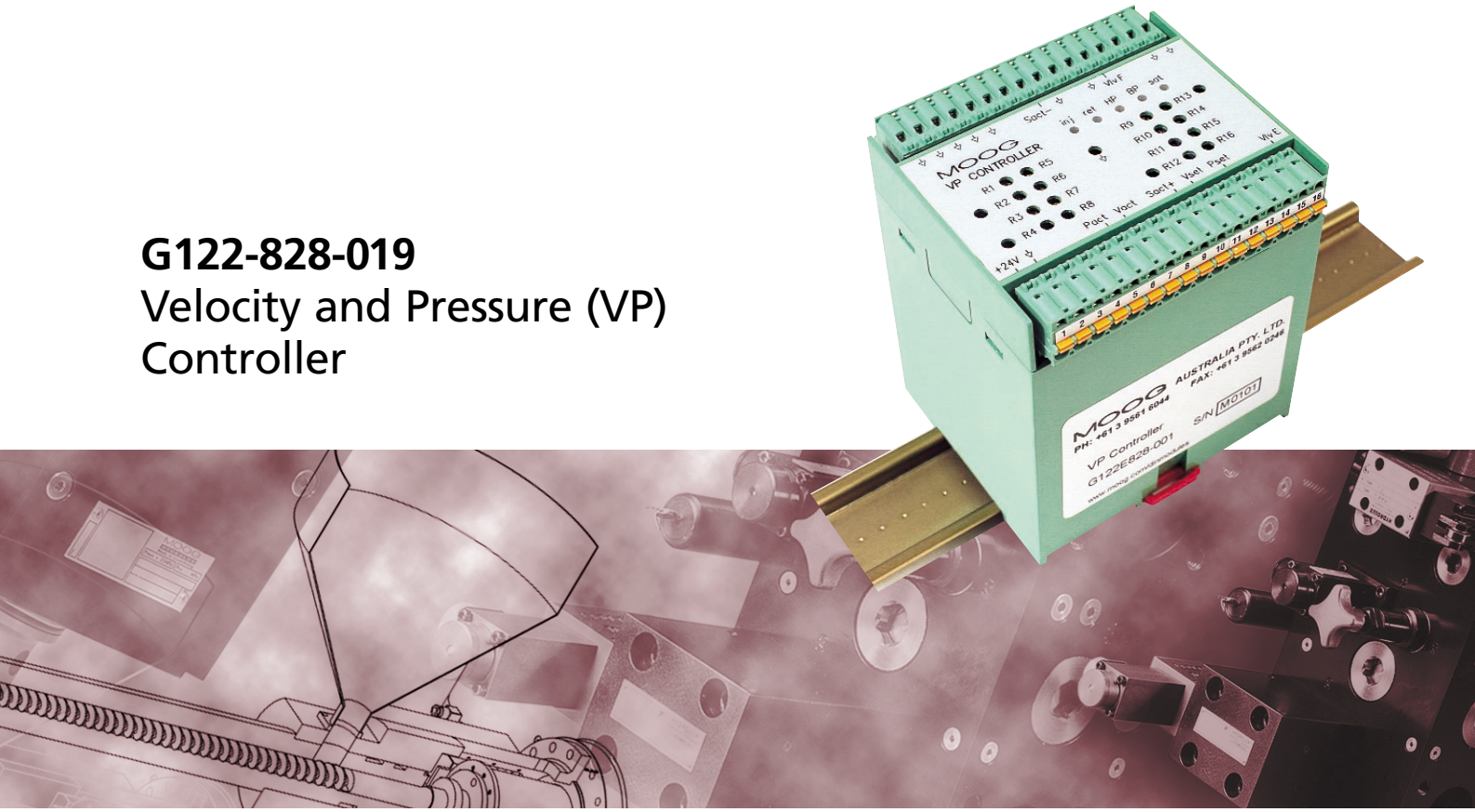
G122-828-019
Velocity and Pressure (VP) Controller



DESCRIPTION

The Moog G122-828-019 VP Controller, combined with a Moog servo valve, a position or velocity transducer and a pressure transducer, will provide closed loop control of the injection cycle of a plastic injection molding machine.

The functions controlled during the cycle are:

- Injection speed
- Injection pressure limiting
- Hold pressure during setting
- Back pressure during plasticising

Retract speed during decompression is controlled open loop.

