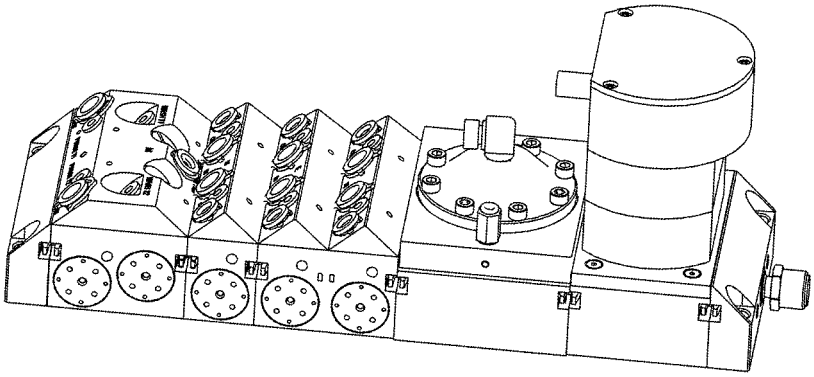
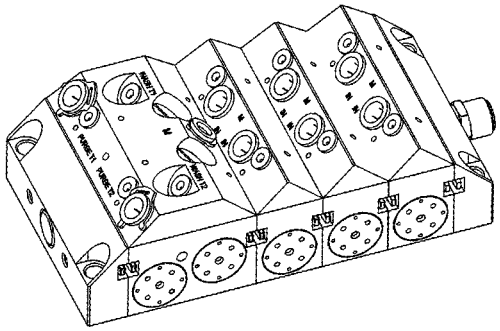
SERVICE MANUAL
CS-02-01.11
(Replaces CS-02-01.10)
JANUARY - 2017

Ransburg

MCV2
COLLET SERIES
MODULAR COLOR CHANGER





MODELS:

A10800-XX Metric
A11077-XX English

CE

IMPORTANT: Before using this equipment, carefully read SAFETY PRECAUTIONS, starting on page 1, and all instructions in this manual. Keep this Service Manual for future reference.

Service Manual Price: $50.00 (U.S.)

NOTE: This manual has been changed from revision **CS-02-01.10** to revision **CS-02-01.11**. Reasons for this change are noted under "Manual Change Summary" on page 58 of this manual.

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CONTENTS (Cont.)

SAFETY

SAFETY PRECAUTIONS

Before operating, maintaining or servicing any Ransburg electrostatic coating system, read and understand all of the technical and safety literature for your Ransburg products. This manual contains information that is important for you to know and understand. This information relates to **USER SAFETY** and **PREVENTING EQUIPMENT PROBLEMS**. To help you recognize this information, we use the following symbols. Please pay particular attention to these sections.

A WARNING! states information to alert you to a situation that might cause serious injury if instructions are not followed.

A CAUTION! states information that tells how to prevent damage to equipment or how to avoid a situation that might cause minor injury.

A NOTE is information relevant to the procedure in progress.

While this manual lists standard specifications and service procedures, some minor deviations may be found between this literature and your equipment. Differences in local codes and plant requirements, material delivery requirements, etc., make such variations inevitable. Compare this manual with your system installation drawings and appropriate Ransburg equipment manuals to reconcile such differences.

Careful study and continued use of this manual will provide a better understanding of the equipment and process, resulting in more efficient operation, longer trouble-free service and faster, easier troubleshooting. If you do not have the manuals and safety literature for your Ransburg system, contact your local Ransburg representative or Ransburg.

⚠ WARNING

➤ The user **MUST** read and be familiar with the Safety Section in this manual and the Ransburg safety literature therein identified.

➤ This equipment is intended to be used by trained personnel **ONLY**.

➤ This manual **MUST** be read and thoroughly understood by **ALL** personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the **WARNINGS** and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to **ALL** local building and fire codes and ordinances as well as **NFPA-33 AND EN 50176 SAFETY STANDARDS, LATEST EDITION**, or applicable country safety standards, prior to installing, operating, and/or servicing this equipment.

⚠ WARNING

➤ The hazards shown on the following pages may occur during the normal use of this equipment. Please read the hazard chart beginning on page 2.

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AREA Tells where hazards may occur.	**HAZARD** Tells what the hazard is.	**SAFEGUARDS** Tells how to avoid the hazard.
Spray Area 	**Fire Hazard** Improper or inadequate operation and maintenance procedures will cause a fire hazard. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.	Fire extinguishing equipment must be present in the spray area and tested periodically. Spray areas must be kept clean to prevent the accumulation of combustible residues. Smoking must never be allowed in the spray area. The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing or maintenance. When using solvents for cleaning: • Those used for equipment flushing should have flash points equal to or higher than those of the coating material. • Those solvents used for general cleaning must have a flash point at minimum of 15°C (27°F) greater than the ambient temperature. It is the end user's responsibility to insure this condition is met. Spray booth ventilation must be kept at the rates required by NFPA-33, OSHA, country, and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents. Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch for every 10KV of output voltage is required at all times. Test only in areas free of combustible material. Testing may require high voltage to be on, but only as instructed. Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury. If used, the key switch bypass is intended for use only during setup operations. Production should never be done with safety interlocks disabled. Never use equipment intended for use in waterborne installations to spray solvent based materials. The paint process and equipment should be set up and operated in accordance with NFPA-33, NEC, OSHA, local, country, and European Health and Safety Norms.

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AREA Tells where hazards may occur.	**HAZARD** Tells what the hazard is.	**SAFEGUARDS** Tells how to avoid the hazard.
Spray Area 	**Explosion Hazard** Improper or inadequate operation and maintenance procedures will cause a fire hazard. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.	Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch for every 10KV of output voltage is required at all times. Unless specifically approved for use in hazardous locations, all electrical equipment must be located **outside** Class I or II, Division 1 or 2 hazardous areas, in accordance with NFPA-33. Test only in areas free of flammable or combustible materials. The current overload sensitivity (if equipped) MUST be set as described in the corresponding section of the equipment manual. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if the current overload sensitivity is not properly set. Frequent power supply shutdown indicates a problem in the system which requires correction. Always turn the control panel power off prior to flushing, cleaning, or working on spray system equipment. Before turning high voltage on, make sure no objects are within the safe sparking distance. Ensure that the control panel is interlocked with the ventilation system and conveyor in accordance with NFPA-33, EN 50176. Have fire extinguishing equipment readily available and tested periodically.
General Use and Maintenance 	Improper operation or maintenance may create a hazard. Personnel must be properly trained in the use of this equipment.	Personnel must be given training in accordance with the requirements of NFPA-33, EN 60079-0. Instructions and safety precautions must be read and understood prior to using this equipment. Comply with appropriate local, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA-33, EN Norms and your insurance company requirements.

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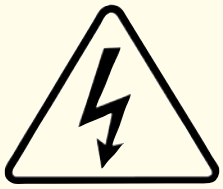
AREA Tells where hazards may occur.	**HAZARD** Tells what the hazard is.	**SAFEGUARDS** Tells how to avoid the hazard.
Spray Area / High Voltage Equipment 	**Electrical Discharge** There is a high voltage device that can induce an electrical charge on ungrounded objects which is capable of igniting coating materials. Inadequate grounding will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.	Parts being sprayed and operators in the spray area must be properly grounded. Parts being sprayed must be supported on conveyors or hangers that are properly grounded. The resistance between the part and earth ground must not exceed 1 meg ohm. (Refer to NFPA-33.) Operators must be grounded. Rubber soled insulating shoes should not be worn. Grounding straps on wrists or legs may be used to assure adequate ground contact. Operators must not be wearing or carrying any ungrounded metal objects. When using an electrostatic handgun, operators must assure contact with the handle of the applicator via conductive gloves or gloves with the palm section cut out. NOTE: REFER TO NFPA-33 OR SPECIFIC COUNTRY SAFETY CODES REGARDING PROPER OPERATOR GROUNDING. All electrically conductive objects in the spray area, with the exception of those objects required by the process to be at high voltage, must be grounded. Grounded conductive flooring must be provided in the spray area. Always turn off the power supply prior to flushing, cleaning, or working on spray system equipment. Unless specifically approved for use in hazardous locations, all electrical equipment must be located **outside** Class I or II, Division 1 or 2 hazardous areas, in accordance with NFPA-33. Avoid installing an applicator into a fluid system where the solvent supply is ungrounded. Do not touch the applicator electrode while it is energized.

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AREA Tells where hazards may occur.	**HAZARD** Tells what the hazard is.	**SAFEGUARDS** Tells how to avoid the hazard.
Electrical Equipment 	**Electrical Discharge** High voltage equipment is utilized in the process. Arcing in the vicinity of flammable or combustible materials may occur. Personnel are exposed to high voltage during operation and maintenance. Protection against inadvertent arcing that may cause a fire or explosion is lost if safety circuits are disabled during operation. Frequent power supply shut-down indicates a problem in the system which requires correction. An electrical arc can ignite coating materials and cause a fire or explosion.	Unless specifically approved for use in hazardous locations, the power supply, control cabinet, and all other electrical equipment must be located outside Class I or II, Division 1 and 2 hazardous areas in accordance with NFPA-33 and EN 50176. Turn the power supply OFF before working on the equipment. Test only in areas free of flammable or combustible material. Testing may require high voltage to be on, but only as instructed. Production should never be done with the safety circuits disabled. Before turning the high voltage on, make sure no objects are within the sparking distance.
Toxic Substances 	**Chemical Hazard** Certain materials may be harmful if inhaled, or if there is contact with the skin.	Follow the requirements of the Safety Data Sheet supplied by coating material manufacturer. Adequate exhaust must be provided to keep the air free of accumulations of toxic materials. Use a mask or respirator whenever there is a chance of inhaling sprayed materials. The mask must be compatible with the material being sprayed and its concentration. Equipment must be as prescribed by an industrial hygienist or safety expert, and be NIOSH approved.
Spray Area 	**Explosion Hazard — Incompatible Materials** Halogenated hydrocarbon solvents for example: methylene chloride and 1,1,1,-Trichloroethane are not chemically compatible with the aluminum that might be used in many system components. The chemical reaction caused by these solvents reacting with aluminum can become violent and lead to an equipment explosion.	Spray applicators require that aluminum inlet fittings be replaced with stainless steel. Aluminum is widely used in other spray application equipment - such as material pumps, regulators, triggering valves, etc. Halogenated hydrocarbon solvents must never be used with aluminum equipment during spraying, flushing, or cleaning. Read the label or data sheet for the material you intend to spray. If in doubt as to whether or not a coating or cleaning material is compatible, contact your coating supplier. Any other type of solvent may be used with aluminum equipment.

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INTRODUCTION

DESCRIPTIONS

The **MCV 2 Collet Series Modular Color Changer** is a material valve stack used to control material flow to an applicator or other material supply equipment. The stack assembly is made up of several sub-assembled stacks which are then connected together. The assemblies are available in both Metric and English tube sizes.

A description of stacks are as follows:

- Bell Wash Module - This may be attached to the main stack.
- Stand-Alone Bell Wash Module - These may be mounted separately away from the stack assembly. An external outlet port is included to provide a connection to an applicator or other such device.
- Two and Four Color Block Modules. Both available in 3 styles: Circulating, Daisy Chain, and Dead Head.
- Inline DR-2 Regulator with performance matching the industry standard Ransburg DR-1 Regulator.
- Flow Meter Module for use with bottom ported fluid flow meters.

The 78949-00 microvalve was designed to trigger up to 2-million cycles. The fluid and air sections are separated by a weep port to prevent contamination between air and fluid.

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SPECIFICATIONS

Electrical/Physical

Operating Pressure:	
Fluid:	300 psi maximum (20.68 bar)
Air:	100 psi maximum (7 bar)
Fluid Tube Metric:	
(Inlet)	10mm ODT
(Circulation)	8mm ODT
(Bell wash)	6mm & 8mm ODT
Fluid Tube English:	
(Inlet)	3/8-inch ODT
(Circulation)	5/16-inch ODT
(Bell wash)	5/16-inch ODT
Air Tube English / Metric:	
(Actuation)	5/32-inch (4mm) ODT Inlet
Air Actuating Pressure:	75-120 psi (5.2-8.3 bar)
Maximum Number of Colors:	32
Construction Materials:	Stainless Steel / UHMW

DR-2 Regulator

Air Pressures:	Variable by Control (Manual or Automatic) 100 psi (7 bar max.)
Fluid Input:	300 psi (20.7 bar max.) (10 psi min. above output pressure)
Fluid Output:	Variable by Regulator Ratio
Pneumatic Connections	
Air Pilot:	1/8-inch NPT (F) Thread (Cap) #10-32 (F) Thread (Plate)
Volume of Paint Held Within Regulator:	5 cc

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REGULATOR PERFORMANCE

The A10725 regulator performance matches that of the stand-alone DR-1. Figures X and Y show the performance curves associated with the A10725 regulator.

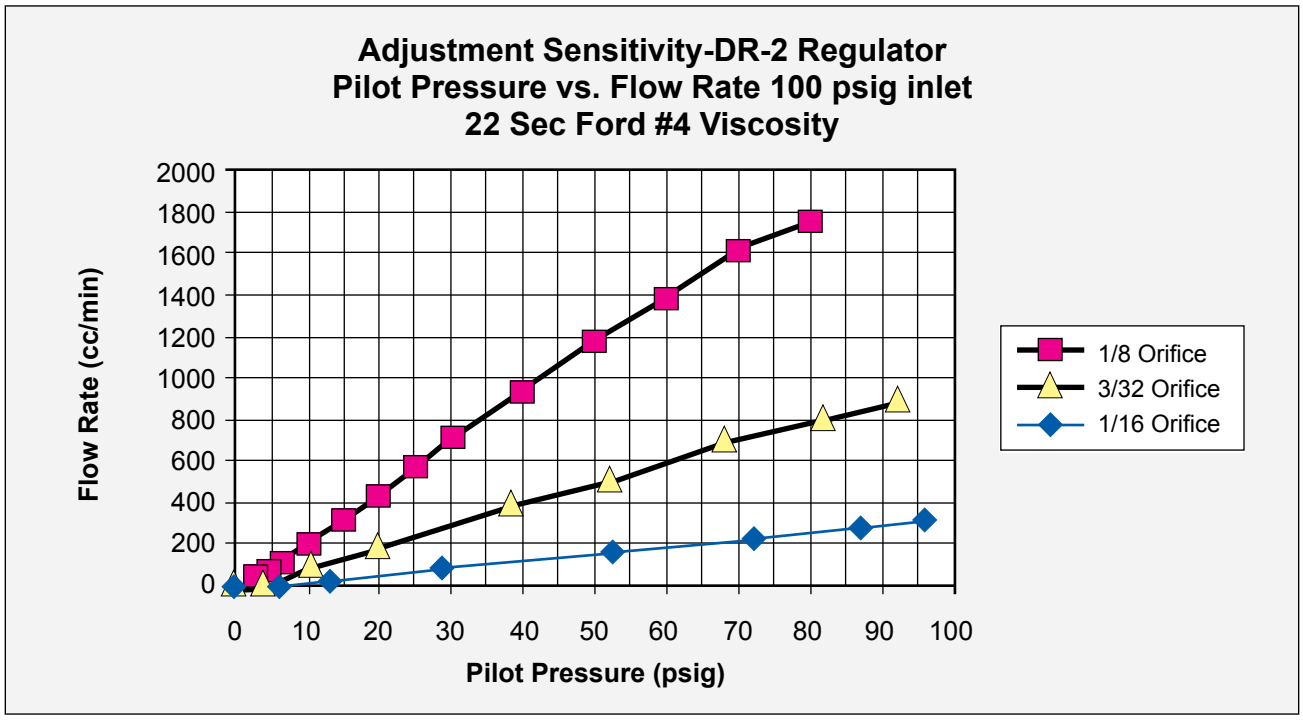

Figure X

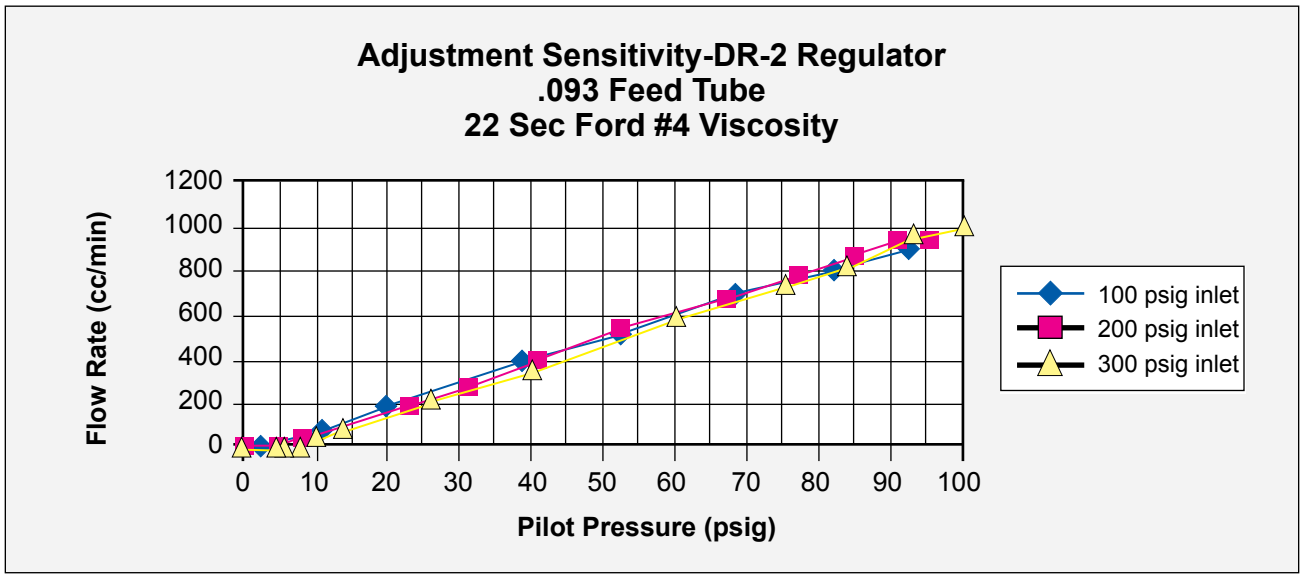

Figure Y

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MCV 2 COLOR CHANGER ASSEMBLIES

The following is for color changer assemblies. Please reference selection chart for the changer assembly number.

