Auto Section Control

Customer and Dealer Training

February, 2014

asc™
auto section control

Overview

- Background on Auto Section Control
- How the System Works
- Technical Info

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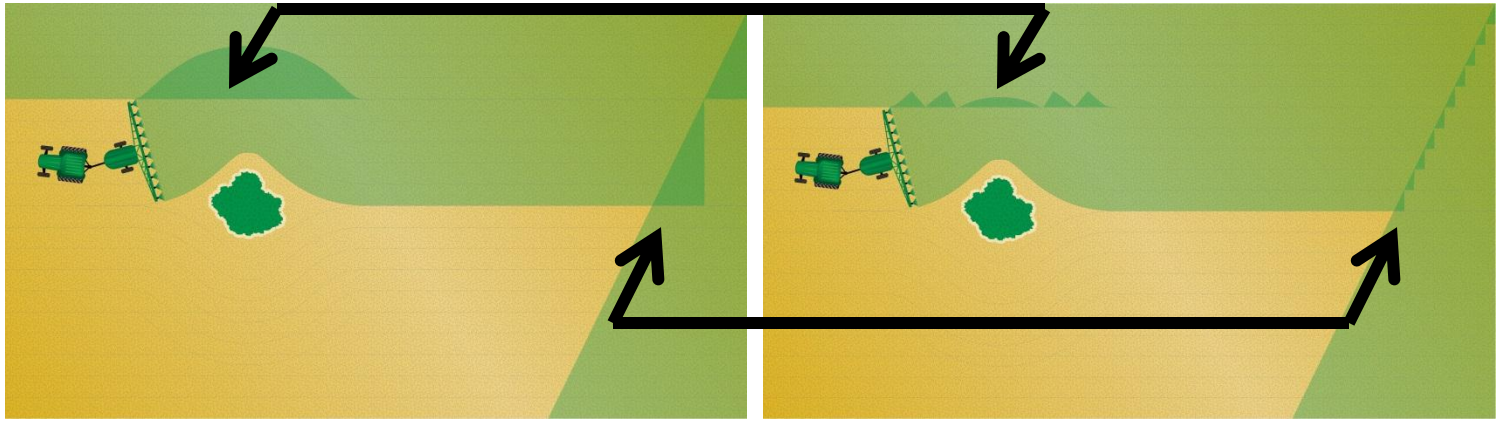
Background

- What is Auto Section Control (ASC)?
  - A method for reducing overlap by dividing one boom into multiple sections
  - These individual sections can turn on and off based on a GPS log of previously applied areas → "Coverage Map"
  - Sprayers have used ASC for a number of years → the trick was to make it work for granular products



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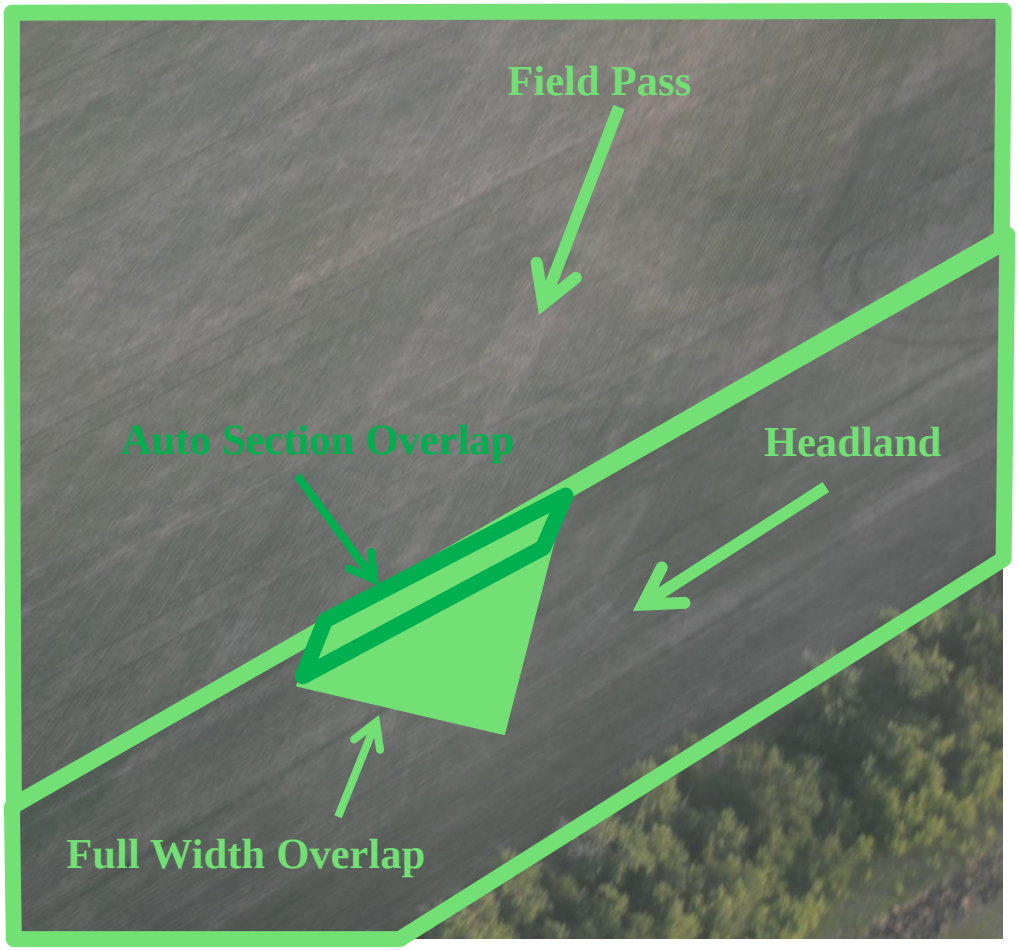
Background

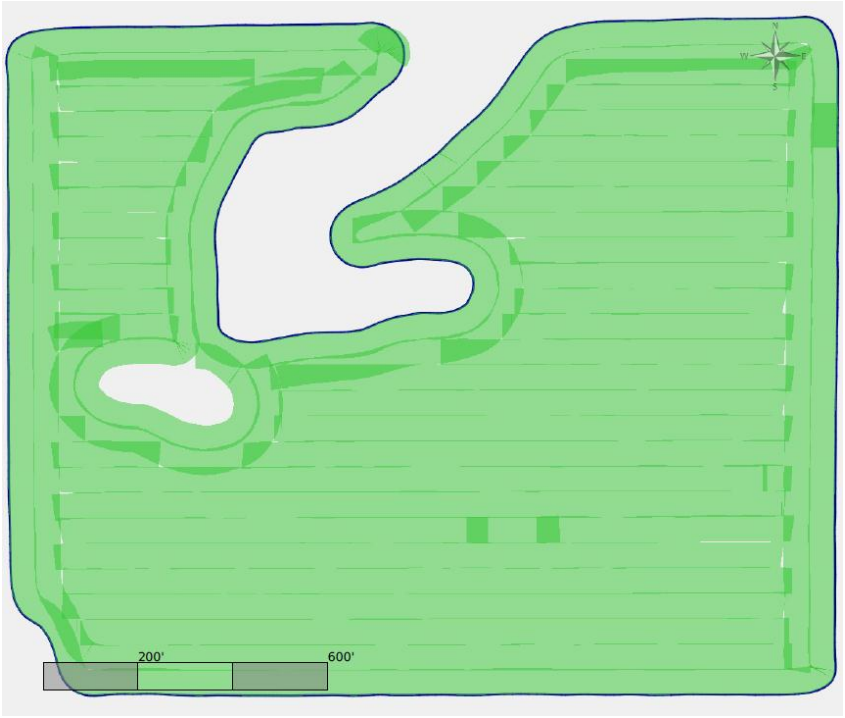
- Auto Section Control Coverage



Background

- Coverage Savings

Full Width Applied Area: 52.82 ac



Auto Section Applied Area: 50.18 ac

Background

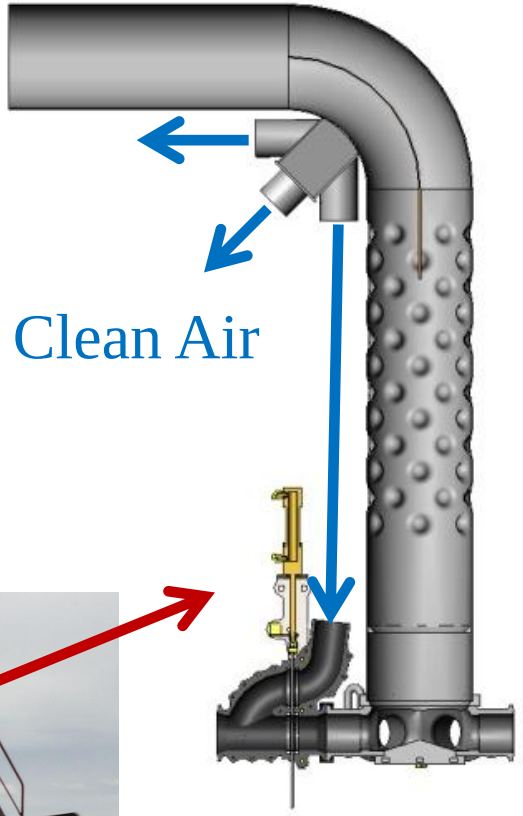
- Sample Savings Calculation

Crop	Seed/Fertilizer Expense /ac
Wheat	$ 70.00
Canola	$ 110.00
Average	$ 90.00
5000 Acre Farm	$ 450,000.00
3% Savings	$ 13,500.00
6% Savings	$ 27,000.00
10,000 Acre Farm	$ 900,000.00
3% Savings	$ 27,000.00
6% Savings	$ 54,000.00

