

COLORAK®
COLOR CHANGER RACK ASSEMBLY
USER MANUAL
OPERATION & MAINTENANCE
ORDERING INFORMATION

The EFC Color Changer Rack (CCR)

Assembly is engineered to provide

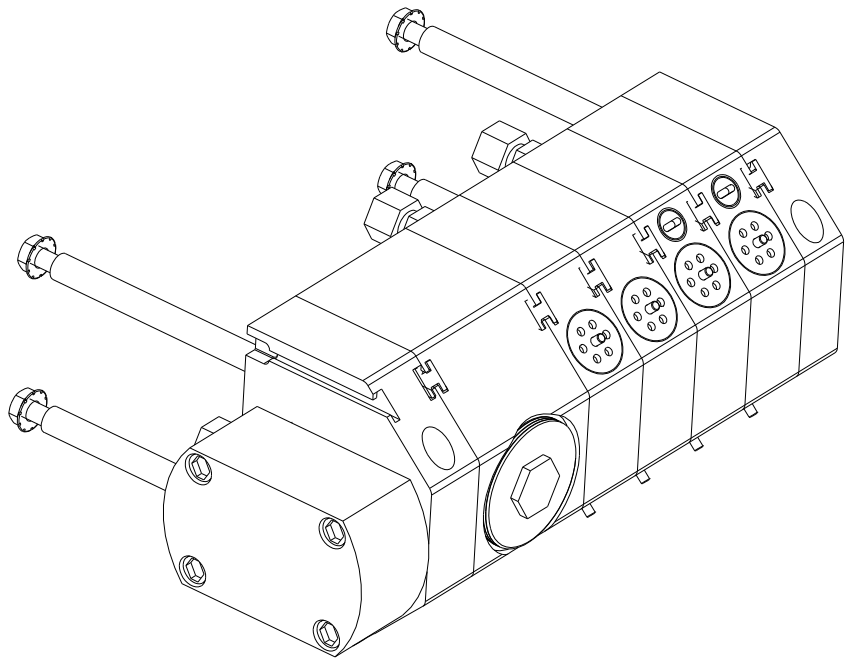
Complete flow-through, fast color changes,

Excellent paint circulation in a compact,

Lightweight package.

Design features include:

- **Microvalve Technology**
- **Modular Design**
- **Unlimited number of slices**
- **Precision CNC Machined**
- **Patented Air / Solvent (Solv-Saver®) Slice with a 30% Reduction in Solvent usage**
- **Optional Slices include:**
 - Regulator (50-1000 cc/min) Slice**
 - Non-circulation Slice**
 - Divider Slice**
 - Support Slice**



ALSO INCLUDED ARE VALVE REPLACEMENTS FOR

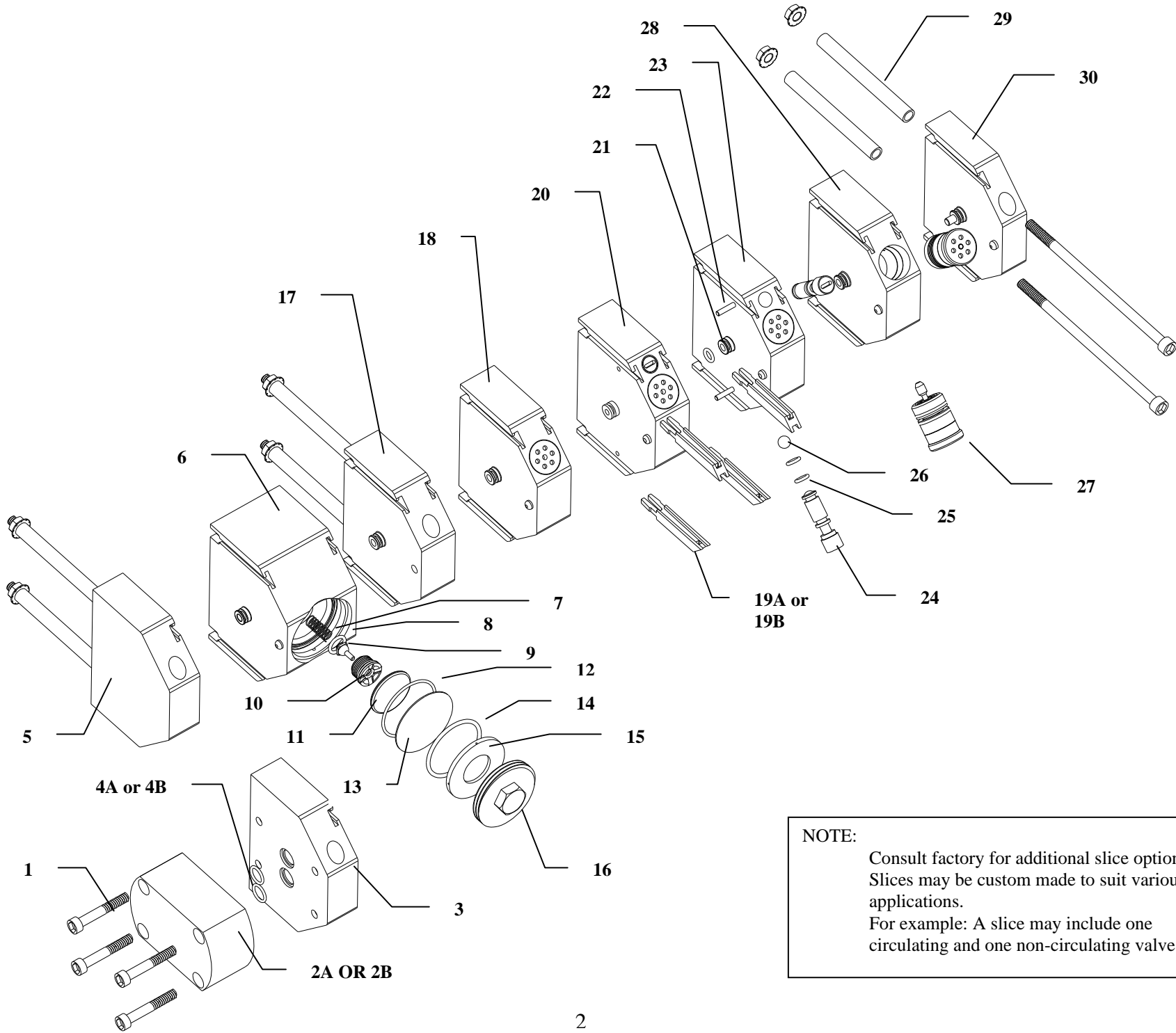
- **ABB**
- **FANUC**
- **ITW / RANSBURG**
- **SAMES®**

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TWO COLOR COLORAK®



NOTE:
 Consult factory for additional slice options.
 Slices may be custom made to suit various applications.
 For example: A slice may include one circulating and one non-circulating valve.

FIGURE 1.1.1: GENERAL COMPONENTS (2-COLOR)

ITEM	EFC PN	QTY	DESCRIPTION
1	640SSC	4	FLOW METER MOUNTING BOLTS
2A	65-1A12	1	FLOW METER
2B	65-1A86	1	EFC FLOW METER ASSY. - BLACK
3	294T60	1	FLOW METER END PLATE ASSY.
4A	1017TR	2	O-RING, TEFLON®
4B	1119CR	2	O-RING, TEKREZ®
5	300T60	1	END PLATE ASSY. W/FLUID OUT
6	65-1A13	1	REGULATOR SLICE ASSY. (0-1000 cc/min)
7	204M50	1	REGULATOR SPRING
8	1020TR	1	O-RING, TEFLON®
9	210M50	1	NEEDLE VALVE, SS
10	211M50	1	SEAT, SS
11	230T60	1	DIAPHRAGM HOLDER
12	41178VR	1	O-RING, VITON®
13	229T60	1	DIAPHRAGM
14	3925VR	1	O-RING, VITON®
15	339T60	1	REGULATOR SPACER
16A	30-1A71	1	REGULATOR COVER, HEX
16B	227T60M	1	REGULATOR COVER, 4 HOLE
17	65-1A15	1	FLOW THROUGH SUPPORT SLICE ASSY.
18	295T60	1	COLOR SLICE ASSY. W/RETURN, NO SHUT-OFF
19A	226T79	2 / SLICE	COLOR SLICE CLIP
19B	226T80	2 / SLICE	COLOR SLICE CLIP W/PINS
20	299T60	1	AIR/SOLVENT SLICE ASSY., NO RETURN, W/SHUT-OFF
21	6419CR	1 / SLICE	O-RING, TEKREZ®
22	295T60D	2 / SHUT OFF SLICE	LOCK PIN
23	297T60	1	COLOR SLICE ASSY. W/RETURN & SHUT-OFF
24	295T60B	2 / SHUT OFF SLICE	SHUT-OFF VALVE
25	6419CR	2 / SHUT OFF VALVE	O-RING, TEKREZ®
26	295T60C	1 / SHUT OFF VALVE	DELRIN® BALL
27	277T60CRG	2 / TRIGGERING SLICE	MICROVALVE ASSY (CHEMICALLY RESISTANT)
28	298T60	1	AIR/SOLVENT SLICE ASSY., NO RETURN, NO SHUT-OFF
29	295K60	VARIES	RACK MOUNTING HARDWARE KIT: 4 BOLTS, 4 LOCK WASHER/NUTS, 4 SPACERS
30	296T60	1	END PLATE ASSY.
31 (NOT SHOWN)	295K30	VARIES	RACK MOUNTING HARDWARE KIT (1/2): 2 BOLTS, 2 LOCK WASHER/NUTS, 2 SPACERS

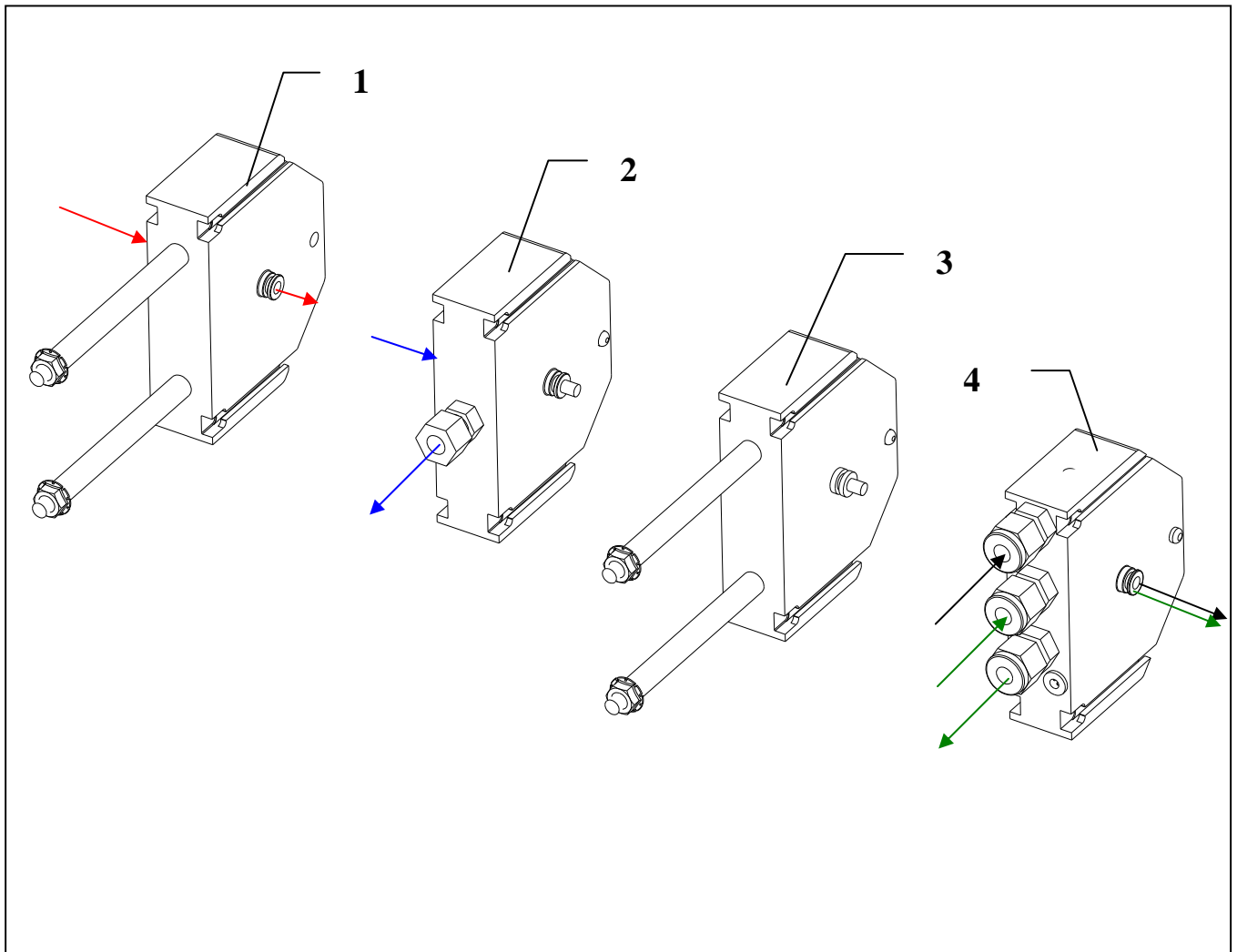


Figure 2.1.1: Specialty Slices

ITEM	EFC PN	QTY	DESCRIPTION
1	65-1A15	1	FLOW THROUGH SUPPORT SLICE ASSY.
2	65-1A19	1	BI-SECTIONAL OUTLET SLICE ASSY.
3	65-1A14	1	BI-DIRECTIONAL DIVIDER SLICE ASSY.
4	65-1A18	1	COLOR SLICE ASSY., NO SHUT-OFF, ½ W/RETURN, ½ W/O RETURN

FUNCTIONS:

1. **65-1A15** is a flow through slice and may be used as an additional support slice in instances where long stacks are to be mounted.
2. **65-1A19** is a bi-sectional outlet slice. Fluid enters in one side and exits the slice via the back fitting. The opposite side of the slice may then be used as an end plate (start point) for a second color changer stack. This side is similar to Item 30 in Figure 1.1.1.
3. **65-1A14** is a bi-directional divider slice. Both sides of this mounting slice serve the same purpose as Item 30 in Figure 1.1. This slice may be used to join two color changer racks together, running in opposite directions.
4. **65-1A18** contains one circulating and one non-circulating circuit and no manual shut-off. This slice may be used as a cleaning slice, supplying air and di-water/solvent.

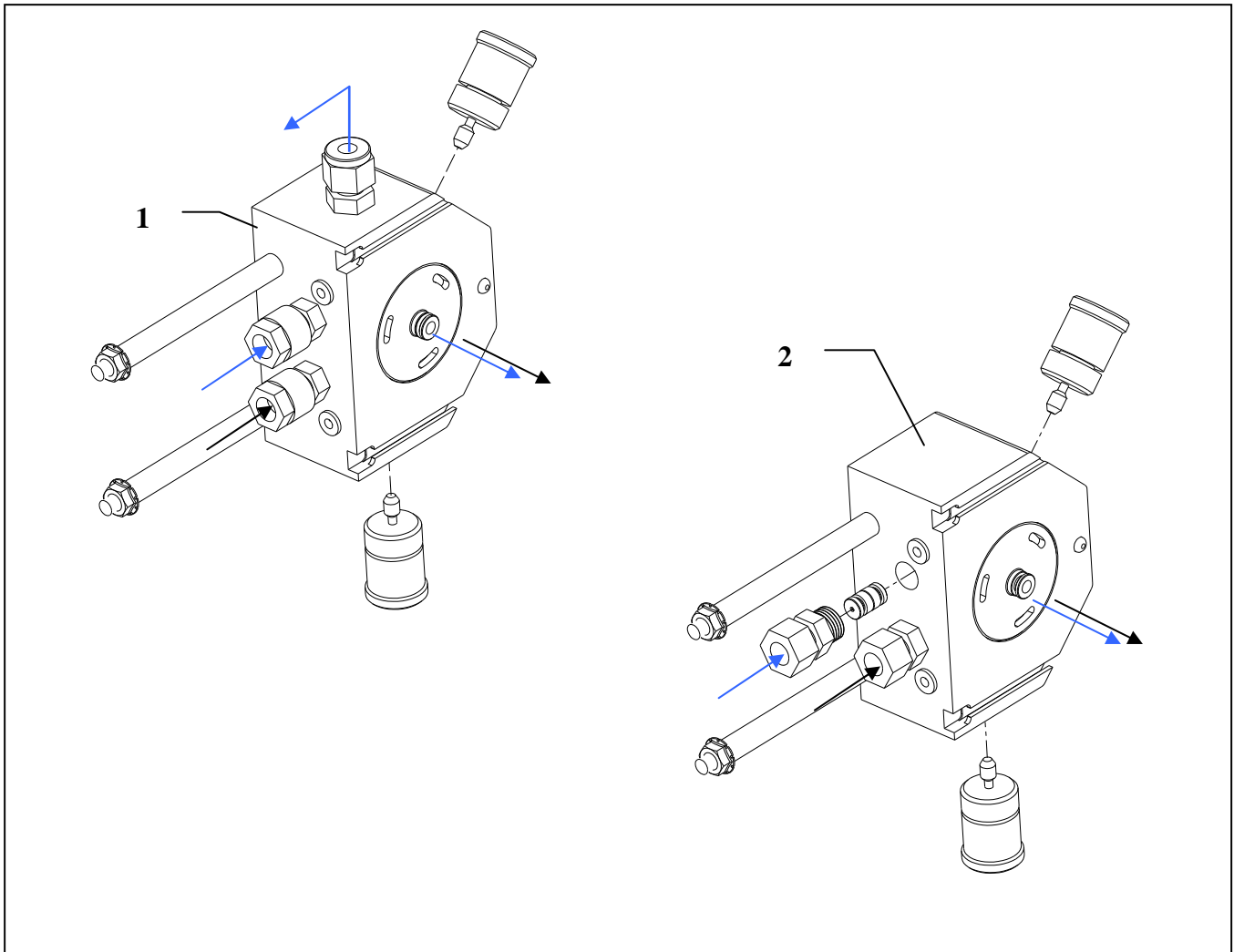


Figure 2.2.1: Specialty Slices (cont.)

ITEM	EFC PN	QTY	DESCRIPTION
1	65-1A59	1	SOLV-SAVER® SLICE ASSY. W/ONE CIRCULATION LINE
2	65-1A79	1	SOLV-SAVER® SLICE ASSY. W/BUILT-IN RESTRICTOR

FUNCTIONS:

1. **65-1A59** is a Solv-Saver® slice. Solvent or di-water and air enter the back of the slice. The solvent/di-water may then be circulated via the compression fitting at the top of the slice. The slice is used as an end plate with mounting hardware. Solvent/di-water and air exit the slice to clean of the Colorak® (not shown).
2. **65-1A79** is a non-circulating Solv-Saver® slice with an in-line restrictor at the solvent/di-water supply. Solvent/di-water flow into the back of the slice and then out through the side to clean the Colorak® (not shown).