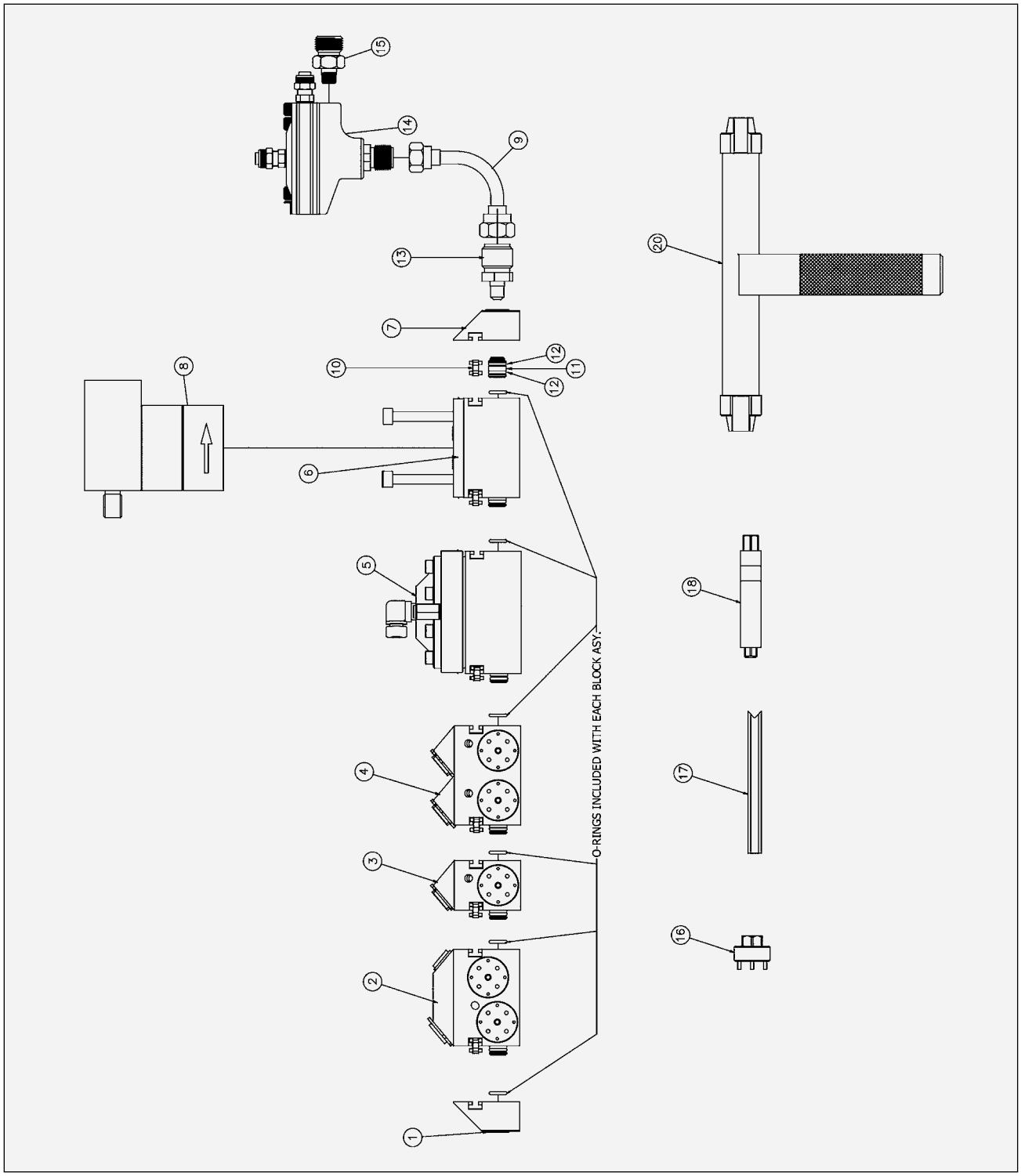

Figure 1: Color Changer Assemblies

MCV 2 COLOR CHANGER ASSEMBLIES - PARTS LIST (METRIC) (Figure 1)

Item #	Part #	Description	Qty
1	A10711-00	Assembly, Plate, Closed End	1
2	**See Table C - "Z"**	Assembly, Bell/Block Wash	**See Table C - "E"**
3	**See Table B - "R"**	Assembly, 2-Color Valve Circulating	**See Table AA - "F"**
4	**See Table B - "S"**	Assembly, 4-Color Valve Circulating	**See Table AA - "G"**
5	**See Table V - "X"**	Assembly, Regulator	**See Table V - "T"**
6	**See Table D - "BB"**	Assembly, Flow Meter Block	**See Table D - "H"**
7	A10712-00	Assembly, Plate Fitting End	1
8	**See Table D - "K"**	Flow Meter	**See Table D - "J"**
9	78069-00	Fluid Regulator Inlet Tube	**See Table W - "N"**
10	77957-00	Retaining Clip, Color Changer	1
11	A10714-00	Fitting, End	1
12	79001-06	O-Ring, Solvent Proof	2
13	78079-00	Fitting, Outlet	1
14	**See Table W - "L"**	Fluid Regulator	**See Table W - "M"**
15	78098-00	Adapter 1/8" NPT (M) X 3/8" NPS (M)	**See Table W - "P"**
16	A10756-00	Tool, Valve Removal	1
17	78078-00	Tool, Retaining Clip Removal	1
18	A10766-00	Tool, Valve Seat Removal	1
19	(Not Used)	----	--
20	A10758-00	Tool, Hose Removal	1

(Tool Items #16, 17, 18, and 20 are included with each assembly.)

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MCV 2 COLOR CHANGER ASSEMBLIES MODEL IDENTIFICATION (METRIC)

When ordering, use A10800-AA, B, C, D, V, W, or Y as indicated by Tables AA, B, C, D, V, W and Y. Seven (7) characters must follow the basic part number, for example:

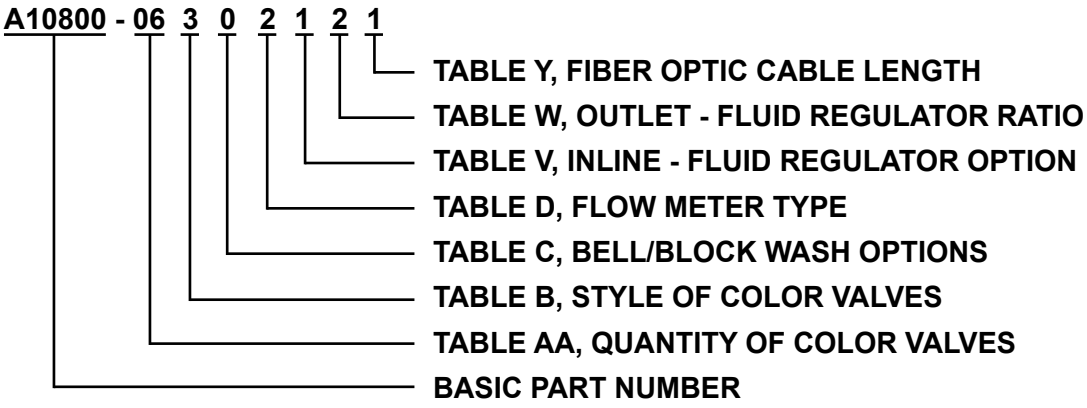

TABLE AA - QUANTITY OF COLOR VALVES (METRIC)

Dash No.	Description	"F"	"G"
00	0-Color - Color Changer	0	0
02	2-Color - Color Changer	1	0
04	4-Color - Color Changer	0	1
06	6-Color - Color Changer	1	1
08	8-Color - Color Changer	0	2
10	10-Color - Color Changer	1	2
12	12-Color - Color Changer	0	3
14	14-Color - Color Changer	1	3
16	16-Color - Color Changer	0	4
18	18-Color - Color Changer	1	4
20	20-Color - Color Changer	0	5
22	22-Color - Color Changer	1	5
24	24-Color - Color Changer	0	6
26	26-Color - Color Changer	1	6
28	28-Color - Color Changer	0	7
30	30-Color - Color Changer	1	7
32	32-Color - Color Changer	0	8

(***Continued on next page***)

TABLE B - STYLE OF COLOR VALVES (METRIC)

Dash No.	Description	"R"	"S"
1	Circulating 8x10mm	A10727-00	A10729-00
2	Daisy Chain	A10726-00	A10728-00
3	Dead Head	A10733-00	A10732-00
4	Circulating 10x10mm	A13930-00	A13932-00

TABLE C - BELL / BLOCK WASH OPTION (METRIC)

Dash No.	Description	"E"	"Z"
0	No Bell / Block Wash	0	0
1	With Both Bell / Block Wash, 8mm	1	A10717-02
2	With Block Wash Only, 8mm	1	A10717-01
3	With Both Bell/Block Wash, 6mm	1	A11788-02
4	With Block Wash Only, 6mm	1	A11788-01

TABLE D - FLOW METER TYPE (METRIC & ENGLISH)

Dash No.	Description	"H"	"J"	"K"	"BB"
0	No Flow Meter	0	0	0	0
1	Block With Flow Meter Kit Attached	1	1	CC	A10720-01
2	Block With No Flow Meter Kit	1	0	0	A10720-01

TABLE V - INLINE - FLUID REGULATOR OPTION (METRIC & ENGLISH)

Dash No.	Description	"X"	"T"
0	No Outlet Regulator	-	0
1	DR-2 - 1:1 Ratio	A10725-01	1
2	DR-2 - 1:2 Ratio	A10725-02	1
3	DR-2 - 1:3 Ratio	A10725-03	1
4	DR-2 - 1:4 Ratio	A10725-04	1
5	DR-2 - 1:6 Ratio	A10725-06	1
6	DR-2 - 1:8 Ratio	A10725-08	1
7	DR-2 - 1:10 Ratio	A10725-10	1

(***Continued on next page***)

TABLE W - OUTLET - FLUID REGULATOR RATIO (METRIC & ENGLISH)

Dash No.	Description	"L"	"M"	"N"	"P"
0	No Outlet Regulator	- - -	0	0	0
1	DR-1 - 1:1 Ratio	74151-11	1	1	1
2	DR-1 - 1:2 Ratio	74151-01	1	1	1
3	DR-1 - 1:3 Ratio	74151-06	1	1	1
4	DR-1 - 1:4 Ratio	74151-02	1	1	1
5	DR-1 - 1:6 Ratio	74151-03	1	1	1
6	DR-1 - 1:8 Ratio	74151-04	1	1	1
7	DR-1 - 1:10 Ratio	74151-05	1	1	1

TABLE Y - FLOW METER KIT/FIBER OPTIC CABLE LENGTH (METRIC & ENGLISH)

Dash No.	Description	"CC"	"Fiber Optic Cable Length"
0	No Flow Meter	-	-
1	Flow Meter, F.O. Sensor, Fiber Optic Cable	A13420-10	10 Ft.
2	Flow Meter, F.O. Sensor, Fiber Optic Cable	A13420-15	15 Ft.
3	Flow Meter, F.O. Sensor, Fiber Optic Cable	A13420-30	30 Ft.
4	Flow Meter, F.O. Sensor, Fiber Optic Cable	A13420-45	45 Ft.
5	Flow Meter, F.O. Sensor, Fiber Optic Cable	A13420-60	60 Ft.
6	Flow Meter, F.O. Sensor, Fiber Optic Cable	A13420-100	100 Ft.

(***Continued on next page***)

MCV 2 COLOR CHANGER ASSEMBLIES - PARTS LIST (ENGLISH) (Figure 1)			
Item #	**Part #**	**Description**	**Qty**
1	A10711-00	Assembly, Plate, Closed End	1
2	**See Table C - "Z"**	Assembly, Bell/Block Wash	**See Table C - "E"**
3	**See Table B - "R"**	Assembly, 2-Color Valve Circulating	**See Table AA - "F"**
4	**See Table B - "S"**	Assembly, 4-Color Valve Circulating	**See Table AA - "G"**
5	**See Table V - "X"**	Assembly, Regulator	**See Table V - "T"**
6	**See Table D - "Y"**	Assembly, Flow Meter Block	**See Table D - "H"**
7	A10712-00	Assembly, Plate Fitting End	1
8	**See Table D - "K"**	Flow Meter	**See Table D - "J"**
9	78069-00	Fluid Regulator Inlet Tube	**See Table W - "N"**
10	77957-00	Retaining Clip, Color Changer	1
11	A10714-00	Fitting, End	1
12	79001-06	O-Ring, Solvent Proof	2
13	78079-00	Fitting, Outlet	1
14	**See Table W - "L"**	Fluid Regulator	**See Table W - "M"**
15	78098-00	Adapter 1/8" NPT (M) X 3/8" NPS (M)	**See Table W - "P"**
16	A10756-00	Tool, Valve Removal	1
17	78078-00	Tool, Retaining Clip Removal	1
18	A10766-00	Tool, Valve Seat Removal	1
19	(Not Used)	----	--
20	A10758-00	Tool, Hose Removal	1

(Tool Items #16, 17, 18, and 20 are included with each assembly.)

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MCV 2 COLOR CHANGER ASSEMBLIES MODEL IDENTIFICATION (ENGLISH)

When ordering, use A11077-AA, B, C, D, V, W, or BB as indicated by Tables AA, B, C, D, V, W and BB. Seven (7) characters must follow the basic part number, for example:

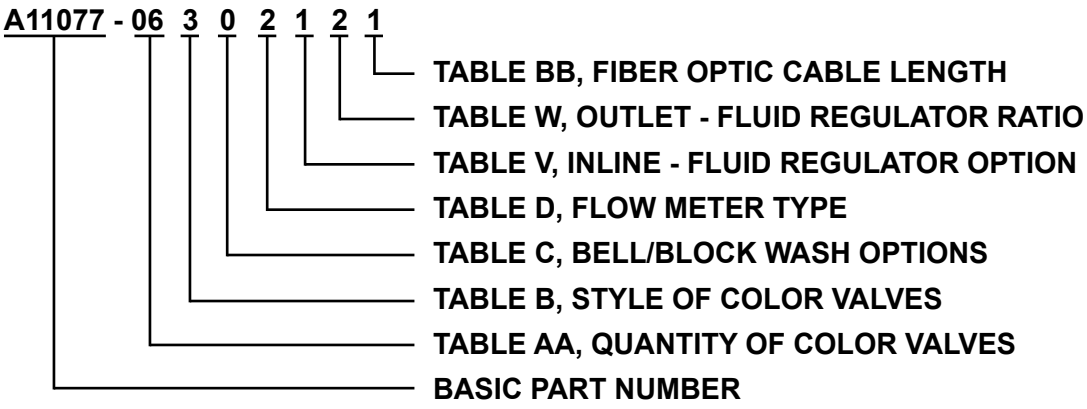

TABLE AA - QUANTITY OF COLOR VALVES (ENGLISH)

Dash No.	Description	"F"	"G"
00	0-Color - Color Changer	0	0
02	2-Color - Color Changer	1	0
04	4-Color - Color Changer	0	1
06	6-Color - Color Changer	1	1
08	8-Color - Color Changer	0	2
10	10-Color - Color Changer	1	2
12	12-Color - Color Changer	0	3
14	14-Color - Color Changer	1	3
16	16-Color - Color Changer	0	4
18	18-Color - Color Changer	1	4
20	20-Color - Color Changer	0	5
22	22-Color - Color Changer	1	5
24	24-Color - Color Changer	0	6
26	26-Color - Color Changer	1	6
28	28-Color - Color Changer	0	7
30	30-Color - Color Changer	1	7
32	32-Color - Color Changer	0	8

(***Continued on next page***)

TABLE B - STYLE OF COLOR VALVES (ENGLISH)

Dash No.	Description	"R"	"S"
1	Circulating	A10953-00	A10960-00
2	Daisy Chain	A10954-00	A10961-00
3	Dead Head	A10955-00	A10962-00

TABLE C - BELL / BLOCK WASH OPTION (ENGLISH)

Dash No.	Description	"E"	"Z"
0	No Bell / Block Wash	0	-
1	With Both Bell / Block Wash	1	A11080-02
2	With Block Wash Only	1	A11080-01

TABLE D - FLOW METER TYPE / FIBER OPTIC CABLE LENGTH (METRIC & ENGLISH)

Dash No.	Description	"H"	"J"	"K"	"Y"
0	No Flow Meter	0	0	0	0
1	Block With AW Flow Meter Attached - Consult your Sales Rep. for Pick-Up Sensor Selection	1	1	**See Table BB - "CC"**	A10720-01
3	AW Block With No Flow Meter	1	0	0	A10720-01

TABLE V - INLINE - FLUID REGULATOR OPTION (METRIC & ENGLISH)

Dash No.	Description	"X"	"T"
0	No Outlet Regulator	-	0
1	DR-2 - 1:1 Ratio	A10725-01	1
2	DR-2 - 1:2 Ratio	A10725-02	1
3	DR-2 - 1:3 Ratio	A10725-03	1
4	DR-2 - 1:4 Ratio	A10725-04	1
5	DR-2 - 1:6 Ratio	A10725-06	1
6	DR-2 - 1:8 Ratio	A10725-08	1
7	DR-2 - 1:10 Ratio	A10725-10	1

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TABLE W - OUTLET - FLUID REGULATOR RATIO (METRIC & ENGLISH)

Dash No.	Description	"L"	"M"	"N"	"P"
0	No Outlet Regulator	- - -	0	0	0
1	DR-1 - 1:1 Ratio	74151-11	1	1	1
2	DR-1 - 1:2 Ratio	74151-01	1	1	1
3	DR-1 - 1:3 Ratio	74151-06	1	1	1
4	DR-1 - 1:4 Ratio	74151-02	1	1	1
5	DR-1 - 1:6 Ratio	74151-03	1	1	1
6	DR-1 - 1:8 Ratio	74151-04	1	1	1
7	DR-1 - 1:10 Ratio	74151-05	1	1	1

TABLE BB - FLOW METER KIT/FIBER OPTIC CABLE LENGTH (METRIC & ENGLISH)

Dash No.	Description	"CC"	"Fiber Optic Cable Length"
0	No Flow Meter	-	-
1	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-10	10 Ft.
2	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-15	15 Ft.
3	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-30	30 Ft.
5	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-45	45 Ft.
4	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-60	60 Ft.
6	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-100	100 Ft.

⚠ WARNING

➤ The color changer **MUST** be properly grounded. Proper grounding (as described below) will prevent static charge buildup and possible discharge from the color changer.

Grounding of the Color Changer

For safety, the color changer MUST be grounded. Using a 12-gauge wire, ground the output plate of the color changer to a true earth ground. Using an ohmmeter, check for ground, testing the earth ground to the outlet. The resistance should be 10 ohms or less.

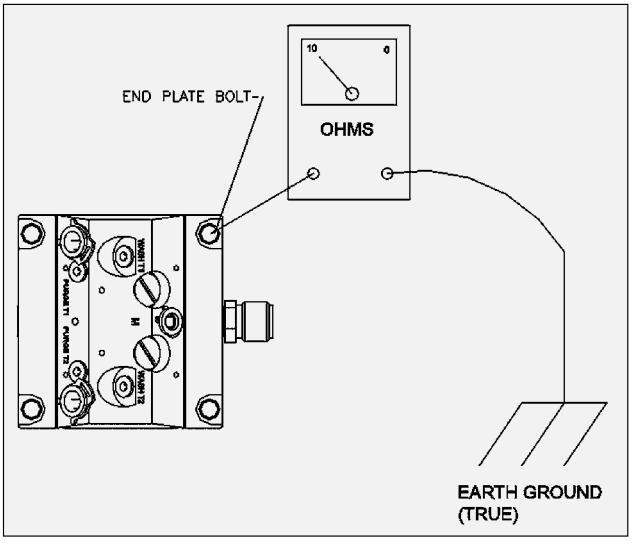

Figure 2: Grounding the Color Changer

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INSTALLATION

MCV 2 INSTALLATION PROCEDURES

Determine Location for Color Changer

The color changer should be located as close as possible to the spray device in order to save paint and solvent with a color changer. If possible, use an enclosure to protect the color changer from airborne paints and solvents.

Calculate Footprint of Color Changer
(See Figure 3)

To calculate the footprint of the color changer add:

- The dimension of the end plate (A)
- The dimension of the purge assembly (B)
- The dimension(s) of the module(s) used to create the desired number of color valves (C)
- The dimension of the regulator and flowmeter (D)
- The dimension of the output assembly (E)

Example: To calculate the footprint of an 6-Color MCV Assembly:

3/4" (End Plate) + 2-3/8" (purge assembly) + 3-11/16" (6-color valve assembly) + 3/4" (output assembly) = 7-9/16"

Mounting the Color Changer

There are two mounting configurations as follows: (Reference Figure 4)

(1) 5/16" clearance holes for flush mounting to the booth wall.

(2) 1/4" x 20 threaded holes in the end blocks.

