

**APPLIED ROBOTICS  
PALLETIZING GRIPPER  
(ARPG)  
*BAG GRIPPER  
PALLET PICKER OPTION***

**95645, Rev 01**

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## REVISION

Revision	Date	Author	Description
00	02/19/2019	DS	Initial Release
01	04/01/2019	DS	Corrections

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# 1 PRECAUTIONS



## READ MANUAL

Do not start, operate or service machine until you read and understand operator's manual. Failure to do so could result in serious injury.



## HAND CRUSH NOTICE

Indicates the possibility for a crush force between components, such as ARPG and the conveyor/pallet.



Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



Indicates a situation which, if not avoided, could result in equipment damage and voiding the manufacturer's equipment warranty.

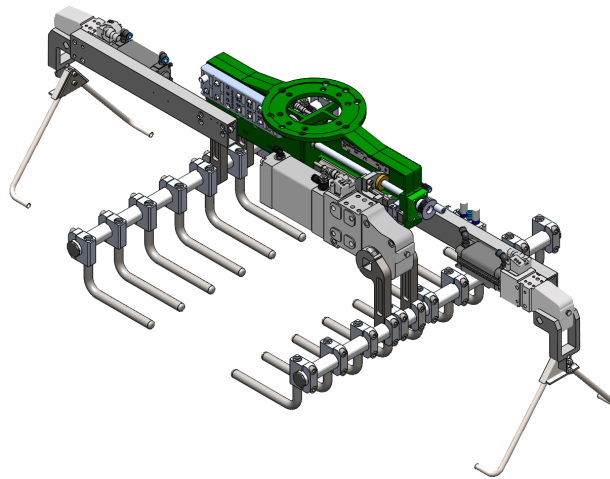
**IGNORING INFORMATION ABOUT POTENTIAL HAZARDS CAN LEAD TO SERIOUS HARM TO PERSONNEL AND/OR DAMAGE TO THE EQUIPMENT, AND MAY RESULT IN THE NULLIFICATION OF THE MANUFACTURER'S EQUIPMENT WARRANTY.**

**HEED ALL PRECAUTION NOTICES**

## 2 SYSTEM DESCRIPTION

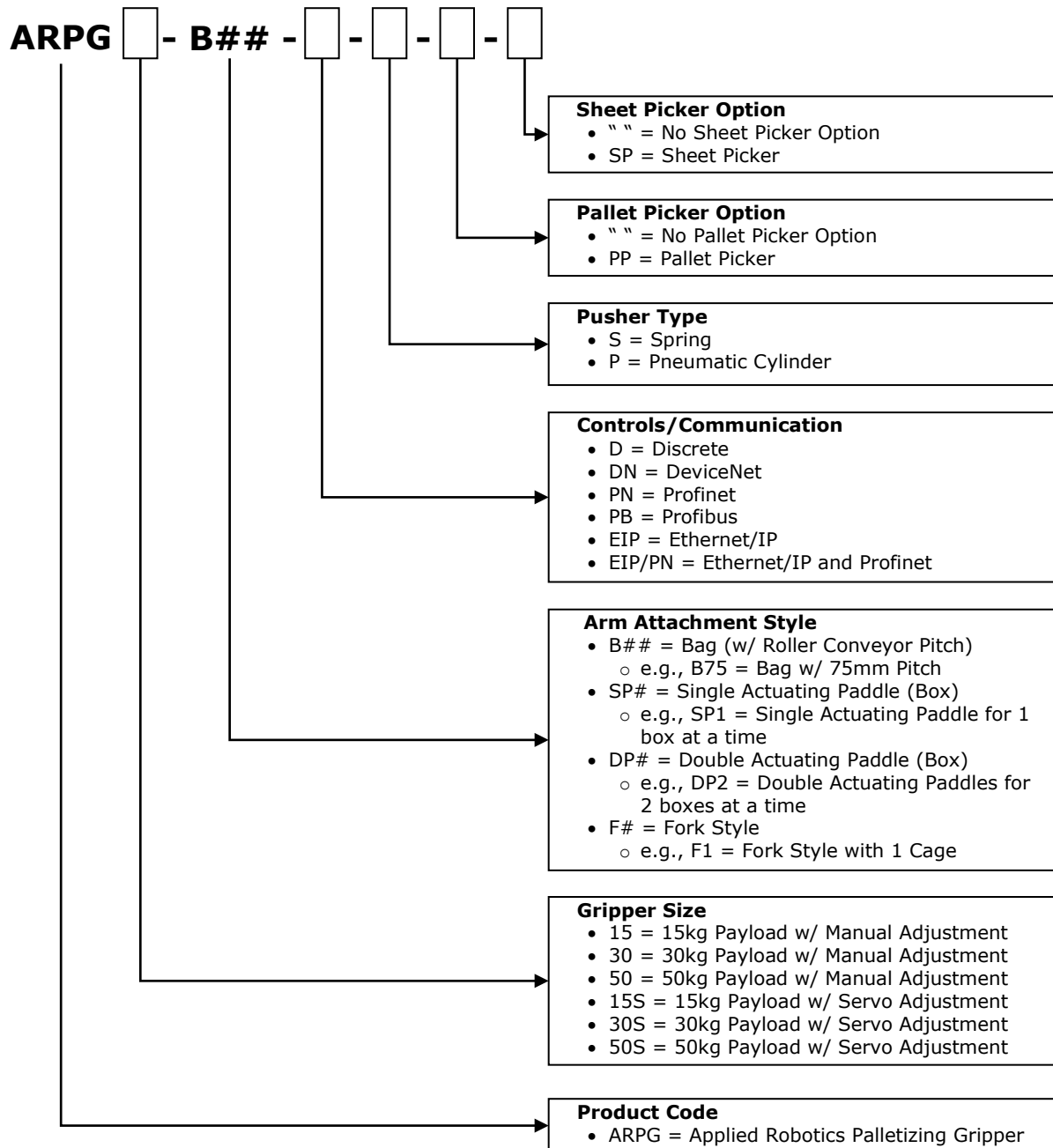
The APPLIED ROBOTICS Palletizing Gripper (ARPG) Bag Gripper provides rapid pick-and-place palletizing of bagged products presented on a roller conveyor. The ARPG mounts directly to robot face plates utilizing an integral ISO 9409-1 125mm or 160mm bolt pattern. The gripper easily integrates with any robot system communicating with a network, only requiring a communication connection, a power connection, and an air supply to operate and utilize the full capability of the ARPG.

The ARPG Bag Gripper – Pallet Picker option mounts directly on the ARPG Bag Gripper frame and allows for the picking and placing of standard pallets without interrupting the palletization cycle.



**Figure 2.1-1. ARPG Bag Gripper with Pallet Picker Option**

## 2.1 PALLETIZING GRIPPER DESCRIPTION

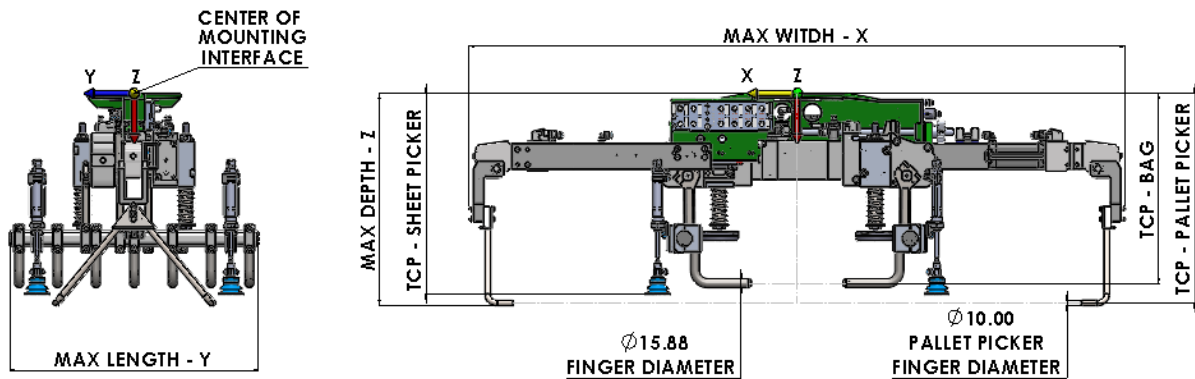


**Special:** ARPG---S####

Note: If " " (blank) is chosen, remove "-" (dash) if that is the only input between dashes.

### 3 TECHNICAL SPECIFICATIONS

The Tool Control Point (TCP) is used when programming the ARPG. Figure 2.1-1 depicts the dimensions from Table 3.1-2, Table 3.2-2, and Table 3.3-2. All values are measured from an origin located at the center of the 160mm bolt circle mounting interface with the X-axis and Y-axis in the plane of the interface and the positive Z-axis in the direction extending away from the mounting interface.



**Figure 2.1-1. ARPG TCP Dimensions**

### 3.1 ARPG15 & ARPG15S (15 KG)

**Table 3.1-1. ARPG15 & ARPG15S Technical Specifications**

Specification	Metric	English
Rated Payload	15 kg	33 lb
Recommended Maximum Bag Length	600 mm	23.62 in
Bag Width	200 to 375 mm	7.87 to 14.76 in
Bag Height	75 to 150 mm	2.95 to 5.91 in
Mass / Weight *	19.9 kg	43.9 lb
Bags Per Minute	30 BPM	
Operating Pressure	4 to 6 bar	58 to 87 psi
Operating Temperature	5 °C to 60 °C	41 °F to 140 °F
Transportation & Storage Temperature	-40 °C to 80 °C	-40 °F to 176 °F
Transportation & Storage Humidity	Up to 50%, Maximum Temperature 40 °C (104 °F)	
Noise Emission	<= 70 dB(A) in any direction	
Chemical Resistance	Contact APPLIED ROBOTICS Technical Support	
Bus Connection	4 Pin D-Coded M12 (Ethernet/IP & Profinet)	
Power Connection	5 Pin L-Coded M12	
Air Supply Connection	Push-to-Connect 6 mm Tube	

\* Weight may vary depending on specific configuration.

**Table 3.1-2. ARPG15 & ARPG15S TCP Specifications**

<b>Specification</b>	<b>No Options</b>	<b>With Pallet Picker</b>	<b>With Sheet Picker</b>	<b>With Pallet Picker and Sheet Picker</b>
Mass / Weight ***	19.9 kg (43.9 lb)	22.6 kg (49.8 lb)	21.0 kg (46.3 lb)	23.7 kg (52.2 lb)
Center of Mass – X	5.5 mm (0.22 in)	4.5 mm (0.18 in)	4.6 mm (0.18 in)	3.7 mm (0.15 in)
Center of Mass – Y	-1.5 mm (-0.06 in)	-1.2 mm (-0.05 in)	-1.3 mm (-0.05 in)	-1.1 mm (-0.04 in)
Center of Mass – Z	162.5 mm (6.4 in)	161.8 mm (6.4 in)	166.5 mm (6.6 in)	165.3 mm (6.5 in)
Max Width – X	588.7 mm (23.2 in)	1303.0 mm (51.3 in)	612.3 mm (24.1 in)	1303.0 mm (51.3 in)
Max Length – Y	494.0 mm (19.4 in)	494.0 mm (19.4 in)	494.0 mm (19.4 in)	494.0 mm (19.4 in)
Max Depth – Z	383.9 mm (15.1 in)	420.1 mm (16.5 in)	397.5 mm (15.6 in)	420.1 mm (16.5 in)
TCP – Bag*	376.0 mm (14.8 in)	376.0 mm (14.8 in)	376.0 mm (14.8 in)	376.0 mm (14.8 in)
TCP – Pallet Picker*	N/A	414.2 mm (16.3 in)	N/A	414.2 mm (16.3 in)
TCP – Sheet Picker*	N/A	N/A	397.5 mm (15.6 in)	397.5 mm (15.6 in)

\* TCP is measured from the Center of the Mounting Interface to the midplane of the fingers or vacuum cup surface.

\*\* All Z values are measured using the 160mm bolt pattern. If using the 125mm bolt pattern, subtract 2 mm (0.08 in) from value.

\*\*\* Weight may vary depending on specific configuration.

