ELWOOD® FLUID POWER

PRESSURE CONTROL VALVE

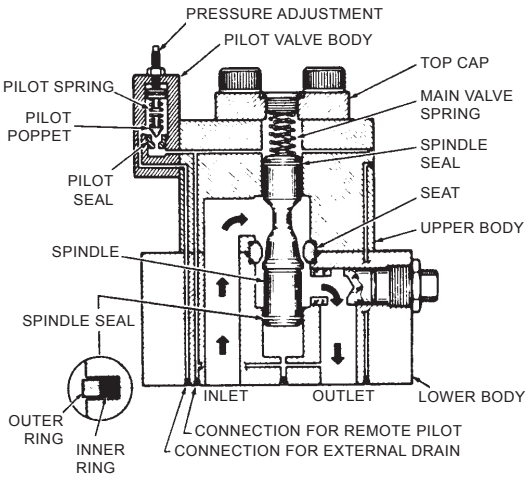
195 West Ryan Road 414-764-7500
Oak Creek, WI 53154 info@elwood.com
www.elwood.com/fluidpower.html

ELWOOD® FLUID POWER

Features

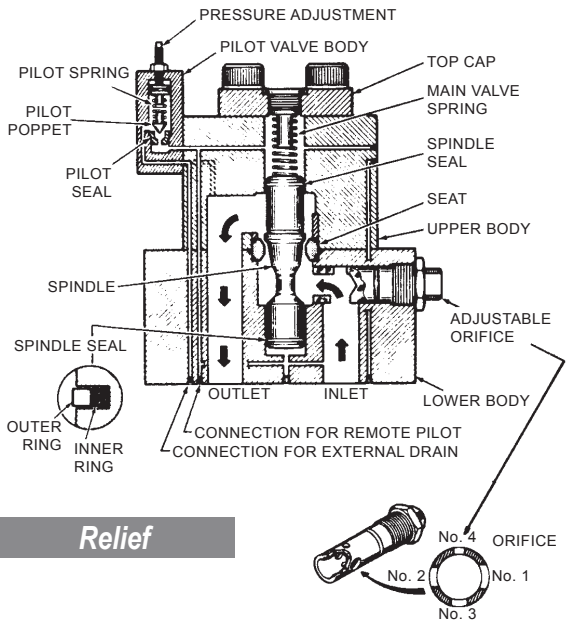
- Simple, compact design consisting of top plate and body.
- Easily convert from relief to reducer or reducer to relief.
- Designed for either SAE flange or manifold mounting.
- All parts replaceable; reversible seat design for additional service life.
- Heat treated stainless steel internals.
- Standard adjustable orifice restrictor on all valves.
- Internal and external pilot feeds, drains, and gages connections located for flexibility and easy maintenance.
- Proportional pressure control option includes pilot head with proportional force controlled solenoid.

