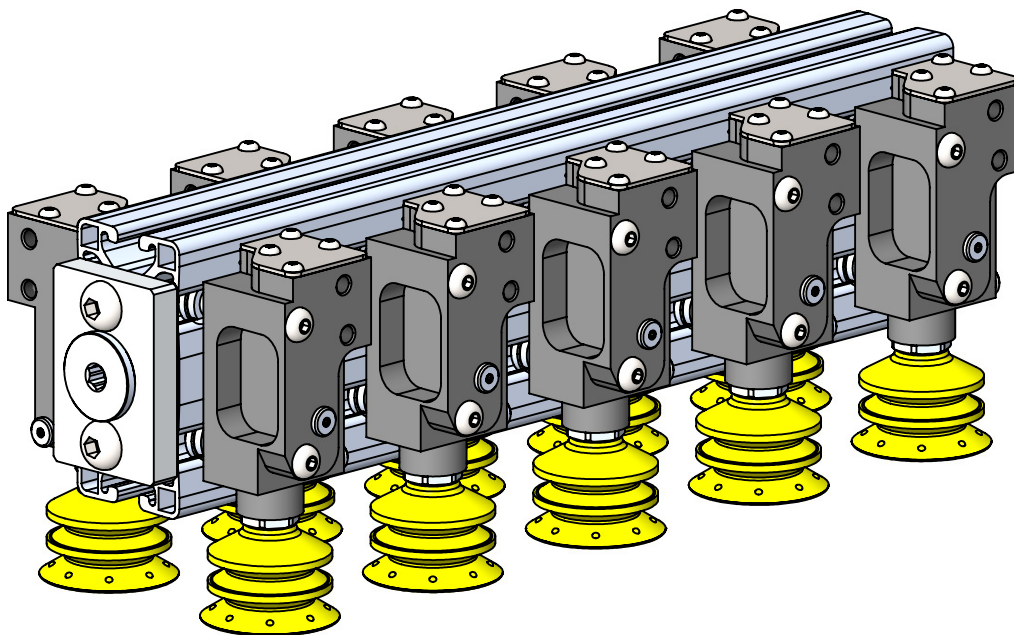
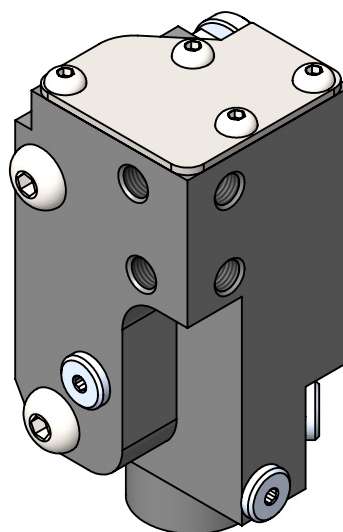


RAIL SYSTEMS

SECTION 12



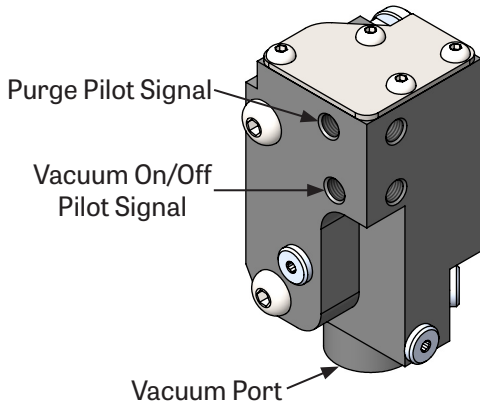
RAIL SYSTEM ASSEMBLIES



General Information	12:3
Ordering Information	12:4
Performance	12:4
RS18	12:5
Rail Assemblies	12:6 - 12:8

RAIL SYSTEMS THE ULTIMATE VACUUM GRIPPER SYSTEM

Rail System Modules include all the features of EDCO Vacuum Grippers with a Positive or Limited Purge. In addition they include a pilot-operated cartridge valve for vacuum on/off control. The modules mount to the side of a lightweight 1-1/2 in. X 3 in. rail profile. Air supply plumbing is completely eliminated by utilizing the rail as a manifold to distribute compressed air to each module.