### 3.2 ARPG30 & ARPG30S (30 KG)

**Table 3.2-1. ARPG30 & ARPG30S Technical Specifications**

Specification	Metric	English
Rated Payload	30 kg	66 lb
Recommended Maximum Bag Length	750 mm	29.53 in
Bag Width	300 to 500 mm	11.81 to 19.69 in
Bag Height	75 to 150 mm	2.95 to 5.91 in
Mass / Weight *	26.2 kg	57.8 lb
Bags Per Minute	30 BPM	
Operating Pressure	4 to 6 bar	58 to 87 psi
Operating Temperature	5 °C to 60 °C	41 °F to 140 °F
Transportation & Storage Temperature	-40 °C to 80 °C	-40 °F to 176 °F
Transportation & Storage Humidity	Up to 50%, Maximum Temperature 40 °C (104 °F)	
Noise Emission	<= 70 dB(A) in any direction	
Chemical Resistance	Contact APPLIED ROBOTICS Technical Support	
Bus Connection	4 Pin D-Coded M12 (Ethernet/IP & Profinet)	
Power Connection	5 Pin L-Coded M12	
Air Supply Connection	Push-to-Connect 6 mm Tube	

\* Weight may vary depending on specific configuration.

**Table 3.2-2. ARPG30 & ARPG30S TCP Specifications**

<b>Specification</b>	<b>No Options</b>	<b>With Pallet Picker</b>	<b>With Sheet Picker</b>	<b>With Pallet Picker and Sheet Picker</b>
Mass / Weight ***	26.2 kg (57.8 lb)	29.0 kg (63.9 lb)	27.3 kg (60.2 lb)	30.0 kg (66.1 lb)
Center of Mass – X	4.2 mm (0.17 in)	3.1 mm (0.12 in)	3.6 mm (0.14 in)	2.6 mm (0.10 in)
Center of Mass – Y	-1.1 mm (-0.04 in)	-0.9 mm (-0.04 in)	-1.0 mm (-0.04 in)	-0.8 mm (-0.03 in)
Center of Mass – Z	176.3 mm (6.9 in)	174.3 mm (6.9 in)	179.0 mm (7.0 in)	176.9 mm (7.0 in)
Max Width – X	609.0 mm (24.0 in)	1303.0 mm (51.3 in)	726.1 mm (28.6 in)	1303.0 mm (51.3 in)
Max Length – Y	646.0 mm (25.4 in)	646.0 mm (25.4 in)	646.0 mm (25.4 in)	646.0 mm (25.4 in)
Max Depth – Z	380.7 mm (15.0 in)	420.1 mm (16.5 in)	398.7 mm (15.7 in)	420.1 mm (16.5 in)
TCP – Bag*	372.8 mm (14.7 in)	372.8 mm (14.7 in)	372.8 mm (14.7 in)	372.8 mm (14.7 in)
TCP – Pallet Picker*	N/A	415.1 mm (16.3 in)	N/A	415.1 mm (16.3 in)
TCP – Sheet Picker*	N/A	N/A	398.7 mm (15.7 in)	398.7 mm (15.7 in)

\* TCP is measured from the Center of the Mounting Interface to the midplane of the fingers or vacuum cup surface.

\*\* All Z values are measured using the 160mm bolt pattern. If using the 125mm bolt pattern, subtract 2 mm (0.08 in) from value.

\*\*\* Weight may vary depending on specific configuration.

### 3.3 ARPG50 & ARPG50S (50 KG)

**Table 3.3-1. ARPG50 & ARPG50S Technical Specifications**

Specification	Metric	English
Rated Payload	50 kg	110 lb
Recommended Maximum Bag Length	1,050 mm	41.34 in
Bag Width	400 to 600 mm	15.75 to 23.62 in
Bag Height	100 to 200 mm	3.94 to 7.87 in
Mass / Weight *	45.3 kg	99.9 lb
Bags Per Minute	30 BPM	
Operating Pressure	4 to 6 bar	58 to 87 psi
Operating Temperature	5 °C to 60 °C	41 °F to 140 °F
Transportation & Storage Temperature	-40 °C to 80 °C	-40 °F to 176 °F
Transportation & Storage Humidity	Up to 50%, Maximum Temperature 40 °C (104 °F)	
Noise Emission	<= 70 dB(A) in any direction	
Chemical Resistance	Contact APPLIED ROBOTICS Technical Support	
Bus Connection	4 Pin D-Coded M12 (Ethernet/IP & Profinet)	
Power Connection	5 Pin L-Coded M12	
Air Supply Connection	Push-to-Connect 6 mm Tube	

\* Weight may vary depending on specific configuration.

**Table 3.3-2. ARPG50 & ARPG50S TCP Specifications**

<b>Specification</b>	<b>No Options</b>	<b>With Pallet Picker</b>	<b>With Sheet Picker</b>	<b>With Pallet Picker and Sheet Picker</b>
Mass / Weight ***	45.3 kg (99.9 lb)	48.2 kg (106.3 lb)	46.4 kg (102.3 lb)	49.4 kg (108.9 lb)
Center of Mass – X	3.3 mm (0.13 in)	2.7 mm (0.11 in)	3.0 mm (0.12 in)	2.4 mm (0.09 in)
Center of Mass – Y	-0.7 mm (0.03 in)	-0.6 mm (-0.02 in)	-0.7 mm (0.03 in)	-0.6 mm (-0.02 in)
Center of Mass – Z	205.2 mm (8.1 in)	208.7 mm (8.2 in)	208.2 mm (8.2 in)	211.8 mm (8.3 in)
Max Width – X	751.9 mm (29.6 in)	1322.9 mm (52.1 in)	826.1 mm (32.5 in)	1322.9 mm (52.1 in)
Max Length – Y	806.0 mm (31.7 in)	806.0 mm (31.7 in)	806.0 mm (31.7 in)	806.0 mm (31.7 in)
Max Depth – Z	471.8 mm (18.6 in)	529.4 mm (20.8 in)	503.5 mm (19.8 in)	529.4 mm (20.8 in)
TCP – Bag*	463.2 mm (18.2 in)	463.2 mm (18.2 in)	463.2 mm (18.2 in)	463.2 mm (18.2 in)
TCP – Pallet Picker*	N/A	524.5 mm (20.6 in)	N/A	524.5 mm (20.6 in)
TCP – Sheet Picker*	N/A	N/A	503.5 mm (19.8 in)	503.5 mm (19.8 in)

\* TCP is measured from the Center of the Mounting Interface to the midplane of the fingers or vacuum cup surface.

\*\* All Z values are measured using the 160mm bolt pattern. If using the 125mm bolt pattern, subtract 2 mm (0.08 in) from value.

\*\*\* Weight may vary depending on specific configuration.

## 4 INSTALLATION

### 4.1 MECHANICAL INSTALLATION

Follow these instructions for each of the two (2) arms of the ARPG Bag Gripper – Pallet Picker option:

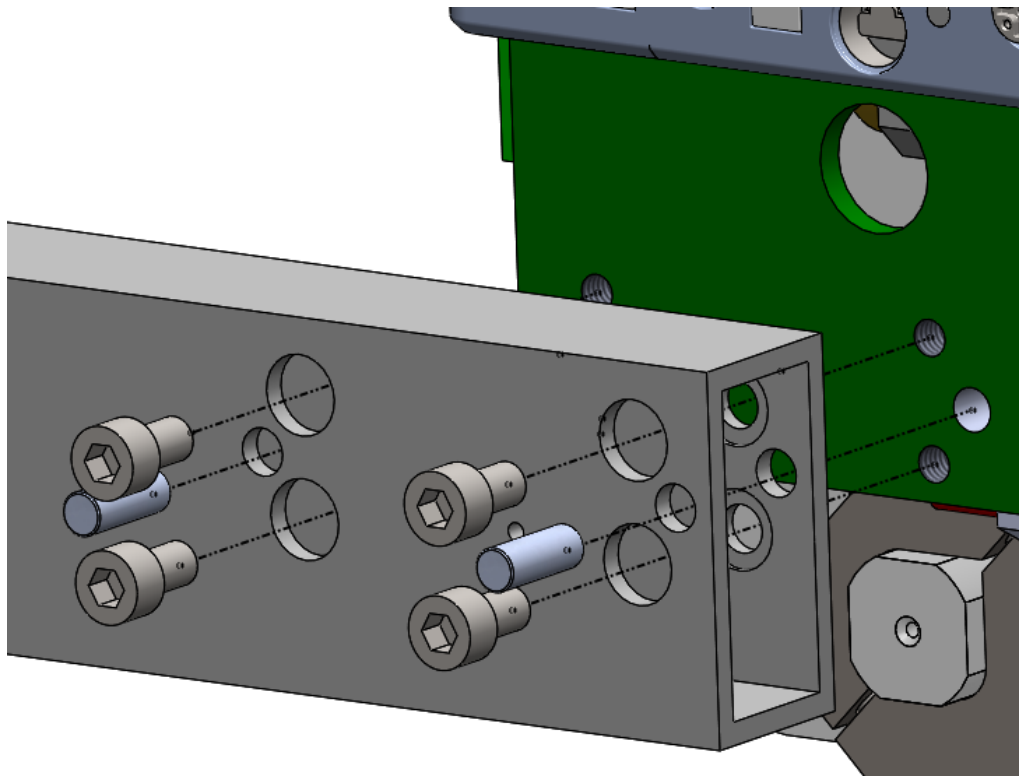
#### NOTICE

**ENSURE THAT THE MATING SURFACES OF THE GRIPPER AND PALLET PICKER RAIL ARE FLUSH (PLANAR) WHEN FASTENING SCREWS.**

1. Locate the ARPG Bag Gripper – Pallet Picker arm utilizing two (2) M6 locating dowels in the locating holes on the ARPG Bag Gripper.
2. Insert and tighten four (4) M6 X 10 socket head cap screws (minimum Property Class 10.9) using Loctite 242 threadlocker or equivalent.

#### NOTICE

**M6 SCREWS HAVE A RECOMMENDED TORQUE OF 10.4 Nm (92.4 IN-LB).**



**Figure 4.1-1. ARPG Bag Gripper – Pallet Picker Installation**

## 4.2 ELECTRICAL CONNECTIONS

### 4.2.1 Bus Module

The ARPG communicates with the Robot Controller using a MURR Multiprotocol (Ethernet/IP or Profinet) I/O Block. The electrical connections that are required to operate the ARPG are communications and power (See Table 4.2.1-2). Information listed refers to the ARPG standard bus module, MURR SOLID67 54503. Confirm information with appropriate bus module manual.

Alternative industrial protocols, including Discrete I/O and specific connections are available upon request. Contact APPLIED ROBOTICS Technical Support (Section 6.2) for details.

Reference most current Manual, Firmware, and Electronic Data Sheets (EDS) located on the MURR website: <https://www.murrelektronik.com/>. The EDS and GSD files as of 03/13/2019 are as follows:

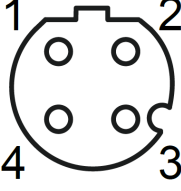
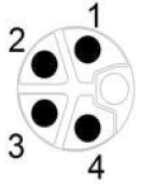



Ethernet: 54503\_SOLID67\_DIO16\_60mm\_M12L\_5P.eds

Profinet: GSDML-V2.33-Murrelektronik-SOLID67\_PNIO\_0400-20180523.xml

**Table 4.2.1-1. I/O Block Set-Up**

<b>I/O Block Set-Up</b>	
Vendor Name	MURR ELEKTRONIK
Product Name	SOLID67 DIO16 60mm M12L 5P
Device Type	7
Product Code	54503
Vendor ID (VID)	640
Communications Type	PTP
Request Packet Interval (RPI)	10 ms
Output Assembly	100
Input Assembly	101
Configuration	110
Input Size	3 bytes
Output Size	2 bytes
Web Address Default	192.168.1.1

**Table 4.2.1-2. Bus Network Electrical Connections**

Bus Network	Communications Connection	Power Connection
Ethernet/IP and Profinet	4 Soc Female D-Coded M12  1 = TD + 2 = RD + 3 = TD - 4 = RD -	5 Pin Male L-Coded M12  1 = 24 V  US 2 = 0 V UA 3 = 0 V US 4 = 24 V  UA 5 = 

\* Confirm pin designation with appropriate wiring schematic (See Section 10).

\*\* Additional network and connection options available upon request. Contact APPLIED ROBOTICS for details.



**BEFORE CONNECTING THE AIR SUPPLY,  
ENSURE THAT ALL ELECTRICAL  
CONNECTIONS ARE MADE AND THE ROBOT  
CONTROLLER IS COMMUNICATING  
PROPERLY WITH THE ARPG.**

The electrical schematic can be found on APPLIED ROBOTICS Informational Documents (See Section 10) or the system schematic that corresponds to the equipment supplied. Ensure connection is firm and secure to avoid unnecessary stress during high dynamic moments. Unused ports should have an IP67 cap installed.