SOLV-SAVER® AIR / SOLVENT SCRUBBER SLICE

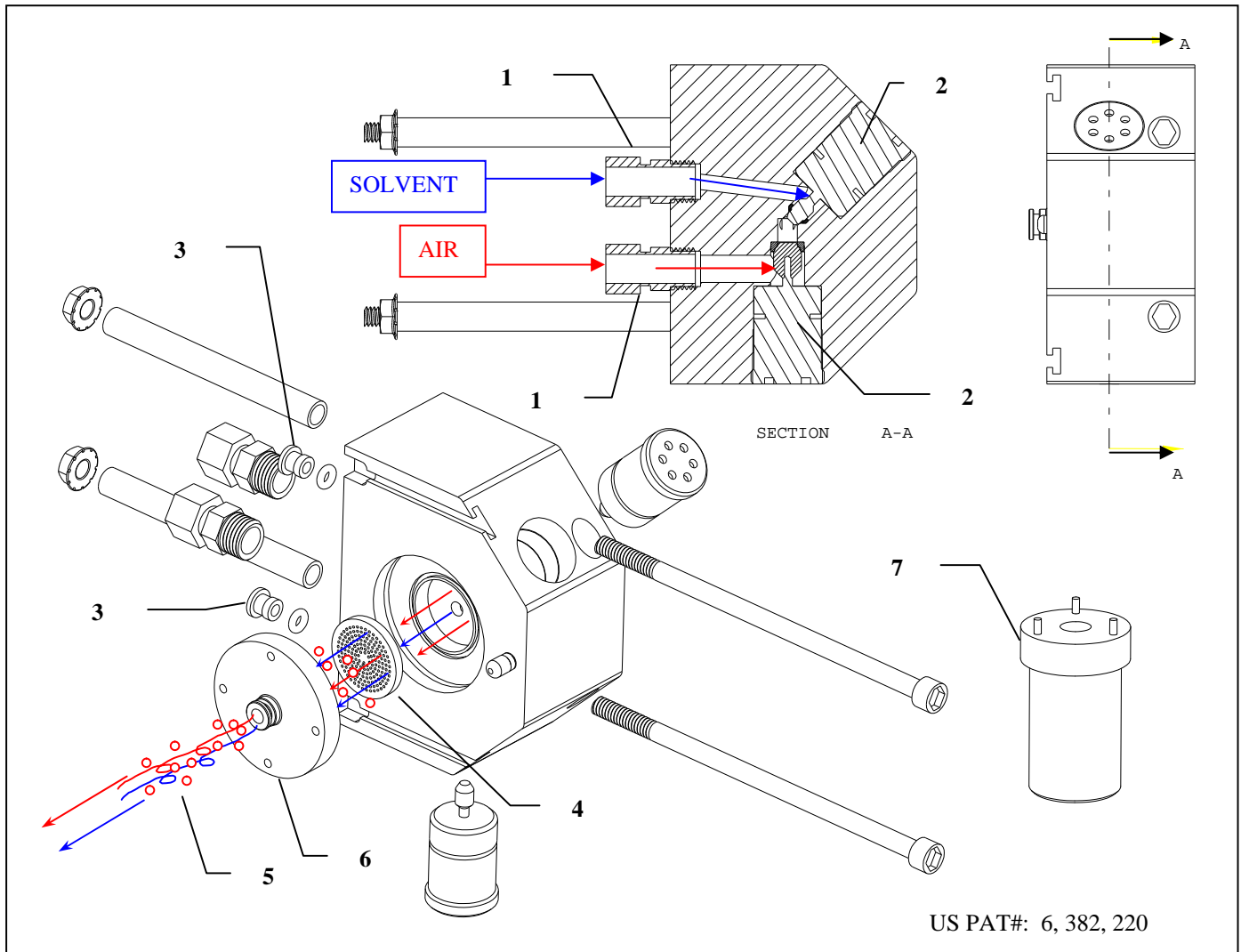


Figure 2.2.2: Specialty Slices (cont.)

Function:

1. Air and solvent enter the Solv-Saver® via the compression fittings (1) as indicated above.
2. The microvalves (2) allow solvent and air to pass through the slice.
3. Both microvalves are triggered by air entering 4mm push fittings (3).
4. As the air and solvent pass through, they are forced through a Screen Plate (4). This specially designed Screen Plate produces a “swirling” and “pulsating” solvent / air mixture. A “bubbling” action (5) is also created in this turbulent mixture further increasing cleaning power and efficiency, thereby **reducing the amount of solvent required.**
5. The microvalves may be triggered simultaneously or independent of one another, depending on the application and the results required for efficient cleaning.

SOLV-SAVER® AIR / SOLVENT SCRUBBER SLICE

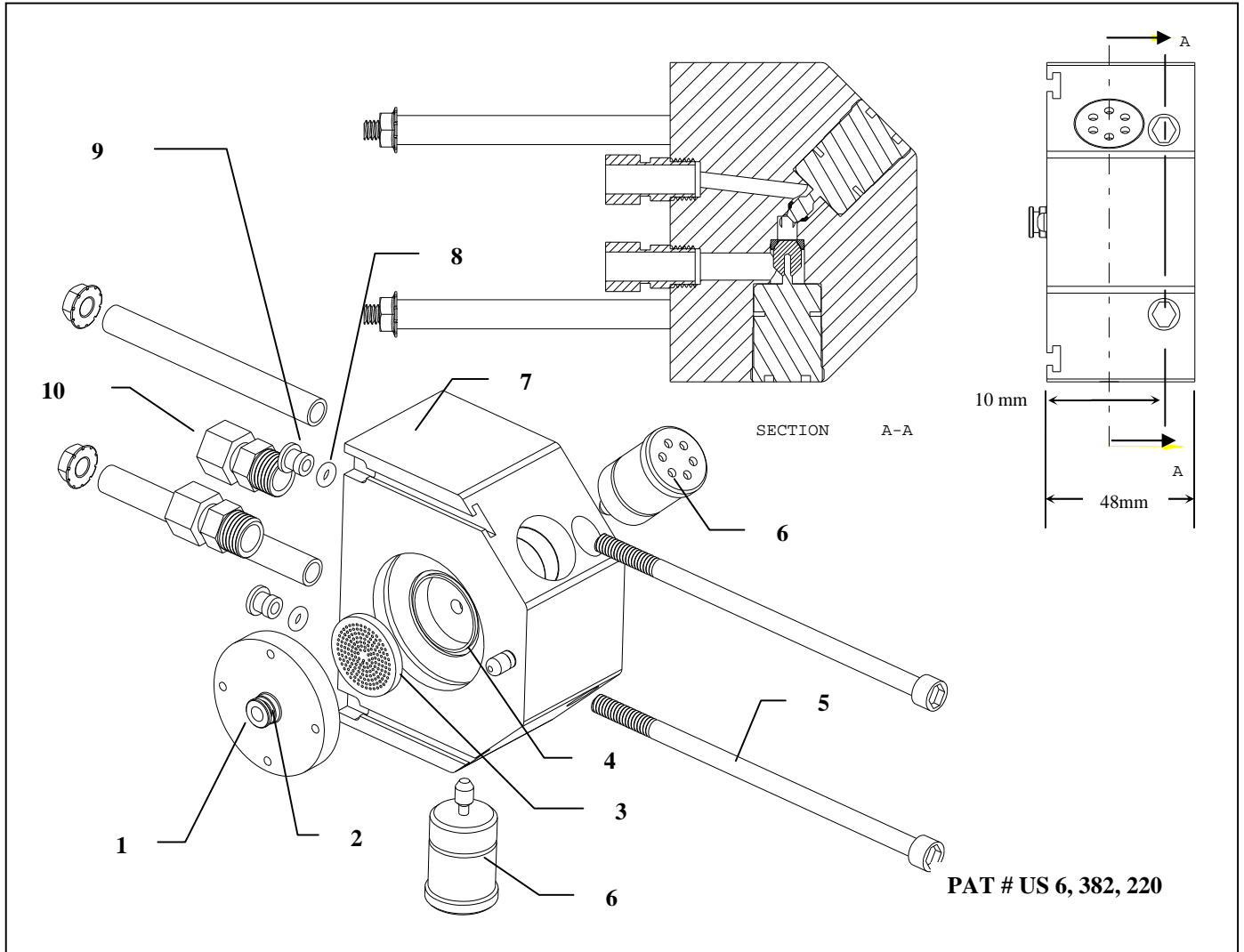


Figure 2.2.3: Specialty Slices (cont.)

ITEM	EFC PN	QTY	DESCRIPTION
1	65-1A25B	1	SCRUBBER SLICE CAP
2	6419CR	1	O-RING, TEKREZ®
3	65-1A25C	1	AIR / SOLVENT SCREEN
4	2717CR	1	O-RING, TEKREZ®
5	295K30	1	RACK MOUNTING HARDWARE KIT
6	277T60CRG	1	MICROVALVE, CHEMICALLY RESISTANT
7	65-1A59	1	SOLV-SAVER® SLICE ASSEMBLY
8	3624VR	2	O-RING, VITON®
9	144T80	2	4mm PUSH FITTING
10	1438NYF-M	2	FITTING, NYLON, MODIFIED**

****CONSULT FACTORY FOR ADDITIONAL FITTING SIZES AND MATERIALS**

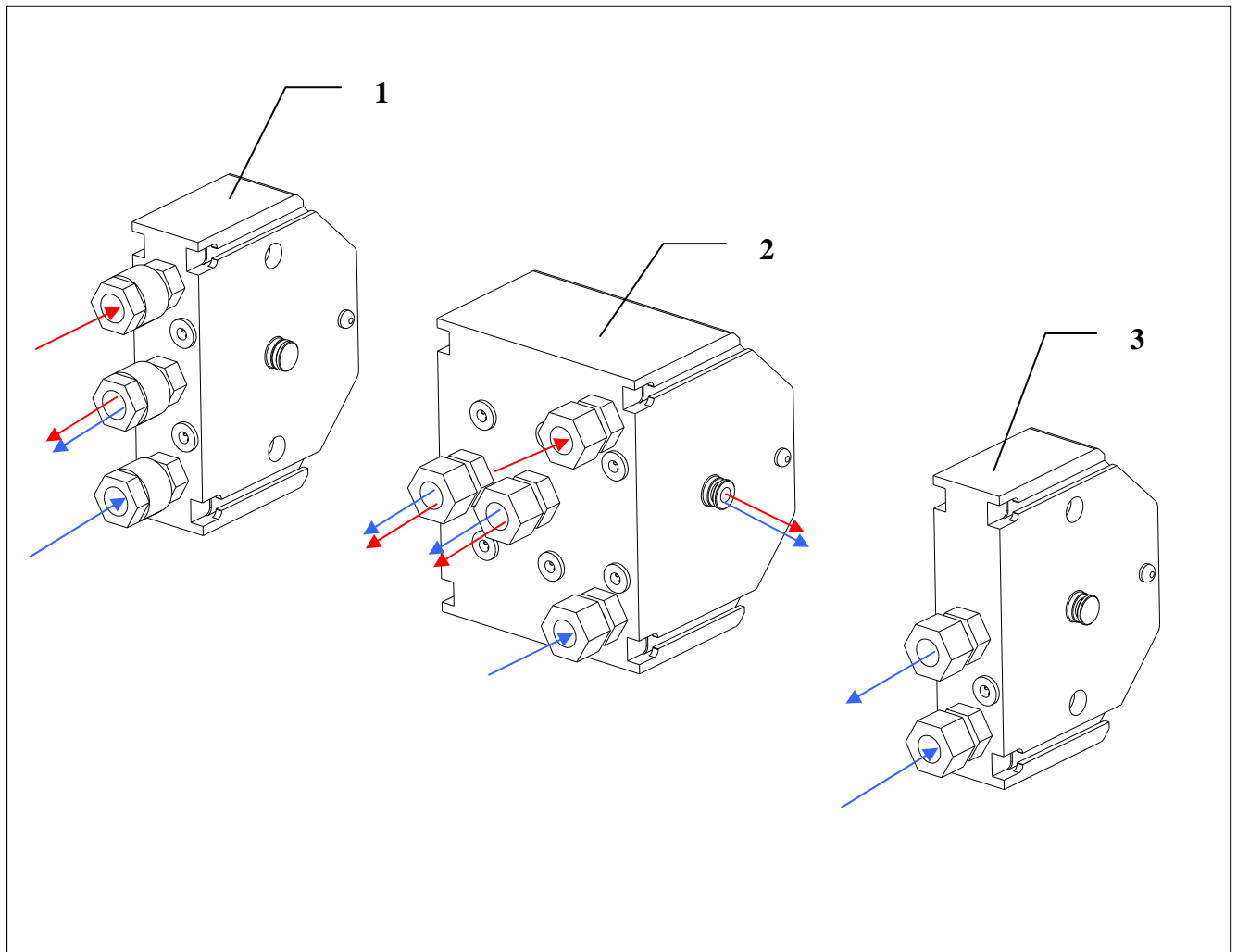


Figure 2.3.1: Specialty Slices (cont.)

ITEM	EFC PN	QTY	DESCRIPTION
1	65-1A61	1	STAND ALONE SOLVENT/AIR SLICE ASSY.
2	65-1A62	1	3 STAGE SOLVENT/AIR SLICE ASSY.
3	65-1A64	1	SOLVENT WASHER SLICE ASSY. (SINGLE VALVE)

FUNCTIONS:

1. **65-1A61** is a stand alone solvent/air slice. It may be placed inline with a Colorak® assembly or may be mounted remotely. Air and solvent enter the back of the slice through two different ports, and exit one common port at the center of the slice.
2. **65-1A62** is a three stage solvent/air slice. Air and solvent enter the back of the slice through two different ports and may exit through two more back ports, or through the centerline of the slice to allow for a Colorak® cleaning. The exits operate independently of one another.
3. **65-1A64** is a single valve solvent washer slice. Solvent enters and exits through the back of the slice only. The slice may be mounted remotely or inline with a Colorak® assembly.

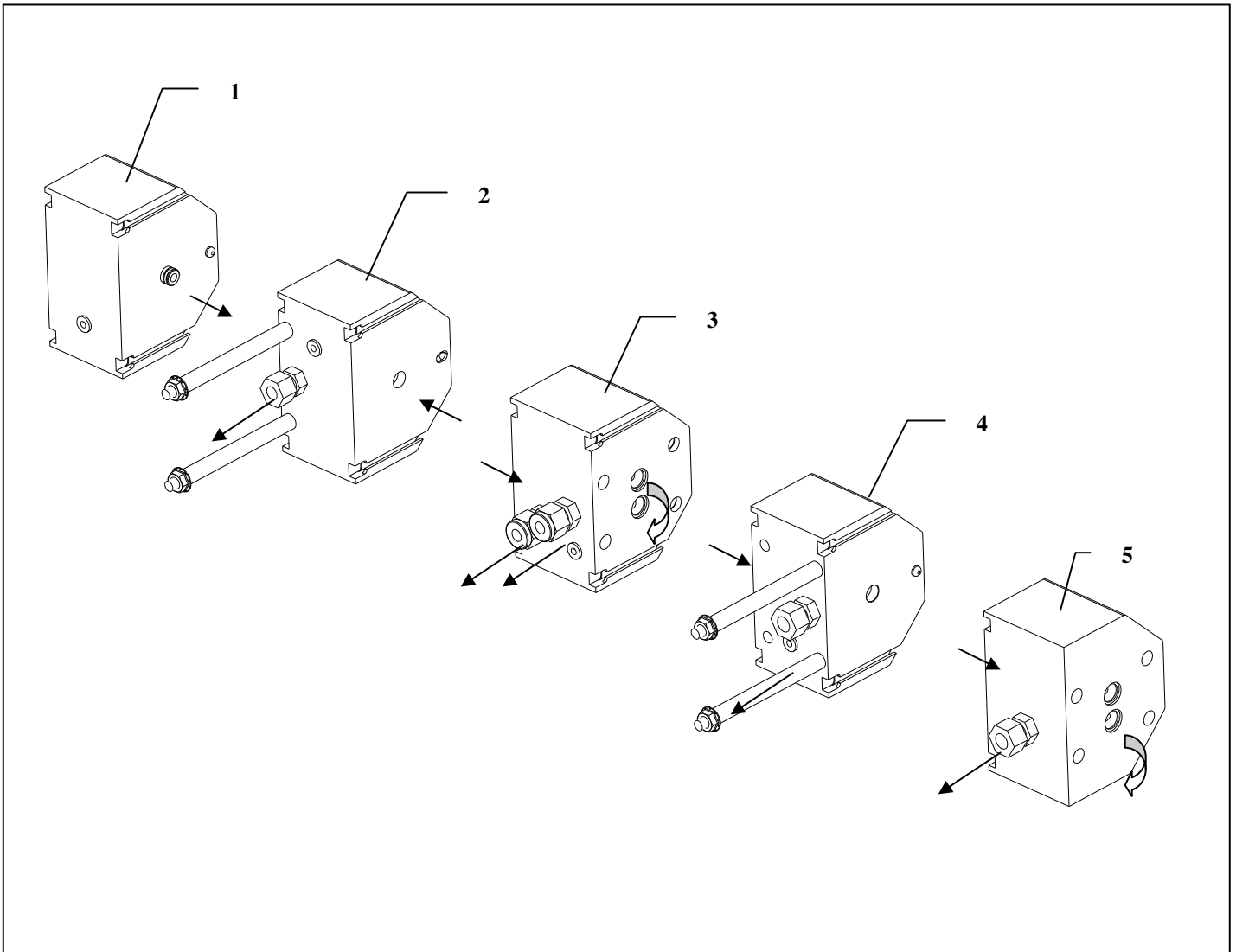


Figure 2.4.1: Specialty Slices (cont.)

ITEM	EFC PN	QTY	DESCRIPTION
1	65-1A13	1	REGULATOR SLICE ASSY.
2	65-1A13F	1	REGULATOR SLICE ASSY. W/FLUID OUT
3	65-1A80	1	REGULATOR / FLOW METER SLICE ASSY. W/DUMP & PAINT OUT
4	65-1A81	1	REGULATOR SLICE ASSY. W/FLUID OUT, MODIFIED
5	65-2A12	1	REGULATOR / FLOW METER SLICE ASSY. W/FLUID OUT

Note: See page 10 for Slice Functions

FUNCTIONS:

1. **65-1A13** is an inline regulator slice as shown in Figure 1.1.1.
2. **65-1A13F** is a regulator end slice with fluid out. This slice is normally placed at the end of the Colorak® with the outlet running to a flow meter then on to the applicator.
3. **65-1A80** is a regulator slice with a means for attaching a flow meter. Fluid enters the slice from the Colorak®, travels through the flow meter (not shown) and then exits the back of the slice. An additional dump port has been added parallel to (and independent of) the fluid out port for dumping the Colorak® without having to dump through the applicator.
4. **65-1A81** is a regulator slice with fluid out. This particular slice is similar to the 65-1A13F; however, it can also act as an end plate. The end plate side of the slice can be used to start another Colorak® assembly.
5. **65-2A12** is a regulator slice with a means for attaching a flow meter. It is similar to 65-1A80; however, it does not have an additional dump line out.

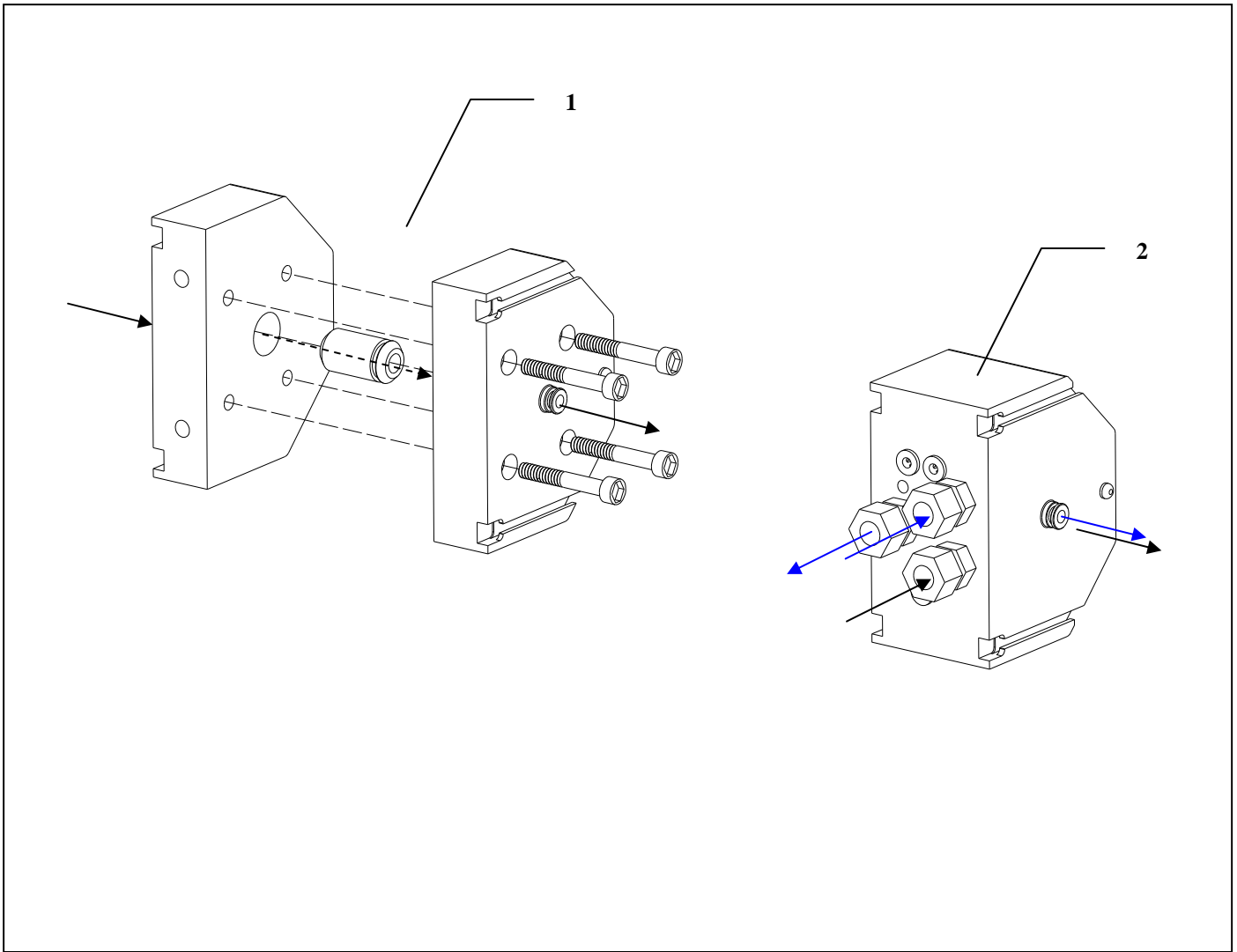


Figure 2.5.1: Specialty Slices (cont.)