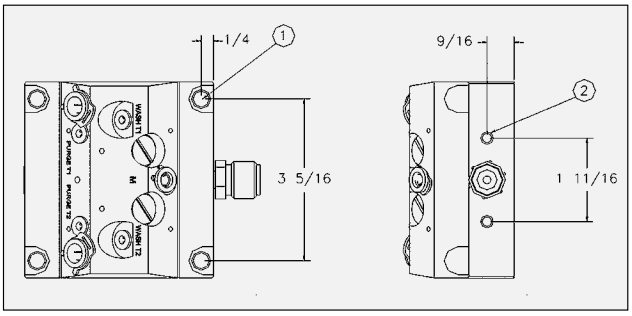

Figure 4: Mounting Configurations Footprint

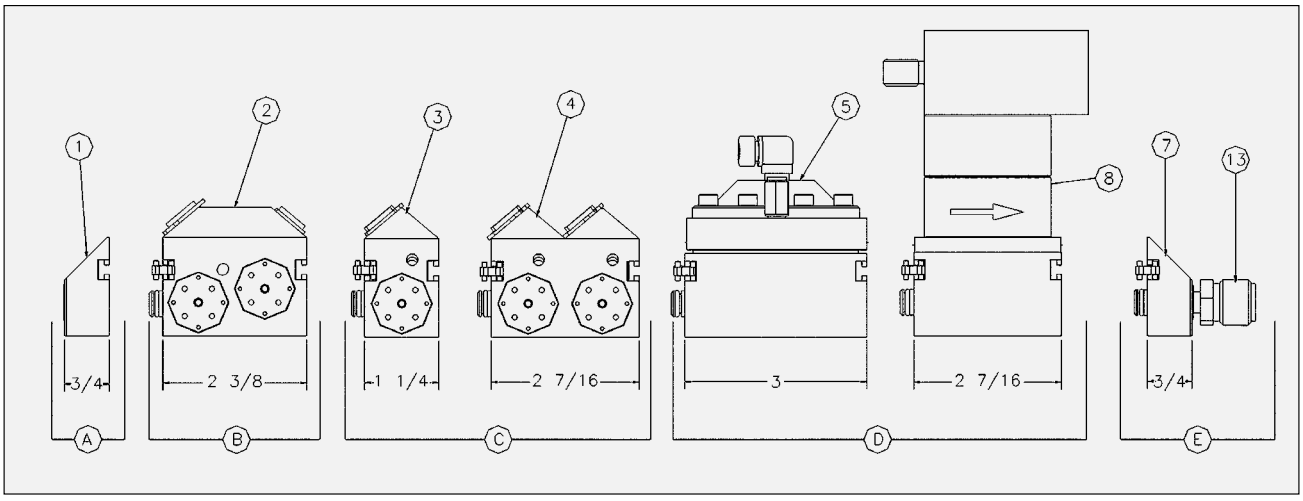

Figure 3: Calculate Footprint

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OPERATION

OPERATING

Modules may be added or removed from the assembly as desired; the user need only purchase the appropriately sized changer. If, for instance, the number of required materials increases, the changer can be expanded by adding more modules. Also, each module can be individually serviced. Recommended for use with waterborne or solventborne paints.

Figure 5a shows “Typical Color Changer Schematics” to prevent back flow of material. Figure 5b shows “Typical Bell Wash or Stack Purge Flow Schematics.

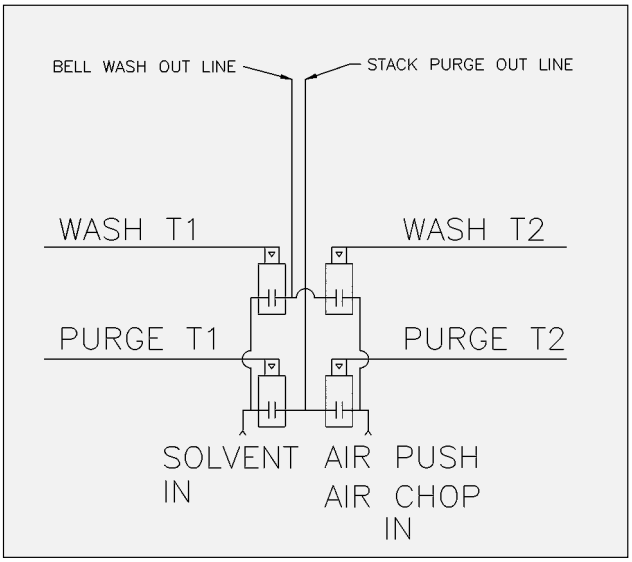

Figure 5b: Typical Bell Wash or Stack Purge Flow Schematics

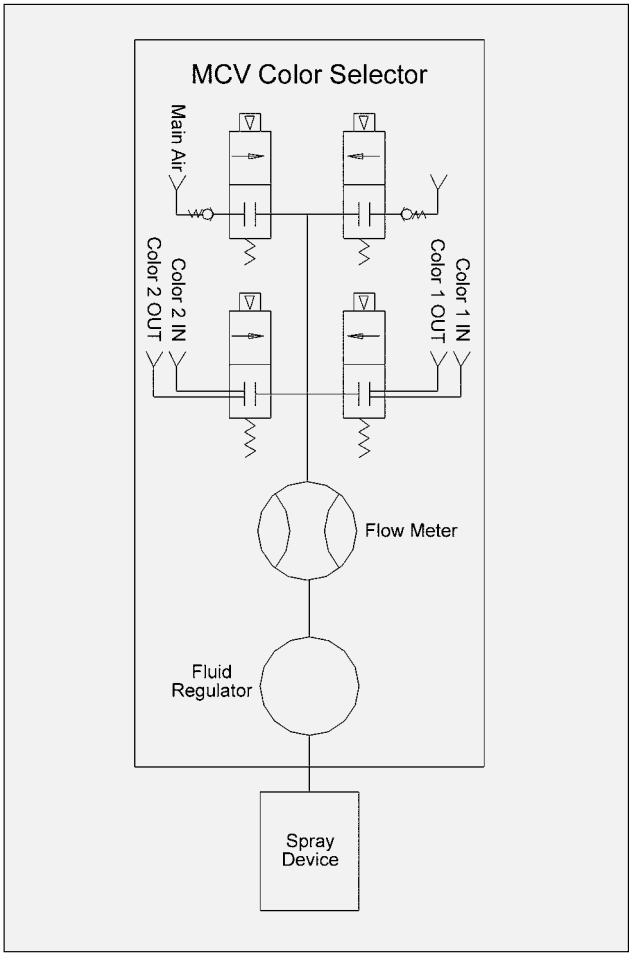

Figure 5a: Color Changer Schematics

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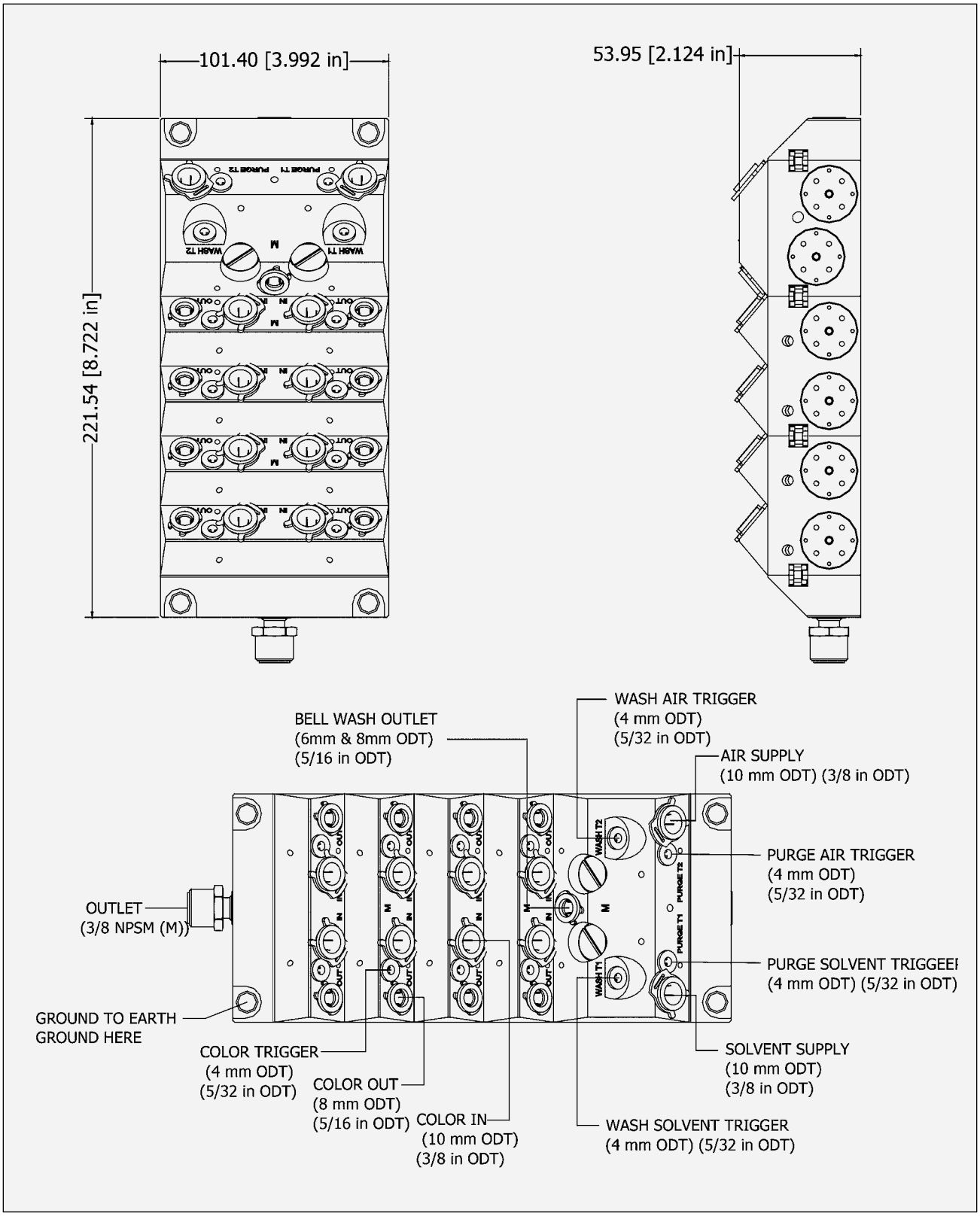
DIMENSIONS - METRIC (ENGLISH) & PROPOSED HOOK-UP FOR 8-COLORS



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MAINTENANCE

⚠ WARNING

➤ Prior to servicing the unit, ensure that all fluid pressure is relieved to atmosphere. A solvent purge should be performed if possible.

GENERAL MAINTENANCE

NOTE

➤ When replacing or repairing any components in this system, before reassembling, apply a light coat of food grade petroleum jelly to all o-rings.

NOTE

➤ The following procedure allows valve and/or seat removal without removing the valve slice from the assembly.

Value and Seat Removal

To remove the valve for any reason, insert the four (4) prongs from the tool into the holes on the top the Microvalve. Using a 1/2" socket, adjustable wrench, or a combination box open-end wrench, turn counter-clockwise to remove the valve.

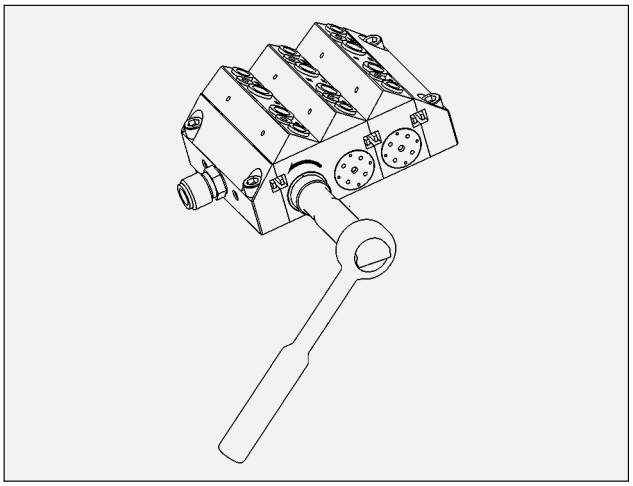

Figure 6: Valve Removal

To remove the seat, insert the seat removal tool into the seat and turn counter-clockwise using a 3/8" socket, adjustable wrench, or combination box open-end wrench.

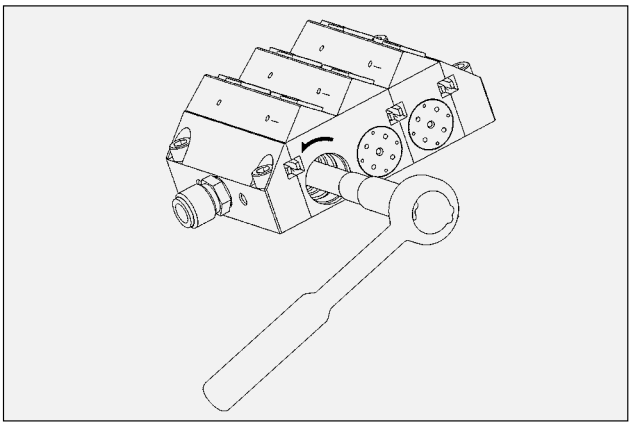

Figure 7: Seat Removal

To reinstall, tighten the valve seat first using the tool by hand. Then using a torque wrench with a 3/8' socket, tighten the seat in place, clockwise in direction to 15 to 20 lbs.•in torque.

NOTE

➤ Not using a torque wrench for seat installation may cause permanent damage to the seat pocket of the valve block.

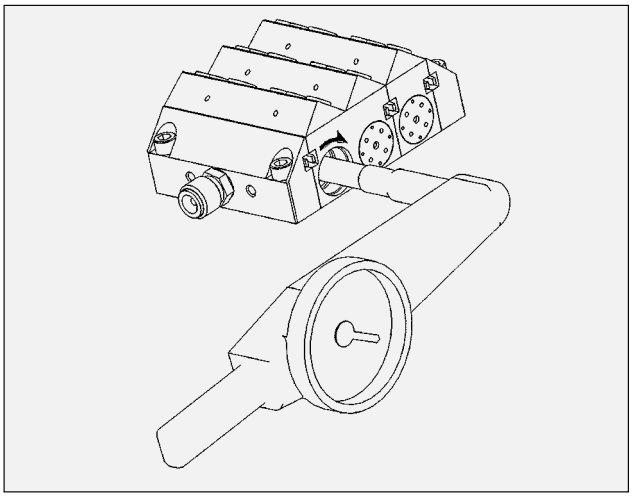

Figure 8: Reinstall Valve and Seat

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To install the Microvalve, tighten the valve into the pocket using the provided tool and a 1/2” wrench or socket clockwise till the valve has just about seated. Then using a torque wrench tighten to 15-20 lbs.•in.

⚠ CAUTION

➤ Be careful not to cross thread the parts when reassembling as this could cause permanent damage to block.

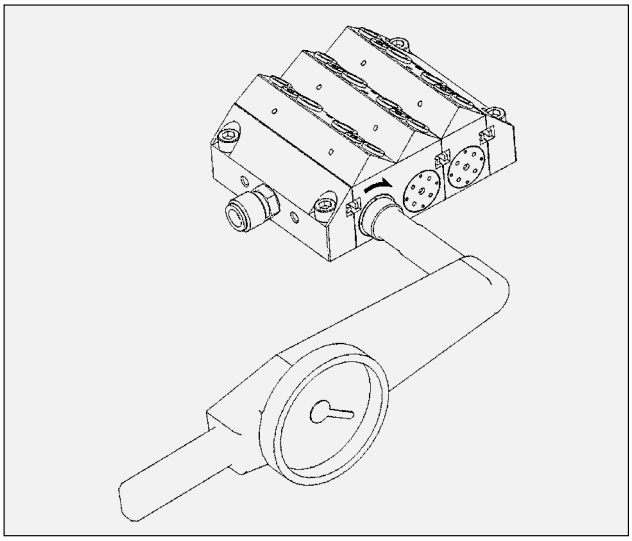

Figure 9: Microvalve Installation

Tube Insertion

Prior to inserting the tube, remove the red clip under the collet. Insert the tube into the stack collet by grasping the tube about 2-4-inches from the end. Press the tube all the way down in the collet until it cannot be pressed any further, **THE TUBE MUST PASS BY BOTH O-RINGS.** Each tube must be inserted into its mating collet to the proper depth as shown in the chart below. With the tube inserted, pull the collet up enough to slide the clip under the collet.

Tube OD	Tube Depth
10mm or 3/8”	19.0mm or 3/4”
8mm or 5/16”	17.5mm or 11/16”
6mm	19.8mm or 25/32”
4mm or 5/32”	16.0mm or 5/8”

Tube Removal

The 4mm trigger line tubes may be removed by hand by pushing on the collet while pulling out the tube. A tool is required to remove both the 8mm and 10mm tubes. To remove the 8mm tube, use the white end of the tool, and for the 10mm tube use the black end. First remove the red clips then press the tool against the collet in the block. With the collet pushed in, pull out the tube that is being removed (see Figure 10).

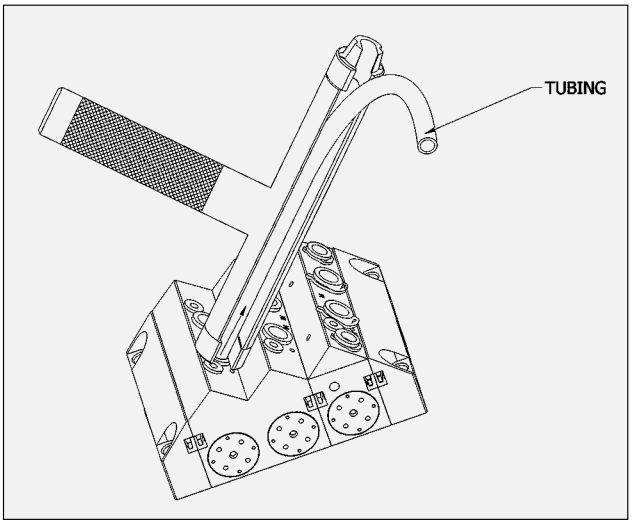

Figure 10: Tube Removal

⚠ WARNING

➤ Prior to servicing the unit, ensure that all fluid pressure is relieved to atmosphere. A solvent purge should be performed if possible.

REMOVING AND REINSTALLING A VALVE BLOCK FROM A STACK

1. Ensure all pressure is bled off the system. If possible, flush the block with appropriate solvent.

2. Using the clip removal tool (78078-00), push on the installed locking clip with the “V” cut as shown in Figure 11.

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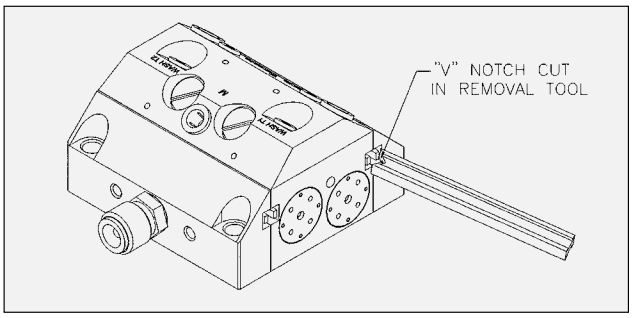

Figure 11: 78078-00 Clip Removal Tool

⚠ WARNING

➤ Be careful of residual fluid pressure or solvent pressure in the line. Cover the area where the valve slice is being removed to prevent any solvent or paint from spraying on you.

3. Push the locking clips out of the locking slots.
4. Loosen and remove any mounting bolts holding the stack in place.
5. Carefully pull the stack assembly ends apart and remove the valve block.
6. Replace the valve slice, push the assembly together and insert the locking clips.