SIMPLE SYSTEM ZONING

One of the most important features of the Rail System is the ease and ability of zoning. Zoning groups several modules to a pair of 3-way solenoid pilot valves. One solenoid pilot valve controls the vacuum-on and the second controls the positive purge for each zone. Zones can include one to several modules and a system can have one to several zones. Systems should be configured with the smallest number of zones that provide the degree of control required for the application. If the requirements of the application change over time, the Rail System can easily be reconfigured by adjusting the number of modules per zone and/or the number of zones per system.

Zones with small numbers of modules provide the most system control, however, they also require the largest number of solenoid pilot valves.

Application example: Picking and placing various sizes of cases onto a single mixed pallet load.

Systems with all modules controlled as a single zone are the simplest and require only two solenoid pilot valves. These systems are limited to basically on/off operation for all of the modules. Application example: Picking and placing identical cases onto a single pallet load.

PP : POSITIVE PRESSURE PURGE

Air pressure supplied to the venturi is diverted to the vacuum port by blocking the venturi exhaust with a piston operated by a pilot pressure signal. Tool separation movement must begin immediately (no dwell) when purge signal is initiated to prevent excessive positive pressure inside suction cups due to forces pressing the tool onto the work surface. Vacuum switches should not be used due to their limited over-pressure capability.

LP : LIMITED PRESSURE PURGE

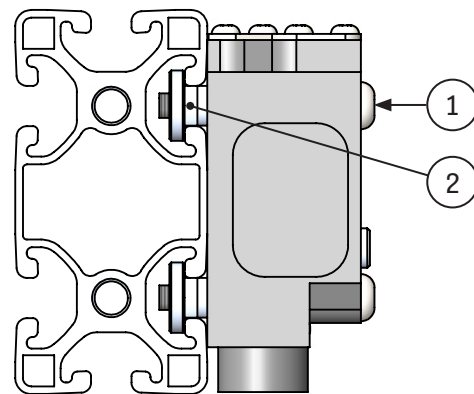
Similar to Positive Purge except it is modified to limit the pressure applied to the suction cup. Purge air flow is not as robust as with the PP option but the pressure is limited so a vacuum switch can be used for part presence detection.

CLEANING OPERATION

Some systems may not require the quick-release provided by the PP or LP options. For these systems, the purge pilot ports can be plugged and not used. However, it would be worthwhile to connect all the purge pilot ports to one pilot valve to provide a brief reverse-flow cleaning action to blow out any ingested debris from the suction cups every few cycles depending on the application environment. This brief cleaning operation won't add to total cycle time and should be performed during the return-home period while suction cups are open to atmosphere.

RUGGED SHEAR KEY MOUNT

Two-point mount with shear keys eliminates the possibility of pumps shifting out of position during operation. Work loads are efficiently and directly transferred to the mounting profile so that mounting screws carry only tensile loads.



- 1) M5 X 40 Screw
- 2) RS-5 - T-Nut

RAIL SYSTEMS

RS18	EXTRUSION PROFILE	VENTURI	PURGE	OPTIONS	CUP SELECTION
	(Blank) = 1-1/2" Profile Rails M = 40 mm Profile Rails	10L 08L 10L	PP PP = Positive Pressure LP = Limited Pressure	SX (Blank) = Standard SX² = Without Valve	B50N (Blank) = No Cup See Information Below
	¹ RS18M can't be purchased as rail assembly.			² Supply valve omitted for constant air supply	

VACUUM CUP SELECTION

Choose vacuum cup style, size, and rubber material from section two of this catalog and add this information as a suffix to the RS18 pump model number. For example: RS18-10L-PP pump and XP-B50N cup are selected. The complete Vacuum Gripper model number would be RS18-10LP-PP-

B50N.