ITEM	EFC PN	QTY	DESCRIPTION
1	65-1A72	1	CHECK VALVE SLICE ASSY.
2	65-1A76	1	2 STAGE SOLVENT, 1 STAGE AIR SLICE ASSY.

FUNCTIONS:

1. **65-1A72** is a check valve slice assembly. This slice allows fluid to flow in one direction only.
2. **65-1A76** – Solvent and air enter the back of the slice and exit the centerline of the slice to clean the entire Colorak® assembly. An additional solvent line exits the back of the slice for auxiliary cleaning.

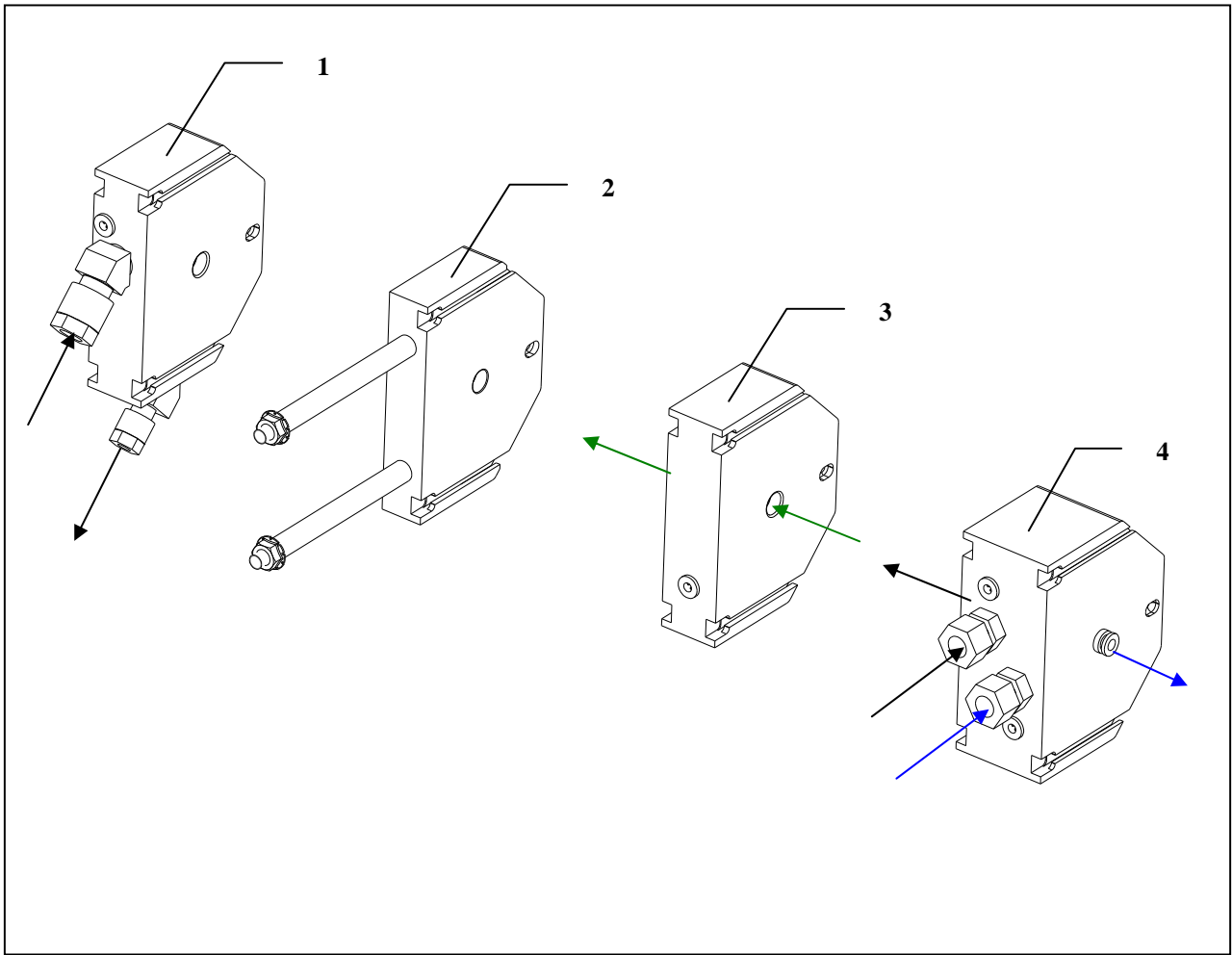


Figure 2.6.1: Specialty Slices (cont.)

ITEM	EFC PN	QTY	DESCRIPTION
1	65-1A83	1	ON/OFF COLOR SLICE ASSY., SINGLE VALVE
2	65-1A84	1	END PLATE ASSY.
3	65-1A87	1	FLOW THROUGH SLICE ASSY., NORMALLY CLOSED
4	65-2A13	1	BI-DIRECTIONAL COLOR SLICE ASSY.

FUNCTIONS:

1. **65-1A83** is a single color, on/off slice. Fluid enters and exits perpendicular to the slice centerline.
2. **65-1A84** is an endplate slice with mounting hardware. It plays the same role as a 296T60, except it is normally located at the opposite end of the Colorak®
3. **65-1A87** – Paint enters one side of the slice and is allowed to proceed through the slice after its microvalve is triggered. There is only one microvalve for this slice. The slice may be used to halt the flow through a Colorak®.
4. **65-2A13** – Two different fluids enter the back of the slice and then, by way of independent microvalves, are allowed to proceed away from the slice, on centerline, in opposite directions.

MOUNTING COMPONENTS

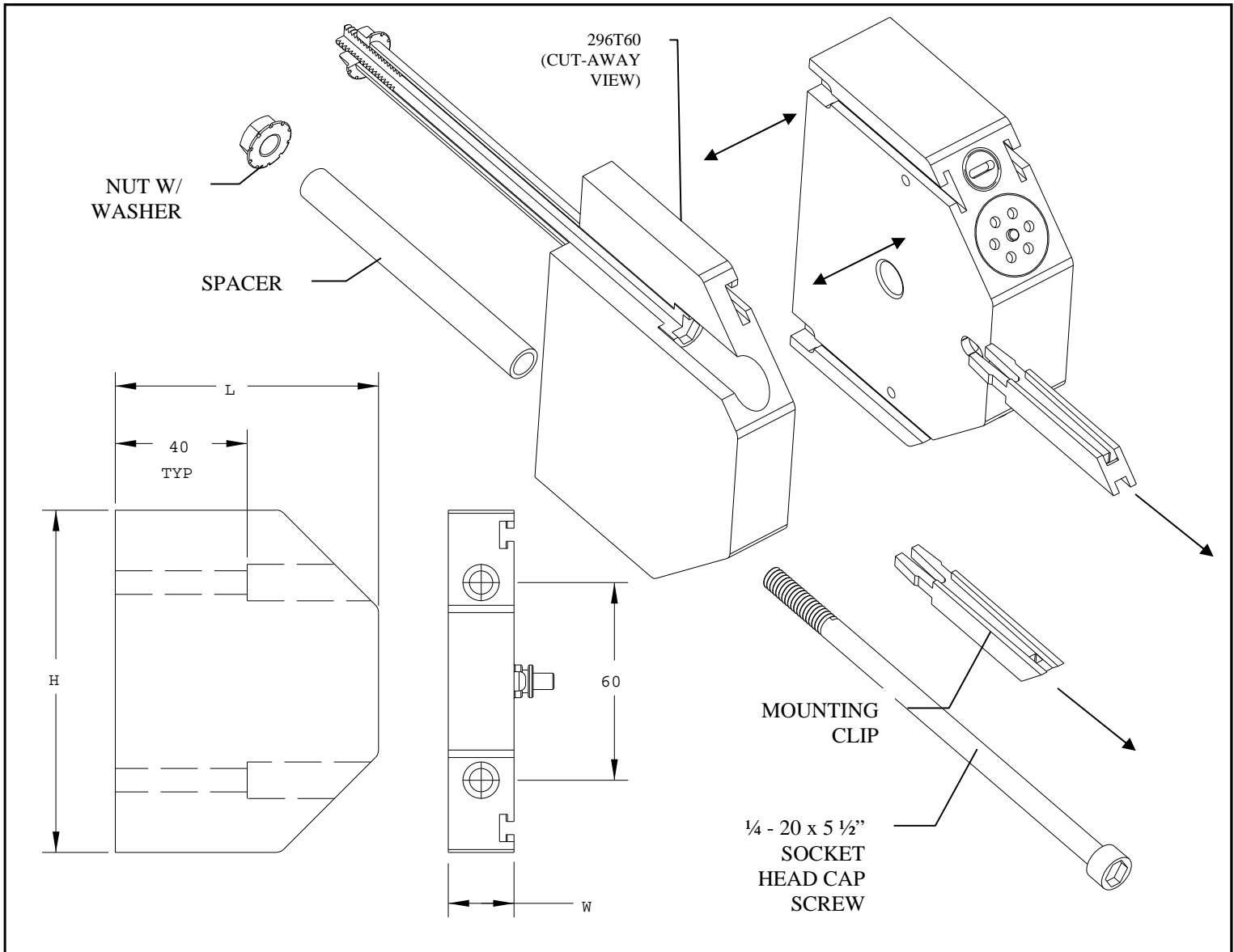


Figure 2.7.1: Overall Dimensions for Mounting Hardware

(All dimensions are in mm unless otherwise specified.)

Note: Consult factory for fitting options and overall dimensions for any of the components in this catalog.

FLOW METER 65-1A86

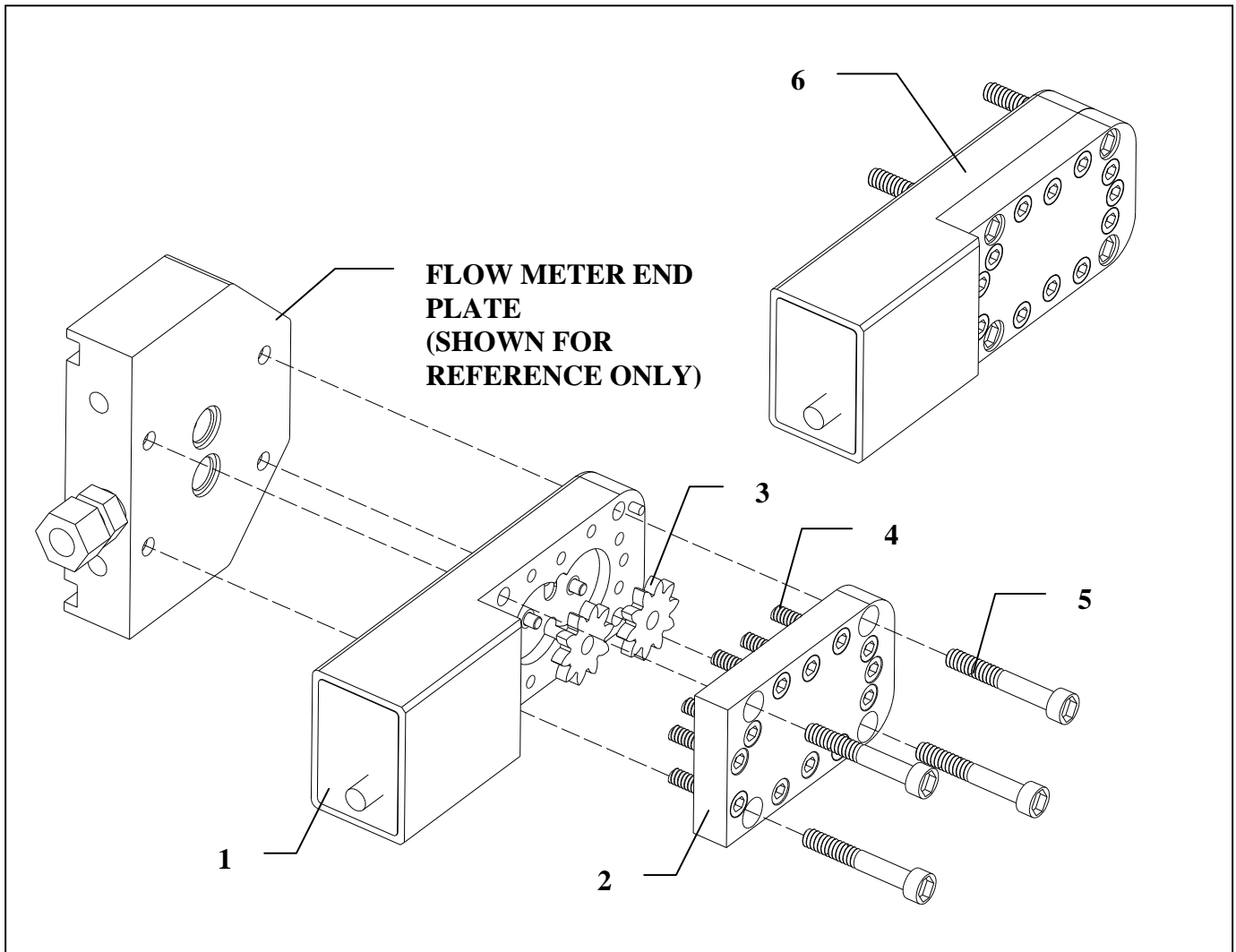


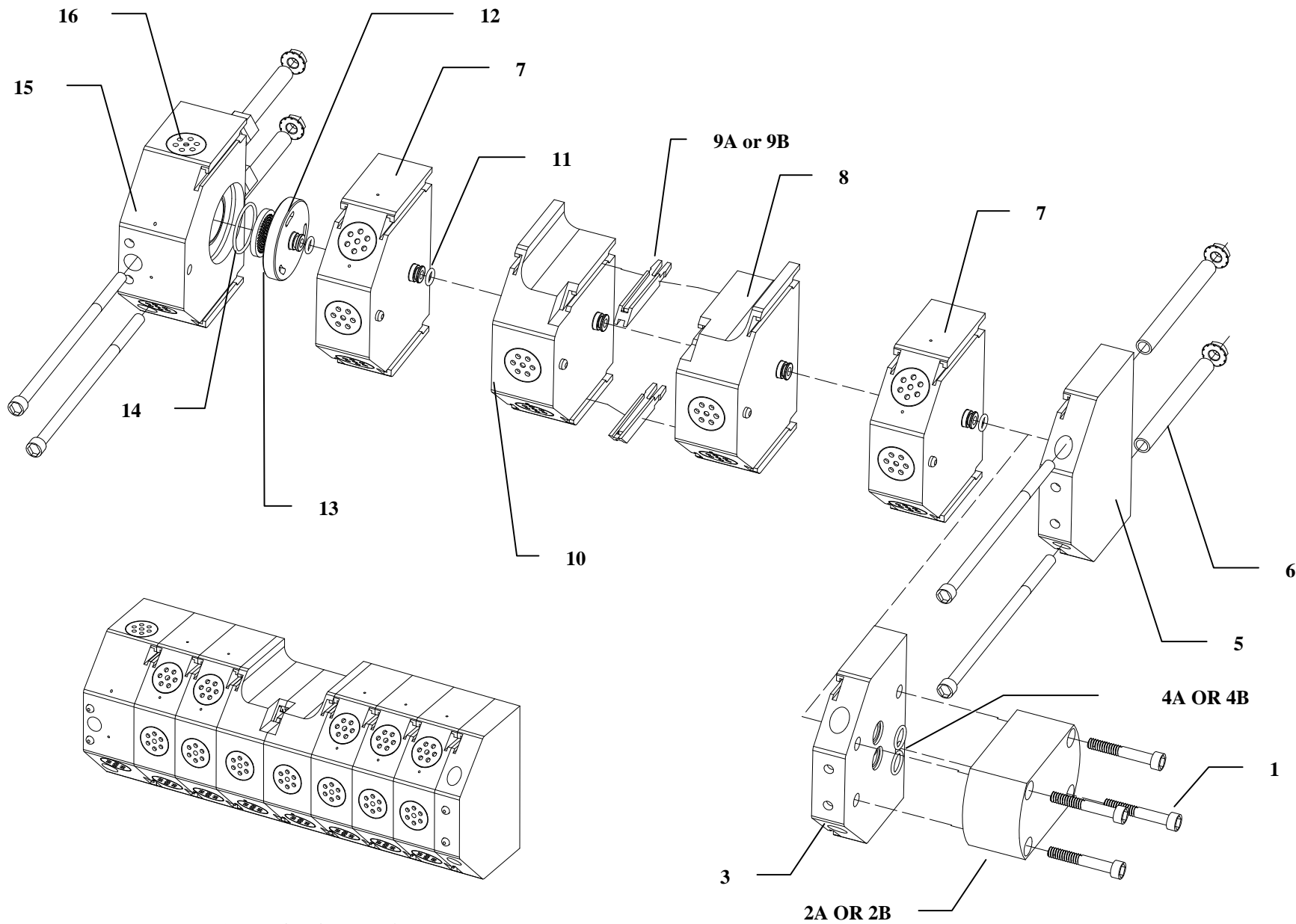
Figure 2.8.1: Specialty Slices (cont.)

ITEM	EFC PN	QTY	DESCRIPTION
1	65-1A86A	1	FLOW METER BODY
2	65-1A86B	1	FLOW METER LID
3	65-1A84E	2	FLOW METER GEAR
4	520SSC	12	5mm SOCKET HEAD CAP SCREW, SS
5	640SSC	4	6mm SOCKET HEAD CAP SCREW, SS
6	65-1A86	1	COMPLETE ASSY.
NOT SHOWN	3925CR	1	O-RING, TEKREZ®

FUNCTION:

The flow meter assembly has been specially designed to mate up to Colorak® components. It contains a fully shielded, intrinsically safe circuit board that transforms a magnetic pulse into an infrared signal that is sent to a flow control card. The magnetic pulses are generated when paint flowing through the flow meter (from the Colorak®) turns the internal gears.

