

Table of Contents

1	Product Description	2
1.1	Application	2
1.2	Mounting location	2
2	Function	2
2.1	Characteristics	2
3	Technical Data	3
4	Ordering Information	3
5	Description of Characteristics in Accordance with Type Code	4
5.1	Variant	4
5.2	Connections	4
5.3	Input flow rate	4
5.4	Characteristics	4
5.5	Pressure Settings (P)	4
5.6	Volume flow setting (Q)	4
5.7	Output flow rate	4
5.8	Check Valve (CV) or Throttle Check Valve (TCV)	4
5.9	Pressure relieve (H)	4
6	Installation	4
6.1	General remarks	4
6.2	Connection recommendations	5
6.3	Installation – space	5
6.4	Tightening torque	5
6.5	Setting the output flow rate	5
6.6	Dimensions	6
7	Standards and Safety Requirements	6
7.1	General remarks	6
7.2	Standards	6
8	Accessories	6

1 Product Description

The flow control valve FC1X of type 2P is designed for closed-centre hydraulic systems. The output flow rate can be controlled electrically-proportional. The output pressure limiting can also be controlled electrically-proportional or set mechanically. The volume flow to and the pressure at the consumer is independent of the pressure and the volume flow of the main functions in the machine.

1.1 Application

The flow control valve is used for the division of a regulated volume flow from the pump flow rate in a hydraulic system for operating an additional consumer. The additional consumer has no priority over the main functions.

1.2 Mounting location

The flow control valve is installed in closed-center systems teed between the pump and the main control valve in parallel to the main control valve of the construction machine.

2 Function

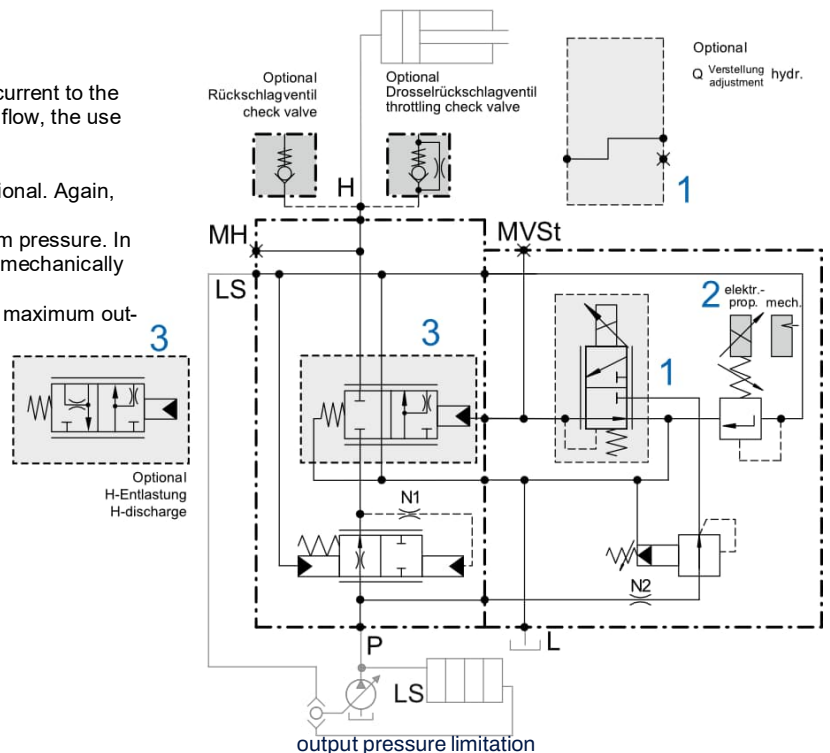
The volume flow is controlled electrical-proportional with the electric current to the piloting valve (1). To achieve a high accuracy of the adjusted volume flow, the use of a current-regulated control (PWM) is recommended.

The pressure relief valve (2) may also be controlled electrical-proportional. Again, the use of a current-regulated control (PWM) is recommended.

The pressure limiting can be set mechanically to the desired maximum pressure. In this case the electrical-proportional piloting valve (2) is replaced by a mechanically adjustable valve.

The piloting valve (1) can also be actuated ON/OFF. In this case, the maximum output flow rate can be limited mechanically.

For applications where the pressure to the attachment can not relieve itself when switched off, the flow control valve can optionally be ordered with a relief nozzle (3). This nozzle is located between the connection to the consumer and the tank connection and is automatically used when the flow control valve is switched off.



