# Changeover Systems

## FDR-1 Series Manual Changeover System

### Features

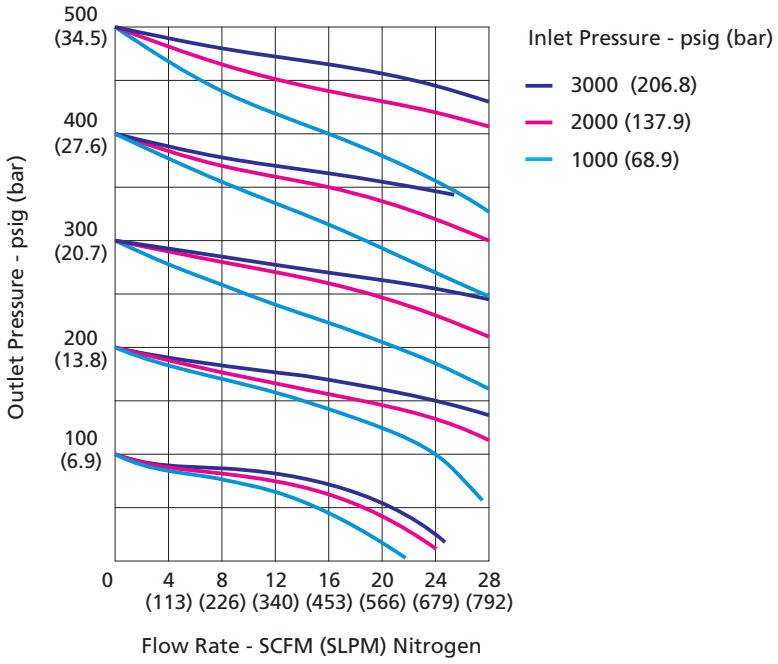
◎ Two gas sources are connected to the system, when the pressure of one gas source is lower than the switching pressure, manually switch to the other gas source to ensure continuous gas supply
◎ With vent valves to relieve residual pressure quickly, easy and safe to remove and replace gas source
◎ With special cleaning and packaging, applicable to oxygen-enriched atmospheres

Model: FDR-16L-30-500-00-B-B-01-00-R

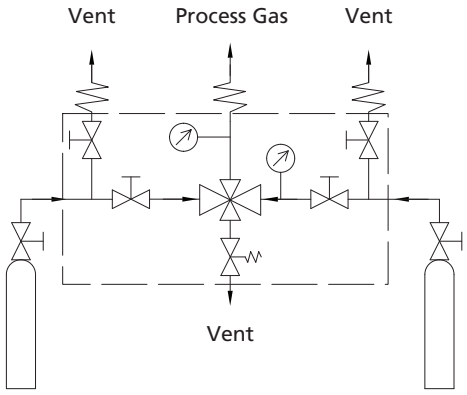
### Technical Data

◎ Maximum inlet pressure: 3000 or 4500 psig
◎ Outlet pressure range: 0 ~ 25, 0 ~ 50, 0 ~ 100, 0 ~ 250 or 0 ~ 500 psig
◎ Material of the main components:
Seat: PCTFE (regulator and diaphragm valve)
Diaphragm: Hastelloy (regulator), cobalt alloy (diaphragm valve)
Diaphragm valve body: 316L
O-ring: FKM
◎ Temperature: -10 °F ~ 150 °F (-23 °C ~ 65 °C)
◎ Valve leak rates (helium):
Internal: $\leqslant 1x10^{-7}$ std $cm^3/s$
External: $\leqslant 1x10^{-9}$ std $cm^3/s$
◎ Flow coefficient (regulator Cv): 0.06

### Typical Flow Chart

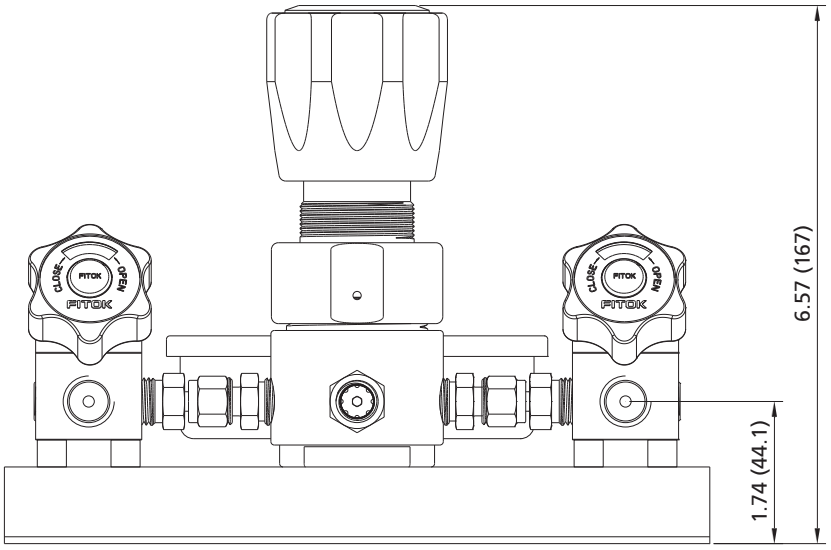


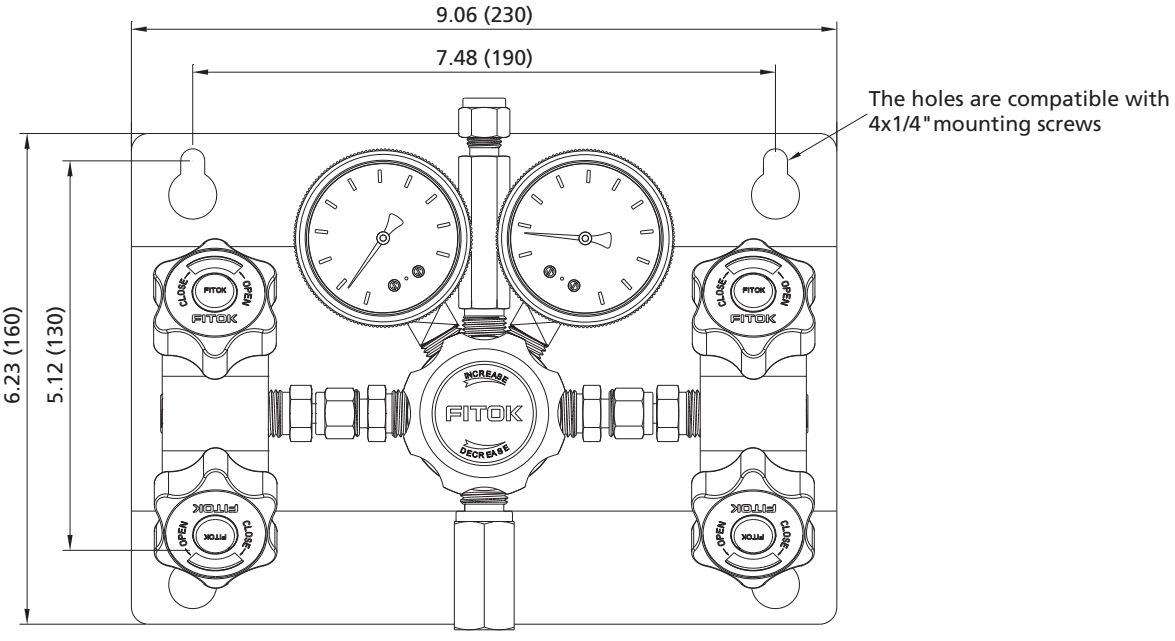
## Flow Schematic



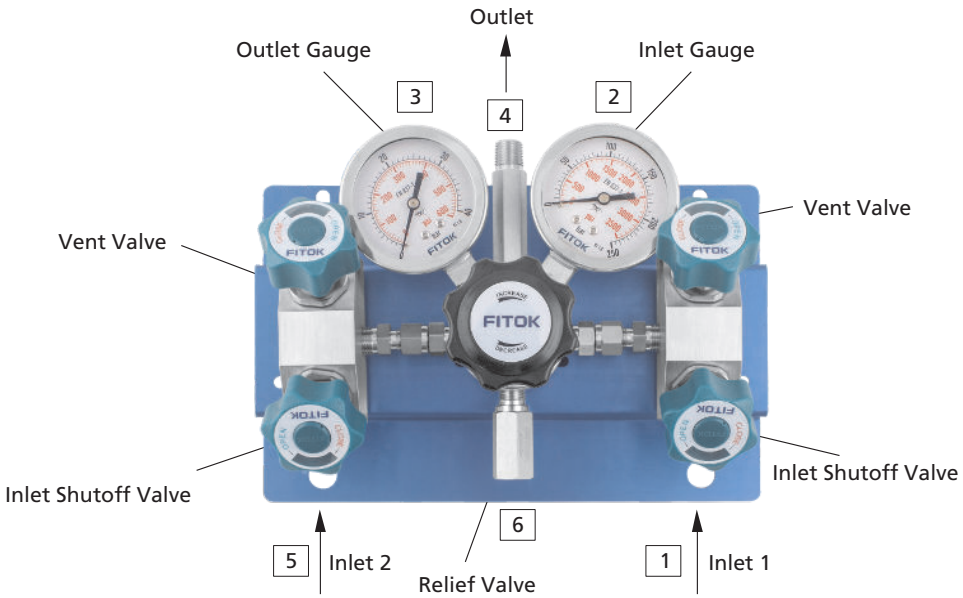

## Dimensions

Dimensions, in inches (millimeters), are for reference only.