For simplified ordering, several Rail System model numbers are tabulated, but other combinations are readily available at standard prices. Contact your local EDCO USA distributor or call EDCO for assistance.

Cup ¹	B30	B40	B50	B75	B110	BF80	BF100	F75	F110	FC75	FC100
Volume: in ³ (cc)	0.61 [10]	0.9 [14.7]	2.0 [32.8]	6.7 [110]	19 [311]	1.8 [29.5]	4.9 [80.3]	1.2 [19.7]	4.3 [70.5]	2.3 [37.6]	4.9 [80.3]
Evacuation Time ² : sec	0.013	0.02	0.04	0.15	0.42	0.04	0.11	0.03	0.1	0.05	0.11
Force @ 15 inHG: lb (N)	4.1 [18.2]	7.3 [32.5]	12.1 [53.8]	30.8 [137]	64.1 [285]	35 [156]	65 [289]	37.5 [167]	78.3 [348]	29.1 [129]	53.3 [237]

¹Values apply to all cup materials

²Evacuating to 15 inHG (50.8 -kPa) at 72 psi (5 bar).

EVACUATION TIME

In a non-porous system, evacuation time for any vacuum cup is calculated by multiplying the internal cup volume by the time factor for the desired vacuum level from the Evacuation Time Calculation Table.

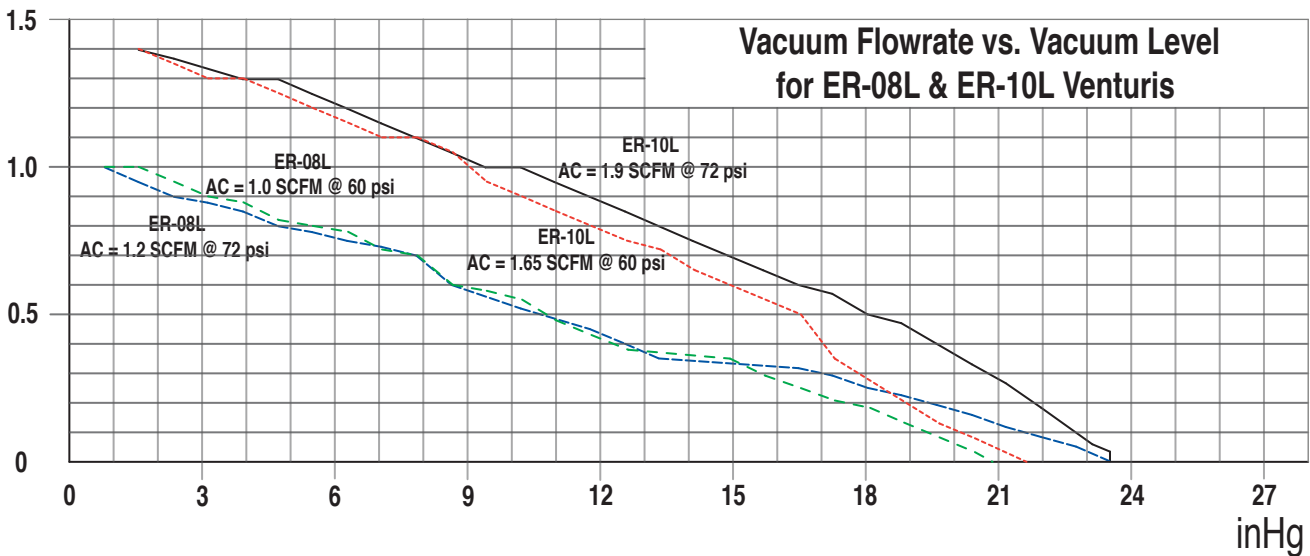
For Example: XP-B75 @ 15 inHG (50.8 kPa)

$$\text{Evacuation Time} = \frac{\text{Volume}}{\text{Time Factor}} = \frac{6.7 \text{ in}^3}{0.022 \text{ sec/in}^3} = 0.15 \text{ sec}$$