- **Roughly one year payback**

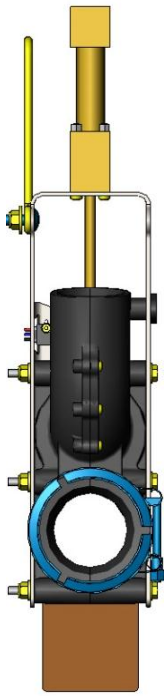
How the System Works

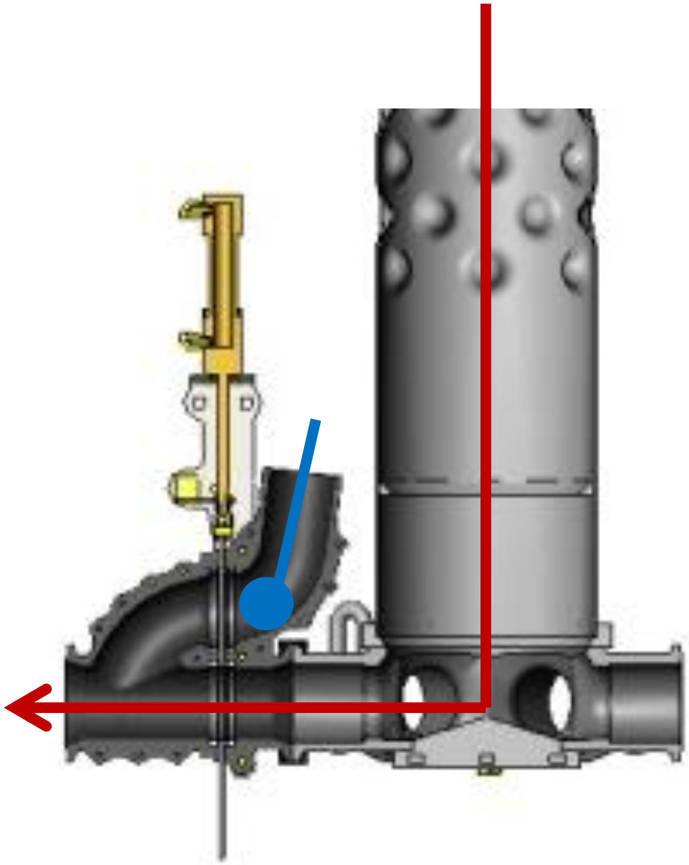
- Product flows through primary elbow
  - Product follows outside radius of elbow
  - Air free from product (clean air) is allowed to exit via the clean air plenum



How the System Works

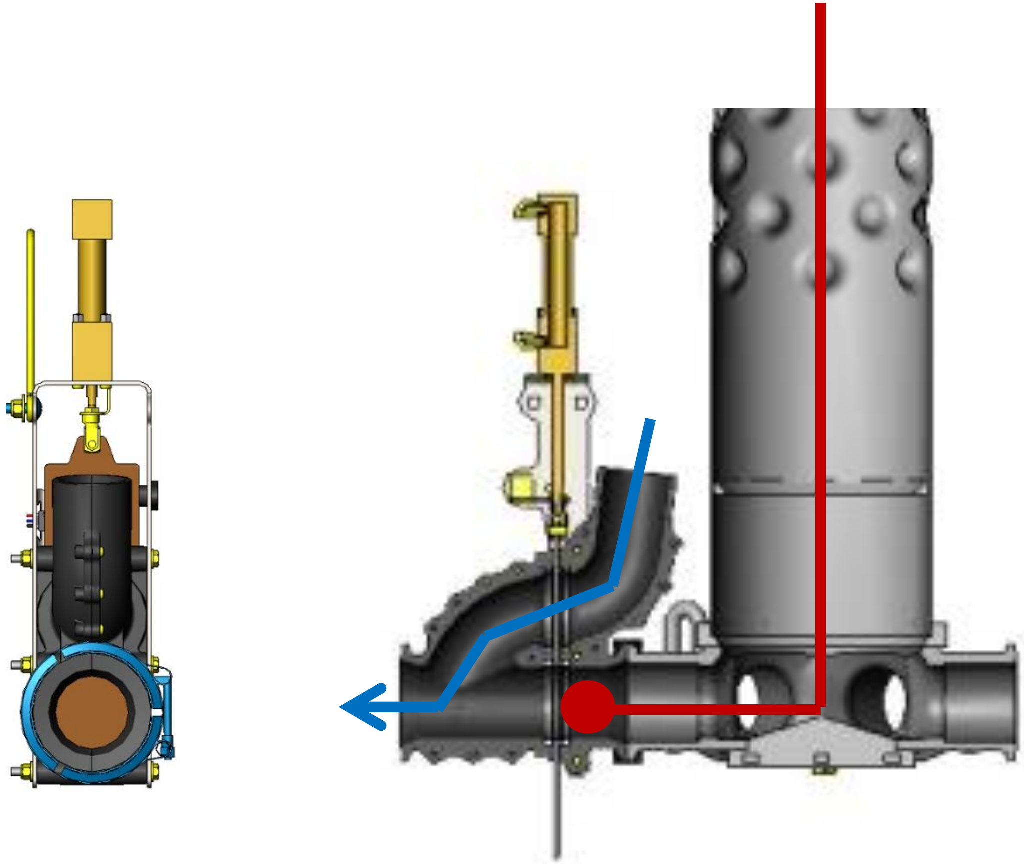
- Seeding Position
  - Cylinder extended
  - Product flow open
  - Clean air blocked





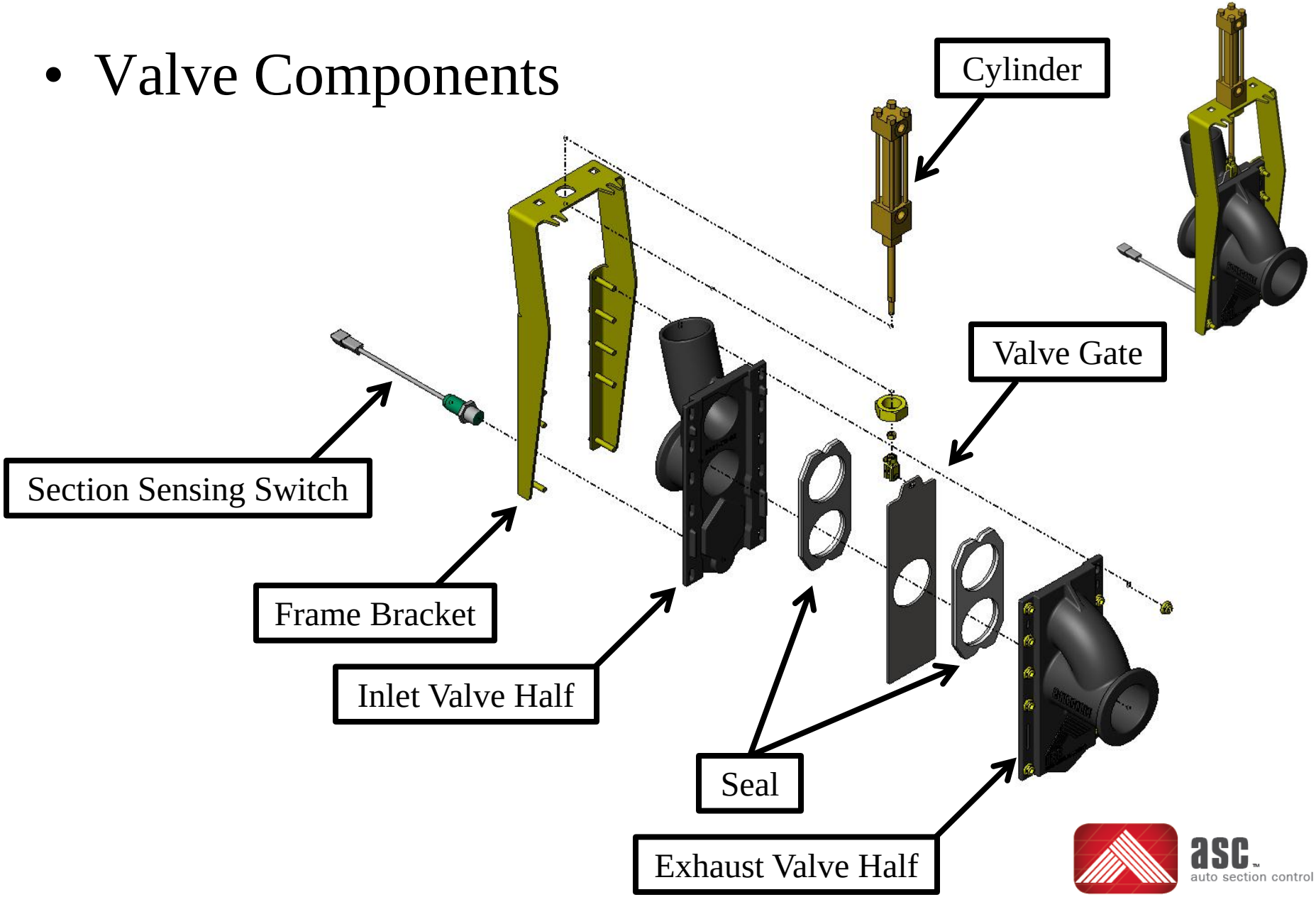
How the System Works

- Closed Position
  - Cylinder retracted
  - Product flow blocked
  - Clean air open