## Components Introduction




## Ordering Number Description

FDR – 16L – 30 – 250 – 00 – B – B – 01 – 00 – R

**Body Material (Regulator)**

| | |
|---|---|
| 6L | 316L SS |
| SS | 316 SS |
| HC | Hastelloy C-276 |
| B | Brass (Nickel-plated) |

**Inlet Pressure P1**

| | |
|---|---|
| 30 | 3000 psig |
| 45 | 4500 psig |

**Outlet Pressure Range P2**

| | |
|---|---|
| 25 | 0~25 psig |
| 50 | 0~50 psig |
| 100 | 0~100 psig |
| 250 | 0~250 psig |
| 500 | 0~500 psig |

**Connection 1**

| | |
|---|---|
| 00 | 1/4" Female NPT |
| 01 | 1/4" Male NPT |
| 10 | 1/4" Tube Fitting |
| 11 | 3/8" Tube Fitting |
| 20 | 6 mm Tube Fitting |
| 21 | 8 mm Tube Fitting |

Other connections are available upon request

**Connection 2**

| | |
|---|---|
| B | With Gauge (psi/bar) |
| M | With Gauge (psi/MPa) |
| P | Plug |
| 00 | 1/4" Female NPT |

**Connection 3**

Same as Connection 2

**Connection 4**

| | |
|---|---|
| 00 | 1/4" Female NPT |
| 01 | 1/4" Male NPT |
| 10 | 1/4" Tube Fitting |
| 11 | 3/8" Tube Fitting |
| 20 | 6 mm Tube Fitting |
| 21 | 8 mm Tube Fitting |

Other connections are available upon request

**Connection 5**

Same as Connection 1

**Connection 6**

| | |
|---|---|
| R | Relief Valve |
| P | Plug |
| 00 | 1/4" Female NPT |

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.
2. Before ordering, please read **User's Guide** on A-11.

# Changeover Systems

## FDR-2 Series Manual Changeover System

### Features

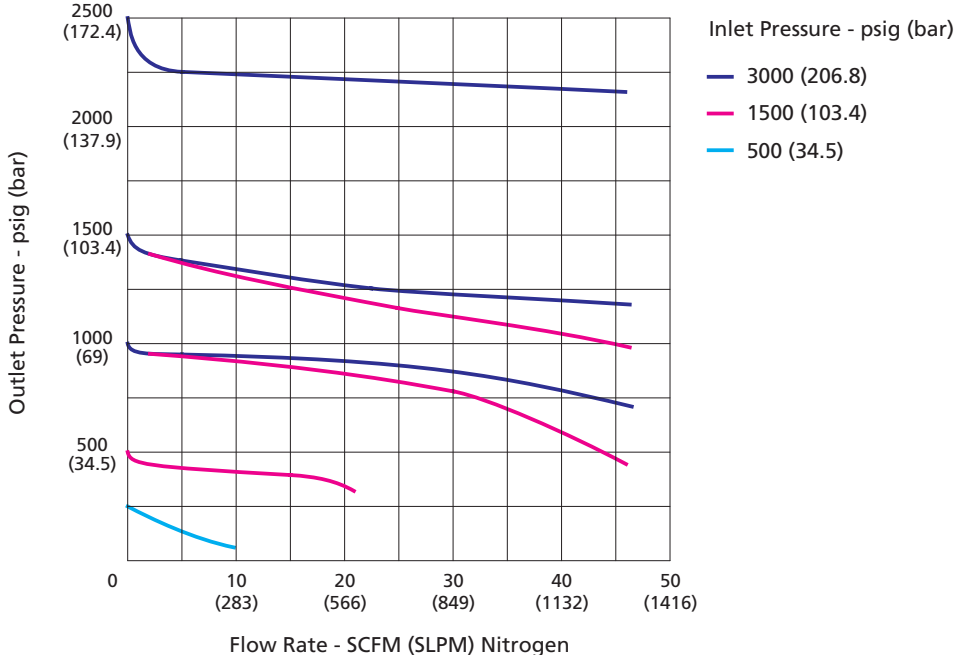
- Two gas sources are connected to the system, when the pressure of one gas source is lower than the switching pressure, manually switch to the other gas source to ensure continuous gas supply
- With vent valves to relieve residual pressure quickly, easy and safe to remove and replace gas source
- With special cleaning and packaging, applicable to oxygen-enriched atmospheres

Model: FDR-2VSS-45-2500-00-B-B-01-00

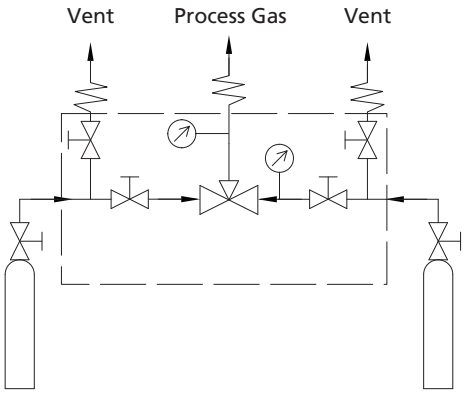
### Technical Data

- Maximum inlet pressure: 3000 or 4500 psig
- Outlet pressure range: 0 ~ 750, 0 ~ 1500 or 0 ~ 2500 psig
- Material of the main components:
  Seat: PCTFE (regulator and diaphragm valve)
  Piston: 316L
  Diaphragm: cobalt alloy (diaphragm valve)
  Diaphragm valve body: 316L
  O-ring: FKM or FFKM
  Filter: 316L
- Temperature: -10 °F ~ 150 °F (-23 °C ~ 65 °C)
- Leak rates:
  Internal: Bubble-tight
  External: Bubble-tight
- Flow coefficient (regulator Cv):
  Without vent: 0.06
  Vent: 0.1

