Applied Robotics™
Solutions in reach

HIKVA MODULE

EPSILON

95648, Rev 00

February 17, 2019

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REVISION

Revision	Date	Author	Description
00	02/17/2019	DS	Initial Release

CONTENTS

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 during coupling of the Robot and Tool Adaptor.

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

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

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

NOTICE — 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 HIKVA Module is an electrical pass through that mounts directly to the long sides of the APPLIED ROBOTICS Tool Changer. The HIKVA Module provides a reliable pass through of user primary welding current for various types of welding (e.g., spot, stud, and MIG). The HIKVA Module contains two mating halves, one mounted on the Robot Side and one mounted on the Tool Side.

HIKVA Module – The HIKVA Module consists of a Robot Side module and Tool Side module. Both the Robot Side and Tool Side contain three contacts.

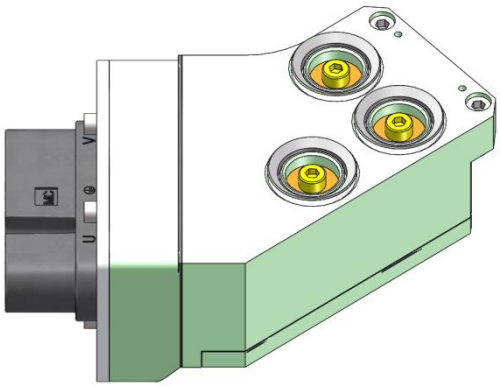


Figure 2-1.
Robot Side HIKVA Module

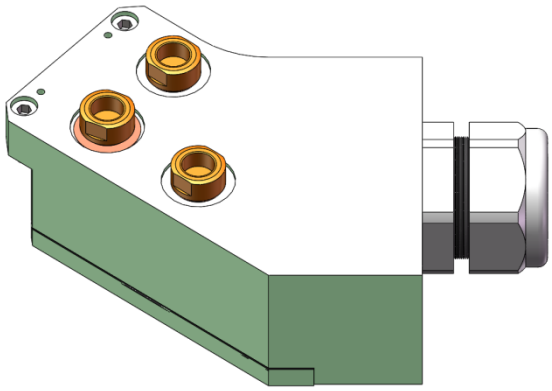
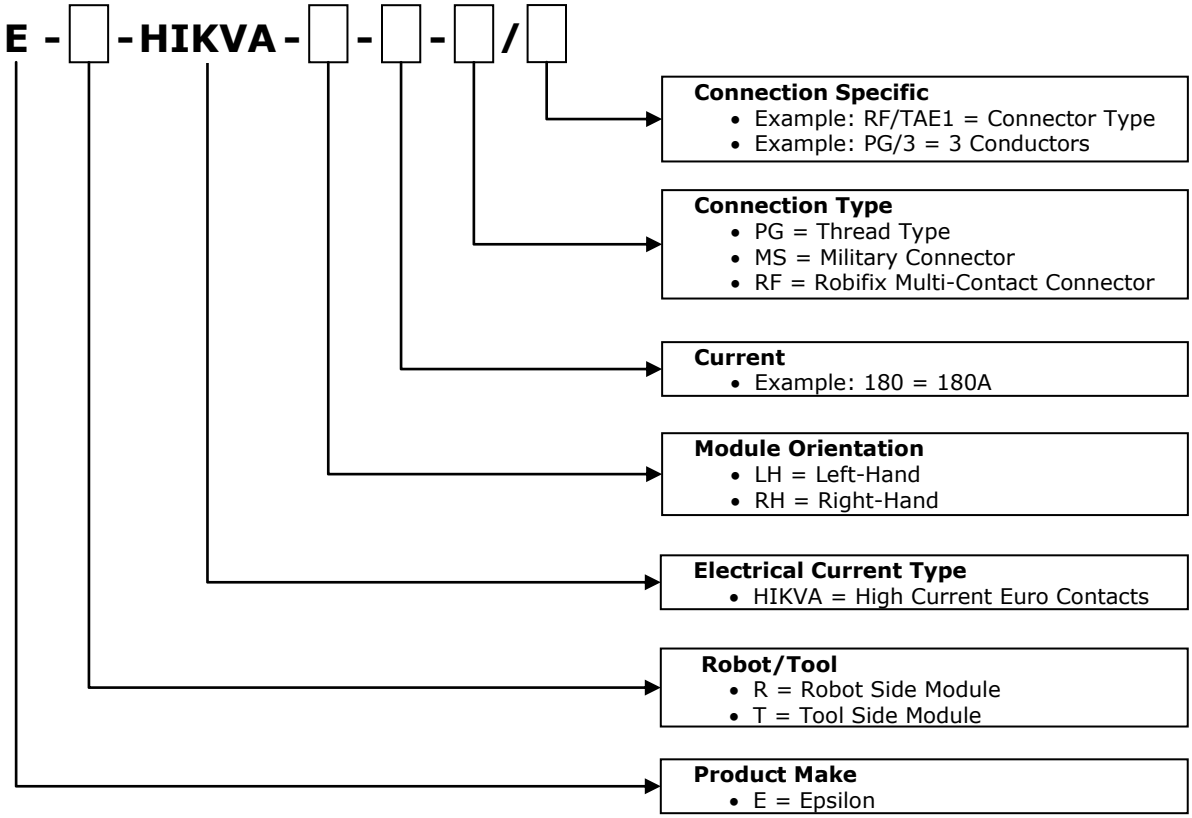