**Table 4.2.1-3. Bitmapping**

Byte	Ports	Channel A/Pin 4		Channel B/Pin 2	
0	X1	0.0	Bag Gripper Left Open	0.1	Bag Gripper Left Closed
	X2	0.2	Bag Gripper Right Open	0.3	Bag Gripper Right Closed
	X3	0.4	Bag Present	0.5	<i>Vacuum Present</i>
	X4	0.6	<i>Vacuum Cups Down</i>	0.7	<i>Pneumatic Pusher Up</i>
1	X5	1.0	Bag Gripper Open CMD	1.1	<i>Pneumatic Pusher CMD</i>
	X6	1.2	<i>Pallet Picker Open CMD</i>	1.3	<i>Vacuum ON CMD</i>
	X7	1.4	<i>Pallet Picker Left Open</i>	1.5	<i>Pallet Picker Left Closed</i>
	X8	1.6	<i>Pallet Picker Right Open</i>	1.7	<i>Pallet Picker Right Closed</i>

\* I/O shown in *Italics* are application specific depending on selected options (Pallet Picker, Sheet Picker, and Pneumatic Pusher).

Key:

Input:

Output:

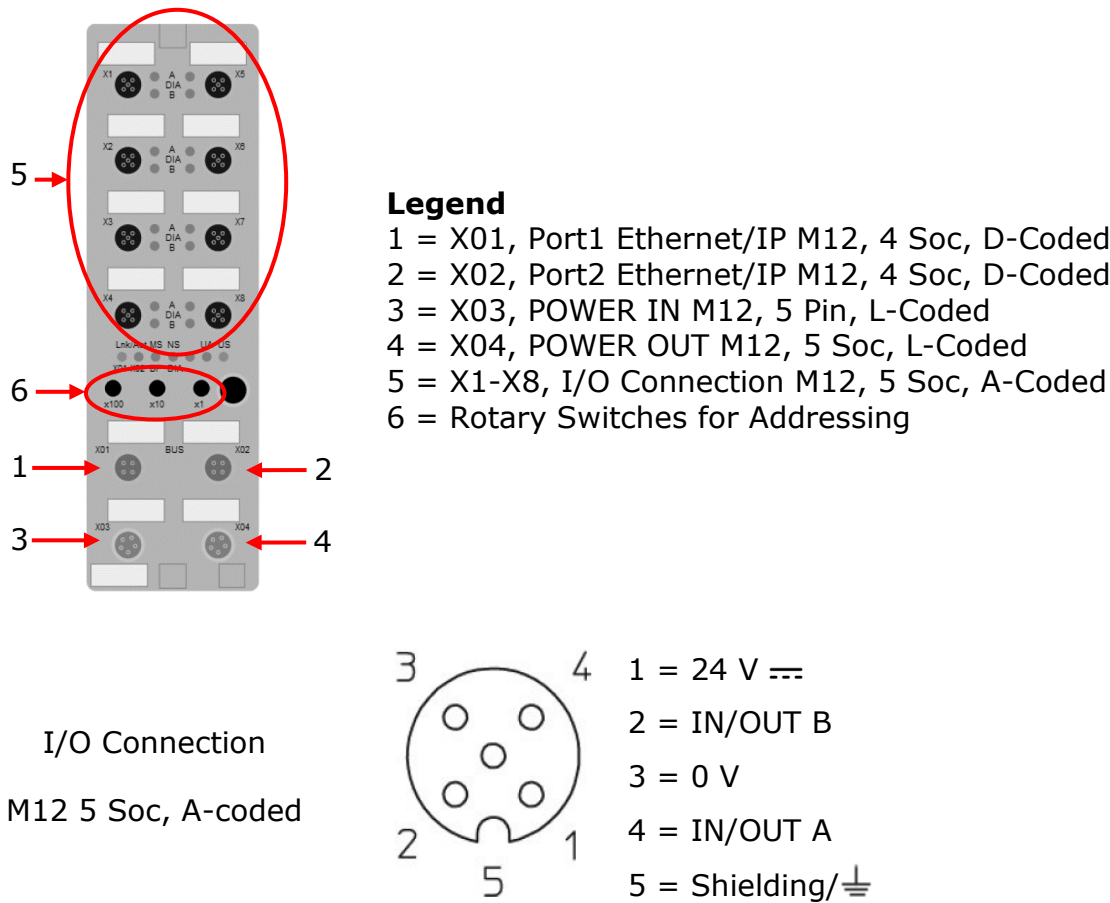


Figure 4.2-1. Bus Module Structure

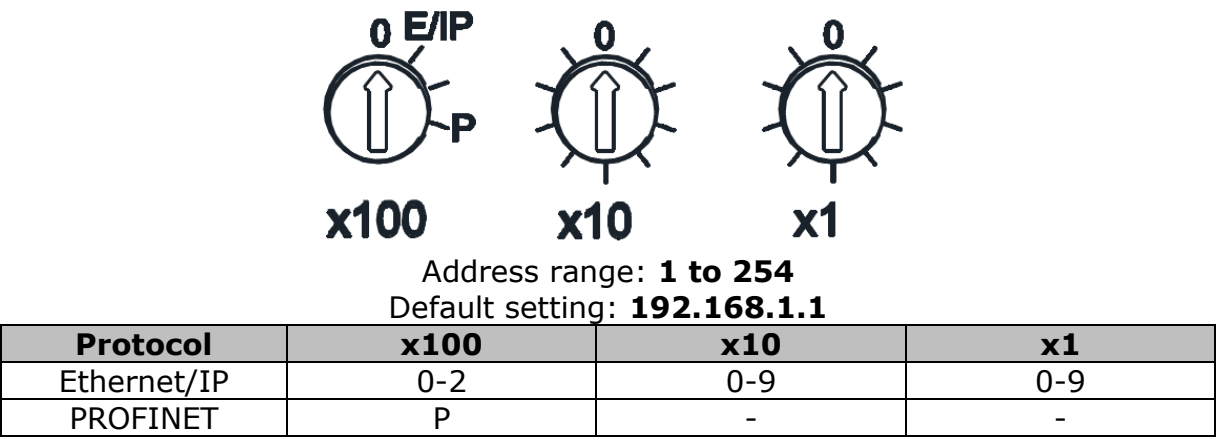
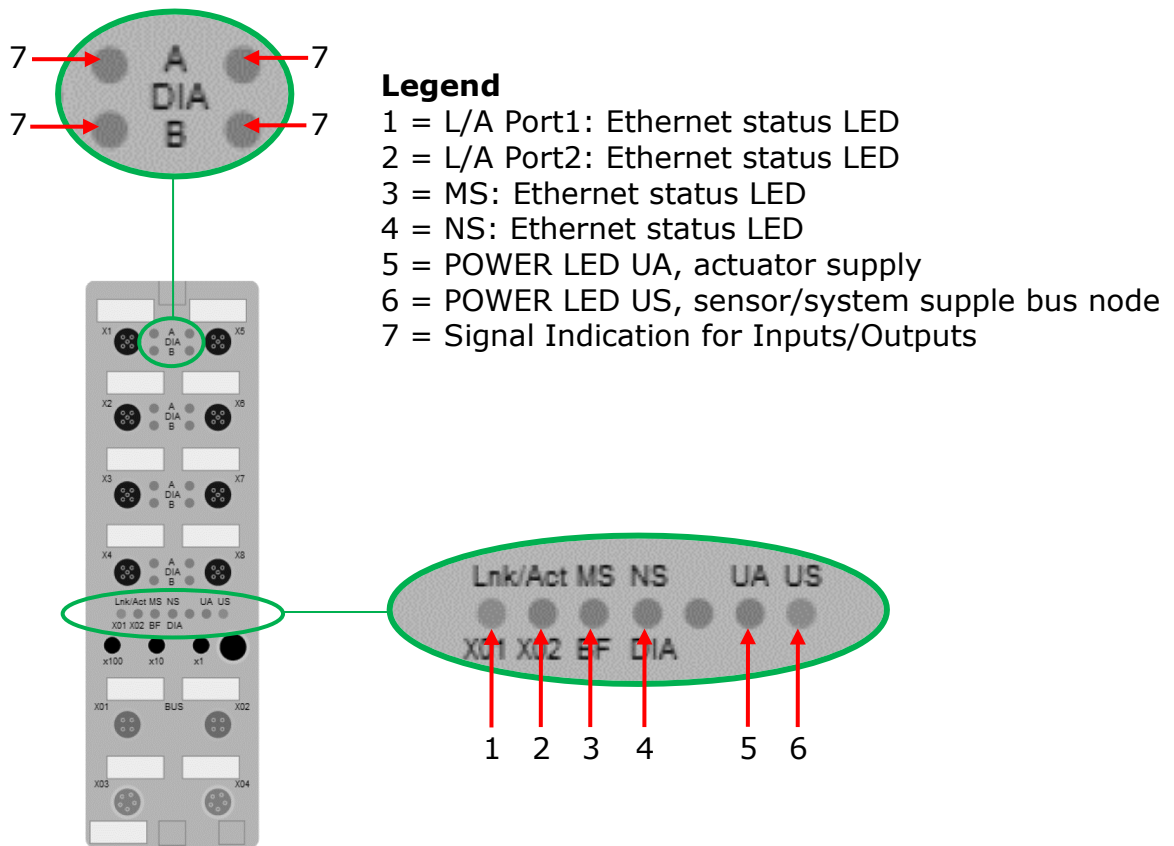


Figure 4.2-2. Protocol Settings



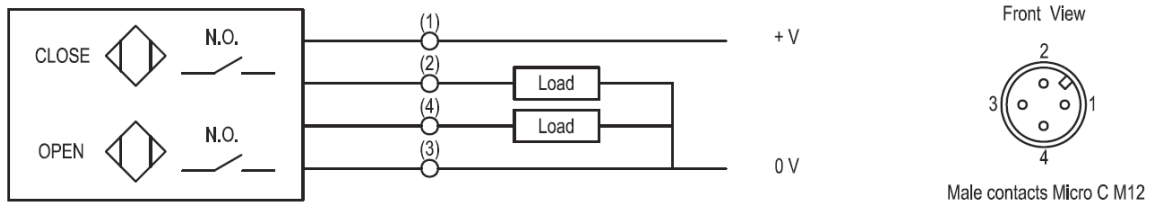
**Figure 4.2-3. Bus Module Indicating Elements**

US	Green	System/ sensor power supply, voltage level $18\text{ V} \leq \text{US} \pm 1\text{V} \leq 30\text{ V}$
	Red	System/ sensor power supply, voltage level $\text{US} < 18\text{ V} \pm 1\text{V}$ or $\text{US} > 30\text{ V} \pm 1\text{V}$
	Off	No system/ sensor power supply
UA	Green	Actuator power supply, voltage level $18\text{ V} \leq \text{UA} \pm 1\text{V} \leq 30\text{ V}$
	Red	Actuator power supply, voltage level $\text{UA} < 18\text{ V} \pm 1\text{V}$ or $\text{UA} > 30\text{ V} \pm 1\text{V}$
	Off	No actuator power supply
X1...X8 A	Yellow	Channel status A "On"
DIA	Red	Periphery error (sensor or actuator overload/short-circuit)
	Off	Not connected, status "Off", no error
X1 ... X8 B	White	Channel status B "On"
	Red	Periphery error (actuator overload/short-circuit)
	Off	Not connected, status "Off", no error
P1 Lnk/Act	Green	Ethernet connection exists to another subscriber. Link connection created.
P2 Lnk/Act	Flashing yellow	Data exchange with another subscriber.
	Off	No connection to another subscriber. No link, no data exchange.
BF (PROFINET)	Red	No configuration, no or slow physical connection
	Red flashing at 2 Hz	No data exchange
	Off	No error
DIA (PROFINET)	Red	Watchdog timeout; diagnostics present; system error
	Red flashing at 2 Hz, 3 sec	DCP signal service is initiated via the bus
	Off	No error message exists
MS (Ethernet/IP)	Green	Device ready for operation
	Flashing green	Device ready but not configured
	Red	Serious error that cannot be resolved
	Flashing red	Minor error that can be resolved: An incorrect or contradictory configuration is classified as a minor error.
	Alternately flashing red/green	The device is performing a self-test.
	Off	Device is switched off.
NS (Ethernet/IP)	Green	Connected: The device has at least one connection.
	Flashing green	No connection: The device has no connections. IP address exists.
	Red	Duplicate IP address. The device has determined that the assigned IP address already exists.
	Flashing red	Connection has exceeded time limit or connection interrupted.
	Alternately flashing red/green	The device is performing a self-test.
	Off	The device is switched off or does not have an IP address.