THREE COLOR COLORAK®



**P155 ROBOT HEAD
19 COLORS**

FIGURE 3.1.1: GENERAL COMPONENTS (3-COLOR)

ITEM	EFC PN	QTY	DESCRIPTION
1	640SSC	4	FLOW METER MOUNTING BOLTS
2A	65-1A12	1	FLOW METER
2B	65-1A86	1	EFC FLOW METER ASSY. - BLACK
3	65-1A89	1	FLOW METER END PLATE ASSY.
4A	1017TR	2	O-RING, TEFLON®
4B	1119CR	2	O-RING, TEKREZ®
5	65-1A49	1	END PLATE ASSY. W/FLUID OUT
6	295K60	1	RACK MOUNTING HARDWARE KIT: 4 BOLTS, 4 LOCK WASHER/NUTS, 4 SPACERS
7	65-1A47	1	COLOR SLICE ASSY. W/RETURN
8	65-1A54	1	2 COLOR SLICE FOR 3 COLOR ASSY., W/RETURN, RIGHT SIDE
9A	226T79	2 AT EACH SLICE INTERFACE	COLOR SLICE CLIP
9B	226T80	2 AT EACH SLICE INTERFACE	COLOR SLICE CLIP W/PINS
10	65-1A53	1	2 COLOR SLICE FOR 3 COLOR ASSY., W/RETURN, LEFT SIDE
11	6419CR	1 / SLICE	O-RING, TEKREZ®
12	65-1A25B	1	SCRUBBER SLICE CAP
13	65-1A25C	1	AIR / SOLVENT SCREEN
14	2717CR	1	O-RING, TEKREZ®
15	65-1A48	1	SOLV-SAVER® ASSY.
16	277T60CRG	VARIES / SLICE	MICROVALVE (CHEMICALLY RESISTANT)
17	CCR300WH	1	19 COLOR CHANGER ASSY. W/HOSE BUNDLE FOR FANUC P155 ROBOT

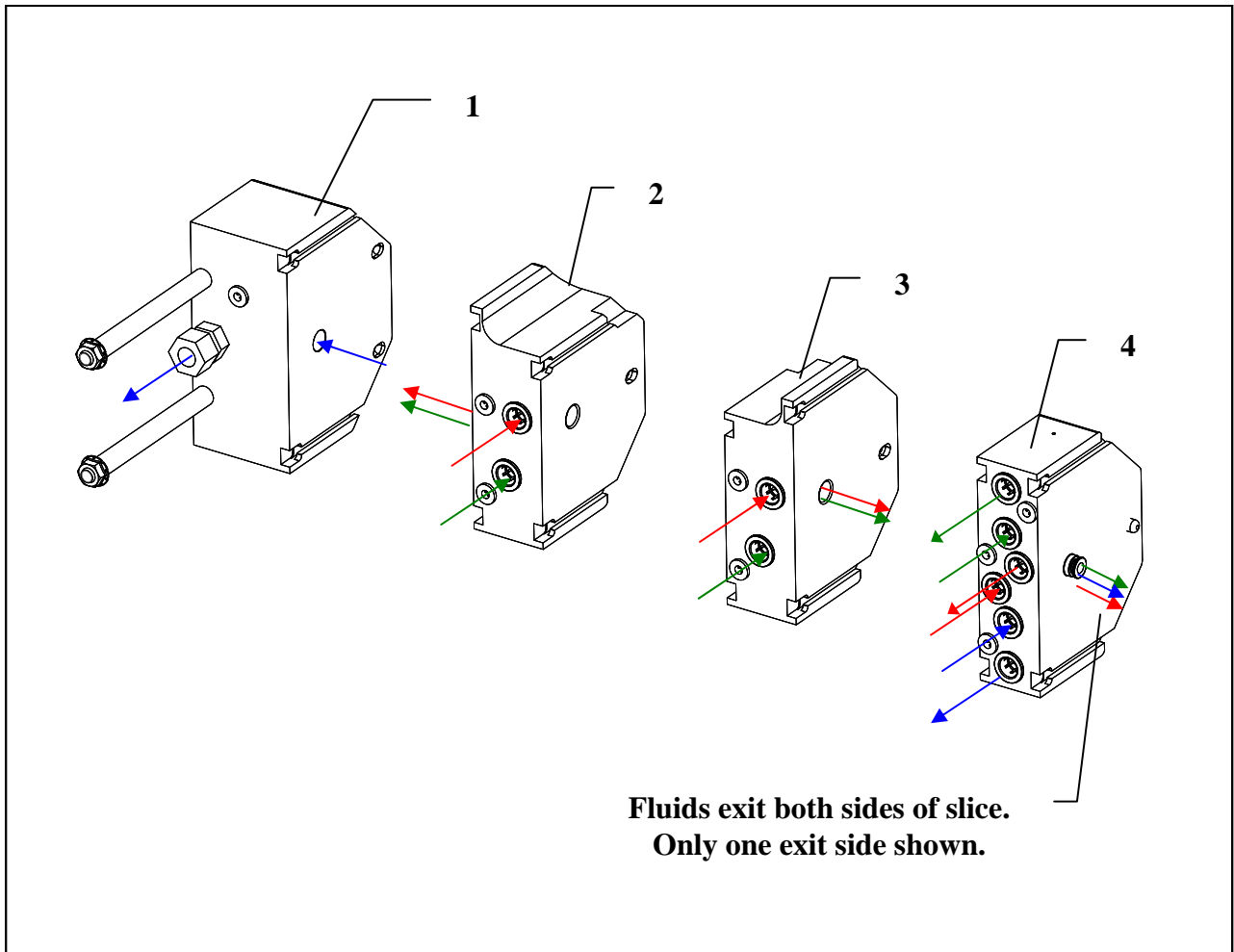


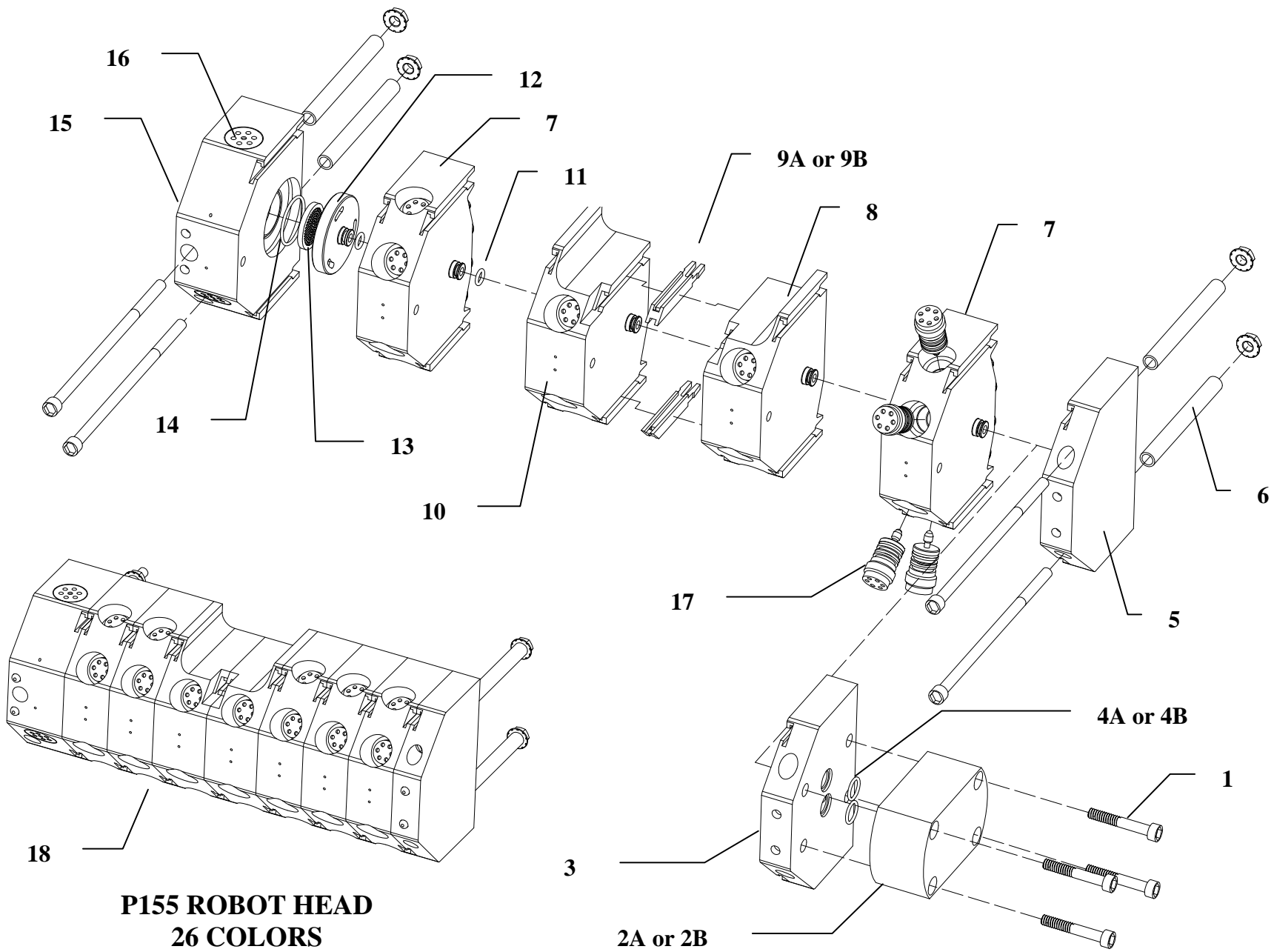
Figure 3.2.1: Specialty Slices (3-Color)

ITEM	EFC PN	QTY	DESCRIPTION
1	65-1A95	1	REGULATOR SLICE ASSY W/FLUID OUT
2	65-1A92	1	2 COLOR SLICE FOR 3 COLOR ASSY W/O RETURN, RIGHT SIDE
3	65-1A91	1	2 COLOR SLICE FOR 3 COLOR ASSY W/O RETURN, LEFT SIDE
4	65-1A97	1	3 COLOR SLICE ASSY., W/ RETURN, DUAL OUTLET

FUNCTIONS:

1. **65-1A95** is a regulator slice for the 3-color rack assembly.
2. **65-1A92** is a 2-color, non-circulation slice for the 3-color rack assembly.
3. **65-1A91** is a 2-color, non-circulation slice for the 3-color rack assembly.
4. **65-1A97** is a 3-color slice with dual outlets. Paint will exit both sides of the slice.

FOUR COLOR COLORAK®



P155 ROBOT HEAD
26 COLORS

FIGURE 4.1.1: GENERAL COMPONENTS (4-COLOR)

ITEM	EFC PN	QTY	DESCRIPTION
1	640SSC	4	FLOW METER MOUNTING BOLTS
2A	65-1A12	1	FLOW METER ASSY.
2B	65-1A86	1	EFC FLOW METER ASSY. - BLACK
3	65-1A89	1	FLOW METER END PLATE ASSY.
4A	1017TR	2	O-RING, TEFLON®
4B	1119CR	2	O-RING, TEKREZ®
5	65-1A49	1	END PLATE ASSY., W/ FLUID OUT
6	295K60	1	RACK MOUNTING HARDWARE KIT: 4 BOLTS, 4 LOCK WASHER/NUTS, 4 SPACERS
7	65-2A47	1	COLOR SLICE ASSY. W/RETURN
8	65-2A54	1	3 COLOR SLICE FOR 4 COLOR ASSY. W/RETURN, RIGHT SIDE
9A	226T79	2 AT EACH SLICE INTERFACE	COLOR SLICE CLIP
9B	226T80	2 AT EACH SLICE INTERFACE	COLOR SLICE CLIP W /PINS
10	65-2A53	1	3 COLOR SLICE FOR 4 COLOR ASSY. W/ RETURN, LEFT SIDE
11	6419CR	1 / SLICE	O-RING, TEKREZ®
12	65-1A25B	1	SCRUBBER SLICE CAP
13	65-1A25C	1	AIR / SOLVENT SCREEN
14	2717CR	1	O-RING, TEKREZ®
15	65-1A48	1	SOLV-SAVER® ASSY.
16	277T60CRG	2	MICROVALVE (CHEMICALLY RESISTANT)
17	65-1A34	VARIES / SLICE	NANOVALVE ASSY.
18	CCR400WH	1	26 COLOR CHANGER ASSY. W/ HOSE BUNDLE FOR FANUC P155 ROBOT

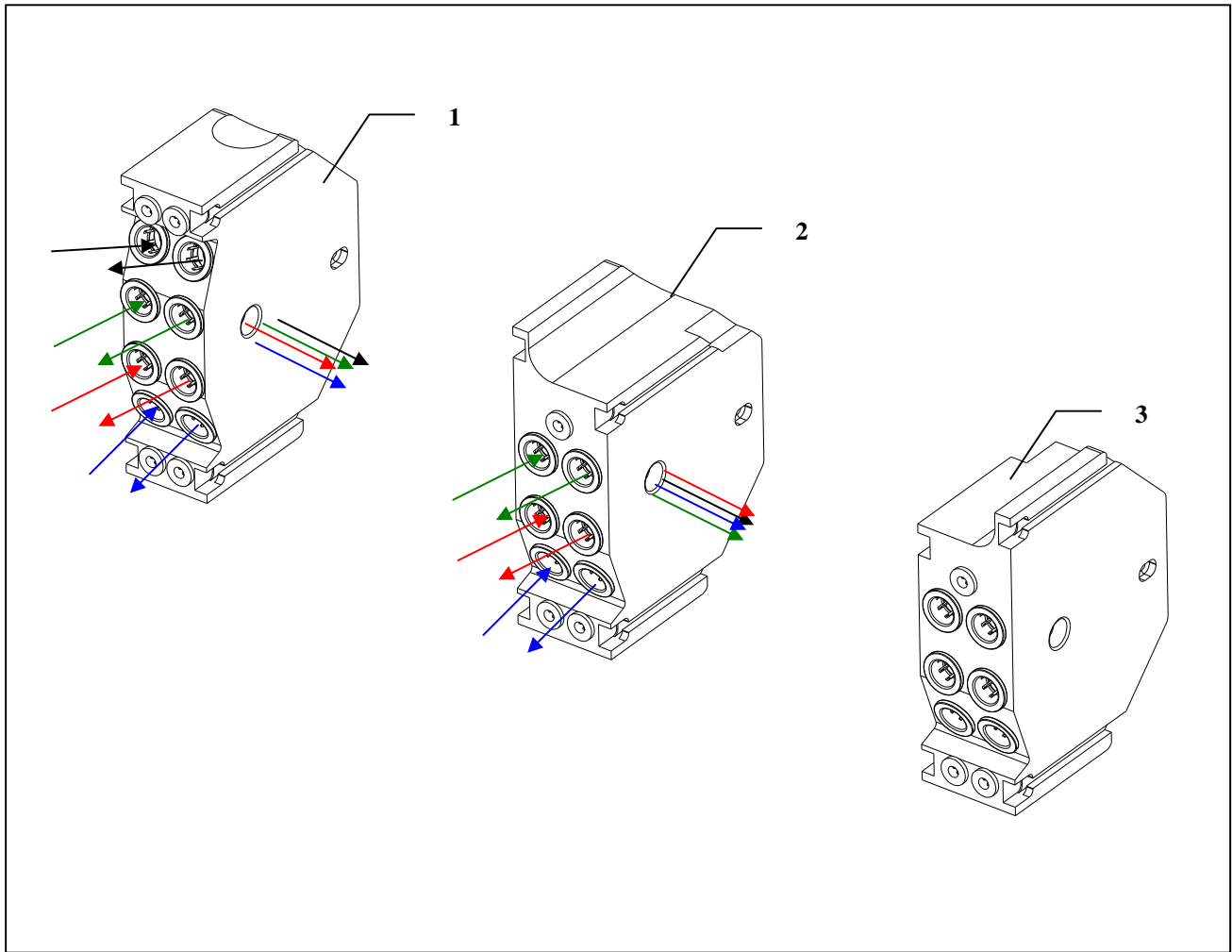


Figure 4.2.1: Specialty Slices (4-Color)

ITEM	EFC PN	QTY	DESCRIPTION
1	65-2A47	1	COLOR SLICE ASSY., W/RETURN
2	65-2A54	1	3 COLOR SLICE FOR 4 COLOR ASSY., W/RETURN, RIGHT SIDE
3	65-2A53	1	3 COLOR SLICE FOR 4 COLOR ASSY., W/RETURN, LEFT SIDE

FUNCTIONS:

1. **65-2A47** – Four different colors enter into and then re-circulate out of the color slice. Nanovalves are triggered to allow the paint to exit the side of the slice and travel on through the Colorak®. All fluids enter the slice via push lock fittings.
2. **65-2A53 & 65-2A54** – Three different fluids enter the back of the slice and then, by way of nanovalves, are allowed to proceed out the side of the slice, on through the Colorak®. All fluids enter the slice via push lock fittings.

SPECIALTY COLOR BLOCKS

**DUAL COLOR
SELECTOR BLOCK
65-1A71**

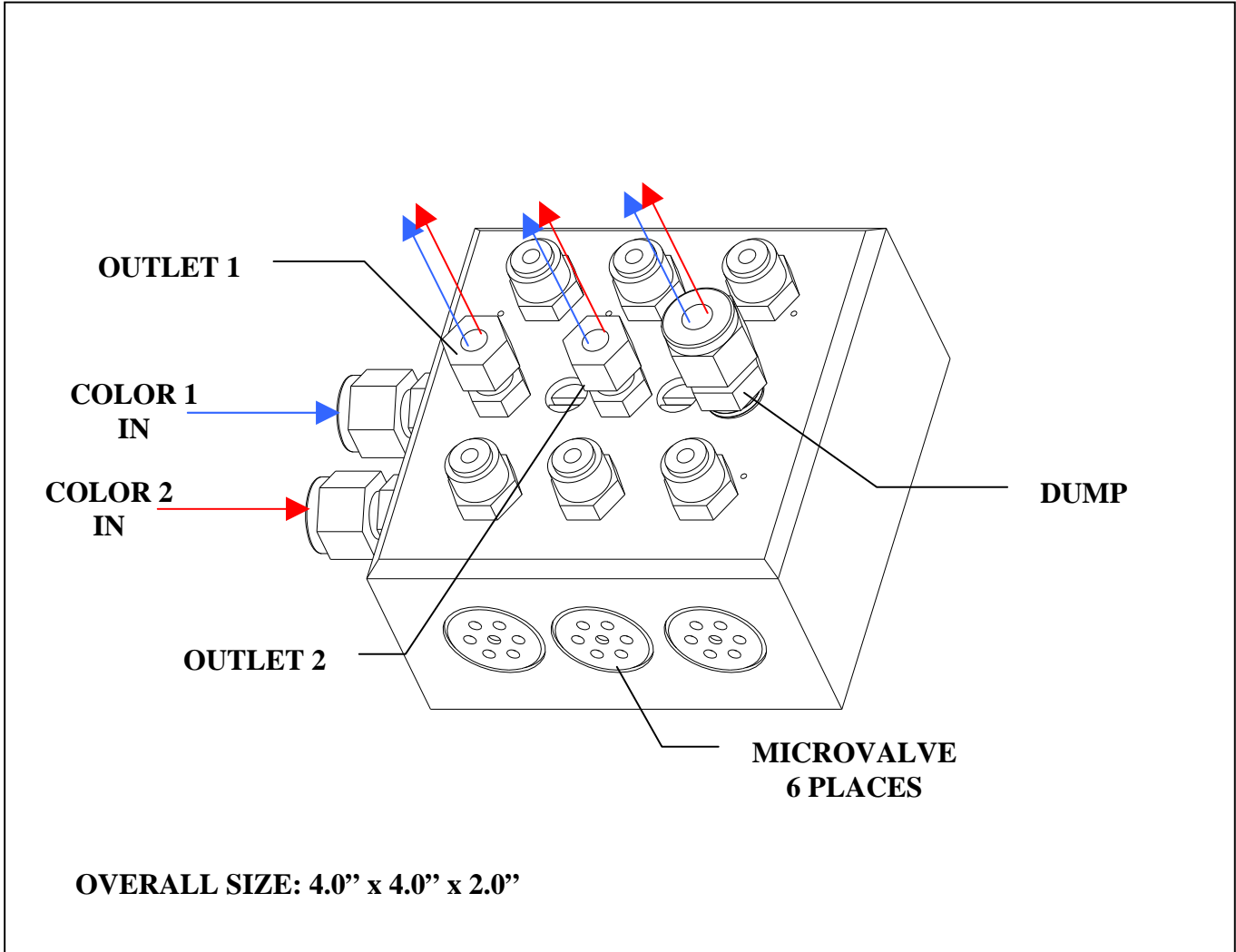


Figure 5.1.1: Specialty Color Blocks

FUNCTION:

The dual color selector block receives two different colors through two independent ports (color 1 and color 2 above). Six microvalves control which outlet valve (outlet 1, 2 or dump) is open for each color, at any particular time. The block may also be used as a mixing device to a two-part mixture.