### Typical Flow Chart

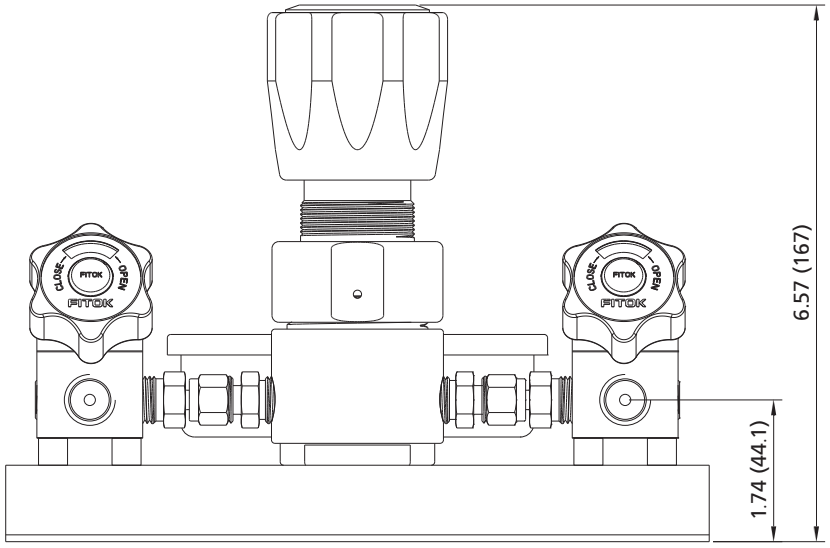


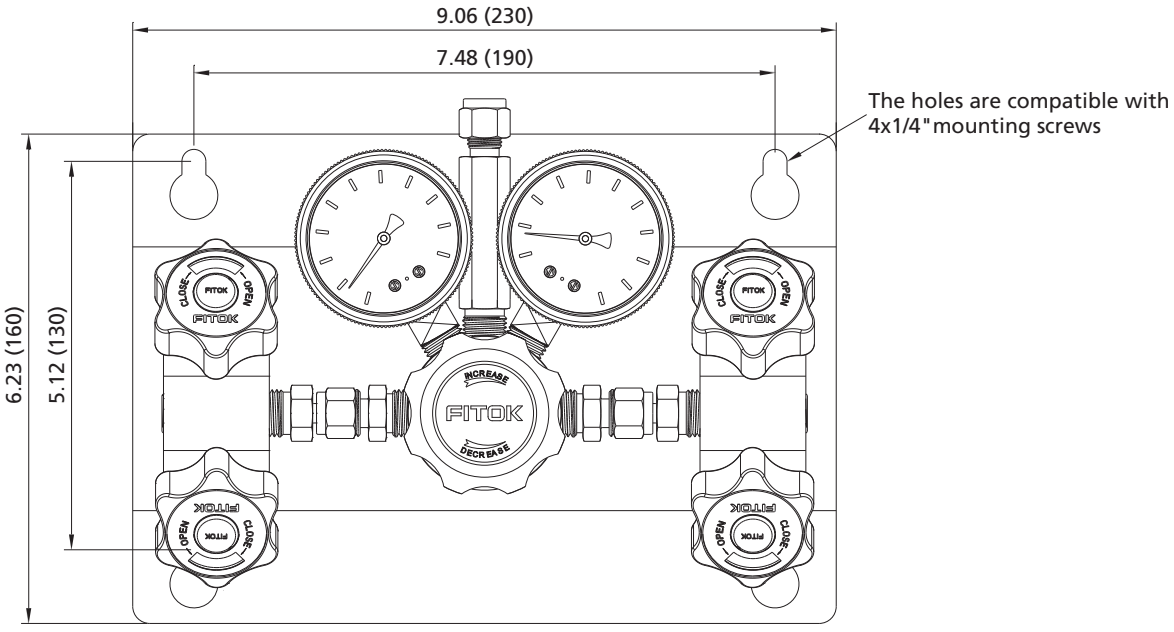
## Flow Schematic



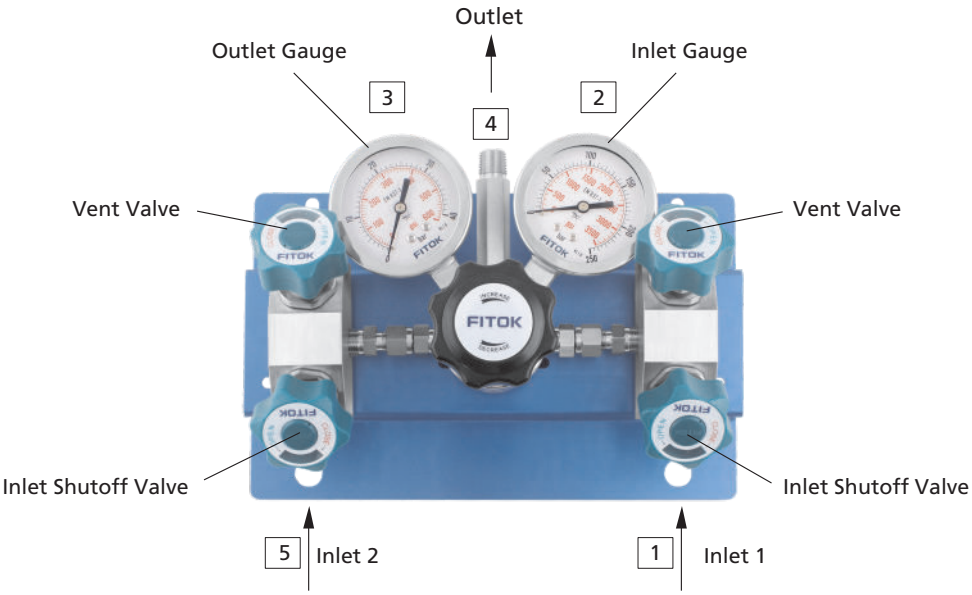

## Dimensions

Dimensions, in inches (millimeters), are for reference only.



## Components Introduction




## Ordering Number Description

FDR – 2V Z 6L – 30 – 750 – 00 – B – B – 01 – 00

**Vent Option**

| | |
|---|---|
| | Without |
| V | With |

**O-ring Material**

| | |
|---|---|
| | FKM |
| Z | FFKM |

**Body Material (Regulator)**

| | |
|---|---|
| 6L | 316L SS |
| SS | 316 SS |
| B | Brass (Nickel-plated) |

**Inlet Pressure P1**

| | |
|---|---|
| 30 | 3000 psig |
| 45 | 4500 psig |

**Outlet Pressure Range P2**

| | |
|---|---|
| 750 | 0~750 psig |
| 1500 | 0~1500 psig |
| 2500 | 0~2500 psig |

**Connection 1**

| | |
|---|---|
| 00 | 1/4" Female NPT |
| 01 | 1/4" Male NPT |
| 10 | 1/4" Tube Fitting |
| 11 | 3/8" Tube Fitting |
| 20 | 6 mm Tube Fitting |
| 21 | 8 mm Tube Fitting |

Other connections are available upon request

**Connection 2**

| | |
|---|---|
| B | With Gauge (psi/bar) |
| M | With Gauge (psi/MPa) |
| P | Plug |
| 00 | 1/4" Female NPT |

**Connection 3**

Same as Connection 2

**Connection 4**

| | |
|---|---|
| 00 | 1/4" Female NPT |
| 01 | 1/4" Male NPT |
| 10 | 1/4" Tube Fitting |
| 11 | 3/8" Tube Fitting |
| 20 | 6 mm Tube Fitting |
| 21 | 8 mm Tube Fitting |

Other connections are available upon request

**Connection 5**

Same as Connection 1

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.
2. Before ordering, please read **User's Guide** on A-11.

# Changeover System

## CEPR Series Automatic Changeover System

The CEPR series automatic changeover system, suitable for uninterrupted gas supply, uses dual gas sources of main supply cylinder and backup cylinder. When the pressure of one gas source drops below the set pressure, the changeover system will automatically switch from the depleted source to the backup source, thus achieving a continuous gas supply.

### Features

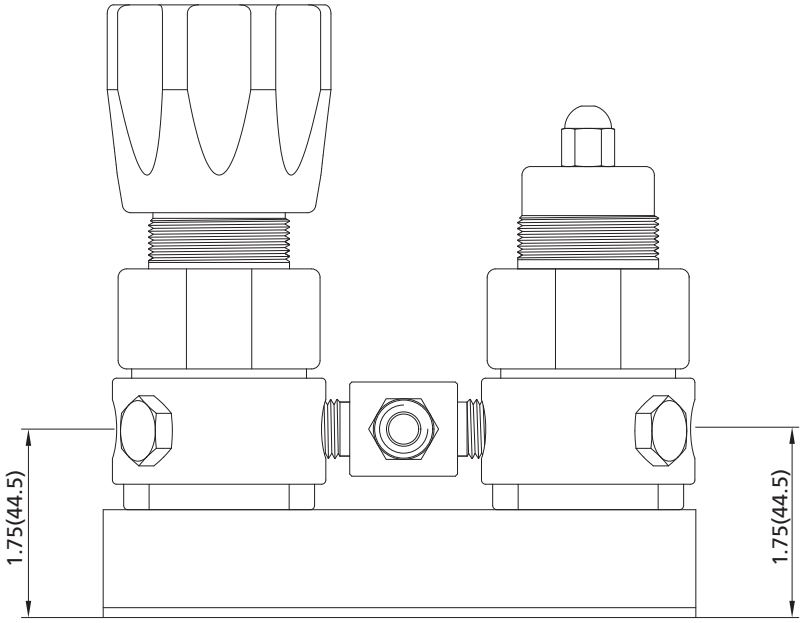
- Two gas sources are connected to regulators of the automatic changeover system, when the pressure of one gas source is lower than the switching pressure, it will automatically switch to the other gas source to supply gas, thus ensuring continuous gas supply
- Excellent sensitivity and set point pressure stability

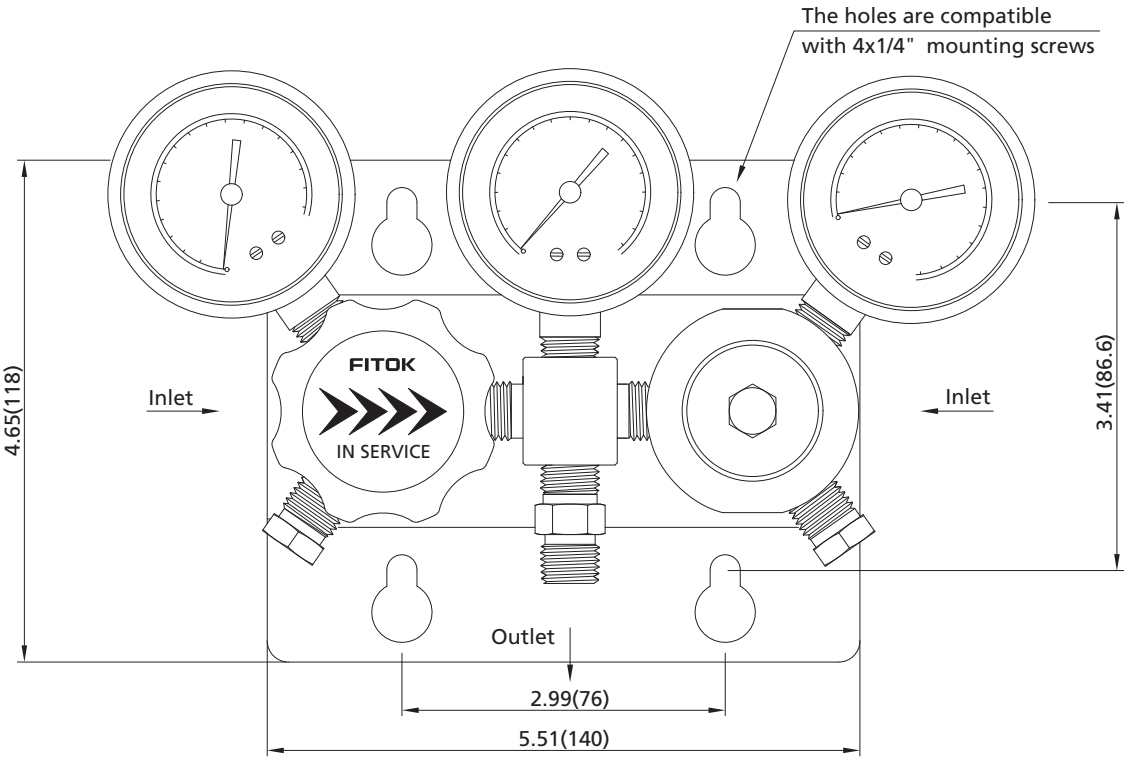
### Technical Data

- Maximum inlet pressure: 3000 psig
- Nominal changeover pressure: 100, 150, 200 and 250 psig
- Outlet pressure ranges: 85 ~ 115, 135 ~ 165, 185 ~ 215, 235 ~ 265 psig
- Material of the internal components:
  Seat: PCTFE
  Diaphragm: Hastelloy
  Filter: 316L
- Working Temperature: -40 °F ~ 165 °F (-40 °C ~ 74 °C)
- Valve leak rates (helium):
  Internal: Bubble-tight
  External: $\leqslant 2 \times 10^{-8}$ std $cm^3/s$
- Flow coefficient (Cv): 0.06
- Weight: ≈5.07 lbs (2.3 kg)

