DVP-Digital Velocity & Pressure Control Card
Model : J124-032
Overview

The MOOG DVP controls Velocity and Pressure (V/P) by closed loop and improves the injection molding process with MOOG high performance servovalve.
It is a Digital Signal Processor (DSP) board, which has the analog interface and the control software for injection cylinder in each process.
The parameters (gain etc.) of closed loop can be
- adjusted by serial communication from a PC
- stored in the flash memory on the DVP.
Once parameters are set and stored, the DVP works as a standalone controller.
The card size is conformed to standard EURO board format - 3U (100 x 160 mm).

Function

The precise and repeatable injection process control can be achieved by DVP with MOOG servovalve.
The card has the following functions:
- Closed loop injection velocity control with pressure limit for mold protection
- Switchover of control mode from velocity to pressure
- Closed loop packing and holding pressure control
- Closed loop back-pressure during plasticizing
- Decompression control
- Position control by using 4way servovalve
Each card has 2 axis control (limited in the number of AI).
DSP is high speed processing enables high servo cycle (0.33 ms)

Control algorithm fit to injection molding machine is pre-installed.
  - Pressure limit circuit
    The injection pressure limitation is activated, when the actual pressure has been reached the setpoint pressure, thereby reducing the injection speed.
    This function can be utilized to obtain the smooth switchover from velocity to pressure mode.
    Besides, the mold can be protected under an unusual machine condition.
  - Load compensation circuit
    Decline of velocity is compensated when injection pressure becomes high
  - Ramp Control
    Ramp rate of velocity command input signal can be changed depending on the characteristics of injection molding machines.

Entering the digital number for tuning parameters enables the precise and repeatable adjustments.
This function shortens set up time comparing with a conventional V/P card with analog circuit.

Test points installed in the software control circuit enables signal monitoring from analog output.

Control algorithm specialized in your injection molding machine is available as a special order.
The following diagram shows the simplified injection control block. The interface of the control block is analog voltage. The DVP receives command from host controller and feedback from sensor, then give the control output to servovalve. The control modes are switched by digital inputs from host controller.

<Typical control data in injection process controls>
Interface

**Block Diagram**

**Front Panel**
- D-type 9 pin connector (RS422 for parameter set-up)
- 3 LEDs (status of the DVP)

**I/O Interface Connector**
DIN41612 96pin (b and c are used, a is NC)

**Power supply**
24VDC/500mA, Or +/-15VDC/25mA & 5VDC/1.5A

**Analog Input (AI)**
- No. of channels : 8
- Resolution : 16 bit
- Input type, range : differential input, +/-10V
  (Common mode : max30V)
- Filtration : 100kHz
- Input impedance : 100k ohm

**AI Channel 0 (AI_0)**
The analog differentiator can be inserted to the AI_0.

<table>
<thead>
<tr>
<th>AL_0</th>
<th>Differentiator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Signal</td>
<td>Output voltage</td>
</tr>
<tr>
<td>+/- 5V/sec</td>
<td>+/- 10V</td>
</tr>
<tr>
<td>+/- 10V/sec</td>
<td></td>
</tr>
<tr>
<td>+/- 25V/sec</td>
<td></td>
</tr>
<tr>
<td>+/- 50V/sec</td>
<td></td>
</tr>
</tbody>
</table>

The range of differentiator is selectable by dip switches.

**Analog Output (AO) for Control**
- No. of channels : 2
- Resolution : 16 bit
- Output range : Ch 0 +/- 10V, 7.5/20/50/100mA
  (Selected by dip switch and jumper)
- Ch 1 +/- 10V
- Filtration : None
- Output capacity : 1mA for voltage output (+/-10V)

**Analog Output (AO) for Monitor**
- No. of channels : 4
- Resolution : 12 bit
- Output range : +/- 10V
- Filtration : None
- Output capacity : 1mA (load should be 10k ohm min.)

**Digital Input**
- No. of channels : 10
- Type : Sink / Source
- Isolation : Optical isolation
- Input Voltage : 15 .. 24VDC (High level)
- Input Current : 2mA min. / ch

**Digital Output**
- No. of channels : 8
- Type : Sink (NPN) / Source (PNP)
  (The type is decided by the model number)
- Isolation : Optical isolation
- External Power : 15 .. 24V
- Output Current : 100mA max.
- Protection : Over load protection

**Encoder Input**
- No. of channels : 1
- Encoder type : Incremental (A,B,Z), Linear
- Counter range : 24 bit
- Max. pulse rate. : 1.25MHz for each phase A / B.

**MPU & Memory**
- MPU : DSP, TMS320C32 (TI)
- Clock : 50MHz
- RAM : 32kWord (1Word=32bit)
- Flash Memory : 256kByte
Connection Example
Installation

Power : 24VDC
Connector : DIN41612 96-pin
Weight : 0.26kg (140 without DC-DC board)

Accessory

- Connector Board (C34842-001)
  The Connector Board is prepared for easy wiring.
  It has removable screw type connectors and LED
  to show the status of the digital inputs.
- Mount Board (C49902-001)
- GOUI DVP Package (C34786-003)
  Windows based HMI to adjust gain
  parameters by PC
- RS232/422 Converter (A47733-026)
- AC adapter for RS232/422 Converter (A47733-027)
- Cable Assembly for RS232 serial communication
  (C14952-00X)
  This cable is used between PC(RS232 port) and RS232/RS422 converter
- Cable Assembly for RS422 serial communication (C14953-00X)
  This cable is used between RS232/RS422 converter and DVP
- Card Holder

Ordering Information

<table>
<thead>
<tr>
<th>Model Number</th>
<th>DO type</th>
<th>DC/DC converter</th>
<th>Power Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>J124-032-001</td>
<td>Sink</td>
<td>with</td>
<td>24VDC</td>
</tr>
<tr>
<td>J124-032-002</td>
<td>Sink</td>
<td>No</td>
<td>5VDC, +/-15VDC</td>
</tr>
<tr>
<td>J124-032-003</td>
<td>Source</td>
<td>with</td>
<td>24VDC</td>
</tr>
<tr>
<td>J124-032-004</td>
<td>Source</td>
<td>No</td>
<td>5VDC, +/-15VDC</td>
</tr>
</tbody>
</table>

- DC/DC Converter makes +/-15V DC and 5VDC from 24VDC.
- The standard control software is included in the flash memory on the card
- One floppy disk for the parameter set up screen files for GOUI comes with DVP