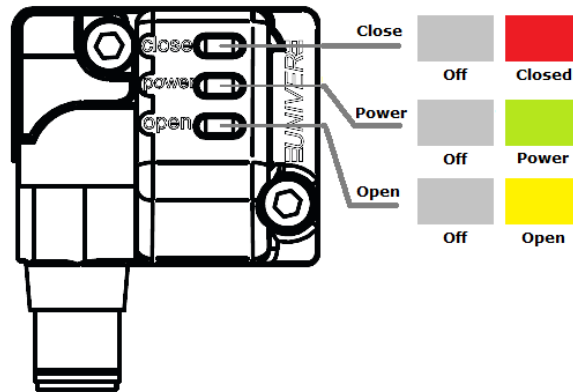
**Figure 4.2-4. Bus Module Indicating Elements States**

#### 4.2.2 Power Clamps

The Pallet Picker fingers are actuated using Power Clamps, which features a locking mechanism which is designed to ensure the fingers stay closed even if air supply is lost. There is a Micro C M12 male connection for the electronic sensor on each Power Clamp that provides open/close status.



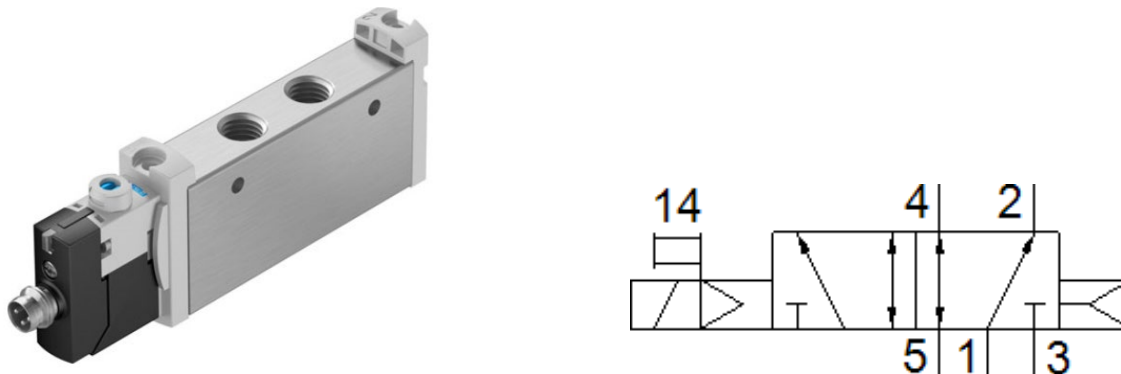
**Figure 4.2.2-1. Power Clamp Electronic Sensor Connection**



**Figure 4.2.2-2. Power Clamp Electronic Sensor LED Indication States**

### 4.2.3 Solenoid Valve

The open/close air supply and actuation of the Power Clamps is performed using a 5/2-way single solenoid valve with a spring return. During a loss of power/signal, the solenoid valve will spring return the fingers to a closed position. The signal to control the valve is supplied via the I/O Block using an M8 3-pin plug connection.

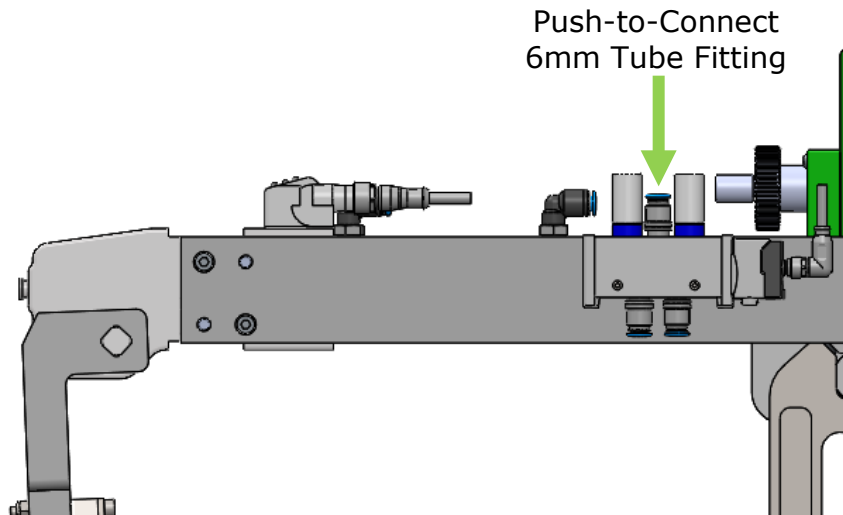


**Figure 4.2.3-1. 5/2-Way Single Solenoid Valve**

## 4.3 CONNECTING THE AIR SUPPLY

### 4.3.1 Solenoid Valve

The pneumatic supply is provided via a push-to-connect 6mm tube fitting (See Figure 4.3.1-1). Ensure connection is firm with no leaks and secure to the tube/line/hose to avoid unnecessary stress during high dynamic movements.



**Figure 4.3.1-1. Valve Module Air Supply**

## 5 GUIDE TO OPERATION

### 5.1 INITIAL TEST

Before continuing with testing and operation, verify all signals are transmitting properly when the ARPG Bag Gripper is open and closed and ensure that the actuation is smooth and synchronized between the finger assemblies.

#### NOTICE

**THE ARPG SHOULD NEVER BE OPERATED WITHOUT FIRST VERIFYING ALL OF THE INPUTS AND OUTPUTS ARE FUNCTIONING PROPERLY.**

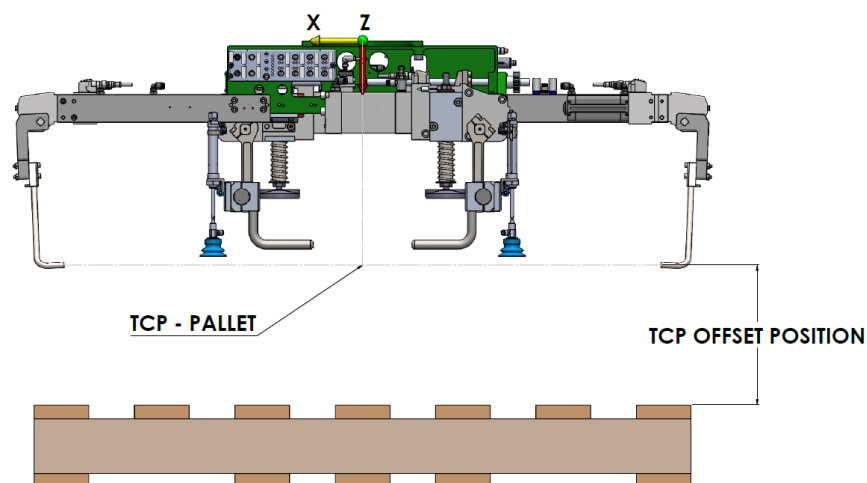
#### NOTICE

**AFTER VERIFYING THE SIGNALS ARE SETUP PROPERLY, TEST THE FUNCTIONALITY OF THE ARPG (AND ARPG OPTIONS) AND ENSURE PROPER OPERATION BEFORE RESUMING WORK.**

### 5.2 PROGRAMMING THE PICKUP AND DROP OFF POINTS

Below is a list of suggested TCP Offset Positions for the ARPG Bag Gripper – Pallet Picker. These positions are also indicated in the Sequence of Operation – Pallet Pick (See Figure 5.3-1).

- **Pallet Pre-Pickup Position** – approximately 500mm directly above stack of pallets that are to be picked.
- **Pallet Pickup Position** – bottom of the Fingers resting flush on the top of the pallet with TCP in the center of the pallet.
- **Pallet Post Pickup Position** – approximately 100mm above stack of pallets.
- **Pallet Pre-Drop Off Position** – approximately 500mm above the floor.
- **Pallet Drop Off Position** – bottom of the pallet is flush with the floor.



**Figure 5.2-1. TCP Offset Position**

### 5.3 RECOMMENDED SEQUENCE OF OPERATION

#### **NOTICE**

**THE ARPG SHOULD NEVER BE OPERATED WITHOUT FIRST VERIFYING ALL OF THE INPUTS AND OUTPUTS ARE COMMUNICATING PROPERLY.**

See Figure 5.3-1 for a graphical representation of the standard sequence of operation for a Robot equipped with the ARPG Bag Gripper – Pallet Picker.



**Figure 5.3-1. Sequence of Operation – Pallet Pick**

## 6 TROUBLESHOOTING

### 6.1 TROUBLESHOOTING GUIDE

Symptom	Possible Cause	Resolution
Bag or Pallet Fingers Do Not Open/Close	Not enough or NO air pressure	Check all air lines and connections and make sure there is 4 to 7 bar (58 to 101 PSI) available.
	Protocol not connected or Programmed incorrectly	Check all connections. Check programming correctness.
		Check I/O Block is illuminated as per manual (See Section 4.2.1).
	The solenoid for the Power Clamp is not receiving the output signal from control or I/O Block	Check to see that an output signal is sent from the controller to the I/O Block.  If an output signal is being sent, check the I/O Block for an output indicator (Figure 4.2-3). If the output indicator is lit, check all cables and connections and that the solenoid is receiving the command.
	Broken/Damaged signal cable	Replace cable.
	No open/close signals are transmitted	Sensors in Power Clamps have failed.  Send to APPLIED ROBOTICS for repair.

### 6.2 TECHNICAL SUPPORT

If you require assistance, contact APPLIED ROBOTICS Technical Support Department at:

Phone: +1 518 384-1000  
E-mail: [techsupport@appliedrobotics.com](mailto:techsupport@appliedrobotics.com)

## 7 MAINTENANCE

### NOTICE

**FAILURE TO FOLLOW THE MAINTENANCE SCHEDULE DESCRIBED IN THIS SECTION COULD ALTER OR VOID THE WARRANTY PROVIDED BY APPLIED ROBOTICS, INC.**

The ARPG is a low maintenance assembly. Perform visual checks and functionality tests every 100,000 cycles or 3 months.

### 7.1 PREVENTIVE MAINTENANCE

#### 7.1.1 Visual Inspection & Functionality Test

1. Inspect the Ethernet and power cables and clean dry air (CDA) supply tube for any cuts or abrasions.
2. With the ARPG in a safe position, cycle the unit several times to verify that it is working properly and the ARPG is operating properly. Check lights as per Figure 4.2-4.
3. With power to the unit off physically hold and shake fingers to check for looseness in any component back to the frame.

## 8 SPARE PARTS

The spare parts listed below are recommended to be maintained in stock for the life of the ARPG Bag Gripper – Pallet Picker. These quantities are based on a single unit. If higher quantities are purchased, please contact the Technical Support Department at +1 518 384 1000 or [techsupport@appliedrobotics.com](mailto:techsupport@appliedrobotics.com) to determine the quantity of spares recommended for the size of your installation.

<b>ARPG15/ARPG30 BAG GRIPPER – PALLET PICKER (PER GRIPPER)</b>		
<b>Description</b>	<b>Part Number</b>	<b>Quantity</b>
SOLENOID VALVE ARPG	1700130P	1
ARM, PICKER ARPG30	1800301M	1
CLAMP CYLINDER, P.PICK. ARPG15	1800316P	1

<b>ARPG50 BAG GRIPPER – PALLET PICKER (PER GRIPPER)</b>		
<b>Description</b>	<b>Part Number</b>	<b>Quantity</b>
SOLENOID VALVE ARPG	1700130P	1
PICKER ARM ARPG50	1800323M	1
CLAMP CYLINDER, P.PICK. ARPG15	1800316P	1

## 9 SPARE PARTS REPLACEMENT

The following procedures explain the correct method for removing and replacing the recommended spare parts listed in Section 8 of this manual.

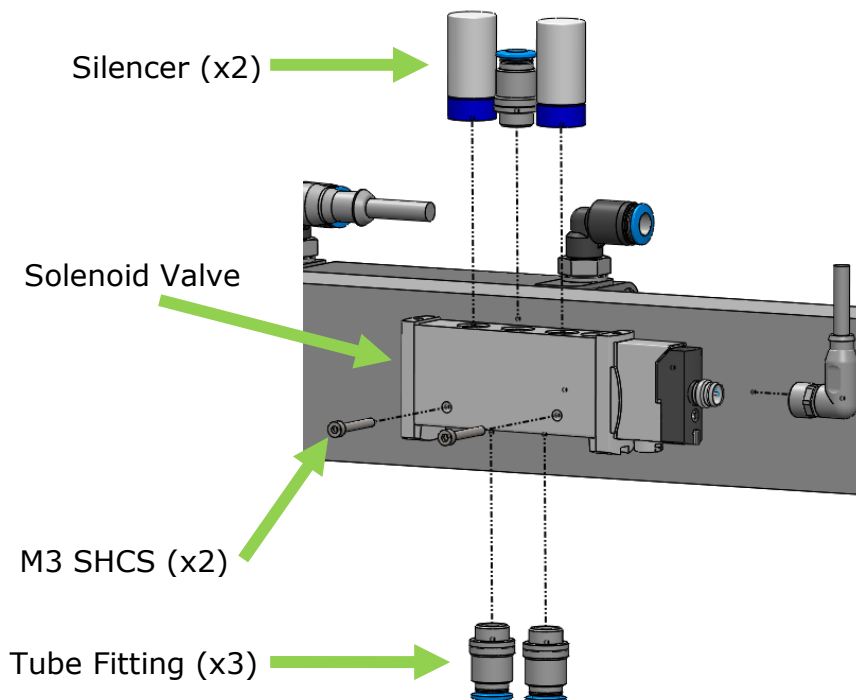


**TURN OFF AND DISCONNECT ALL POWER AND PRESSURIZED AIR FROM UNIT BEFORE REPLACING COMPONENTS ON UNIT.**

### 9.1 SOLENOID VALVE

Figure 9.1-1 displays the items needed to be removed in order to replace the Solenoid Valve. Some items are hidden for clarity.

