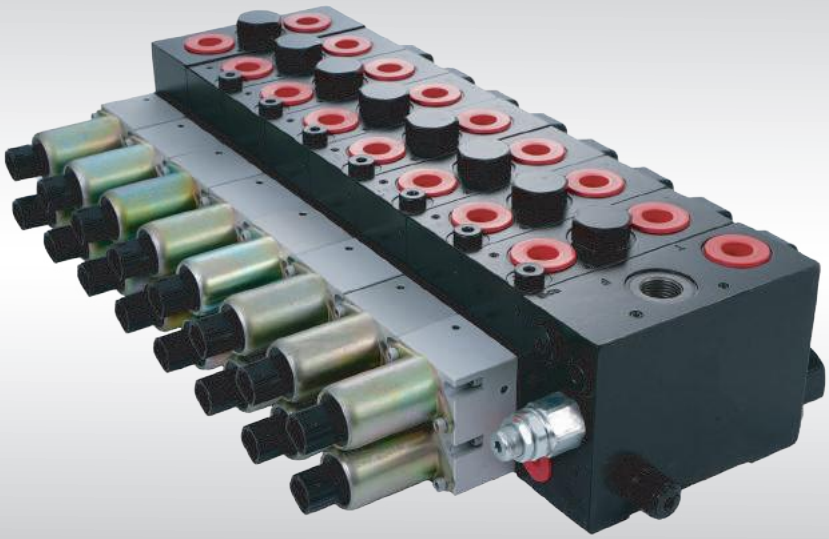
RYAN HYDRAULICS
Solution to Hydraulic System

Technical Information

Load Sensing Proportional Valves

GBV60 / GBV80 / GBV100 / GBV200



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RYAN HYDRAULICS

Keep the concept seeking excellence,

RYAN try our best to create more value for you with products and service.

RYAN Hydraulics

About RYAN

RYAN's manufacturing base was established in 1986, with quality hydraulic components and solutions to hydraulic system in the applications of engineering machinery, mobile industries, agricultural machinery, aviation, mining, and other fields. Main products include gear pump, gear motor, flow divider, orbital motor, loadsensing proportional valve, monoblock valve, sectional valve, manifold assembly and hydraulic power unit as well.

Long-term Development Strategy

Reducing emissions by new energy is one of RYAN's long-term strategies. RYAN will be providing innovative technologies, products, and services for the global development of new energy, moving towards a century development strategy, and writing a century-new chapter in the hydraulic field.

Innovation leads the future

Through a few decades of development, RYAN's manufacturing base has built an intelligent manufacturing factory, gathering international R&D talents, accumulating rich R&D and manufacturing experience, possessing independent intellectual property rights, continuously providing customers with new products and technologies, and creating value for all of the customers.






Proportional Control Valves

GBV60 Proportional Control Valves

Introduction of GBV60

GBV60 Proportional valve is a load sensitive and pre-pressure compensated proportional valve. Because of the pressure compensation, working flow is independent of load. All the proportional valves in this series have been load sensing. We can choose different cartridge unit for the main valve body to accomplish different function. This series valve is building with modular design concept, system designer can choose different module to accomplish various complicated system design. Valve spool can provide excellent flow characteristics and low flow force.

Functions

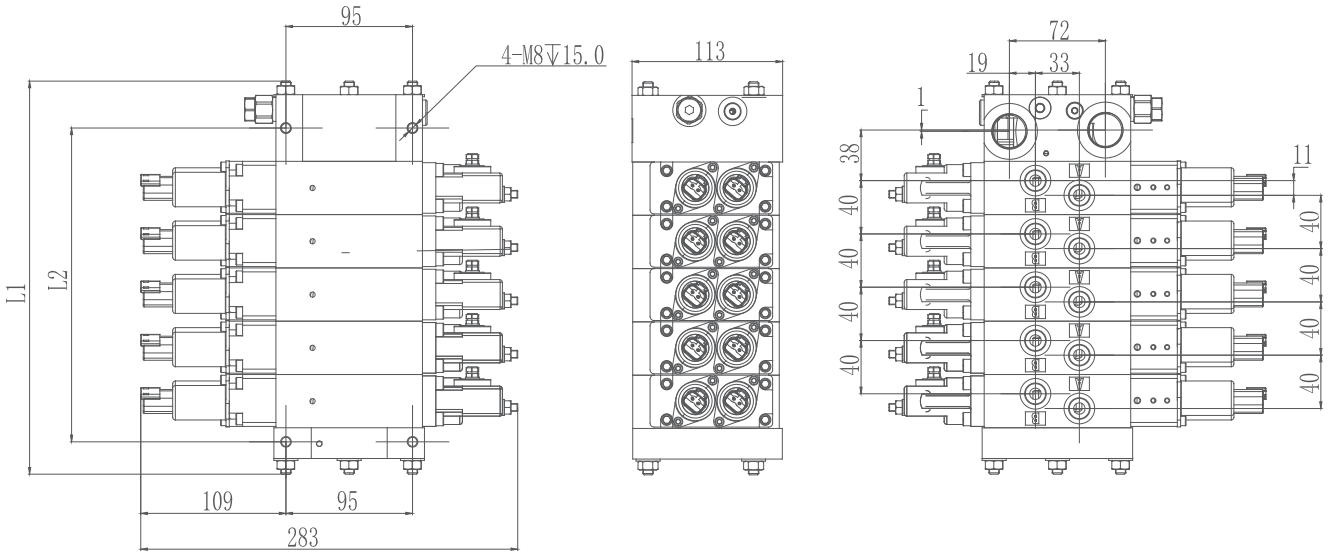
- Inlet section matches with fixed displacement pump
- Inlet section matches with variable displacement pump
- Multiple control operations
- Overload protections
- Manual proportional valve can provide mechanical and friction detent
- Floating function

Valve Options

- Manually controlled proportional valve or manually controlled flow sharing proportional valve
- Hydraulic pilot controlled proportional valve or hydraulic pilot controlled flow sharing proportional valve
- Electrically controlled proportional valve or electrically controlled flow sharing proportional valve
- Electro-hydraulic proportional valve or electro-hydraulic flow sharing proportional valve

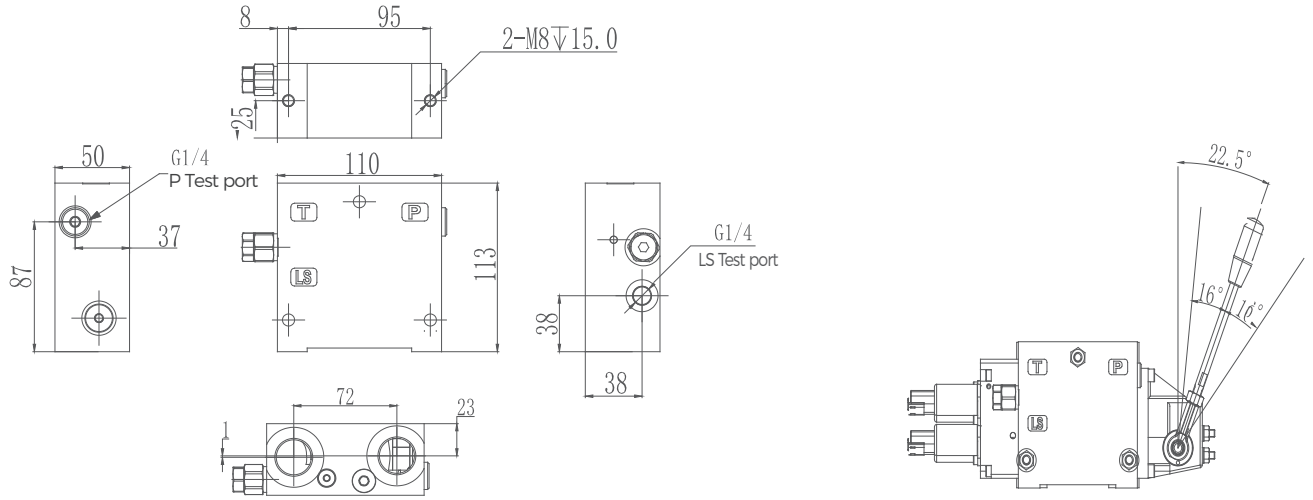
Max flow of this series is 60L/min. Maximun working pressure is 31MPa, intermittent pressure is 35 MPa. Electro-Hydraulic proportional valve can use two direct current coils: 12VDC and 24VDC, corresponding current is 0 ~ 1.5 Amp and 0 ~ 0.75 Amp.

Dimensions

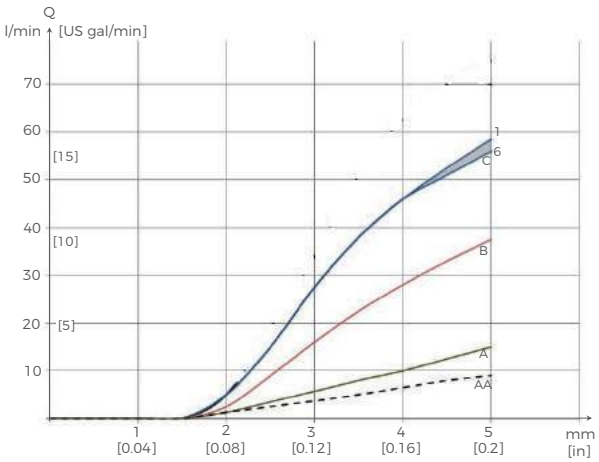


Section		1	2	3	4	5	6	7
L1	mm	135	175	215	255	295	335	375
L2	mm	75.5	115.5	155.5	195.5	235.5	275.5	315.5

Inlet section drawing



Standard Spool Flow Characteristics



AA, A, B, C indicate spool

All tests are based on 32 @ 21 mm²/s.

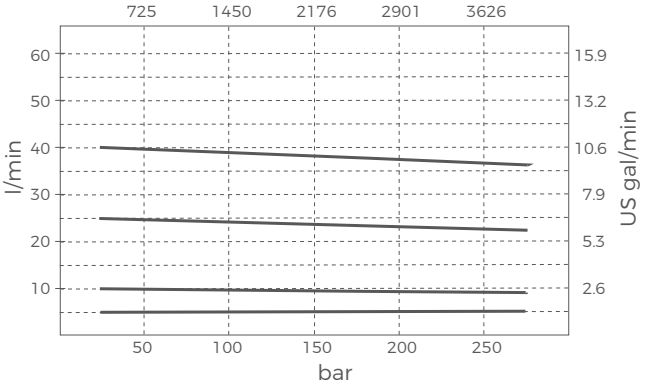
Spool stroke and flow rate with open spool.

The flow rate depends on the supply volume (Q).

This characteristic applies to total supply volume of 100 l/min.

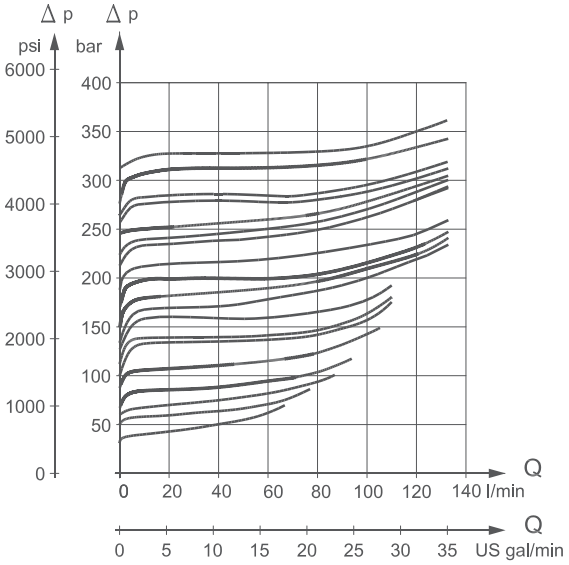
1, 6 represent the spool(C)

Load Independent Flow Characteristics (Pressure Compensation)

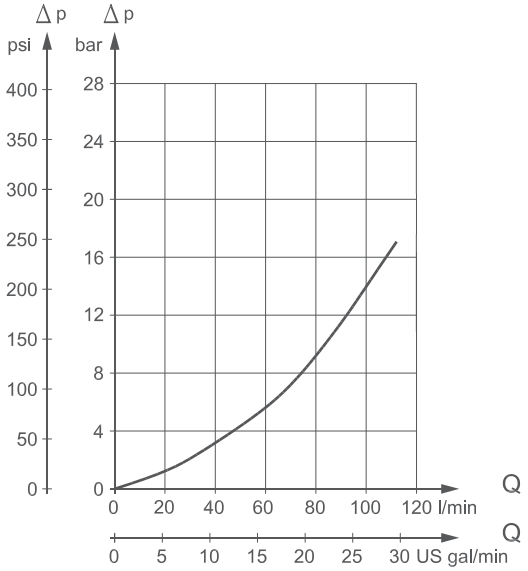


Cartridge Valve Characteristics

GBV60 Buffer Valve



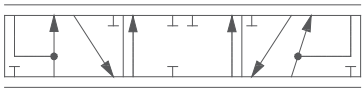
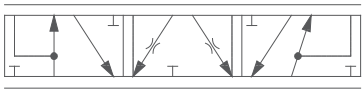
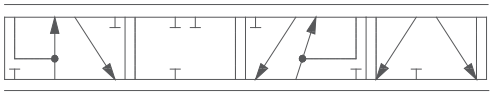
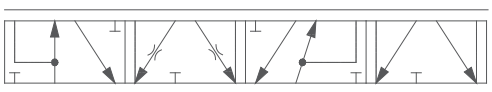
GBV60 Charge Valve



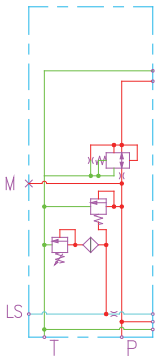
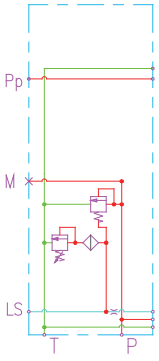
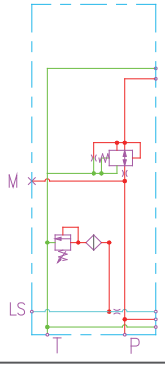
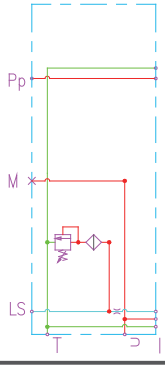
Technical Specification

