**Product Type**

Equipment enables valve pin opening velocity and intermediate pin holding control for hydraulic valve gate hot runner systems up to 24-zones. Contact Synventive for applications greater than 24-Zones.

1. **Valve Gate Hot Runner System**

Hydraulic valve gate hot runner system with conical valve gate.

   a) Hydraulic actuator with position sensor
   b) For use on all E-Series and XP-Series nozzles.

   **Note:** synflow® is available with the HB2508, HB4016, and QCVG16M06 hydraulic actuators. Reference the Actuator Catalogue for more information.

2. **synflow® Flow Control**

   c) Position Junction Box
   d) Drive Junction Box
   e) Valve Assemblies (eFRV)
   f) Controller
   g) Tablet

**Operation Principle, Application, Benefits**

- User-defined valve pin opening velocity for a user-defined distance
- User-defined valve pin opening intermediate position
- Up to two different user defined pin opening profiles per nozzle for each injection molding cycle

   **Note:** Valve Pin Sequencing is controlled by Customer’s Sequential Valve Gate Controller.

**Areas of Application**

- Optimized surface quality of sequentially or cascade injection molded parts
- Improved dimensional control on injection molded parts
- Improved cavity-to-cavity balance
- Reduce cavity pack pressures
- Pre-fill cold runners

**Plug 'n Play® Systems**

Components and wiring connections are installed on the hot runner system and are delivered pre-wired and pre-tested.
### Overview Hydraulic Configuration A / B / C

#### Configuration A
Configuration A refers to systems with individual open and close fittings plumbed directly to each actuator. Systems are controlled by a directional valve stack either on the molding machine or on a stand-alone hydraulic power unit.

Option: synflow can be added either as a cart or plate option.

#### Configuration B
Configuration B refers to systems with individual open and close fittings plumbed to each actuator through either a synflow InLine eFRV’s or a dummy block depending on whether the system is synflow or VMI. Systems of this configuration are controlled by a directional valve stack either on the molding machine or on a stand-alone hydraulic power unit.

Option: If adding synflow in the field, replace preplumbed dummy blocks with In-Line eFRV’s. If over 12 zones eFRV JB needs to be added.

#### Configuration C
Configuration C refers to systems with a directional valve stack on the tool or hot runner and just two hydraulic fittings for the mold (pressure and return to tank).

Option: If adding synflow in the field, install sandwich eFRV’s between solenoid valves and hydraulic manifold, add eFRV junction box.

The Electronic Flow Restrictor Valves (eFRV’s) used by synflow must be plumbed on the "close" line between the directional valves and the actuators.

Molders may use directional valves on the injection molding machine or on a stand-alone hydraulic power unit. In this situation two hydraulic connections must be made to the mold for each actuator, one for "open" and one for "close".

Molders may also use directional valves that are pre-plumbed to the hot runner system. In this situation there are only two hydraulic connections to the mold, one for “pressure” and one for “return to tank”.

These different hydraulic configurations impact both the hot runner design of a synflow system as well as the controller options for running the mold as synflow.
### Configuration A - Plate with Controller Option

#### FRV & Driver box SF3-24Z DRV BOX

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Qty.: IN-LINE eFRV</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF3-MPK-01</td>
<td>1</td>
</tr>
<tr>
<td>SF3-MPK-02</td>
<td>2</td>
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<tr>
<td>SF3-MPK-03</td>
<td>3</td>
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<tr>
<td>SF3-MPK-04</td>
<td>4</td>
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<td>SF3-MPK-05</td>
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<td>SF3-MPK-06</td>
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<tr>
<td>SF3-MPK-24</td>
<td>24</td>
</tr>
</tbody>
</table>

Configuration A comes complete with controller, touchscreen, eFRV’s and all necessary cables. Hydraulic lines or fittings not supplied.
Product Description

Mobile PID control unit with max. 24 control zones which enables valve pin opening velocity and intermediate pin holding control for hydraulic valve gate hot runner systems.