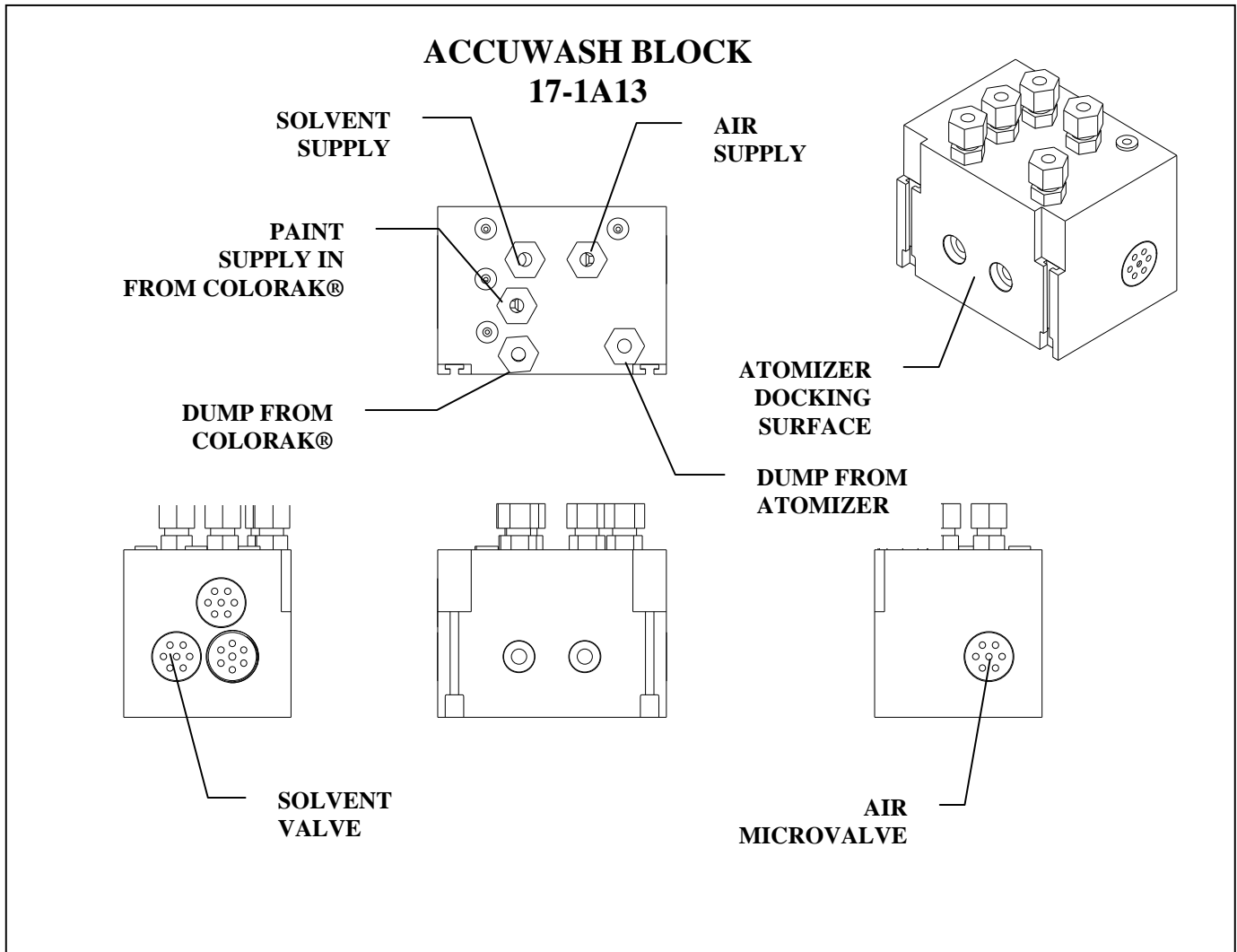


Figure 5.2.1: Specialty Color Blocks (cont.)

FUNCTION:

The Accuwash block is a quick purge manifold that is specially designed for use with the Accustat® and Aquabell systems. This compact, lightweight manifold serves as a docking station for the atomizer. During a color change cycle, the atomizer will dock with the manifold and dump its contents out through the manifold. Solvent and air (which are supplied at the manifold) will then clean and dry the atomizer. The new color (supplied from a Colorak®, not shown) will then fill the atomizer's canister.

After the atomizer undocks from the Accuwash block and begins painting the next job, solvent and air are cleaning the Accuwash block. This process of simultaneously cleaning the Accuwash block (and paint line leading up to it from the Colorak®) and painting at the same time greatly increases the amount of cleaning time available. Increasing the cleaning time decreases the chance of color contamination from one job to the next.

Also, bringing another source of solvent and air up close to the tip of the atomizer greatly decreases the amount of solvent that is needed between two jobs of the same color. The only parts that need to be cleaned between two jobs of the same color are the docking components between the atomizer and the Accuwash block.

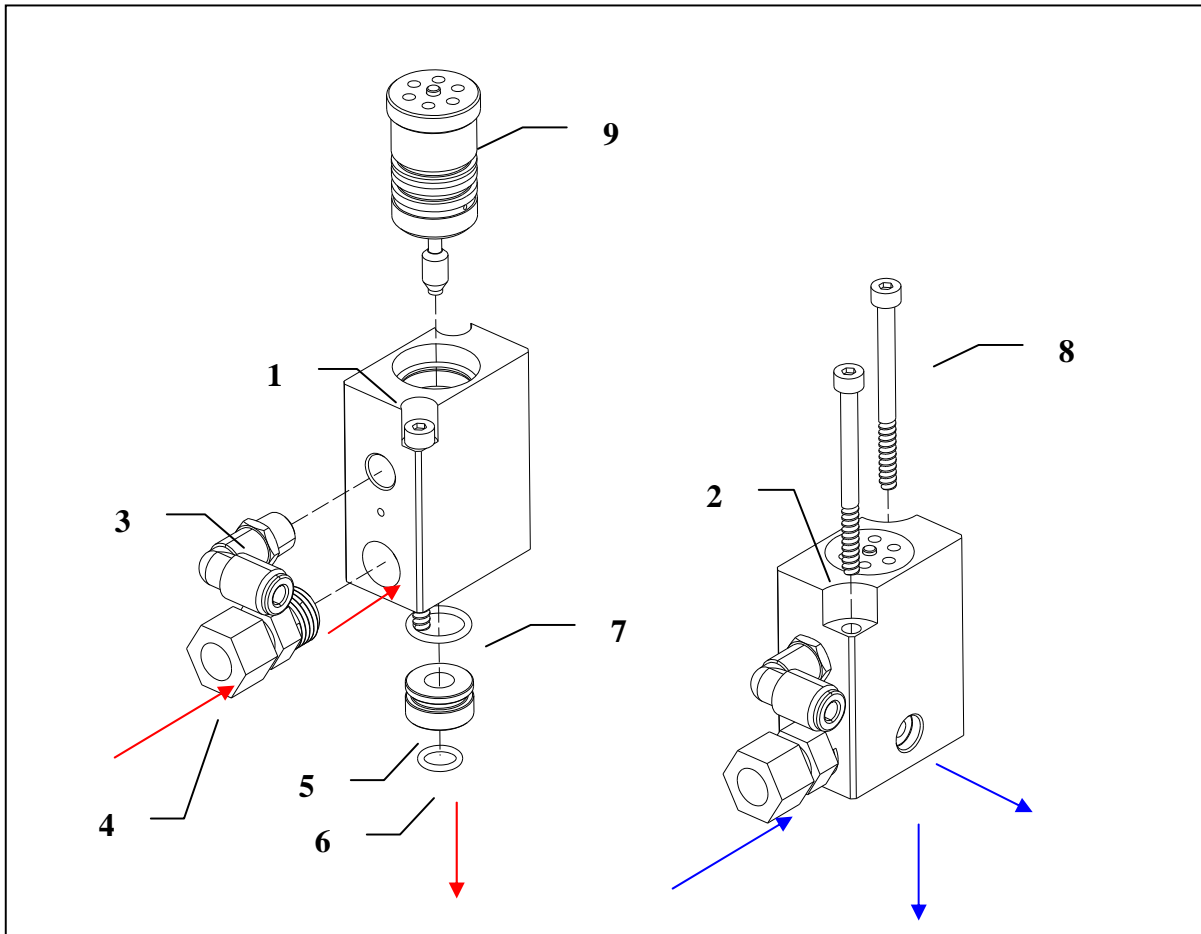


Figure 5.3.1: Specialty Color Blocks – Replaces ABB V-21 & V-22 Valves

ITEM	EFC PN	QTY	DESCRIPTION
1	19-1A12	1	SOLVENT VALVE BLOCK ASSY. (E-21)
2	18-1A21	1	TRIGGER VALVE ASSY. (E-22)
3	*	1 / BLOCK	TRIGGER FITTING, 1/8" NPT
4	*	1 / BLOCK	FLUID IN FITTING, 1/4" NPT
5	18-1A21D	1 / BLOCK	BLOCK SEAT
6	7515CR	1 / BLOCK	O-RING, TEKREZ®
7	1217CR	1 / BLOCK	O-RING, TEKREZ®
8	450SSC	2 / BLOCK	4mm SOCKET HEAD CAP SCREW, SS
-	90-1A91	2 / BLOCK	4mm SOCKET HEAD CAP SCREW, BRONZE
9	18-1A23	1 / BLOCK	ALPHA VALVE

FUNCTIONS:

1. **19-1A12** – the solvent valve block assembly is used to bring solvent into a color stack assembly (not shown). Solvent enters via fitting at **4**. Pilot air enters at **3** and opens the Alpha valve **1**. The solvent then travels out of the block assembly, into the rest of the color rack manifold.
2. **18-1A21** – is a trigger valve assembly that allows paint to exit the side (to a dump valve) or the bottom to a color stack assembly.

* Currently not supplied

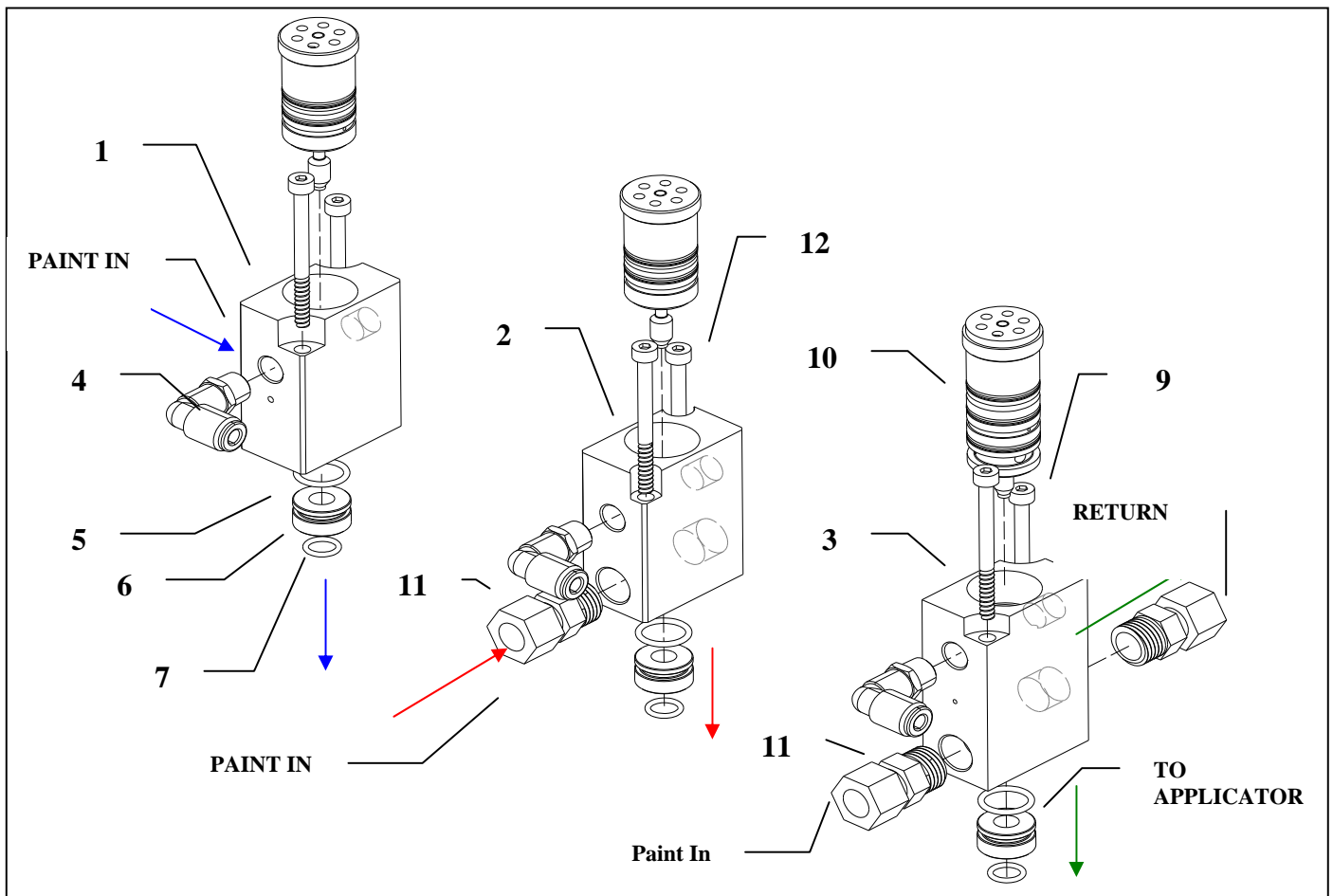


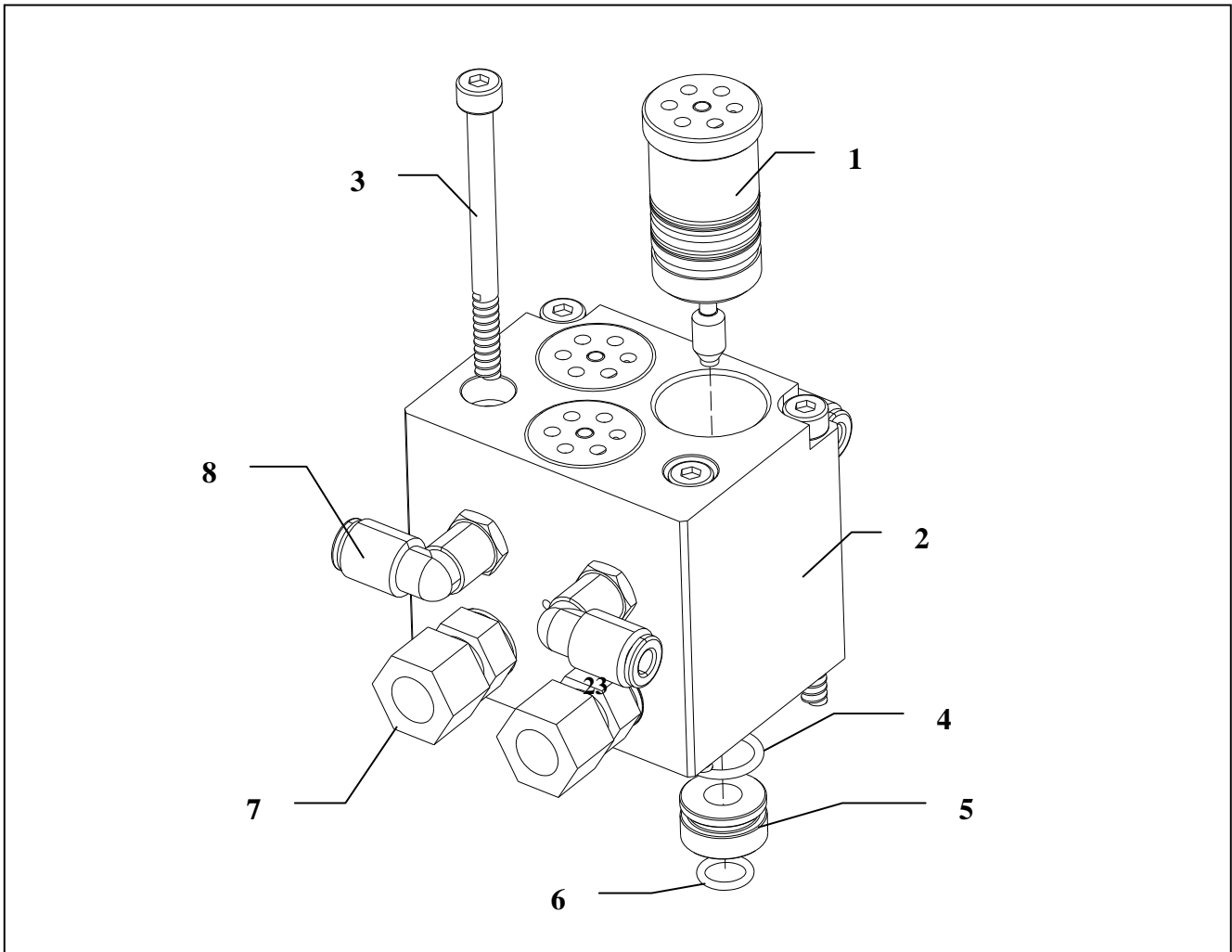
Figure 5.3.2: Specialty Color Blocks – Replaces ABB V-32, V-24 & V-31 Valves

ITEM	EFC PN	QTY	DESCRIPTION
1	18-1A22	1	DUMP VALVE ASSY. (E-23)
2	19-1A18	1	TWO-WAY VALVE ASSY. (E-24)
3	19-1A15	1	COLOR CHANGE VALVE ASSY. W/ RECIRCULATION (E-31)
4	*	1 / BLOCK	TRIGGER FITTING, 1/8" NPT
5	1217CR	1 / BLOCK	O-RING, TEKREZ®
6	18-1A21D	1 / BLOCK	BLOCK SEAT
7	7515CR	1 / BLOCK	O-RING, TEKREZ®
8	18-1A23	1	ALPHA VALVE
9	460SSC	2 / BLOCK	4mm SOCKET HEAD CAP SCREW, SS
10	90-1A92	2 / BLOCK	4mm SOCKET HEAD CAP SCREW, BRONZE
11	*	2	FLUID FITTING
12	450SSC	2 / BLOCK	4mm SOCKET HEAD CAP SCREW, SS
-	90-1A91	2 / BLOCK	4mm SOCKET HEAD CAP SCREW, BRONZE

FUNCTIONS:

1. **18-1A22** – the dump valve block assembly is used to dump paint/solvent from the rest of the color stack (not shown).
2. **19-1A18** - is a two-way valve. Paint exits the bottom of the valve block when triggered.
3. **19-1A15** – is a shuttle valve assembly that allows paint to circulate through the block. When the color circulating through this block is needed, this valve is triggered to allow that color to travel to the applicator.

* Currently not supplied



***Figure 5.3.3: Flush Valve Assembly for Flushable Gear Pump
Replaces ABB Waterborne Application Version (1D3151)***

ITEM	EFC PN	QTY	DESCRIPTION
1	18-1A23	3	ALPHA VALVE
2	19-1A17	1	FLUSH VALVE ASSY
3	560SSC	4	5mm SOCKET HEAD CAP SCREW, SS.
4	1217CR	3	O-RING, TEKREZ®
5	18-1A21D	3	BLOCK SEAT
6	7515CR	3	O-RING, TEKREZ®
7	*	2	FLUID FITTING
8	*	3	TRIGGER FITTING

FUNCTION:

The flush valve assembly is used in conjunction with a flushable gear pump assembly (not shown). The flushable gear pump assembly supplies measured paint to an atomizer and the flush valve assembly allows for a quick cleaning during a color change by either flushing through the gears in the pump assembly or by-passing them and flushing out the paint line leading to the pump assembly. Each of the three interchangeable Alpha valves is air actuated and close by way of a spring (2-way valve).