Max. pressure	P port(Con.)	310 bar	[4495 psi]
	P port(Int.)	350 bar	[5075 psi]
	A/B port(Con.)	310 bar	[4495 psi]
	A/B port(Int.)	350 bar	[5075 psi]
	T port(Static/dynamic)	25/40 bar	[365/580 psi]
Rated flow	P port	100 l/min	[22 US gal/min]
	A/B port	55 l/min	[12 US gal/min]
Spool Stroke	Dead Zone	±1.5 mm	[±0.06 in]
	Proportional range	±5.0 mm	[±0.2 in]
	Floating position	±7.5 mm	[±0.3 in]
Max. internal leakage at 100bar [1450 psi] and 21mm² [102 SUS]	A/B → T w/o cushion valve	20 cm³/min	[1.85 in³/min]
	A/B → T cushion valve system setup 30 bar [435 psi]	25 cm³/min	[2.15 in³/min]
Oil port (Temperature)	Recommend	30 → 60 ℃	[86 → 140 ℉]
	Min.	-30 ℃	[-22 ℉]
	Max.	90 ℃	[194 ℉]
Ambient temperature		-30 → 60 ℃	[-22 → 140 ℉]

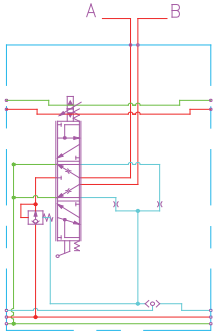
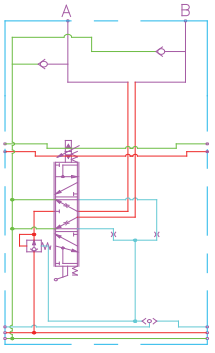
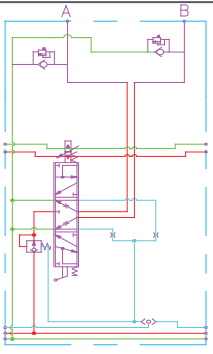
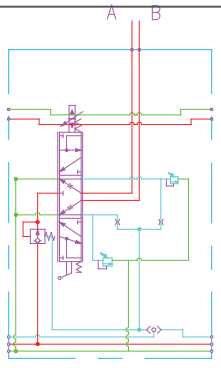
Main Spool Functions

Code	Symbol	Functions	Notes
FG1		Standard 3 position-4 way O type middle function Pre-pressure compensation	Usually used in controlling cylinder
FG2		3 position-4 way Y type middle function Pre-pressure compensation	Usually used in controlling motor
FG3		Standard 3 position-4 way O type middle function 4th position floating Pre-pressure compensation	Usually used in controlling cylinder
FG4		3position-4 way Y type middle function 4th position floating Pre-pressure compensation	Usually used in controlling cylinder

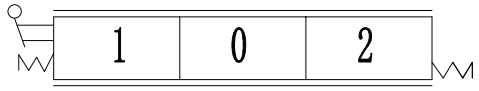
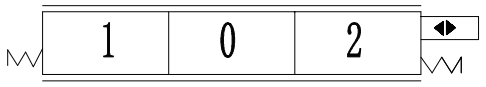
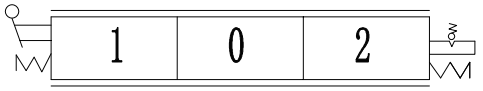
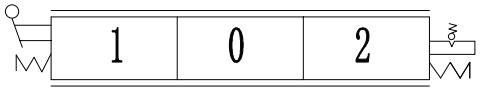
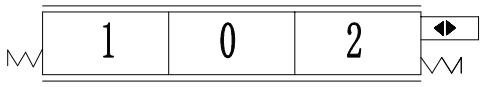
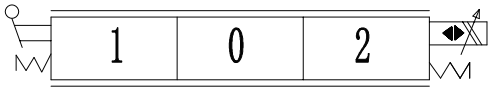
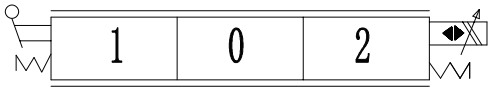
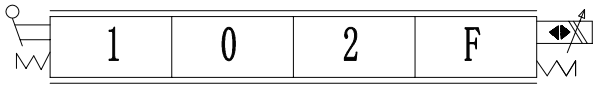
Inlet Section Valve Functions and Schematics

Code	Schematics	Main Functions	Standard Port Sizes
J01		Used in closed circuits with electronically controlled fixed displacement pumps. With pilot oil source.	LS: M14X1.5, G1/4 M: M14X1.5, G1/4 T: M22X1.5, G1/2 P: M22X1.5, G1/2
J02		Used in closed circuits with electronically controlled fixed displacement pumps. Requires external pilot oil source.	Pp: M14X1.5, G1/4 LS: M14X1.5, G1/4 M: M14X1.5, G1/4 T: M22X1.5, G1/2 P: M22X1.5, G1/2
J03		Used in closed circuits with electronically controlled variable displacement pumps. With pilot oil source.	LS: M14X1.5, G1/4 M: M14X1.5, G1/4 T: M22X1.5, G1/2 P: M22X1.5, G1/2
J04		Used in closed circuits with electronically controlled variable displacement pumps. Requires external pilot oil source.	Pp: M14X1.5, G1/4 LS: M14X1.5, G1/4 M: M14X1.5, G1/4 T: M22X1.5, G1/2 P: M22X1.5, G1/2

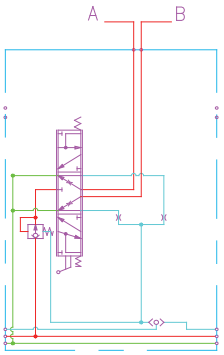
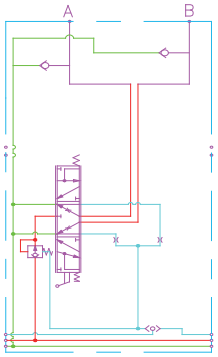
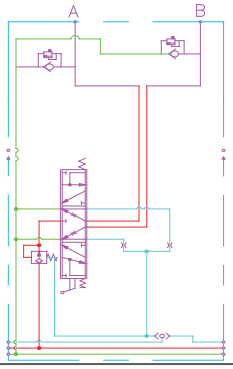
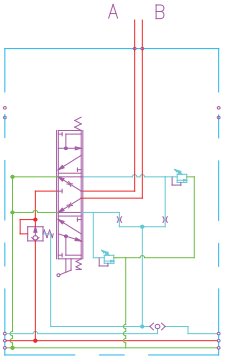
Main Valve Functions and Schematics

Code	Schematics	Main Functions	Notes
Z01		Pre-pressure compensation (load sensing) Basic module	
Z02		Pre-pressure compensation (load sensing) Oil suction valve at working port prevents system from cavitation	Mostly used for motors
Z03		Pre-pressure compensation (load sensing) Relief valve at the working port to prevent system overload Oil suction valve to prevent the system from cavitation	
Z04		Pre-pressure compensation (load sensing) Relief valve on the LS port of work port to avoid system overloading	

Drive Types for Main Valve Section

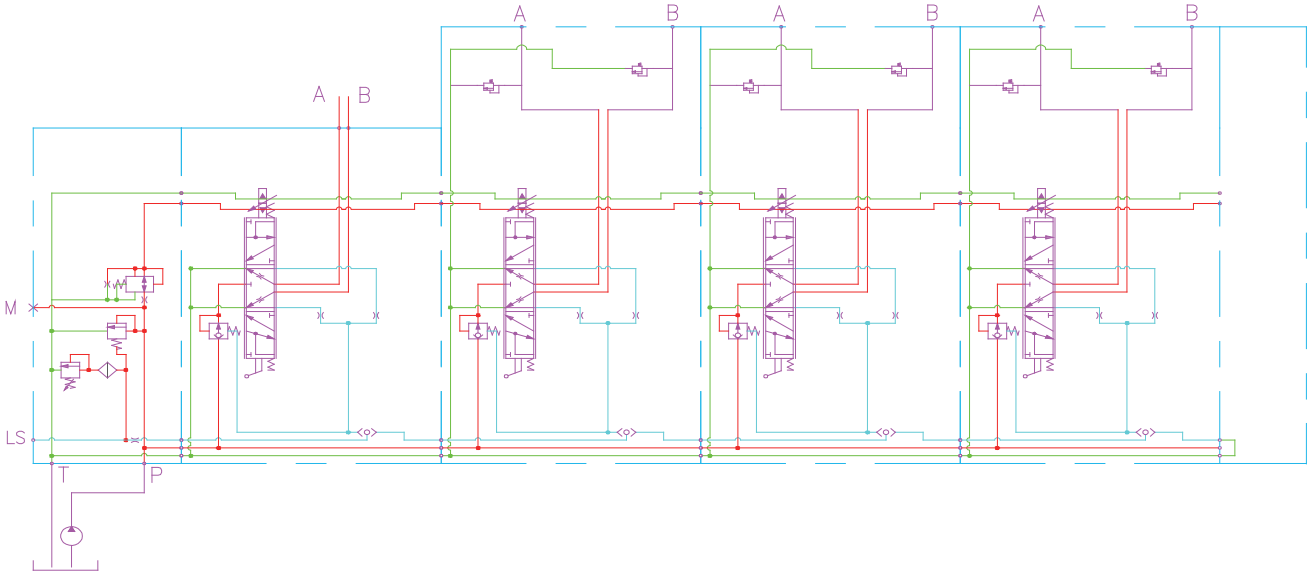
Code	Symbol	Functions
Q1		Standard manually operated
Q2		Hydraulic proportional control
Q3		Manually operated with detent
Q4		Manually operated with floating function
Q5		Electric on/off control
Q6		Standard Electro-hydraulic proportional control
Q7		Standard Electro-hydraulic proportional control with manual override
Q8		Standard Electro-hydraulic proportional control with floating function

End Section Functions and Schematics

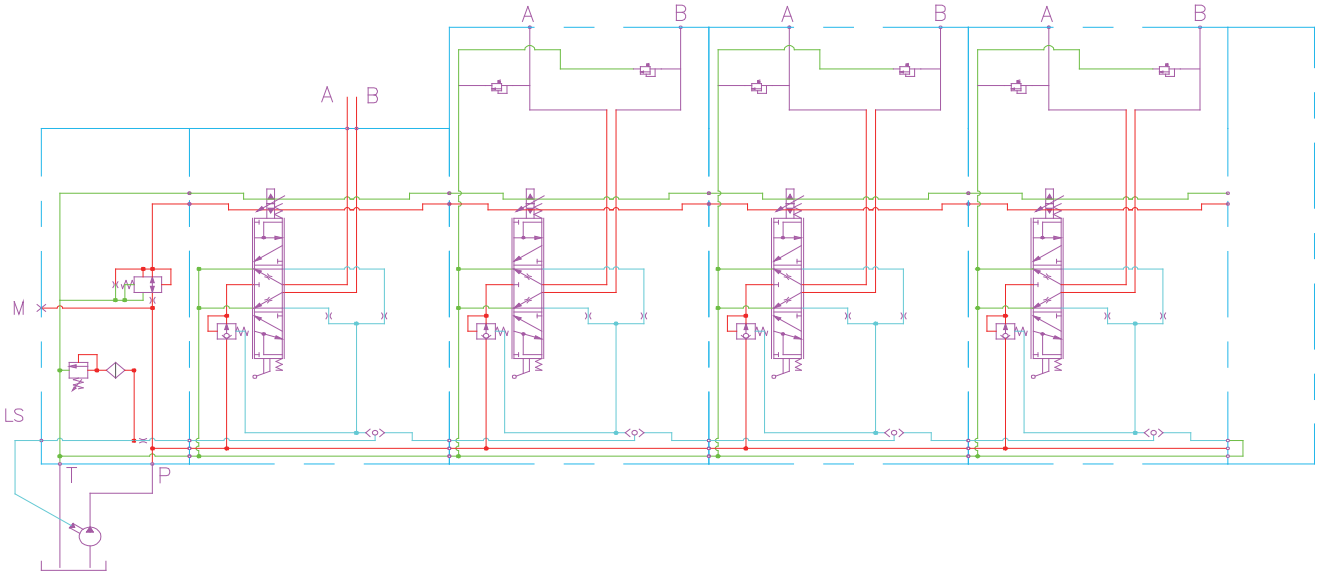
Code	Schematics	Main Functions	Notes
Z05		Pre-pressure compensation (load sensing) Basic valve section	
Z06		Pre-pressure compensation (load sensing) Check valve in working port to prevent air cavitation of system	Mostly used for motors
Z07		Pre-pressure compensation (load sensing) Relief valve in working port to prevent overload and check valve to prevent air cavitation of system	
Z08		Pre-pressure compensation (load sensing) Relief valve on the LS port of work port to avoid system overloading	

Hydraulic System Examples

Electro-hydraulic proportional control circuit with fixed displacement pump
(Pre-pressure compensation)



Electro-hydraulic proportional control circuit with variable displacement pump
(Pre-pressure compensation)



Ordering Code

GBV60	-*	-J**	/***	-D**	-O1	-Z**	Q*	-FG*	-DC/**	-QL/***	-O2	...
a	b	c	d	e	f	g	h	i	j	k	l	m

ⓐ Model
ⓑ Number of main section
ⓒ Inlet section code
ⓓ Main relief valve setting pressure (bar)
ⓔ End section code(End cap)
if no end cap is required use code D00
ⓕ First main section
ⓖ Main section code
ⓗ Drive style code
ⓘ Spool function code
ⓙ Electrical option
12VDC, 24VDC, 00=None electrical
ⓚ Flow rate
ⓛ Second section
ⓜ .....

**If the standard port is not selected, please provide the order code and the port size.

Ordering Example

GBV60	-3	-J03	/210	-D00	-O1	-Z02	-Q6	-FG1	-DC/24	-QL/60
a	b	c	d	e	f	g	h	i	j	k

ⓐ Model
ⓑ Three main sections
ⓒ Inlet code
ⓓ Relief setting 210bar
ⓔ No end cap
ⓕ First section
ⓖ Main section code
ⓗ Drive style
ⓘ Spool function
ⓙ 24VDC
ⓚ Flow 60L/min

-O2	-Z01	-Q6	-FG1	-DC/24	-QL/50
l	m	n	o	p	q

-O3	-Z01	-Q6	-FG1	-DC/24	-QL/40
r	s	t	u	v	w

ⓛ Second section
ⓜ Main section code
ⓝ Drive style code
ⓞ Spool function code
ⓟ 24VDC
ⓠ Flow 40L/min

ⓡ Third section
ⓢ Main section code
ⓣ Drive style code
ⓤ Spool function code
ⓥ 24VDC
ⓦ Flow 30L/min

Ordering example notes: From system example, the selected valve is GBV60 series, we know that the valve has three sections. Inlet relief valve setting pressure is 21MPa. There is no end section. Return from inlet section, the first section has no load relief valve. The section is driven by 24VDC coils. The spool middle function is a O type. The required flow is 60L/min. The second section is also driven by 24VDC coils. There is no overload relief on neither A or B port. The spool middle function is O type, The required flow is 40L/min. The third section is driven by 24VDC coils. No overload relief on neither A or B port. Spool middle function is O type. The required flow is 30L/min.