## Dimensions

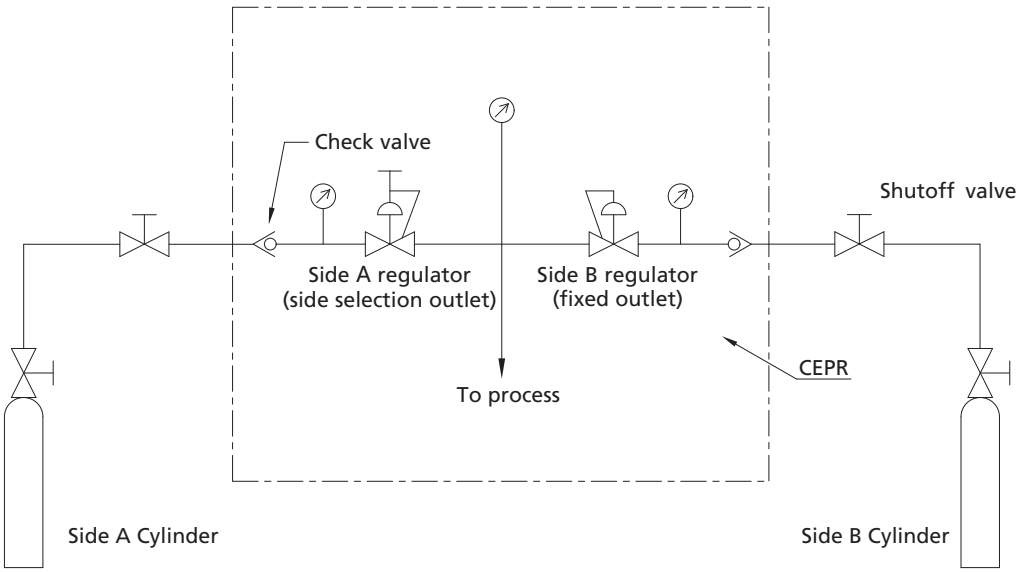
Dimensions, in inches (millimeters), are for reference only.



## Operation Overview

The CEPR series changeover system consists of two separate regulators. The two regulators are respectively attached to separate source cylinders. One of the regulators has an adjusting handle which can swivel to enable source side selection.
The other regulator is preset to an appropriate setting for the system outlet range. The source selection handle adjusts the outlet pressure to be either above or below the preset side within 15 ~ 30 psig. When the handle is turned to point to the standby side, the standby side continues to supply gas due to the change in differential pressure to achieve continuous and uninterrupted gas supply. When one supply drops below the changeover pressure, the selector regulator automatically switches the gas feed from the depleted supply to an alternate supply.



# Ordering Number Description

COSSS – CEPR – 610P – FNS4 – NS4 – O – F2

| Base Series |
|---|
| COS Series |

| Body Material | |
|---|---|
| 6L | 316L SS |
| SS | 316 SS |
| B | Brass (nickel-plated) |

| Embodied Series |
|---|
| CEPR Series |

| Inlet Pressure P1 | |
|---|---|
| 6 | 3000 psig |

| Outlet Pressure | | |
|---|---|---|
| Outlet Pressure Range P2 | | Nominal Changeover Pressures |
| 10 | 85~115 psig | 100 psig |
| 15 | 135~165 psig | 150 psig |
| 20 | 185~215 psig | 200 psig |
| 25 | 235~265 psig | 250 psig |
| Inlet pressure must exceed changeover pressure for automatic switching to occur | | |

| Gauge | |
|---|---|
| B | With Gauge (psi/bar) |
| M | With Gauge (psi/MPa) |
| P | Plug |

| Inlet Type | |
|---|---|
| FNS | Female NPT |
| NS | Male NPT |
| FL | Fractional Tube Fitting |
| ML | Metric Tube Fitting |
| Other type available | |

| Inlet Size | |
|---|---|
| 2 | 1/8" |
| 4 | 1/4" |
| 6 | 3/8" or 6 mm |
| 8 | 1/2" or 8 mm |
| Other size available | |

| Outlet Type |
|---|
| Same as inlet type |

| Outlet Size |
|---|
| Same as inlet size |

| Check Valve | |
|---|---|
| | None |
| V | CV Series |
| O | CO Series |
| A | COA Series |
| Check valve default cracking pressure is 3 psig, see check valve catalog for the detail | |

| Product Grade | |
|---|---|
| | Standard Cleaning and Packaging |
| F2 | Special Cleaning and Packaging |

Notes:

1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.
2. Before ordering, please read **User's Guide** on A-11.

# Changeover Systems

## FDR-1L Series Automatic Changeover System

### Features

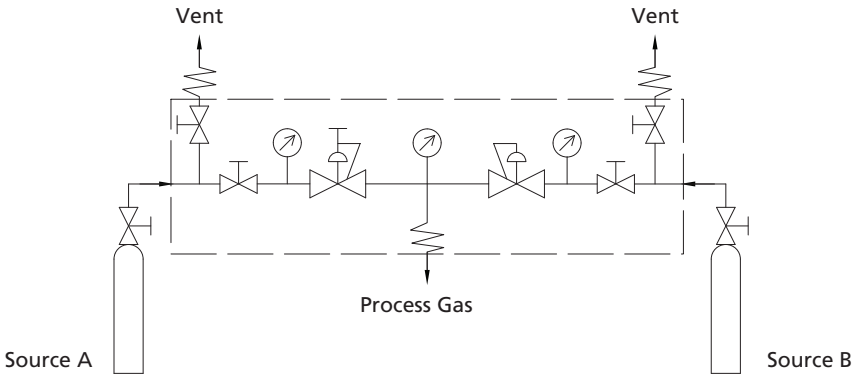
◎ With CEPR series automatic changeover device
◎ With vent valves to relieve residual pressure quickly, easy and safe to remove and replace gas source
◎ With special cleaning and packaging, applicable to oxygen-enriched atmospheres

Model: FDR-1L6L-30-10-B-00-00-00

### Technical Data

◎ Maximum inlet pressure: 3000 or 4500 psig
◎ Nominal changeover pressure: 100, 150, 200 and 250 psig
◎ Outlet pressure range: 85 ~ 115, 135 ~ 165, 185 ~ 215 or 235 ~ 265 psig
◎ Material of the main components:
Seat: PCTFE (regulator and diaphragm valve)
Diaphragm: Hastelloy (regulator), cobalt alloy (diaphragm valve)
Diaphragm valve body: 316L
◎ Temperature: -10 °F ~ 150 °F (-23 °C ~ 65 °C)
◎ Valve leak rates (helium):
Internal: $\leqslant 1 \times 10^{-7}$ std $cm^3/s$
External: $\leqslant 1 \times 10^{-9}$ std $cm^3/s$
◎ Flow coefficient (regulator Cv): 0.06
◎ Weight: ≈12.1 lbs (5.5 kg)

### Flow Schematic



## Operation Overview

The FDR-1L Series Changeover System is mainly comprised of one adjustable outlet pressure regulator together with one fixed outlet pressure regulator.

**When the 2 inlets are both open, the one side that the "IN SERVICE" arrow is pointing at by turning the handle would be the 1st source for gas supply.**

*Fig. 1 When the "In Service" arrow is pointing at side B, side B would be the gas source. At this time, the fixed outlet pressure of side B is higher than the set pressure of side A. Consequently, the diaphragm of side A regulator moves to enable the stem to close the regulator.*

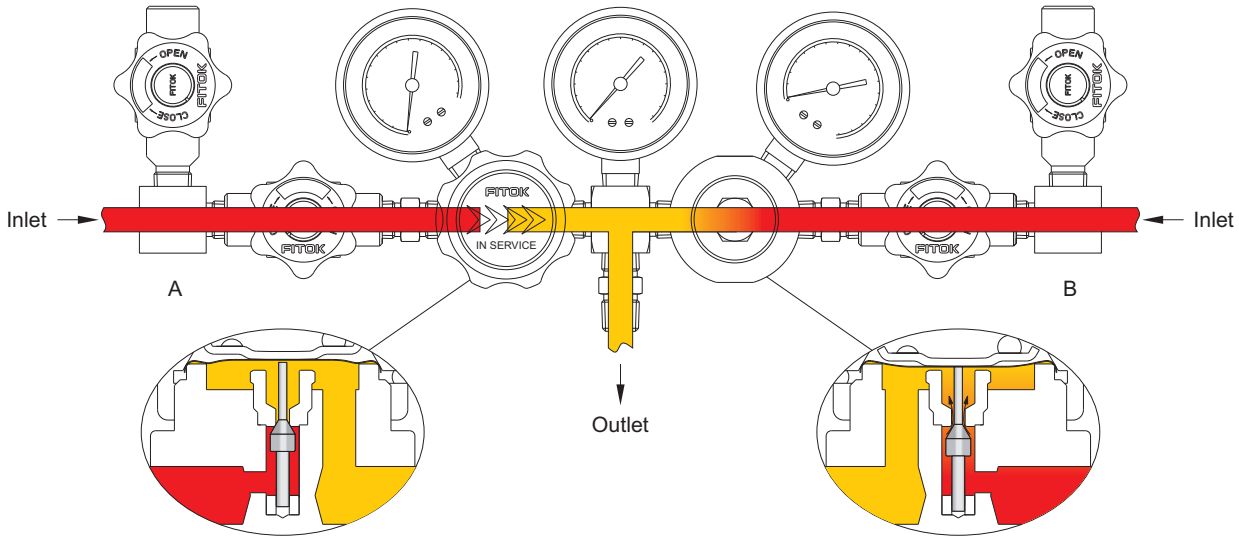



Fig. 1

*Fig. 2 If side A is chosen as the gas source, the handle should be turned clockwise until the "IN SERVICE" arrow is pointing at side A. At this time, the set pressure of side A is higher than the fixed outlet pressure of side B. Consequently, the diaphragm of side B regulator moves to enable stem to close the regulator.*