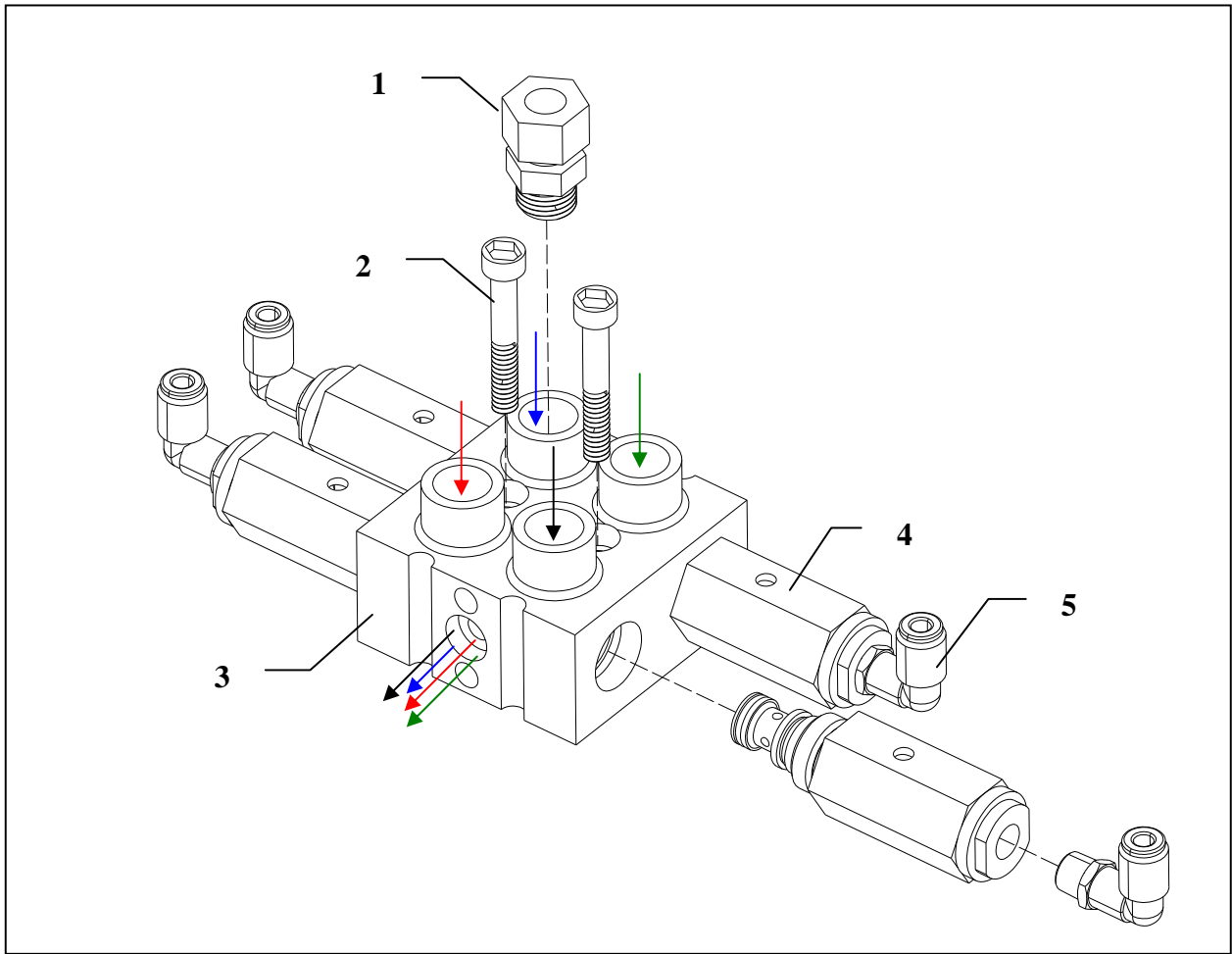


Figure 5.4.1: Specialty Color Blocks (cont.)

ITEM	EFC PN	QTY	DESCRIPTION
1	*	4	FLUID IN FITTING, ¼" NPT
2	640SSC	2	6mm SOCKET HEAD CAP SCREW, SS
3	344A61A	1	COLOR BLOCK BODY
4	65-1A46	4	COLOR VALVE ASSY.
5	*	4	PILOT FITTING, 1/8" NPT
N/A	344A61	1	COMPLETE COLOR BLOCK ASSY.

FUNCTION:

Four different colors are supplied to the color block assembly. Each color exits the color block after the proper color valve has been triggered, by supplying pilot air to the color valve assembly.

*Consult factory for various fitting sizes and materials.

TWO COMPONENT BYPASS BLOCK ASSY

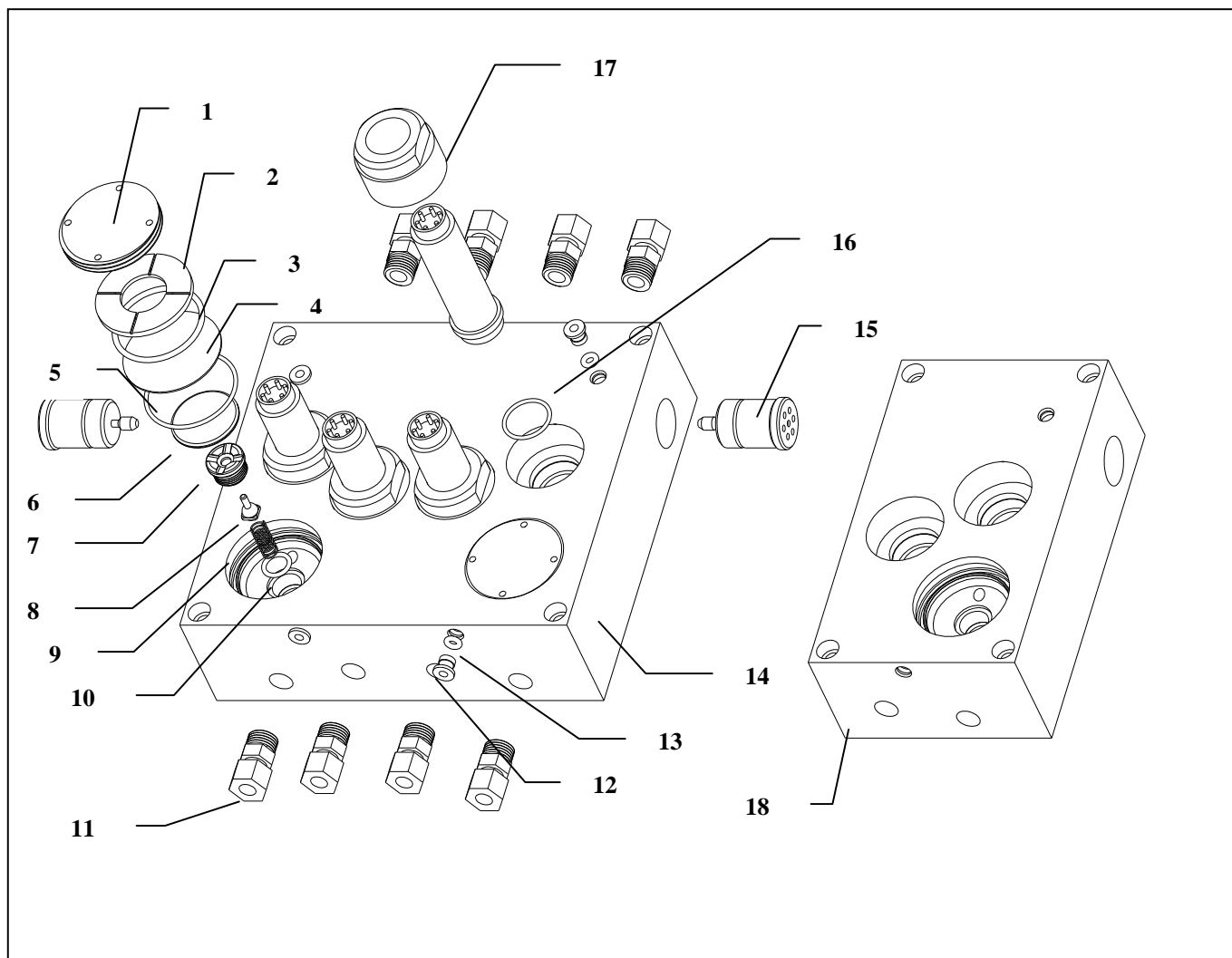


Figure 5.5.1: Specialty Color Blocks (cont.)

ITEM	EFC PN	QTY	DESCRIPTION
N/A	30-1A34	1	2K BYPASS BLOCK ASSY. COMPLETE, LESS TRANSDUCERS (DUAL)
N/A	30-1A60	1	2K BYPASS BLOCK ASSY. COMPLETE, LESS TRANSDUCERS (SINGLE)
1	277T60	2	COVER NUT
2	339T60	2	SPACER
3	3925VR	2	O-RING, VITON®
4	229T60	2	DIAPHRAGM
5	41178VR	2	O-RING, VITON®
6	230T60	2	DIAPHRAGM HOLDER
7	211M50	2	SEAT, SS
8	210M50	2	NEEDLE VALVE, SS
9	204M40	2	REGULATOR SPRING
10	1020TR	2	O-RING, TEFLON®
11	1456SSF	8	FITTING, SS
12	144T80	4	4mm PUSH FITTING
13	3624VR	4	O-RING, VITON®
14	30-1A34A	1	DUAL FLUID BLOCK BODY
15A	277T60CRG	2	MICROVALVE (CHEM. RESISTANT)
15B	65-1A67	2	MICROVALVE (CHEM. RESISTANT) FOR 2K APPLICATIONS
16	2017TR	4	O-RING, TEFLON®
17	30-1A34B	4	TRANSDUCER NUT
18	30-1A60A	1	SINGLE FLUID BLOCK BODY
NOT SHOWN	347T65	1	2K REGULATOR BYPASS BLOCK REBUILD KIT (ITEMS 1-10)

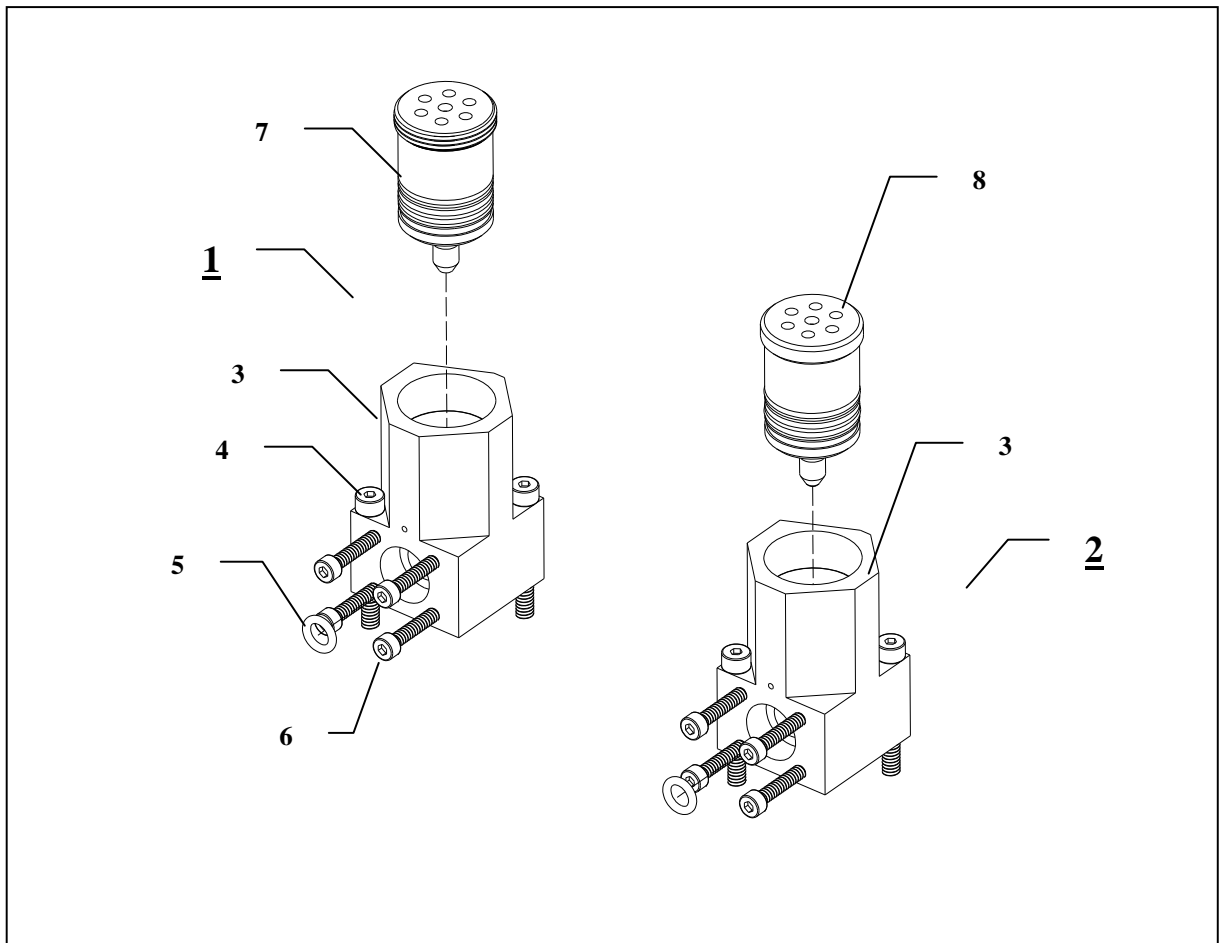


Figure 5.6.1: Specialty Color Blocks – Replaces SAMES® U. S. Valves

ITEM	EFC PN	QTY	DESCRIPTION
1	CCA203	1	SOLVENT VALVE ASSY. W / 65-1A93
2	CCA204	1	COLOR CHANGER ASSY. W / 65-1A67
3	384T60	1	MICROVALVE BLOCK ASSY.
4	832114SSC	2 / BLOCK	SCREW, SS SOCKET HEAD CAP
5	5719CR	1 / BLOCK	O-RING, TEKREZ®
6	632875SSC	4 / BLOCK	SCREW, SS SOCKET HEAD CAP
7	65-1A93	1 / BLOCK	MICROVALVE, CHEM. RESISTANT BODY
8	65-1A67	1	MICROVALVE, 2K APPLICATIONS

FUNCTIONS:

1. **CCA203** – is a solvent block assembly used for cleaning a color stack. The body of the microvalve is made of a chemically resistant material.
2. **CCA204** – is a color block assembly used to supply paint to a color stack. The microvalve assembly is specially made for 2K applications.

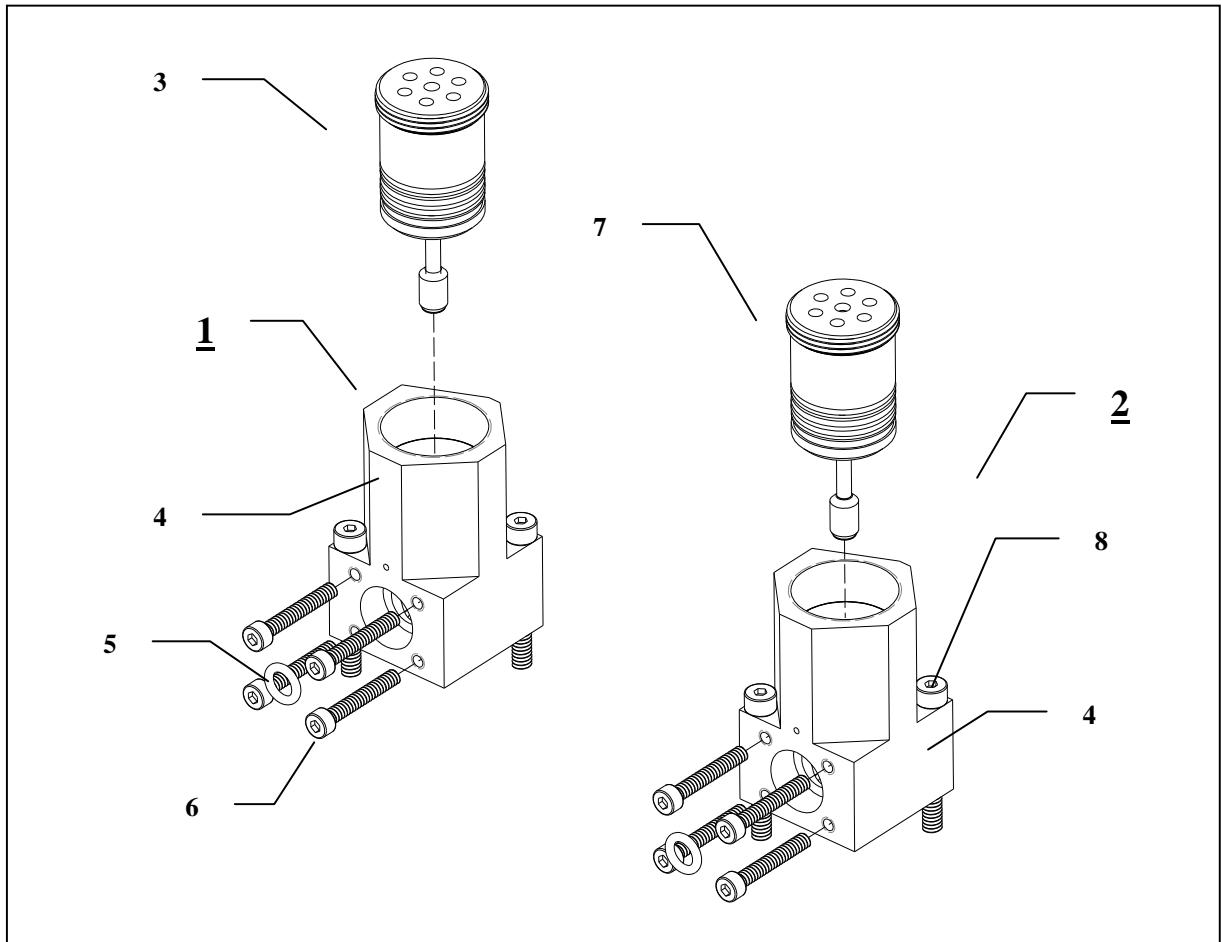


Figure 5.6.2: Specialty Color Blocks – Replaces SAMES® U. S. Valves

ITEM	EFC PN	QTY	DESCRIPTION
1	CCA205	1	COLOR CHANGER ASSY. W / 385T61
2	CCA207	1	COLOR CHANGER ASSY. W / 385T62
3	385T61	1	MICROVALVE, LONG STEM
4	385T60	1	MICROVALVE BLOCK ASSY.
5	5719CR	1 / BLOCK	O-RING, TEKREZ®
6	632875SSC	4 / BLOCK	SCREW, SS SOCKET HEAD CAP
7	385T62	1	MICROVALVE, LONG STEM WITH CHEMICALLY RESISTANT BODY
8	832114SSC	2 / BLOCK	SCREW, SS SOCKET HEAD CAP

FUNCTIONS:

1. **CCA205** – is a color block assembly with a long stem microvalve. This special microvalve reduces the amount of paint “dead space” in the color rack assembly.
2. **CCA207** – is a color block assembly with a long stem, chemically resistant microvalve. This microvalve reduces the amount of paint “dead space” in the color rack assembly.