Closed loop control of the critical injection speed and pressures ensures precise repeatability of mold fill and so consistent and high quality machine output. Variations in material characteristics, machine hydraulic pressure, mold temperature, screw clearances, etc, do not result in the normally observed variations is part quality. Consistent and repeatable inject speed, hold pressure and back pressure dramatically reduce the influence of these variables.

The VP Controller is housed in a compact DIN rail mounting enclosure and requires a 24V DC supply.

FEATURES

- Improved yield
- Higher quality parts
- Set once, no further adjustments needed
- Low cost
- Moog quality and reliability
- Compact DIN rail housing
- Convenient front panel controls, test points and indicators

SPECIFICATIONS

Logic inputs: Inject, hold pressure, back pressure and retract
On at 10 V
Off at 5 V
Max 28 V
5.1 mA @ 24 V

Valve output: 0 to ± 10 V @ ± 2 mA max
Short circuit and over voltage protected

Monitor signal outputs:
P-act 0 to +10 V
V-act 0 to +10 V
2mA max, short circuit and over-voltage protected

Front panel test points:
Wipers of R2, 4,12 & 13 and 0 V reference

Front panel indicators:
inj (inject) – green
HP (hold pressure) – green
BP (back pressure) – green
ret (retract) – green
sat (valve saturated) – yellow

Front panel trimpots:

R1	velocity sensitivity	R9	hold pressure I gain
R2	actual pressure zero	R10	back pressure P gain
R3	actual pressure sensitivity	R11	back pressure I gain
R4	hold pressure zero	R12	back pressure zero
R5	hold pressure balance	R13	retract adjust
R6	voltage distributor P gain	R14	integral delay time
R7	voltage distributor I gain	R15	pressure limiter P gain
R8	hold pressure P gain	R16	pressure limiter I gain

P-set signal input:
Pin 13 Rin = 100 kOhm
Vin = 0 to +10 V

V-set signal input:
Pin 11 Rin = 10 kOhm
Vin = 0 to +10 V

P-act signal input:
Pin 4 Rin = 500 Ohm
Iin = 0 to +20 mA

S-act signal input: J404 made
Pin 8, voltage Rin = 100 kOhm
Vin = +10 to 0 V
Vin must decrease during injection

S-act signal input:
Pin 9 Rin = 100 kOhm
Vin = –10 to 0 V

Pressure transducer supply, Pin 3: +5 V ± 0.25 V @ 50 mA max

Valve supply: Internally supplied from pin 1
Pin 20 300 mA max output

Supply: 24V nominal, 22 to 28 V
130 mA @ 24 V, sat LED on

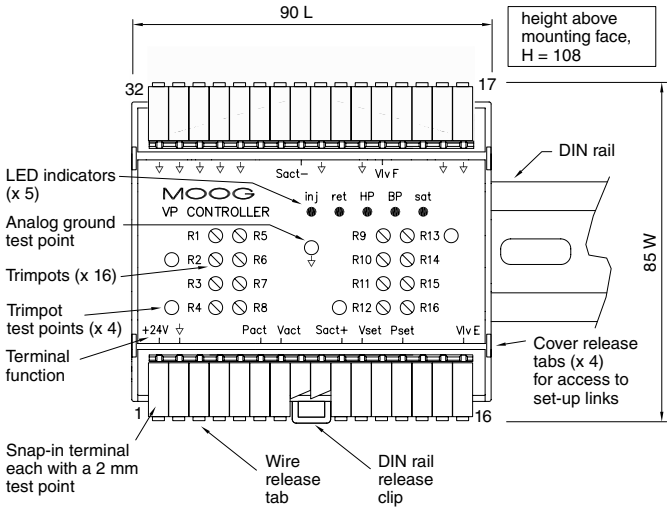
Recommended supply protection: M205, 250mA T (slow blow) fuse compliant with IEC 127-2 sheet 3

Mounting: DIN rail to EN50002
Housing IP40
Terminal block IP20

Temperature: 0 to +40°C

Dimensions: 90 L x 85 W x 108 H

Weight: 316 gm



CYCLE DESCRIPTION

Refer to the timing diagram below and the Operating detail drawings on page 4.