1. Remove control cable from solenoid input and disconnect the input and output tubing by releasing the clamp mechanism in the fitting.
2. Using a 2mm Allen wrench, remove the two (2) M3 socket head cap screws fastening the solenoid to the main frame.
3. Using a 4mm Allen wrench remove three (3) 6mm tubing fittings from the valve and install in the replacement valve.
4. Using pliers, remove two (2) silencers and install in the replacement valve.
5. Place the replacement valve and fittings in place. Reinstall two (2) M3 socket head cap screws and tighten as required.
6. Install input and output tubing and attach control cable.
7. Safely operate unit to test proper installation of replacement valve, cable, and tubing.



**Figure 9.1-1. Solenoid Valve Replacement**

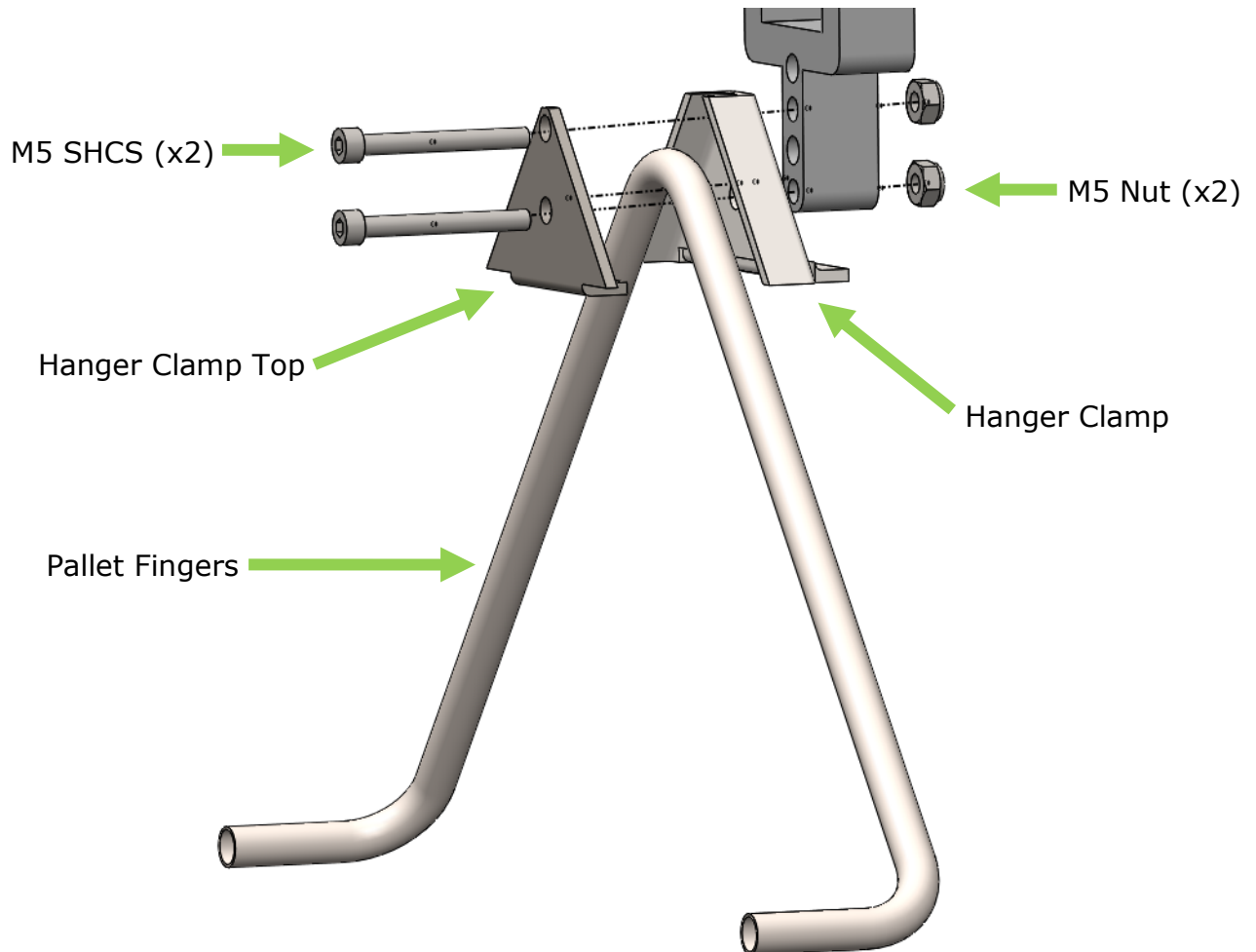
## 9.2 PALLET FINGERS

Figure 9.2-1 displays the items needed to be removed in order to replace the Pallet Fingers.

1. Using an 4mm Allen wrench, remove the two (2) M5 socket head cap screws fastening the Hanger Clamp Top to the Hanger Clamp. This will disassemble the M5 nuts and Hanger Clamp from clamp cylinder.
2. Remove Pallet Fingers from the Hanger Clamp.
3. Place the replacement Pallet Fingers in the Hanger Clamp.
4. Install the Hanger Clamp Top onto the Hanger Clamp.
5. Place the Hanger Clamp assembly onto clamp cylinder. Reinstall two (2) M5 socket head cap screws and tighten onto M5 nuts using Loctite 242 threadlocker or equivalent.

### NOTICE

**M5 SCREWS HAVE A RECOMMENDED TORQUE OF 6.1 Nm (54.0 IN-LB).**



**Figure 9.2-1. Pallet Fingers Replacement**

### 9.3 CLAMP CYLINDER

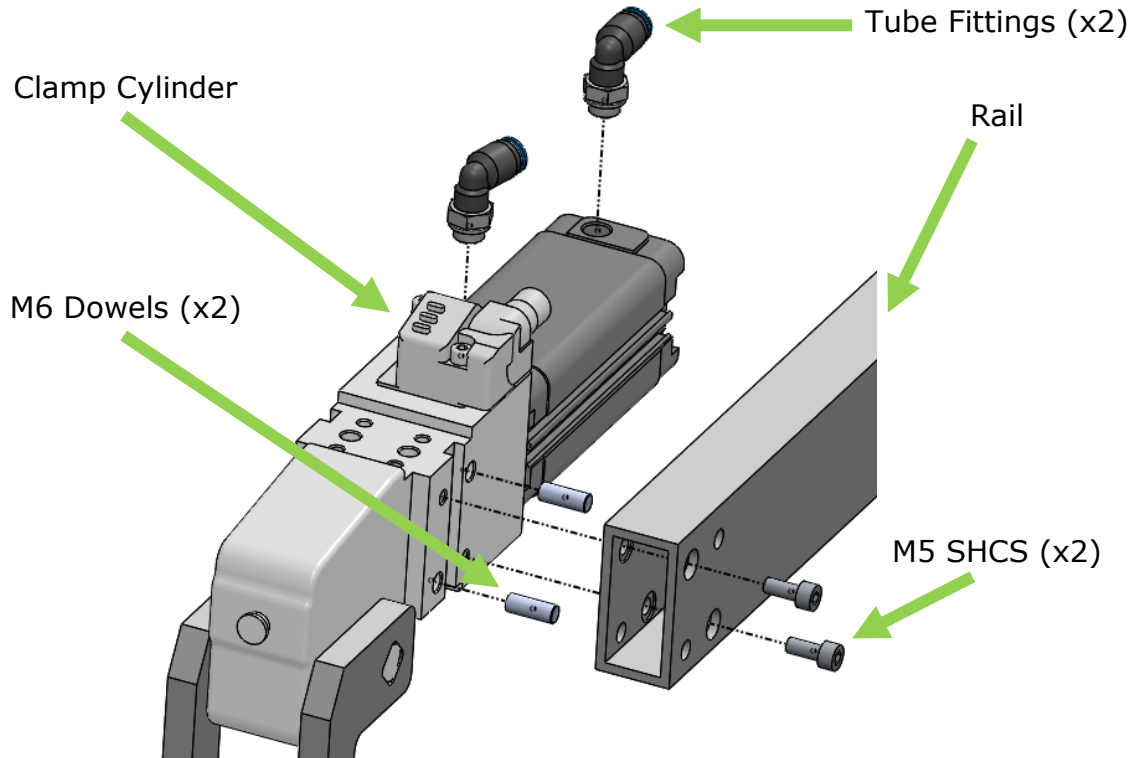
Figure 9.3-1 displays the items needed to be removed in order to replace the clamp cylinder.

1. Disconnect feedback cable and two (2) 6mm tubes from fittings on clamp cylinder.
2. Remove Pallet Fingers from clamp cylinder by following Steps 1 and 2 in Section 9.2.
3. While supporting the clamp cylinder, remove two (2) M5 socket head cap screws using a 4mm Allen wrench and remove clamp cylinder from rail.
4. Remove two (2) M6 dowels from clamp cylinder.
5. Place the dowels in the corresponding locations in the new clamp cylinder.
6. Using a 4mm Allen wrench, attach new clamp cylinder to rail with two (2) M5 socket head cap screws using Loctite 242 threadlocker or equivalent.

## NOTICE

**M5 SCREWS HAVE A RECOMMENDED TORQUE OF 6.1 Nm (54.0 IN-LB).**

7. Install Pallet Fingers to clamp cylinder by following Steps 3, 4, and 5 in Section 9.2.
8. Attached feedback cable and two (2) 6mm tubes to appropriate fitting on clamp cylinder. Test unit to insure proper function.