The control unit is delivered including all connection cables with a standard length of 7.5 m.

The control unit is operated by a touch screen which can be mounted in different ways.

Technical Data

<table>
<thead>
<tr>
<th>Current</th>
<th>1/PE 110 / 230 V AC 50 / 60 Hz 3 A max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>5 ... 40 °C</td>
</tr>
<tr>
<td>Humidity</td>
<td>0...80% non condensing</td>
</tr>
</tbody>
</table>

Dimensions

h x w x d 1145 x 600 x 550 mm

Control unit SF3-ICART comes complete with controller, touchscreen and eFRV’s. Hydraulic lines or fittings not supplied.
Product Description

Electronically controlled flow control valve - "In-Line Version" for controlling valve pin opening velocity and intermediate position.

The control valve is be mounted in line to the hydraulic pipe.

Attention: The customer’s cascade control is still required!

Operating Data

<table>
<thead>
<tr>
<th>Operating Pressure</th>
<th>40 - 60 bar (70-100 bar, QCVG16 only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil type</td>
<td>Hydraulic oil, HLP 32, DIN 51524-2</td>
</tr>
<tr>
<td>Connections for hoses or piping</td>
<td>A1, A2: G 3/8&quot;</td>
</tr>
</tbody>
</table>

May be supplied as a synflow ready, in which case dummy block will be supplied as placeholders for the eFRV’s to simplify any future upgrade.

eFRV Kits

- SF200-2000-IVK-01 with 2 m Cable
- SF200-2000-IVK-03 with 6 m Cable

Components

a) In-Line eFRV
- SF100-5000-01-01
- eFRV Cable 2 m: SF200-2000-JC-20-01
- eFRV Cable 6 m: SF200-2000-JC-60-01

- eFRV M6 Mounting Bolts (not shown): DIN912-M6X150-12.9

Configuration

In-Line: eFRV’s & drive junction box mounted on the tool using customer supplied Injection Molding Machine’s Directional Control Valves

Note: Synventive can supply the eFRV’s to be mounted on the machine, eliminating recurring costs on additional tools. For specific applications, please contact Synventive.
**Product Description**
Electronically controlled flow control valve – sandwich version for controlling valve pin opening velocity and intermediate position. Used when the hydraulic directional control valves are supplied as part of the hot runner system, the eFRV are mounted between the hydraulic manifold and the directional control valve.

The hydraulic valve block, including an oil pressure gauge is mounted as one unit to the hot runner system.

**Attention:** The customer’s cascade control is still required!

### Operating Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>40 - 60 bar (70-100 bar, QCVG16 only)</td>
</tr>
<tr>
<td>Connections / master gauge for holes</td>
<td>NG 06 DIN 24340 Form A / ISO 4401-03</td>
</tr>
<tr>
<td>Oil type</td>
<td>Hydraulic oil, HLP 32 DIN 51524-2</td>
</tr>
</tbody>
</table>

The hot runner system may be supplied as a synflow ready, in which case eFRV’s can be installed at a later date.

### eFRV Kits

- SF200-2000-RVK-02 with 2 m Cable
- SF200-2000-RVK-04 with 6 m Cable

### Components

- **Sandwich eFRV** SF3-SV01
  - Description: SF3 Sandwich Valve Assembly
- **eFRV Cable 2 m** SF200-2000-JC-20-01
- **eFRV Cable 6 m** SF200-2000-JC-60-01
- **eFRV M5 Mounting Bolts** (not shown) DIN912-M5X120-12.9

### Configuration

**Sandwich Valves:** eFRV’s drive junction box and Synventive supplied Directional Control Valves mounted on tool.

**Note:** Synventive can supply the eFRV’s to be mounted on the machine, eliminating recurring costs on additional tools. For specific applications, please contact Synventive.
Examples of eFRV, Sandwich style mounting:
1. Example of a 2-fold valve block with one synflow® control zone

2. Example of an 8-fold valve block with six synflow® control zones

Operating Data

<table>
<thead>
<tr>
<th>Operating Pressure</th>
<th>40 - 60 bar (70-100 bar, QCVG16 only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connections</td>
<td>P, T: G 1/2”  A, B: G 3/8”</td>
</tr>
<tr>
<td>Oil type</td>
<td>Hydraulic oil, HLP 32 DIN 51524-2</td>
</tr>
</tbody>
</table>
Product Description

Position and drive junction boxes are available in 12-zone and 24-zone configurations.