Pressure Control



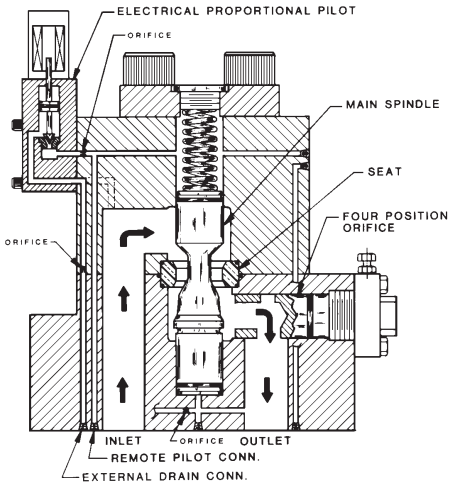
Reducer

Pressure Control



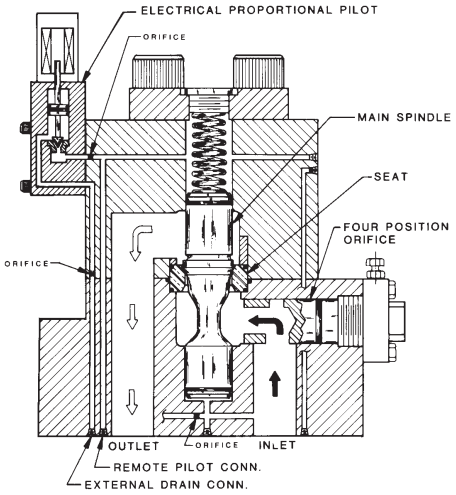
Relief

Proportional Pressure Control



Reducer

Proportional Pressure Control



Relief

Operation & Functionality

Proportional Pressure Control

- Set system pressure using an electronic amplifier card, or adaptive control module.
  - Available in Open Loop or Closed Loop
  - Used with Pressure Transducer
  - Closed Loop used for extreme accuracy.
- System pressure is adjusted in relation to a current signal to the proportional solenoid.
- Pressure balance on the main spindle allows the spring to hold the valve in a closed position, for relief, and open for reducing.
- When system pressure working on the pilot poppet exceeds the solenoid force, pilot flow is established to the external drain.
- The adjustable orifice plug allows a pre-pressure drop to occur in the valve allowing the main spindle to create a larger opening in the sealing area, adding to the life of the valve.

Non-Proportional Pressure Control

- Set system pressure by adjusting the pilot relief control valve.
- Pressure balance on the main spindle allows the spring to hold the valve in a closed position, for relief, and open for reducing.
- When system pressure working on the pilot poppet exceeds the set pilot relief adjustment, pilot flow is established to the external drain.
- The adjustable orifice plug allows a pre-pressure drop to occur in the valve allowing the main spindle to create a larger opening in the sealing area, adding to the life of the valve.

Technical Data				Reducer	Relief
Hydraulic Fluid	Fluid Media			HWCF, 97/3 Soluble Oil in Water, Synthetics, Mineral Oils, & Kerosene	
	Viscosity Range at 100°F (38°C)			20 SSU (1.2 Cst.) to 1,800 SSU (385 Cst.)	
	Temperature	HWFC		35° to 150°F (2° to 65°C)	
		Mineral Oil		5° to 150°F (-15° to 65°C)	
Pressure	Max. Operating Pressure			6,000 PSI (414 bar)	
	Max. Pressure Ratings			1,500 PSI (103 bar)	
				3,600 PSI (250 bar)	
				6,000 PSI (414 bar)	
	Min. Set Pressure	1,500 PSI (103 bar)		250 PSI (17 bar)	300 PSI (21 bar)
		3,600 PSI (250 bar)		250 PSI (17 bar)	450 PSI (31 bar)
		6,000 PSI (414 bar)		500 PSI (34 bar)	550 PSI (38 bar)
Size & Flow Rate	Nominal Port Connection Size	P-Size	1/4"	-	0 - 2 GPM (8 LPM)
		A-Size	1/2"	0 - 15 GPM (57 LPM)	0 - 20 GPM (75 LPM)
		C-Size	3/4"	10 - 50 GPM (190 LPM)	10 - 85 GPM (320 LPM)
		D-Size	1-1/4"	40 - 120 GPM (455 LPM)	40 - 190 GPM (720 LPM)
		E-Size	2"	80 - 200 GPM (760 LPM)	80 - 300 GPM (1,140 LPM)
		F-Size	3"	180 - 500 GPM (1,900 LPM)	180 - 660 GPM (2,500 LPM)
		G-Size	4"	350 - 800 GPM (3,000 LPM)	350 - 1,000 GPM (3,800 LPM)
Other	Recommended Filtration			50-60 micron pilot filter provided	
	Finishes	Black Oxide		Good corrosion resistance	
		Stainless Steel		Standard finish; Best corrosion resistance	

Proportional Data		#16 Solenoid	#20 Solenoid
Electrical	Pressure Rating	3,000 PSI	6,000 PSI
	Type of Supply	Direct Current (DC)	
	Minimum Control Current	150 mA	175 mA
	Maximum Control Current	1,400 mA	1,600 mA
	Coil Resistance	10.6 Ω	
	Coil Rating	Continuous	
	Max. Ambient Temperature	175°F (79°C)	
	Electrical Connection Insulation	Hirshmann Type DIN #43650	
		Exceeds NEMA Class B Requirements	
Hydraulics	Repeatability	Closed Loop with Dither ± 10%	
		Closed Loop with Dither ± 0.5%	
		(± 0.07% with Electronic Adaptive Control)	
	Hysteresis	with Dither ± 0.5%	
	Response Time / Step Change	800 - 2,500 PSI (55 - 172 bar)	
		800 - 1,500 PSI (55 - 103 bar)	
		400 - 800 PSI (28 - 55 bar)	