2.1 Characteristics

- Electrical proportional control of output flow rate and
- Used with consumers with high demands on the accuracy of the volume flow
- Simple operation of different consumers with varying settings for flow rate and pressure relief

3 Technical Data

Criterion	Units	Value		
Installation position		any		
Weight	kg	14,2		
Max. input pressure (P)	bar	420		
Adjustable attachment pressure	bar	120-420		
Output flow rate accuracy	%	± 8		
Maximum recommended tank pressure (L)	bar	< 1		
Maximum pilot pressure VST (only with option "VSt exter-")	bar	< 50		
Maximum input flow rate (P)	l/min	230, 350		
Minimum input flow (P)	l/min	30		
Hydraulic fluid		Mineral oil (HL, HLP) conforming with DIN 51524, other fluids upon request		
Hydraulic fluid temperature range	°C	-20 bis +80		
Ambient temperature	°C	< +50		
Viscosity range	mm ² /s	2,8 - 500		
Contamination grade		Filtering conforming with NAS 1638, class 9, with minimum retention rate β ₁₀ ≥ 75		
Supply voltage	VDC	12 oder 24 +/-10%		
Electrical control	Hz	PWM - frequency 140 - 150 Hz		
Maximal current I _{MAX} :	A	solenoid valve pressure: 12V: 1,76A bei 4,7Ω	24V: 0,88A bei 18,70Ω	
	A	solenoid valve volume flow: 12V: 1,5A bei 5,3Ω	24V: 0.75A bei 21,20Ω	
Solenoid duty cycle	%	100		
Protection class according to DIN 40050		DIN 43650: bis IP65	AMP - JT: bis IP67	Deutsch DT04-2P: bis IP69
Port P	G1"	ISO 1179-1	supply port	
Port H	G1"		consumer port	
Port VSt	G ¼"		pilot port	
Port L,	G ¼"		drain line	
Port MH, MVSt	G ¼"		measuring ports	
Port LS	G ¼"		Load sensing	

4 Ordering Information

FC1X	2P	03F						
00	01	02	03	04	05	06	07	08

00	Product group	Flow control valve for one-way applications	FC1X
01	Variant	proportional operation	2P
02	Connections	supply line (P), consumer port (H)	G1" - ISO 1179-1
03	Maximum output volume flow (Q _{max})	l/min	230 350
04	Actuation pressure setting (P)	12V, AMP JPT connector	12P002
		12V, DEUTSCH connector	12P003
		24V, AMP JPT connector	24P002
		24V, DEUTSCH connector	24P003
		mechanically adjustable	MAN000
05	Actuation Volume flow setting (Q)	12V, AMP JPT connector	12P002
		12V, DEUTSCH connector	12P003
		24V, AMP JPT connector	24P002
		24V, DEUTSCH connector	24P003
		hydraulically proportional	HYP03B
06	check valve (CV) Throttle check valve (TCV)	no check valve	00
		CV 25S 427.071.323.9 G1"	02
		TCV 25S 427.071.322.9 G1"	14
07	Piloting pressure	internal	1
		external (G ¼)	0
08	pressure relief (H)	pressure relief	1
		No pressure relief	0

Verschiedene Konfigurationen sind aus technischen Gründen leider nicht realisierbar. Bitte lassen Sie sich bei Fragen hierzu von uns beraten.

5 Description of Characteristics in Accordance with Type Code

5.1 Variant

The valve of type 2P controls the output volume flow and the output pressure limitation electrical-proportional. Optionally, the output pressure limitation can be set mechanically.

5.2 Connections

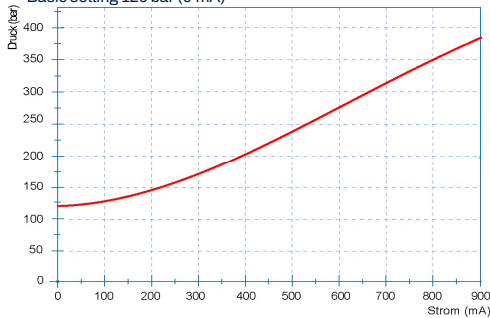
Supply port (P), consumer port (H): G1" - ISO 1179-1.

5.3 Input flow rate

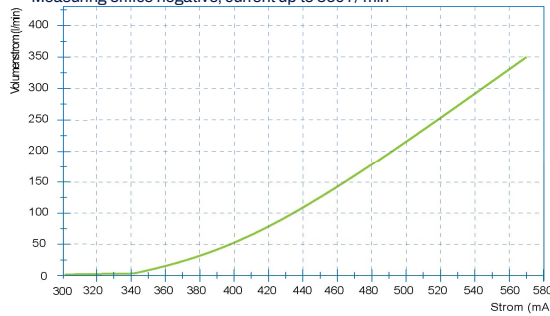
The valves are 2-way current regulators. The maximum input volume flow corresponds to the output volume flow and is 230 l/min, or 350 l/min.