Technical Info

- Valve Components



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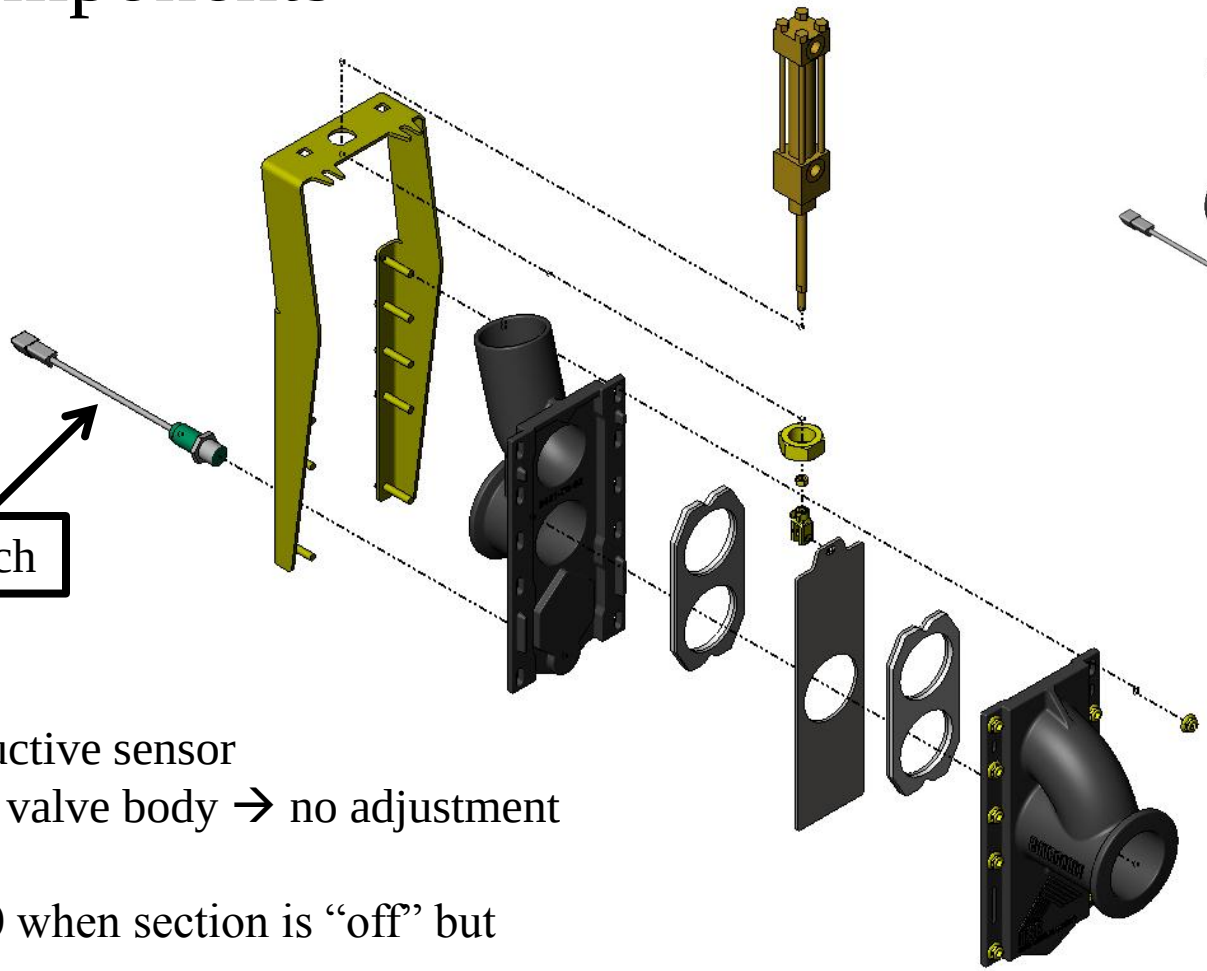
Technical Info

- Valve Components

Section Sensing Switch



- Solid state inductive sensor
- Bottoms out in valve body → no adjustment required
- Alarms on X30 when section is “off” but should be “on”
- LED indicates section is “on”

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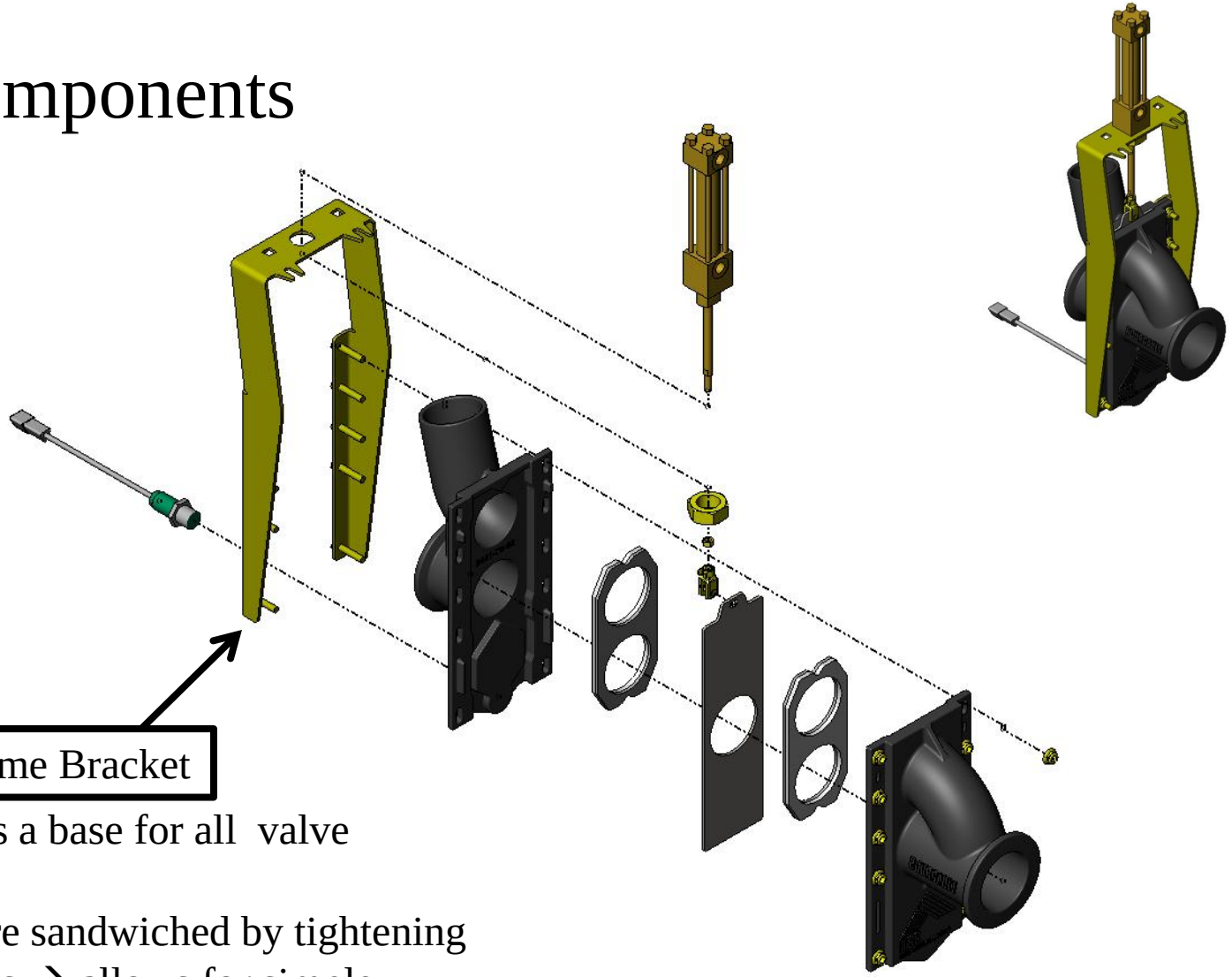
Technical Info