REPLACEMENT COLOR VALVES

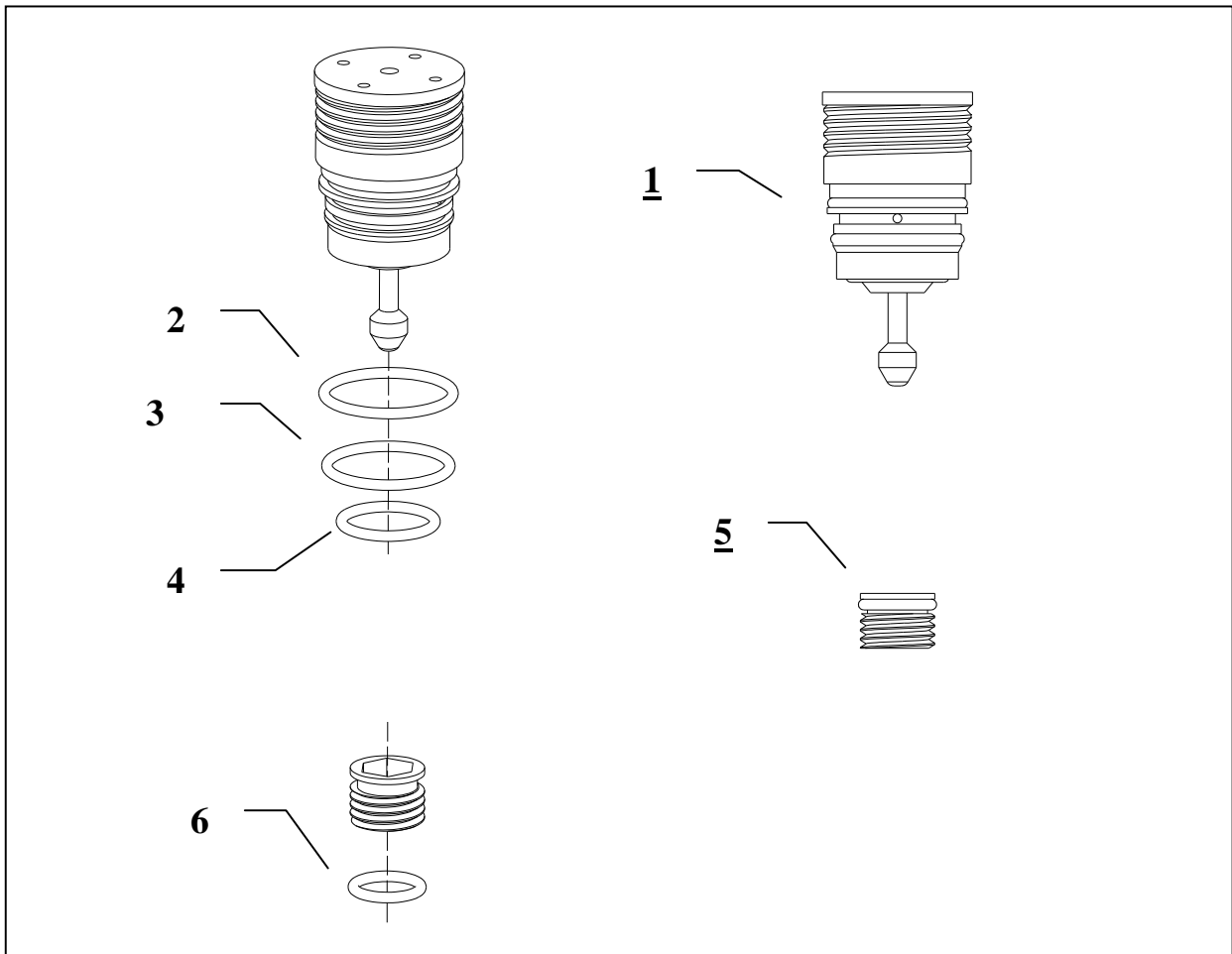


Figure 5.7.1: Color Valve – Replaces ITW Ransburg U. S. Valves

ITEM	EFC PN	QTY	DESCRIPTION
<u>1</u>	65-2A16	1	MICROVALVE (1) (INCLUDES O-RINGS)
2	2017CR	1	O-RING, TEKREZ®
3	1817CR	1	O-RING, TEKREZ®
4	1417CR	1	O-RING, TEKREZ®
<u>5</u>	65-2A17	1	MICROVALVE SEAT (1) ASSY. (INCLUDES O-RING)
6	9217CR	1	O-RING, TEKREZ®

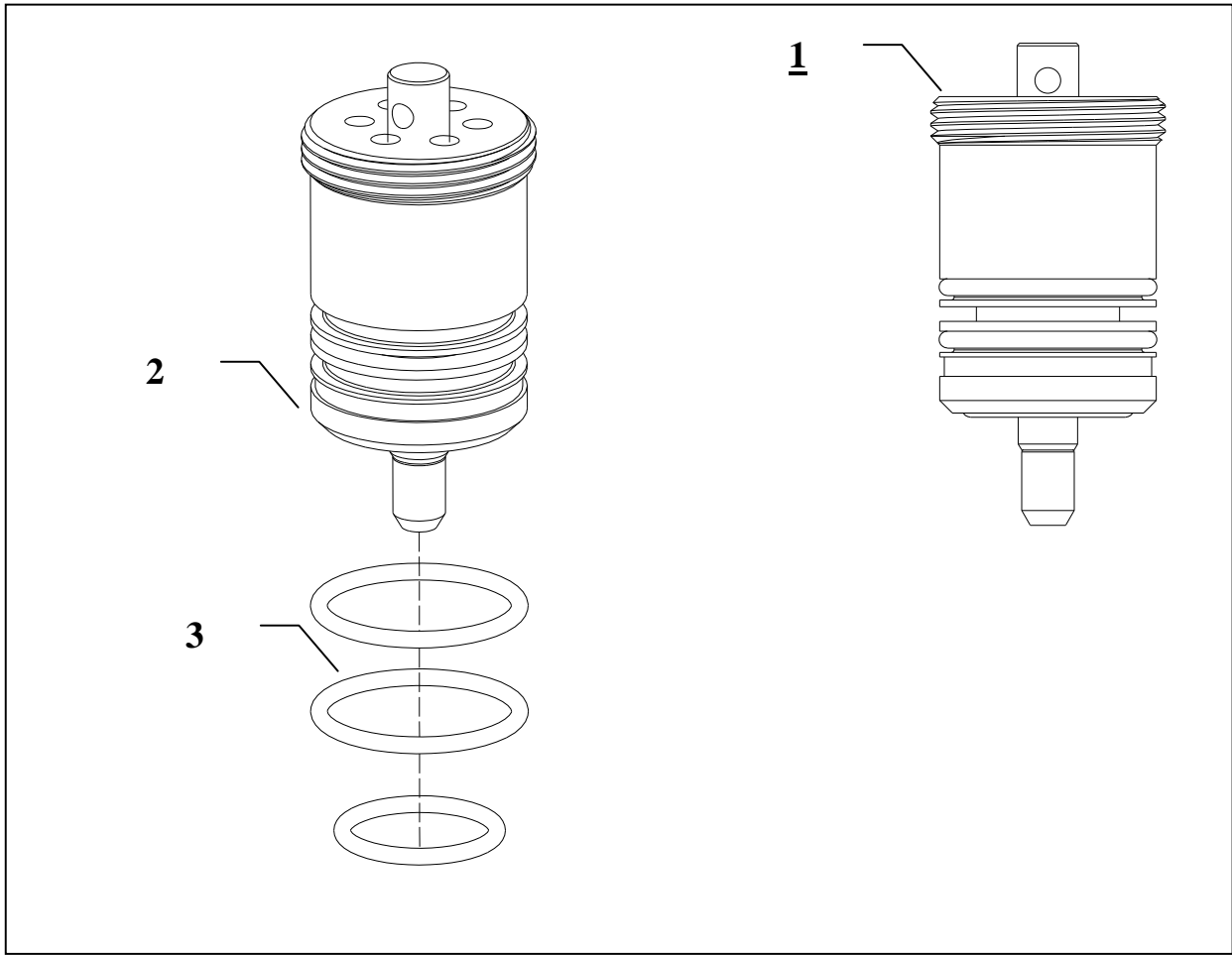


Figure 5.7.2: Color Valve – Replaces Fanuc Versa Bell U. S. Valves

ITEM	EFC PN	QTY	DESCRIPTION
<u>1</u>	65-2A10	1	MICROVALVE (V) (INCLUDES O-RINGS)
2	1817CR	2	O-RING, TEKREZ®
3	1417CR	1	O-RING, TEKREZ®

OPERATION
MAINTENANCE
&
TROUBLESHOOTING

CIRCULATING COLOR SLICE OPERATION

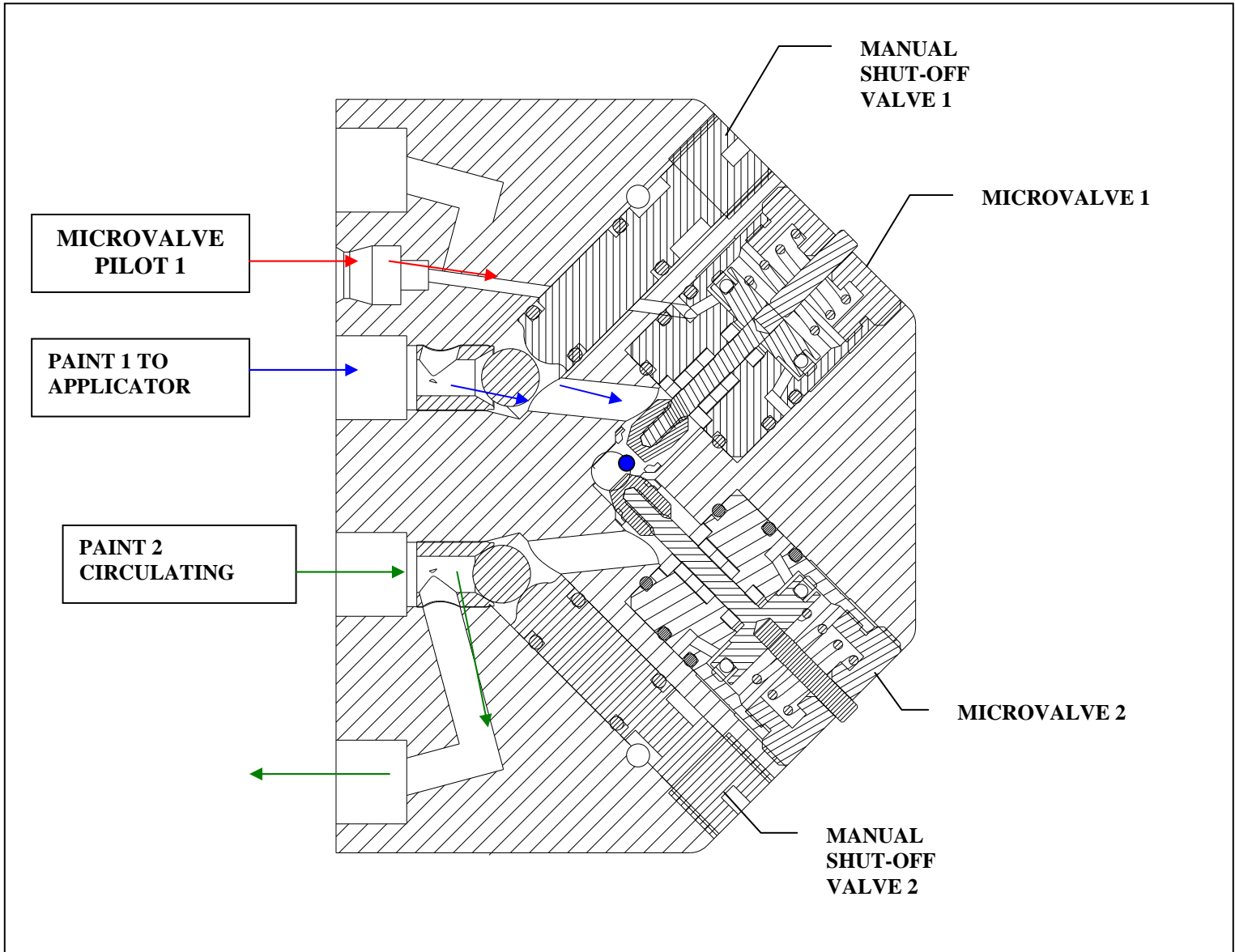


Figure 6.1.1

OPERATING PROCEDURES:

1. Paint 1 and Paint 2 continuously circulate into, then out of the color slice.
2. Microvalve Pilot 1 triggers, allowing Paint 1 to proceed to the applicator.
3. After Paint 1 is finished, the Air / Solvent Slice is triggered, cleaning the entire color stack.
4. Microvalve Pilot 2 triggers, allowing Paint 2 to proceed to the applicator.
5. Again, after Paint 2 is finished, the Air / Solvent Slice triggers, cleaning the entire color stack.
6. The Manual Shut-off valves serve two purposes:
 1. They act as check valves, preventing back flow.
 2. They may be engaged to close off a circuit to allow for the removal of the Microvalve in that particular circuit.

NONCIRCULATING COLOR SLICE OPERATION

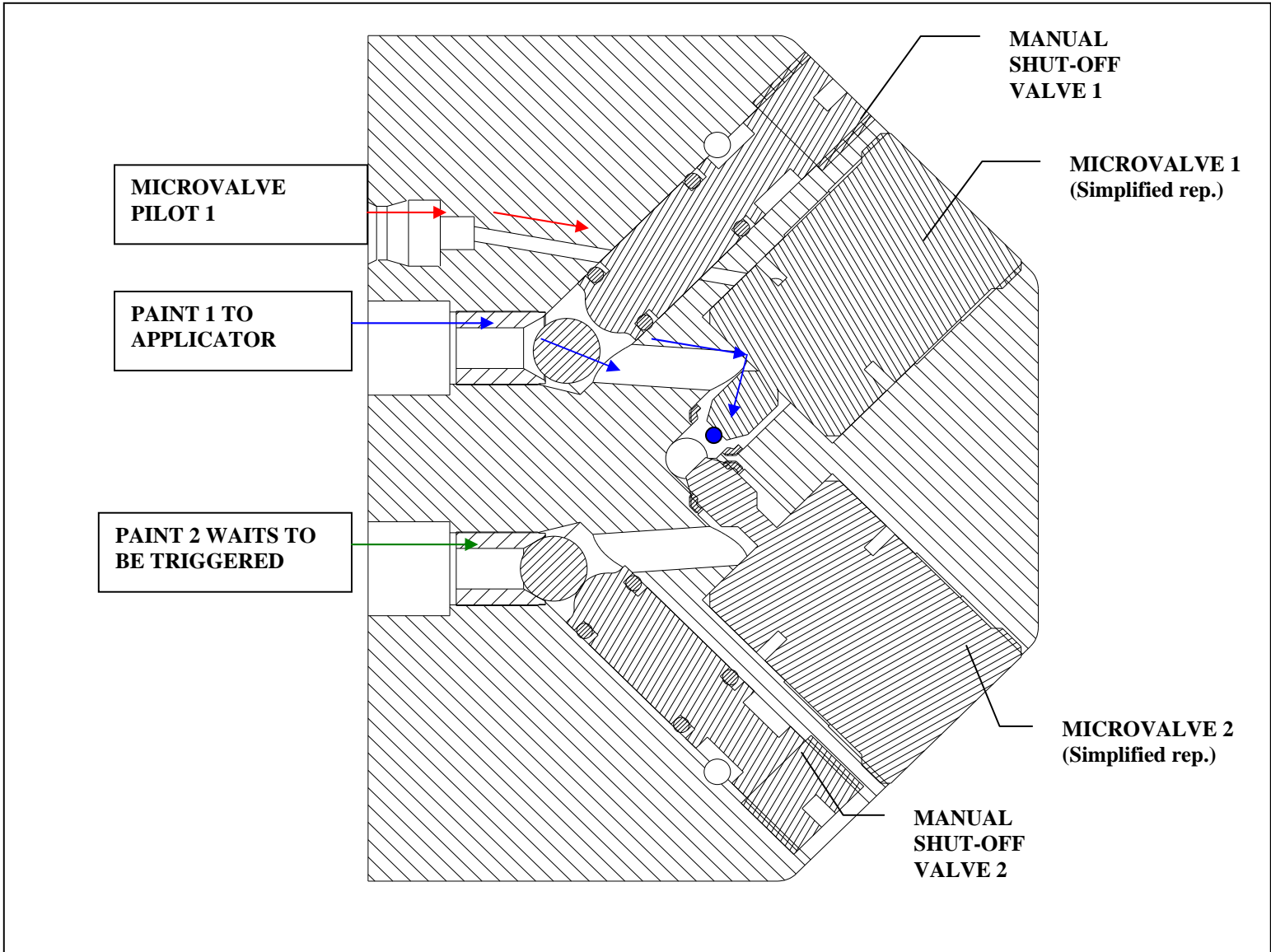


Figure 6.1.2

OPERATING PROCEDURES:

1. Paint 1 and Paint 2 enter the slice as shown.
2. Microvalve Pilot 1 triggers, allowing Paint 1 to proceed to the atomizer.
3. After Paint 1 is finished, the Air / Solvent Slice is triggered, cleaning the entire color stack.
4. Microvalve Pilot 2 triggers, allowing Paint 2 to proceed to the atomizer.
5. Again, after Paint 2 is finished, the Air / Solvent Slice triggers, cleaning the entire color stack.
6. The Manual Shut-off valves serve two purposes:
 1. They act as check valves, preventing back flow.
 2. They may be engaged to close off a circuit to allow for the removal of the Microvalve in that particular circuit.

MICROVALVE REMOVAL

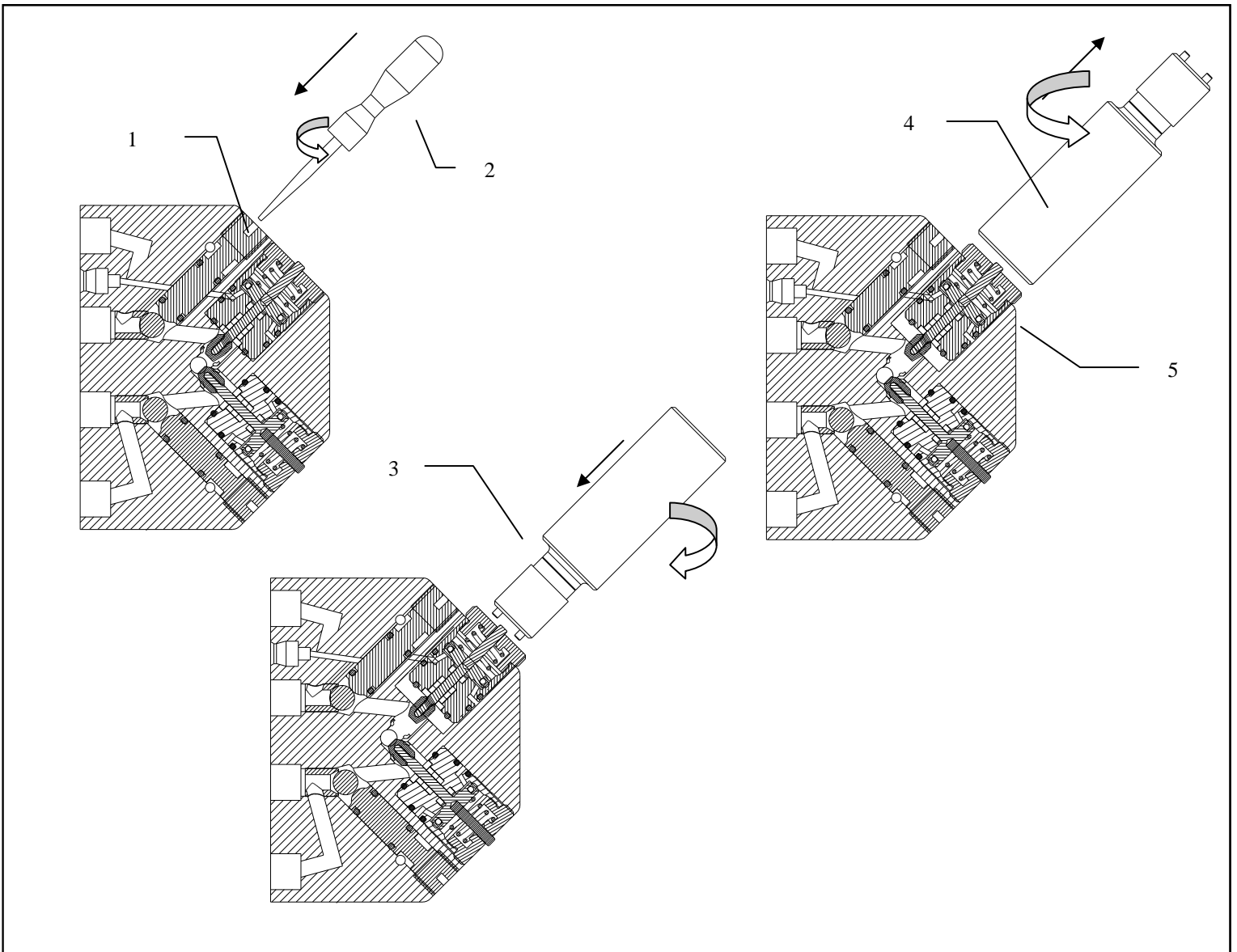


Figure 6.1.3

Microvalve Removal Sequence:

1. Disconnect all supply lines from the circuit being serviced.
2. Engage Shut-off valve (1) by tightening clockwise with a flat blade screwdriver (2).
3. With the small end of a Microvalve removal tool (3) (EFC PN TL950), unscrew the Microvalve approximately four (4) complete turns counterclockwise.
4. Screw the large end of the Microvalve removal tool (4) clockwise onto the O.D. threads of the Microvalve (5), and pull the Microvalve out.
5. Follow the reverse sequence for **Reinstalling** the Microvalve.