Figure 2-2.
Tool Side HIKVA Module

2.1 HIKVA MODULE – EPSILON



Custom/Special: E-□-HIKVA-□-□-S####

3 TECHNICAL SPECIFICATIONS

Table 3-1. HIKVA Module Technical Specifications

Specification		Metric	English
Number of Contacts		3	
Max Conductor Size		50 mm^2	1/0 AWG
Mass / Weight *	Robot	1.77 kg	3.90 lb
	Tool	1.76 kg	3.88 lb
Operating Temperature		5 to 60 °C	40 to 140 °F
Transportation & Storage Temperature		5 to 60 °C	40 to 140 °F
Noise Emission		<= 70 dB(A) in any direction	
Current Rating		223A Continuous	
Higher Current Ratings		Contact APPLIED ROBOTICS Technical Support	

* Module weight may vary depending on specific configuration.

4 INSTALLATION

The HIKVA Module is designed to mount directly to APPLIED ROBOTICS' Sigma, Sigma NextGen, and Epsilon (E125, E160, ES160, & ES200) Tool Change Systems.

The HIKVA Module can be installed on any long side mounting position of the Sigma, Sigma NextGen, or Epsilon Tool Changer. That is, Positions 2, 4, or 6 for the Sigma, Sigma NextGen, and Epsilon E160, ES160, and ES200 Tool Changers, and Positions 2 or 4 for the Epsilon E125 Tool Changer. See applicable Tool Changer manual.

To install the HIKVA Module, locate the module using the two installed M6 dowels and fasten the module to the mounting position using the two M6 socket head cap screws, supplied with the module (See Figure 4-1).

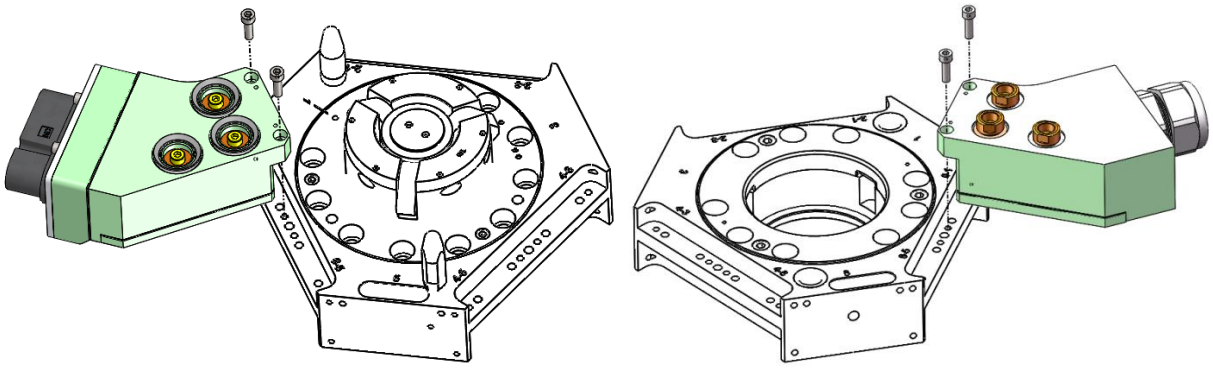


Figure 4-1. HIKVA Module Installation

4.1 CABLE INSTALLATION

For cable size specifications, reference applicable equipment drawing.

4.1.1 Robot Side

1. For Cable Preparation, refer to module drawing for cable stripping lengths (See Section 10).
2. Unscrew strain relief cap from strain relief and remove insert.

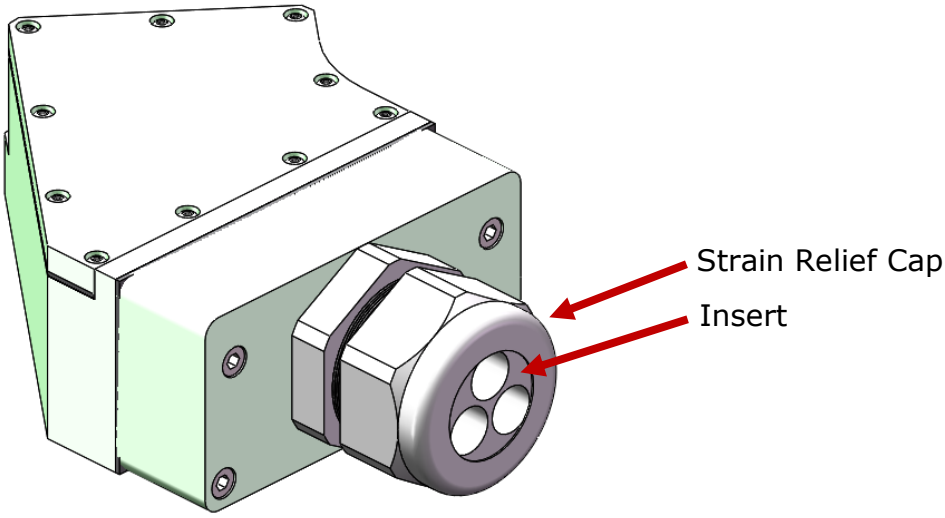


Figure 4.1.1-1. Remove/Install Strain Relief Cap and Insert

3. Remove tool cover by using a 5mm Allen wrench to remove ten (10) M3 button head cap screws from tool base. Note that the tool gasket will also become loose.