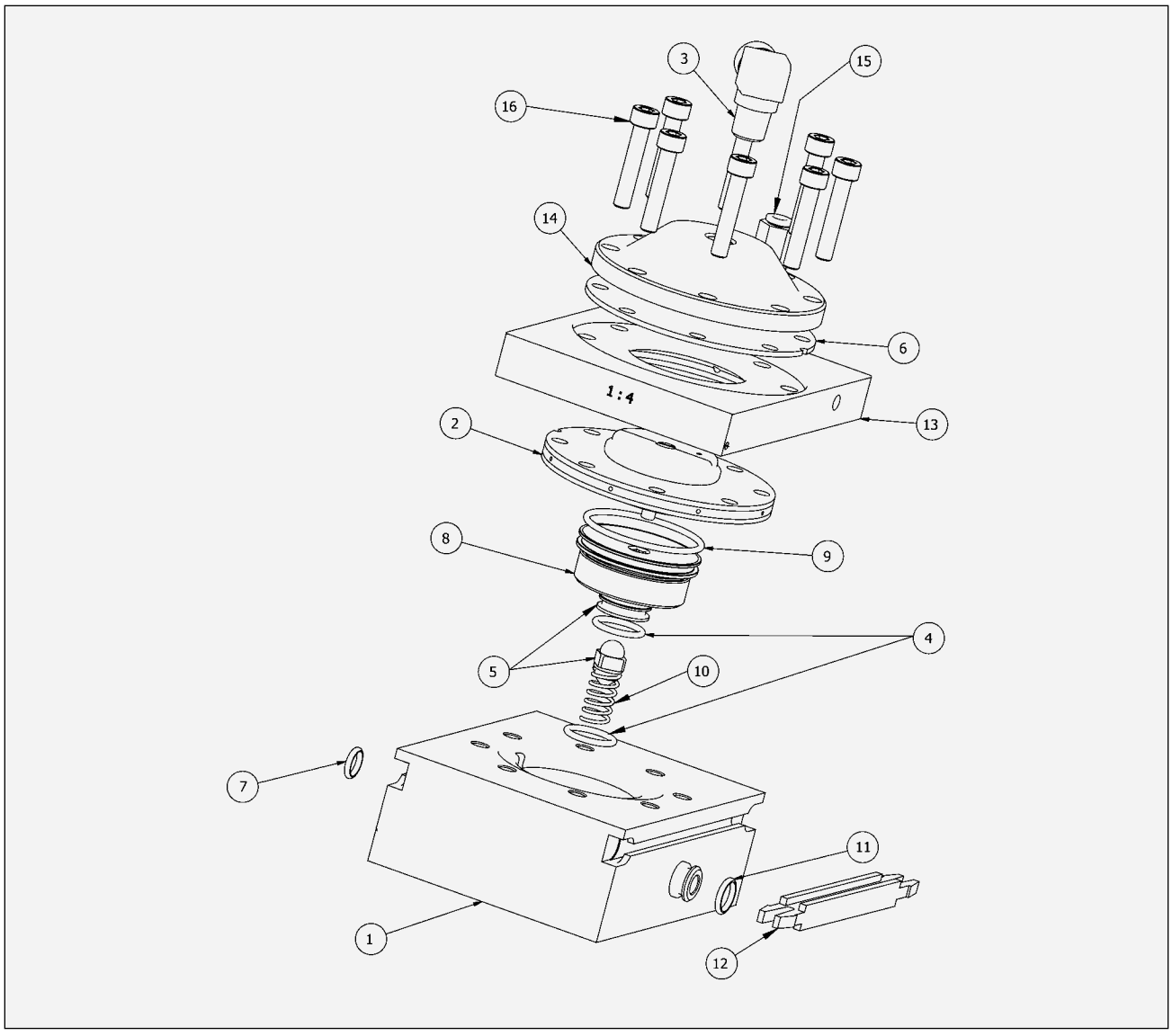

Figure 12: Regulator Disassembly/Reassembly Procedure

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REGULATOR DISASSEMBLY / REASSEMBLY PROCEDURE

Disassembly

1. Remove eight (8) screws [16] using a 5/32" Allen wrench.

2. Pull cap [14], upper diaphragm [6], and plate [13] from the assembly.

3. Pull diaphragm assembly [2] from the assembly.

4. Using a 3/16" Allen wrench, remove the regulator insert [8]. By removing the insert, the seat will be removed [5]. To remove the carbide seat from the insert, blow compressed air in the hex end of the insert and the carbide seat will come out.

Reassembly

NOTE

➤ The seat and stem are matched sets of parts, each having a serial number engraved on them. Care must be taken not to mix non-matching seats and stems or the regulator will not perform properly.

1. Install all removed o-rings [9] and [4] on the insert and the seat. Push the seat [5] into the insert (straight in) using an arbor press if possible.

2. Insert spring [10], stem [5], and one o-ring [4] into the regulator body [1].

3. Using a 3/16" Allen wrench, tighten the insert down until it bottoms out.

4. Locate the dot on the diaphragm assembly [2] and place it so it is 180° from the outlet hole of the body.

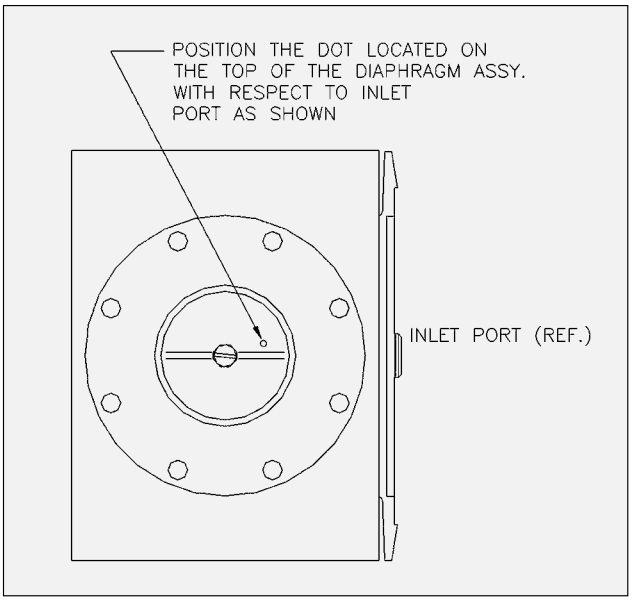

Figure 13: Diaphragm Assembly Position

5. Add plate [13], upper diaphragm [6], and lid [14 Tighten the eight (8) screws [16] in a cross pattern to 10 lbs•in. Then follow by tightening each screw in a circular pattern to 20 lbs•in.

TEST AND CHECKOUT PROCEDURE FOR COLOR CHANGER

Step 1:

1. Connect air line to a regulated air supply.
2. Attach the air line to a ball valve assembled to the outlet of the color changer.
3. Adjust the air supply pressure to 100 psi (6.9 bar).
4. Open the ball valve at the outlet of the color changer.
5. Apply a soap solution on the color changer manifold.
6. Check the manifold assembly's mating surfaces between color blocks for soap bubbles.

NOTE

➤ If bubbles are observed, dismantle color changer manifold and repair as required.

7. If no bubbles are present, rinse manifold with water and blow dry with air.

Step 2:

1. Attach two (2) regulated air supply hoses, one with a 3-way valve (normally closed) for operating the color valve cylinder on the color changer. (Set the pressure to the 3-way valve at 75 psi (5.8 bar) or more.)

   The second hose will be used for supplying 100 psi (6.9 bar) of air to the color inlet port of each color changer valve.

2. Connect the air supply hose with 100 psi (6.9 bar) to color inlet valve. Connect a 2-way ball valve to the matching return port on the color changer manifold.
3. Turn the ball valve installed on the paint circulation fitting to verify recirculation ability.

NOTE

➤ Ensure valve is closed when completed.

4. Connect the air supply with a 3-way valve (normally closed) to the color valve cylinder.
5. Activate the 3-way valve to operate the color valve.

NOTE

➤ The piston rod on the top of the color valve assembly should EXTEND and air should blow out of the color changer outlet. Check for a crisp and sharp actuation of the color valve air cylinder.

6. Deactivate the 3-way valve and close the color valves.

NOTE

➤ The piston rod on the top of the color valve assembly should be RETRACTED, and the air should have stopped blowing out of the outlet of the color changer.

7. Connect a 1/4-inch (6.4cm) ID hose 3-ft. (91.4cm) long to the outlet of the color changer.

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8. Acquire a container of water and fill it with about 4-inches (10.6cm) of WATER. Position the hose in the container filled with water.

9. There should be no more than 6 bubbles per minute coming from the outlet of the hose that is submerged.

10. If there are more than 6 bubbles per minute, remove the color valve assembly, replace the valve seat (77367-00) and reinstall color valve assembly. If the new seat does not correct the problem, either the manifold block or color valve assembly is defective.

11. Proceed to the next color valve and repeat Steps 2 thru 11.

12. When all the color valves are checked out, then check the purge valve assembly repeating Steps 2 thru 11.

13. Once all valves are operational, deactivate the 3-way valve, and then disconnect the air lines used for testing from the color changer.

⚠ WARNING

➤ **ALWAYS** test color changer for conductivity after assembly or repair. Proper conductivity is required to assure entire color changer can be properly grounded when installed.

14. With an ohmmeter, check for conductivity between the output plate on the color changer and earth ground. There should be 10 ohms or less between the two points (see Figure 14).

⚠ WARNING

➤ **NEVER** wrap the equipment in plastic to keep it clean. A surface charge may build-up on the plastic surface and discharge to the nearest grounded object. Efficiency of the equipment will also be reduced and damage or failure of the equipment's components may occur. **WRAPPING THE EQUIPMENT** in plastic will void warranty.

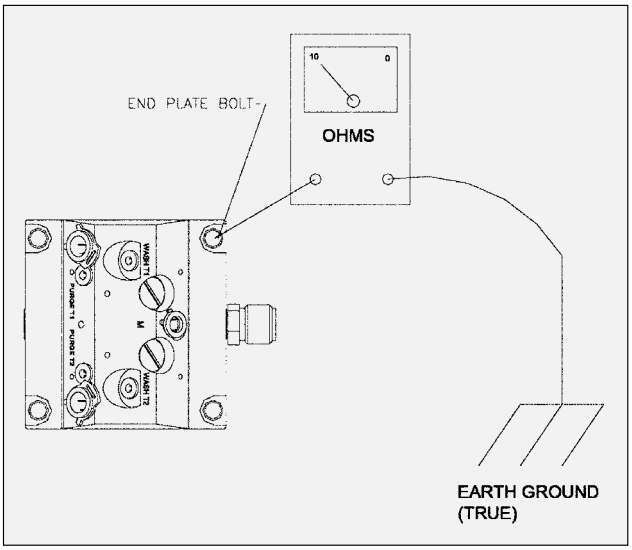

Figure 14: Ground Test

PARTS IDENTIFICATION

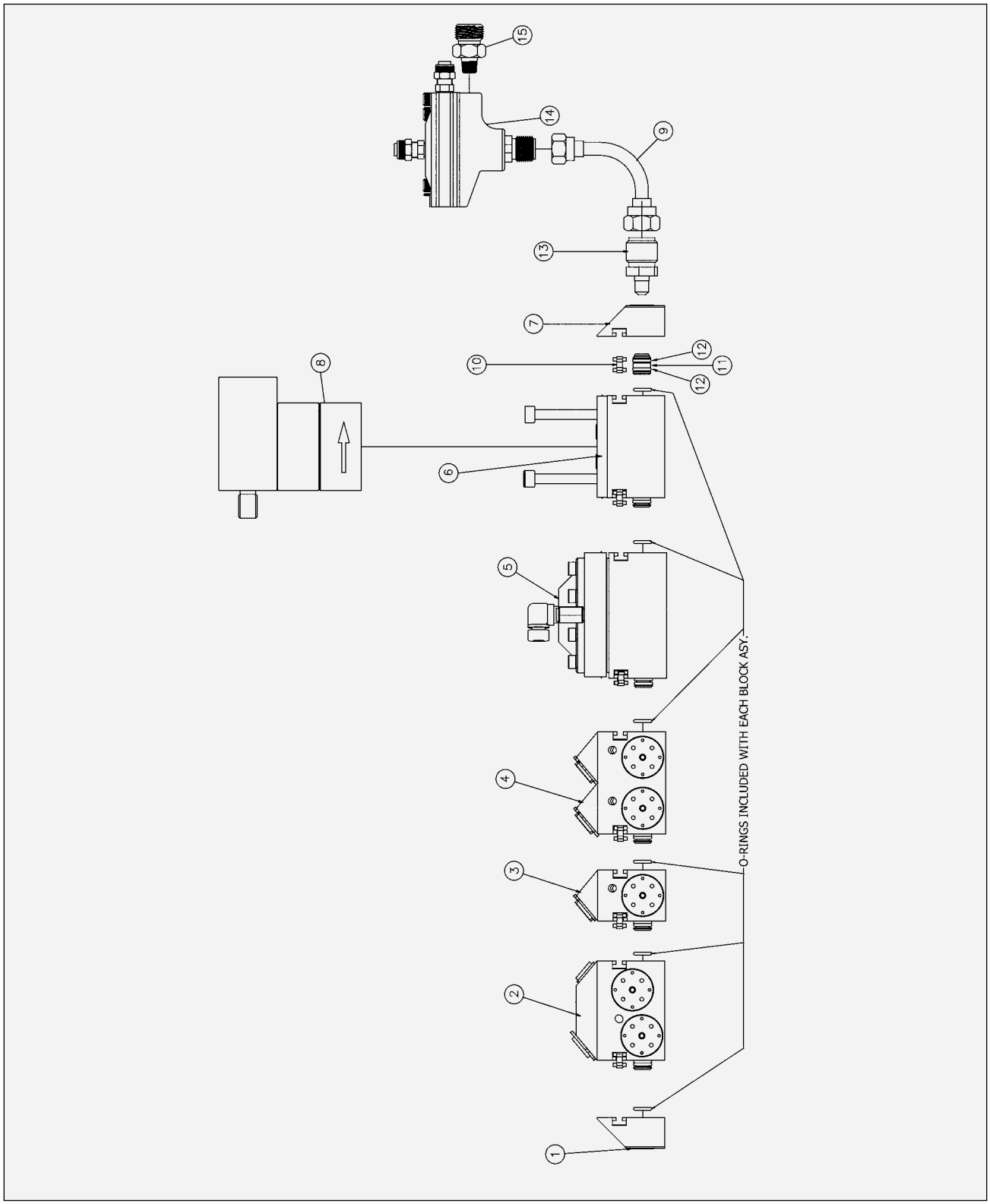

Figure 15: A10800 (Metric) & A11077 (English) MCV 2 Color Changer Assemblies

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A10800 MCV 2 COLOR CHANGER ASSEMBLY - PARTS LIST (METRIC) (Figure 15)

Item #	Part #	Description	Qty
1	A10711-00	Assembly, Plate Closed End	1
2	**See Table C - "Z"**	Assembly, Bell/Block Wash (Metric)	**See Table C - "E"**
3	**See Table B - "R"**	Assembly, 2-Color Valve Circulating (Metric)	**See Table AA - "F"**
4	**See Table B - "S"**	Assembly, 4-Color Valve Circulating (Metric)	**See Table AA - "G"**
5	**See Table V - "X"**	Assembly, Regulator	**See Table V - "T"**
6	**See Table D - "BB"**	Assembly, Flow Meter Block	**See Table D - "H"**
7	A10712-00	Assembly, Plate Fitting End	1
8	**See Table D - "K"**	Flow Meter	**See Table D - "J"**
9	78069-00	Fluid Regulator Inlet Tube	**See Table W - "N"**
10	77957-00	Retaining Cup, Color Changer	1
11	A10714-00	Fitting, End	1
12	79001-06	O-Ring, Solvent Proof	2
13	78079-00	Fitting, Outlet	1
14	**See Table W - "L"**	Fluid Regulator	**See Table W - "M"**
15	78098-00	Adapter 1/8" NPT (M) X 3/8" NPS (M)	**See Table W - "P"**

TABLE B - STYLE OF COLOR VALVES (METRIC)

Dash No.	Description	"R"	"S"
1	Circulating 8x10mm	A10727-00	A10729-00
2	Daisy Chain	A10726-00	A10728-00
3	Dead Head	A10733-00	A10732-00
4	Circulating 10x10mm	A13930-00	A13932-00

TABLE C - BELL / BLOCK WASH OPTION (METRIC)

Dash No.	Description	"E"	"Z"
0	No Bell / Block Wash	0	0
1	W/Both Bell / Block Wash, 8mm	1	A10717-02
2	W/Block Wash Only, 8mm	1	A10717-01
3	W/Both Bell / Block Wash, 6mm	1	A11788-02
4	W/Purge Block Only, 6mm	1	A11788-01

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TABLE D - FLOW METER TYPE (METRIC & ENGLISH)

Dash No.	Description	"H"	"J"	"K"	"BB"
0	No Flow Meter	0	0	0	0
1	Block With Flow Meter Attached	1	1	**See Table Y - "CC"**	A10720-01
2	Block With No Flow Meter	1	0	0	A10720-01

TABLE V - INLINE - FLUID REGULATOR OPTION

Dash No.	Description	"X"	"T"
0	No Outlet Regulator	-	0
1	DR-2 - 1:1 Ratio	A10725-01	1
2	DR-2 - 1:2 Ratio	A10725-02	1
3	DR-2 - 1:3 Ratio	A10725-03	1
4	DR-2 - 1:4 Ratio	A10725-04	1
5	DR-2 - 1:6 Ratio	A10725-06	1
6	DR-2 - 1:8 Ratio	A10725-08	1
7	DR-2 - 1:10 Ratio	A10725-10	1

TABLE W - OUTLET - FLUID REGULATOR RATIO

Dash No.	Description	"L"	"M"	"N"	"P"
0	No Outlet Regulator	- - -	0	0	0
1	DR-1 - 1:1 Ratio	74151-11	1	1	1
2	DR-1 - 1:2 Ratio	74151-01	1	1	1
3	DR-1 - 1:3 Ratio	74151-06	1	1	1
4	DR-1 - 1:4 Ratio	74151-02	1	1	1
5	DR-1 - 1:6 Ratio	74151-03	1	1	1
6	DR-1 - 1:8 Ratio	74151-04	1	1	1
7	DR-1 - 1:10 Ratio	74151-05	1	1	1

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TABLE Y - FLOW METER KIT/FIBER OPTIC CABLE LENGTH (METRIC & ENGLISH)

Dash No.	Description	"CC"	"Fiber Optic Cable Length"
0	No Flow Meter	-	-
1	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-10	10 Ft.
2	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-15	15 Ft.
3	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-30	30 Ft.
5	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-45	45 Ft.
4	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-60	60 Ft.
6	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-100	100 Ft.