Inject: At the start of the cycle the machine PLC sets the INJECT logic input true and outputs an analog voltage V-set, to set the inject speed. It also outputs an analog voltage P-set, which sets the upper limit of the inject pressure. As soon as the actual inject pressure reaches the P-set value, the speed control is suppressed by the pressure control and the rest of the inject part of the cycle is at constant pressure. The pressure will normally rise to this limit when the mold is full and the inject actuator can no longer move forward.

Hold Pressure: This part of the cycle maintains a constant pressure on the part, setting in the mold. The machine PLC now removes the INJECT logic input and sets HOLD PRESSURE true. At the same time it adjusts the P-set analog value to the required hold pressure.

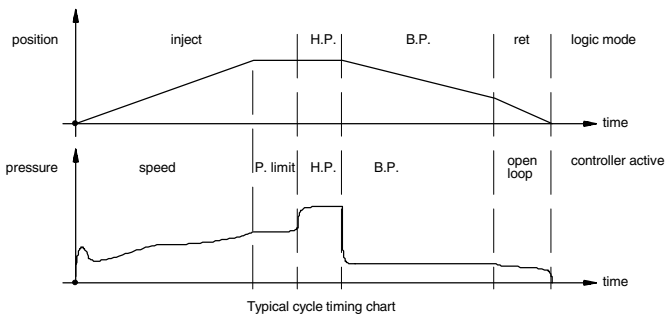
Back Pressure: This part of the cycle maintains a constant pressure in the rear of the injection actuator to ensure even plasticising.

The machine PLC removes the HOLD PRESSURE logic signal and sets the BACK PRESSURE logic signal true. It adjusts the P-set analog signal to the required pressure and the closed loop holds the oil pressure at that value as the screw rotates and forces the inject actuator back.

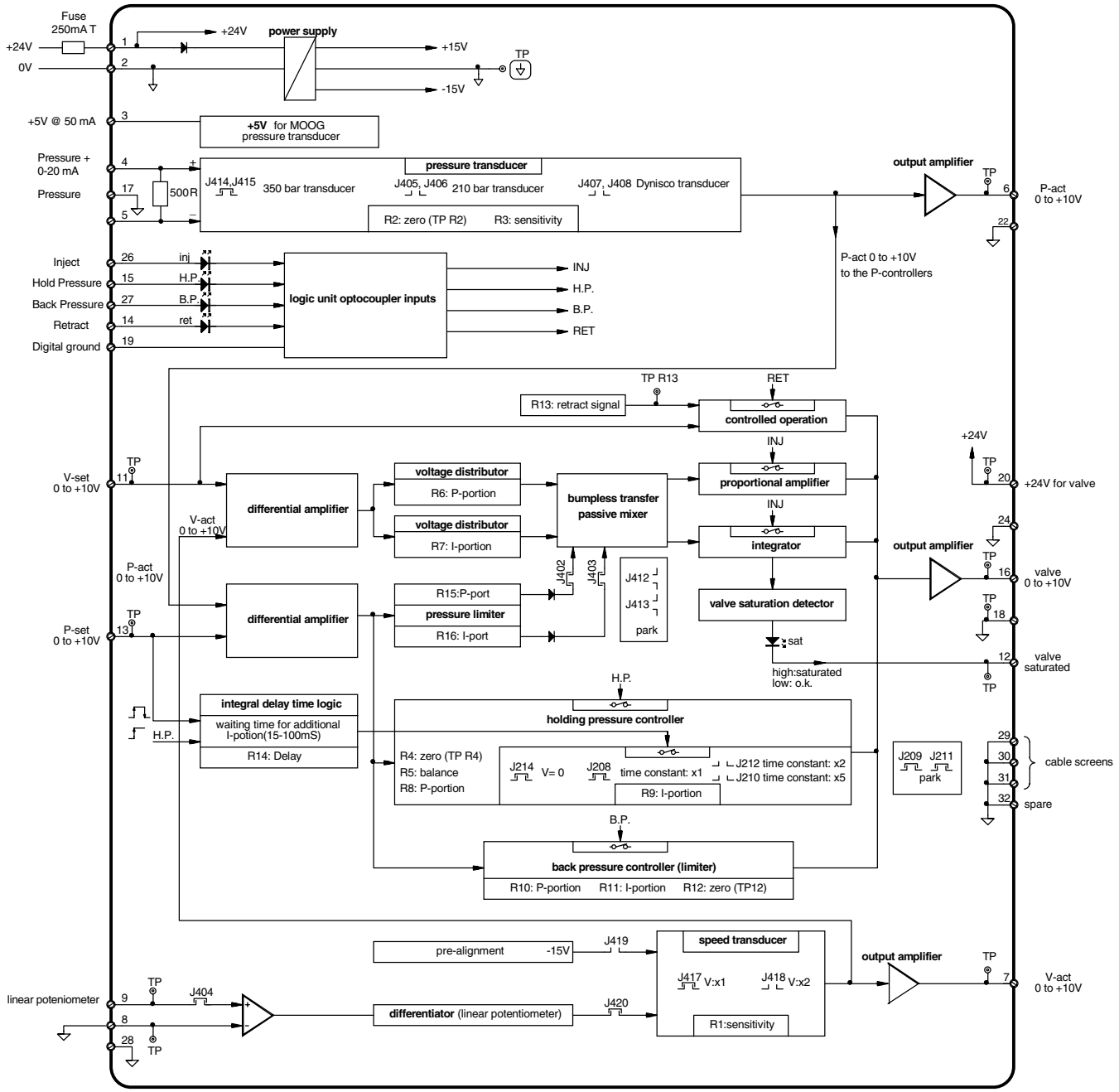
Retract: After plasticising, the screw is pulled back to stop inject nozzle drool.