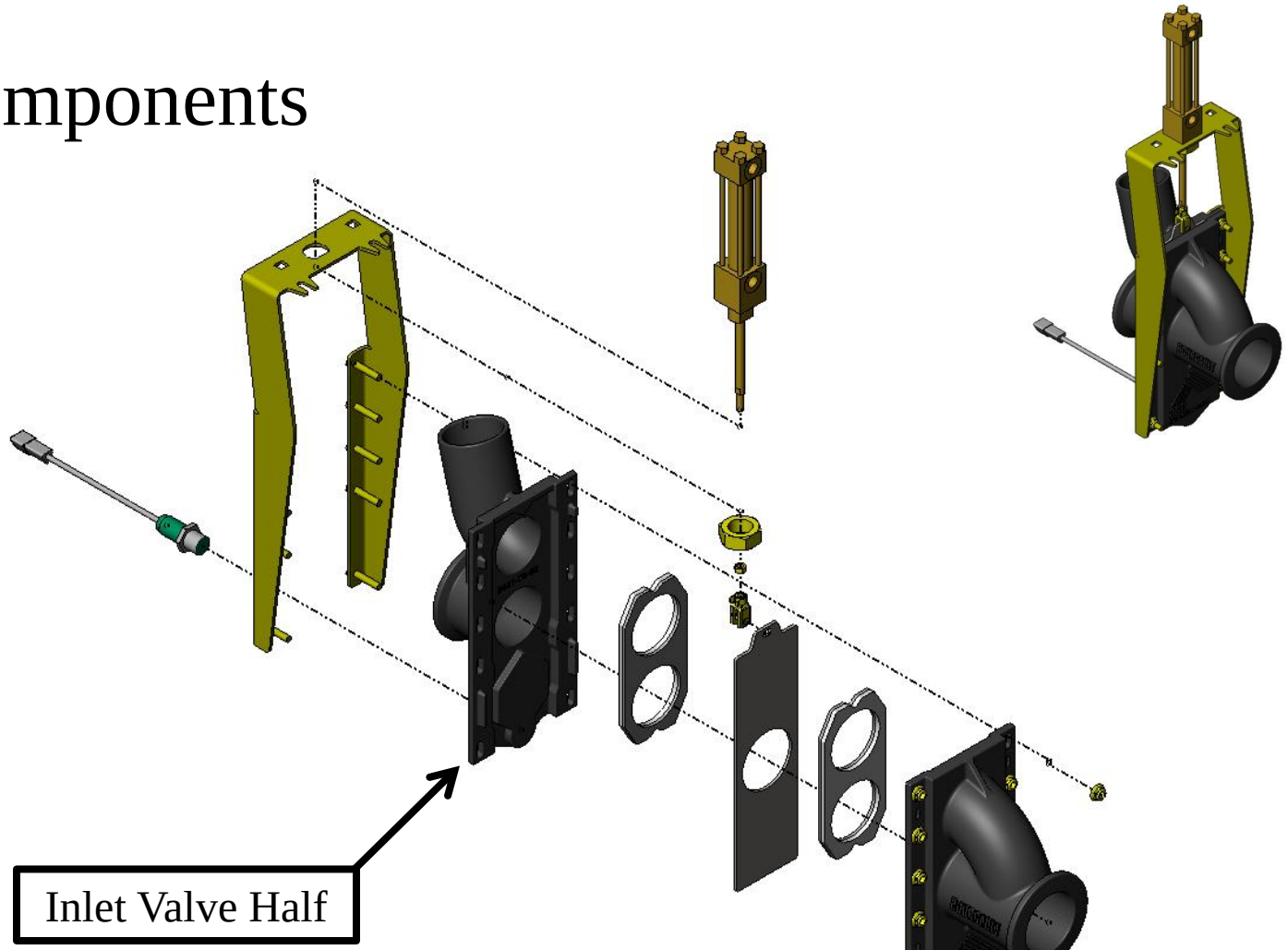
- Valve Components



- Frame provides a base for all valve components
- Components are sandwiched by tightening nuts to the studs → allows for simple assembly

Technical Info

- Valve Components



- Mounts directly to primary manifold by use of a flange band clamp
- Orientation of the part is manual

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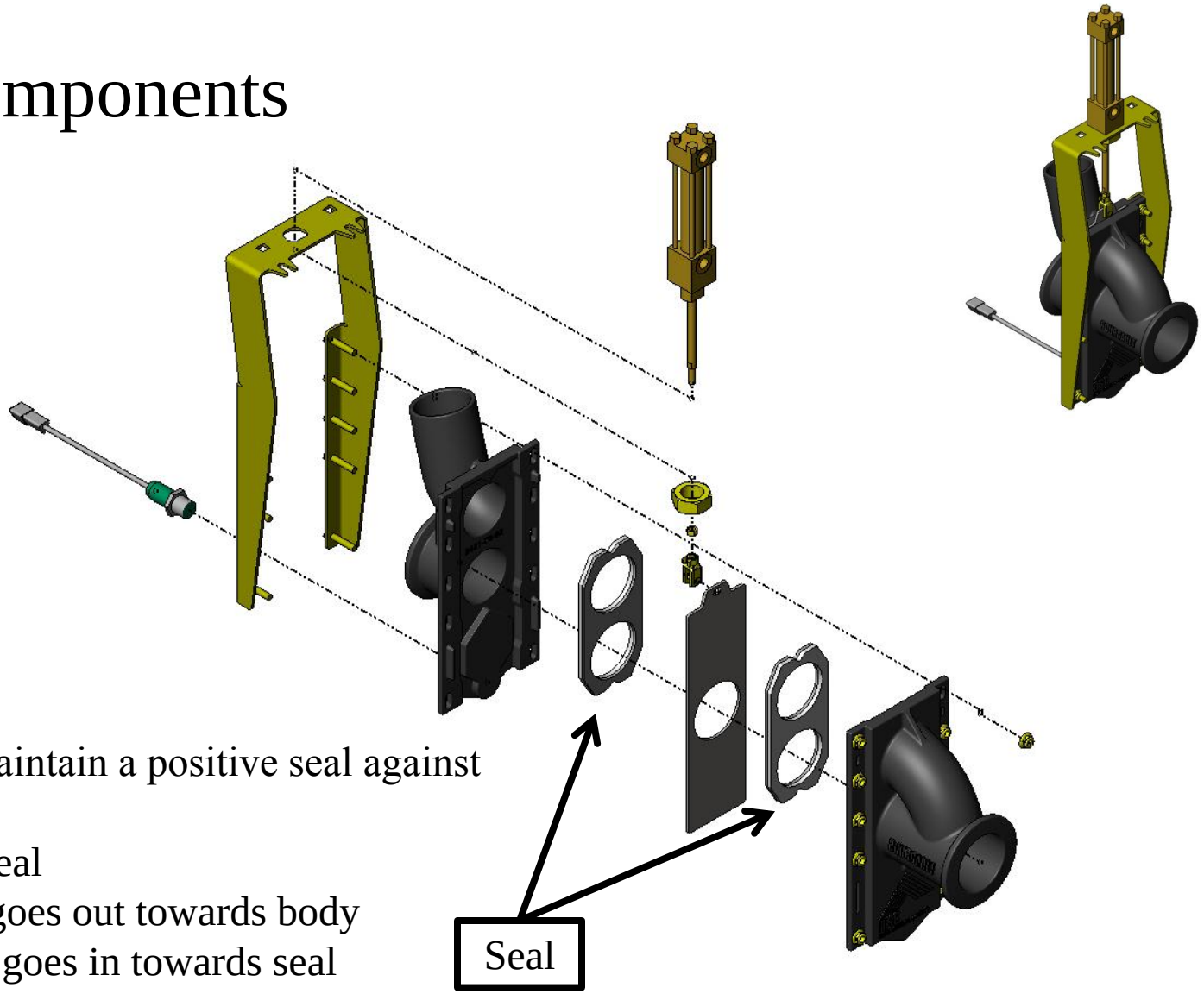
Technical Info

- Valve Components



- "Live" seals maintain a positive seal against the gate
- 2-component seal
  - Soft half goes out towards body
  - Hard side goes in towards seal

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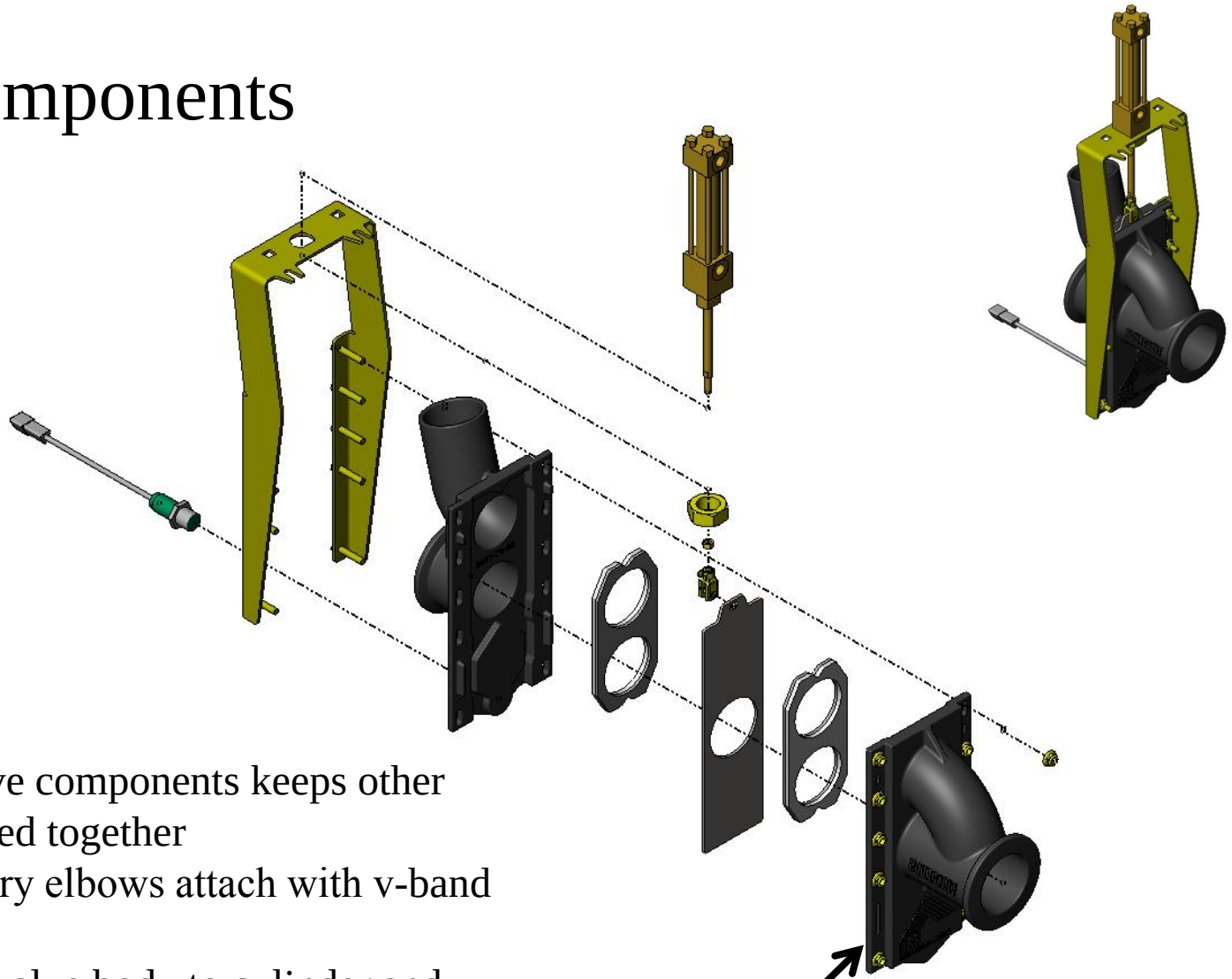
Technical Info