5.4 Characteristics

Pressure Valve Characteristic:
Pressure depending on the electric current
Basic setting 120 bar (0 mA)

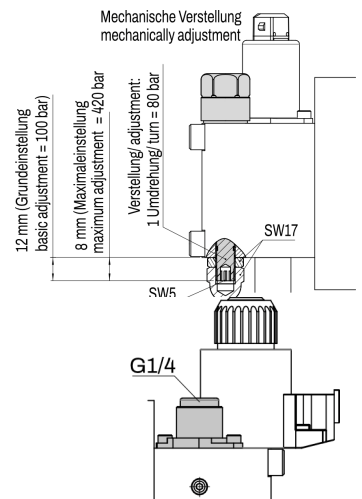
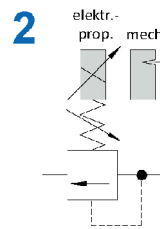


Volume Flow Characteristic:
Volume flow as a function of the electric current (Qmax: 400 l / min)
Measuring orifice negative, current up to 350 l / min



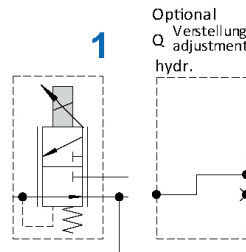
5.5 Pressure Settings (P)

- In For the electrical variant the power is supplied via a DEUTSCH plug DT04-2P or an AMP Junior Timer plug.
- For the mechanical version the limitation of the maximum pressure is done by a mechanical adjustment (see picture on the right)



5.6 Volume flow setting (Q)

- For the electrical variant, the power is connected via a Deutsch DT04-2P or an AMP Junior Power Timer plug.
- For the hydraulically proportional version, the piloting signal is connected via a G1 / 4 port (see picture on the right).

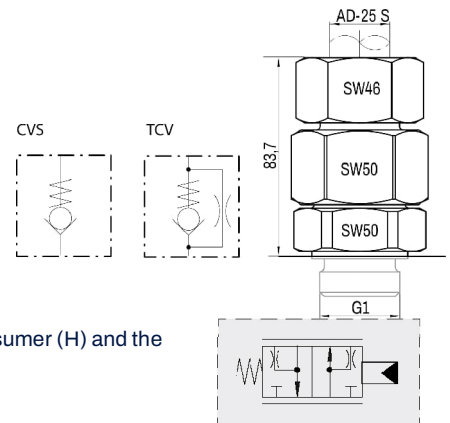


5.7 Output flow rate

The adjustment of the volume flow is done electrical-proportional by means of varying the electric current to the pilot valve (1). To achieve a high accuracy of the volume flow to be set, the use of a current-regulated (PWM) control is recommended. The pilot valve (1) can also be operated ON/OFF with 12V or 24 Volt. In this case, the volume flow limitation can be done mechanically.

5.8 Check Valve (CV) or Throttle Check Valve (TCV)

Specifies which Check Valve (CV) or Throttle Check Valve (TCV) will be used with the respective version of the flow control valve.



5.9 Pressure relieve (H)

For applications where the pressure to the attachment can not relieve itself when switched off, the flow control valve can optionally be ordered with a relieve nozzle. This nozzle is located between the connection to the consumer (H) and the tank connection (T) and is automatically used when the flow control valve is switched off.

6 Installation

6.1 General remarks

- Observe all installation and safety information of the machine manufacturer.

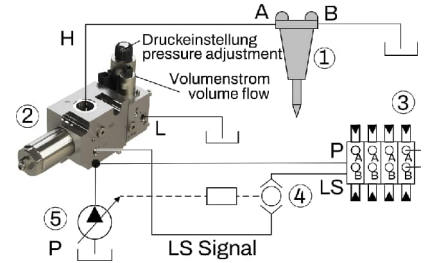
- Only technically permitted changes are to be made on the machine.
- The user has to ensure that the device is suitable for the respective application.
- Application exclusively for the range of application specified by the manufacturer.
- Before installation or dismantling, the hydraulic system is to be depressurized.
- Settings are to be made by qualified personnel only.
- May only be opened with the approval of the manufacturer, otherwise the warranty is invalidated.
- The enclosed connection suggestion is without guarantee. The functionality and the technical details of the construction machine must be checked.

6.2 Connection recommendations



NOTE The included connection recommendations are not guaranteed. The functionality and the technical specifications of the machine must be checked. It must be ensured that the construction machine is suitable in terms of technology and safety for the operation of the attachment.