Proportional Control Valves

GBV80 Proportional Control Valves

GBV80 Load-Sensing Proportional Control Valve Introduction

GBV80 is a load-sensing proportional hydraulic control valve, designed to achieve optimal equipment performance and maximum design flexibility. The control valve adopts a modular concept, allowing equipment designers to customize solutions to meet diverse applications in the diverse market.
It belongs to the GBV product platform and interface of other valve series, enabling a single valve block to control all machine functions.
It can regulate a maximum operating flow rate of 125 L/min [33 US gal/min] and an operating oil pressure of up to 420 bar [6090 psi].
Load-independent proportional control, high-performance electro-hydraulic technology, and low-pressure-drop design optimize equipment performance and efficiency, increasing productivity while reducing energy consumption.

GBV80 Features

The features and advantages of the GBV80 load-sensing proportional valve are summarized as follows:

- Load-independent flow control:
  The supply flow to a specific actuator is independent of its load pressure
  The supply flow to a specific actuator is independent of the load pressure of other actuators
- When using the interface module, it can be combined with other products in the GBV series
- Each GBV80 valve bank can be equipped with up to 12 working modules
- Excellent speed adjusting characteristics
- Pressure reduction at ports A and B reduces energy loss while achieving the required pressure
- Pipe joint and flange connection options
- Compact design, easy to install and maintain
- Energy-efficient
- Lightweight

Other Technical Characteristics

The features of the oil inlet, working module housing, and actuation methods are as follows:

Oil Inlet Includes:

- Internal flow control valve
- Pressure test port
- Applicable to different types of models:

Open circuit system, with fixed-displacement pump
Closed circuit system, with variable-displacement pump

- Integrated pilot oil supply

Working Module Housing Includes:

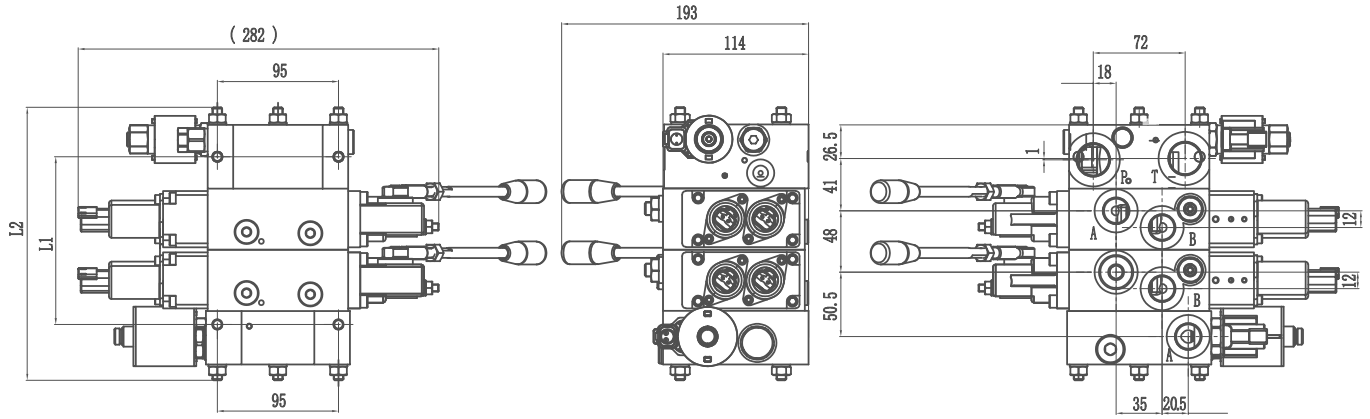
- Replaceable valve spool
- Pressure test port
- Applicable to models for different application requirements:

Internal compensator for load-independent flow
P-channel integrated load-holding check valve
Integrated pilot pressure compensator
Integrated local drain valve

Actuation Methods Include:

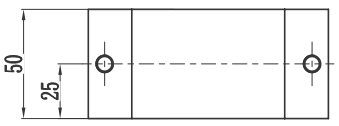
- Manual control:
  With handle
  With friction positioning
- Hydraulic control
- Electro-hydraulic control:
  On/off control
  Proportional control
  CAN bus proportional control
  PWM proportional control

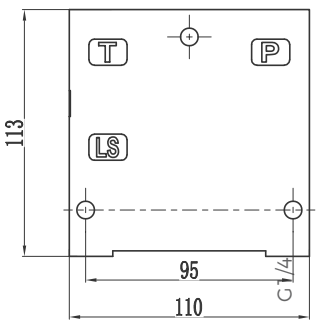
Dimensions

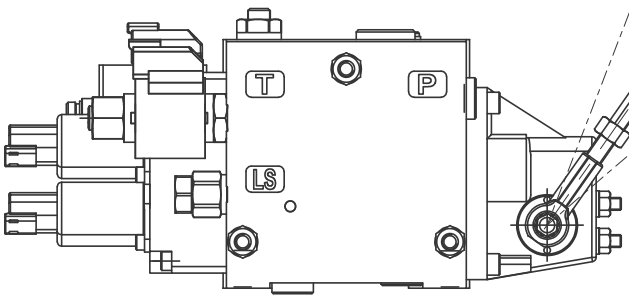


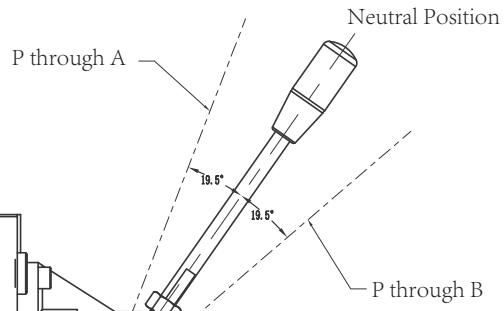
Section		1	2	3	4	5	6	7	8
L1	mm	83	131	179	227	275	323	371	419
L2	mm	118	166	214	262	310	358	406	454

Inlet section drawing





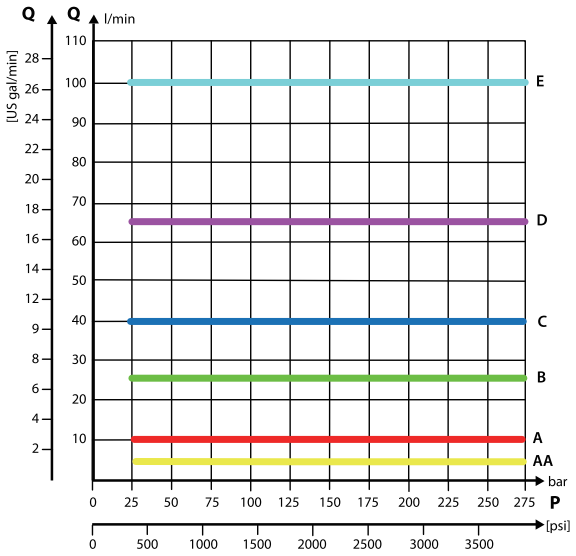




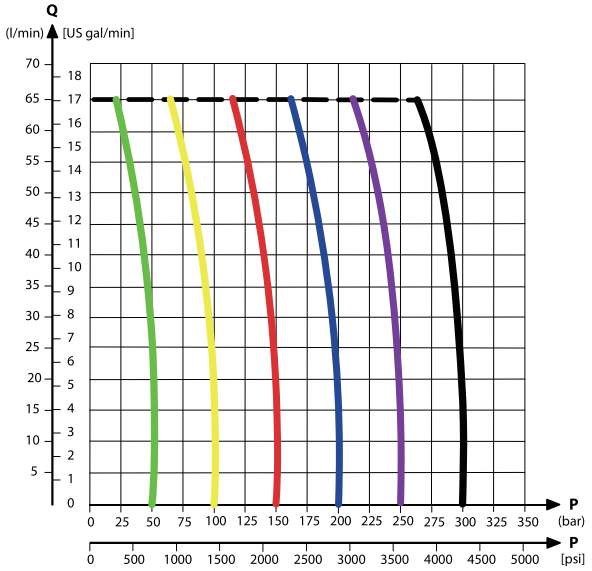
Fixed displacement pump

Variable displacement pump

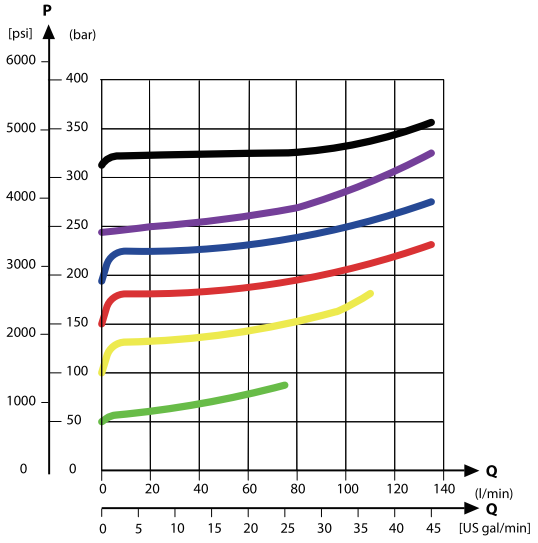
Main valve body pressure compensation curve



Main valve body LS A/B pressure curve



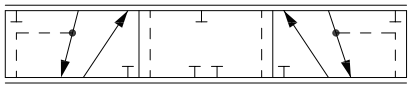
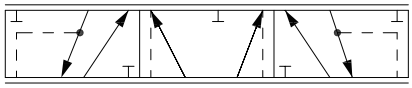
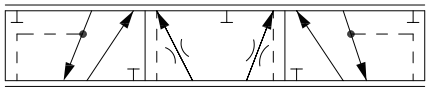
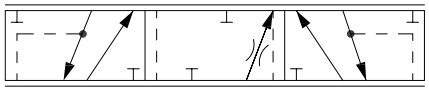
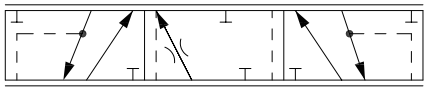
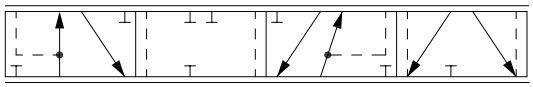
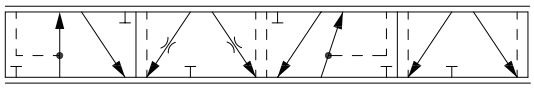
Main valve body cushion valve pressure curve



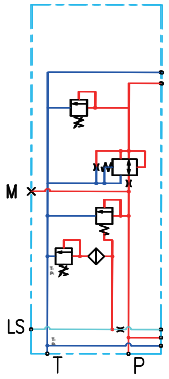
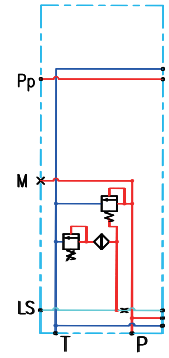
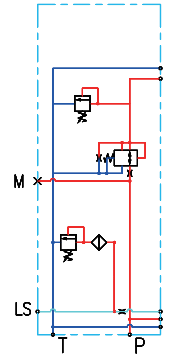
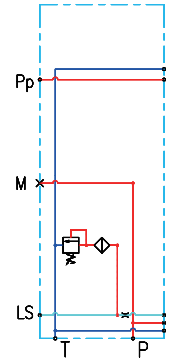
Technical Parameters

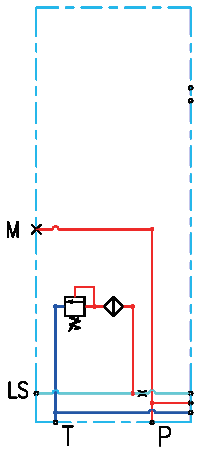
Maximum Pressure	Port P Continuous	310 bar
	Port P Intermittent	350 bar
	Ports A/B Continuous	310 bar
	Ports A/B Intermittent	350 bar
	Port T Static/Dynamic	25/40 bar
Rated Flow	Port P	140 l/min
	Ports A/B	120 l/min
Spool Stroke	Dead Zone	±1.5 mm
	Proportional Range	±7.0 mm
Maximum Internal Leakage@ 100bar [1450 psi]&21mm²[102 SUS]	A/B→T without Cushion Valve	20cm³/min
	A/B→T with Cushion Valve 30bar [435 psi] System Set 30 bar [435 psi]	25cm³/min
Port Temperature	Recommended Temperature	30 → 60 ℃
	Minimum Temperature	-30 ℃
	Maximum Temperature	90 ℃
Ambient Temperature		-30 → 60 ℃

Spool Functions

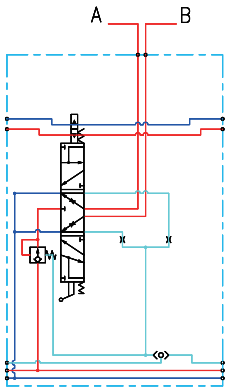
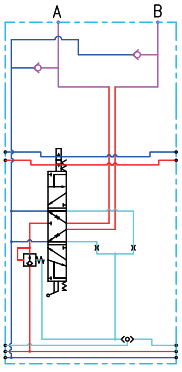
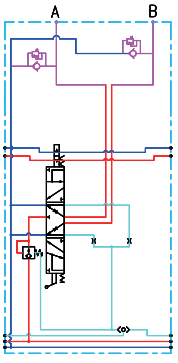
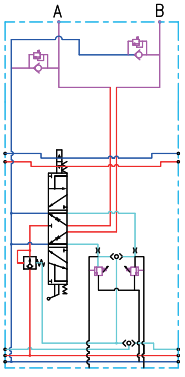
Code	Schematics	Main Functions
FG1		Flow Control Spool - Closed Neutral
FG2		Flow Control Spool - Open Neutral
FG3		Flow Control Spool - Throttle Open Neutral
FG4		Flow Control Spool - Throttle A-T Neutral
FG5		Flow Control Spool - Throttle B-T Neutral
FG6		O-Type Function 4th Section Float Pre-Position Compensation
FG7		Y-Type Function 4th Section Float Pre-Position Compensation

