

Biffi High Flow

High-Pressure Solenoid Valve

A high-flow, high-pressure solenoid valve designed specifically to operate Biffi™ GPO and GIG/GIGS direct gas actuators.



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General Application

Designed for use in on/off, ESD and PST applications in pipelines, gas reduction stations, compressor stations, gas gathering, storage plants, pig launcher/receivers, LNG plants and anywhere high-pressure gas is present.

Technical Data

Material:	Anodized aluminum with 316 SS trim or full 316 SS
Design pressure:	7 to 120 barg / 100 to 1740 psi
Special execution:	3 to 60 barg / 43 to 870 psi To 160 barg / 2320 psi
Supply medium:	Air, nitrogen, natural gas, sweet and sour gas
Voltage supplies:	12, 24, 48, 110, 115, 125, 220 V DC 110, 120 V AC at 50 Hz 120, 240 V AC at 60 Hz
Power consumption:	10 to 24 W
Special execution:	1.4 W
Coil:	Class H
Temperature range:	Refer to the selected certificate

Features

- High-pressure capability eliminates the need for a pressure reducer, increasing actuator reliability.
- Can be used in combination with high-pressure reducer and low pressure actuator providing reduced costs.
- Solenoid Valve (SOV) manifold totally enclosed in an IP rated cabinet with on board junction box.
- A proven system with no leakage.
- On-board lever for manual operation with padlockable option.
- Manifold with double or single coil configuration directly connected to pilot valve with choice of orifice sizes allowing wide range of flow rates.
- NO or NC function.
- Can be used with many high-pressure modular control components designed to obtain various functions or a combination of these:
 - Emergency Shutdown (ESD) or Breakdown Voltage (BDV) action
 - Line break action
 - Impulsive signal allowed
 - Partial Stroke Test (PST)

Approvals

Safety integrity level

Failure rates are compatible with SIL 3 values according to IEC 61508-1÷7: 2010

Area classification

Mechanical and Electrical

ATEX (EN 60079-0 2012/A11 2013, EN 60079 -1 2014, EN 60079-31 2014):

II 2GD

Ex db IIC T(**) GD

Ex tb IIIC T(**) Db

(**) according to temperature range

Electrical

IECEx (IEC 60079-0 2011,

IEC 60079-1 2007-04, IEC 60079-31 2008):

Ex d IIC T5 - T3 Gb according to temperature range

Ex tb IIIC T100 °C or T135 °C or T150 °C Db

FM

Nema Type4

Division:

Class I, Div 1 and 2, Group C and D dust-ignition proof;

Class II, Div 1 and 2, Groups E, F, G

Class III, Div 1 and 2

Maximum Ambient Temperature 65 °C - T4

Zone:

(Power<10 W)

Class I, Zone 1 AEx db IIC T5 Tamb. -60 to 50 °C

Class I, Zone 1 AEx db IIC T4 Tamb. -60 to 85 °C

(10 W>Power<24 W)

Class I, Zone 1 AEx db IIC T4 Tamb. -60 to 65 °C

Class I, Zone 1 AEx db IIC T3 Tamb. -60 to 85 °C

FMc

Nema Type4

Zone:

(Power<10 W)

Ex db IIC T5 Gb Tamb. -60 to 50 °C

Ex db IIC T4 Gb Tamb. -60 to 85 °C

(10 W>Power<24 W)

Ex db IIC T4 Gb Tamb. -60 to 65 °C

Ex db IIC T3 Gb Tamb. -60 to 85 °C

Inmetro (ask to factory)

Ex db IIC T5 or T4 or T3 Gb

Ex tb IIIC T100 °C or T135 °C or T150 °C Db

IP65 or IP66

Peso/CCOE (ask to factory)

Ex db IIC T5 or T4 or T3 Gb

EAC Russia and Belarus

Ask to factory

EAC Kazakhstan (ask to factory)

Exd IIC T5 or Exd IIC T4

CCC Certified

Biffi high-pressure control group is CCC certified. Refer to factory and certificate at Biffi website.