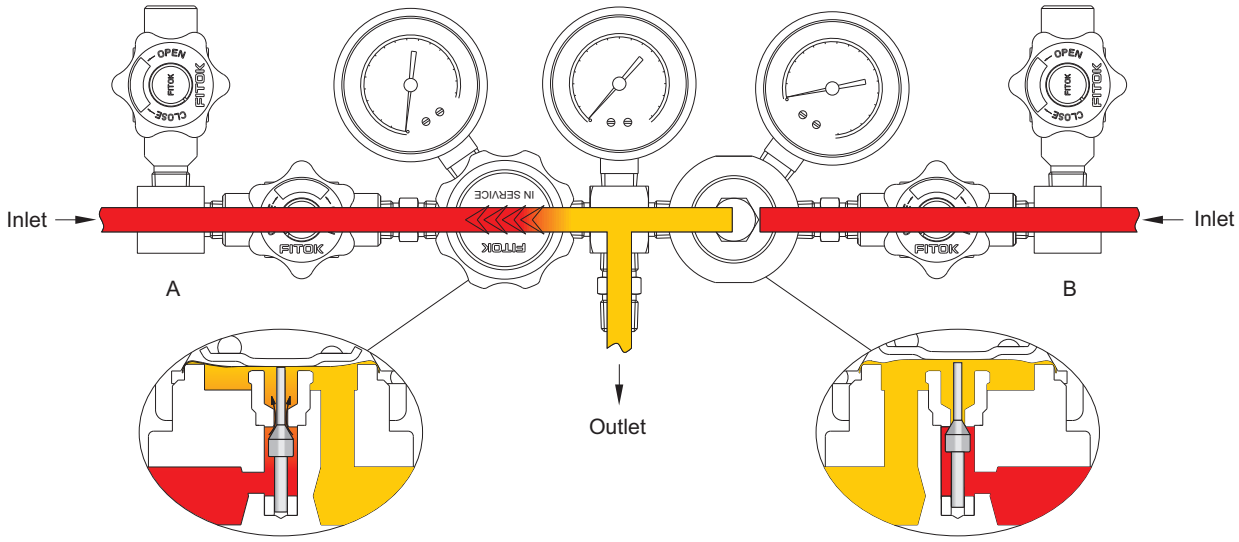



Fig. 2

**When gas source of one side is depleted, gas source would automatically change to the other side.**

*Fig. 1 When "IN SERVICE" arrow is pointing at side B, but gas source of side B is depleted, its outlet pressure shall decrease to be lower than the set pressure of side A. By the force of spring, side A regulator will be opened to begin gas supply as shown in Fig. 3*

*Gas from side A will flow back into side B. At this time, replace to a new gas source of side B, close the shutoff valve and open the vent valve to exhaust the remaining pressure, then replace to a new gas source. After the replacement, if not rotating the handle, the gas supply will return to the status as of Fig. 1. And if rotating the handle to the status as shown is Fig. 2, the gas supply will be changed to the status as of Fig. 2.*

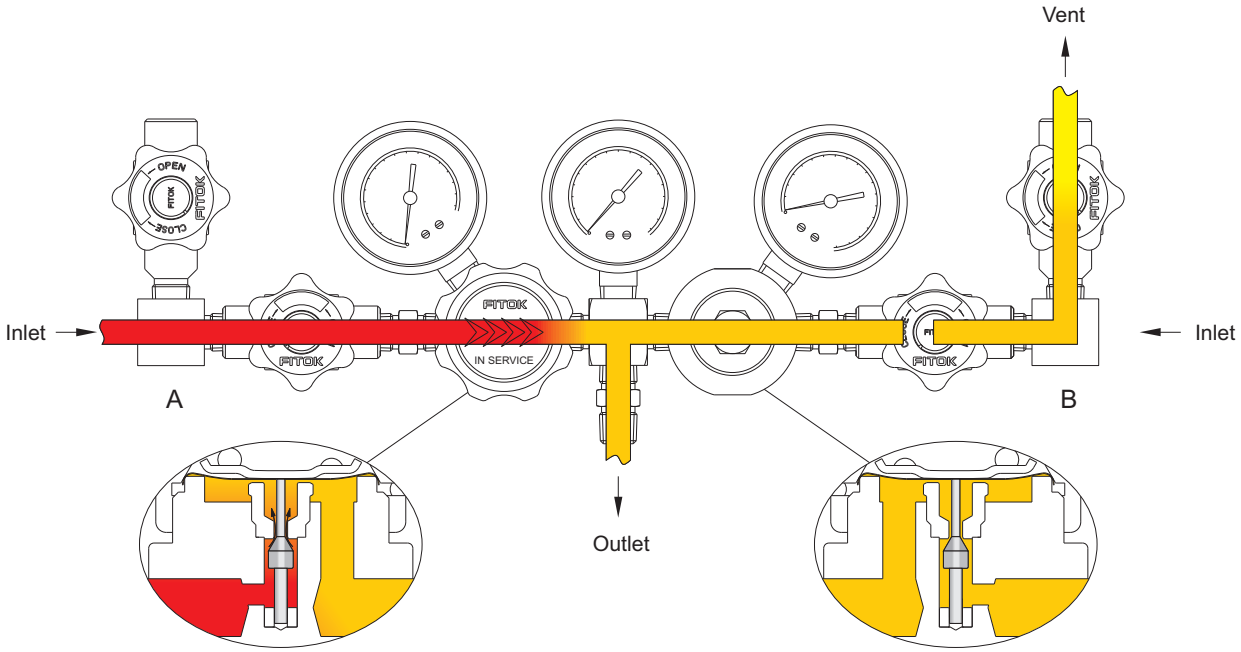
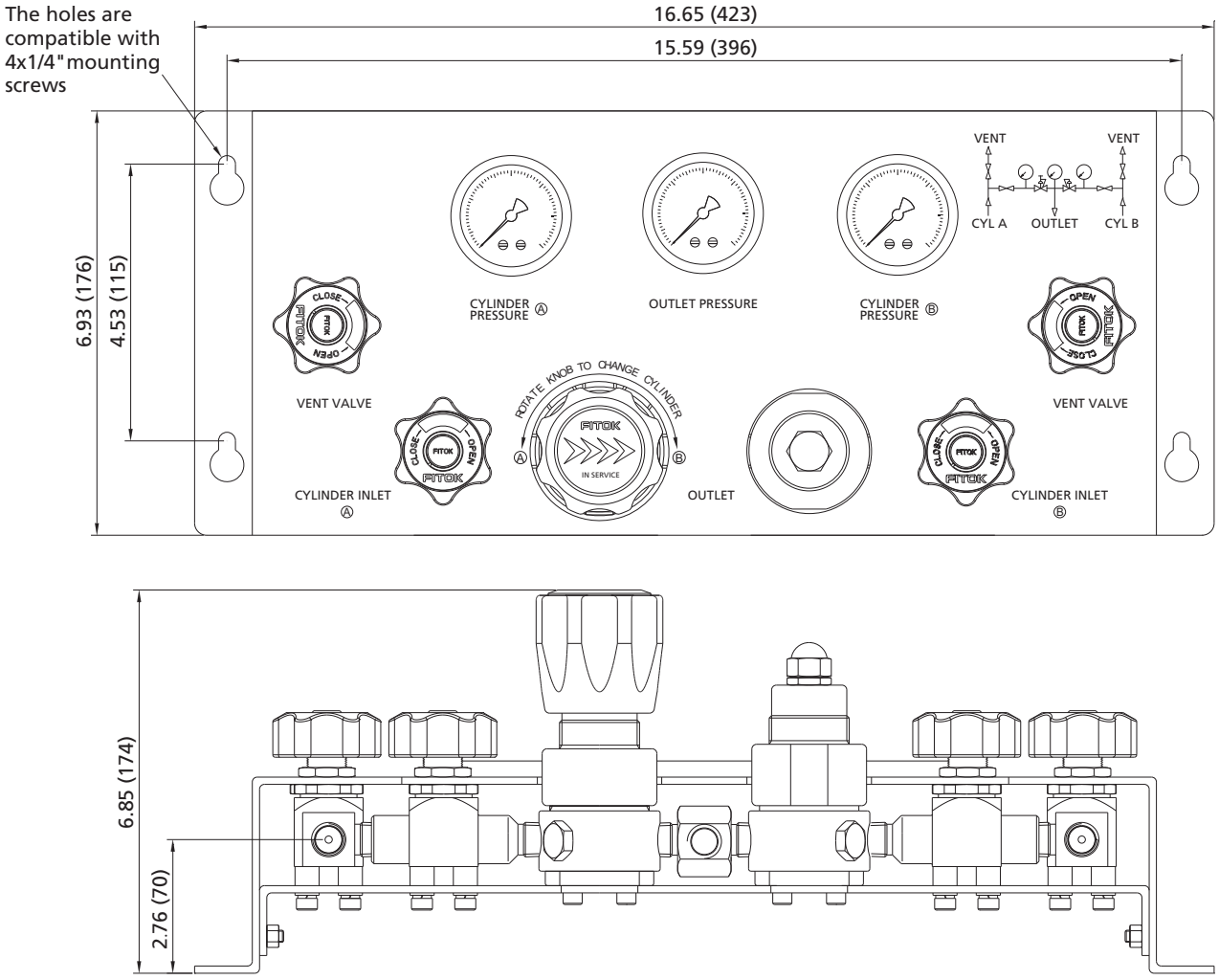



Fig. 3

## Dimensions

Dimensions, in inches (millimeters), are for reference only.