- 1 - New consumer (e.g. Hammer)
- 2 - Flow control valve FC1X-2P
- 3 - Main control unit construction machine
- 4 - Switch valve (Signal for LS controller)
- 5 - Master pump



6.3 Installation – space

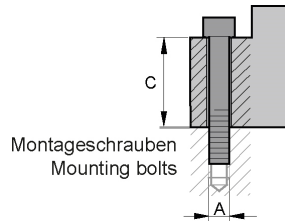
- Observe strength class and tightening torque of the fastening screws.
 - Do not damage seals.
 - Hydraulic system must be vented
 - Pay attention to the evenness of the supporting element
 - Pay attention to a tension-free assembly
 - Make sure there is sufficient space for adjustment and assembly work
- a. Install the flow valve on the support element using M10 bolts.
 - b. Make electrical connections.



CAUTION! Hydraulic hoses must not come into contact with the flow control valve as they will suffer thermal damage.

6.4 Tightening torque

Thread A	Strength class	Tightening torque Nm	C mm
M10	8.8	48	35



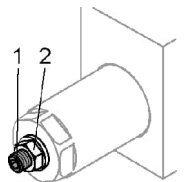
6.5 Setting the output flow rate



Attention! During operation, the valve can heat up to the oil temperature.

After loosening the counter-nut (2), the set-screw (1) can be used to mechanically set the maximum aperture.

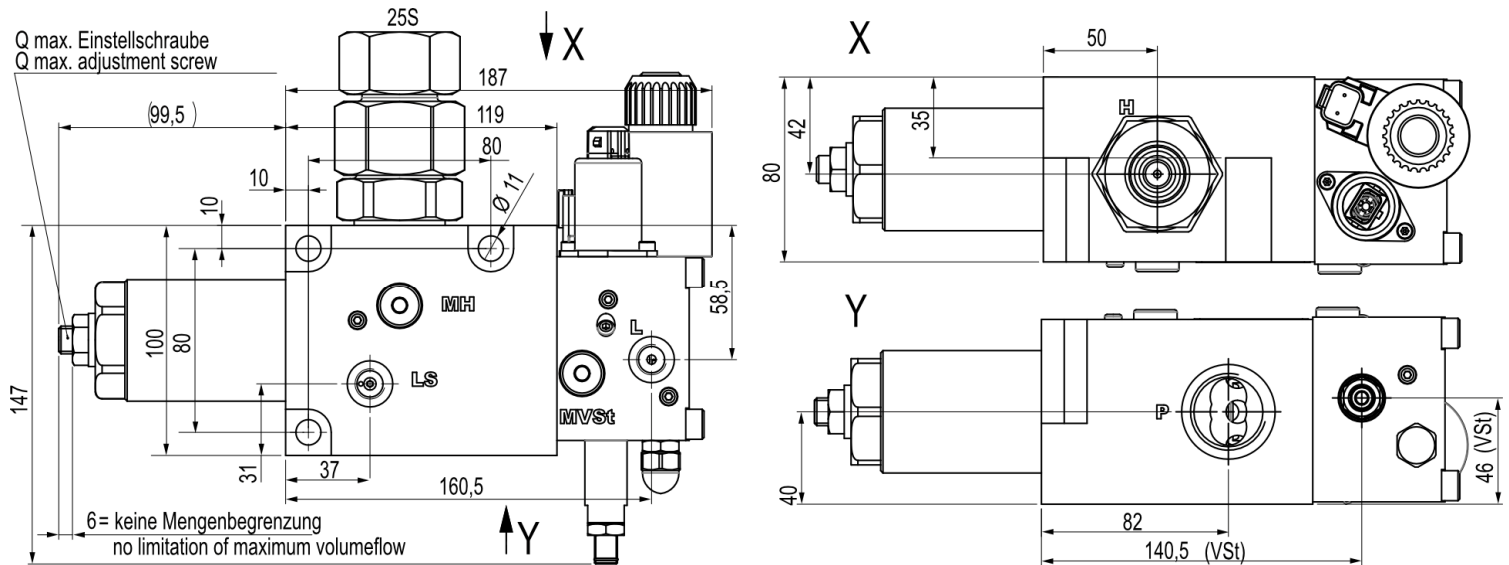
- Screw in (CW): reduce the output volume
- Turning out (CCW): increase output flow



This setting is required when the flow control valve is switched to set the output flow rate. The setting can also be used with pro-portionally actuated valve to limit the output flow independently of the input signal.

6.6 Dimensions

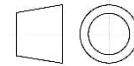
G1" - ISO 1179-1



7 Standards and Safety Requirements

7.1 General remarks

- Die Ansichten in Zeichnungen werden nach der europäischen Variante der Normalprojektion dargestellt
- Als Dezimaltrenner in Zeichnungen wird das Komma (,) verwendet
- Alle Maße sind in mm angegeben



7.2 Standards

Folgende Normen sind bei der Installation und dem Betrieb des Ventils zu beachten:

- DIN EN ISO 13732-1:2008, Temperaturen an berührbaren Oberflächen

8 Accessories