A 12-zone combo-box is also available as a compact solution when the valves are mounted on the tool or hotrunner.

All junction boxes have the same form factor and mounting pattern.

Drive Junction Box
Electronic Flow Restrictor Valve (eFRV) control
Position Junction Box
Position sensor input and recipe storage

Components

1) 12 Zone Position JB
SF3-12Z-JB-01

2) 24 Zone Position JB (shown)
SF3-24Z-JB-01

3) 12 Zone Potentiometer JB (QCVG16M06 only)
SF3-12Z-JB-02

4) 24 Zone Potentiometer JB (QCVG16M06 only)
SF3-24Z-JB-02

5) 12 Zone Drive JB
SF3-12Z-DRV-01

6) 24 Zone Drive JB
SF3-24Z-DRV-01

7) 12 Zone Position & Drive Combo JB*
(shown)
SF3-12Z-CMB-01

8) 12 Zone Potentiometer & Drive Combo JB
SF3-12Z-CMB-02 (QCVG16M06 only)

9) Mounting Bracket (shown)
VMI-16ZJBE-MB

10) M6 Socket Cap Screw DIN912 (shown)
DIN912-M6x12.9

* 12-Zone Position & Drive Combo Junction Box with Mounting Brackets and M6 Cap Screws shown below. Reference system BOM to determine actual part used on applicable system.
Controller for up to 24 zones.

Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>100 / 240 VAC, 1 Phase / N / PE (±10%)</td>
</tr>
<tr>
<td>Temperature</td>
<td>0 - 50 °C (32 - 122 °F)</td>
</tr>
<tr>
<td>Humidity</td>
<td>&lt;95 % no condensate</td>
</tr>
</tbody>
</table>

Components

a) Controller SF3-24ZC-01
b) AC Power Cord, EU IL13EU1H053100200
c) AC Power Cord, US/CA IL13US1SVT3100183
d) AC Power Cord, CN 6051.2030
e) Socket Cap Screw DIN912 DIN912-M8x75-12.9
f) Metric Hex Nut M8x1.25 mm DIN934-M8x1.25-SS
g) M8 Washer DIN125x89

Connections

a) Main Power
b) Drive Box
c) Position Signal
d) Tablet
Cable Kit, 7.5 m (length)
SF3-CBK-70-01

Components
a) Drive Cable
SF3-DRV-JC-01

b) Position Sensor Cable
VMI-SC01-7000

Tablet (Display) Kit
SF3-SDK-01

Components
a) Tablet
SF3-TBLT-01

b) Tablet Cable
SF3-UI-JC-01

Note
The Controller Kit, Cable Kit, and Tablet Kit are available under a single part number SF3-24ZK01
Optional synflow IMM I/O Module (SF3-IMMCK01)

The optional synflow IMM Interface connects to the synflow controller in order to provide signals that can be used to inhibit injection for cases when the Controller:

♦ Is Set to Idle (in order to prevent molding bad parts)
♦ Cycle is not complete:
  - Pins do not fully open during a cycle
  - Pins do not fully close upon completing a cycle

Also provides signal that can be used by the IMM to warn operator when any pin is in open state before entering safety gate.

The SF3-IMMCK01 (IMM Connector Kit) includes:

1) SF3 IMM Relay Box
2) Cable, DB9 M/M Molded 7,5 m (25 Ft)

Applicable wiring instructions are available on the Synventive website.