Vacuum Level: inHG (-kPa)	9 [30.5]	12 [40.6]	15 [50.8]	18 [61]	21 [71]
Time Factor: sec/in ³	0.008	0.014	0.022	0.036	0.061

PERFORMANCE

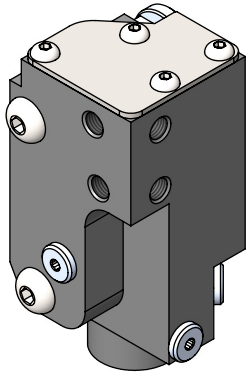
SCFM



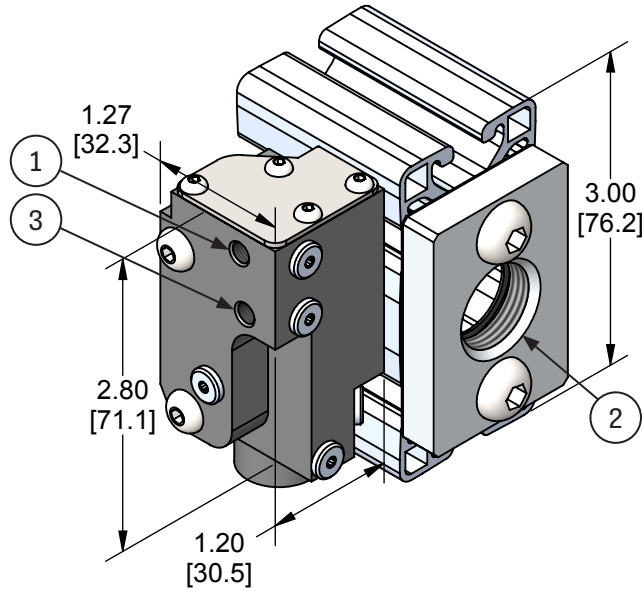
All performance data presented is a representation of production pumps but is not a guarantee due to variations in local barometric pressure and of mass produced components.

RAIL SYSTEMS

RS18-10L-PP / RS18-10L-LP



Weight: 0.28 lbs [125.0 g]



- 1) Purge Pilot Signal - M5 (10-32 UNF)
- 2) Air Supply - 3/8 NPSF
- 3) Vacuum On/Off - M5 (10-32 UNF)

ALUMINUM PILOT FITTINGS

LB25-10 – Elbow
10-32 UNF (M5),
with O-ring seal
4mm (5/32 in) O.D.
Tubing Barb



Weight: 0.0045 lbs (2.14 g)

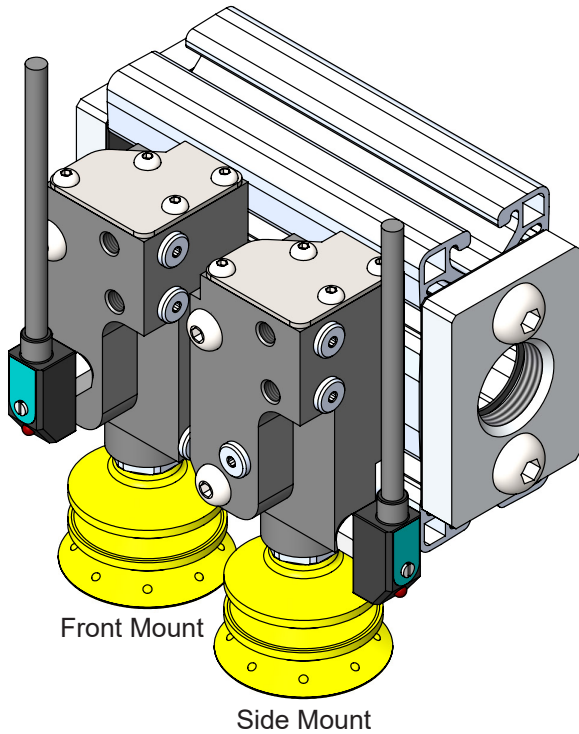
P10 – Plug
10-32 UNF (M5),
with O-ring seal