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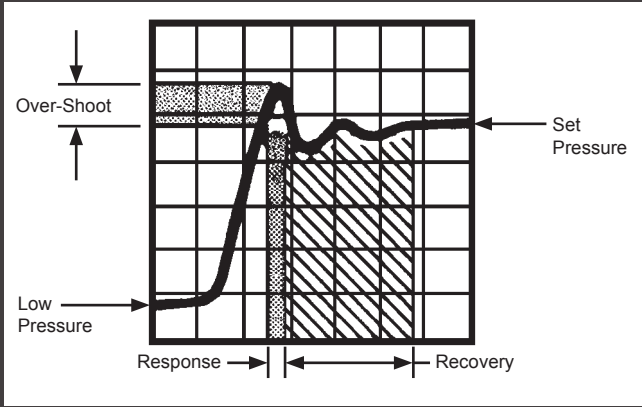
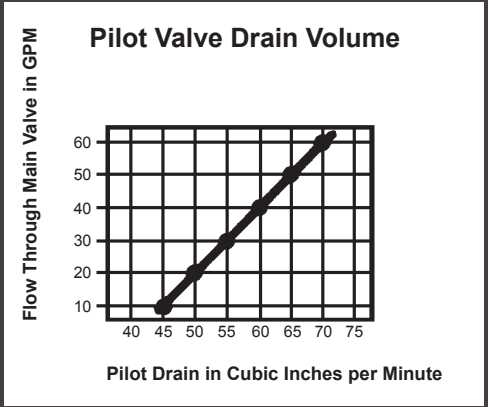
Response Data

Definitions

1. Cracking Pressure - The point the main spindle first begins to open.
2. Response Time - The duration of time from when the set pressure is met as pressure increases, to when the set pressure is met as pressure decreases.
3. Pressure Over-Shoot - The amplitude of the peak pressure over the set pressure of the valve.
4. Recovery - The duration of time from the end of the response time to the stabilization at set pressure.
5. Pressure Override - The difference between full flow and cracking pressure.
6. Compound Relief Valve - A relief valve that operates in two (2) stages. The pilot stage contains the pressure-limiting valve; wherein, a poppet is held against the seat by an adjustable spring. The work port connections are made to the main body, and diversions of the full flow volume by the balanced spindle in the main body.
7. Balanced Spindle - During normal operation, this spindle is in hydraulic balance.





Typical oscilloscope reading of a relief valve, shown above. Elwood Pressure Control Valves testing has revealed the following:

- Over-shoot is approximately 10% greater than set pressure.
- Response time ranges between 50 and 100 milliseconds.
- Recovery time is normally within 150 milliseconds.
- Cracking pressure is approximately 10-12% below set pressure.

This graph illustrates the pilot valve drain volume that is typical of an Elwood Pressure Control Valve operating at a constant inlet pressure of 5,000 PSI.

Solenoid Power Draw Curve

Circuit:

- Test results shown reflect the pressure response time of the C-size Proportional Reducer/Relief Assembly reacting on a three (3) gallon volume of fluid.
- Input current supplied in a square waveform from a frequency generator.

Results:

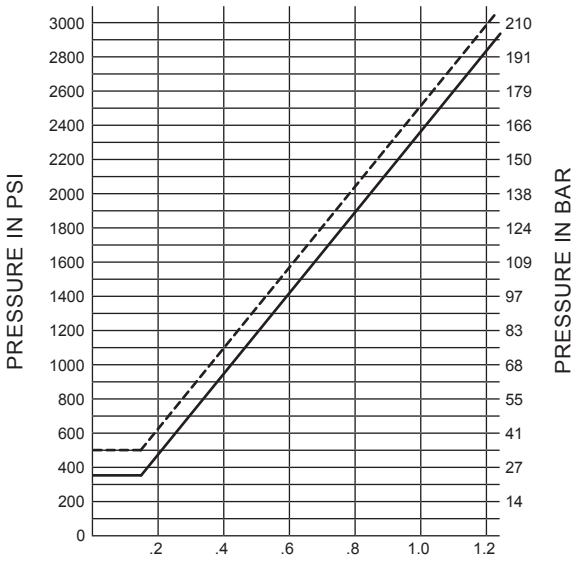
- The graphs illustrate the current (Channel A) and pressure (Channel B) waveforms as displayed on a storage type oscilloscope.