- Valve Components



- Outermost valve components keeps other parts sandwiched together
- 2-1/2” secondary elbows attach with v-band clamp
- Calibration of valve body to cylinder and bracket possible by use of slots

Exhaust Valve Half

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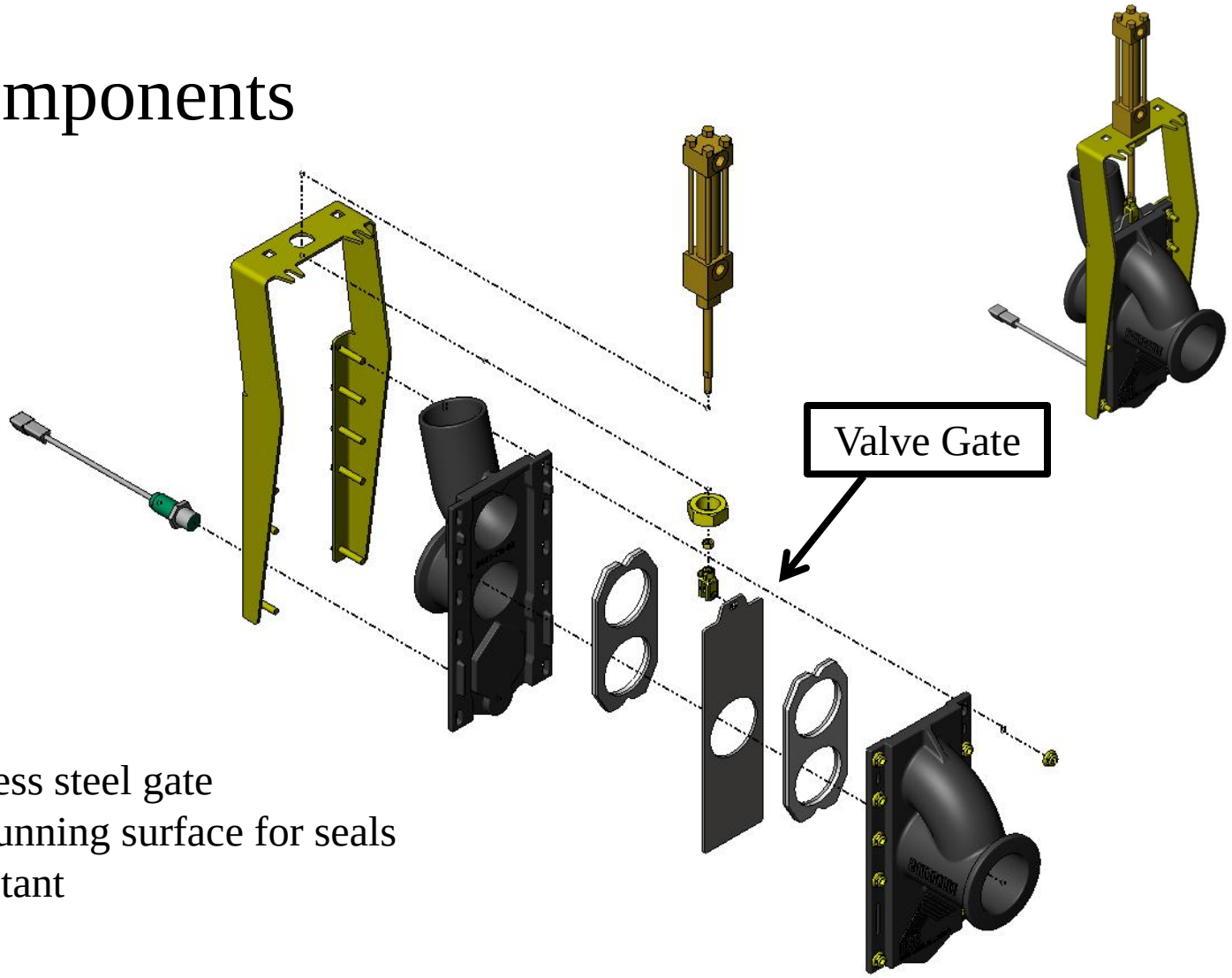
Technical Info

- Valve Components



- Polished stainless steel gate
- Provides free running surface for seals
- Corrosion resistant

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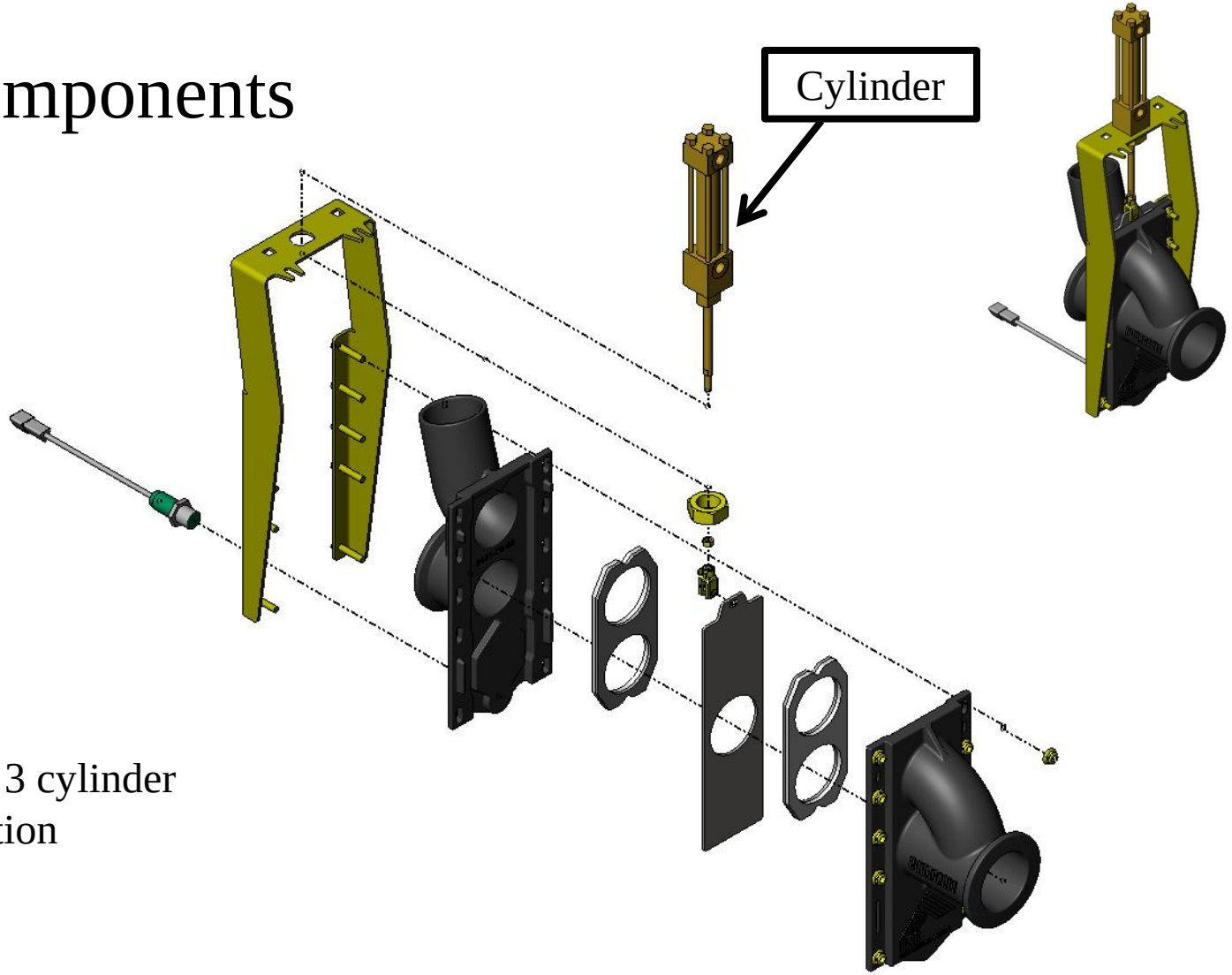
Technical Info

- Valve Components



- 3000 psi 5/8 X 3 cylinder
- Brass construction

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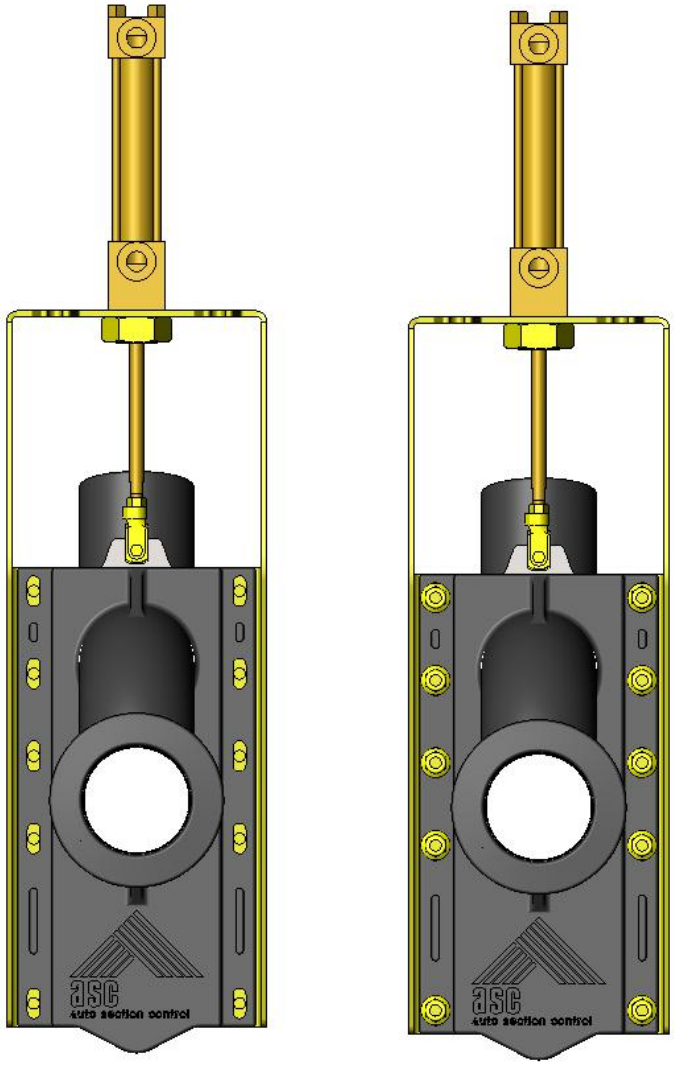
Technical Info