The machine PLC removes the BACK PRESSURE logic signal and sets the RETRACT logic signal true. The machine also pressurises the front of the inject actuator to pull back the screw. Oil flow out of the back of the actuator is controlled open loop by the servo valve. The command to the servo valve can come from V-set, or R13 on the VP Controller, or both.

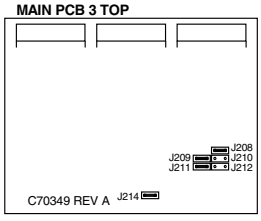
CYCLE TIMING DIAGRAM



Typical cycle timing chart



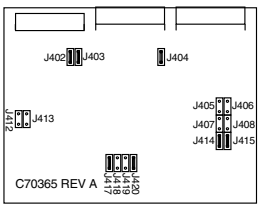
MAIN PCB 3 TOP



Default link loaded.

Link	Default	Function
J208	✓	Hold pressure controller integrating capacitor 470nF
J209	✓	Spare
J210		Hold pressure controller integrating capacitor 100nF
J211	✓	Spare
J212		Hold pressure controller integrating capacitor 220nF
J214	✓	Hold pressure controller integrator dissable

MAIN PCB 4 BOTTOM



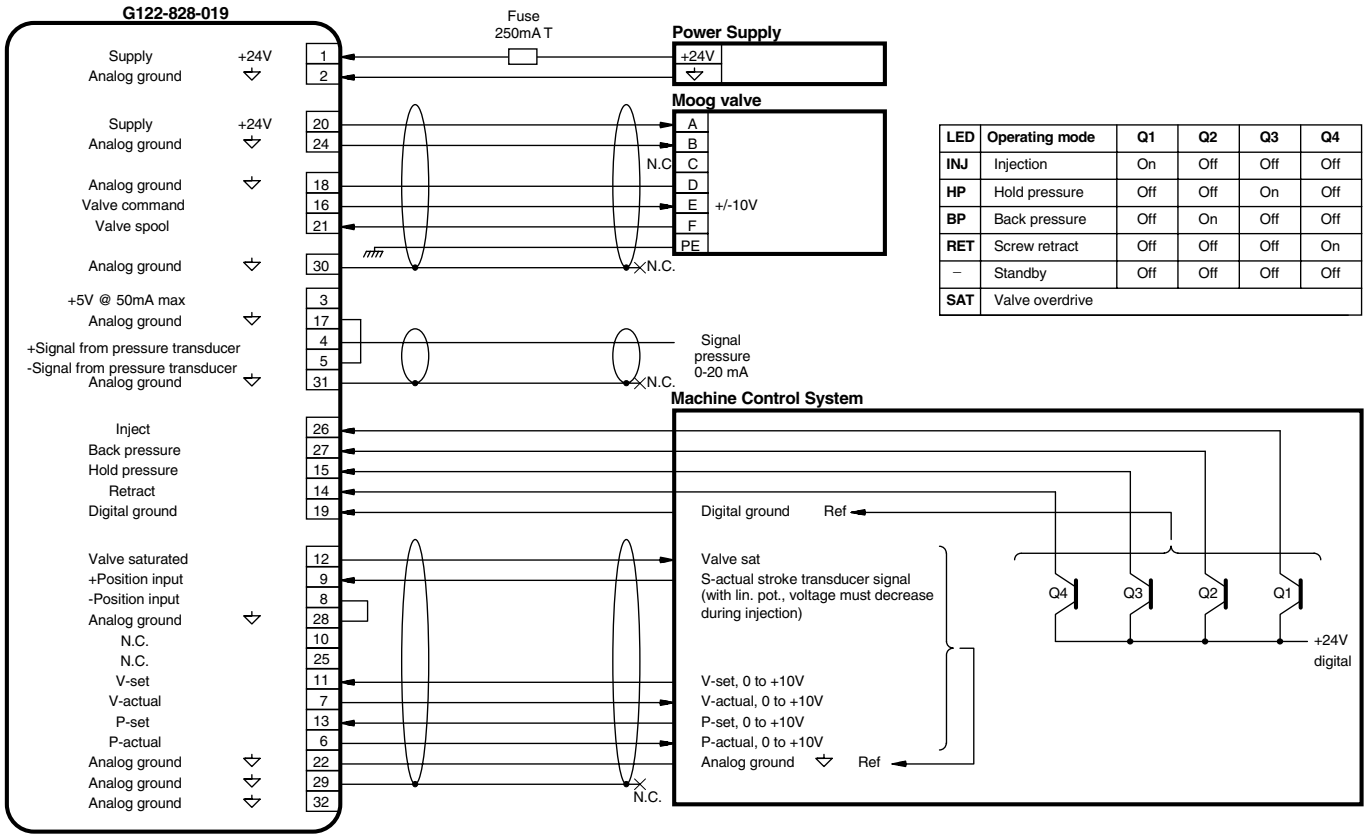
Link	Defualt	Function
J402	✓	Pressure limiter P enable
J403	✓	Pressure limiter I enable
J404	✓	Velocity signal from linear pot
J405		Pressure measuring amp 210 bar
J406		Pressure measuring amp 210 bar
J407		Pressure measuring amp Dynisco
J408		Pressure measuring amp Dynisco
J412		Spare for J402
J413		Spare for J403
J414	✓	Pressure measuring amp 350 bar
J415	✓	Pressure measuring amp 350 bar
J417	✓	Velocity mearsing amp low gain V=1
J418		Velocity mearsing amp high gain V=2
J419		Velocity signal offset
J420	✓	Velocity signal from linear pot

LINK ACCESS