Note:

- Test data shown is with a “C” size reducer at 2,500 PSI.
- It is recommended that the hydraulic supply pressure be maintained at a level of 15% higher than the maximum set pressure to obtain optimum performance from the valve.

INPUT CURRENT VS. PRESSURE

Model C, 3000 PSI, Size 16 Solenoid



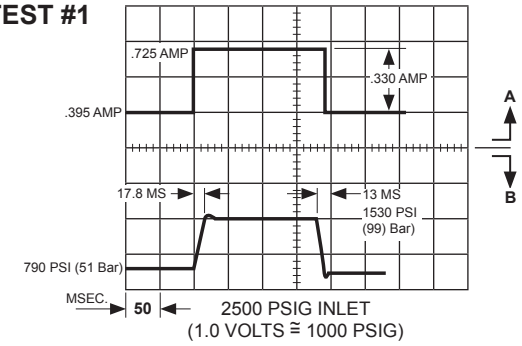
Reducer Pressure response to current input

Relief Pressure response to current input (reflects differential adjustment of 150 PSI

TYPICAL VALVE RESPONSE

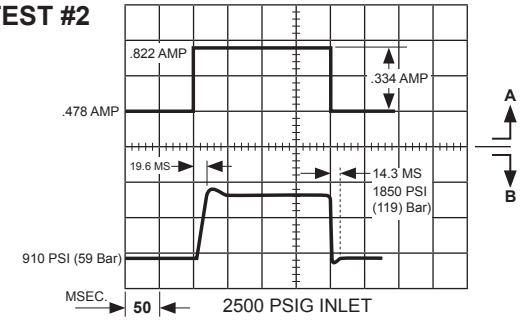
Current Input From Sq. Wave Gen.

TEST #1



A: 0.2 VOLTS / DIVISION
B: 0.5 VOLTS / DIVISION

TEST #2



A: 0.2 VOLTS / DIVISION
B: 0.5 VOLTS / DIVISION

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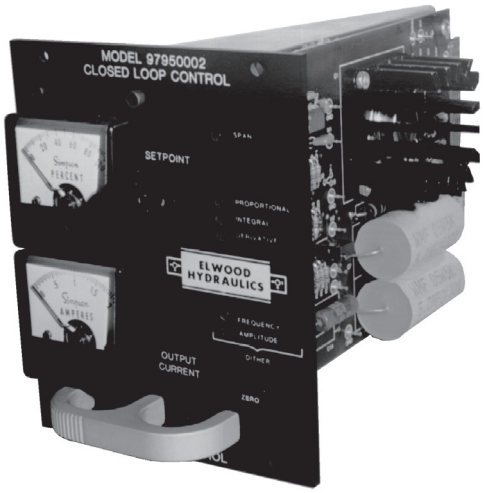
Open Loop Control

Description:

- The Model 9795-0003 accepts command signals in several formats and provides currents to operate the valve solenoid. The module is equipped with an integral power supply operating from the line voltage.
- An analog meter indicates the command signal in percent and the output current in amperes. The Model 9795-0003 provides output current proportional to the command signal.
- The model 9795-0003 can be sub-panel mounted, utilizing the Model 9795-0006 enclosure or may be rack mounted using the Model 9795-0007 enclosure.

Open Loop Specifications	
Supply Voltage	120/240 VAC, 50/60 Hz, 2/1 A
Output Current	1 to 2 A
Command Signal	
Panel Potentiometer	1 turn (270°), 5 kΩ
Remote Potentiometer	10 turn, 5 kΩ
External Voltage Command	0 to10 V
CMRR	60 dB at 60 Hz
Common Mode Voltage	5 V
External Current Command	0 to 50 mA
Frequency Response	20 kHz
Indicators	
Command Signal Analog Meter	0 to 100%
Output Current Analog Meter	0 to 2 A
Power On	LED indicator
Size	5.25" H x 4.25" W x 8" D



Closed Loop Control

Description:

- The Model 9795-0002 accepts a command signal and provides current to operate the valve solenoid. The module is equipped with an integral power supply and operating from line voltage.
- An analog meter indicates the command signal in percent and the output current in amperes. The Model 9795-0002 provides a flow proportional to the common signal.
- The Model 9795-0002 can be sub-panel mounted, utilizing the Model 9795-0006 enclosure or may be rack mounted using the Model 9795-0007 enclosure.