Inlet Section Valve Functions and Schematics

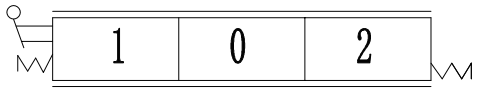
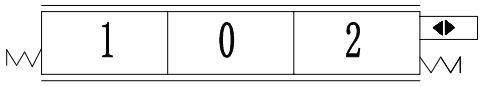
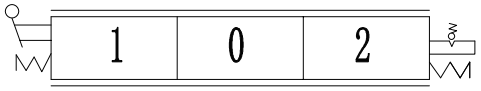
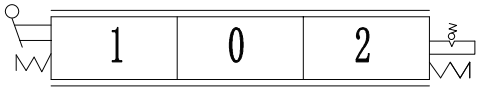
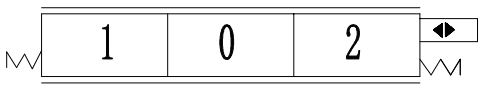
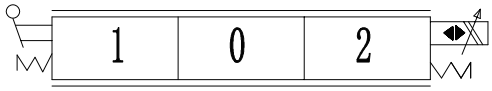
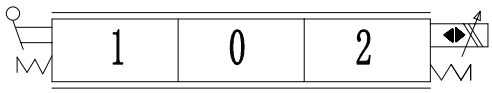
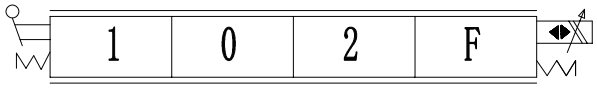
Code	Schematics	Main Functions	Notes
J01		Used in closed circuits with electronically controlled fixed displacement pumps. Requires external pilot oil source.	P,T:G3/4;A,B:G1/2
J02		Used in closed circuits with electronically controlled fixed displacement pumps. With pilot oil source.	P,T:G3/4;A,B:G1/2
J03		Used in closed circuits with electronically controlled fixed displacement pumps. Requires external pilot oil source.	P,T:G3/4;A,B:G1/2
J04		Used in closed circuits with electronically controlled fixed displacement pumps. With pilot oil source.	P,T:G3/4;A,B:G1/2

Code	Schematics	Main Functions	Notes
J05		Used in closed circuits with electronically controlled fixed displacement pumps. Requires external pilot oil source.	P,T:G3/4;A,B:G1/2

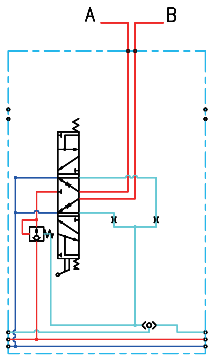
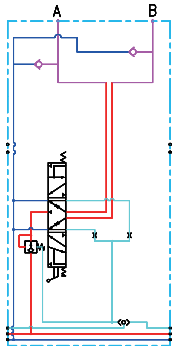
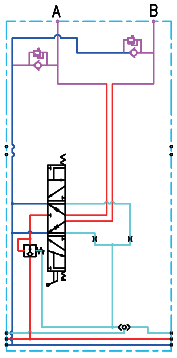
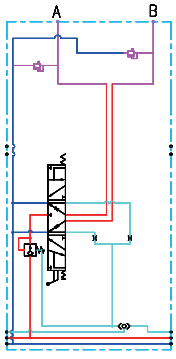
Main Valve Functions and Schematics

Code	Schematics	Main Functions	Notes
Z01		Pre-position pressure compensation (proportional distributer) Basic module	
Z02		Pre-position pressure compensation (proportional distributer) Work port with suction valve anti-cavitation	Mostly used for motors
Z03		Pre-position pressure compensation (proportional distributer) Work port with relief valve to prevent system overload and suction valve. anti-cavitation	
Z04		Pre-position pressure compensation (proportional distributer) Work port with relief valve to prevent system overload A,B with LS pressure protection valve	

Drive Types for Main Valve Section

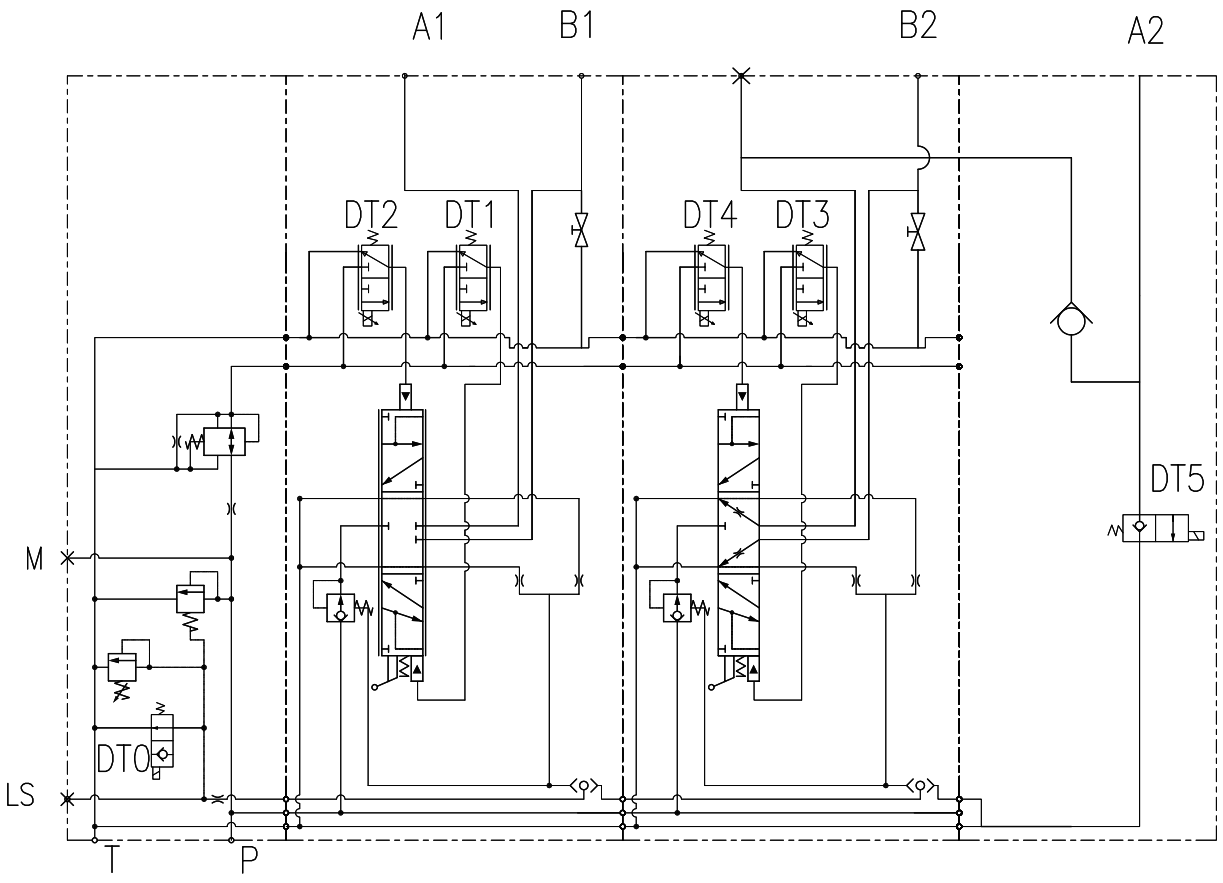
Code	Symbol	Functions
Q1		Standard manually operated
Q2		Hydraulic control
Q3		Manually operated with detent
Q4		Manually operated with floating function
Q5		Electric on/off control
Q6		Standard Electro-hydraulic proportional control
Q7		Standard Electro-hydraulic proportional control with manual override
Q8		

End Section Functions and Schematics

Code	Schematics	Main Functions	Notes
Z05		Pre-pressure compensation (load sensing) Basic module	
Z06		Pre-pressure compensation (load sensing) Check valve in working port to prevent air cavitation of system	Mostly used for motors
Z07		Pre-pressure compensation (load sensing) Relief valve in working port to prevent overload and check valve to prevent air cavitation of system	
Z08		Pre-pressure compensation (load sensing) Relief valve on the LS port of work port to avoid system overloading	

Hydraulic System Examples

Hydraulic schematic diagram



Ordering Code

GBV80	-*	-J**	/***	-D**	-O1	-Z**	Q*	-FG*	-DC/**	-QL/***	-O2	...
a	b	c	d	e	f	g	h	i	j	k	l	m

ⓐ Model
ⓑ Number of main section
ⓒ Inlet section code
ⓓ Main relief valve setting pressure (bar)
ⓔ End section code(End cap)
if no end cap is required use code D00
ⓕ First main section
ⓖ Main section code
ⓗ Drive style code
ⓘ Spool function code
ⓙ Electrical option
12VDC, 24VDC, 00=None electrical
ⓚ Flow rate
ⓛ Second section
ⓜ .....

**If the standard port is not selected, please provide the order code and the port size.

Ordering Example

GBV80	-3	-J03	/210	-D00	-O1	-Z02	-Q6	-FG1	-DC/24	-QL/80
a	b	c	d	e	f	g	h	i	j	k

ⓐ Model
ⓑ Three main sections
ⓒ Inlet code
ⓓ Relief setting 210bar
ⓔ No end cap
ⓕ First section
ⓖ Main section code
ⓗ Drive style
ⓘ Spool function
ⓙ 24VDC
ⓚ Flow 80L/min

-O2	-Z01	-Q6	-FG1	-DC/24	-QL/80
l	m	n	o	p	q

ⓛ Second section
ⓜ Main section code
ⓝ Drive style code
ⓞ Spool function code
ⓟ 24VDC
ⓠ Flow 80L/min

-O3	-Z01	-Q6	-FG1	-DC/24	-QL/30
r	s	t	u	v	w

ⓡ Third section
ⓢ Main section code
ⓣ Drive style code
ⓤ Spool function code
ⓥ 24VDC
ⓦ Flow 30L/min

Ordering example notes: From system example, the selected valve is GBV80 series, we know that the valve hasthree sections. inlet relief valve setting pressure is 21MPa. There is no end section. Return from inlet section, thefirst section has no load relief valve. The section is driven by 24vDc coils. The spool middle function is a 0 type. Thereguired flow is 60L/min. The second section is also driven by 24vDc coils. There is no overload relief on neither Aor B port. The spool middle function is O type, The required flow is 40L/min. The third section is driven by 24VDccoils. No overload relief on neither A or B port. spool middle function is O type. The required flow is 30L/min.

Proportional Control Valves

GBV100 Proportional Control Valves

Introduction of GBV100

GBV100 Proportional valve is a load sensitive and post-pressure compensated proportional valve. For post-pressure compensation valve, it can distribute flow proportionally for each working function. Because of the pressure compensation, working flow is independent of load. All the proportional valves in this series have been load sensing and spring return. We can choose different cartridge unit for the main valve body to accomplish different function. This series valve is building with modular design concept, system designer can choose different module to accomplish various complicated system design. Valve spool can provide excellent flow characteristics and low flow force.

Functions

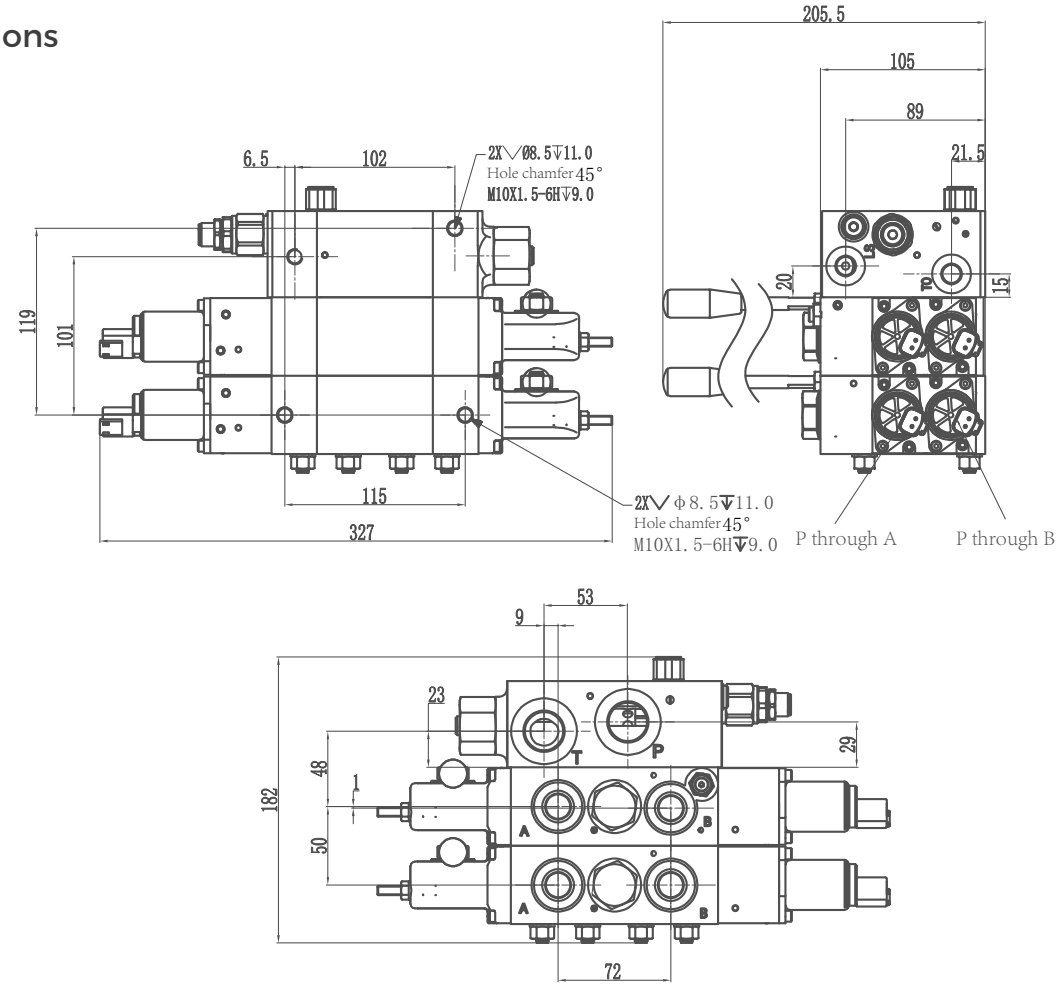
- Inlet section matches with fixed displacement pump
- Inlet section matches with variable displacement pump
- Multiple control operations
- Overload protections
- Manual proportional valve can provide mechanical and friction detent
- Main valve with float function