Access to the internal circuit boards, so the links can be set, is achieved by the following:

- Remove both electrical connectors.
- Using a medium sized, flat blade screw driver, push in one side tab while pulling the cover away from the base. The cover will click over the tab.
- Repeat for the other tab on that side.
- After the two tabs on one side are released, release the tabs on the other.
- Withdraw the electronics assembly and identify the circuit boards by their part numbers C70349 and C70365.

INTERCONNECT DIAGRAM



LED	Operating mode	Q1	Q2	Q3	Q4
INJ	Injection	On	Off	Off	Off
HP	Hold pressure	Off	Off	On	Off
BP	Back pressure	Off	On	Off	Off
RET	Screw retract	Off	Off	Off	On
–	Standby	Off	Off	Off	Off
SAT	Valve overdrive				

ORDERING INFORMATION

G122-828-019 VP Controller

INTERNET DATA

For the latest version of this Data Sheet please refer to the Moog website www.moog.com/dinmodules

Moog Australia Pty. Ltd. 14 Miles Street, Mulgrave, Victoria 3170, Australia. Telephone: 03 9561 6044. Fax: 03 9562 0246.
Industrial Controls Division. Moog Inc., East Aurora, NY 14052-0018. Telephone: 716/652-3000. Fax: 716/655-1803. Toll Free 1-800-272-MOOG.
Moog GmbH. Hanns-Klemm-Strasse 28, 71034 Böblingen, Germany. Telephone: 07031-622-0. Fax: 07031-622-100.
Moog Japan Ltd. 1-8-37 Nishisindo, Hiratsuka, Kanagawa, Japan 254-0019. Telephone: 81 463 55 3615. Fax: 81 463 54 4709.
For the location nearest you, contact: www.moog.com/worldwide.