Weight: 0.0005 lbs (0.28 g)

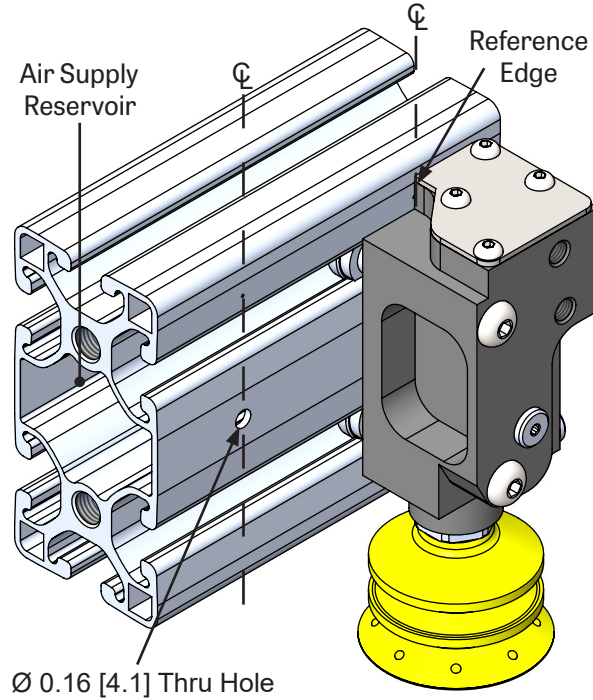
VACUUM SENSOR OPTION

A P10 plug can be removed from the front or side of the RS18 module to accommodate a VP-3 or VN-3 vacuum sensor.



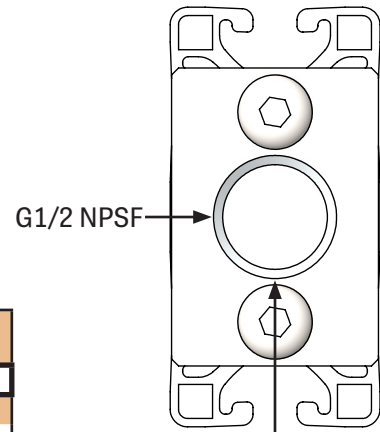
SIMPLE MODULE ALIGNMENT

Placing the Reference Face of the module on the center line of the thru hole aligns the compressed air port with the thru hole.



RAIL SYSTEMS RAIL ASSEMBLIES

The 1-1/2"x3" Aluminum extrusion profiles include 3/8" NPSF ports at each end, one for air supply and the other for a plug or a pressure gauge. Rails are drilled to mount modules on center-to-center distances to your specifications. The minimum recommended spacing is 1-1/2 in. (38.1 mm) but is also dependent on suction cup diameter. RS18-10L modules will be mounted to the rail and tested by EDCO USA. Pilot port fittings, zone tubing, and 3-way air solenoid pilot valves must be installed by the system integrator because of the many possible configurations.



RSA	MODULES	CENTER SPACING	END SPACING	SINGLE OR DOUBLE SIDED
	20 Insert number of modules desired	2.40 Insert distance from center of one module to the center of the next module (inches)	0.9 Insert distance from end of profile to the center of the first module	S S = Single Sided D = Double Sided <small>*Limited to 50 mm and smaller cups.</small>

PROFILE LENGTH

Minimum recommended center-to-center spacing is 1.5in but is also dependent on suction cup diameter. The minimum recommended end spacing is 0.9 in.

Profile Length Calculation

$$+ \frac{2 \times \text{End Spacing (in)} + \text{Center Spacing (in)} \times (\text{Number of Modules}^* - 1)}{\quad} = \text{Profile Length (in)}$$

* For a Double Sided rail divide the **Number of Modules** by 2.