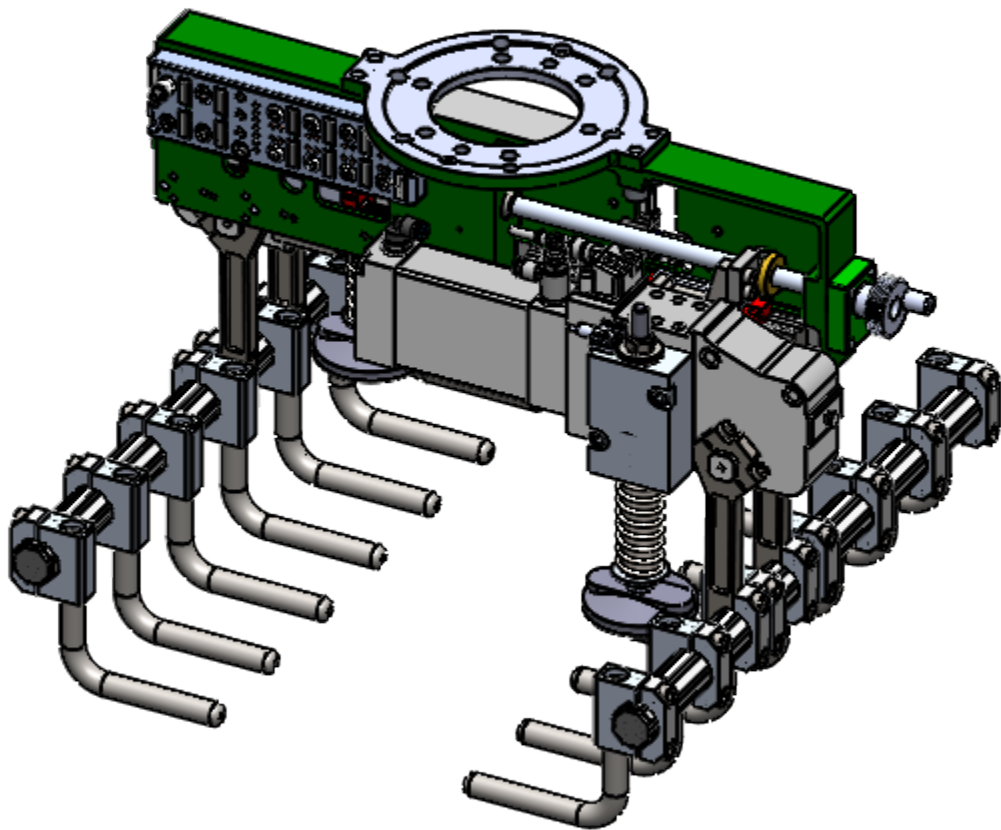
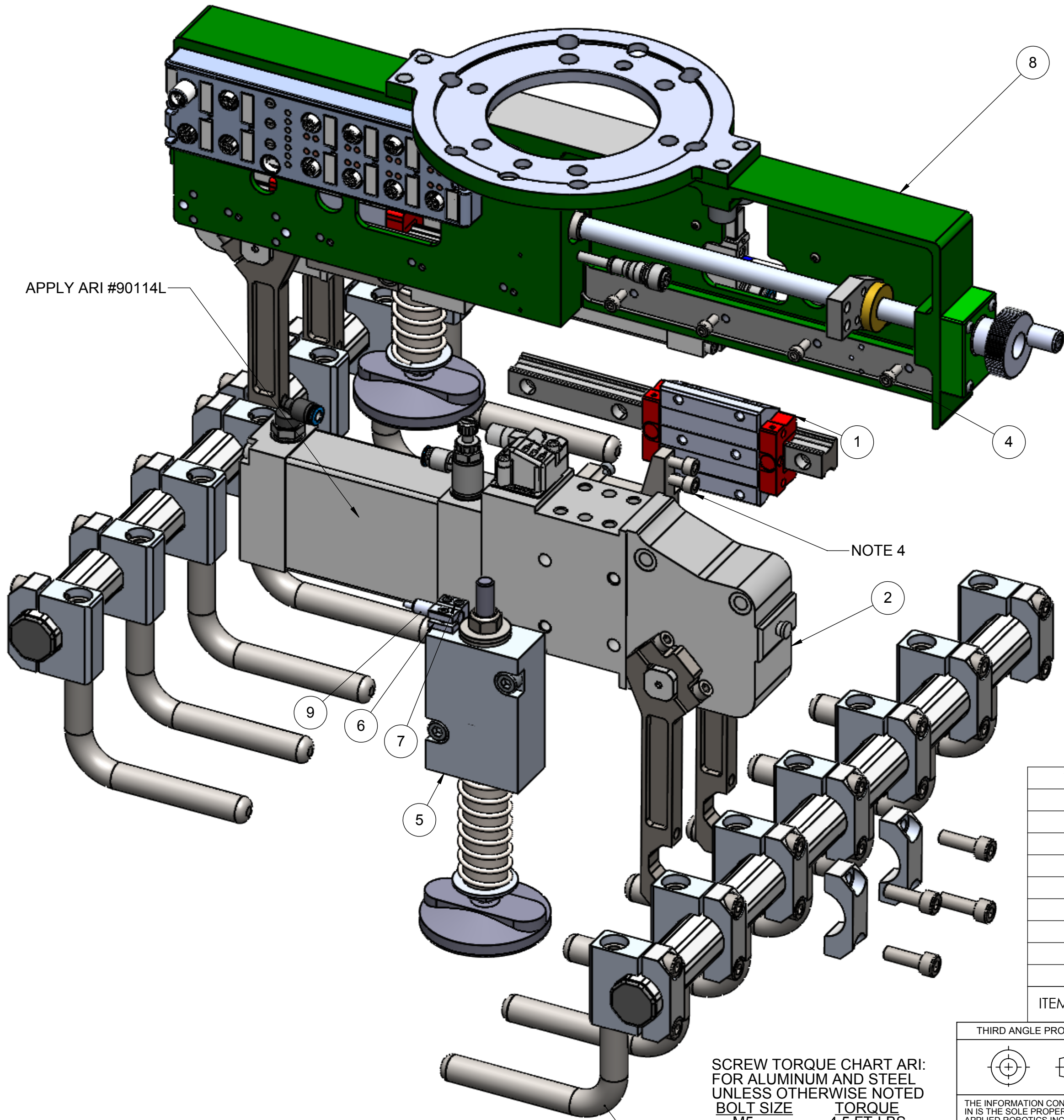
**Figure 9.3-1. Clamp Cylinder Replacement**

## 10 INFORMATIONAL DOCUMENTS

The documents in this section can assist with installation, use, and identification of replacement parts for the ARPG Bag Gripper – Pallet Picker. Please contact **APPLIED ROBOTICS Technical Support** if you have any questions.

DRAWINGS		
MODEL	DRAWING NUMBER	DESCRIPTION
ARPG15	1800246A	ARPG15-B76.2-EIP-S-N-N
	1800313A	SUBASSY, PALLET PICKER ARPG15/30
ARPG30	1700090A	ARPG30-B76.2-EIP-S-N-N
	1800313A	SUBASSY, PALLET PICKER ARPG15/30
ARPG50	1800250A	ARPG50-B76.2-EIP-S-N-N
	1800255A	SUBASSY, PALLET PICKER ARPG50
ALL	1800256S	SCHEM, SYSTEM ARPG

REVISIONS						
ZONE	REV	DESCRIPTION	DR	CHK	DATE	ECR/ESR NO.
	00	RELEASE FOR MANUFACTURE	TS	TM	6-18	TSTG-AY6GR7



- NOTE:
- REFERENCE 1800256S SCHEM, SYSTEMARPG, PIPING AND ELECTRICAL SCHEMATIC
  - USE LOCTITE 290 ON M6 SCREWS FASTENING THE CLAMP AND NUT BRACKETS
  - AFTER LEAD SCREW ALIGNMENT IS COMPLETE
  - USE LOCTITE 242 ON ALL OTHER FASTENERS
  - ALL ITEMS RECEIVING LOCTITE ARE TO BE CLEANED, DEGREASED, AND HAVE PRIMER 'N' APPLIED PREVIOUS TO THE LOCTITE APPLICATION

SCREW TORQUE CHART ARI: FOR ALUMINUM AND STEEL UNLESS OTHERWISE NOTED BOLT SIZE		TORQUE
M5		4.5 FT-LBS
M6		7.7 FT-LBS
M8		19.0 FT-LBS
M10		37.0 FT-LBS
M12		65.0 FT-LBS

ITEM NO.	Gripper with no options/QTY.	PART NO.	DESCRIPTION
10	1	1800877M	TUBING, 6MM KIT ARPG
9	1	1800876P	PROX SW M8 2mm SENSE 0.4M CABLE
8	1	1700113A	SUBASSY, FRAME
7	2	49414	SCR, SOC HD CAP M3 X 14 (SS)
6	1	1800272P	BRACKET, PROX SWITCH
5	2	1800249A	SUBASSY, SPRING PUSHER
4	8	49116	SCR, SOC HD CAP M5 X 20 (STL)
3	2	1800248A	SUBASSY, BOOM
2	2	1800247A	SUBASSY, CLAMP
1	2	1800260P	RAIL ASSEMBLY, ARPG15

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METRIC

UNLESS OTHERWISE SPECIFIED:

UNTOLERANCED DIMS ARE BASIC

	.25	A	B	C
	φ .25(M)	A	B	C

ALL HOLE DIAMETERS +/- 0.25

INTERNAL RADII & BROKEN EDGES TO BE .13-.38

ALL SURFACE FINISHES 1.6Ra

MAT'L:

SURFACE TREATMENT:

DR: T. STRANG

CHK: T. MARCELLA

ENG: T. STRANG

MFG: M. DUDNATH

QC: M. DUDNATH

3D MODEL NUMBER: 1800246A

SCALE: 1:5

DO NOT SCALE DRAWING

ISO 9001 REGISTERED

Solutions in reach

648 Saratoga Rd. Glenville, NY 12302

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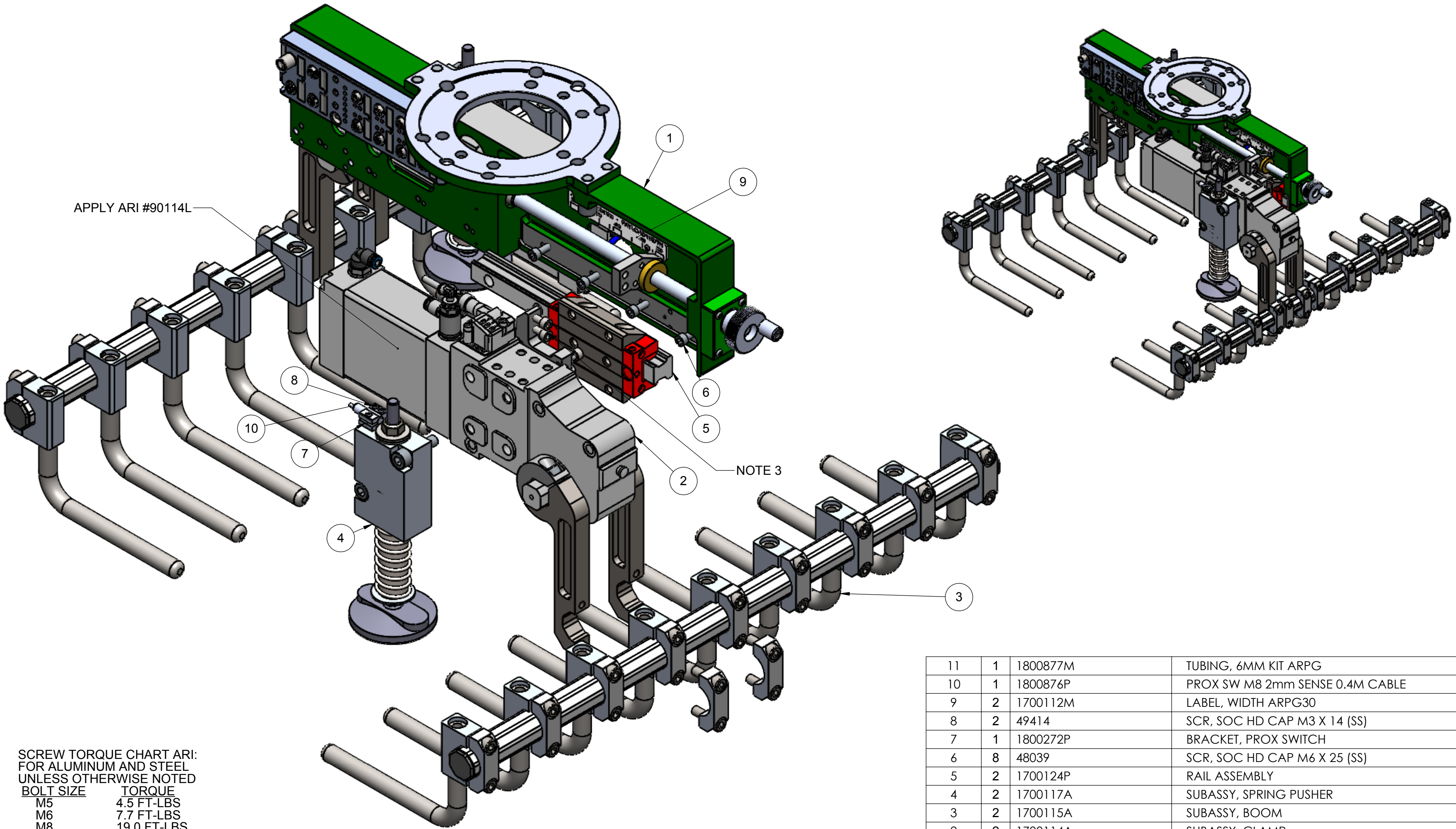
TITLE: ARP15-B76.2-EIP-S-N-N GRIPPER

SIZE	DRAWING NUMBER	REV
C	1800246A	00

Weight: 19.68 kg	RoHs COMPLIANT:	SHT. 1 OF 1
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REVISIONS						
ZONE	REV	DESCRIPTION	DR	CHK	DATE	ECR/ESR NO.
	00	RELEASE FOR MANUFACTURE	TS	TM	6-18	TSTG-AY6GR7