A11077 MCV 2 COLOR CHANGER ASSEMBLY - PARTS LIST (ENGLISH) (Figure 15)

Item #	Part #	Description	Qty
1	A10711-00	Assembly, Plate, Closed End	1
2	**See Table C - "Z"**	Assembly, Bell/Block Wash	**See Table C - "E"**
3	**See Table B - "R"**	Assembly, 2-Color Valve	**See Table AA - "F"**
4	**See Table B - "S"**	Assembly, 4-Color Valve	**See Table AA - "G"**
5	**See Table V - "X"**	Assembly, Regulator	**See Table V - "T"**
6	**See Table D - "Y"**	Assembly, Flow Meter Block	**See Table D - "H"**
7	A10712-00	Assembly, Plate Fitting End	1
8	**See Table D - "K"**	Flow Meter	**See Table D - "J"**
9	78069-00	Fluid Regulator Inlet Tube	**See Table W - "N"**
10	77957-00	Retaining Cup, Color Changer	1
11	A10714-00	Fitting, End	1
12	79001-06	O-Ring, Solvent Proof	2
13	78079-00	Fitting, Outlet	1
14	**See Table W - "L"**	Fluid Regulator	**See Table W - "M"**
15	78098-00	Adapter 1/8" NPT (M) X 3/8 " NPS (M)	**See Table W - "P"**

TABLE B - STYLE OF COLOR VALVES (ENGLISH)

Dash No.	Description	"R"	"S"
1	Circulating	A10953-00	A10960-00
2	Daisy Chain	A10954-00	A10961-00
3	Dead Head	A10955-00	A10962-00

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TABLE C - BELL / BLOCK WASH OPTION (ENGLISH)

Dash No.	Description	"E"	"Z"
0	No Bell / Block Wash	0	0
1	With Both Bell / Block Wash	1	A11080-02
2	With Block Wash Only	1	A11080-01

TABLE D - FLOW METER TYPE

Dash No.	Description	"H"	"J"	"K"	"Y"
0	No Flow Meter	0	0	0	0
1	Block With AW Flow Meter Attached	1	1	**See Table BB - "CC"**	A10720-01
3	Block With No Flow Meter	1	0	0	A10720-01

TABLE V - INLINE - FLUID REGULATOR OPTION

Dash No.	Description	"X"	"T"
0	No Outlet Regulator	-	0
1	DR-2 - 1:1 Ratio	A10725-01	1
2	DR-2 - 1:2 Ratio	A10725-02	1
3	DR-2 - 1:3 Ratio	A10725-03	1
4	DR-2 - 1:4 Ratio	A10725-04	1
5	DR-2 - 1:6 Ratio	A10725-06	1
6	DR-2 - 1:8 Ratio	A10725-08	1
7	DR-2 - 1:10 Ratio	A10725-10	1

TABLE W - OUTLET - FLUID REGULATOR RATIO

Dash No.	Description	"L"	"M"	"N"	"P"
0	No Outlet Regulator	- - -	0	0	0
1	DR-1 - 1:1 Ratio	74151-11	1	1	1
2	DR-1 - 1:2 Ratio	74151-01	1	1	1
3	DR-1 - 1:3 Ratio	74151-06	1	1	1
4	DR-1 - 1:4 Ratio	74151-02	1	1	1
5	DR-1 - 1:6 Ratio	74151-03	1	1	1
6	DR-1 - 1:8 Ratio	74151-04	1	1	1
7	DR-1 - 1:10 Ratio	74151-05	1	1	1

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TABLE BB - RF-1 FLOW METER KIT/FIBER OPTIC CABLE LENGTH (METRIC & ENGLISH)

Dash No.	Description	"CC"	"Fiber Optic Cable Length"
0	No Flow Meter	-	-
1	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-10	10 Ft.
2	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-15	15 Ft.
3	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-30	30 Ft.
5	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-45	45 Ft.
4	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-60	60 Ft.
6	Flow Meter, Receiver & Cable, Fiber Optic Cable	A13420-100	100 Ft.

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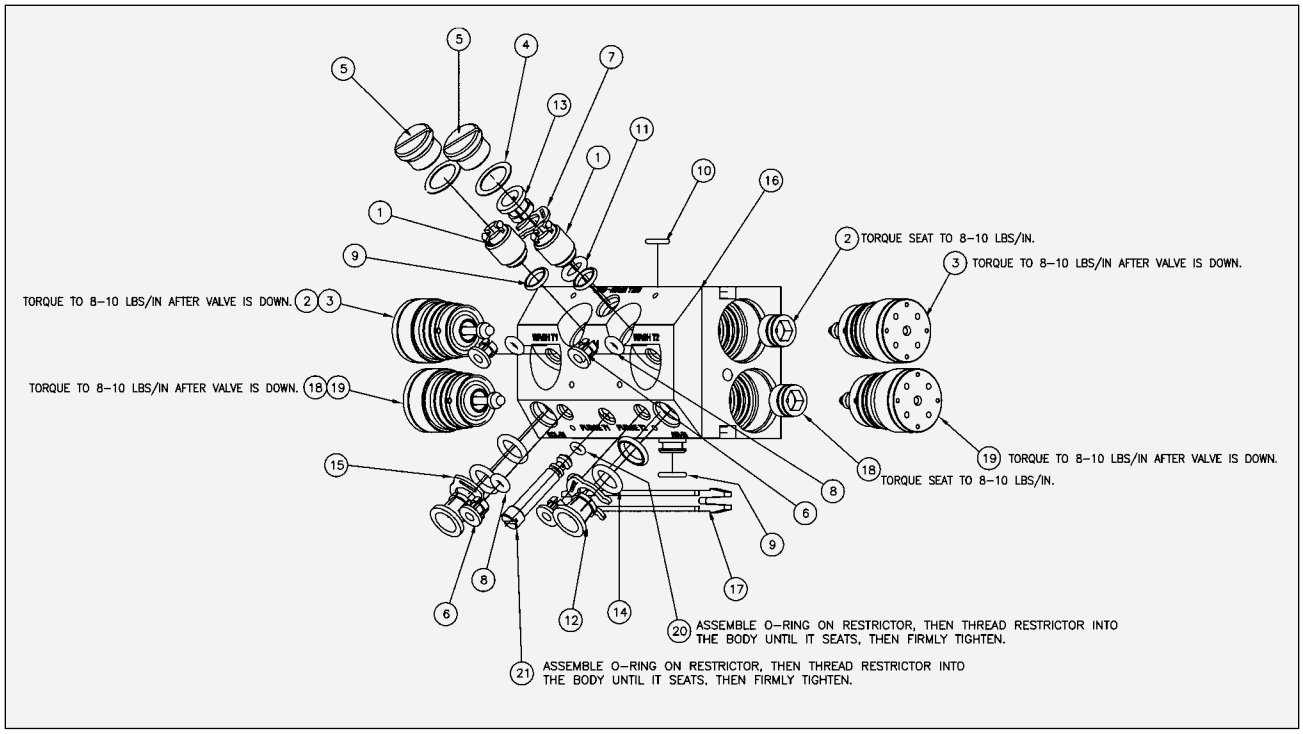

Figure 16: A10717 (Metric) & A11080 (English) Bell/Block Wash Assembly

A10717 BELL /BLOCK WASH ASSEMBLY - PARTS LIST (METRIC) (Figure 16)

Item #	Part #	Description	Qty
1	78944-00	Assembly, Check Valve	2
2	**See Table X - "A"**	Assembly, Valve Seat or Plug	2
3	**See Table X - "B"**	Assembly, Valve or Plug	2
4	78947-00	Seal	2
5	78945-00	Plug, Check Valve	2
6	77516-04	Collet, 4mm	4
7	A10825-00	Red Locking Clip, 1/4" OD Tube	1
8	79001-30	O-Ring, Solvent Proof	4
9	79001-06	O-Ring, Solvent Proof	3
10	79001-05	O-Ring, Solvent Proof	1
11	79001-34	O-Ring, Solvent Proof	2
12	77762-02	Collet, 10mm	2
13	77762-04	Collet, 8mm	1
14	79001-31	O-Ring, Solvent Proof	4
15	A10824-00	Red Locking Clip, 3/8" OD Tube	2
16	A10968-00	Assembly, Bell Wash & Purge Block	1
17	77957-00	Retaining Clip, Color Changer	1
18	77367-00	Assembly, Valve Seat	2
19	78949-00	Assembly, Valve	2
20	79001-16	O-Ring Solvent Proof	1
21	A11578-00	Restrictor Plug	1

TABLE X - A10717 BELL/BLOCK WASH ASSEMBLY - PARTS LIST (METRIC)

Part No.	Description	"A"	"B"
A10717-01	Purge Block Only	Kit #77620-00	
A10717-02	Bell Wash & Purge Block	78949-00	77367-00

A11788 BELL /BLOCK WASH ASSEMBLY - PARTS LIST (METRIC) (Figure 16)

Item #	Part #	Description	Qty
1	78944-00	Assembly, Check Valve	2
2	**See Table X - "A"**	Assembly, Valve Seat or Plug	2
3	**See Table X - "B"**	Assembly, Valve or Plug	2
4	78947-00	Seal	2
5	78945-00	Plug, Check Valve	2
6	77516-04	Collet, 4mm	4
7	A10825-00	Red Locking Clip, 1/4" OD Tube	1
8	79001-30	O-Ring, Solvent Proof	4
9	79001-06	O-Ring, Solvent Proof	3
10	79001-05	O-Ring, Solvent Proof	1
11	79001-32	O-Ring, Solvent Proof	2
12	77762-02	Collet, 10mm	2
13	77762-01	Collet, 6mm	1
14	79001-31	O-Ring, Solvent Proof	4
15	A10824-00	Red Locking Clip, 3/8" OD Tube	2
16	A10968-01	Assembly, Bell Wash & Purge Block (6mm)	1
17	77957-00	Retaining Clip, Color Changer	1
18	77367-00	Assembly, Valve Seat	2
19	78949-00	Assembly, Valve	2
20	79001-16	O-Ring Solvent Proof	1
21	A11578-00	Restrictor Plug	1

TABLE X - A11788 BELL/BLOCK WASH ASSEMBLY - PARTS LIST (METRIC)

Part No.	Description	"A"	"B"
A11788-01	Purge Block Only	Kit #77620-00	
A11788-02	Bell Wash & Purge Block	78949-00	77367-00

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A11080 BELL /BLOCK WASH ASSEMBLY - PARTS LIST (ENGLISH) (Figure 16)

Item #	Part #	Description	Qty
1	78944-00	Assembly, Check Valve	2
2	**See Table X - "A"**	Assembly, Valve Seat or Plug	2
3	**See Table X - "B"**	Assembly, Valve or Plug	2
4	78947-00	Seal	2
5	78945-00	Plug, Check Valve	2
6	77516-04	Collet, 5/32"	4
7	A10825-00	Red Locking Clip, 1/4" OD Tube	1
8	79001-30	O-Ring, Solvent Proof	4
9	79001-06	O-Ring, Solvent Proof	3
10	79001-05	O-Ring, Solvent Proof	1
11	79001-34	O-Ring, Solvent Proof	2
12	77762-05	Collet, 3/8"	2
13	77762-04	Collet, 5/16"	1
14	79001-24	O-Ring, Solvent Proof	4
15	A10824-00	Red Locking Clip, 3/8" OD Tube	2
16	A11079-00	Assembly, Bell Wash & Purge Block	1
17	77957-00	Retaining Clip, Color Changer	1
18	77367-00	Assembly, Valve Seat	2
19	78949-00	Assembly, Valve	2
20	79001-16	O-Ring Solvent Proof	1
21	A11578-00	Restrictor Plug	1

TABLE X - A11080 BELL/BLOCK WASH ASSEMBLY - PARTS LIST (ENGLISH)

Part No.	Description	"A"	"B"
A11080-01	Purge Block Only	Kit #77620-00	
A11080-02	Bell Wash & Purge Block	78949-00	77367-00

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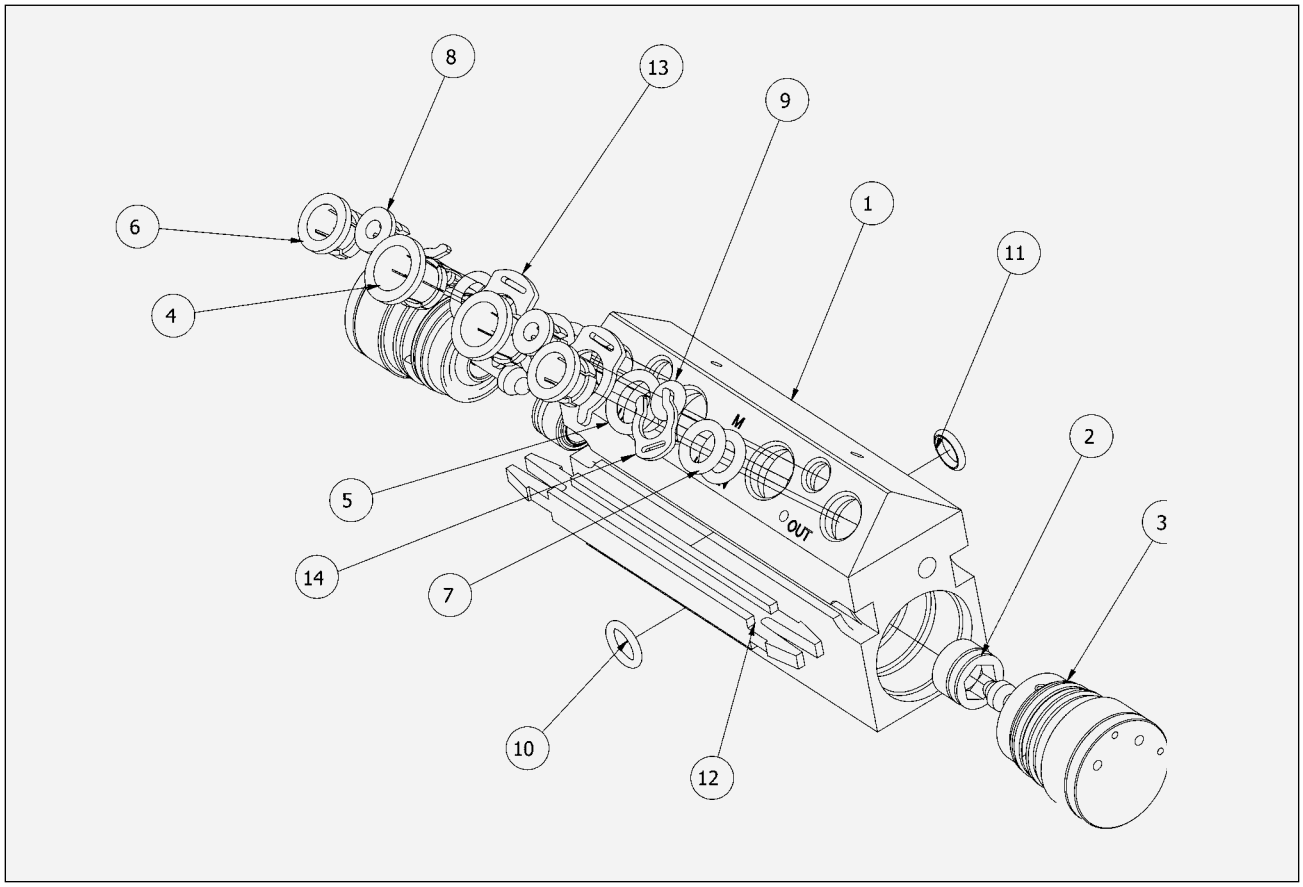

Figure 17: A10727 (Metric) & A10953 (English) 2-Color Valve Circulating Assembly

A10727 2-COLOR VALVE CIRCULATING ASSEMBLY - PARTS LIST (METRIC) (Figure 17)

Item #	Part #	Description	Qty
1	A10734-01	Assembly, 2-Color Valve Circulating	1
2	77367-00	Assembly, Valve Seat	2
3	78949-00	Assembly, Valve	2
4	77762-02	Collet, 10mm	2
5	79001-31	O-Ring, Solvent Proof	4
6	77762-04	Collet, 8mm	2
7	79001-34	O-Ring, Solvent Proof	4
8	77516-04	Collet, 4mm	2
9	79001-30	O-Ring, Solvent Proof	2
10	79001-06	O-Ring, Solvent Proof	1
11	79001-05	O-Ring, Solvent Proof	1
12	77957-00	Retaining Clip, Color Changer	1
13	A10824-00	Red Locking Clip, 3/8” OD Tube	2
14	A10825-00	Red Locking Clip, 1/4” OD Tube	2

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A10953 2-COLOR VALVE CIRCULATING ASSEMBLY - PARTS LIST (ENGLISH) (Figure 17)			
Item #	**Part #**	**Description**	**Qty**
1	A10956-01	Assembly, 2-Color Valve Circulating	1
2	77367-00	Assembly, Valve Seat	2
3	78949-00	Assembly, Valve	2
4	77762-05	Collet, 3/8”	2
5	79001-24	O-Ring, Solvent Proof	4
6	77762-04	Collet, 5/16”	2
7	79001-34	O-Ring, Solvent Proof	4
8	77516-04	Collet, 5/32”	2
9	79001-30	O-Ring, Solvent Proof	2
10	79001-06	O-Ring, Solvent Proof	1
11	79001-05	O-Ring, Solvent Proof	1
12	77957-00	Retaining Clip, Color Changer	1
13	A10824-00	Red Locking Clip, 3/8” OD Tube	2
14	A10825-00	Red Locking Clip, 1/4” OD Tube	2

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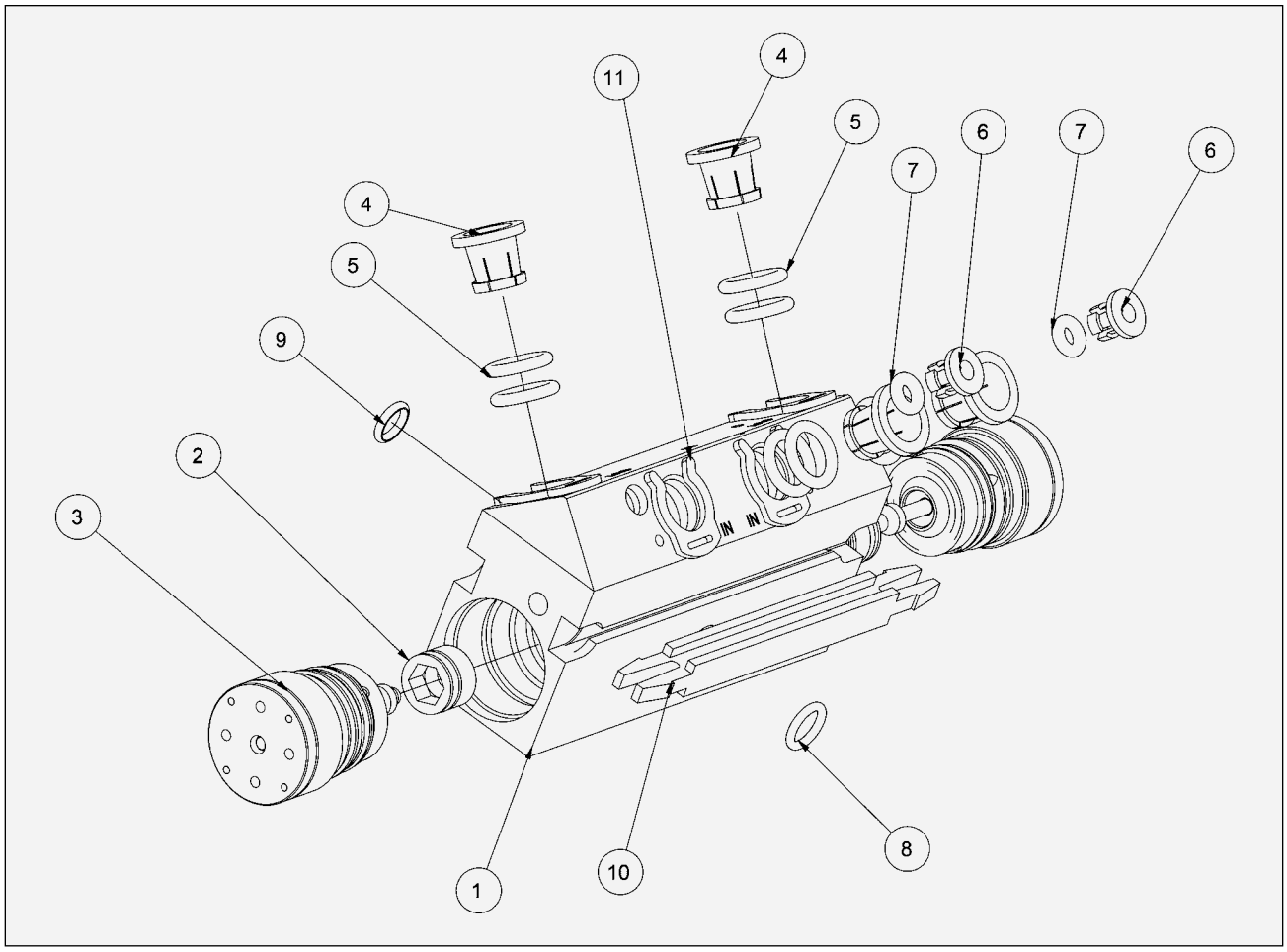