MICROVALVE OPERATION & MAINTENANCE

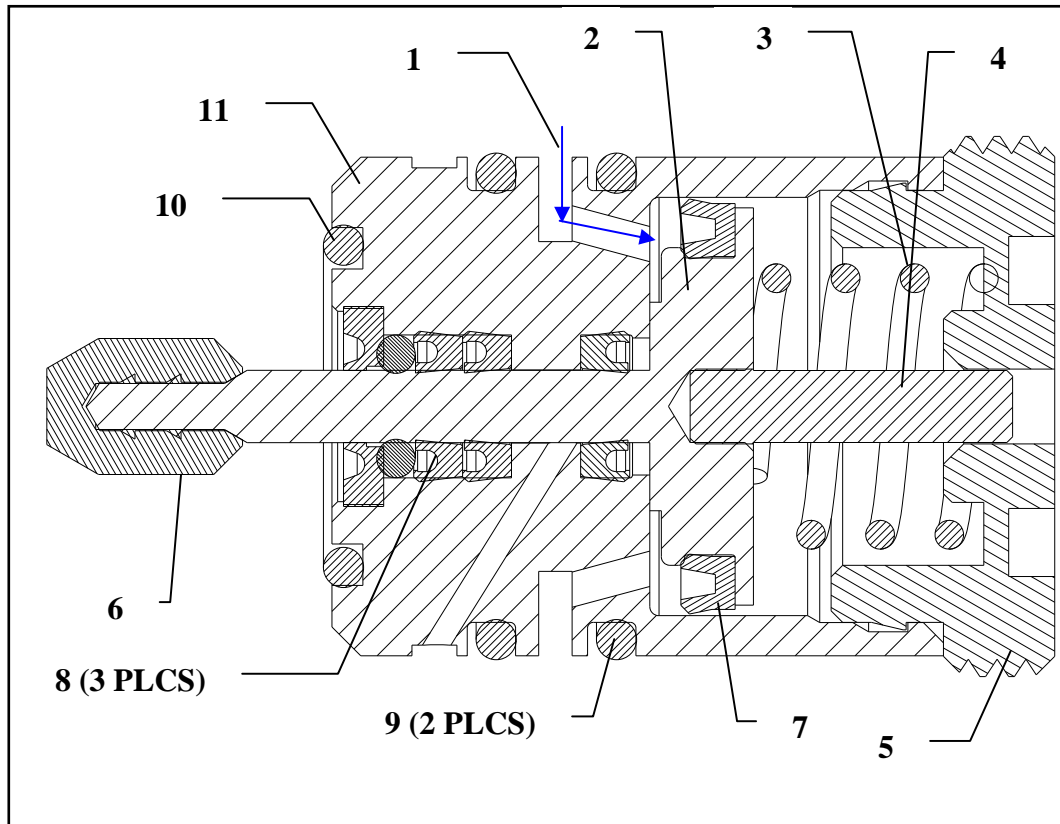


Figure 6.1.4
Operation:

1. Pilot air enters at (1), retracting the piston (2) against trigger spring (3). As the piston retracts, so does the indicator pin (4). When triggered, the top of the indicator pin will be approximately 0.05” above the Microvalve Cap (5).
2. The valve tip (6) is then lifted from its seat (not shown).
3. A seal (7) contains pilot air to the front of the piston (2), allowing for proper trigger operation.
4. Three seals (8) separate the fluids (paint and solvent) from the trigger air.
5. After the trigger process ends, the trigger spring (3) forces the valve shut.

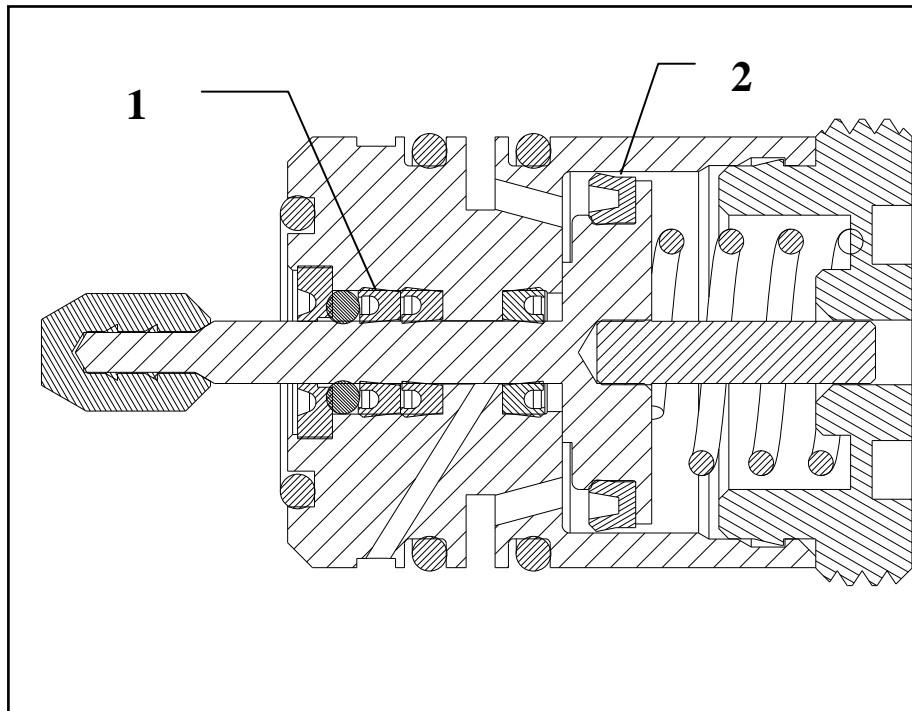
Maintenance:

1. After disassembling the Microvalve, check the o-rings (9) and (10) for damage and replace as necessary.
2. The o-rings (9) and (10) are the only components that may be replaced. If any other damage occurs to the Microvalve body, needle, tip, etc., then the entire Microvalve unit will need to be replaced to ensure proper operation.
3. All **EFC** Microvalve components may be immersed in aggressive solvents. The Tekrez® o-rings (9) and (10) may be immersed in aggressive solvents.
4. Before reinserting the Microvalve back into the color slice (not shown), apply a thin film of Vaseline™ to the outside of the Microvalve body (11) and o-rings (9) and (10).

TROUBLESHOOTING

1. MICROVALVE

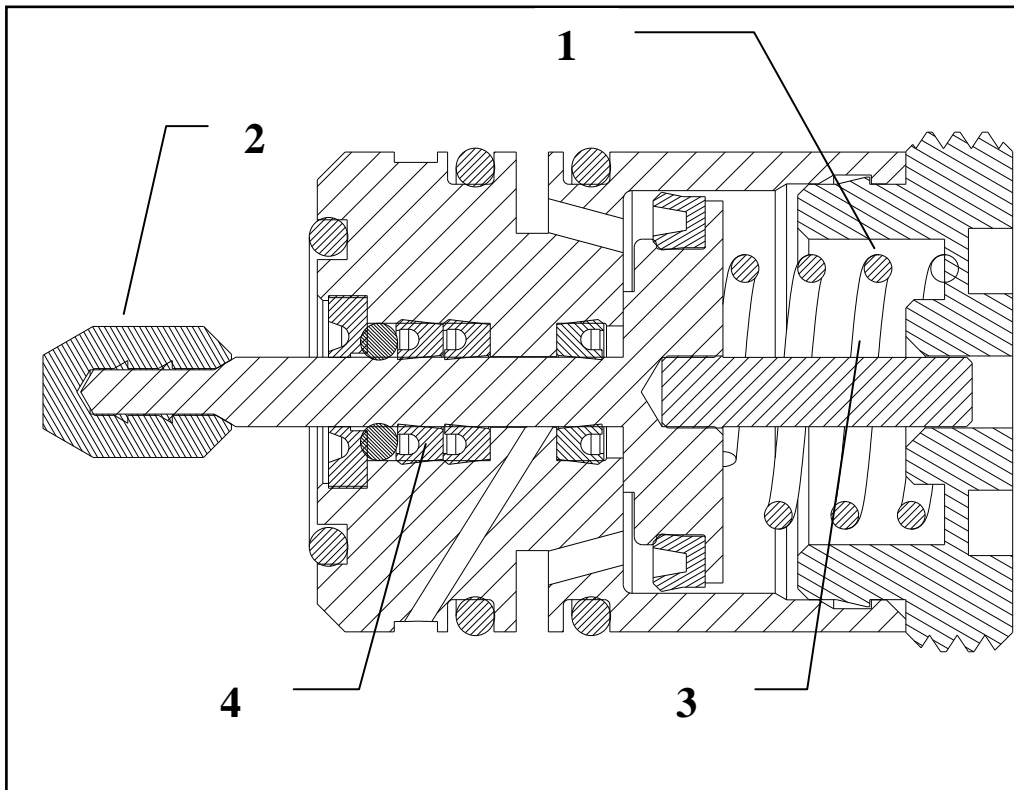
PROBLEM	POSSIBLE CAUSE	SOLUTION
<p>MICROVALVE DOES NOT OPEN</p>	<p>PILOT AIR IS NOT REACHING THE MICROVALVE</p> <p>PILOT TRIGGER AIR PRESSURE IS TOO LOW</p> <p>SEALS AT 1 ARE NOT FUNCTIONING PROPERLY BECAUSE OF EXCESSIVE WEAR AND OR PAINT BUILDUP</p> <p>THE SEAL AT 2 IS DAMAGED OR NOT FUNCTIONING PROPERLY</p>	<p>ENSURE THAT THE PILOT AIR IS REACHING THE COLOR SLICE IN QUESTION (I.E. CHECK FOR KINKS IN PILOT AIR SUPPLY LINE).</p> <p>INCREASE PILOT AIR PRESSURE. MICROVALVE WILL TRIGGER SUCCESSFULLY AT 90 psi.</p> <p>FIRST, REMOVE AND CLEAN ENTIRE MICROVALVE WITH SOLVENT.</p> <p>SECOND, IF THIS DOES NOT SOLVE THE PROBLEM, REPLACE THE MICROVALVE ASSY.</p> <p>REPLACE THE MICROVALVE ASSY.</p>



TROUBLESHOOTING (cont.)

1. MICROVALVE (cont.)

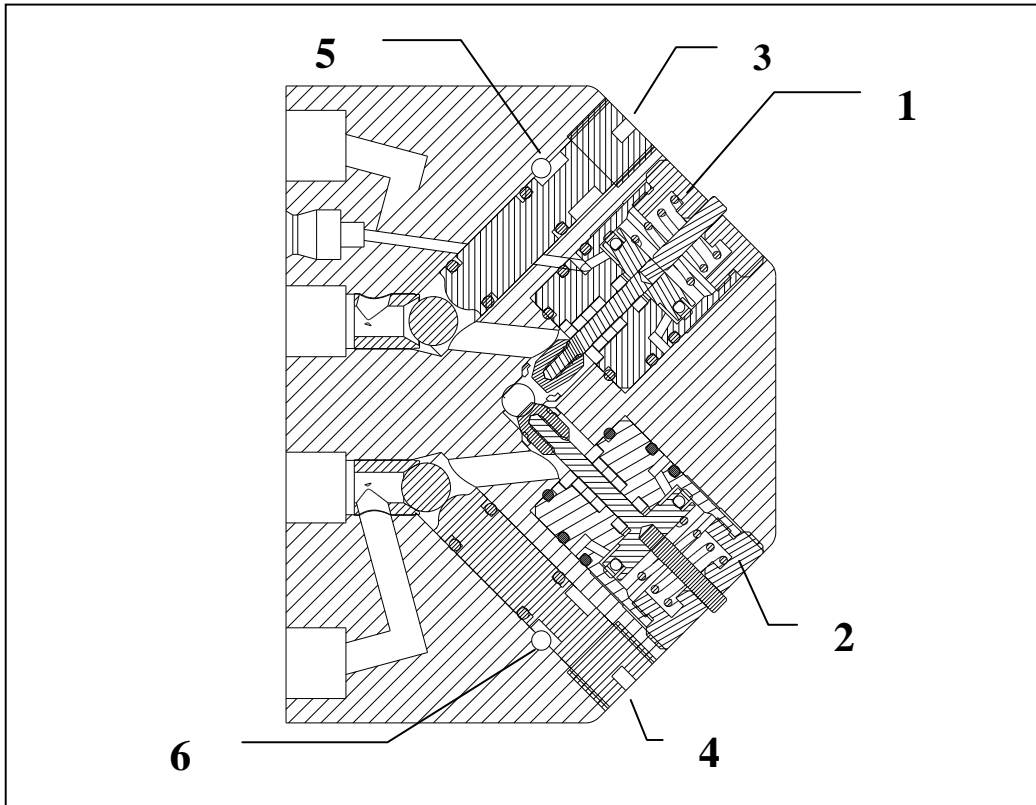
PROBLEM	POSSIBLE CAUSE	SOLUTION
<p>MICROVALVE DOES NOT CLOSE</p>	<p>PILOT AIR CONTINUES TO ACTIVATE THE MICROVALVE ASSY.</p> <p>FAULTY TRIGGER SPRING AT 1.</p> <p>SEALS AT 4 ARE NOT FUNCTIONING PROPERLY BECAUSE OF EXCESSIVE WEAR AND OR PAINT BUILDUP</p>	<p>ENSURE THAT THE PILOT AIR IS NOT PRESSURIZING THE CIRCUIT AND IS EXHAUSTING PROPERLY TO THE ATMOSPHERE.</p> <p>REMOVE MICROVALVE ASSY. AND TEST TRIGGER SPRING BY CAREFULLY DEPRESSING THE VALVE TIP AT 2. THE INDICATOR PIN AT 3 SHOULD PROTRODE THEN RETRACT. IF THE VALVE TIP DOES NOT RETURN THEN THE MICROVALVE ASSY. NEEDS TO BE REPLACED.</p> <p>FIRST, REMOVE AND CLEAN ENTIRE MICROVALVE WITH SOLVENT. SECOND, IF THIS DOES NOT SOLVE THE PROBLEM, REPLACE THE MICROVALVE ASSY.</p>



TROUBLESHOOTING (cont.)

2. COLOR SLICE

PROBLEM	POSSIBLE CAUSE	SOLUTION
<p>PAIN T IS NOT FLOWING THROUGH THE COLOR SLICE.</p>	<p>MICROVALVE 1 OR 2 IS NOT FUNCTIONING PROPERLY.</p> <p>THE MANUAL SHUT-OFF VALVE 3 OR 4 MAY BE ENGAGED.</p> <p>THE TUBING LEADING INTO THE INTO THE COLOR SLICE MAY BE INCORRECTLY PLACED.</p>	<p>TROUBLESHOOT THE MICROVALVE ASSY. AS INDICATED ABOVE.</p> <p>UNSCREW (COUNTERCLOCKWISE) THE MANUAL SHUT-OFF VALVE UNTIL IT ENGAGES THE LOCK PIN 5 OR 6.</p> <p>ENSURE PROPER HOSE CONNECTIONS ON ALL PAINT, SOLVENT AND PILOT LINES.</p>
<p>PAIN T IS LEAKING AROUND THE MANUAL SHUT-OFF VALVE 3 OR 4</p>	<p>THE MANUAL SHUT-OFF VALVE IS DAMAGED.</p>	<p>REPLACE THE MANUAL SHUT-OFF VALVE</p>
<p>PAIN T IS LEAKING AROUND THE MICROVALVE ASSY.</p>	<p>ONE OF THE O-RINGS ON THE MICROVALVE ASSY. MAY BE DAMAGED.</p>	<p>CHECK MICROVALVE ASSY. O-RINGS AND REPLACE IF NECESSARY.</p>



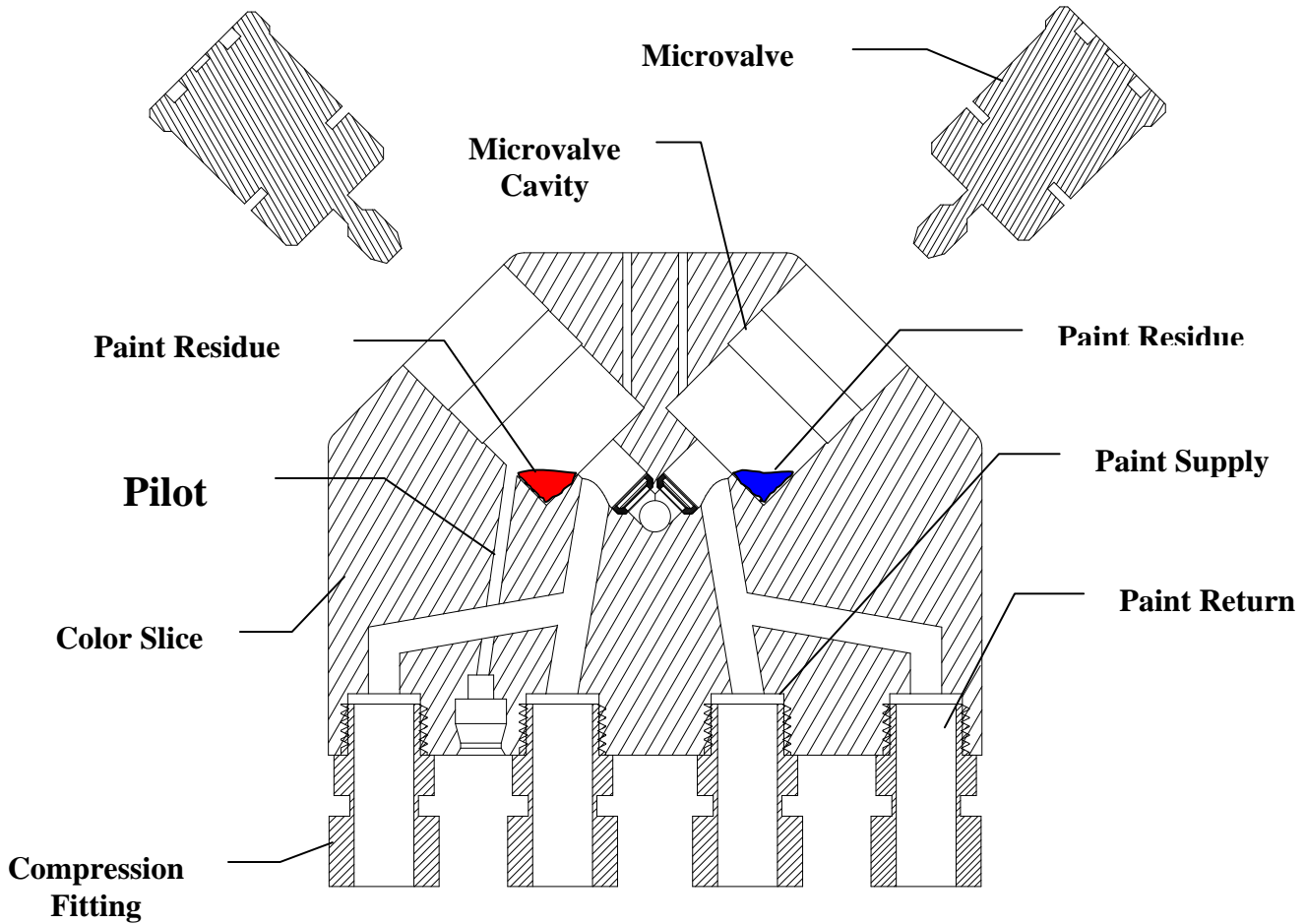
ENGINEERING NOTICES & NOTES



SYSTEMS, INC.

ENGINEERING NOTICE

MICROVALVE REPLACEMENT PROCEDURE



After the Microvalve is removed from the color slice, it is important to clean the Microvalve cavity with a solvent soaked cloth before reinstalling another valve. As the Microvalve is removed from the cavity, paint pressure in the supply line often allows the paint to migrate into the Microvalve cavity. If this residual paint material is not removed before reinstalling another Microvalve, then it becomes possible for paint to enter the Microvalve assembly, thereby destroying the Microvalve. Paint may also enter the pilot line, closing off the pilot air supply.



SYSTEMS, INC.

ENGINEERING NOTICE

MICROVALVE/COLOR SLICE OPERATING PRESSURES

MICROVALVE

Maximum Operating Pressure = 250 psi (short term)

Recommended Operating Pressure = 100 psi

COLOR SLICE

Maximum Operating Pressure = 300 psi

Recommended Operating Pressure = 100 psi