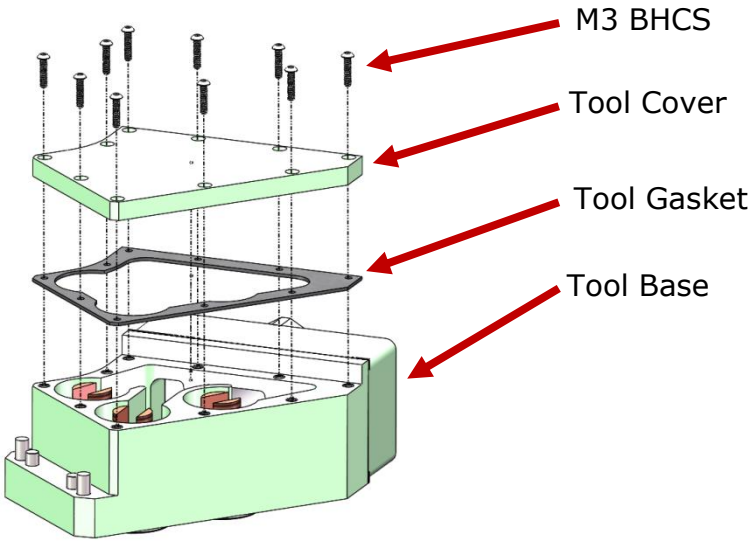


Figure 4.1.1-2. Remove/Install Tool Cover

4. Remove three (3) terminal nuts and three (3) terminal lugs from contacts.

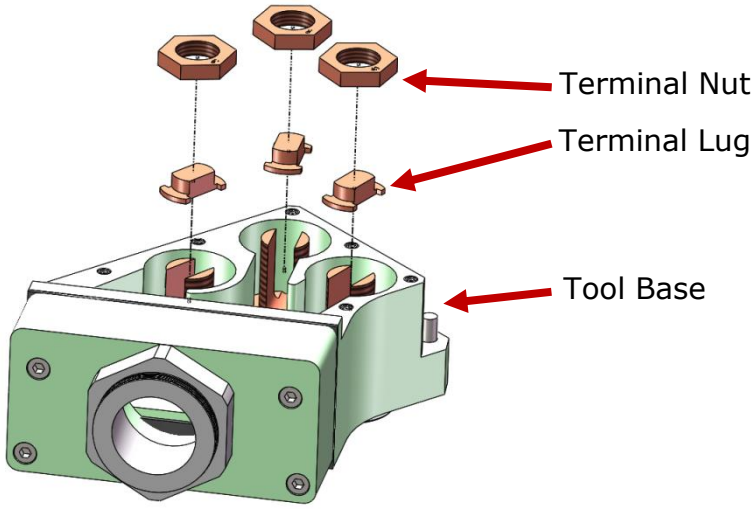


Figure 4.1.1-3. Remove/Install Terminal Nuts and Terminal Lugs

5. Slide cable through strain relief cap, insert, and strain relief in order to install conductors to respective contact terminal. Conductors should be oriented so they are closest to respective contact terminal.
    a. Green conductor goes to PE contact.
    b. Black conductor goes to V contact.
    c. White conductor goes to U contact.

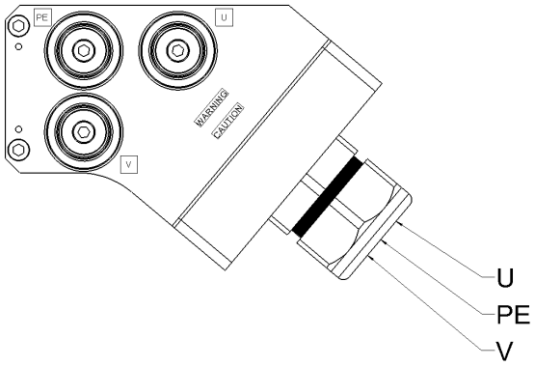


Figure 4.1.1-4. Conductor Orientation

6. Reinstall three (3) terminal nuts and three (3) terminal lugs to contacts (See Figure 4.1.1-3).

NOTICE

TERMINAL NUTS ONLY THREAD ONE WAY; PICK-PUNCHED OR STAMPED LETTER UP.

NOTICE

TERMINAL NUTS HAVE A RECOMMENDED TORQUE OF 12.43 Nm (110.4 IN-LB).