Figure 18: A10726 (Metric) & A10954 (English) 2-Color Valve - Daisy Chain

A10726 2-COLOR VALVE - DAISY CHAIN - PARTS LIST (METRIC) (Figure 18)

Item #	Part #	Description	Qty
1	A10734-03	Assembly, 2-Color Daisy Chain	1
2	77367-00	Assembly, Valve Seat	2
3	78949-00	Assembly, Valve	2
4	77762-02	Collet, 10mm	4
5	79001-31	O-Ring, Solvent Proof	8
6	77516-04	Collet, 4mm	2
7	79001-30	O-Ring, Solvent Proof	2
8	79001-06	O-Ring, Solvent Proof	1
9	79001-05	O-Ring, Solvent Proof	1
10	77957-00	Retaining Clip, Color Changer	1
11	A10824-00	Red Locking Clip, 3/8” OD Tube	4

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A10954 2-COLOR VALVE - DAISY CHAIN - PARTS LIST (ENGLISH) (Figure 18)

Item #	Part #	Description	Qty
1	A10956-03	Assembly, 2-Color Daisy Chain	1
2	77367-00	Assembly, Valve Seat	2
3	78949-00	Assembly, Valve	2
4	77762-05	Collet, 3/8”	4
5	79001-24	O-Ring, Solvent Proof	8
6	77516-04	Collet, 5/32”	2
7	79001-30	O-Ring, Solvent Proof	2
8	79001-06	O-Ring, Solvent Proof	1
9	79001-05	O-Ring, Solvent Proof	1
10	77957-00	Retaining Clip, Color Changer	1
11	A10824-00	Red Locking Clip, 3/8” OD Tube	4

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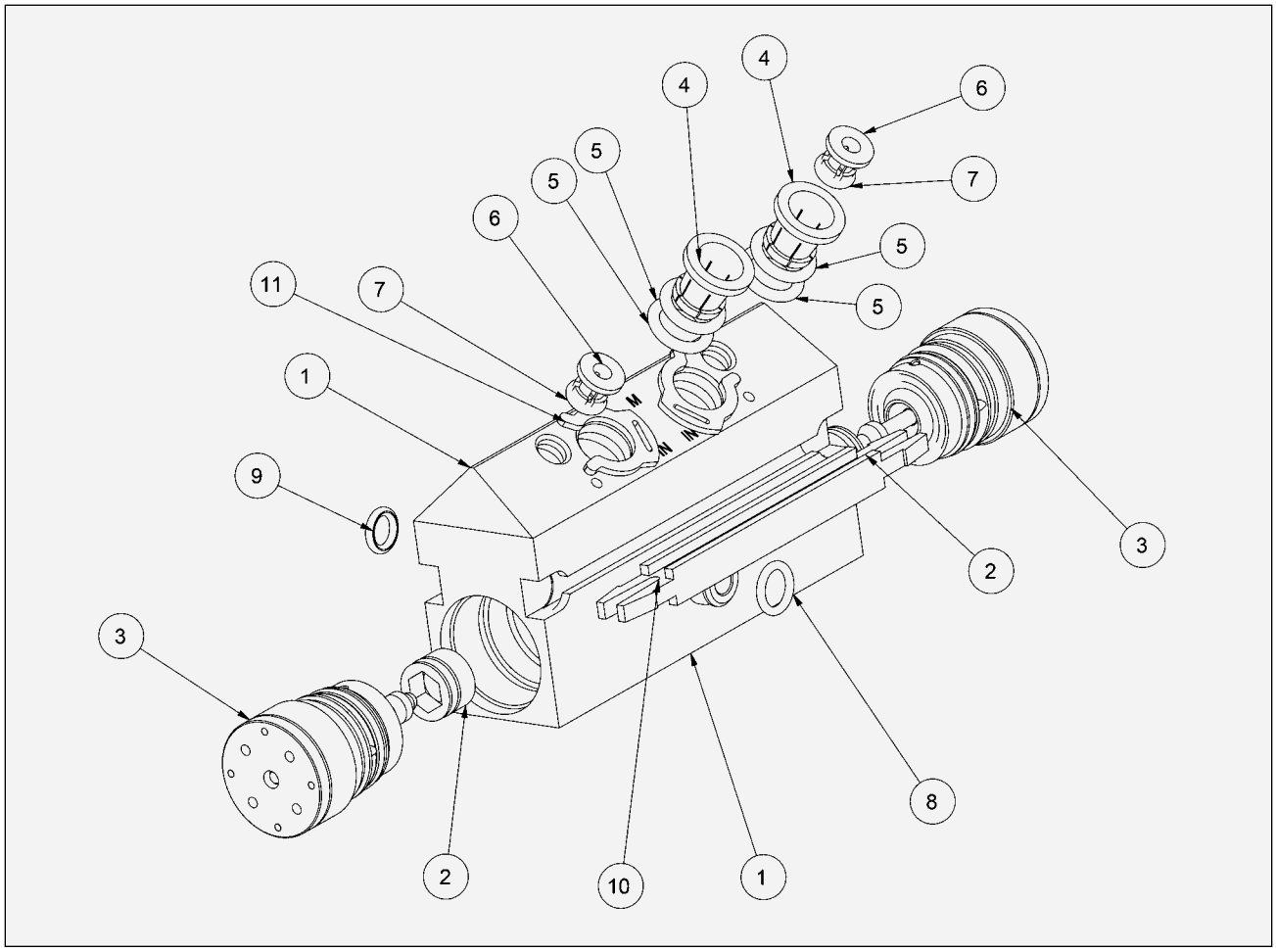

Figure 19: A10733 (Metric) & A10955 (English) 2-Color Valve - Dead Head

A10733 2-COLOR VALVE - DEAD HEAD - PARTS LIST (METRIC) (Figure 19)

Item #	Part #	Description	Qty
1	A10734-02	Assembly, 2-Color Dead Head (Metric)	1
2	77367-00	Assembly, Valve Seat	2
3	78949-00	Assembly, Valve	2
4	77762-02	Collet, 10mm	2
5	79001-31	O-Ring, Solvent Proof	4
6	77516-04	Collet, 4mm	2
7	79001-30	O-Ring, Solvent Proof	2
8	79001-06	O-Ring, Solvent Proof	1
9	79001-05	O-Ring, Solvent Proof	1
10	77957-00	Retaining Clip, Color Changer	1
11	A10824-00	Red Locking Clip, 3/8” OD Tube	2

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A10955 2-COLOR VALVE - DEAD HEAD - PARTS LIST (ENGLISH) (Figure 19)

Item #	Part #	Description	Qty
1	A10956-02	Assembly, 2-Color Dead Head (Metric)	1
2	77367-00	Assembly, Valve Seat	2
3	78949-00	Assembly, Valve	2
4	77762-05	Collet, 3/8”	2
5	79001-24	O-Ring, Solvent Proof	4
6	77516-04	Collet, 5/32”	2
7	79001-30	O-Ring, Solvent Proof	2
8	79001-06	O-Ring, Solvent Proof	1
9	79001-05	O-Ring, Solvent Proof	1
10	77957-00	Retaining Clip, Color Changer	1
11	A10824-00	Red Locking Clip, 3/8” OD Tube	2

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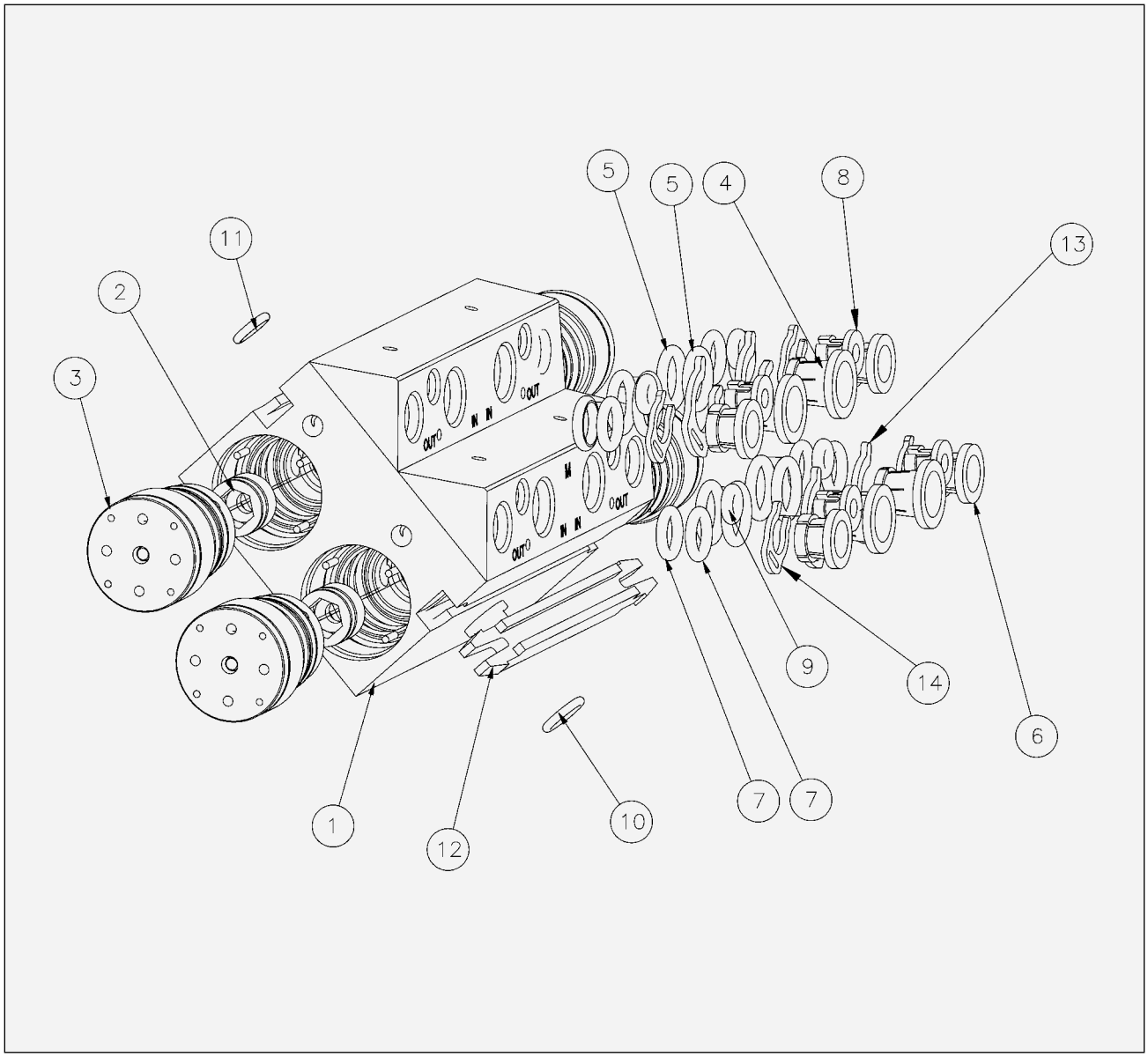

Figure 20: A10729 (Metric) & A10960 (English) 4-Color Valve Circulating Assembly

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A10729 4-COLOR VALVE CIRCULATING ASSEMBLY - PARTS LIST (METRIC) (Figure 20)

Item #	Part #	Description	Qty
1	A10735-01	Assembly, Circulating 4-Color Stack	1
2	77367-00	Assembly, Valve Seat	4
3	78949-00	Assembly, Valve	4
4	77762-02	Collet, 10mm	4
5	79001-31	O-Ring, Solvent Proof	8
6	77762-04	Collet, 8mm	4
7	79001-34	O-Ring, Solvent Proof	8
8	77516-04	Collet, 4mm	4
9	79001-30	O-Ring, Solvent Proof	4
10	79001-06	O-Ring, Solvent Proof	1
11	79001-05	O-Ring, Solvent Proof	1
12	77957-00	Retaining Clip, Color Changer	1
13	A10824-00	Red Locking Clip, 3/8” OD Tube	4
14	A10825-00	Red Locking Clip, 1/4” OD Tube	4

A10960 4-COLOR VALVE CIRCULATING ASSEMBLY - PARTS LIST (ENGLISH) (Figure 20)

Item #	Part #	Description	Qty
1	A10963-01	Assembly, Circulating 4-Color Stack	1
2	77367-00	Assembly, Valve Seat	4
3	78949-00	Assembly, Valve	4
4	77762-05	Collet, 3/8”	4
5	79001-24	O-Ring, Solvent Proof	8
6	77762-04	Collet, 5/16”	4
7	79001-34	O-Ring, Solvent Proof	8
8	77516-04	Collet, 5/32”	4
9	79001-30	O-Ring, Solvent Proof	4
10	79001-06	O-Ring, Solvent Proof	1
11	79001-05	O-Ring, Solvent Proof	1
12	77957-00	Retaining Clip, Color Changer	1
13	A10824-00	Red Locking Clip, 3/8” OD Tube	4
14	A10825-00	Red Locking Clip, 1/4” OD Tube	4

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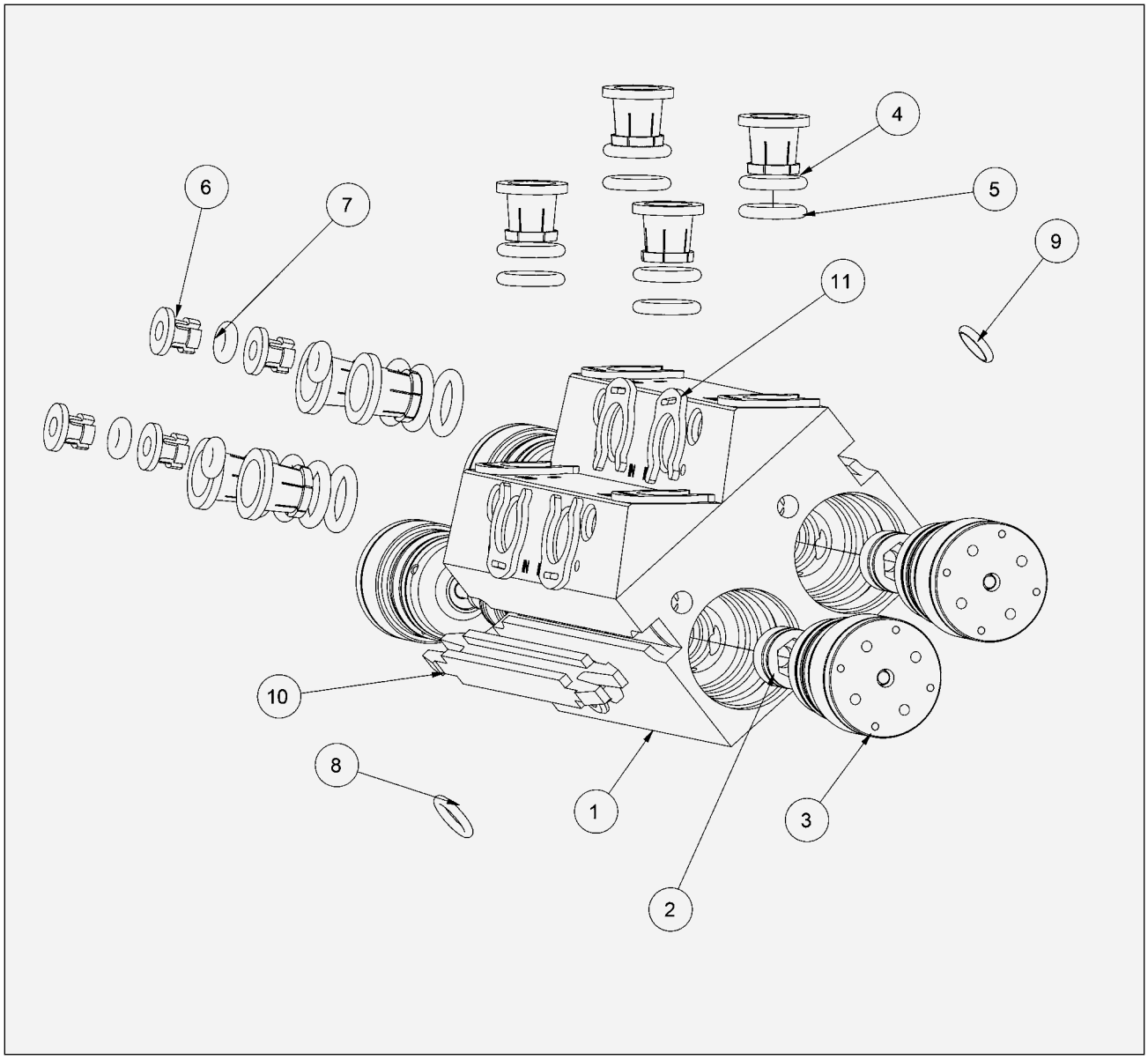

Figure 21: A10728 (Metric) & A10961 (English) 4-Color Valve - Daisy Chain Assembly

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A10728 4-COLOR VALVE - DAISY CHAIN ASSEMBLY - PARTS LIST (METRIC) (Figure 21)

Item #	Part #	Description	Qty
1	A10735-03	Assembly, Body 4-Color - Daisy Chain	1
2	77367-00	Assembly, Valve Seat	4
3	78949-00	Assembly, Valve	4
4	77762-02	Collet, 10mm	8
5	79001-31	O-Ring, Solvent Proof	16
6	77516-04	Collet, 4mm	4
7	79001-30	O-Ring, Solvent Proof	4
8	79001-06	O-Ring, Solvent Proof	1
9	79001-05	O-Ring, Solvent Proof	1
10	77957-00	Retaining Clip, Color Changer	1
11	A10824-00	Red Locking Clip, 3/8” OD Tube	8

A10961 4-COLOR VALVE - DAISY CHAIN ASSEMBLY - PARTS LIST (ENGLISH) (Figure 21)

Item #	Part #	Description	Qty
1	A10963-03	Assembly, Body 4-Color - Daisy Chain	1
2	77367-00	Assembly, Valve Seat	4
3	78949-00	Assembly, Valve	4
4	77762-05	Collet, 3/8”	8
5	79001-24	O-Ring, Solvent Proof	16
6	77516-04	Collet, 5/32”	4
7	79001-30	O-Ring, Solvent Proof	4
8	79001-06	O-Ring, Solvent Proof	1
9	79001-05	O-Ring, Solvent Proof	1
10	77957-00	Retaining Clip, Color Changer	1
11	A10824-00	Red Locking Clip, 3/8” OD Tube	8