Examples:

Single Sided Rail

RSA-20-2.40-0.9-S

End Spacing = 0.9
Center Spacing = 2.40
Number of Modules = 20

$$+ \frac{2 \times (0.9) + 2.40 \times (20-1)}{\quad} = 47.4 \text{ in.}$$

Double Sided Rail

RSA-40-2.00-0.9-D

End Spacing = 0.9
Center Spacing = 2.00
*Number of Modules = 40
For the calculation we need to divide the Number of Modules by 2.
40/2 = 20

$$+ \frac{2 \times (0.9) + 2.00 \times (20-1)}{\quad} = 39.8 \text{ in.}$$

RAIL ASSEMBLY WEIGHT

For total assembly weight add the Rail weight with RS18 Module weights, 0.253 lbs for the 3/8 NPSF End Caps, suction cup weights, and fitting weights.

Weight Calculations

Rail Weight (lbs)

$$+ \frac{\text{Profile Length (in)} \times 0.138 + \text{Number of Modules} \times 0.275}{\quad} + 0.267 \text{ (End Plates)} = \text{Rail Weight (lbs)}$$

Example:

RSA-20-2.40-0.9-S

Profile Length = 47.4 in

$$+ \frac{47.4 \times 0.138 + 20 \times 0.275}{\quad} + 0.267 = 11.21 \text{ lbs}$$

Total Weight (lbs)

$$+ \frac{\text{Rail Weight (lbs)} + \text{Number of P10} \times 0.0005 + \text{Number of LB25-10} \times 0.0045 + \text{Number of Cups} \times \text{Cup Weight}}{\quad} + \text{Number of Cups} \times \text{Cup Fitting Weight} = \text{Total Weight (lbs)}$$

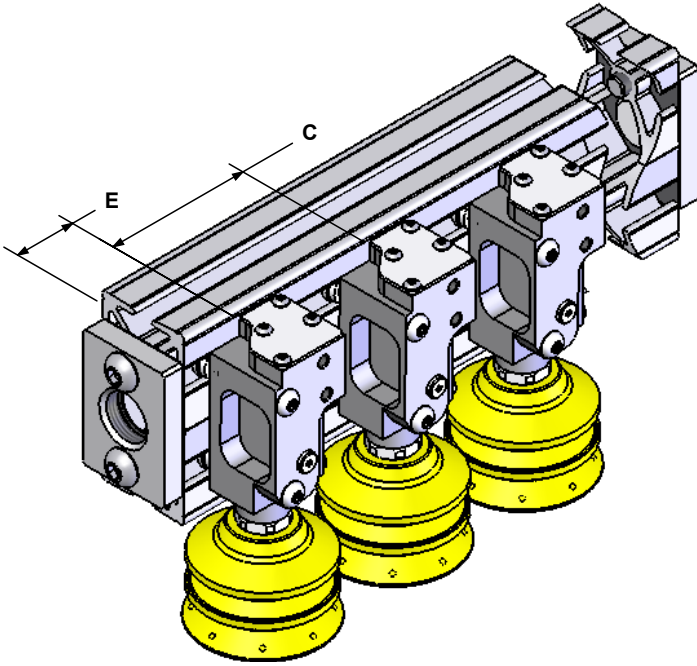
Example:

RSA-20-2.40-0.9-S with RS18-10L-PP-B50N

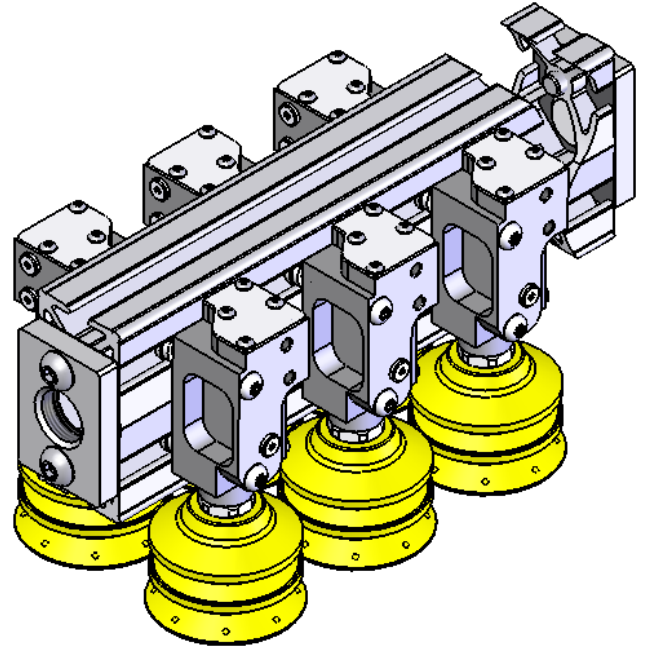
Rail Weight 11.21
20 P10 Plugs 20 x 0.0005
20 LB25-10 Elbows 20 x 0.0045
20 XP-B50N Cups 20 x 0.047
20 50-38M Fittings 20 x 0.02