7. Reinstall tool cover and tool gasket onto tool base by using a 5mm Allen wrench to install ten (10) M3 button head cap screws (See Figure 4.1.1-2).

NOTICE

M3 BUTTON HEAD CAP SCREWS HAVE A RECOMMENDED TORQUE OF 0.56 Nm (5 IN-LB).

8. Reinstall strain relief cap and insert onto strain relief (See Figure 4.1.1-1).

NOTICE

STRAIN RELIEF SHOULD BE SCREWED SO THAT FLATS ARE PARALLEL TO EDGES OF ADAPTOR. IF NOT, MODULES MAY BE DAMAGED DURING OPERATION.

4.1.2 Tool Side

1. For Cable Preparation, refer to module drawing for cable stripping lengths (See Section 10).
2. Unscrew strain relief cap from strain relief and remove insert.

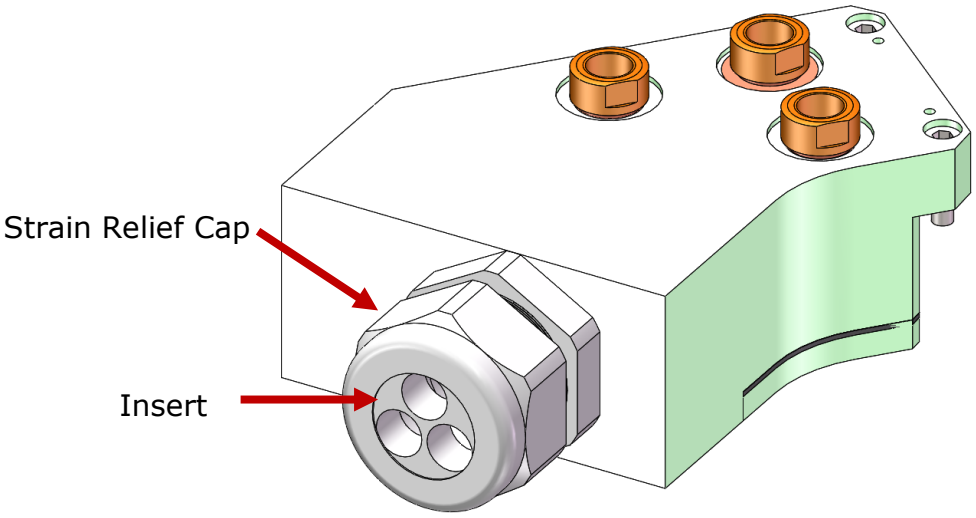


Figure 4.1.2-5. Remove/Install Strain Relief Cap and Insert

3. Remove tool cover by using a 5mm Allen wrench to remove ten (10) M3 button head cap screws from tool base. Note that the tool gasket will also become loose.

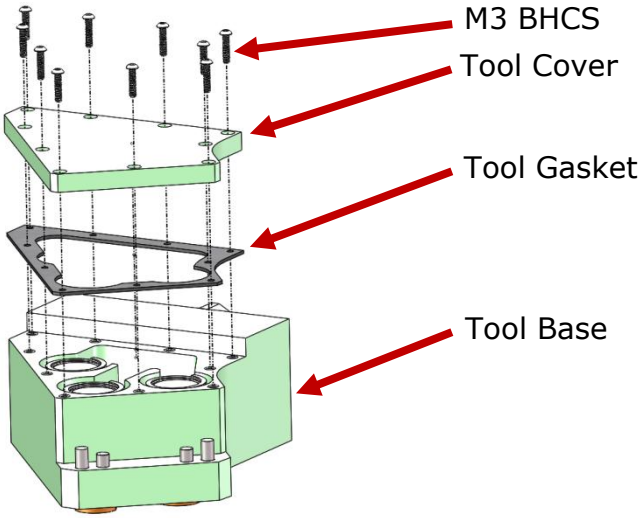


Figure 4.1.2-6. Remove/Install Tool Cover

4. Remove three (3) contact springs, spring retainers, terminal nuts, and terminal lugs from contacts.

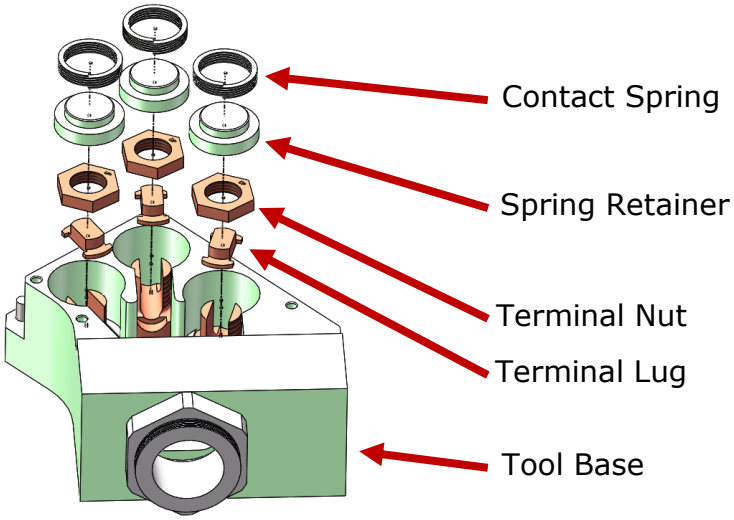


Figure 4.1.2-7. Remove/Install Contact Springs, Spring Retainers, Terminal Nuts, and Terminal Lugs

5. Slide cable through strain relief adaptor and install conductors to respective contact terminal. Conductors should be oriented so they are closest to respective contact terminal.
    a. Green conductor goes to PE contact.
    b. Black conductor goes to V contact.
    c. White conductor goes to U contact.