SCREW TORQUE CHART ARI:  
FOR ALUMINUM AND STEEL  
UNLESS OTHERWISE NOTED

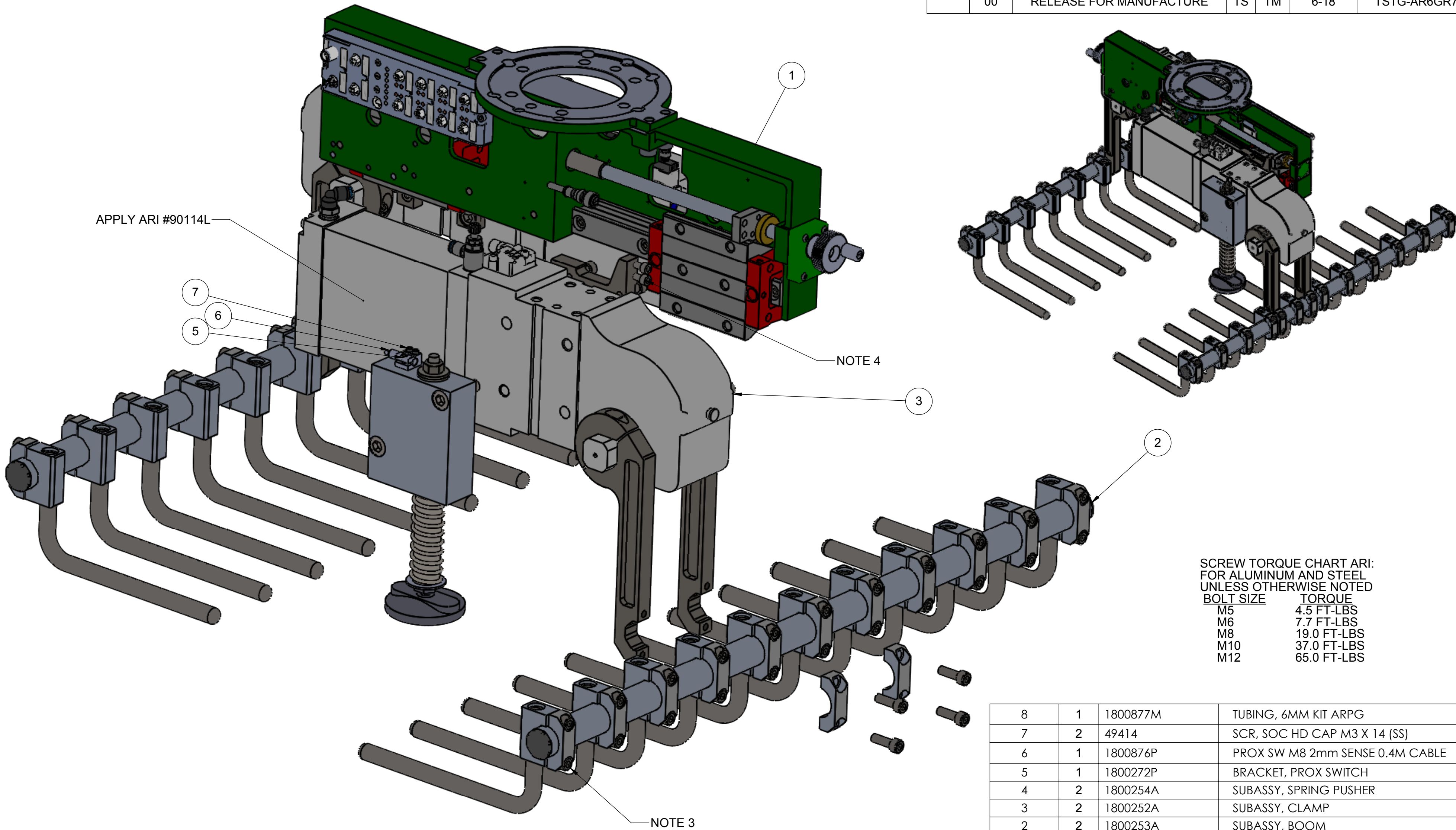
BOLT SIZE	TORQUE
M5	4.5 FT-LBS
M6	7.7 FT-LBS
M8	19.0 FT-LBS
M10	37.0 FT-LBS
M12	65.0 FT-LBS

- NOTE:
1. REFERENCE 1800256S SCHEM, SYSTEM ARPG PIPING AND ELECTRICAL SCHEMATIC
  2. USE LOCTITE 290 ON M6 SCREWS FASTENING THE CLAMP AND NUT BRACKETS AFTER LEAD SCREW ALIGNMENT IS COMPLETE
  3. USE LOCTITE 242 ON ALL OTHER FASTENERS
  4. ALL ITEMS RECEIVING LOCTITE ARE TO BE CLEANED, DEGREASED, AND HAVE PRIMER 'N' APPLIED PREVIOUS TO THE LOCTITE APPLICATION

11	1	1800877M	TUBING, 6MM KIT ARPG
10	1	1800876P	PROX SW M8 2mm SENSE 0.4M CABLE
9	2	1700112M	LABEL, WIDTH ARPG30
8	2	49414	SCR, SOC HD CAP M3 X 14 (SS)
7	1	1800272P	BRACKET, PROX SWITCH
6	8	48039	SCR, SOC HD CAP M6 X 25 (SS)
5	2	1700124P	RAIL ASSEMBLY
4	2	1700117A	SUBASSY, SPRING PUSHER
3	2	1700115A	SUBASSY, BOOM
2	2	1700114A	SUBASSY, CLAMP
1	1	1700113A	SUBASSY, FRAME

ITEM NO.	QTY	PART NO.	DESCRIPTION
THIRD ANGLE PROJECTION			
METRIC			
UNLESS OTHERWISE SPECIFIED:			
UNTOLERANCED DIMS ARE BASIC			
ALL HOLE DIAMETERS +/- 0.25			
INTERNAL RADII & BROKEN EDGES TO BE .13-.38			
ALL SURFACE FINISHES 1.6Ra			
MATERIAL:			
SURFACE TREATMENT:			
DIM. AND TOLERANCING IN ACCORDANCE WITH ASMEY 14.5-2009			
PRINT DATE 1/22/2019			
ISO 9001 REGISTERED			
SCALE: 1:10 DO NOT SCALE DRAWING			
APPLIED ROBOTICS SOLUTIONS IN REACH			
648 Saratoga Rd. Glenville, NY 12302 www.appliedrobotics.com			
TITLE: ARPG30-B76.2-EIP-S-N-N GRIPPER			
SIZE C			
DRAWING NUMBER 1700090A			
REV 00			
Weight: 26.15 kg			
RoHs COMPLIANT:			
SHT. 1 OF 1			

REVISIONS						
ZONE	REV	DESCRIPTION	DR	CHK	DATE	ECR/ESR NO.
	00	RELEASE FOR MANUFACTURE	TS	TM	6-18	TSTG-AR6GR7



SCREW TORQUE CHART ARI:  
FOR ALUMINUM AND STEEL  
UNLESS OTHERWISE NOTED

BOLT SIZE	TORQUE
M5	4.5 FT-LBS
M6	7.7 FT-LBS
M8	19.0 FT-LBS
M10	37.0 FT-LBS
M12	65.0 FT-LBS

ITEM NO.	QTY	PART NO.	DESCRIPTION
8	1	1800877M	TUBING, 6MM KIT ARPG
7	2	49414	SCR, SOC HD CAP M3 X 14 (SS)
6	1	1800876P	PROX SW M8 2mm SENSE 0.4M CABLE
5	1	1800272P	BRACKET, PROX SWITCH
4	2	1800254A	SUBASSY, SPRING PUSHER
3	2	1800252A	SUBASSY, CLAMP
2	2	1800253A	SUBASSY, BOOM
1	1	1800251A	SUBASSY, FRAME

- NOTE:
- REFERENCE 1800256S SCHEM, SYSTEM ARPG FOR PIPING ELECTRICAL CONNECTIONS
  - USE LOCTITE 290 ON M6 SCREWS FASTENING THE CLAMP AND NUT BRACKETS AFTER LEAD SCREW ALIGNMENT IS COMPLETE
  - USE LOCTITE 242 ON ALL OTHER FASTENERS
  - ALL ITEMS RECEIVING LOCTITE ARE TO BE CLEANED, DEGREASED, AND HAVE PRIMER 'N' APPLIED PREVIOUS TO THE LOCTITE APPLICATION

PRINT DATE  
12/31/2018

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METRIC

UNLESS OTHERWISE SPECIFIED:

UNTOLERANCED DIMS ARE BASIC

	.25	A	B	C
	φ .25(M)	A	B	C

ALL HOLE DIAMETERS +/- 0.25

INTERNAL RADII & BROKEN EDGES TO BE .13-.38

ALL SURFACE FINISHES 1.6Ra

MAT'L:

SURFACE TREATMENT:

DR: T. STRANG

CHK: T. MARCELLA

ENG: T. STRANG

MFG: M. DUDNATH

QC: M. DUDNATH

3D MODEL NUMBER: 1800250A

SCALE: 1:10  
DO NOT SCALE DRAWING

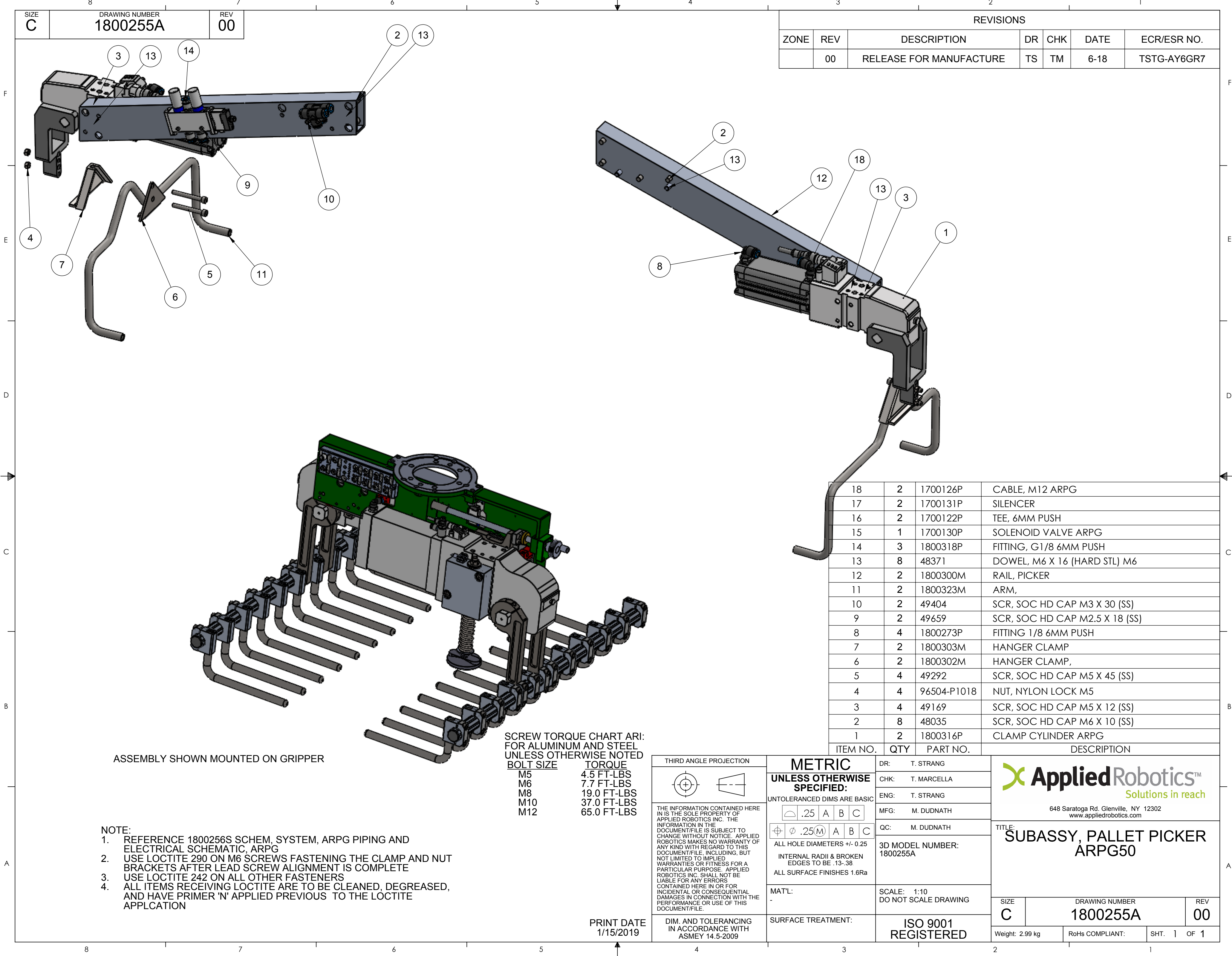
ISO 9001 REGISTERED

648 Saratoga Rd. Glenville, NY 12302  
www.appliedrobotics.com

TITLE: ARPG50-B76.2-EIP-S-N-N GRIPPER

SIZE	DRAWING NUMBER	REV
C	1800250A	00

Weight: 45.01 kg	RoHs COMPLIANT:	SHT. 1 OF 1
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REVISIONS						
ZONE	REV	DESCRIPTION	DR	CHK	DATE	ECR/ESR NO.
	00	RELEASE FOR MANUFACTURE	TS	TM	6-18	TSTG-AY6GR7