- Valve Calibration
  - Valve body halves needs to be aligned with stainless gate
    1. Ensure Cylinder is fully extended
    2. Align hole in stainless gate with through port in valve halves
    3. Tighten 10 nuts



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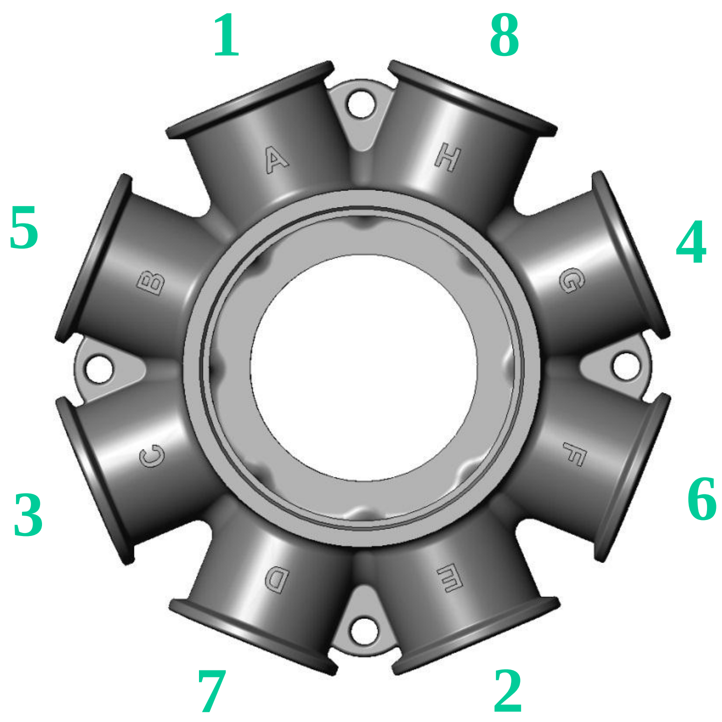
- Manifold Function

1-A 2-E 3-C 4-G 5-B 6-F 7-D 8-H

- Section On
- Section Off



Technical Info

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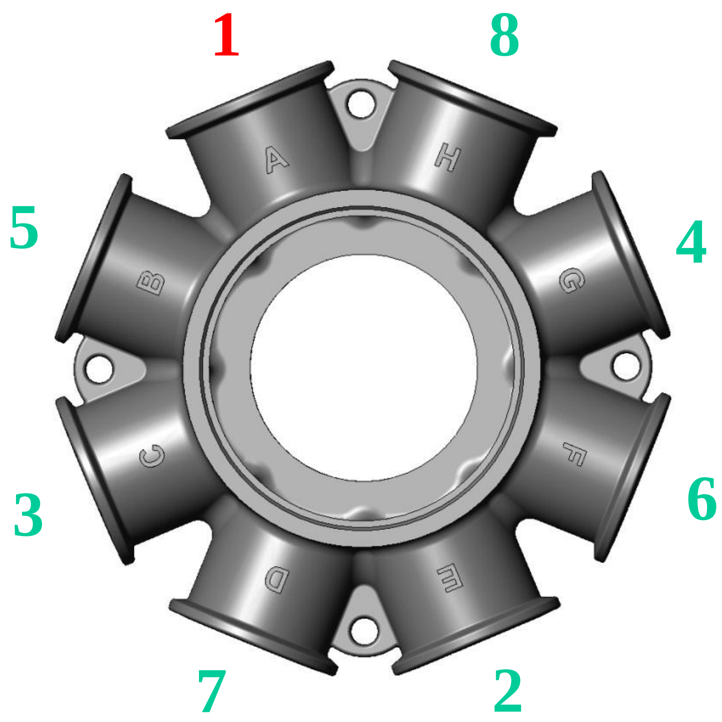

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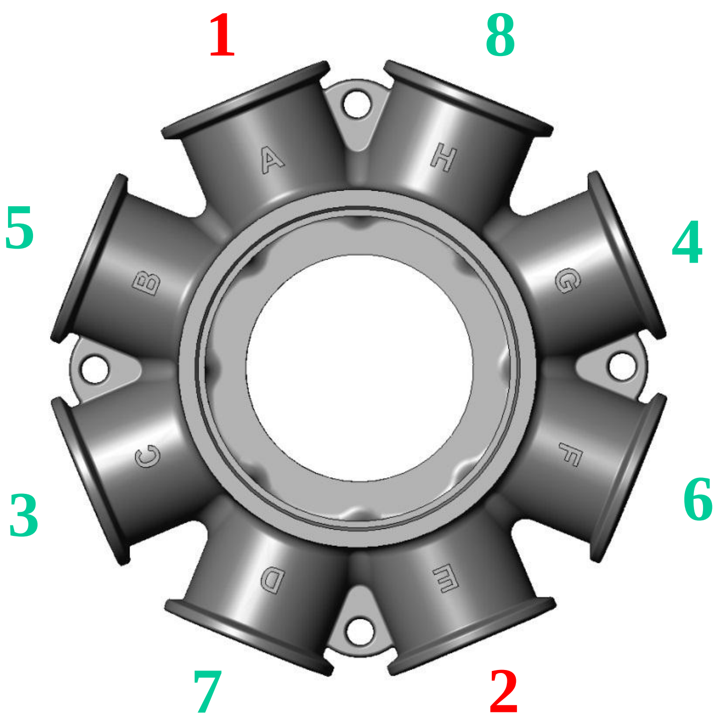

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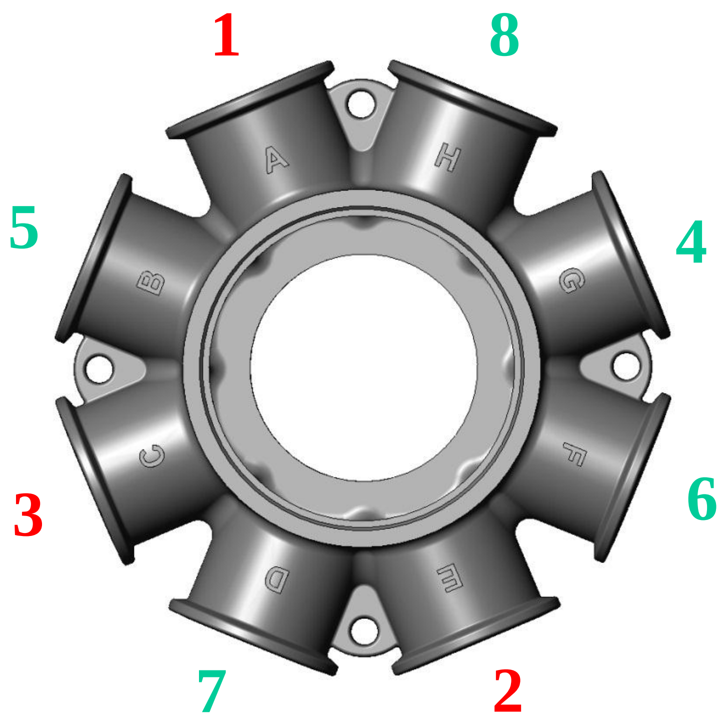

Technical Info

- Manifold Function

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- Section On
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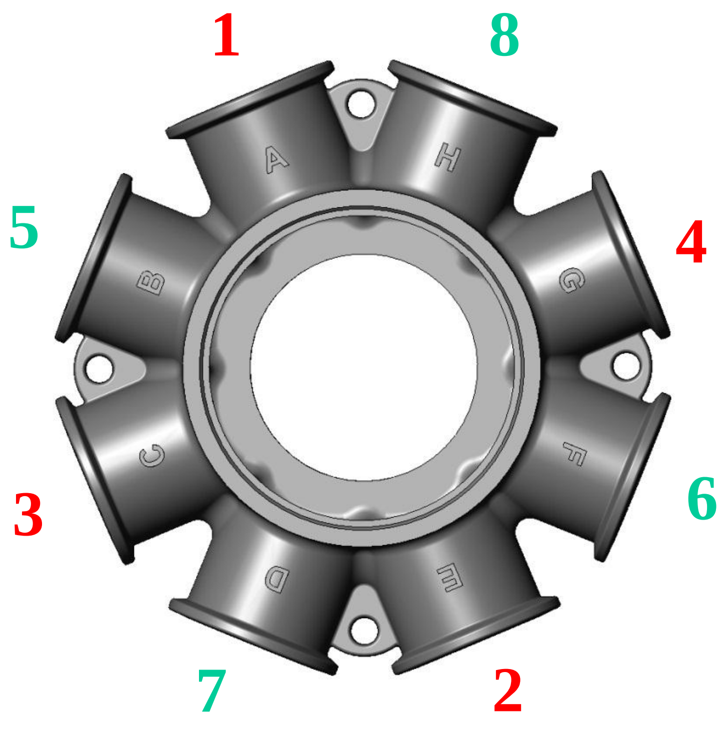