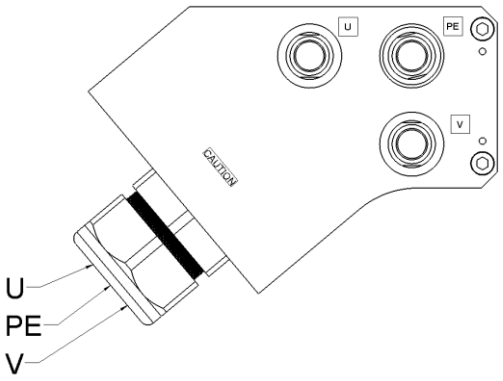


Figure 4.1.2-8. Conductor Orientation

6. Reinstall three (3) contact springs, spring retainers, terminal nuts, and terminal lugs to contacts. (See Figure 4.1.2-7).

NOTICE

TERMINAL NUTS ONLY THREAD ONE WAY; PICK-PUNCHED OR STAMPED LETTER UP.

NOTICE

TERMINAL NUTS HAVE A RECOMMENDED TORQUE OF 12.43 Nm (110.4 IN-LB).

7. Reinstall tool cover and tool gasket onto tool base by using a 5mm Allen wrench to install ten (10) M3 socket head cap screws (See Figure 4.1.2-6).

NOTICE

M3 BUTTON HEAD CAP SCREWS HAVE A RECOMMENDED TORQUE OF 0.56 Nm (5 IN-LB).

8. Reinstall strain relief cap and insert onto strain relief (See Figure 4.1.2-5).

NOTICE

STRAIN RELIEF SHOULD BE SCREWED SO THAT FLATS ARE PARALLEL TO EDGES OF ADAPTOR. IF NOT, MODULES MAY BE DAMAGED DURING OPERATION.

5 GUIDE TO OPERATION

The two halves of the HIKVA Module mate when the Robot Side of the Tool Changer goes to dock a tool. Power is transmitted via spring loaded pins on the Tool Side when mated. Tool Changer locating pins provide alignment and guidance for interfacing the two halves of the HIKVA Module during docking.

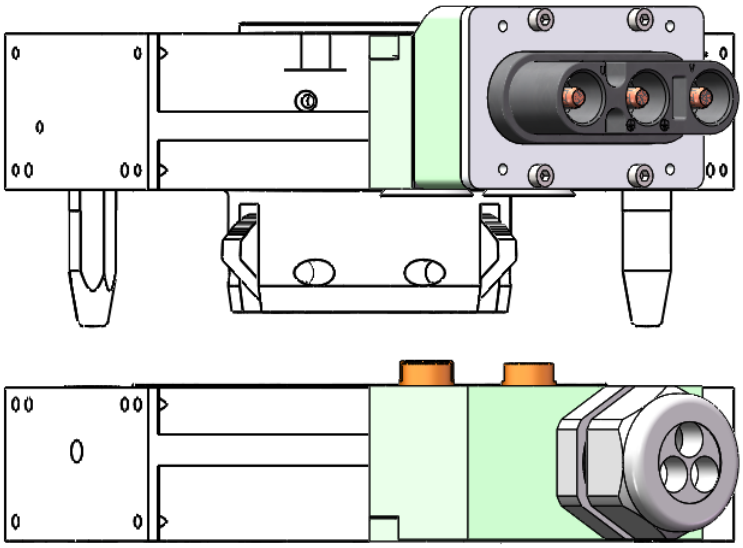


Figure 5-1. Tool Changer Undocked

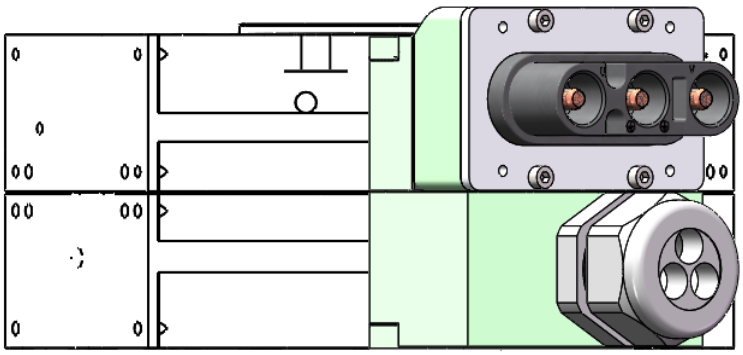


Figure 5-2. Tool Changer Docked

The Robot Side has a V-Ring seal around each of the three contacts in order to protect the contacts from debris when the Tool Changer is docked.

