pressure Generates Too Slowly or Not At All*. A slow running booster means that the pump itself is running slowly which also causes the pressure to be generated slowly.

- Check that booster drive shutoff valve (❹) is fully open. If not, open valve fully.
- Check that the booster drive adjust regulator (❷) is set to a pressure of 0.15 MPa (20 psig) or higher and that minimum flow requirements are met (see *Specifications* and *Site Requirements*). If the drive pressure gauge drops while the booster is cycling, this indicates inadequate drive air supply.
- Check there are no restrictions in the shop drive air supply circuit. Remove any restrictions. If an external filter is installed on the shop drive air circuit, it may cause a flow restriction.
- Check that there are no leaks in the shop drive air circuit. Repair any leaks.

Pressure Generates Too Slowly Or Not At All

A slow running booster will cause the pressure to be generated slowly. Ensure the booster is running properly before you continue (see *Booster will not Run*).

- Check that the test gas (high pressure) supply to the SUPPLY port is not below the minimum recommended pressure. If the supply is too low, increase supply pressure. Speed of pressure generation is directly related to the pressure of the test gas supply. For example, pressure is generated twice as quickly with the test gas supply at 14 MPa (2 000 psi) than with the supply at 7 MPa (1 000 psi).
- Check that there are no restrictions in the test gas supply line to the booster. If a restriction exists, remove it. Possible restrictions include a valve not fully opened, a regulator with a low flow constant (CV), an inline filter, or small diameter tubing.
- Check that the booster inlet and outlet check valves in the high-pressure booster piston are operating properly. Close the booster drive shutoff valve (❹). Adjust the high-pressure regulator (❻) to zero pressure by rotating the knob counter-clockwise until no spring force is felt.
- Open the booster drive shutoff valve (❹). The booster should cycle several times then stall. If the booster does not stall when the test gas supply pressure is above 2 MPa (300 psi) and the shop drive air pressure is below 0.25 MPa (40 psi), the check valves are the most likely cause. Contact a Fluke Calibration Authorized Service Center if faulty check valves are suspected.

Booster Runs Continuously

The booster is a pneumatically operated pump. The reciprocating action is caused by an imbalance of forces within the pump due to the opposing drive air pressure and the high-pressure instrument gas supply that is being boosted. If the booster runs continuously, it means that forces do not equalize.

- Check that the test gas supply is present at the SUPPLY port (❺) and is at least 1/25 of the desired booster output pressure. Generally, test gas supply needs to be at least 7 MPa (1 000 psi). If not, ensure that supply meets required specifications (see *High-Pressure Gas Supply*).
- Check that the high-pressure circuit connected to the HIGH PRESSURE OUT port is not open to atmosphere.
- Check that there are no leaks in the high-pressure line from the output of the booster at the check valve to the point-of-use. Repair any leaks. If driver air supply pressure is above 0.25 MPa (40 psi), adjust to below this limit. If booster stops running, increase test gas supply.
- Check that the inlet and outlet check valves in the high-pressure booster piston are operating properly. Close the booster drive shutoff valve (❹). Adjust the high-pressure regulator (❻) to zero pressure by rotating the knob counter-clockwise until no spring force is felt.
- Open the booster drive shutoff valve (❹). The booster should cycle several times then stall. If the booster does not stall when the test gas supply pressure is above 20 MPa (300 psi) and the drive air pressure is below 0.25 MPa (40 psi), the check valves are the most likely cause (indicated by a leak from the top of the high-pressure head), followed by high-pressure seal failure (indicated by a leak from the exhaust filter). Contact a Fluke Calibration Authorized Service Center if faulty check valves or high-pressure seal are suspected.

Cannot Achieve Pressure

- Check that the test gas supply is high enough. Test gas supply must be at least 1/25 of desired booster output.
- Check that drive air is set to the correct value and that it is supplied to the booster (see *Installation*).
- Check that no leaks exist in the pressure circuit from the instrument gas supply to the point-of-use. Repair any leaks.

Leaks

Pressure leaks are the most common problem found in pressure handling equipment. The first step is to determine if the leak is within the GBK-50M or GBK-110M or outside of the unit.

To determine if the leak is within the unit, disconnect the unit at the HIGH PRESSURE OUT port and plug the port using an appropriate plug fitting. Establish conditions similar to those under which the leak was observed and determine if the leak is still present. For small leaks, it may be necessary to install an appropriate pressure sensing device at the HIGH PRESSURE OUT port. In some cases, it is useful to perform simple leak checks on the most common outside sources before disconnecting the test system. Note that leaks inside the Product are unusual unless there has been some disassembly.