$$+ \frac{\quad}{\quad} = 12.65 \text{ lbs}$$

RAIL SYSTEMS
SINGLE SIDED RAIL ASSEMBLY

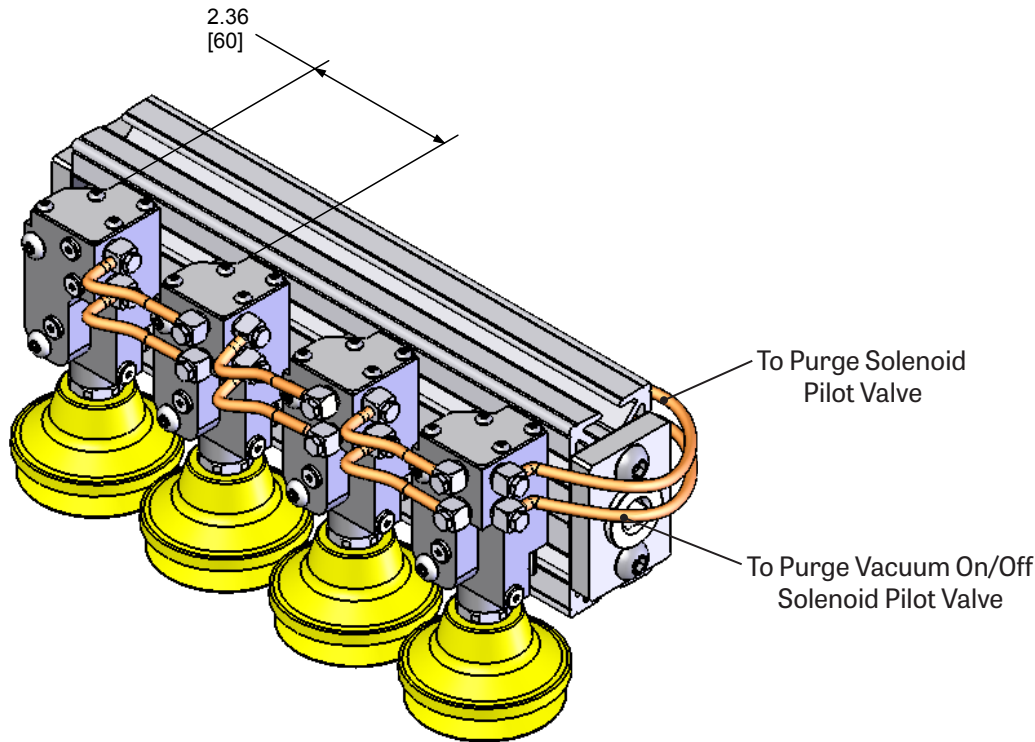


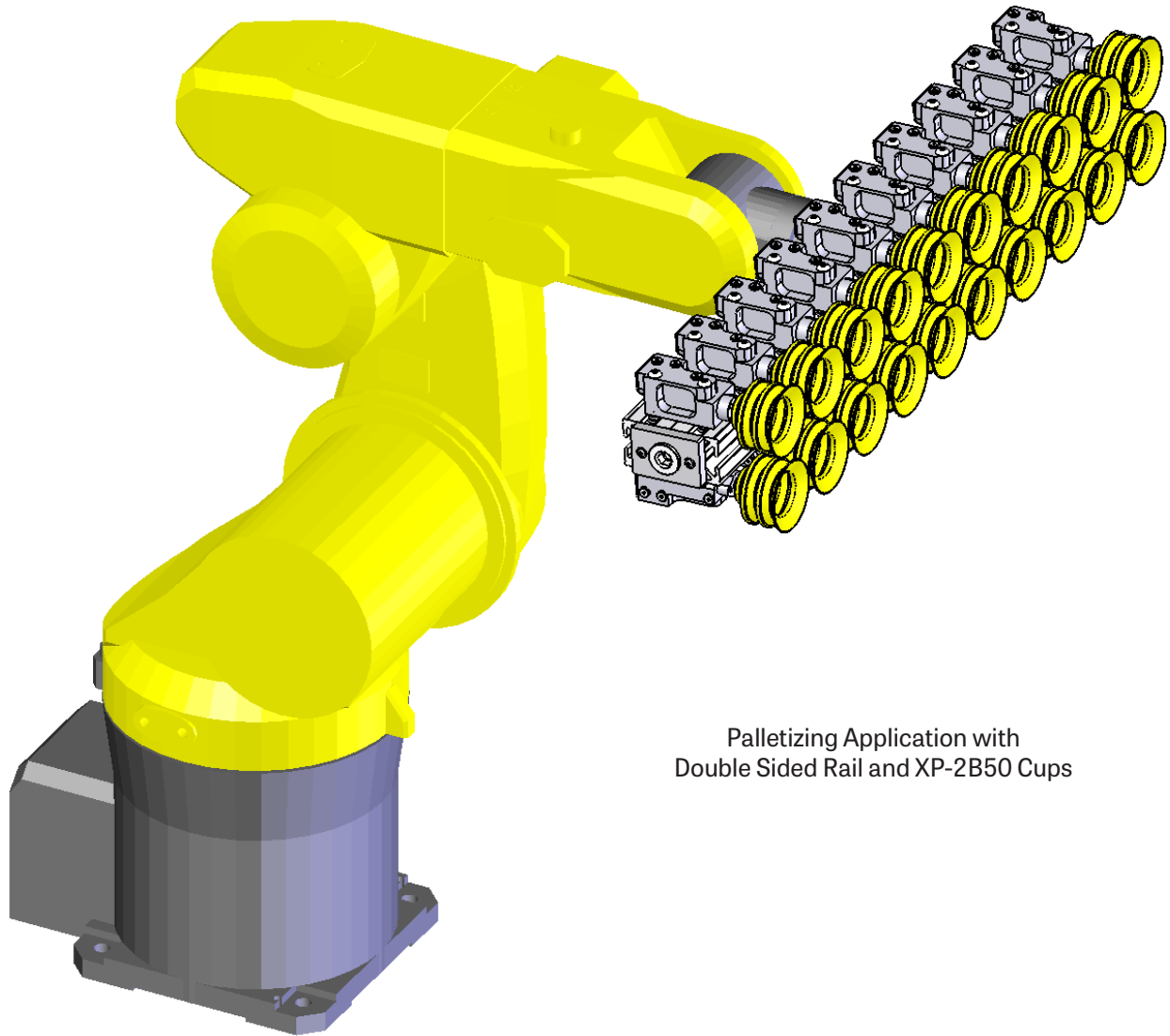
DOUBLE SIDED RAIL ASSEMBLY



ZONED RAIL ASSEMBLY

Typical XP-B50 center-to-center spacing of 2.36 in [60 mm].





Palletizing Application with
Double Sided Rail and XP-2B50 Cups