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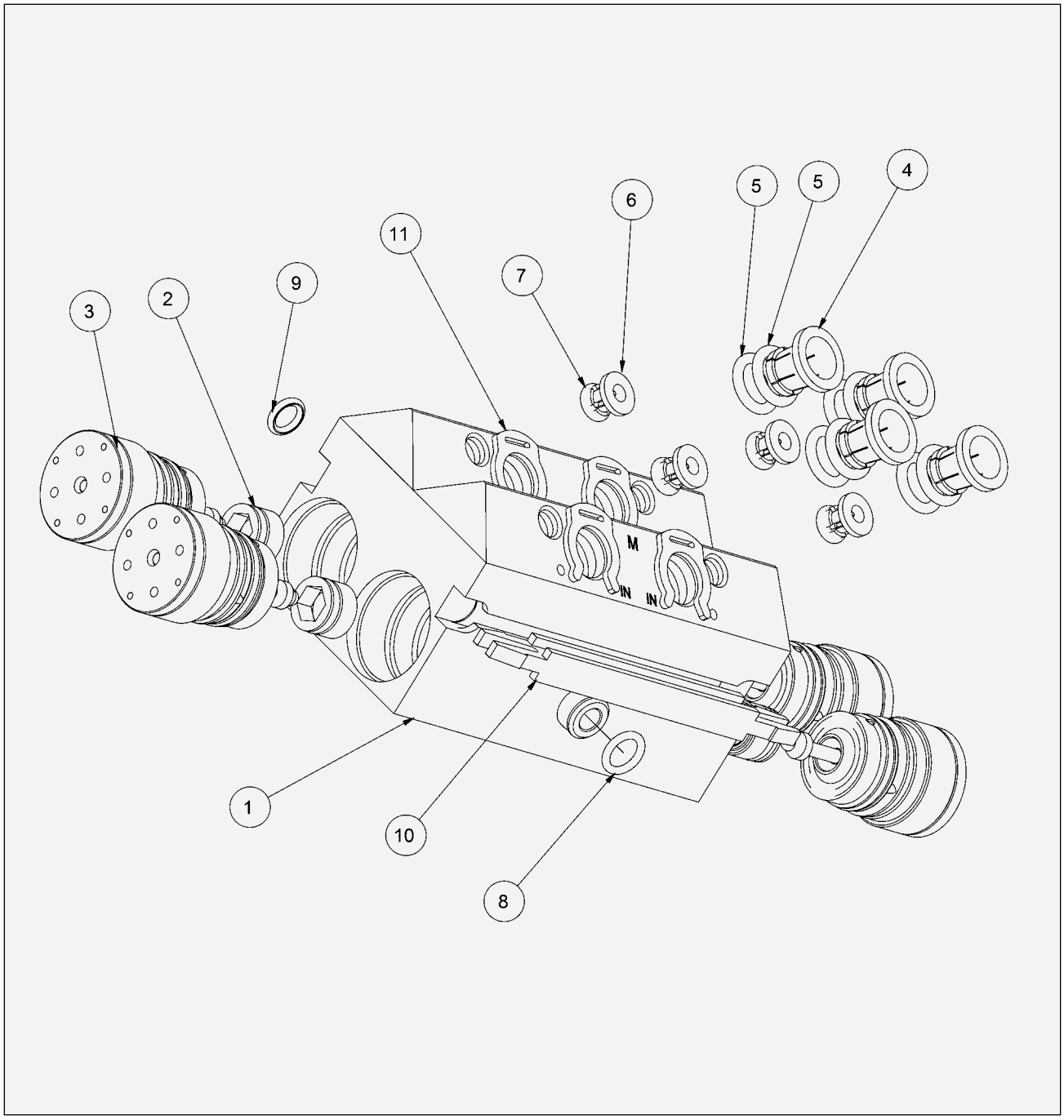

Figure 22: A10732 (Metric) & A10962 (English) 4-Color Valve Dead Head Assembly

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A10732 4-COLOR VALVE DEAD HEAD ASSEMBLY - PARTS LIST (METRIC) (Figure 22)

Item #	Part #	Description	Qty
1	A10735-02	Assembly, Body 4-Color - Dead Head	1
2	77367-00	Assembly, Valve Seat	4
3	78949-00	Assembly, Valve	4
4	77762-02	Collet, 10mm	8
5	79001-31	O-Ring, Solvent Proof	16
6	77516-04	Collet, 4mm	4
7	79001-30	O-Ring, Solvent Proof	4
8	79001-06	O-Ring, Solvent Proof	1
9	79001-05	O-Ring, Solvent Proof	1
10	77957-00	Retaining Clip, Color Changer	1
11	A10824-00	Red Locking Clip, 3/8” OD Tube	8

A10962 4-COLOR VALVE DEAD HEAD ASSEMBLY - PARTS LIST (ENGLISH) (Figure 22)

Item #	Part #	Description	Qty
1	A10963-02	Assembly, Block 4-Color Dead Head	1
2	77367-00	Assembly, Valve Seat	4
3	78949-00	Assembly, Valve	4
4	77762-05	Collet, 3/8”	4
5	79001-24	O-Ring, Solvent Proof	8
6	77516-04	Collet, 5/32”	4
7	79001-30	O-Ring, Solvent Proof	4
8	79001-06	O-Ring, Solvent Proof	1
9	79001-05	O-Ring, Solvent Proof	1
10	77957-00	Retaining Clip, Color Changer	1
11	A10824-00	Red Locking Clip, 3/8” OD Tube	4

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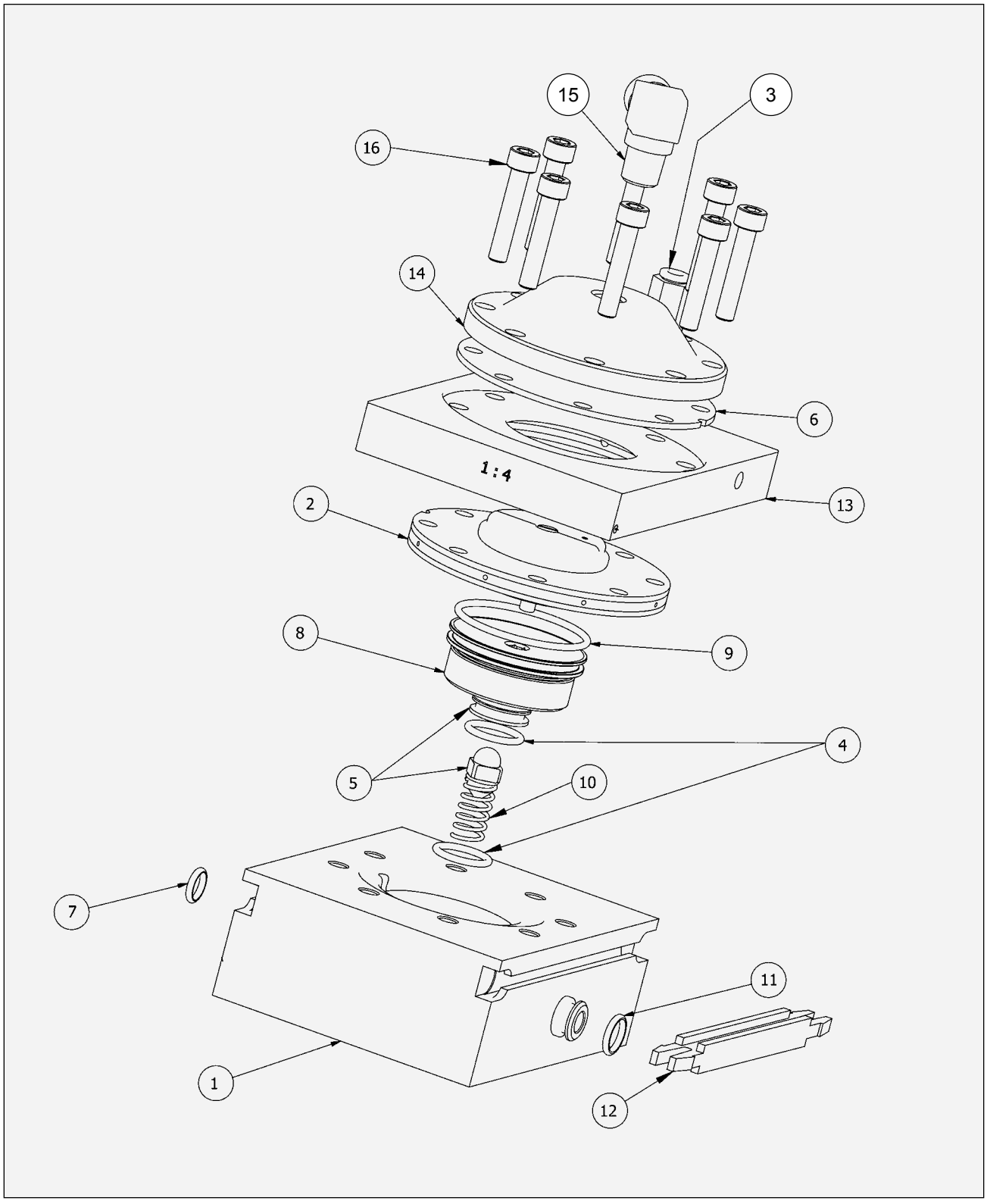

Figure 23: A10725 Regulator Assembly

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A10725 REGULATOR ASSEMBLY - PARTS LIST (Figure 23)

Item #	Part #	Description	Qty
1	A10724-00	Assembly, Regulator Body	1
2	**See Table A - "A"**	Assembly, Diaphragm DR-2	1
3	77544-01	Fitting, Straight, Push-In, 10-32 x 5/32" (4mm) ODT	1
4	79001-08	O-Ring, Solvent Proof	2
5	74160-00	Assembly Matched Seat & Stem	1
6	74157-03	Diaphragm, Regulator	1
7	79001-05	O-Ring, Solvent Proof	1
8	79238-00	Insert, Regulator	1
9	79001-18	O-Ring, Solvent Proof	1
10	74161-00	Spring, Regulator	1
11	79001-06	O-Ring, Solvent Proof	1
12	77957-00	Retaining Clip, Color Changer	1
13	**See Table A - "B"**	Ratio Spacer Ring, Fluid Regulator	1
14	79231-00	Cap, Fluid Regulator	1
15	A11069-00	Fitting, Elbow, Push-In, 1/8" NPT x 5/32" (4mm) ODT	1
16	LSFA0006-40F	Screw, Socket Head Cap, 10-32 X 1-1/4" Lg.	8

TABLE A - A10725 REGULATOR ASSEMBLY

Dash No.	Description	"A"	"B"
01	Regulator Ratio 1:1	79235-01	A11067-01
02	Regulator Ratio 1:2	79235-02	A11067-02
03	Regulator Ratio 1:3	79235-03	A11067-03
04	Regulator Ratio 1:4	79235-04	A11067-04
06	Regulator Ratio 1:6	79235-06	A11067-06
08	Regulator Ratio 1:8	79235-08	A11067-08
10	Regulator Ratio 1:10	79235-10	A11067-10

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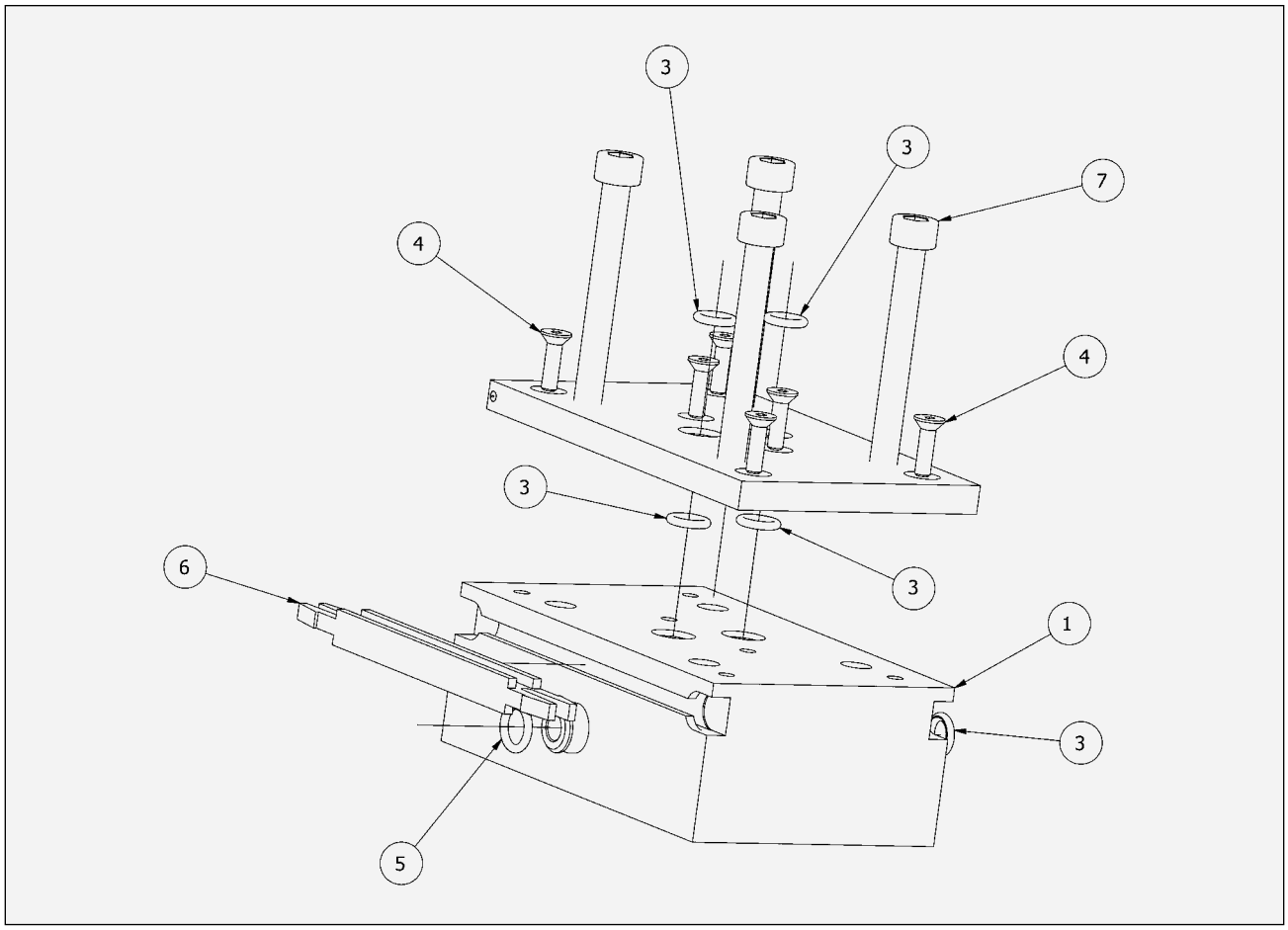

Figure 24: A10720-01/02 Flow Meter Block Assembly

A10720-01/02 FLOW METER BLOCK ASSEMBLY - PARTS LIST
(Figure 24)

Item #	Part #	Description	Qty
1	A10719-00	Assembly, Flow Meter Block	1
2	A10467-00	Assembly, Flow Meter Plate	1
3	79001-05	O-Ring, Solvent Proof	5
4	78232-16C	Screw, Counter Sunk Head	6
5	79001-06	O-Ring, Solvent Proof	1
6	77957-00	Retaining Clip, Color Changer	1
7	**See Table Y - "A"**	Screw, SHC	4

TABLE Y - FLOW METER BLOCK ASSEMBLY OPTION

Part #	Description	"A"
A10720-01	AW Flow Meter Block	A10468-45

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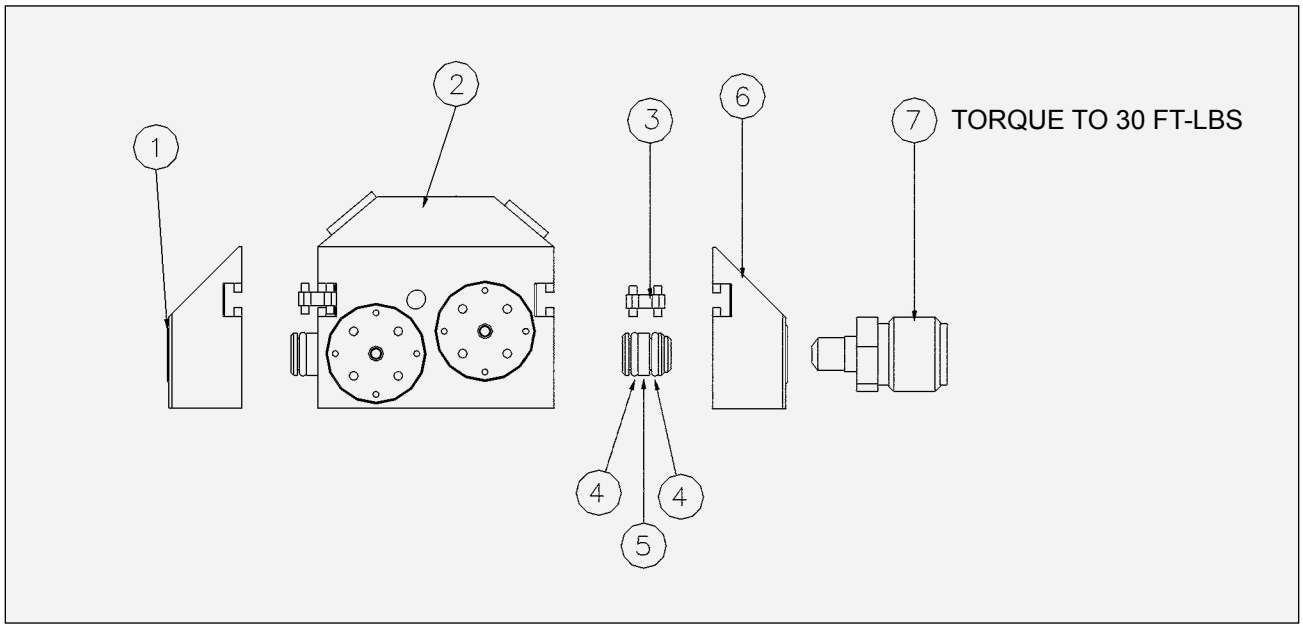

Figure 25: A10826-XX Stand Alone Bell/Block Wash Assembly

A10826-XX STAND ALONE BELL / BLOCK WASH ASSEMBLY - PARTS LIST (METRIC & ENGLISH) (Figure 25)

Item #	Part #	Description	Qty
1	A10711-00	Assembly, Plate Closed End	1
2	**See Table Z - "A"**	Assembly, Bell / Block Wash (Metric)	1
3	77957-00	Retaining Clip, Color Changer	1
4	79001-06	O-Ring, Solvent Proof	2
5	A10714-00	Fitting, End	1
6	A10712-00	Assembly, Plate Fitting, End	1
7	78079-00	Fitting, Outlet	1

TABLE Z - A10826 STAND ALONE BELL / BLOCK WASH ASSEMBLY OPTIONS

Part #	Description	"A"
A10826-01	Purge Block Only, 8mm (Metric)	A10717-01
A10826-02	Bell Wash & Purge Block, 8mm (Metric)	A10717-02
A10826-03	Purge Block Only (English)	A10080-01
A10826-04	Bell Wash & Purge Block (English)	A11080-02
A10826-06	Purge Block Only, 6mm (Metric)	A11788-01
A10826-06	Bell Wash Purge Block, 6mm (Metric)	A11788-02

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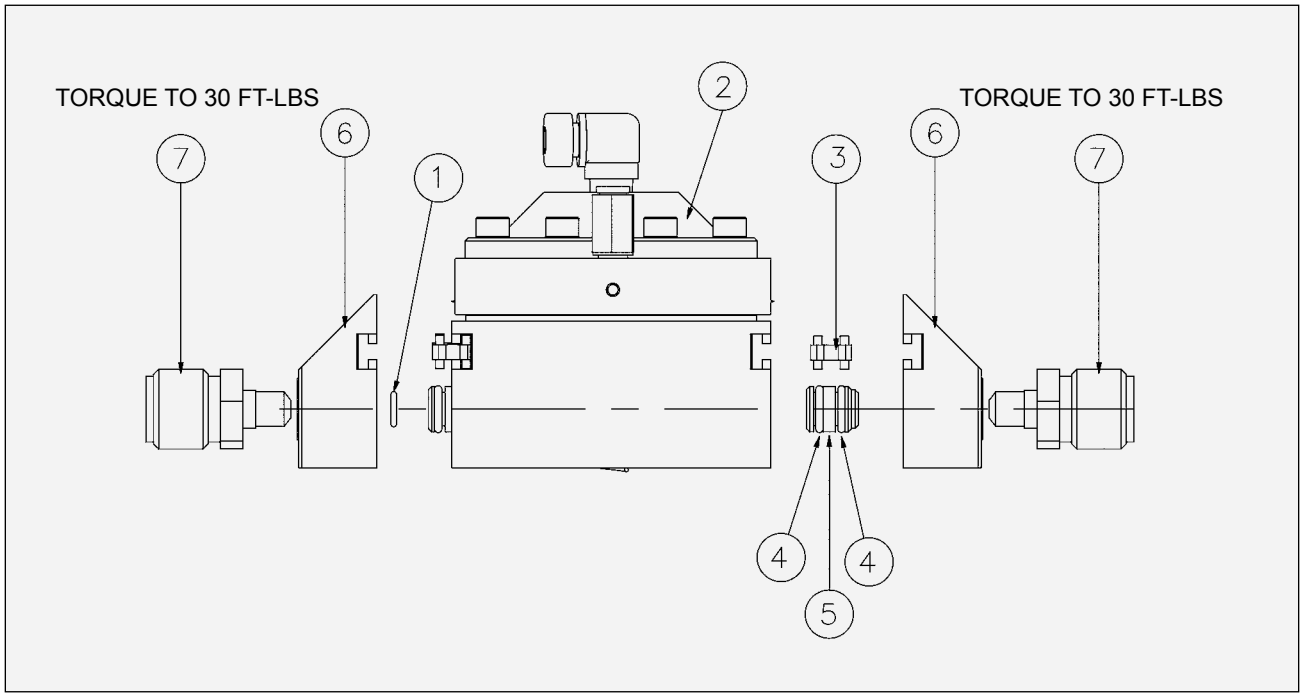