18	2	1700126P	CABLE, M12 ARPG
17	2	1700131P	SILENCER
16	2	1700122P	TEE, 6MM PUSH
15	1	1700130P	SOLENOID VALVE ARPG
14	3	1800318P	FITTING, G1/8 6MM PUSH
13	8	48371	DOWEL, M6 X 16 (HARD STL) M6
12	2	1800300M	RAIL, PICKER
11	2	1800323M	ARM,
10	2	49404	SCR, SOC HD CAP M3 X 30 (SS)
9	2	49659	SCR, SOC HD CAP M2.5 X 18 (SS)
8	4	1800273P	FITTING 1/8 6MM PUSH
7	2	1800303M	HANGER CLAMP
6	2	1800302M	HANGER CLAMP,
5	4	49292	SCR, SOC HD CAP M5 X 45 (SS)
4	4	96504-P1018	NUT, NYLON LOCK M5
3	4	49169	SCR, SOC HD CAP M5 X 12 (SS)
2	8	48035	SCR, SOC HD CAP M6 X 10 (SS)
1	2	1800316P	CLAMP CYLINDER ARPG
ITEM NO.		QTY	PART NO.
			DESCRIPTION

SCREW TORQUE CHART ARI: FOR ALUMINUM AND STEEL UNLESS OTHERWISE NOTED	
BOLT SIZE	TORQUE
M5	4.5 FT-LBS
M6	7.7 FT-LBS
M8	19.0 FT-LBS
M10	37.0 FT-LBS
M12	65.0 FT-LBS

- NOTE:
- REFERENCE 1800256S SCHEM. SYSTEM, ARPG PIPING AND ELECTRICAL SCHEMATIC, ARPG
  - USE LOCTITE 290 ON M6 SCREWS FASTENING THE CLAMP AND NUT BRACKETS AFTER LEAD SCREW ALIGNMENT IS COMPLETE
  - USE LOCTITE 242 ON ALL OTHER FASTENERS
  - ALL ITEMS RECEIVING LOCTITE ARE TO BE CLEANED, DEGREASED, AND HAVE PRIMER 'N' APPLIED PREVIOUS TO THE LOCTITE APPLCATION

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DIM. AND TOLERANCING IN ACCORDANCE WITH ASMEY 14.5-2009

METRIC

UNLESS OTHERWISE SPECIFIED:

UNTOLERANCED DIMS ARE BASIC

	.25	A	B	C
	φ .25(M)	A	B	C

ALL HOLE DIAMETERS +/- 0.25

INTERNAL RADII & BROKEN EDGES TO BE .13-.38

ALL SURFACE FINISHES 1.6Ra

MAT'L:

-

SURFACE TREATMENT:

DR: T. STRANG

CHK: T. MARCELLA

ENG: T. STRANG

MFG: M. DUDNATH

QC: M. DUDNATH

3D MODEL NUMBER: 1800255A

SCALE: 1:10  
DO NOT SCALE DRAWING

ISO 9001 REGISTERED

648 Saratoga Rd. Glenville, NY 12302  
www.appliedrobotics.com

TITLE: SUBASSY, PALLET PICKER ARPG50

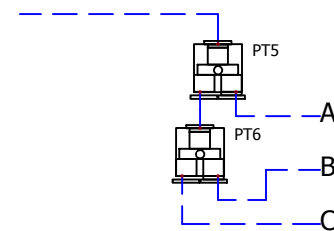
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Weight: 2.99 kg	RoHs COMPLIANT:	SHT. 1 OF 1

PRINT DATE  
1/15/2019

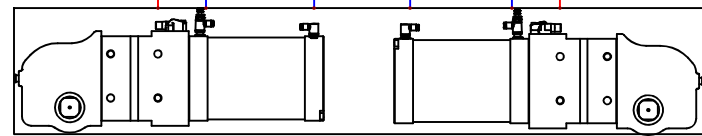
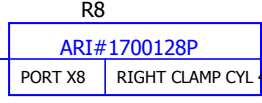
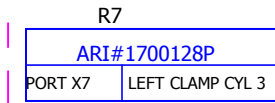
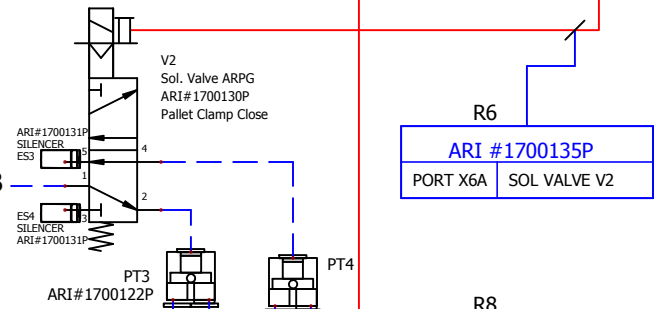
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ZONE	REV	DESCRIPTION	DR	CHK	DATE	EOR/ESR NO.	
-	00	RELEASED FOR MANUFACTURE	ML	TS	12/27/2018	TSTG-AY6GR7	

Bag Grip Left Open	DI 0.0	
Bag Grip Left Closed	DI 0.1	
Bag Grip Right Open	DI 0.2	
Bag Grip Right Closed	DI 0.3	
Bag Not present	DI 0.4	
Vac. Present	DI 0.5	
Left Vac. Cups UP	DI 0.6	
Right Vac. Cups UP	DI 0.7	
Bag Grip Open CMD		DO 1.0
Reserved		DO 1.1
Pal. Grip Close CMD		DO 1.2
Vac. On CMD		DO 1.3
Pal. Picker Left Open	DI 1.4	
Pal. Picker Left Closed	DI 1.5	
Pal. Picker Right Open	DI 1.6	
Pal. Pick. Right Closed	DI 1.7	

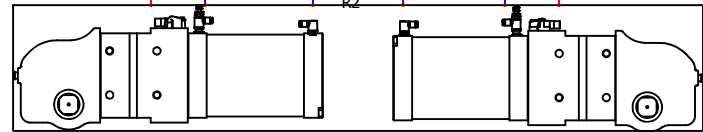
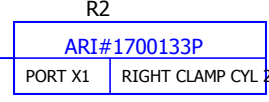
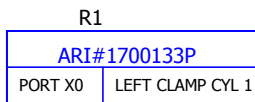
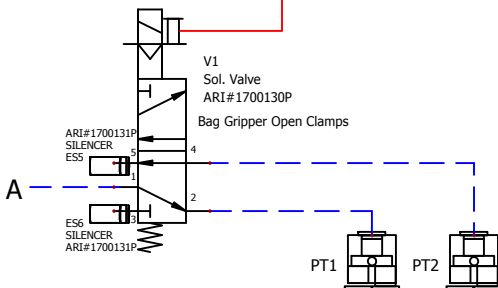
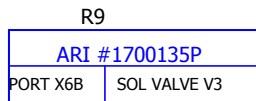
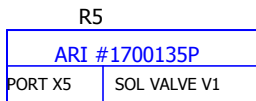
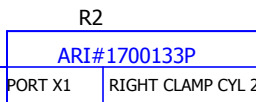
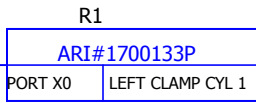
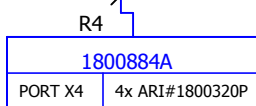
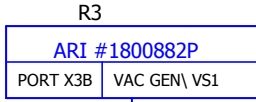
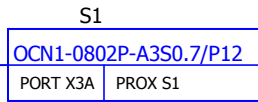
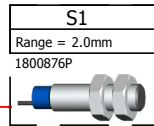
CUSTOMER SUPPLIED  
M12 D-CODE ETHERNET



### F1 - Pallet Picker Option



ARI#1800263P	CLAMP CYLINDER, ARPG15
ARI#1700134P	CLAMP CYLINDER, ARPG30
ARI#1800270P	CLAMP CYLINDER, ARPG50

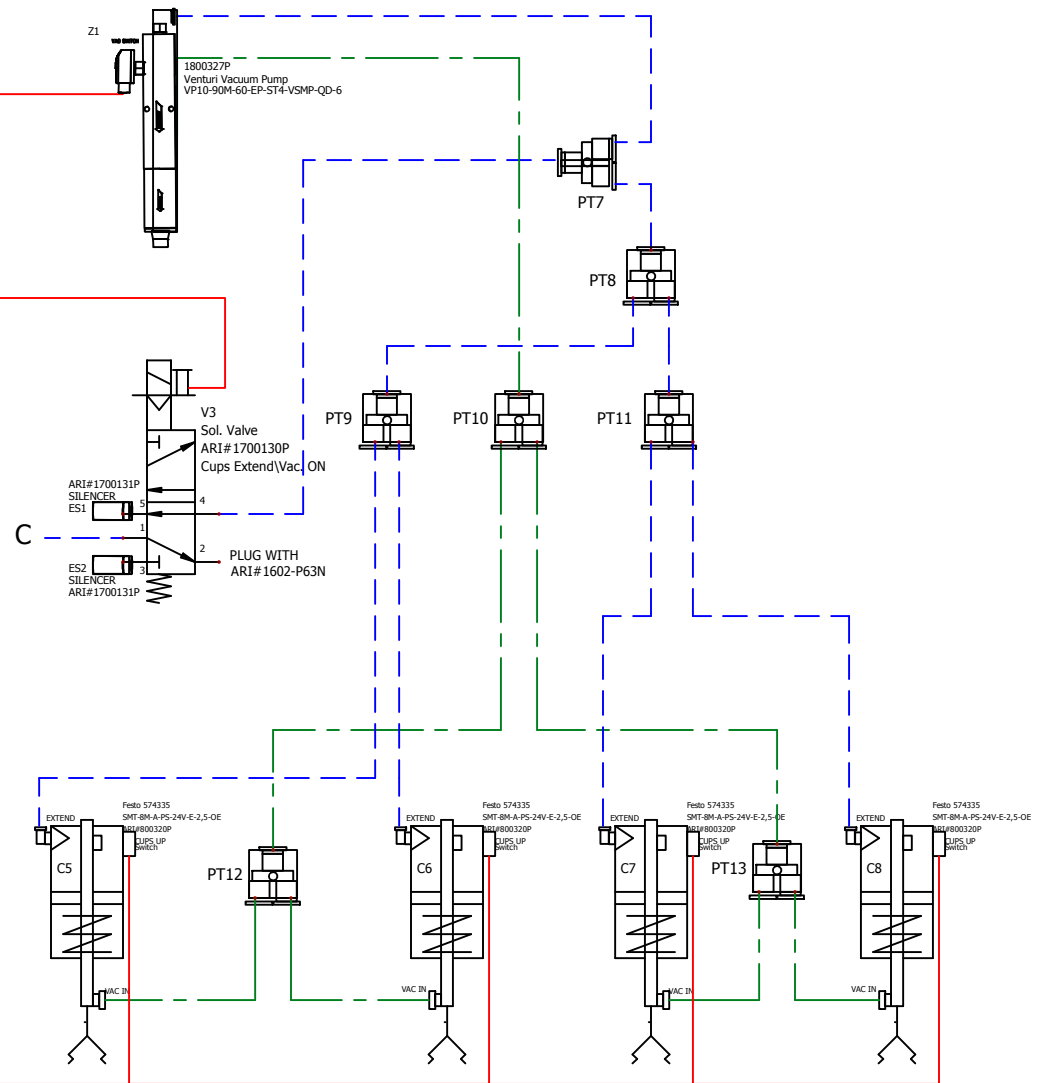



ARI#1800263P CLAMP CYLINDER, ARPG15  
ARI#1700134P CLAMP CYLINDER, ARPG30  
ARI#1800270P CLAMP CYLINDER, ARPG50

VACUUM LINE 6 mm

ARI#1800883P

F1 F2 - SHEET PICK Option



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	GR: TS	12/27/2018			
	ER: TS	12/27/2018			
	MR: M. Dudnath				
SURFACE TREATMENT:	GR: M. Dudnath		TITLE:		
	3D MODEL NUMBER:		<p>SCHEM, SYSTEM</p> <p>ARPG</p>		
	NA				
	SCALE: NA NOT APPLICABLE				
NA	ISO 9001		SIZE: D	DRAWING NUMBER: 1800256S	REV: 00
	REGISTERED		MASS: NA kg NA	DATE COMPLAINT: YES	SHT. 1 of 1

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