Valve Options

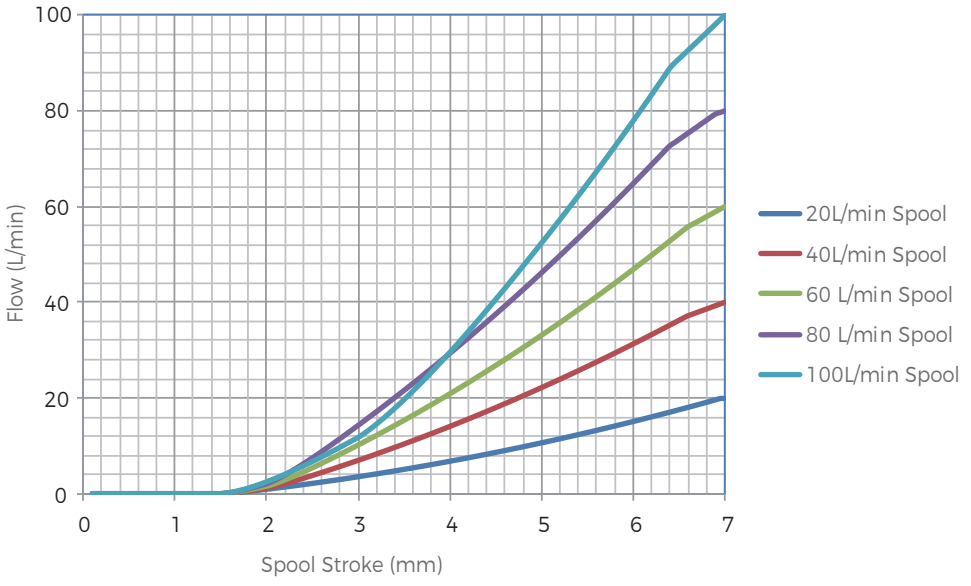
- Manually controlled proportional valve or mechanically controlled flow sharing proportional valve
- Hydraulic pilot controlled proportional valve or hydraulic pilot controlled flow sharing proportional valve
- Electrically controlled on/off valve or electrically controlled flow sharing proportional valve
- Electro-hydraulic proportional valve or electro-hydraulic flow sharing proportional valve

Max flow of this series is 100L/min. Rated pressure is 31MPa. Inermittent pressure is 35 MPa.
Electro-Hydraulic proportional valve can use two direct current coils: 12VDC and 24VDC, corresponding current is 0 ~ 1.5 Amp and 0 ~ 0.75 Amp.

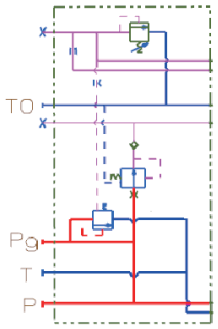
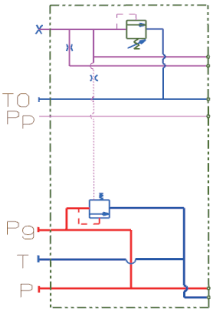
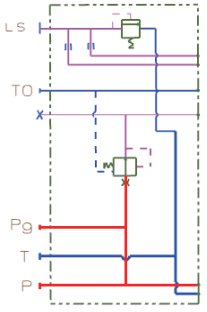
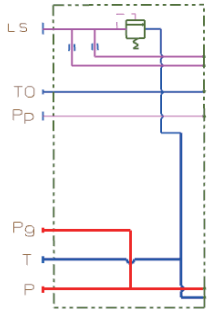
Dimensions



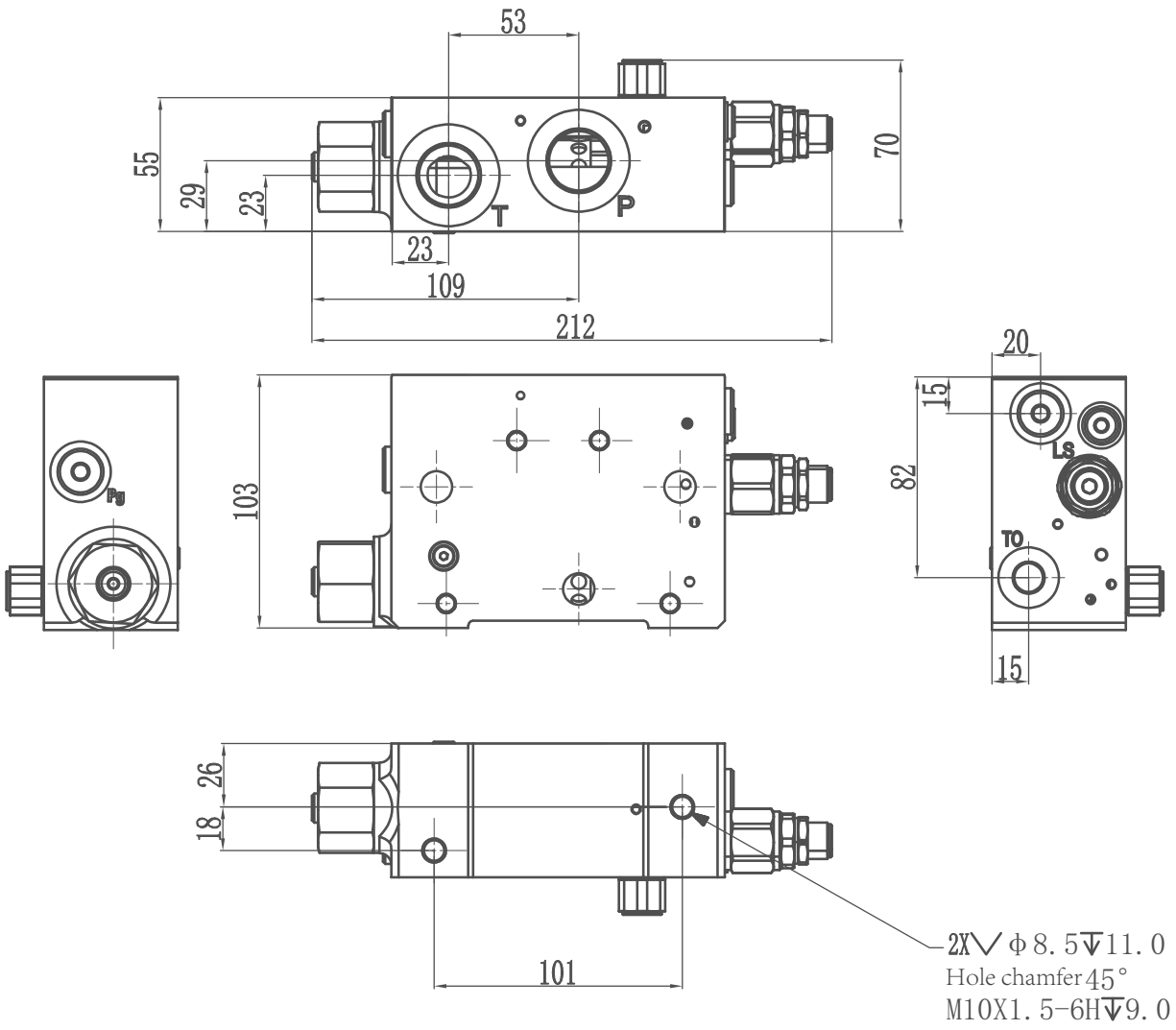
Characteristic for Standard Spool



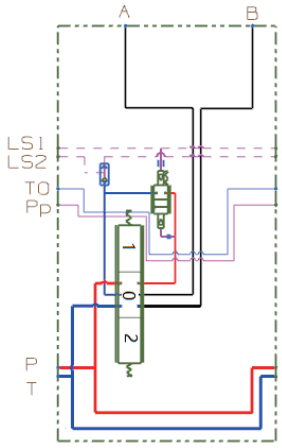
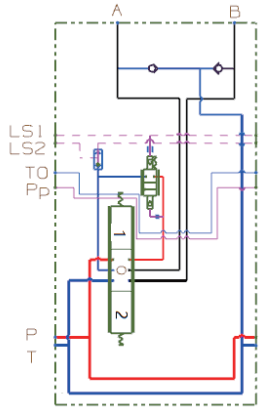
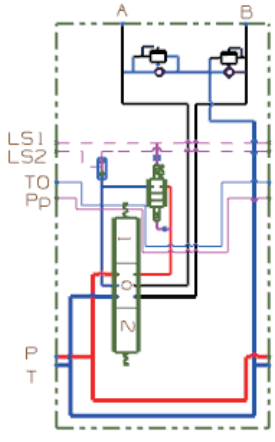
Inlet Section Valve Functions and Schematics

Code	Schematics	Functions	Standard Port Sizes
J01		Used in fixed displacement pump system with pilot oil source	Pg: M14X1.5, G1/4 T0: M14X1.5, G1/4 T: M27X2, G3/4 P: M27X2, G3/4
J02		Used in closed circuits with fixed displacement pumps. Requires external pilot oil source	Pp: M14X1.5, G1/4 Pg: M14X1.5, G1/4 T0: M14X1.5, G1/4 T: M27X2, G3/4 P: M27X2, G3/4
J03		Used in closed circuits for variable displacement pumps with pilot oil source	LS: M14X1.5, G1/4 Pg: M14X1.5, G1/4 T0: M14X1.5, G1/4 T: M27X2, G3/4 P: M27X2, G3/4
J04		Used in closed circuits with variable displacement pumps. Requires external pilot oil source	LS: M14X1.5, G1/4 Pp: M14X1.5, G1/4 Pg: M14X1.5, G1/4 T0: M14X1.5, G1/4 T: M27X2, G3/4 P: M27X2, G3/4

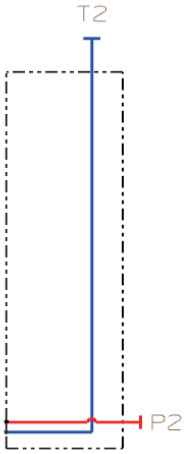
Inlet Section Dimensions



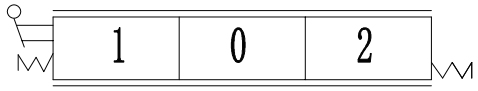
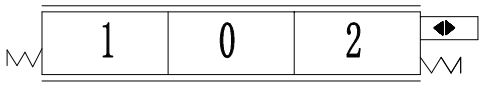
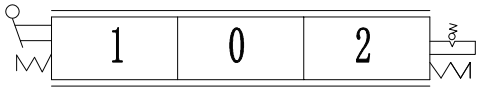
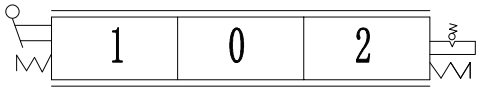
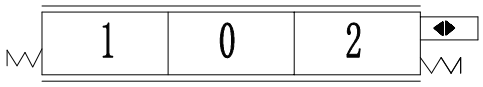
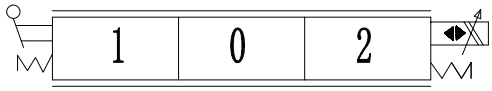
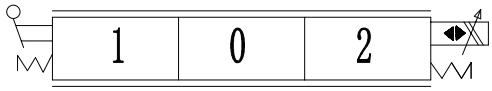
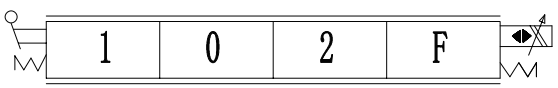
Main Valve Functions and Schematics

Code	Schematics	Functions	Notes
Z01		Post-pressure compensation (proportional flow sharing) Basic valve body	Standard port sizes Working oil ports A and B: M27×2, G3/4
Z02		Post-pressure compensation (proportional flow sharing) Check valve in working port to prevent cavitation of system	Usually used in hydraulic motor
Z03		Post-pressure compensation (proportional flow sharing) Relief valve in working port to prevent overload and check valve to prevent cavitation of system	

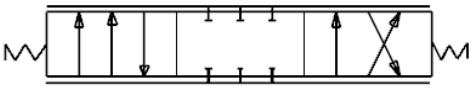
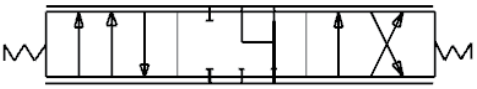
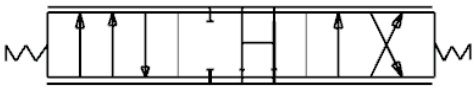
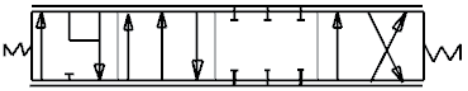
End Cap Functions and Schematics

Code	Schematics	Functions	Notes
D01		Usually used with fixed displacement pump	Port Size T2: M27×2 P2: G3/4

Drive Types for Main Valve Section

Code	Symbol	Functions
Q1		Standard manually operated
Q2		Hydraulic control
Q3		Manually operated with detent
Q4		Manually operated with floating function
Q5		Electric control(on/off)
Q6		Standard electro-hydraulic proportional control
Q7		Standard electro-hydraulic proportional control with manual overide
Q8		Standard electro-hydraulic proportional control with floating function