Weatherproof and Waterproof

IP65 (without cover protection) or

IP66 (with cover protection)

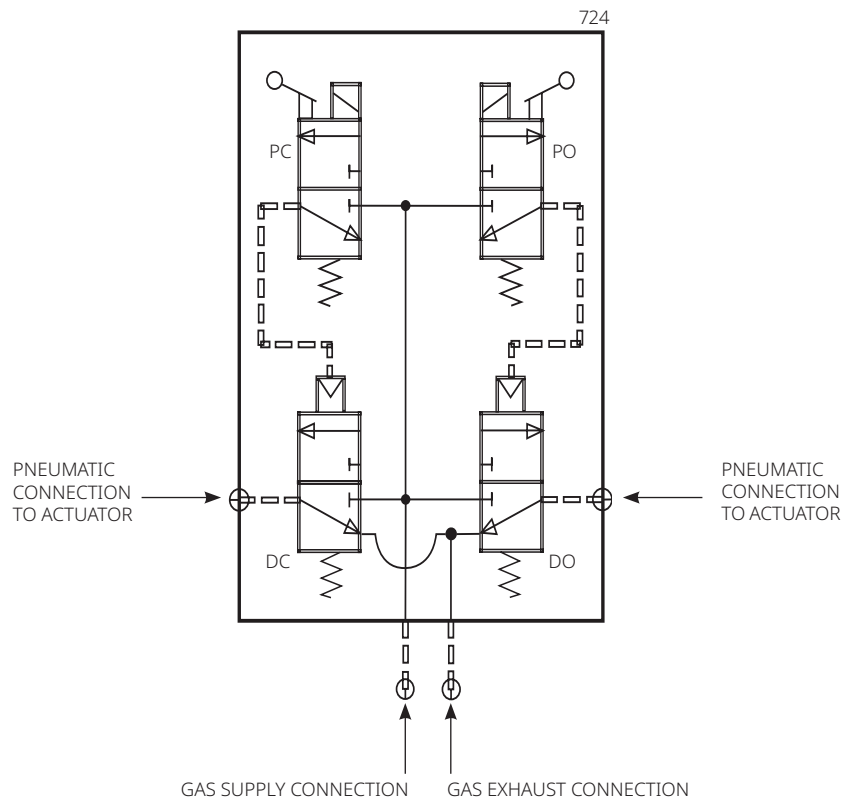
NEMA 4 (with cover protection)

Operation

Base Configuration

Electronic remote control to open and to close. Energize solenoid valve 724-PO to open or 724-PC to close the actuator during all the valve stroke. Solenoid valves must be de-energized at the end of the actuator operation. Local control to open and close, press the lever on valve 724-PO to open or 724-PC to close with gas supply.