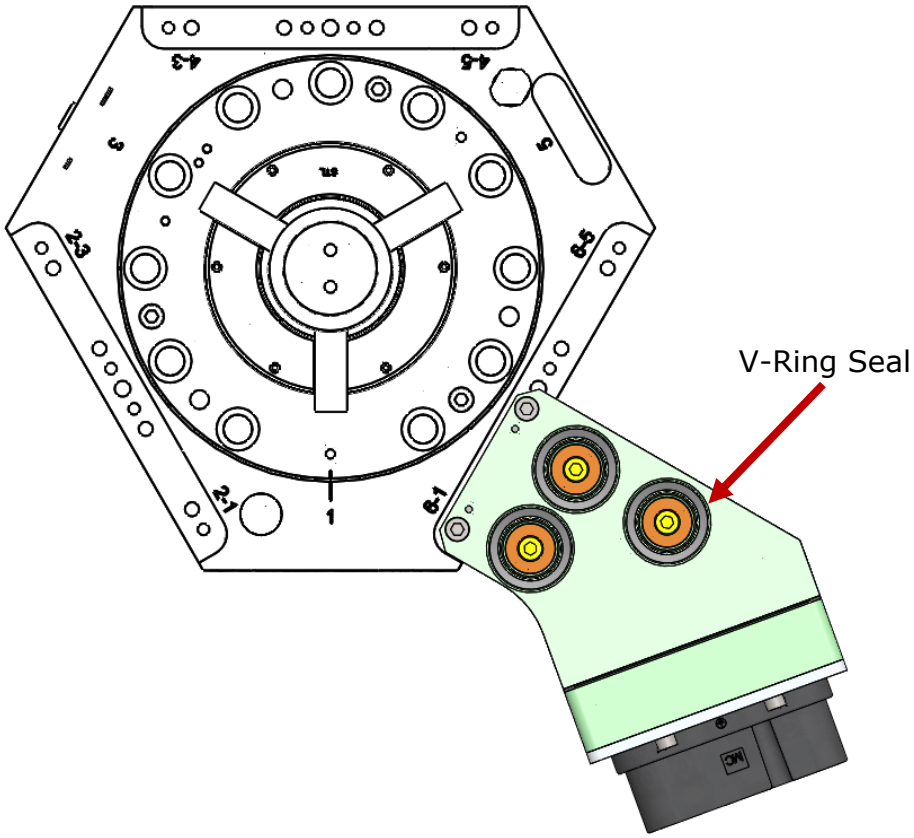


Figure 5-3. Robot Side V-Ring Seal

The Tool Side contacts are designed so that the ground (PE) contact is slightly higher than the two power contacts. This ensures the ground contact is First to Mate, where it is the first to make a connection when the Tool Changer is docking and the last to break the connection when the Tool Changer is undocking.

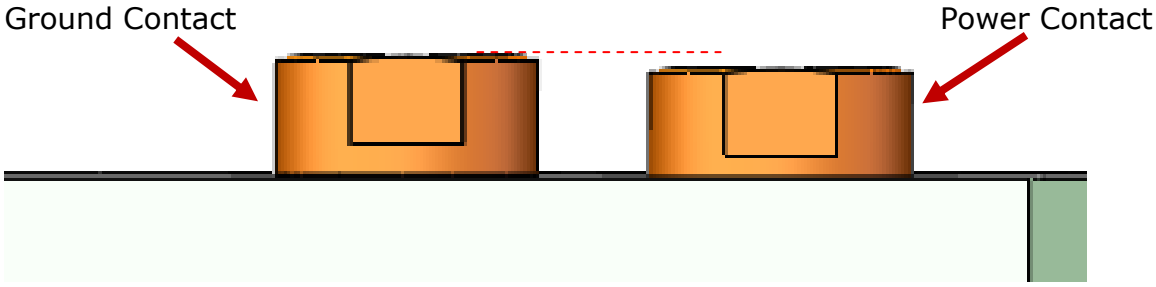


Figure 5-4. Tool Side Contacts

⚠ WARNING

TURN OFF POWER DURING CONNECT/DISCONNECT TO AVOID ARCING AND SHORTS.

6 TROUBLESHOOTING

6.1 TROUBLESHOOTING GUIDE

Symptom	Possible Cause	Resolution
Burnt or pitted contacts	Broken Tool Side contact Springs	Replace Tool Side contact springs and all contact tips. (See Sections 9.1, 9.2, and 9.3).
	Contaminants on pins	Replace Tool Side contact springs and all contact tips. (See Sections 9.1, 9.2, and 9.3).
Burnt Housings	Loose conductors	Replace burnt components and make sure conductors are secured.

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

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 following table provides a schedule for preventive maintenance to be performed for the HIKVA Module.