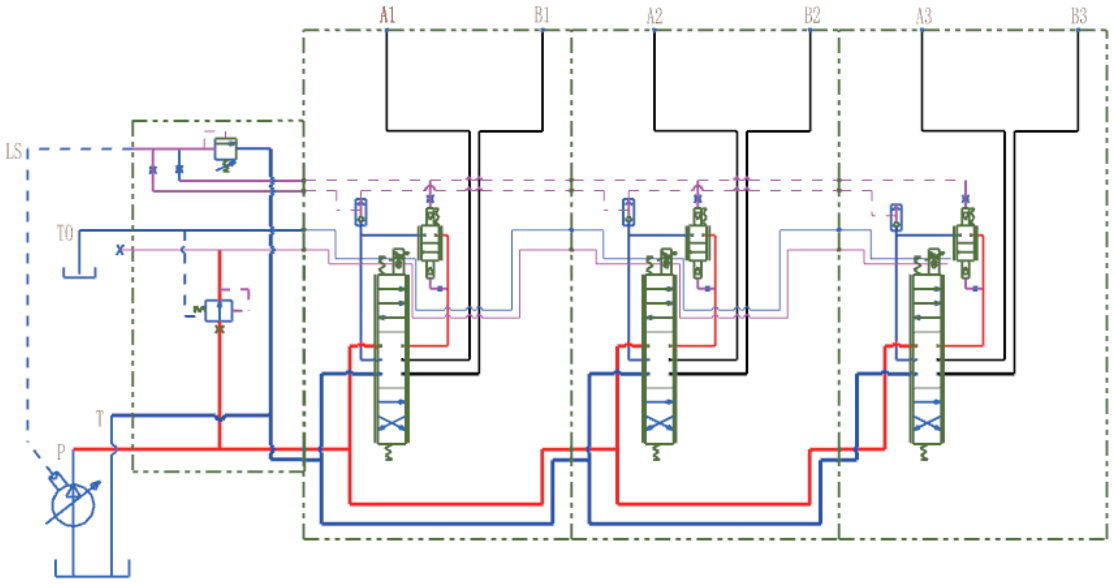
Main Spool Functions

Code	Spool Type	Functions	Notes
FG1		Standard 3 position-4 way O middle function Post-pressure compensation	Usually used in controlling cylinder
FG2		3 position-4 way Y middle function Post-pressure compensation	Usually used in controlling motor
FG3		3 position-4 way H middle function Post-pressure compensation	Usually used in controlling cylinder
FG4		Standard 4 position-4 way with floating function Post-pressure compensation	Usually used in controlling cylinder

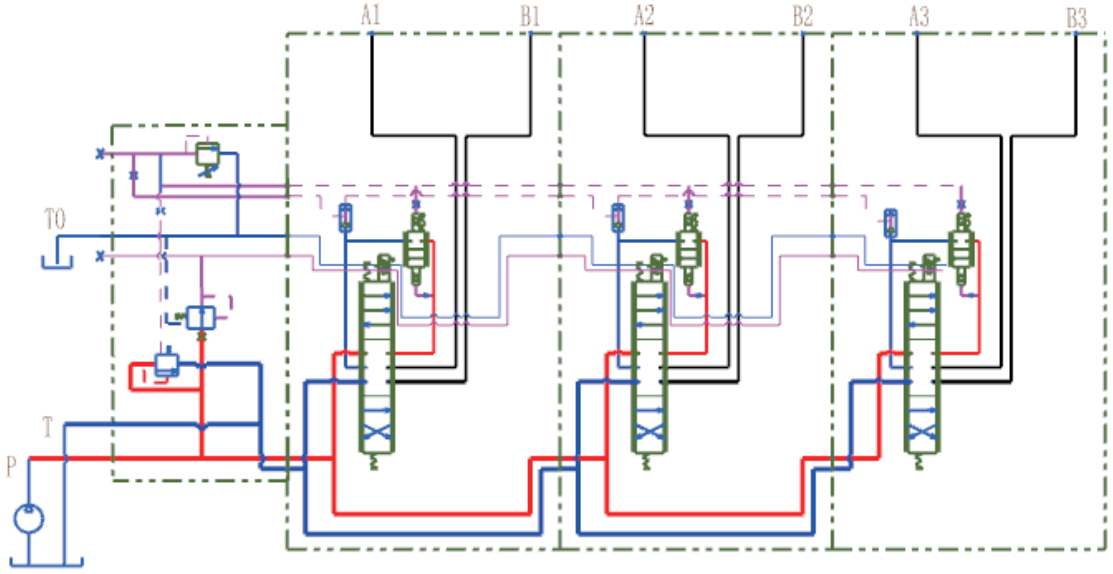
** All spools are spring centered.

Hydraulic System Examples

Electro-hydraulic Proportional Control System with Variable Displacement Pump
(Post-pressure Compensation)



Electro-hydraulic Proportional Control System with Fixed Displacement Pump
(Post-pressure Compensation)



Ordering Code

GBV100	-*	-J**	/***	-D**	-O1	-Z**	Q*	-FG*	-DC/**	-QL/***	-O2	...
a	b	c	d	e	f	g	h	i	j	k	l	m

ⓐ Model
ⓑ Number of main section
ⓒ Inlet section code
ⓓ Relief setting (bar)
ⓔ End section code (End cap) without end section use code D00
ⓕ First main section
ⓖ Main section code
ⓗ Drive style code
ⓘ Spool function code
ⓙ Electrical option
12VDC, 24VDC, 00=None electrical
ⓚ Flow rate
ⓛ Second section
ⓜ .....

**Port Size: If user do not want our standard size, you have to not only provide ordering code, but also you have to specify all the port sizes.

Ordering Example

GBV100	-3	-J03	/210	-D00	-O1	-Z02	-Q6	-FG1	-DC/24	-QL/100
a	b	c	d	e	f	g	h	i	j	k

ⓐ Model
ⓑ Three main sections
ⓒ Inlet code
ⓓ Relief setting pressure
ⓔ No end cap
ⓕ First section
ⓖ Main section code
ⓗ Drive style
ⓘ Spool function
ⓙ 24VDC
ⓚ Flow 100L/min

-O2	-Z01	-Q6	-FG1	-DC/24	-QL/80
l	m	n	o	p	q

-O3	-Z01	-Q6	-FG1	-DC/24	-QL/30
r	s	t	u	v	w

ⓛ Second section
ⓜ Main section code
ⓝ Drive style code
ⓞ Spool function code
ⓟ 24VDC
ⓠ Flow 80L/min

ⓡ Third section
ⓢ Main section code
ⓣ Drive style code
ⓤ Spool function code
ⓥ 24VDC
ⓦ Flow 30L/min

Ordering Example Description: The selected valve is GBV100 series, with three sections, a relief valve in the inlet section with a set pressure of 21 MPa, and no end cap (return from the inlet section). The first section is electro-hydraulic proportional drive, "A" and "B" port are no overload valve, using DC voltage 24 volts. The neutral is "O" type, which requires the first section to provide a flow rate of 60 l/min. The second section is electro-hydraulic propor - tional drive using 24 volts DC. The "A" and "B" ports have no overload protection valves and the neutral is an "O" type, which is required to provide a flow rate of 40 l/min. The third section is an electro-hydraulic proportional drive, with no overload protection valves on the "A" and "B" ports, with an "O" type neutral position, and requires a flow rate of 30 l/min.

Proportional Control Valves

GBV200 Proportional Control Valves

Introduction of GBV200

GBV200 Proportional valve is a load sensitive and post-pressure compensated proportional valve. For post-pressure compensation valve, it can distribute flow proportionally. Because of the pressure compensation, working flow is independent of load. All the proportional valves in this series have been load sensing and spring return. We can choose different cartridge unit for the main valve body to accomplish different function.

This series valve is building with modular design concept, system designer can choose different module to accomplish various complicated system design. Valve spool can provide excellent flow characteristics and low flow force.

Functions

- Inlet section with priority valves
- Inlet section matches with fixed displacement pump
- Inlet section matches with variable displacement pump
- P. O. Check Valve
- One-way throttle valve
- Multiple control operations
- Overload protections
- Manual proportional valve can provide mechanical positioning, friction positioning
- Manual proportional valve can provide floating function
- Overload protections
- Manual proportional valve can provide mechanical and friction function
- Manual proportional valve can provide main valve with float function

Valve Options

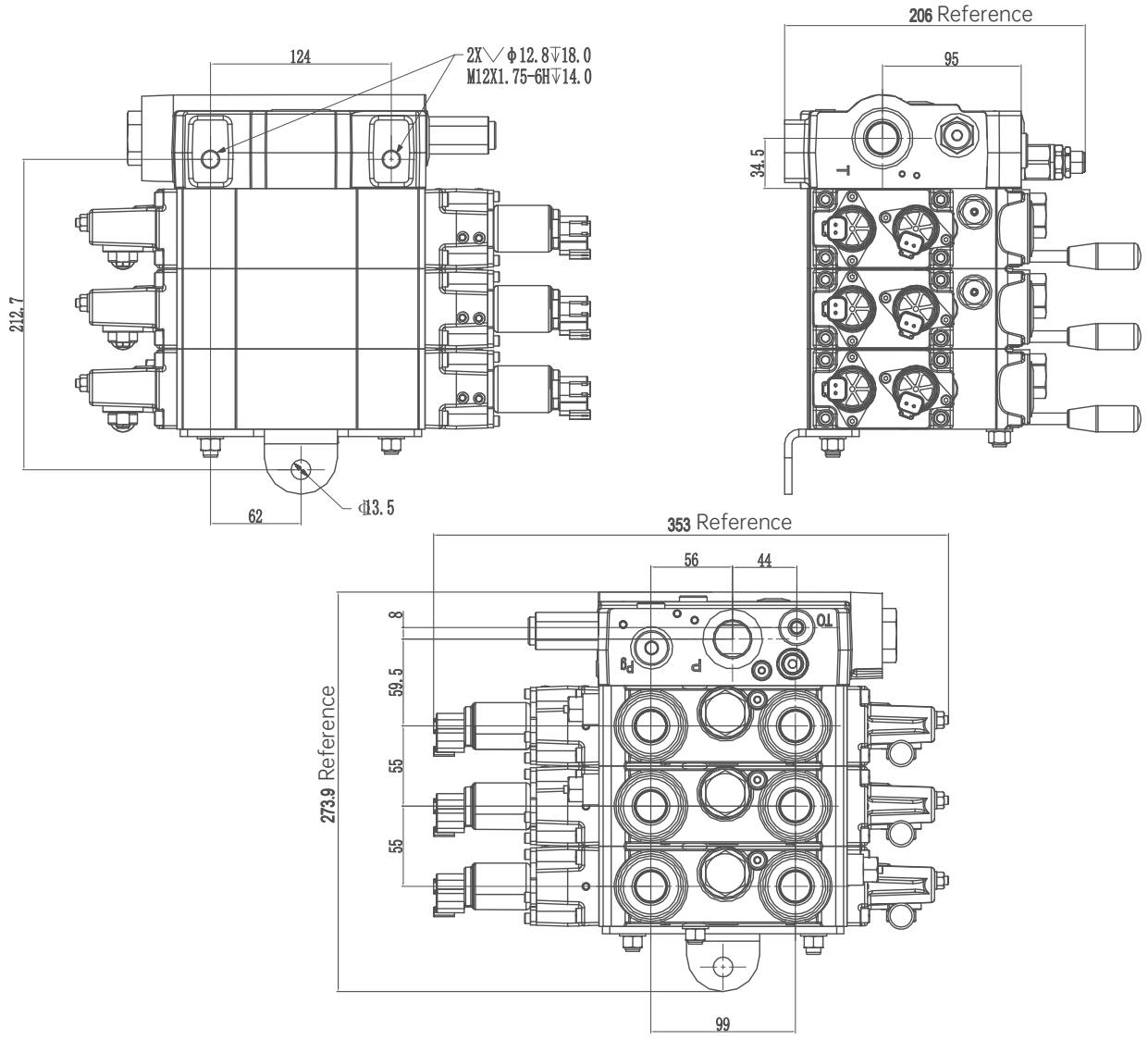
- Manually controlled proportional valve or mechanically controlled flow sharing proportional valve
- Hydraulic pilot controlled proportional valve or hydraulic pilot controlled flow sharing proportional valve
- Electrically controlled on/off valve or electrically controlled flow sharing proportional valve
- Electro-hydraulic proportional valve or electro-hydraulic flow sharing proportional valve
- Mixture proportional valve (sections with proportional flow sharing and pre-pressure compensation)

Max flow of this series is 220L/min. Rated pressure is 31MPa. Intermittent pressure is 35 MPa.

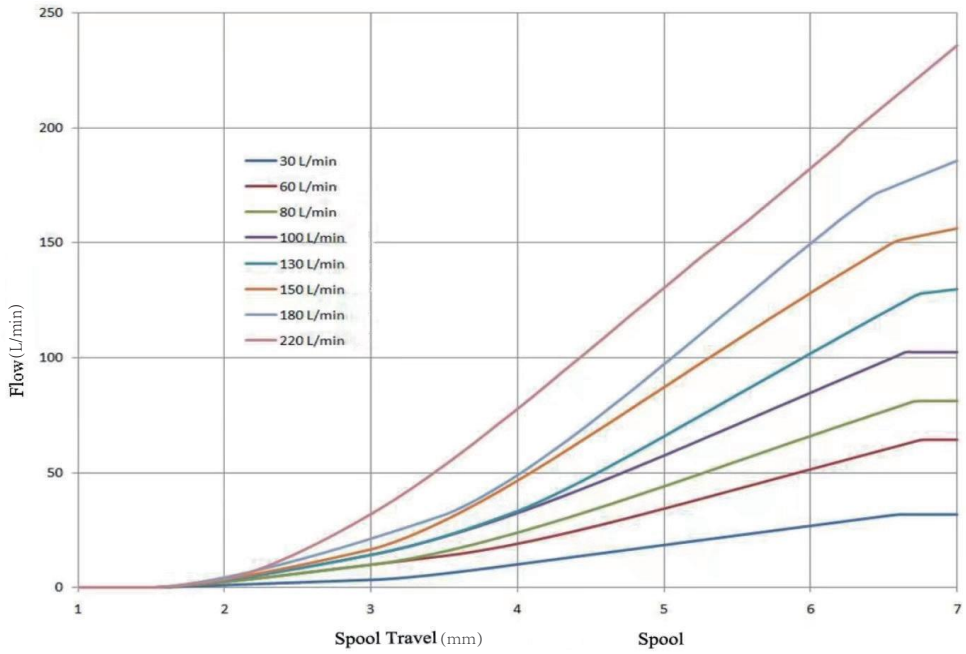
Electro-Hydraulic proportional valve can use two direct current coils: 12VDC and 24VDC, corresponding current is 0 ~1.5 Amp and 0 ~ 0.75 Amp.