Figure 1. Local Remote Schematic Diagram



Operation Options

ESD Action

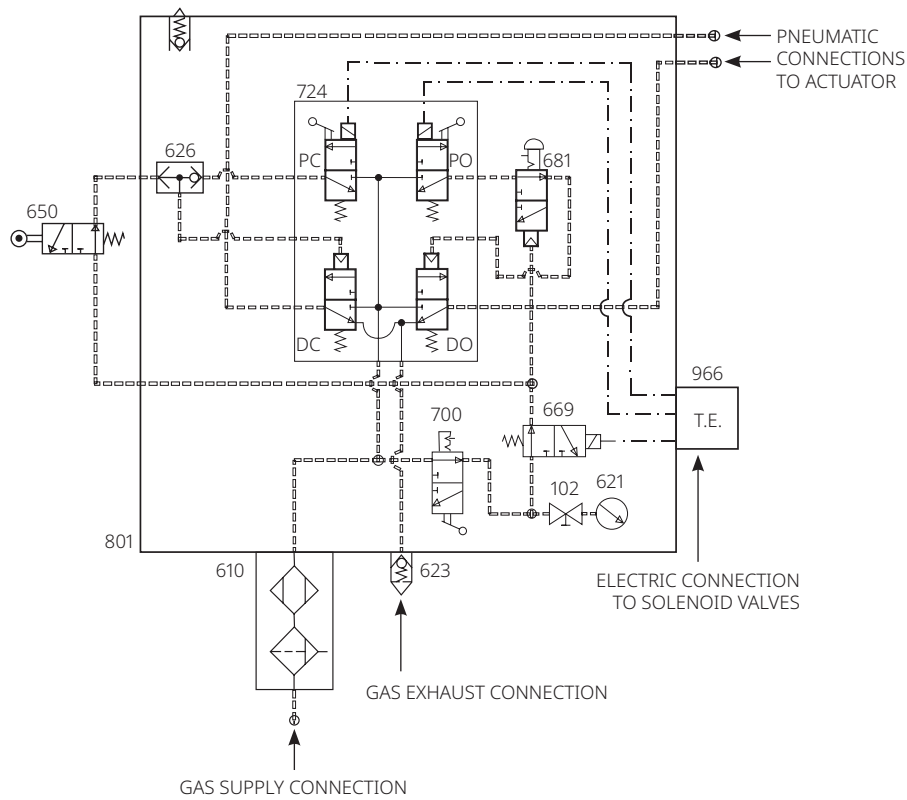
Electric Emergency Closing Operation

When the electric signal to the solenoid valve 669 is cut off, a pressure signal pilots the valve 681 to inhibit the opening operation and the valve 724-DC controls the closing operation. At the end of the closing operation, the gas hydraulic tank 4-C is exhausted by the pneumatic limit switch 650. When the solenoid valve 669 is energized, the valve 681 has to be reset manually before the opening operation can be controlled.

NOTE:

The valve 700 must be in the 'remote' position to allow the electric emergency closing operation.

Figure 2. Local Remote with ESD and Manual Reset Schematic Diagram



Line Break with Partial Stroke Test

Line Break Operation

When a rate of pressure drop in the gas pipeline is higher than the preset value, the electronic line break device energizes the solenoid valve 670A. The solenoid valve 670 pilots the valve 681 to inhibit the open operation and the valve 724-DC causes the actuator to close. After the line break intervention, the inhibition valve 681 must be reset manually before the actuator can be reopened. The line break pilot has to be connected to the pipeline (downstream of the valve) and the pressure intake has to be separate from the gas supply pressure intake.

Electric Remote Closure Test

Energize the solenoid valve 670B; the actuator moves towards closing. When the actuator reaches the preset angular position, the valve 650PST and the relevant 'test' switch 41 are actuated: the closing operation is no longer controlled and the actuator returns to the open position. The fully open position is signaled by the relevant 'open' switch 41.

NOTE:

The solenoid valve 670B must be energized until all the test cycle is completed (relevant 'open' switch 41 actuated).