## Ordering Number Description

FDR – 1L6L – 30 – 20 – B – 10 – 00 – 00

**Body Material (Regulator)**

| | |
|---|---|
| 6L | 316L SS |
| SS | 316 SS |
| HC | Hastelloy C-276 |
| B | Brass (Nickel-plated) |

**Inlet Pressure P1**

| | |
|---|---|
| 30 | 3000 psig |
| 45 | 4500 psig |

**Outlet Pressure**

| Outlet Pressure Range P2 | | Nominal Changeover Pressures |
|---|---|---|
| 10 | 85~115 psig | 100 psig |
| 15 | 135~165 psig | 150 psig |
| 20 | 185~215 psig | 200 psig |
| 25 | 235~265 psig | 250 psig |

Inlet pressure must exceed changeover pressure for automatic switching to occur

**Gauge Scale**

| | |
|---|---|
| B | With Gauge (psi/bar) |
| M | With Gauge (psi/MPa) |

**Inlet A**

| | |
|---|---|
| 00 | 1/4" Female NPT |
| 01 | 1/4" Male NPT |
| 10 | 1/4" Tube Fitting |
| 11 | 3/8" Tube Fitting |
| 20 | 6 mm Tube Fitting |
| 21 | 8 mm Tube Fitting |

Other connections are available upon request

**Inlet B**

Same as Inlet A

**Outlet**

Same as Inlet A

Notes:
1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.Not all combinations are available.
2. Before ordering, please read **User's Guide** on A-11.

# Changeover Systems

## DPPR Series Automatic Changeover System

The DPPR series automatic changeover system, suitable for uninterrupted gas supply, uses dual gas sources of main supply cylinder and backup cylinder. When the pressure of one gas source drops below the set pressure, the changeover system will automatically switch from the depleted source to the backup source, thus achieving a continuous gas supply.

### Features

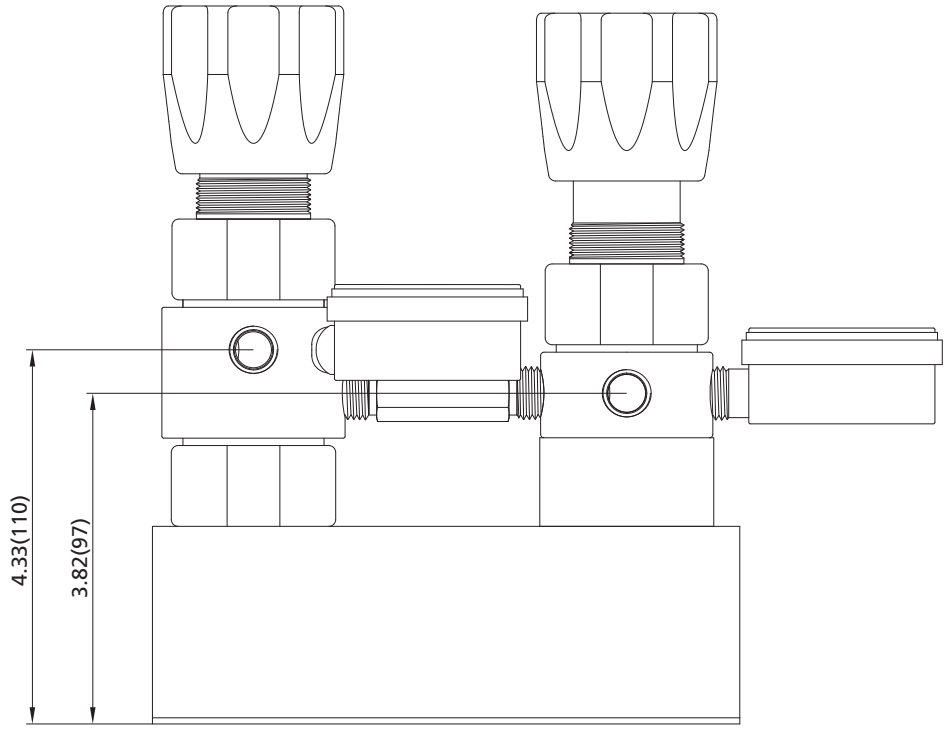
- Two gas sources are connected to regulators of the automatic changeover system, when the pressure of one gas source is lower than the switching pressure, it will automatically switch to the other gas source to supply gas, thus ensuring continuous gas supply.
- Excellent sensitivity and set point pressure stability

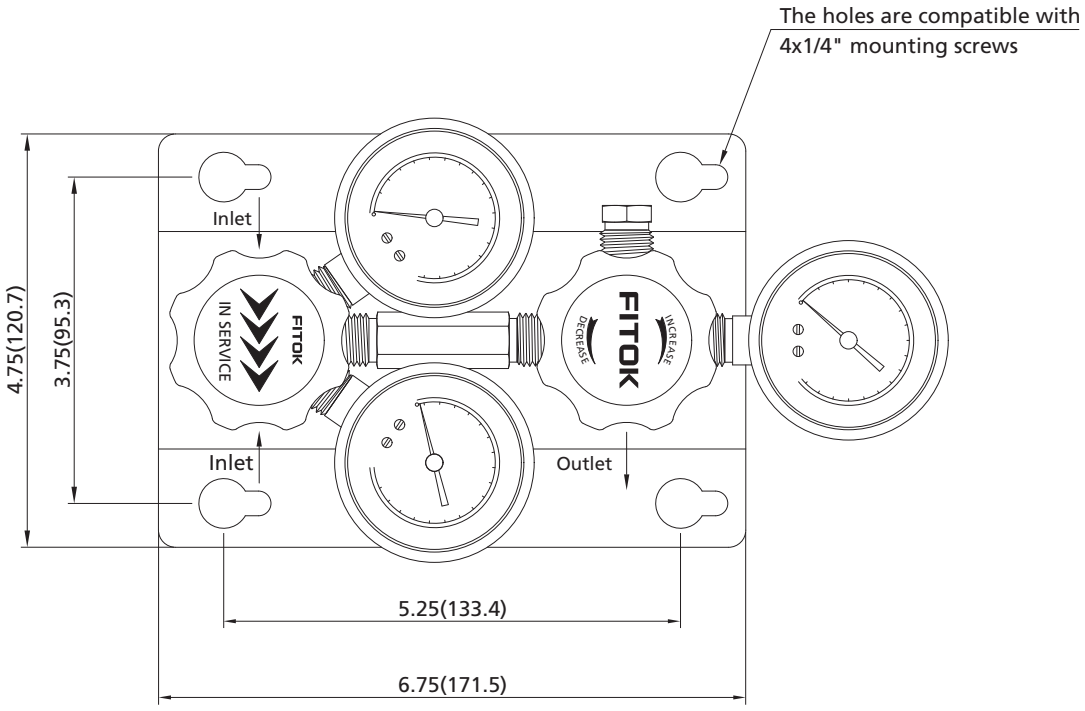
### Technical Data

- Maximum inlet pressure: 3000 psig
- Nominal changeover pressures: 250 psig
- Outlet pressure ranges: 0 ~ 25, 0 ~ 50, 0 ~ 100, 0 ~ 150 psig
- Material of the internal components:
  Seat: PCTFE
  Diaphragm: Hastelloy
  Filter: 316L
- Temperature: -40 °F ~ 165 °F (-40 °C ~ 74 °C)
- Valve leak rates (helium):
  Internal: Bubble-tight
  External: $\leqslant 2x10^{-8}$ std $cm^3/s$
- Flow coefficient (Cv): 0.06
- Weight: ≈5 lbs (2.3 kg)

## Dimensions

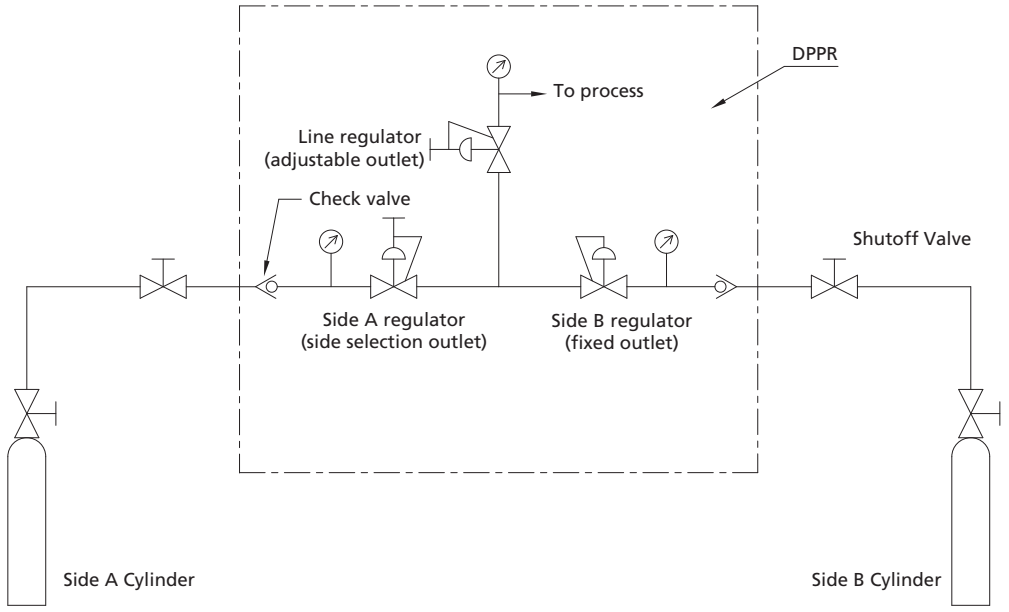
Dimensions, in Inches (millimeters), are for reference only.