Because of the close-fitting components and short tubing runs, some users may find it beneficial to return the Product to a Fluke Calibration Service Center for repair rather than performing the troubleshooting and repair themselves.

More than one leak can exist in a system. Fixing one leak does not guarantee a leak tight system. Therefore, continue executing the troubleshooting procedures until all leaks are located and corrected. Since it is impractical to produce a troubleshooting guide that will cover every conceivable leak, the source of your leak may not be covered in this guide.

The leak detection procedures may require you to tighten a leaking fitting. There are two precautions that need to be observed when doing this:

⚠ Warning

To prevent personal injury, never tighten a fitting while it is under pressure. If pressure is in the system and the fitting should fail while tightening it, you or those around you may be injured.

⚠ Caution

To prevent Product damage, do not over-torque the compression-type fittings that are inside the Product. To do so will damage them requiring their replacement.

Check all fittings and components for leaks. Use leak detection fluid for small leaks. Tighten loose fittings or replace damaged fittings. Repair or replace leaking regulators.

Leaks can exist in the high-pressure section of the gas booster. These leaks are difficult to isolate and detect. If no leaks can be found following the procedures above, it is likely the problem is within the booster. Contact a Fluke Calibration Service Center for assistance.

Gas Continuously Vents Through Exhaust Muffler

When the booster does not run and gas is venting through the muffler (14), the air cycling valve of the booster (spool valve) is stuck between its toggle points. This is normally caused by a low drive air flow rate or dirty air cycling valves.

There are two methods to restore proper operation. Perform the second method only if the first method does not restore operation.

Method 1:

1. Close the high-pressure adjust regulator (6) and booster drive shutoff valve (4).
2. Increase drive air pressure to about 0.5 MPa (75 psi).
3. Open the booster drive shutoff valve (4) quickly. If the booster begins to operate normally, close the booster drive shutoff valve (4) and reset regulators to previous settings.
4. Repeat the process until the booster begins normal operation.

Method 2:

1. Close the high-pressure adjust regulator (6) and booster drive shutoff valve (4).
2. Increase shop drive air pressure to about 0.5 MPa (75 psi).
3. Remove the exhaust muffler (14) and use your hand to plug the vent port.
4. Quickly open the booster drive shutoff valve (4). When the build-up of pressure begins to leak past your hand, quickly remove it. If booster begins to operate normally, close the booster drive shutoff valve (4), reinstall the muffler, and reset regulators to previous settings.
5. Repeat the process until the booster begins normal operation.

Only when the Maintenance, Adjustments, and Troubleshooting are carried out, the Product is safe to use.

Specifications

Dimensions	37.5 cm H x 37.5 cm W x 73.7 cm D (14.75 in H x 14.75 in W x 29 in D)
Weight	32.7 kg (72 lb) for GBK-110M 27.7 kg (61 lb) for GBK-50M
Drive air pressure supply	
Maximum Pressure	1.7 MPa (250 psi)
Flow	Up to 2280 L/min (81 cfm) Free Air Delivery (FAD) FAD is at 20 °C and 101 kPa absolute (70 °F and 14.7 psia). Flow rate at booster's typical inlet pressure of 700 kPa (100 psi) is up to 330 L/min (11.6 cfm).
Test gas pressure supply	
Maximum Pressure	41 MPa (6000 psi)
Minimum Pressure (GBK-50M)	4 MPa (600 psi)
Minimum Pressure (GBK-110M)	7 MPa (1000 psi)
Flow	140 to 560 slm (5 to 20 scfm)
Maximum Output Pressure	
GB-50M	61 MPa (8850 psi)
GB-100M	124 MPa (18 000 psi)
Operating media	air, helium, nitrogen
Pressure connections	
Drive air supply	1/4 in. NPT F
Test gas pressure supply	1/4 in. NPT F
High Pressure Out (GBK-50M)	1/4 in. NPT F
High Pressure Out (GBK-110M)	DH500
Piston Ratio	
GBK-50M	75:1
GBK-110M	152:1
High Pressure Volume	
GBK-50M	133 cm^3
GBK-110M	98 cm^3

LIMITED WARRANTY AND LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for one year from the date of purchase. This warranty does not cover fuses, disposable batteries, or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

11/99