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Technical Info

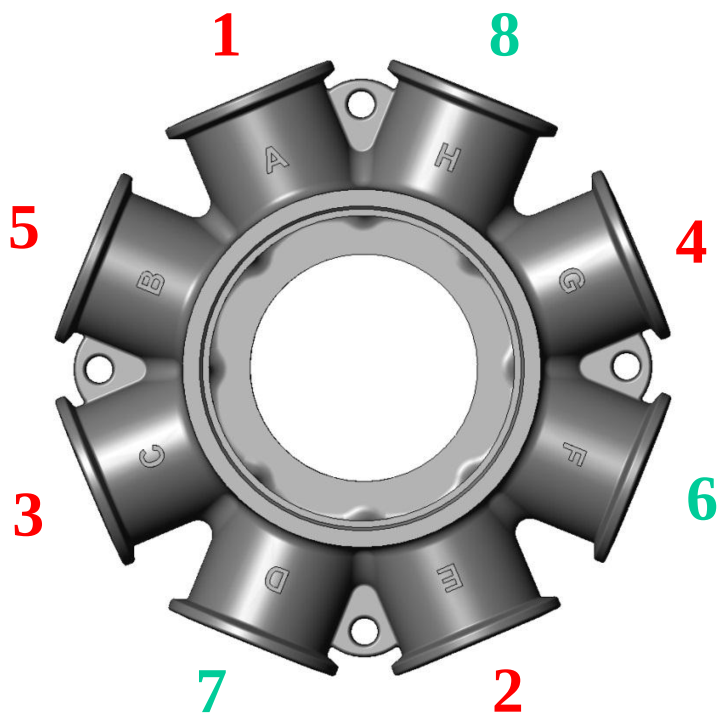
BOURGAULT

- Manifold Function

1-A 2-E 3-C 4-G 5-B 6-F 7-D 8-H

- Section On

- Section Off



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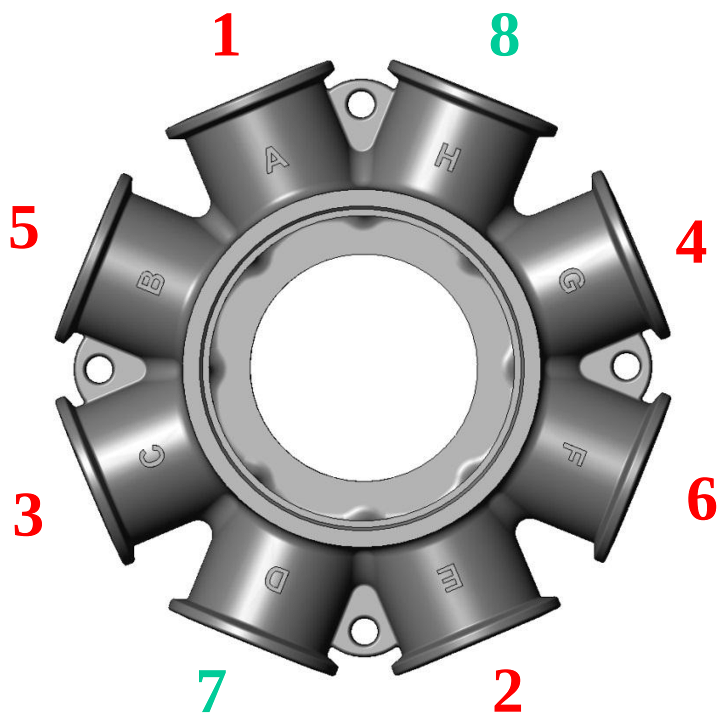
Technical Info

- Manifold Function

1-A 2-E 3-C 4-G 5-B 6-F 7-D 8-H

- Section On
- Section Off



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Technical Info

- Manifold Function

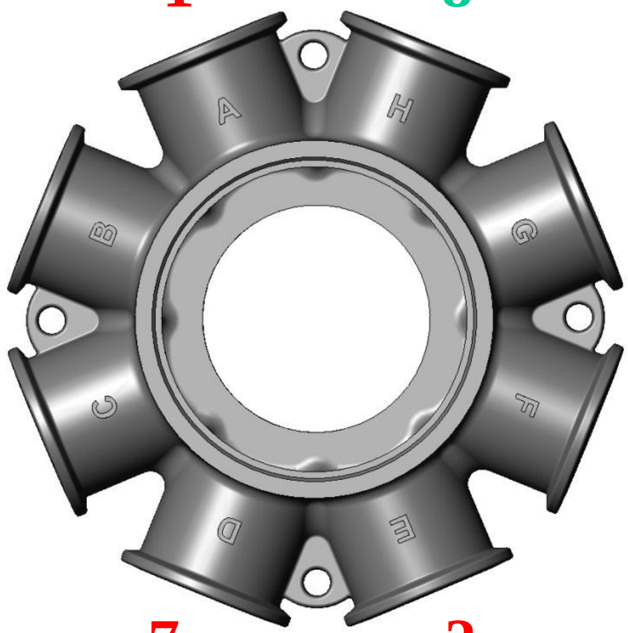
1-A 2-E 3-C 4-G 5-B 6-F 7-D 8-H

- Section On

- Section Off

1 8

5 4



3 6

7 2

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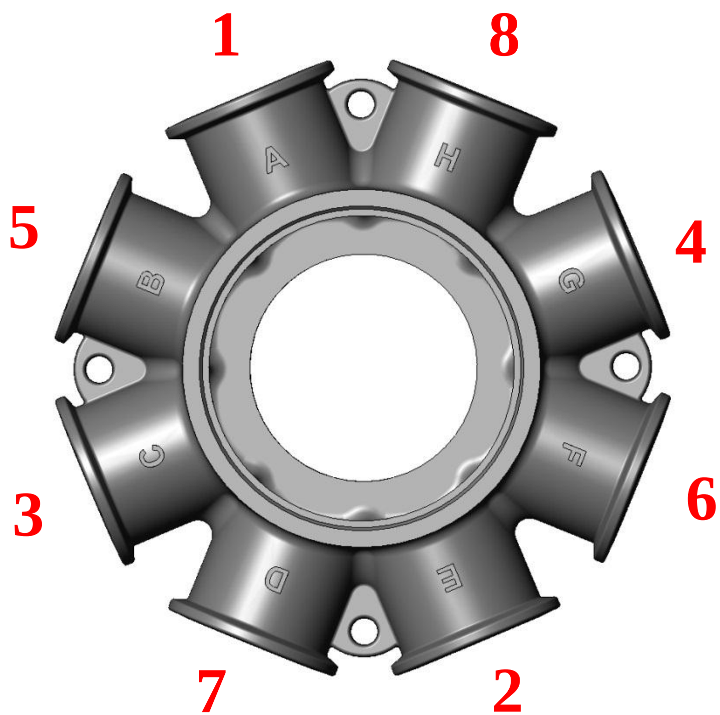
- Manifold Function

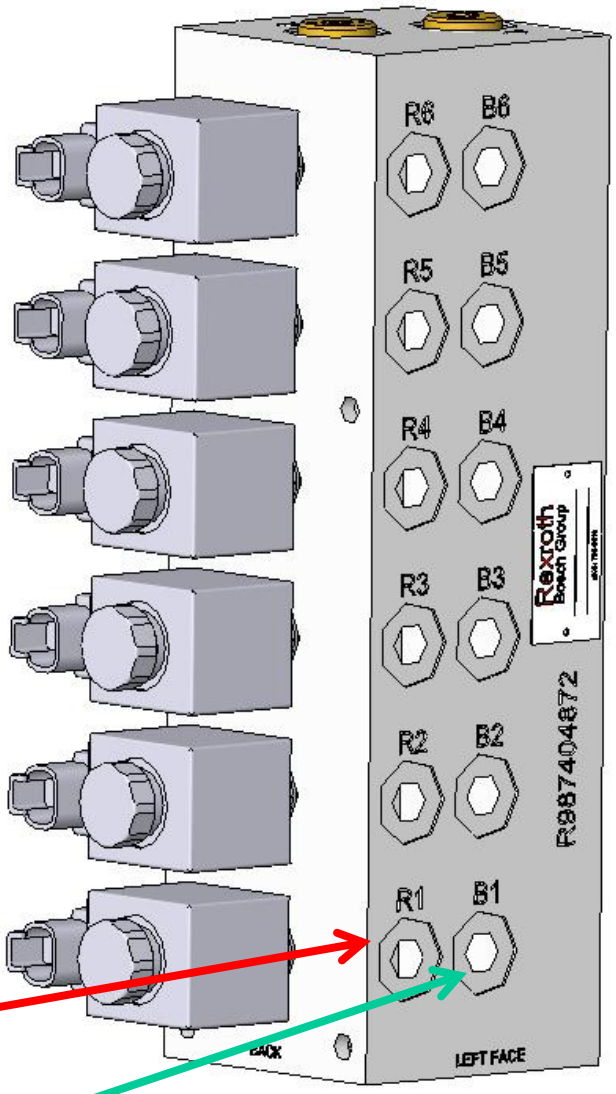
1-A 2-E 3-C 4-G 5-B 6-F 7-D 8-H

- Section On
- Section Off



Technical Info

- Hydraulic Plumbing
  - ASC manifold supply
    - Fan #1 pressure
      - Tee on P1 (front of main block)
  - ASC manifold return
    - Fan #1 return
      - Tee on T1 (front of main block)
  - Section hoses bundled
    - Labelled for manifold assembly
    - Sized for cylinder assembly