## Operation Overview

The DPPR series changeover system consists of three pressure regulators, housing two single-stage regulators in a single body and a line regulator. The two single-stage regulators are each attached to separate source cylinders. The adjusting handle can swivel to enable source side selection. The other regulator is preset to an appropriate setting for the system outlet range. The source selection handle adjusts the outlet pressure to be either above or below the preset side within 15 ~ 30 psig. When the handle is turned to point to the standby side, the standby side continues to supply gas due to the change in differential pressure to achieve continuous and uninterrupted gas supply.
When one supply drops below the changeover pressure, the selector regulator automatically switches the gas feed from the depleted supply to an alternate supply. At this time, the main gas cylinder can be changed for continuous uninterrupted gas supply.



# Ordering Number Description

COSSS – DPPR – 610P – FNS4 – NS4 – O – F2

| Base Series |
|---|
| COS Series |

| Body Material (Regulator) | |
|---|---|
| 6L | 316L SS |
| SS | 316 SS |
| B | Brass (nickel-plated) |

| Embodied Series |
|---|
| DPPR Series |

| Inlet Pressure P1 | |
|---|---|
| 6 | 3000 psig |

| Outlet Pressure | | |
|---|---|---|
| Outlet Pressure Range P2 | | Nominal Changeover Pressures |
| 02 | 0~25 psig | 250 psig |
| 05 | 0~50 psig | |
| 10 | 0~100 psig | |
| 15 | 0~150 psig | |
| Inlet pressure must exceed changeover pressure for automatic switching to occur | | |

| Gauge | |
|---|---|
| B | With Gauge (psi/bar) |
| M | With Gauge (psi/MPa) |
| P | Plug |

| Inlet Type | |
|---|---|
| FNS | Female NPT |
| NS | Male NPT |
| FL | Fractional Tube Fitting |
| ML | Metric Tube Fitting |
| | Other type available |

| Inlet Size | |
|---|---|
| 2 | 1/8" |
| 4 | 1/4" |
| 6 | 3/8" or 6 mm |
| 8 | 1/2" or 6 mm |
| | Other size available |

| Outlet Type |
|---|
| Same as inlet type |

| Outlet Size |
|---|
| Same as inlet size |

| Inlet Check Valve | |
|---|---|
| | None |
| V | CV Series |
| O | CO Series |
| A | COA Series |
| Check valve default cracking pressure is 3 psig, see check valve catalog for the detail | |

| Product Grade | |
|---|---|
| | Standard Cleaning and Packaging |
| F2 | Special Cleaning and Packaging |

Notes:

1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.
2. Before ordering, please read **User's Guide** on A-11.

# Changeover Systems

## FDR-1T Series Automatic Changeover System

### Features

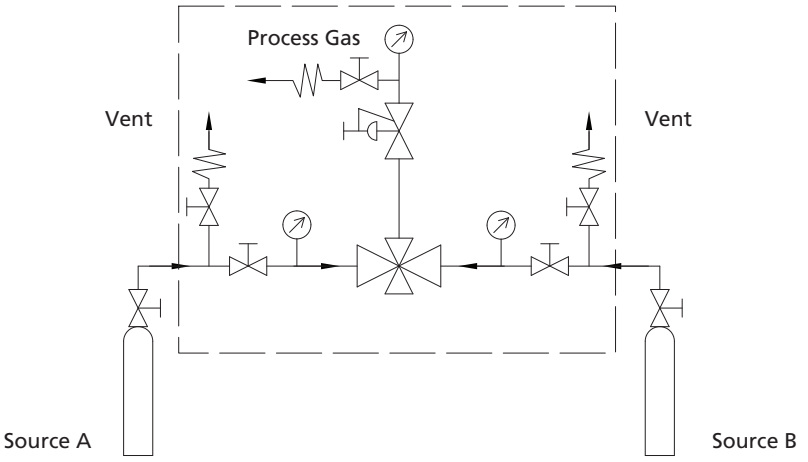
◎ Two gas sources are connected to pressure regulators of the automatic changeover system, when the pressure of one gas source is lower than the switching pressure, it will automatically switch to the other gas source to supply gas to ensure continuous gas supply
◎ Excellent sensitivity and set point pressure stability
◎ With special cleaning and packaging, applicable to oxygen-enriched atmospheres

Model: FDR-1T6L-45-150-B-00-00-00

### Technical Data

◎ Maximum inlet pressure: 3000 or 4500 psig
◎ Nominal changeover pressures: 250 psig
◎ Outlet pressure range: 0 ~ 25, 0 ~ 50, 0 ~ 100 or 0 ~ 150 psig
◎ Material of the main components:
Seat: PCTFE (regulator and diaphragm valve)
Diaphragm: Hastelloy (regulator), cobalt alloy (diaphragm valve)
Diaphragm valve body: 316L
◎ Temperature: -10 °F ~ 150 °F (-23 °C ~ 65 °C)
◎ Valve leak rates (helium):
Internal: $\leqslant 1x10^{-7}$ std $cm^3/s$
External: $\leqslant 1x10^{-9}$ std $cm^3/s$
◎ Flow coefficient (regulator Cv): 0.06
◎ Weight: ≈19.6 lbs (8.9 kg)

### Flow Schematic



## Operation Overview

The FDR-1T Series Changeover System is mainly comprised of one adjustable outlet pressure regulator and one fixed outlet pressure regulator, together with a line pressure regulator on the outlet port.

**When the 2 inlets are both open, the one side that the "IN SERVICE" arrow is pointing at by turning the handle would be the 1st source for gas supply.**

*Fig. 1 When the "In Service" arrow is pointing at side B, side B would be the gas source. At this time, the fixed outlet pressure of side B is higher than the set pressure of side A. Consequently, the diaphragm of side A regulator moves to enable the stem to close the regulator.*

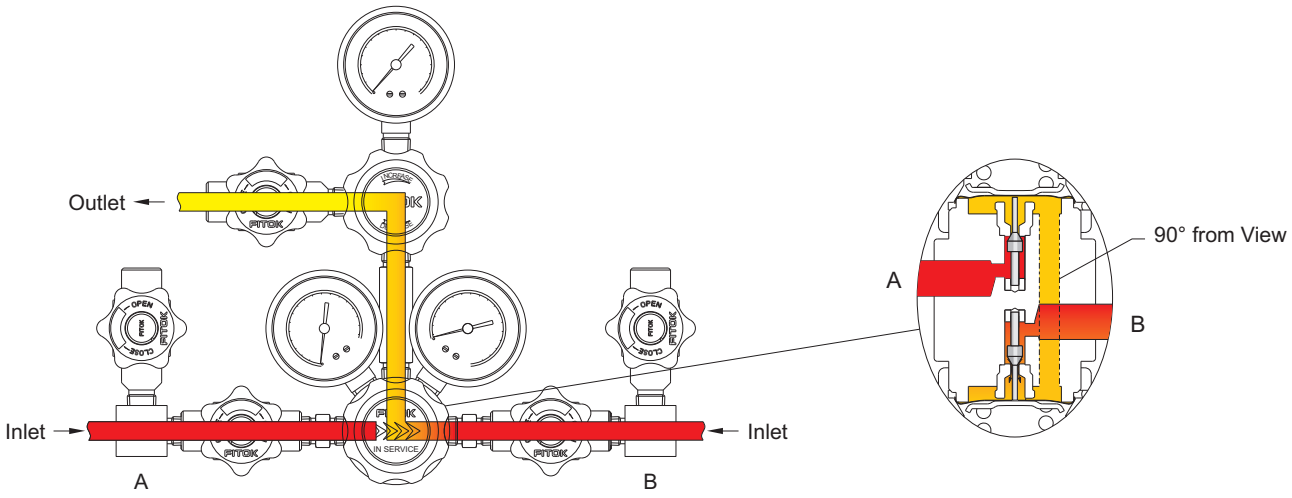



Fig. 1

*Fig. 2 If side A is chosen as the gas source, the handle should be turned clockwise until the "IN SERVICE" arrow is pointing at side A. At this time, the set pressure of side A is higher than the fixed outlet pressure of side B. Consequently, the diaphragm of side B regulator moves to enable the stem to close the regulator.*