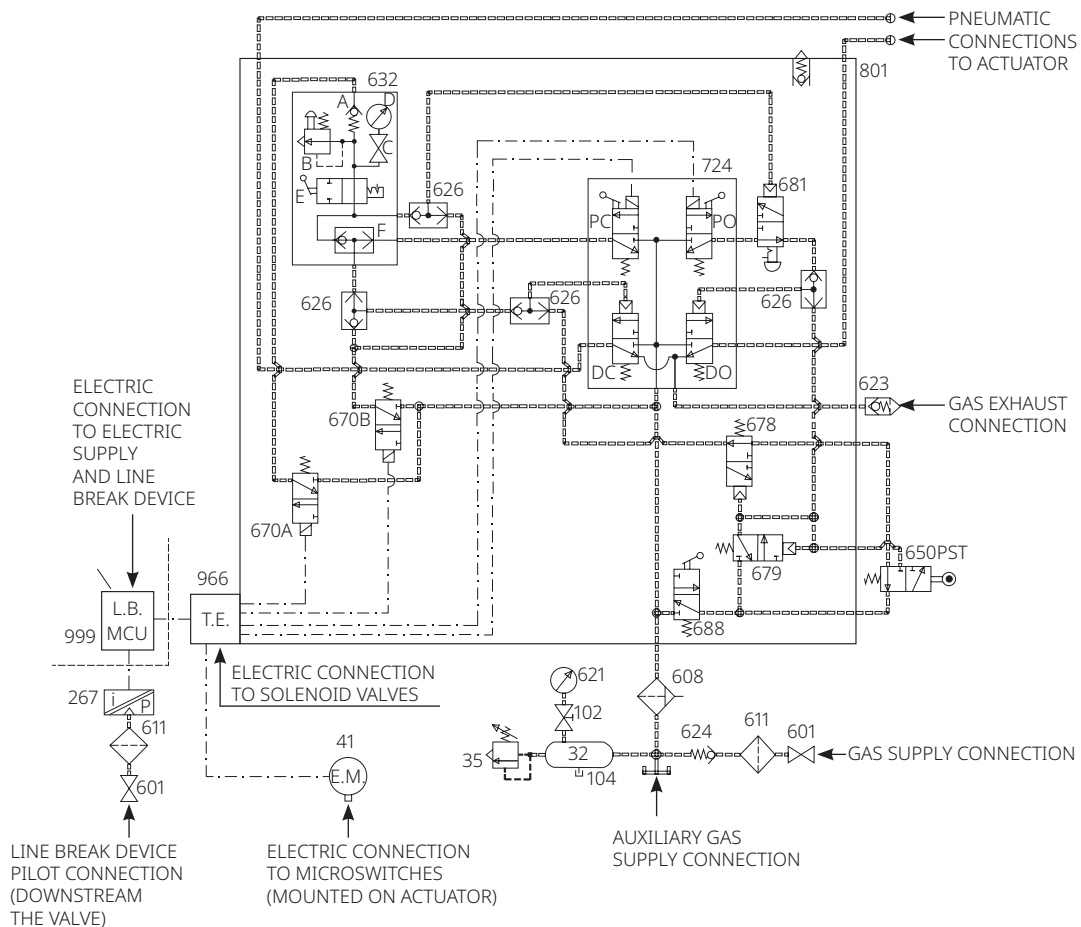
Local Partial Closure Test

Press the lever on the valve 688 and check if the actuator moves towards closing. When the actuator reaches the preset angular position, the valve 650PST is actuated: the closing operation is no longer controlled and the actuator returns to the open position.

NOTE:

The lever on valve 688 must be kept pressed until all the test cycle is completed.

Figure 3. Electronic Line Break System (ELBS) Schematic Diagram



Impulsive Signal

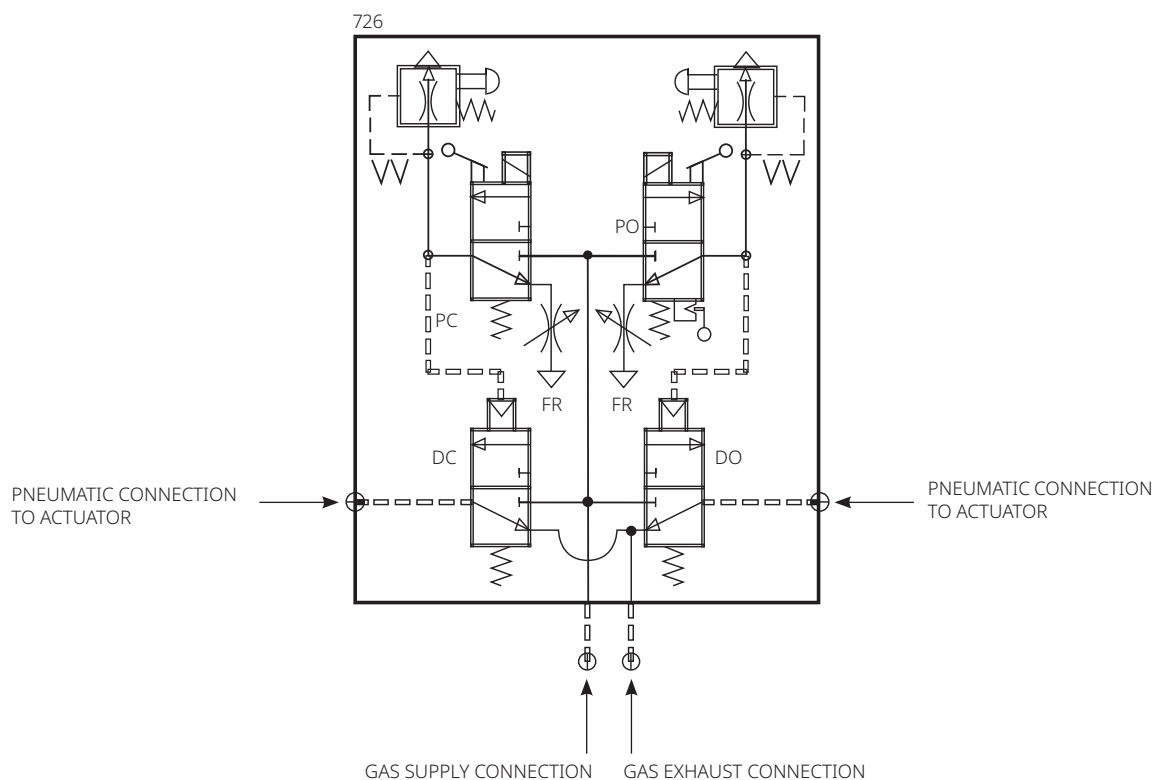
Electric Remote Control to Open and to Close

Energize by a pulse signal the solenoid valve 726-PC to close or 726-PO to open the actuator.

Local Control to Open and to Close

Press by pulse control the lever of valves 726-PC to close or 726-PO to open with power supply. PST with high-pressure SMART electronic device (IMVS) and ESD.