"R" → Rod end cylinder port

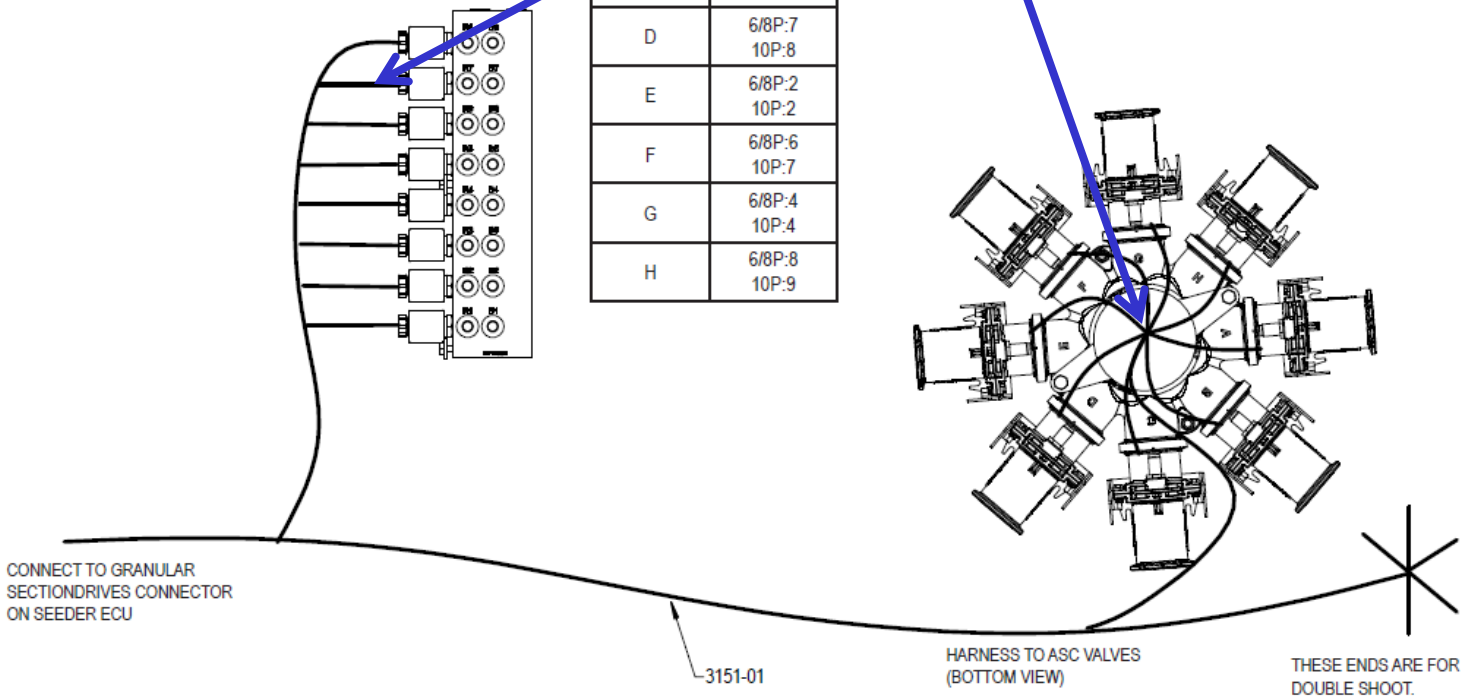
"B" → Blind end cylinder port

Technical Info

- Electrical Connections (6-port, 8-port)

Connect harnesses according to labels

MANIFOLD PORT LABEL	HARNESS LABEL
A	6/8P:1 10P:1
B	6/8P:5 10P:5/6
C	6/8P:3 10P:3
D	6/8P:7 10P:8
E	6/8P:2 10P:2
F	6/8P:6 10P:7
G	6/8P:4 10P:4
H	6/8P:8 10P:9



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Technical Info

- Electrical Connections (10-port)

ECU controls 10-port with 9 sections
- Sections 5/6 combined
- Requires jumpers for:
  - Section solenoids
  - Section sensors

MANIFOLD PORT LABEL	3151-01 HARNESS LABEL	3151-31 HARNESS LABEL
A	6/8P:1 10P:1	-
B	6/8P:6 10P:7	
C	6/8P:3 10P:[illegible]	-
D	6/8P:5 10P:5/6	10P:5
E	6/8P:8 10P:9	-
F	6/8P:2 10P:2	-
G	6/8P:7 10P:8	-
H	6/8P:4 10P:4	-
I	6/8P:5 10P:5/6	10P:6
J	6/8P:9 10P:10	-

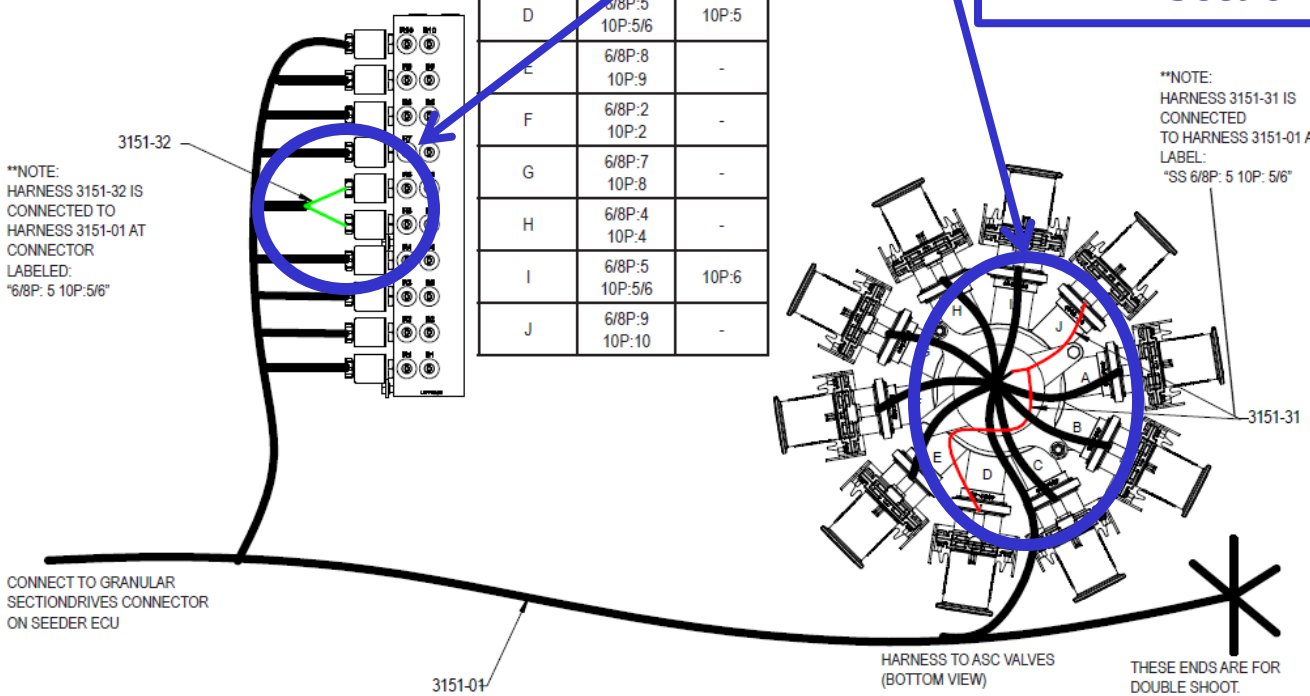

Figure 7.12 - Auto Section Control - 10 Ports

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Technical Info

- Section Switching Alarms
  - X30 will alarm if a section should be “on”, but valve is not open
    - (Not vise-versa)
  - X30 will display an alarm indicating the Boom #, and Section #
    - Granular ASC is Boom #1
  - Section sensing alarms can be diagnosed using the sensors on the valve bodies
    - Sensors detect if section is closed more than about 15% closed

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Technical Info

- Troubleshooting Section Switching Alarms
  - An alarm in the X30 will indicate which section is affected
    - Could be either the SS or DS manifold → Sensors wired in series
  - Sensor LED will indicate where the problem is

SS Manifold

SS Manifold

Both valves in seeding position

Technical Info

- Troubleshooting Section Switching Alarms
  - An alarm in the X30 will indicate which section is affected
    - Could be either the SS or DS manifold → Sensors wired in series
  - Sensor LED will indicate where the problem is

SS Manifold

DS Manifold

● ○ Problem on DS valve

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Technical Info

- Troubleshooting Section Switching Alarms
  - An alarm in the X30 will indicate which section is affected
    - Could be either the SS or DS manifold → Sensors wired in series
  - Sensor LED will indicate where the problem is

SS Manifold

DS Manifold

- Problem on SS Valve (or both)

Technical Info

- Section Timing
  - For 3.16.XX software versions (2014), the meter and section sequence times must be the same

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Technical Info

- Section Timing
  - For 3.16.XX software versions (2014), the meter and section sequence times must be the same
    - "On" Time
      - Time from when product *starts flowing* at the meter to when product *starts flowing* to the ground on the *longest* run

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Technical Info

- Section Timing
  - For 3.16.XX software versions (2014), the meter and section sequence times must be the same
    - "Off" Time
      - Time from when product *stops flowing* at the meter to when product *stops flowing* to the ground on the *shortest* run

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Technical Info

- Practical Suggestions, Recommendations and Limitations
  - *GPS Signal*
    - Omnistar or RTK recommended
      - Auto section control is map-driven → requires precise location information
      - Satellite drift is the primary concern
  - *Drive Straight!*
    - Auto section control is looking 6 – 10 seconds (45 – 75 feet) ahead of the current position → Sharp turns in and out of coverage can cause inaccurate section actuation
  - *Blockage a Must*
    - Along with the section sensing system, single run blockage will provide assurance that the system is operating correctly