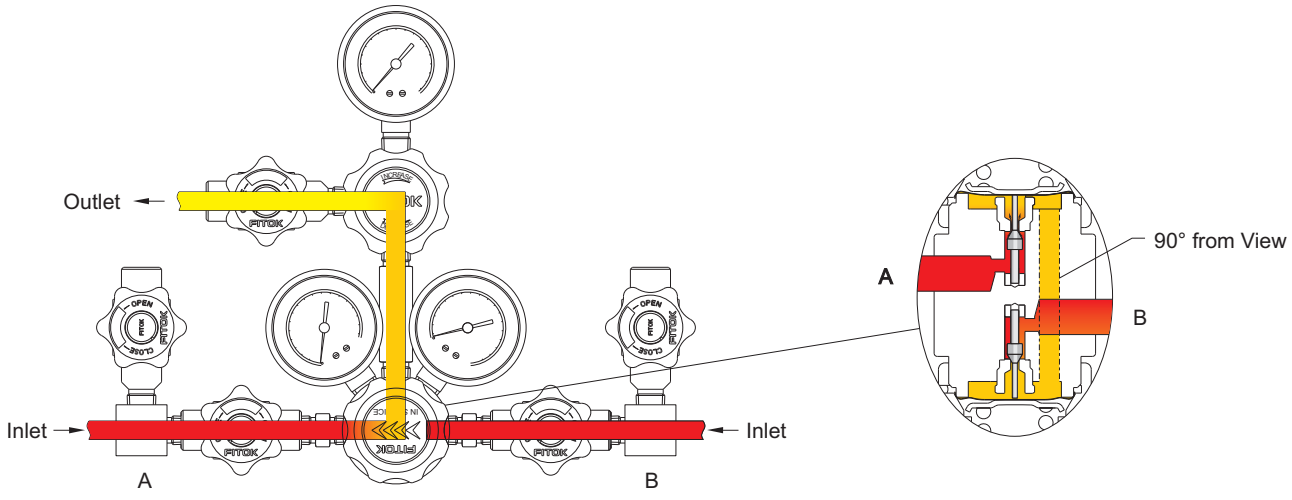



Fig. 2

**When gas source of one side is depleted, gas source would automatically change to the other side.**

*Fig. 3 When "IN SERVICE" arrow is pointing at side B, but gas source of side B is depleted, its outlet pressure shall decrease to be lower than the set pressure of side A. By the force of spring, side A regulator will be opened to begin gas supply.*

*Gas from side A will flow back into side* B. *At this time, replace to a new gas source of side B, close the shutoff valve and open the vent valve to exhaust the remaining pressure, then replace to a new gas source. After the replacement, if not rotating the handle, the gas supply will return to the status as of Fig. 1. And if rotating the handle to the status as shown is Fig. 2, the gas supply will be changed to the status as of Fig. 2.*

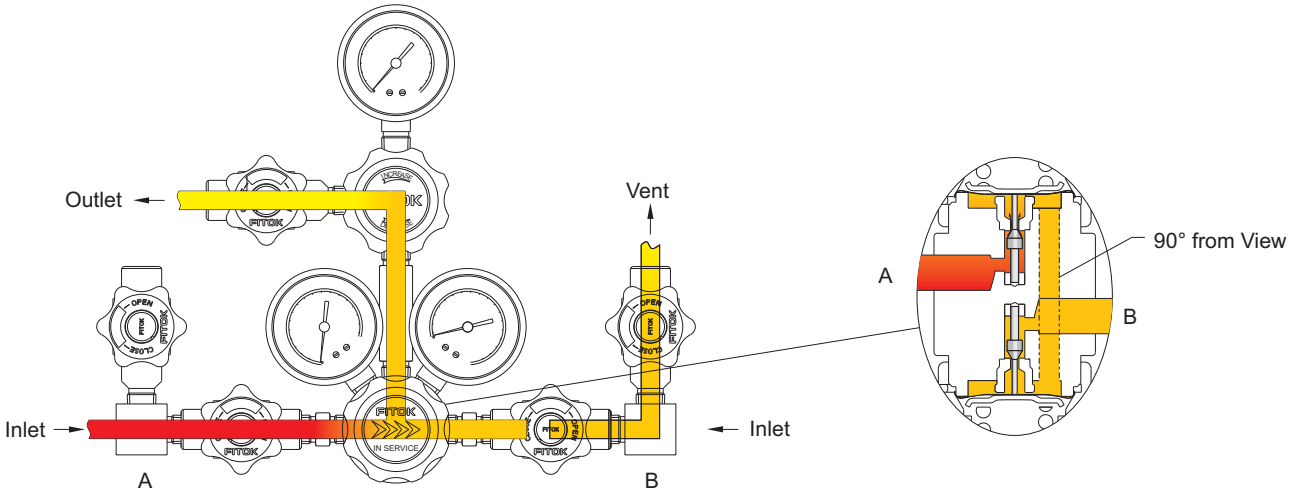
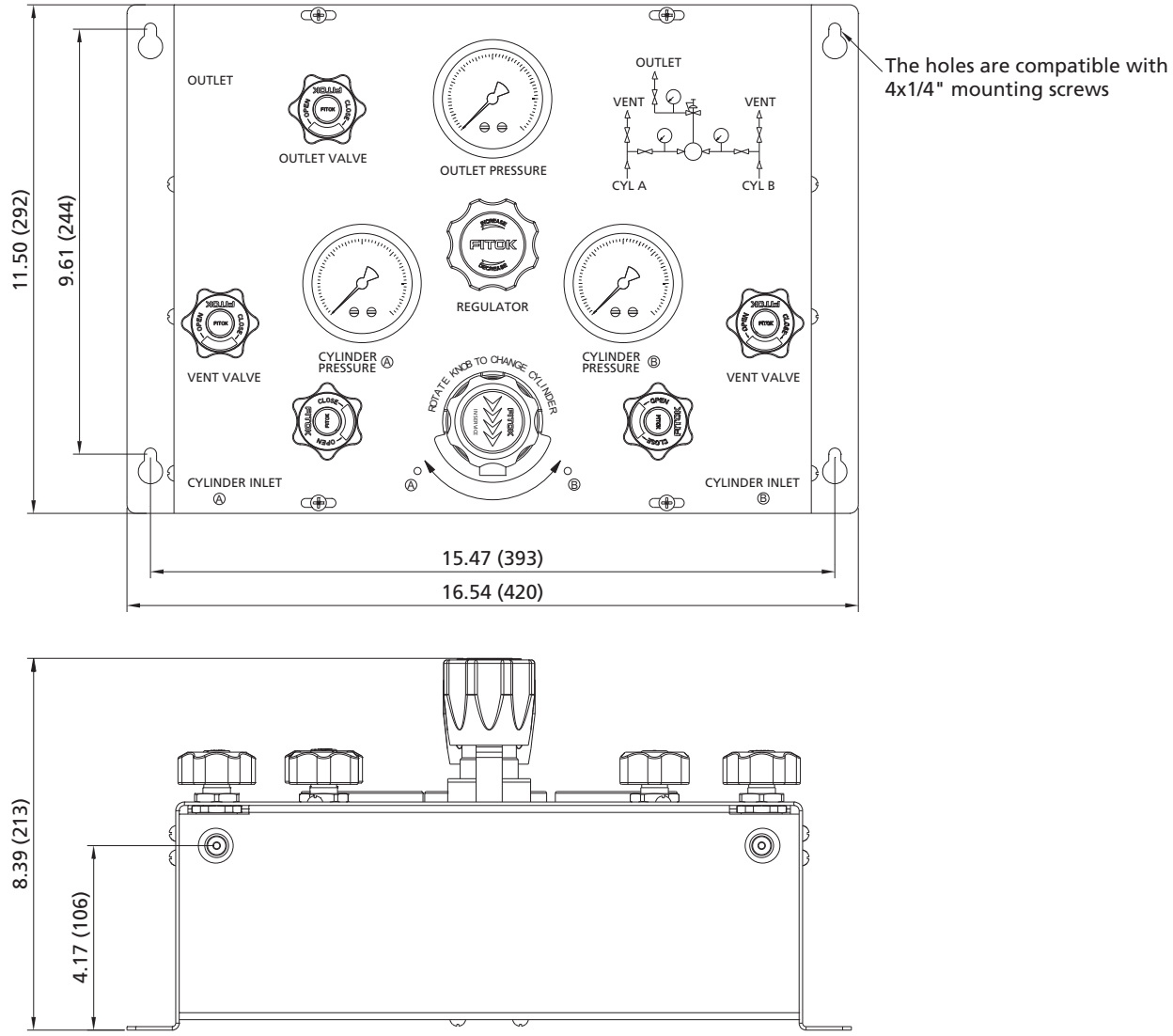



Fig. 3

## Dimensions

Dimensions, in inches (millimeters), are for reference only.




## Ordering Number Description

FDR – 1T6L – 30 – 25 – B – 10 – 00 – 00

**Body Material (Regulator)**

| | |
|---|---|
| 6L | 316L SS |
| SS | 316 SS |
| HC | Hastelloy C-276 |
| B | Brass (Nickel-plated) |

**Inlet Pressure P1**

| | |
|---|---|
| 30 | 3000 psig |
| 45 | 4500 psig |

**Outlet Pressure**

| Outlet Pressure Range P2 | | Nominal Changeover Pressures |
|---|---|---|
| 25 | 0~25 psig | 250 psig |
| 50 | 0~50 psig | |
| 100 | 0~100 psig | |
| 150 | 0~150 psig | |

Inlet pressure must exceed changeover pressure for automatic switching to occur

**Gauge Scale**

| | |
|---|---|
| B | With Gauge (psi/bar) |
| M | With Gauge (psi/MPa) |

**Inlet A**

| | |
|---|---|
| 00 | 1/4" Female NPT |
| 01 | 1/4" Male NPT |
| 10 | 1/4" Tube Fitting |
| 11 | 3/8" Tube Fitting |

Other connections are available upon request

**Inlet B**

Same as Inlet A

**Outlet**

Same as Inlet A

Notes: 1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.Not all combinations are available.

2. Before ordering, please read **User's Guide** on A-11.

FITOK