Figure 4. Local Remote with Auto Retain Schematic Diagram



Partial Stroking Test with High-Pressure SMART Electronic Device and ESD

ESD Closing Operation

In case of electrical supply failure to solenoid valve 669, the actuator moves in closing with the gas stored inside tank 32. At the end of the actuator stroke, the pneumatic limit switch 650-C is operated and causes the exhaust of the gas used for the operation from the gas hydraulic tank 4-C.

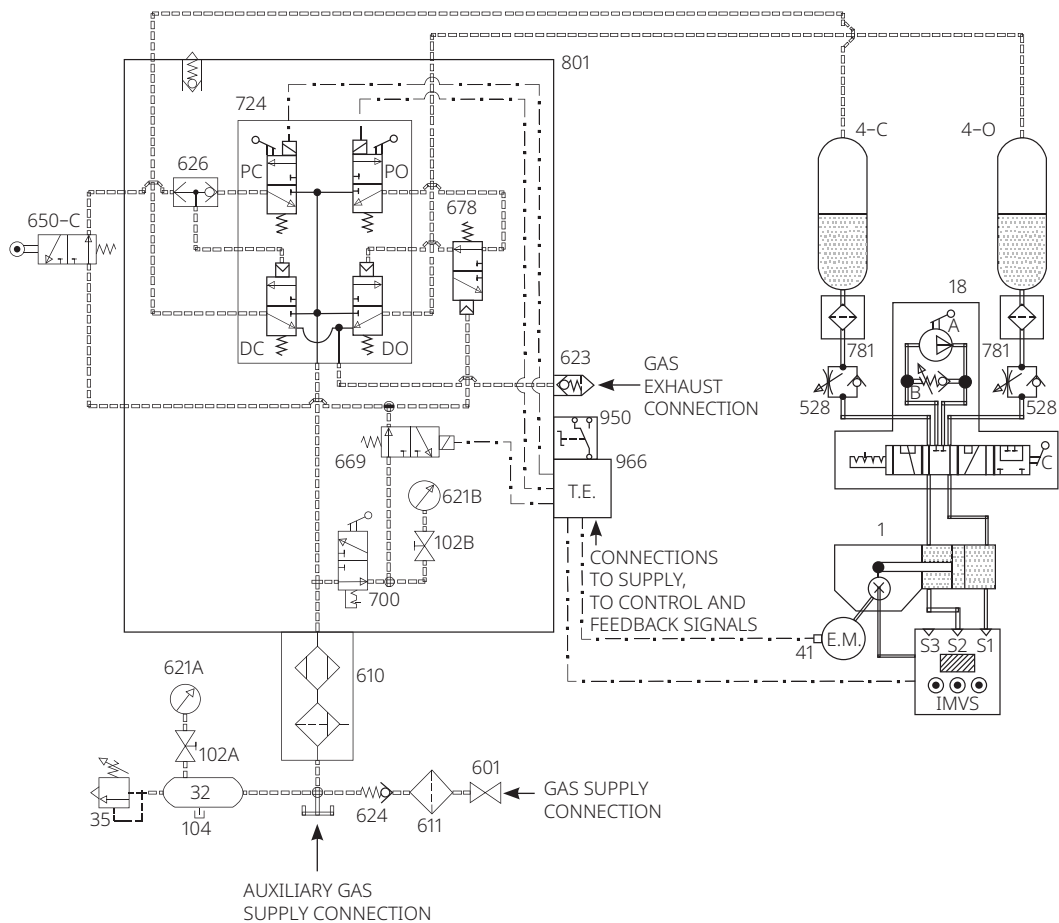
NOTE:

The ESD operation above overrides the open, close or PST operation performed locally or through the IMVS. The alarm signal is given to the control room, and in order to cancel it the actuator has to be controlled in opening or a closing command and has to be sent to the IMVS. The electrical supply must be restored to solenoid valve 669 to allow the opening operation.

Partial Stroke Test

The IMVS starts the PST operation upon the control signal, given by the control room or based on preset timing. The solenoid valve 724-PC is energized up to the point where the actuator reaches the PST angular position. The solenoid valve 724-PC is de-energized and the 724-PO is energized to return the actuator to the fully open position. The solenoid valve 724-PO is de-energized. In case of PST failure, the alarm signal is given to the control room.

Figure 5. Partial Stroke Test Schematic Diagram



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