Table 7-1. Preventive Maintenance Schedule

Frequency of Maintenance	Preventative Maintenance
Every 2 Weeks	Visual Checks
250,000 Cycles	Visual Checks & Contact Spring Inspection (Tool Side)
500,000 Cycles	
750,000 Cycles	
1,000,000 Cycles	Visual Checks & Contact Spring Inspection (Tool Side) & Replace if Worn or Damaged Parts
1,250,000 Cycles	
1,500,000 Cycles	
1,750,000 Cycles	
2,000,000 Cycles[1]	

7.1 PREVENTIVE MAINTENANCE

1. Inspect contact surfaces for excessive dirt or pitting. Replace contact surfaces if excessive pitting is observed (See Section 9.1 and 9.2).

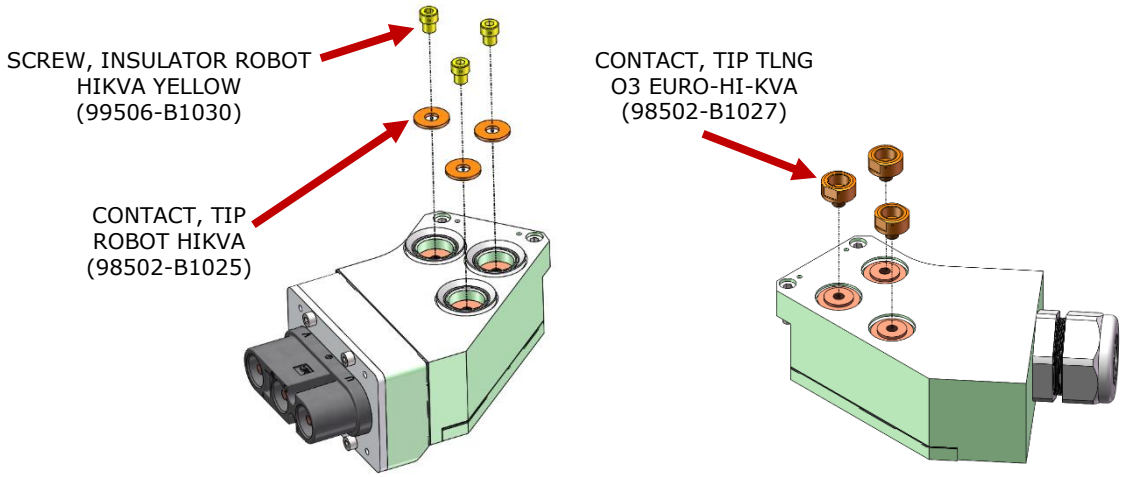


Figure 7.1-1. Contact Tip Robot and Tool HIKVA Module

[1] Continue Visual Checks every 250,000 Cycles. Continue inspecting for wear or damaged components every 500,000 cycles.

8 SPARE PARTS

The spare parts listed below are recommended to be maintained in stock for the life of the HIKVA Module. 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 to determine the quantity of spares recommended for the size of your installation.

HIKVA MODULE (PER MODULE)			
Side	**Description**	**Part Number**	**Quantity**
Robot	CONTACT, TIP ROBOT HIKVA	98502-B1025	3
	SCREW, INSULATOR ROBOT HIKVA YELLOW	99506-B1030	3
Tool	CONTACT, TIP TLNG O3 EURO-HI-KVA	98502-B1027	3
	SPRING, WAVE SMALLEY	96506-P1031	3

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.

⚠ DANGER **TURN OFF AND DISCONNECT ALL POWER BEFORE REPLACING ANY COMPONENTS.**

9.1 CONTACT TIP REPLACEMENT (ROBOT SIDE)

The Contact Tips can be replaced while still on the Robot Adaptor.

1. Remove Insulated Screws (99506-B1030).
2. Remove Contact Tips (98502-B1025).
3. Apply a thin film of Conductive Paste (86005-P1208) Jet Lube Inc. KOPR-SHIELD to one side of the new Contact Tips.
4. Lay the Contact Tip (98502-B1025) so that the side coated with Conductive Paste (86005-P1208) is in contact with the High-Power Contact (96502-B1091).
5. Thread the Insulated Screws (99506-B1030) into the High-Power Contacts (96502-B1091) through the Contact Tips (98502-B1025).