Closed Loop Specifications	
Supply Voltage	120/240 VAC, 50/60 Hz, 2/1 A
Output Current	1 to 2 A Command
Command Signal	
Panel Potentiometer	1 turn (270°), 5 kΩ
Remote Potentiometer	10 turn, 5 kΩ
External Voltage Command	0 to10 V
CMRR	60 dB at 60 Hz
Common Mode Voltage	5 V
External Current Command	0 to 50 mA
Resolution	1 PSI
Frequency Response	20 kHz
Pressure Transducer	
Excitation	10 VDC
Input Sensitivity	30 mV full scale
Auxiliary Output	
Pressure	0 to 10 VDC full scale at 5 mA
Indicators	
Command Signal Analog Meter	0 to 100%
Output Current Analog Meter	0 to 2 A
Power On	LED indicator
Size	5.25" H x 4.25" W x 8" D

Ordering Data - Pressure Control Relief & Reducing Valves

For Proportional Control Only — *For Unloading Relief Only*

MODEL CODE EXAMPLE

[PR] - CRL - 3K - 3M - [6 - 11D]

- PR: *Electrical Proportional*
- CRL: *Model*
- 3K: *Max. Working Pressure*
- 3M: *Port Connection*
- 6: *Voltage*
- 11D: *Valve Accessories*

ELECTRICAL PROPORTIONAL

CODE NO.	DESCRIPTION
PR	Proportional Pressure Control 24 VDC

Electrical proportional pressure control is optional.

MAXIMUM WORKING PRESSURE

CODE NO.	DESCRIPTION
1.5K	1,500 PSI / 105 BAR
3K	3,000 PSI / 210 BAR
6K	6,000 PSI / 415 BAR

Custom pressures available upon request.

PORT CONNECTION SIZE

CODE NO.	Connection Options	Valve Sizes Applicable	Connection Size
1M	M - Manifold Mounting	P-Size Valves PRL	1/4”
2M	M - Manifold Mounting NFPA P-06 Mounting	A-Size Valves ARL, ARD	1/2”
3M 3F61 3F62	M - Manifold Mounting F61 - SAE Code 61 F62 - SAE Code 62	C-Size Valves CRL, CRD, CURL	3/4”
5M 5F61 5F62	M - Manifold Mounting F61 - SAE Code 61 F62 - SAE Code 62	D-Size Valves DRL, DRD, DURL	1-1/4”
8M 8F61 8F62	M - Manifold Mounting F61 - SAE Code 61 F62 - SAE Code 62	E-Size Valves ERL, ERD, EURL	2”
12M 12F61 12F62	M - Manifold Mounting F61 - SAE Code 61 F62 - SAE Code 62	F-Size Valves FRL, FRD, FURL	3”
16M 16F61 16F62	M - Manifold Mounting F61 - SAE Code 61 F62 - SAE Code 62	G-Size Valves GRL, GRD, GURL	4”

Custom sizing & mounting connections available upon request.