Figure 26: A10827-00 Stand Alone Regulator Assembly

A10827-00 STAND ALONE REGULATOR ASSEMBLY - PARTS LIST (Figure 26)

Item #	Part #	Description	Qty
1	79001-05	O-Ring, Solvent Proof	1
2	**See Table A - "A"**	Assembly, Regulator	1
3	77957-00	Retaining Clip, Color Changer	1
4	79001-06	O-Ring, Solvent Proof	2
5	A10714-00	Fitting, End	1
6	A10712-00	Assembly, Plate Fitting End	2
7	78079-00	Fitting, Outlet	2

TABLE A - A10827-00 REGULATOR ASSEMBLY

Part #	Description	"A"
A10827-01	Regulator- 1:1 Ratio	A10725-01
A10827-02	Regulator - 1:2 Ratio	A10725-02
A10827-03	Regulator - 1:3 Ratio	A10725-03
A10827-04	Regulator - 1:4 Ratio	A10725-04
A10827-06	Regulator - 1:6 Ratio	A10725-06
A10827-08	Regulator - 1:8 Ratio	A10725-08
A10827-10	Regulator - 1:10 Ratio	A10725-10

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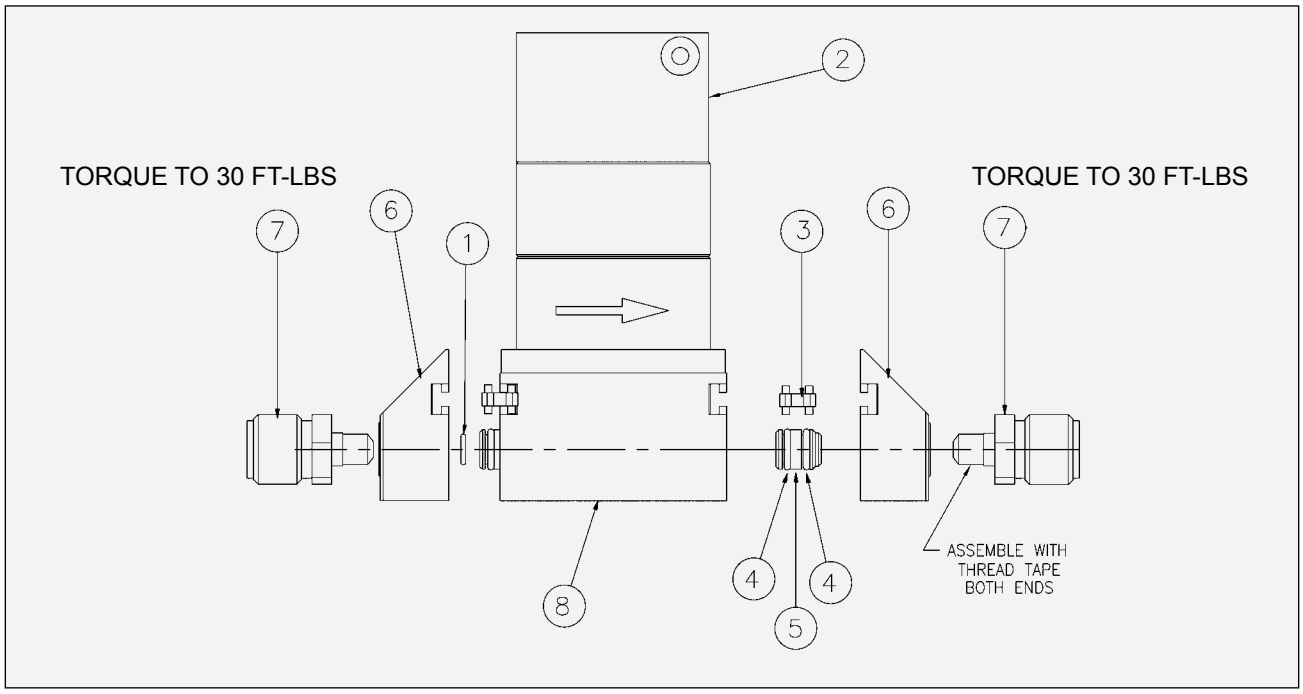

Figure 27: A10828-XX Stand Alone Flow Meter Assembly (RF-1 Fiber Optic)

A10828-XX STAND ALONE FLOW METER ASSEMBLY (RF-1 FIBER OPTIC) - PARTS LIST (Figure 27)

Item #	Part #	Description	Qty
1	79001-05	O-Ring, Solvent Proof	1
2	**See Table BB - "A"**	Flow Meter and Cable	1
3	77957-00	Retaining Clip, Color Changer	1
4	79001-06	O-Ring, Solvent Proof	2
5	A10714-00	Fitting, End	1
6	A10712-00	Assembly Plate, Fitting End	2
7	78079-00	Fitting, Outlet	2
8	A10720-02	Assembly Flow Meter Block	1

TABLE BB - FLOW METER KIT/ FIBER OPTIC CABLE LENGTH (METRIC & ENGLISH)

Dash No.	Description	"A"	"Fiber Optic Cable Length"
10	Flow Meter, Fiber Optic Sensor & Cable	A13420-10	10 ft.
15	Flow Meter, Fiber Optic Sensor & Cable	A13420-15	15 ft.
30	Flow Meter, Fiber Optic Sensor & Cable	A13420-30	30 ft.
45	Flow Meter, Fiber Optic Sensor & Cable	A13420-45	45 ft.
60	Flow Meter, Fiber Optic Sensor & Cable	A13420-60	60 ft.
100	Flow Meter, Fiber Optic Sensor & Cable	A13420-100	100 ft.

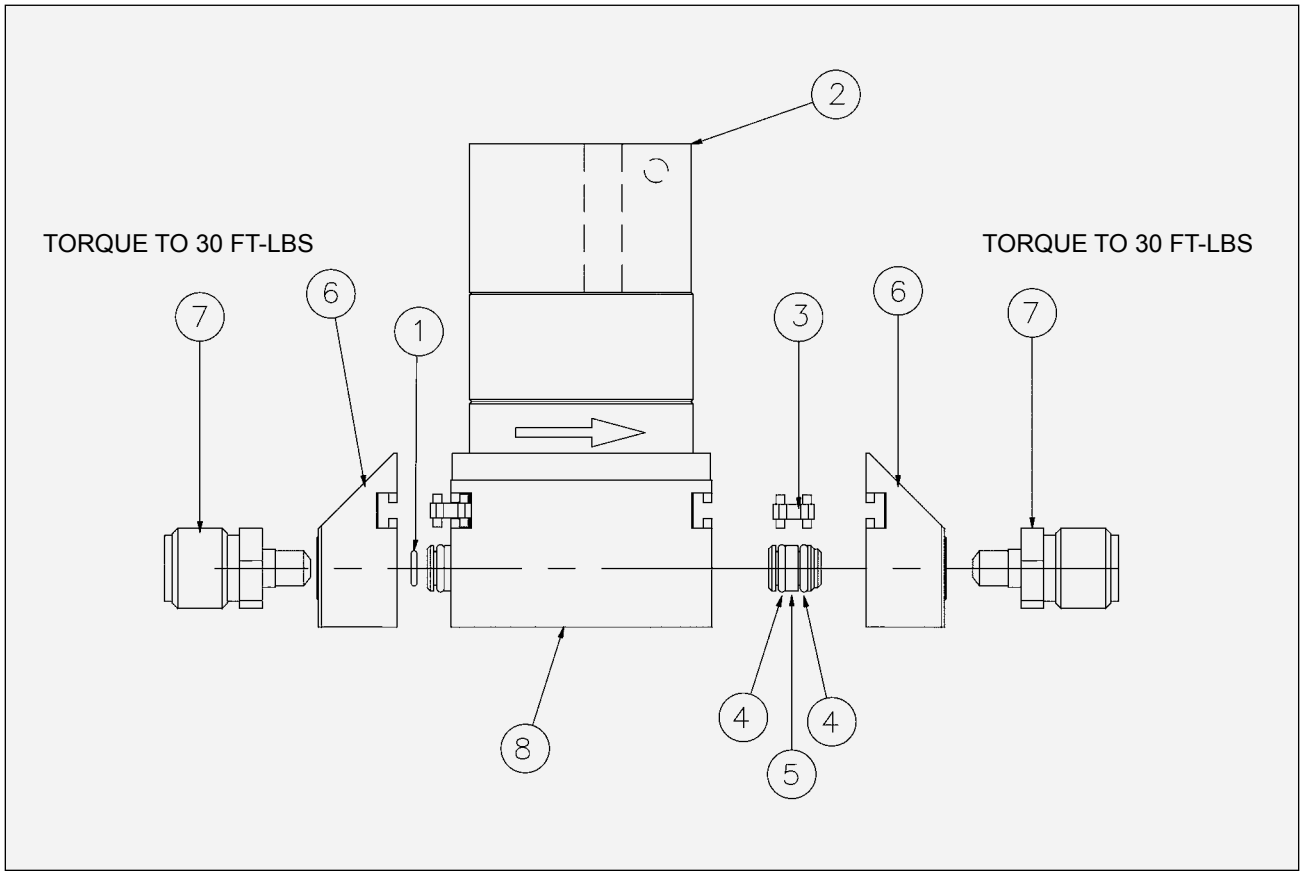

Figure 28: A10999-00 Stand Alone Flow Meter Assembly (AW)

A10999-00 STAND ALONE FLOW METER ASSEMBLY (AW) - PARTS LIST (Figure 28)

Item #	Part #	Description	Qty
1	79001-05	O-Ring, Solvent Proof	1
2	75955-06	Flow Meter, AW (Consult Your Sales Representative for Pick-Up)	1
3	77957-00	Retaining Clip, Color Changer	1
4	79001-06	O-Ring, Solvent Proof	2
5	A10714-00	Fitting, End	1
6	A10712-00	Assembly, Plate Fitting End	2
7	78079-00	Fitting, Outlet	2
8	A10720-01	Assembly, Flow Meter Block, AW	1

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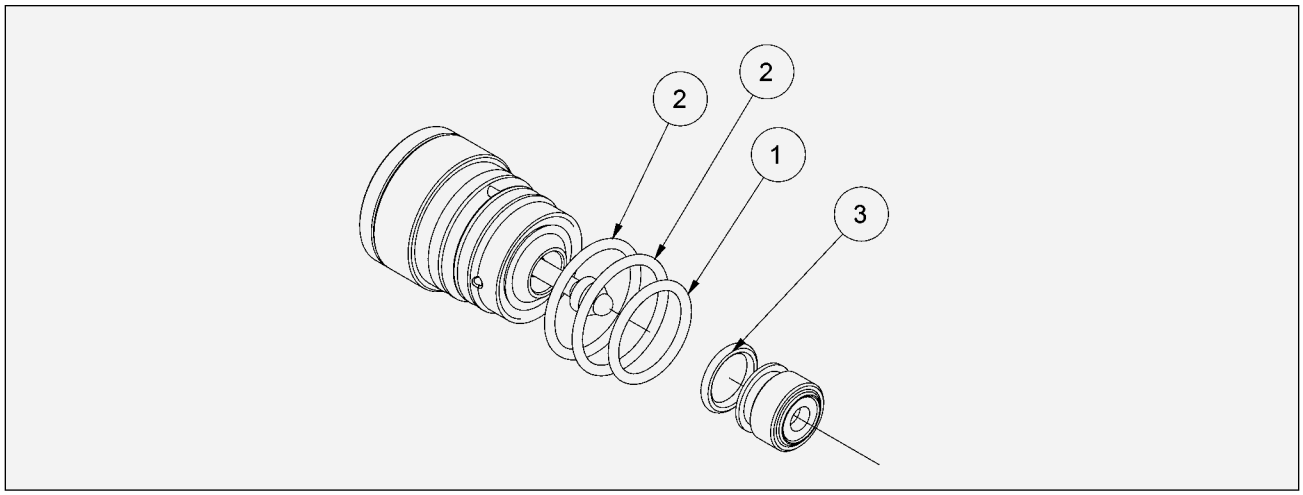

Figure 29a: 78949-00 Valve & 77367-00 Seat Replacement Parts

78949-00 VALVE & 77367-00 SEAT REPLACEMENT PARTS
(Figure 29a)

Item #	Part #	Description	Qty
1	79244-00	Plug	1
2	79001-19	O-Ring, Solvent Proof	1
3	79001-14	O-Ring, Solvent Proof	1
4	77618-00	Plug, Seat	1

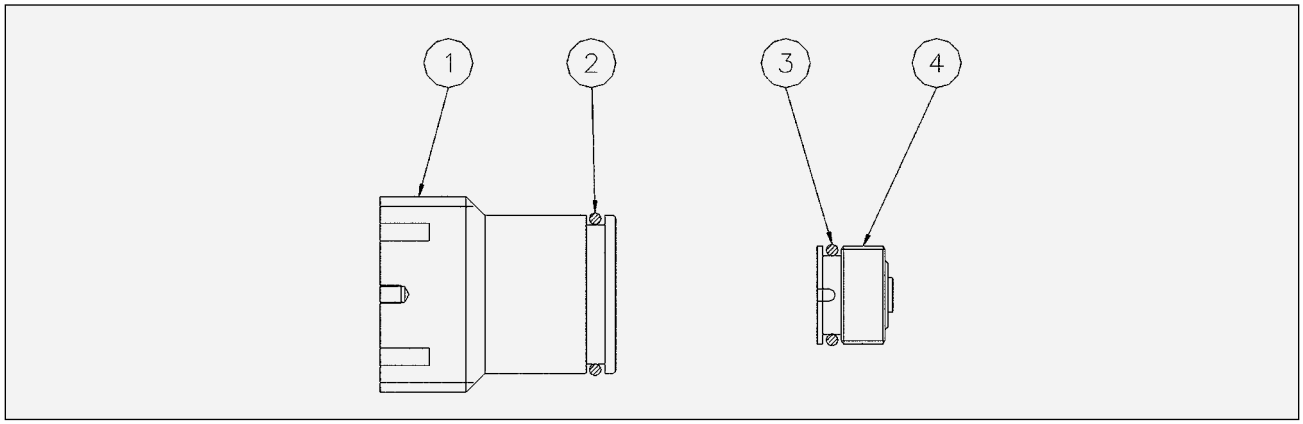

Figure 29b: 77620-00 Valve Plug Kit

77620-00 VALVE PLUG KIT (Use in Place of Valve & Seat) (Optional)
(Figure 29b)

Item #	Part #	Description	Qty
1	79244-00	Plug	1
2	79001-01	O-Ring, Solvent Proof	1
3	79001-14	O-Ring, Solvent Proof	1
4	77618-00	Plug, Seat	1

RECOMMENDED SPARE PARTS

Part #	Description
74160-00	Needle and Seat, Regulating
74161-00	Spring
77957-00	Retaining Clip
A10824-00	Locking Clip, 3/18”
A10825-00	Locking Clip, 1/4”
79001-05	O-Ring, Solvent Proof
79001-06	O-Ring, Solvent Proof

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WARRANTY POLICIES

LIMITED WARRANTY

Ransburg will replace or repair without charge any part and/or equipment that falls within the specified time (see below) because of faulty workmanship or material, provided that the equipment has been used and maintained in accordance with Ransburg's written safety and operating instructions, and has been used under normal operating conditions. Normal wear items are excluded.

THE USE OF OTHER THAN RANSBURG APPROVED PARTS, VOID ALL WARRANTIES.

SPARE PARTS: One hundred and eighty (180) days from date of purchase, except for rebuilt parts (any part number ending in "R") for which the warranty period is ninety (90) days.

EQUIPMENT: When purchased as a complete unit, (i.e., guns, power supplies, control units, etc.), is one (1) year from date of purchase. **WRAPPING THE APPLICATOR IN PLASTIC, SHRINK-WRAP, ETC., WILL VOID THIS WARRANTY.**

RANSBURG'S ONLY OBLIGATION UNDER THIS WARRANTY IS TO REPLACE PARTS THAT HAVE FAILED BECAUSE OF FAULTY WORKMANSHIP OR MATERIALS. THERE ARE NO IMPLIED WARRANTIES NOR WARRANTIES OF EITHER MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. RANSBURG ASSUMES NO LIABILITY FOR INJURY, DAMAGE TO PROPERTY OR FOR CONSEQUENTIAL DAMAGES FOR LOSS OF GOODWILL OR PRODUCTION OR INCOME, WHICH RESULT FROM USE OR MISUSE OF THE EQUIPMENT BY PURCHASER OR OTHERS.

EXCLUSIONS:

If, in Ransburg's opinion the warranty item in question, or other items damaged by this part was improperly installed, operated or maintained, Ransburg will assume no responsibility for repair or replacement of the item or items. The purchaser, therefore will assume all responsibility for any cost of repair or replacement and service related costs if applicable.

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MANUAL CHANGE SUMMARY

Supersede Service Manual **CS-02-01.9** with the following changes:

1. Change logo.

Supersede Service Manual **CS-02-01.10** with the following changes:

1. Change to new color format — ***All Pages***.
2. Update table of contents — ***Contents***.
3. Incorporate new Safety Section — ***Pages 1-5***.
4. Update table — ***Page 10***.
5. Update Model Identification and tables B, D, and Y — ***Pages 11-13***.
6. Update Model Identification and tables C, D, V, and BB — ***Pages 15-17***.
7. Add bullet point D and make corrections to text — ***Page 18***.
8. Change font in figure 5a — ***Page 19***.
9. Corrected tables 1 and add line 4 to table 2 — ***Page 28***.
10. Update tables D, V, and BB — ***Pages 31-32***.
11. New drawings for Figure 16 and add items 20 and 21 to table— ***Page 33***.
12. Add items 20 and 21 to table 2 — ***Page 34***.
13. Correct part number for item 11 in tables — ***Pages 36-37***.
14. Corrected part numbers for items 1 and 7 in table 2 — ***Page 43***.
15. Corrected call-outs 15 and 3 in figure 23 — ***Page 48***.
16. Corrected table 1 — ***Page 49***.
17. Remove item 2 in table 2 — ***Page 50***.
18. Add “TORQUE TO 30 FT-LBS” to drawings — ***Pages 51-54***.
19. Update both tables — ***Page 53***.
20. Correct part number for item 2in table 2 — ***Page 56***.

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Ransburg

Manufacturing

1910 North Wayne Street
Angola, Indiana 46703-9100
Telephone: 260-665-8800
Fax: 260-665-8516

Technical Service — Assistance

320 Phillips Ave.
Toledo, Ohio 43612-1493
Telephone (toll free): 800-233-3366
Fax: 419-470-2233

Technical Support Representative will direct you to the appropriate telephone number for ordering Spare Parts.

Form No. CS-02-01.11
Litho in U.S.A.
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