Dimensions

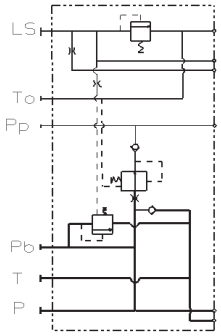
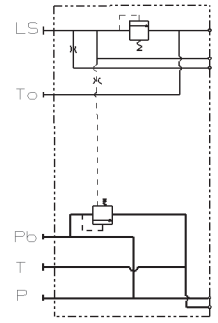
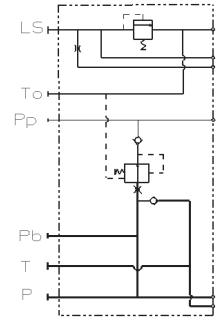
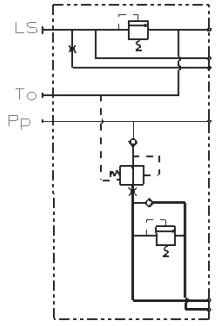
Three Sections Electro-hydraulic Proportional Valve



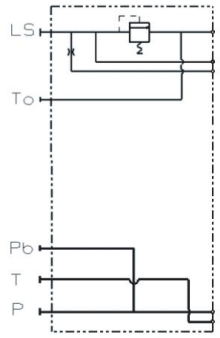
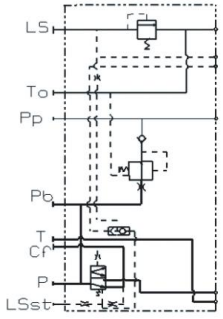
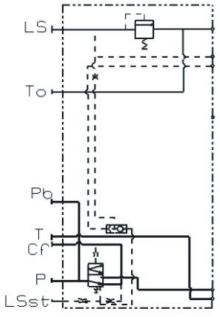
Flow Characteristic for Standard Spool



Inlet Section Valve Functions and Schematics

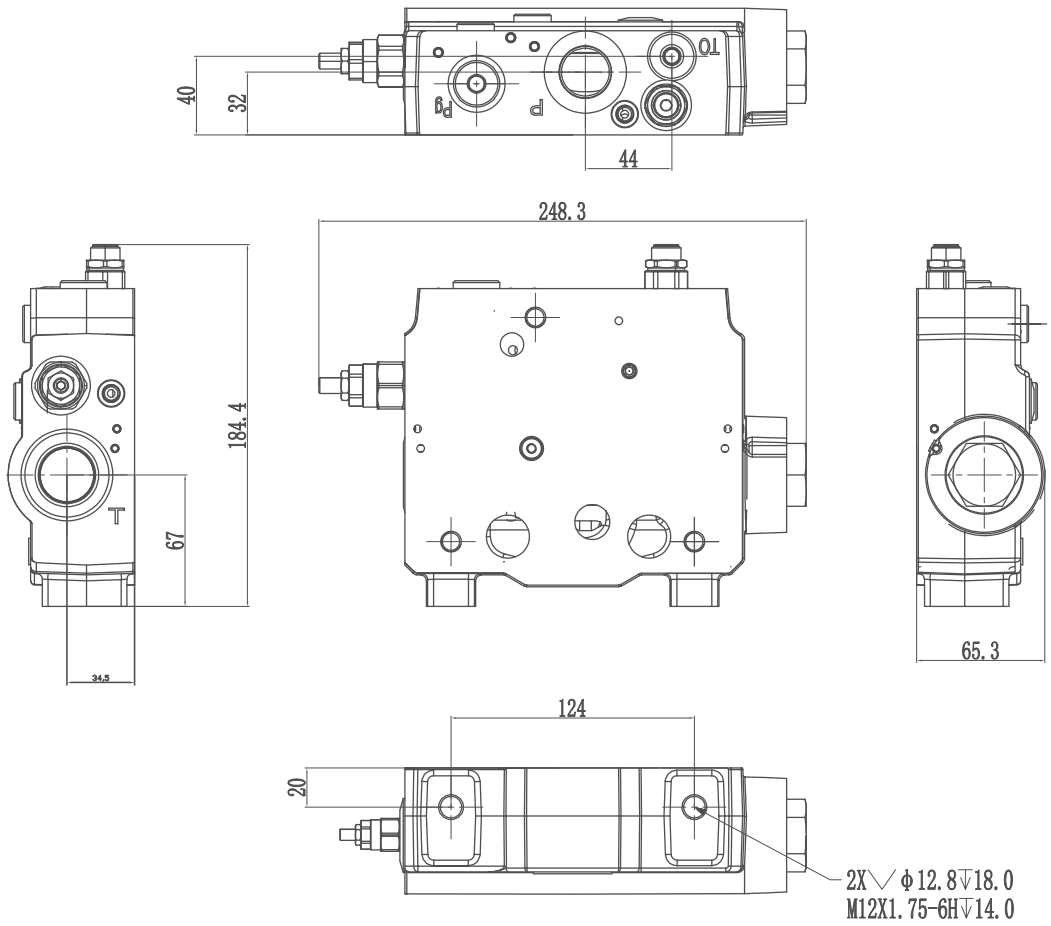
Code	Schematics	Main Functions	Standard Port Sizes
J01		Used in closed circuit fixed displacement pump system, with pilot oil source	LS:M14×1.5, G1/4 T0:M14×1.5, G1/4 T:M27×2, G1 Pp:M14×1.5, G1/4 Pb:M14×1.5, G1/4 P:M27×2, G3/4
J02		Used in closed circuit fixed displacement pump system, manual control, without pilot oil source	LS:M14×1.5, G1/4 T0:M14×1.5, G1/4 T:M27×2, G1 Pb:M14×1.5, G1/4 P:M27×2, G3/4
J03		Used in closed circuit variable displacement pump system, with pilot oil source	LS:M14×1.5, G1/4 T0:M14×1.5, G1/4 T:M27×2, G1 Pp:M14×1.5, G1/4 Pb:M14×1.5, G1/4 P:M27×2, G3/4
J04		Used in closed circuit fixed displacement pump system, without pilot oil source	LS:M14×1.5, G1/4 T0:M14×1.5, G1/4 T:M27×2, G1 Pp:M14×1.5, G1/4 Pb:M14×1.5, G1/4 P:M27×2, G3/4

Inlet Section Valve Functions and Schematics

Code	Schematics	Main Functions	Standard Port Sizes
J05		Used in closed circuits with electronically controlled fixed displacement pumps. Requires external pilot oil source.	LS:M14×1.5, G1/4 T0:M14×1.5, G1/4 T:M27×2, G1 Pb:M14×1.5, G1/4 P:M27×2, G3/4
J06		Used in closed circuits with electronically controlled fixed displacement pumps. Requires external pilot oil source.	LS:M14×1.5, G1/4 T0:M14×1.5, G1/4 T:M27×2, G1 Pp:M14×1.5, G1/4 Pb:M14×1.5, G1/4 P:M27×2, G3/4 Cf:G1/2 LSst:M14×1.5, G1/4
J07		Used in closed circuits with electronically controlled fixed displacement pumps. Requires external pilot oil source.	LS:M12×1.5 TO:M12×1.5 T:M27×2 Pb:M12×1.5 P:M27×2

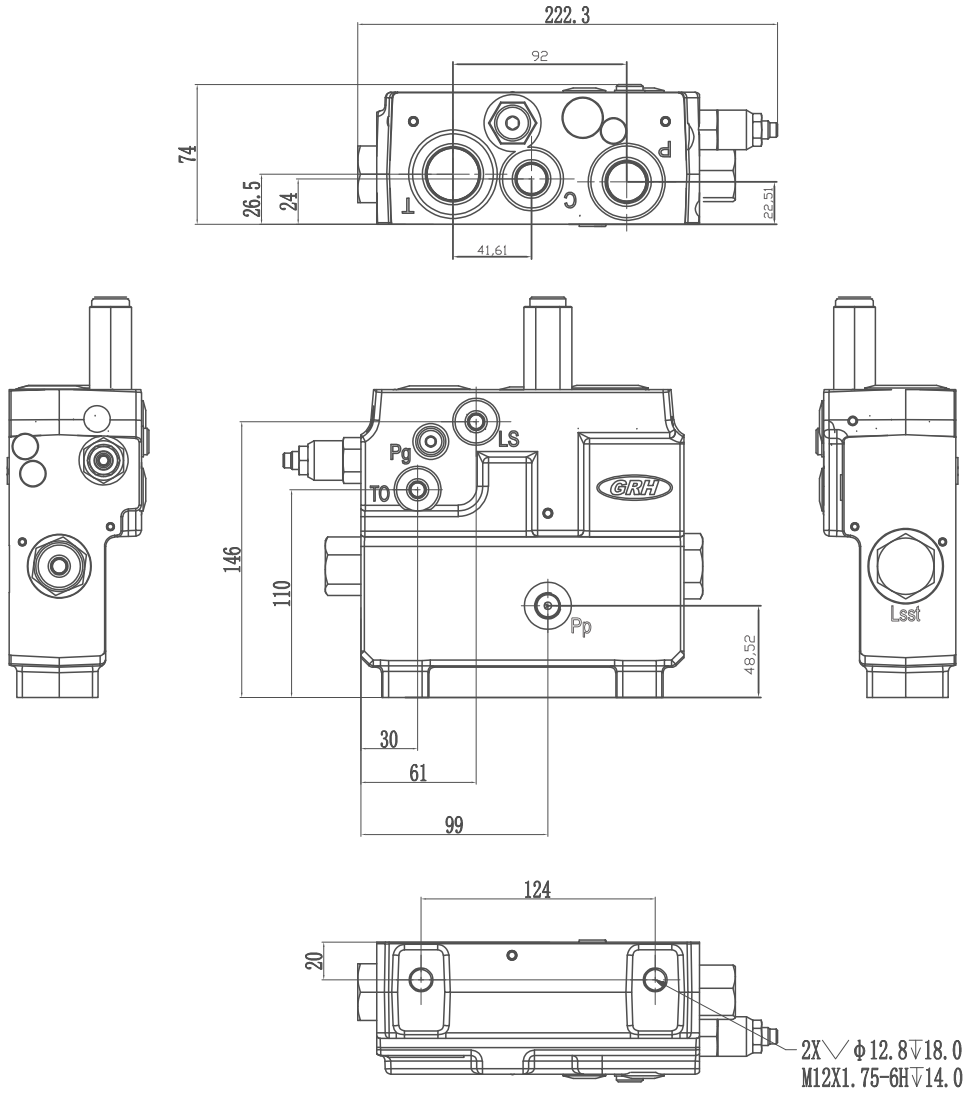
Inlet Section Dimensions

Standard Inlet Section Dimensions

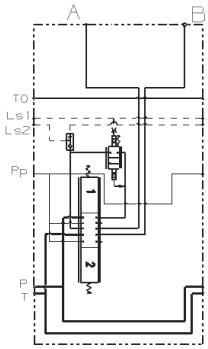
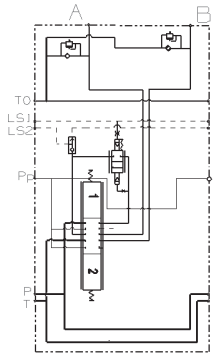
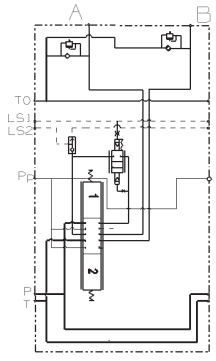
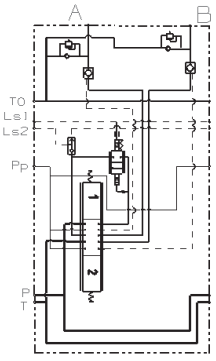


Inlet Section Dimensions

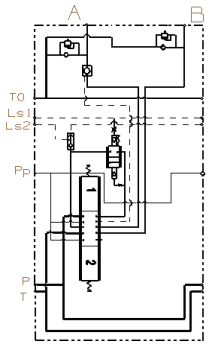
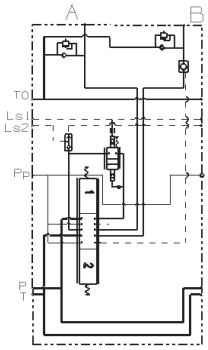
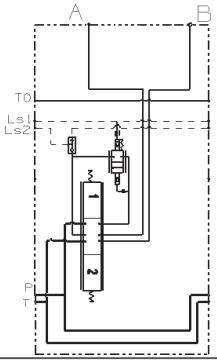
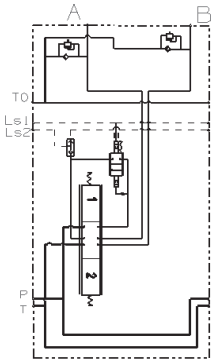
Inlet Section Dimensions with Priority Valve



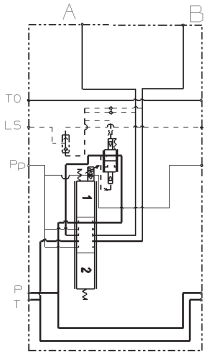
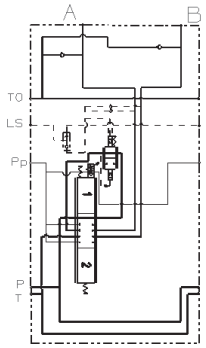
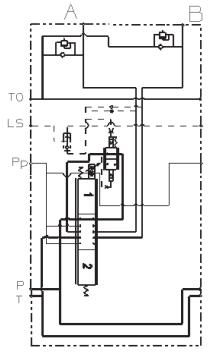
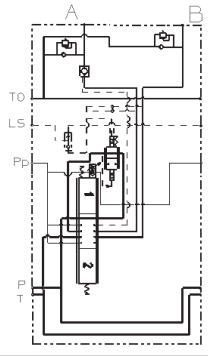
Main Valve Functions and Schematics

Code	Schematics	Main Functions	Notes
Z01		Post-pressure compensation (proportional flow sharing) Basic valve section	
Z02		Post-pressure compensation (proportional flow sharing) Anti-cavitation valve on work ports to prevent cavitations	Commonly used in hydraulic motor applications
Z03		Post-pressure compensation (proportional flow sharing) Provides work ports overload protections and anti-cavitation valve to prevent cavitations	
Z04		Post-pressure compensation (proportional flow sharing) Provides work ports overload protections Provides P.O. checks to hold loads and anti-cavitation valve to prevent cavitations	Most commonly used in cylinder load and holding The P.O. check is used to control load lowering It is also used for swing cylinder and motor