MODEL

TYPE	CODE NO.	DESCRIPTION	FLOW RANGE
RELIEF	PRL	P-Size Relief Valve	0 - 2 GPM 8 L/MIN
	ARL	A-Size Relief Valve	0 - 20 GPM 75 L/MIN
	CRL	C-Size Relief Valve	10 - 85 GPM 320 L/MIN
	DRL	D-Size Relief Valve	40 - 190 GPM 720 L/MIN
	ERL	E-Size Relief Valve	80 - 300 GPM 1,140 L/MIN
	FRL	F-Size Relief Valve	180 - 660 GPM 2,500 L/MIN
	GRL	G-Size Relief Valve	350 - 1,000 GPM 3,800 L/MIN
REDUCER	ARD	A-Size Reducing Valve	0 - 15 GPM 57 L/MIN
	CRD	C-Size Reducing Valve	10 - 50 GPM 190 L/MIN
	DRD	D-Size Reducing Valve	40 - 120 GPM 455 L/MIN
	ERD	E-Size Reducing Valve	80 - 200 GPM 760 L/MIN
	FRD	F-Size Reducing Valve	180 - 500 GPM 1,900 L/MIN
	GRD	G-Size Reducing Valve	350 - 800 GPM 3,000 L/MIN
UNLOADING RELIEF	CURL	C-Size Unloading Relief Valve	10 - 50 GPM 190 L/MIN
	DURL	D-Size Unloading Relief Valve	40 - 120 GPM 455 L/MIN
	EURL	E-Size Unloading Relief Valve	80 - 200 GPM 760 L/MIN
	FURL	F-Size Unloading Relief Valve	180 - 500 GPM 1,900 L/MIN
	GURL	G-Size Unloading Relief Valve	350 - 800 GPM 3,000 L/MIN

Custom sizes & specifications available upon request.

VOLTAGE (1)

1	6 VDC
2	12 VDC
3	24 VDC
5	110 VDC
6	110/120VAC 50/60Hz
8	220/240VAC 50/60Hz
9	410/460VAC 50/60Hz
10	200VAC 50/60Hz
11	440/480VAC 60Hz
12	24VAC 50/60Hz

VALVE ACCESSORIES (2)

CODE NO.	DESCRIPTION
11B	ELECTRICAL QUICK DISCONNECT MALE - INDUSTRIAL, 3-BLADE PATTERN
11D	ELECTRICAL QUICK DISCONNECT MALE - DIN# 43650, 3-BLADE PATTERN
11E	ELECTRICAL QUICK DISCONNECT MALE - BRAD HARRISON 3-PIN

INDICATOR LIGHTS ARE STANDARD

REDUCING/RELIEVING PACKAGES

Pressure control reducing/relieving packages available in all sizes.

Standard package model codes:

C-Size Package - PR-CRD/CRL-HB-3K-3M

D-Size Package - PR-DRD/DRL-HB-6K-5M

E-Size Package - PR-ERD/ERL-HB-6K-8M

Any size packages and mounting available upon request.

Notes

(1) Codes 3, 6, & 8 are standard voltages. For non-standard voltages, please contact us!

(2) Filter Block Assembly available as option code -27.

For custom specifications and non-standard voltages, please contact us! Our team at Elwood is happy to customize a valve to fit your requirements!

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Elwood Fluid Power is proud to provide high pressure hydraulic valves and systems for water and other low viscosity applications. Traditionally, Elwood custom valves have been used in steel mills, aluminum mills, and petrochemical facilities across the world!

Today Elwood is expanding its markets into custom high pressure water or low viscosity applications across many industries. Contact us today to start talking with our team!

Water and Low Viscosity Hydraulics

2-, 3- & 4-Way Directional Control Valves

As one of the most fundamental components in hydraulic and pneumatic machinery, directional control valves are responsible for stopping, allowing, and changing direction of fluid flow from one or multiple sources.

Packed Spool 4-Way Directional Control Valves

Deliver precise valve control through air actuated function.

Pressure Control Valves

Named for their primary function, pressure control valves provide relief, reduce, or stop system pressure.

Isolation Valves

Utilize system maintenance with the ISO-Lock valve by isolating manifold mounted directional control valves without shutting the entire system down.

2-Way Valves

- Descaling applications
- Pump unloading & bypass applications
- Stop applications

Accumulator System Shut-Off Valves

As system pressure builds, this safety valve shuts off pressure when determined levels are reached.

Decoking Control Valves

Assisting the refinery industry since the late 1930's, Elwood's decoking control valves have come a long way. Support provided is for older Nordberg and Rexnord valves. Newer designs feature additional beneficial characteristics. Available in spindle and cartridge designs, customized to fit your needs.

Valve Stands & Manifolds

Brochure 500 08/18

ELWOOD CORPORATE POLICY STATEMENT

It is the policy of Elwood to provide our customers with products that meet or exceed their expectations for performance, reliability and safety while ensuring compliance with applicable laws and regulations, and to continually improve all aspects of our business.

ISO 9001:2015 CERTIFIED COMPANY

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