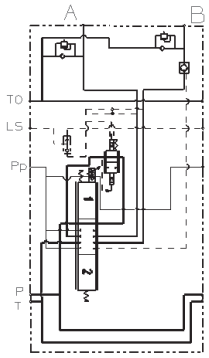
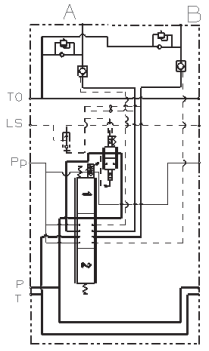
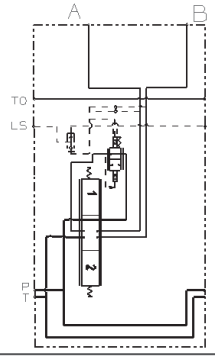
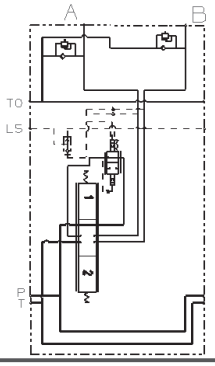
Main Valve Functions and Schematics

Code	Schematics	Main Functions	Notes
Z05		Post-pressure compensation (proportional flow sharing) Provides work ports overload protections and anti-cavitation valve to prevent cavitations	Most commonly used in cylinder load holding applications The P.O. check is used to control load lowering
Z06		Post-pressure compensation (proportional flow sharing) Provides work ports overload protections and anti-cavitation valve to prevent cavitations Provides P.O. check to hold load on B port	Most commonly used in cylinder load holding applications The P.O. check is used to control load lowering
Z07		Post-pressure compensation (proportional flow sharing) Basic valve section Manually operated	Commonly used in manually controlled proportional valves
Z08		Post-pressure compensation (proportional flow sharing) Provides work ports overload protections and anti-cavitation valve to prevent cavitations Manually operated	

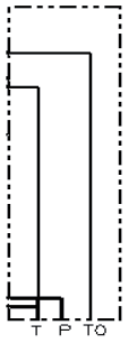
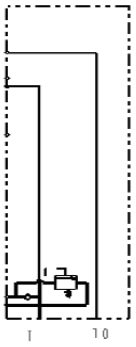
Main Valve Functions and Schematics

Code	Schematics	Main Functions	Notes
Z09		Pre-pressure compensation (proportional flow) Basic valve section	
Z10		Pre-pressure compensation (proportional flow) Anti-cavitation valve on work ports to prevent cavitations	
Z11		Pre-pressure compensation (proportional flow) Provides work ports overload protections and anti-cavitation valve to prevent cavitations	
Z12		Pre-pressure compensation (proportional flow) Provides work ports overload protections and anti-cavitation valve to prevent cavitations Provides P.O. check to hold load on A port	Most commonly used in cylinder load holding applications The P.O. check is used to control load lowering

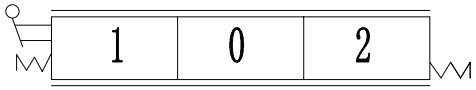
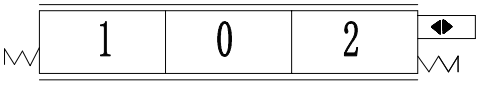
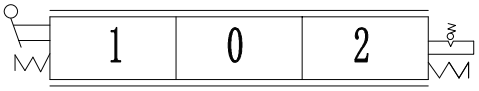
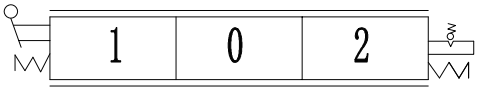
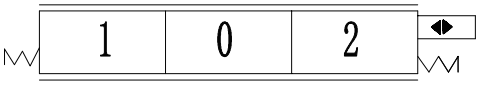
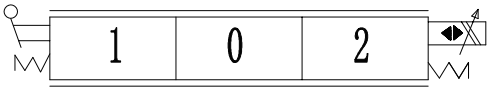
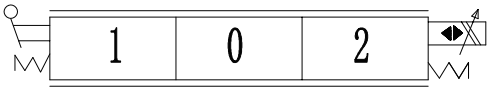
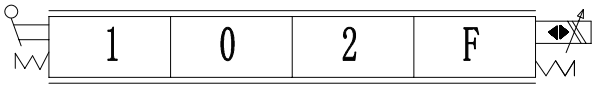
Main Valve Functions and Schematics

Code	Schematics	Main Functions	Notes
Z13		Pre-pressure compensation (proportional flow) Provides work ports overload protections and anti-cavitation valve to prevent cavitation Provides P.O. check to hold load on B port	Commonly used in cylinder load holding applications The P.O. check is used to control load lower-ing
Z14		Pre-pressure compensation (proportional flow) Provides work ports overload protections and anti-cavitation valve to prevent cavitation Provides P.O. checks to hold loads	Most commonly used in cylinder load holding applications. It is also used for swing cylinder and motor applications
Z15		Pre-pressure compensation (proportional flow) Basic valve section Manually operated	Commonly used manually controlled proportional valve.
Z16		Pre-pressure compensation (proportional flow) Provides work ports overload protections and anti-cavitation valve to prevent cavitation Manually operated	Commonly used manually controlled proportional valve with system protections

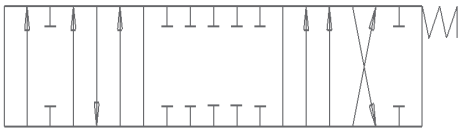
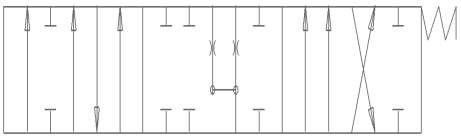
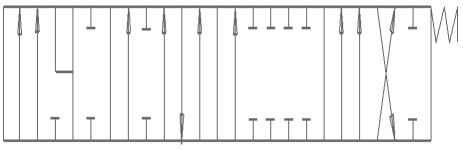
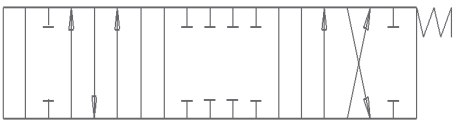
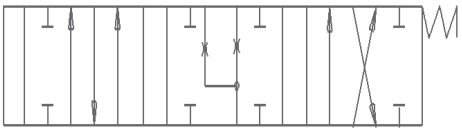
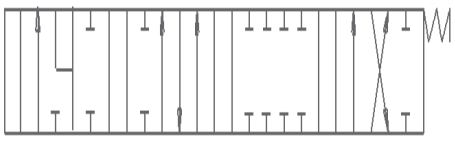
End Cap Functions and Schematics

Code	Schematics	Main Functions	Standard Port Sizes
D01		Usually used in closed circuit with variable displacement pump system	T0:M14×1.5, G1/4 T:M33×2, G1 P:M27×2, G3/4
D02		Usually used in fixed displacement pump system	T0:M14×1.5, G1/4 T:M33×2, G1

Drive Types for Main Valve Section

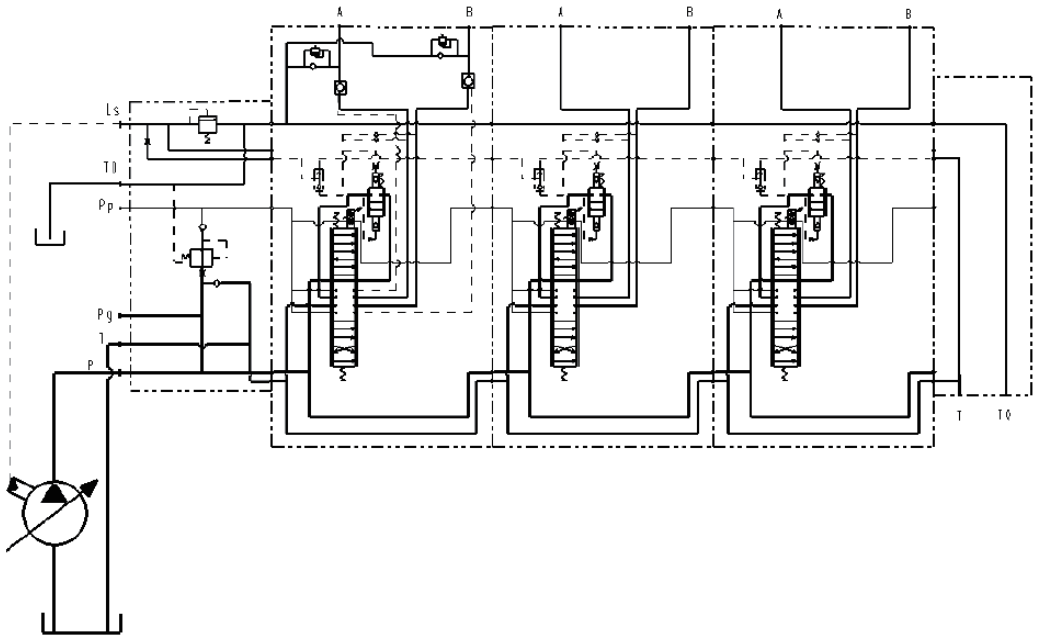
Code	Symbol	Functions
Q1		Standard manually operated
Q2		Hydraulic control
Q3		Manually operated with detent
Q4		Manually operated with floating function
Q5		Electric on/off control
Q6		Standard electro-hydraulic proportional control
Q7		Standard electro-hydraulic proportional control with manual override
Q8		Standard electro-hydraulic proportional control with floating function

Main Spool Functions

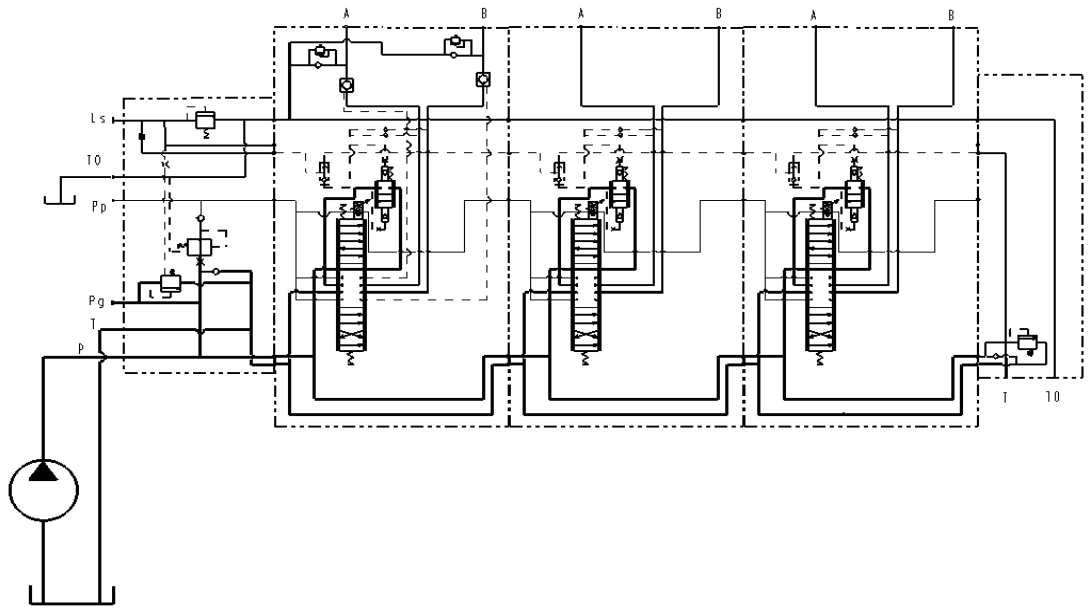
Code	Symbol	Functions	Notes
FG1		Standard 3 position-4 way O type middle function Post-pressure compensation	Commonly used in hydraulic cylinder applications
FG2		3 position-4 way Y type middle function Post-pressure compensation	Commonly used in hydraulic motor applications
FG3		Standard 4 position-4 way O type middle function, with fourth position floating Post-pressure compensation	Commonly used in hydraulic cylinder applications
FG4		Standard 3 position-4 way O type middle function Pre-pressure compensation	Commonly used in hydraulic cylinder applications
FG5		3 position-4 way Y type middle function Pre-pressure compensation	Commonly used in hydraulic motor applications
FG6		Standard 4 position-4 way O type middle function with fourth position floating Pre-pressure compensation	Commonly used in hydraulic cylinder applications

Hydraulic System Examples

Electro-hydraulic proportional control circuit with variable displacement pump
(Post-pressure compensation)



Electro-hydraulic proportional control circuit with fixed displacement pump
(Post-pressure compensation)



Ordering Code

GBV200	-*	-J**	/***	-D**	-O1	-Z**	Q*	-FG*	-DC/**	-QL/***	-O2	...
a	b	c	d	e	f	g	h	i	j	k	l	m

ⓐ Model
ⓑ Number of main section
ⓒ Inlet section code
ⓓ Relief setting (bar)
ⓔ End section code (End cap) without end section use code D00
ⓕ First main section
ⓖ Main section code
ⓗ Drive style code
ⓘ Spool function code
ⓙ Electrical option
12VDC, 24VDC, 00=none electrical
ⓚ Expected flow rate
ⓛ Second section
ⓜ .....

**Port Size: If user do not want our standard size, you have to not only provide ordering code, but also you have to specify all the port sizes.

Ordering Example

GBV200	-3	-J03	/210	-D00	-O1	-Z02	-Q6	-FG1	-DC/24	-QL/100
a	b	c	d	e	f	g	h	i	j	k

ⓐ Model
ⓑ Three main sections
ⓒ Inlet code
ⓓ Relief setting pressure
ⓔ No end cap
ⓕ First section
ⓖ Main section code
ⓗ Drive style
ⓘ Spool function
ⓙ 24VDC
ⓚ Flow 200L/min

-O2	-Z01	-Q6	-FG1	-DC/24	-QL/180
l	m	n	o	p	q

-O3	-Z01	-Q6	-FG1	-DC/24	-QL/130
r	s	t	u	v	w

ⓛ Second section
ⓜ Main section code
ⓝ Drive style code
ⓞ Spool function code
ⓟ 24VDC
ⓠ Flow 180L/min

ⓡ Third section
ⓢ Main section code
ⓣ Drive style code
ⓤ Spool function code
ⓥ 24VDC
ⓦ Flow 130L/min

Order example notes: From system example, the valve selected is GBV200 series, we know that the valve has three cap. (Return is from inlet section.) Inlet relief valve setting pressure is 21MPa. There is no end section. The first section has no load relief valve. The section is driven by 24VDC coils. The spool middle function is a O type. The required flow is 200L/min. The second section is also driven by 24VDC coils. There is no overload relief on neither A or B port. The spool middle function is O type, The required flow for the 180L/min. The third section is driven by 24VDC coils. No overload relief on neither A or B port. Spool middle function is O type, the required flow is

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