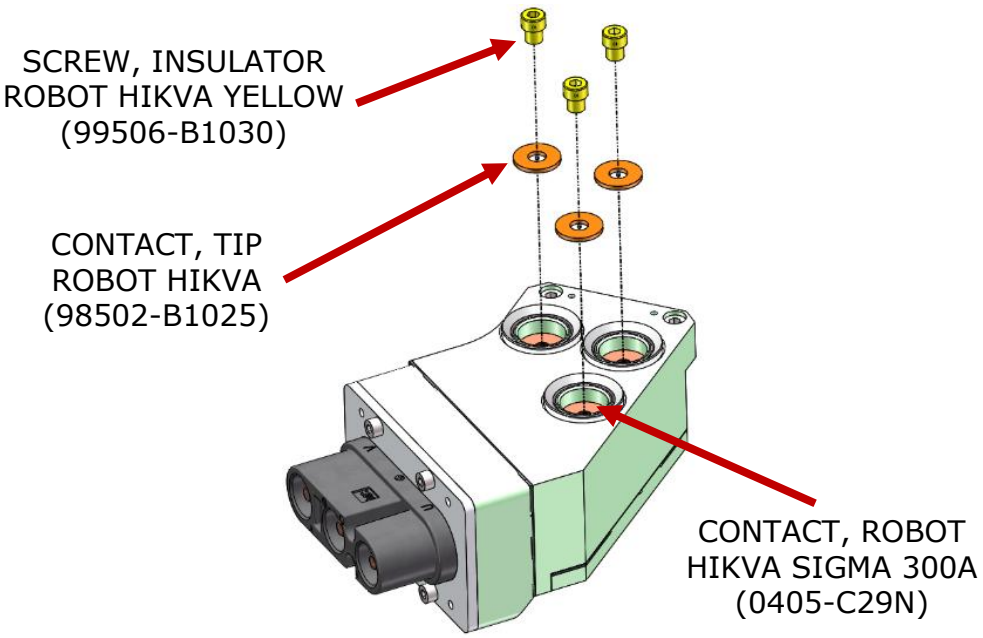


Figure 9.1-1. Contact Tip Replacement (Robot Side)

NOTICE **INSULATED SCREWS HAVE A RECOMMENDED TORQUE OF 1.1 Nm (10 IN-LB).**

9.2 CONTACT TIP REPLACEMENT (TOOL SIDE)

The Contact Tips can be replaced while still on the Tool Adaptor.

9. Remove Contact Tips (98502-B1027).
10. Apply a thin coat of Conductive Paste (86005-P1208) / Jet Lube Inc. KOPR-SHIELD to the exposed surfaces of the High-Power Contact Bodies (98502-C1024).
11. Thread new Contact Tips (98502-B1027) into the High-Power Contact Bodies (98502-C1024).

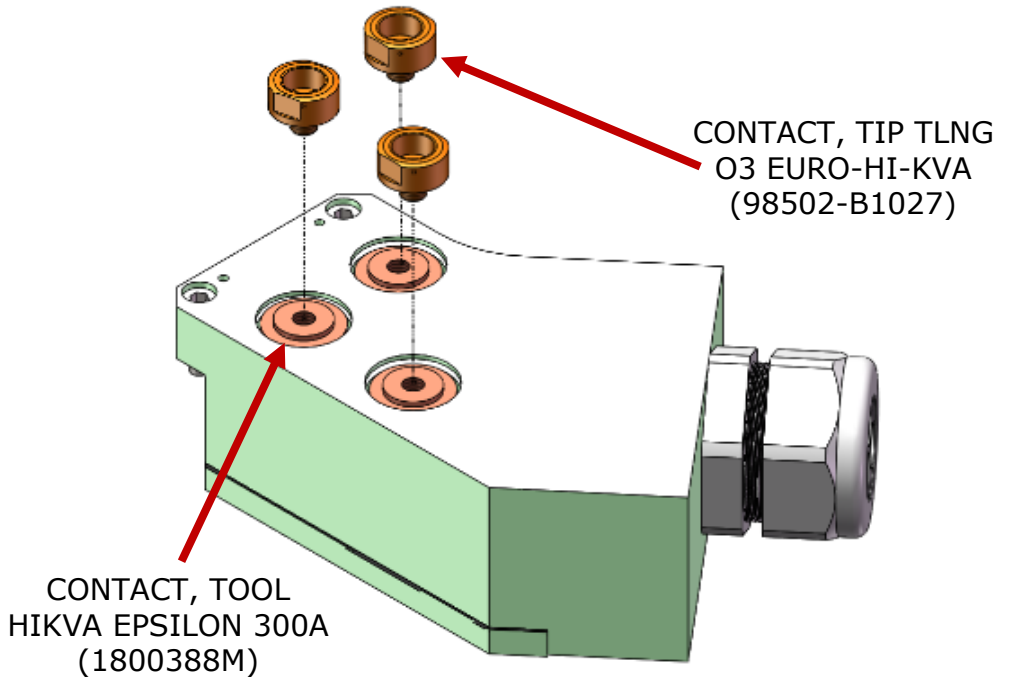


Figure 9.2-1. Contact Tip Replacement (Tool Side)

NOTICE

CONTACT TIPS HAVE A RECOMMENDED TORQUE OF 7.9 Nm (70 IN-LB).

9.3 CONTACT SPRINGS REPLACEMENT (TOOL SIDE)

1. Remove M3 (1800095P) button head cap screws from Tool Cover (1800077M) as shown in Figure 9.3-1. Contact Spring Replacement (Tool Side).
2. Remove Tool Cover (1800077M). Be aware that the Tool Gasket (1800078M) will be loose when the Tool Cover (1800077M) is removed from the Tool Base.
3. Remove Spring Retainers (0405-B36N) and Contact Springs (96506-P1031).

4. Place new Contact Springs (96506-P1031) and Spring Retainers (0405-B36N) into the Tool Base.
5. Remount the Tool Cover (1800077M) by threading the M3 (1800095P) button head cap screws into the Tool Base through the Tool Cover (1800077M) and Tool Gasket (1800078M).

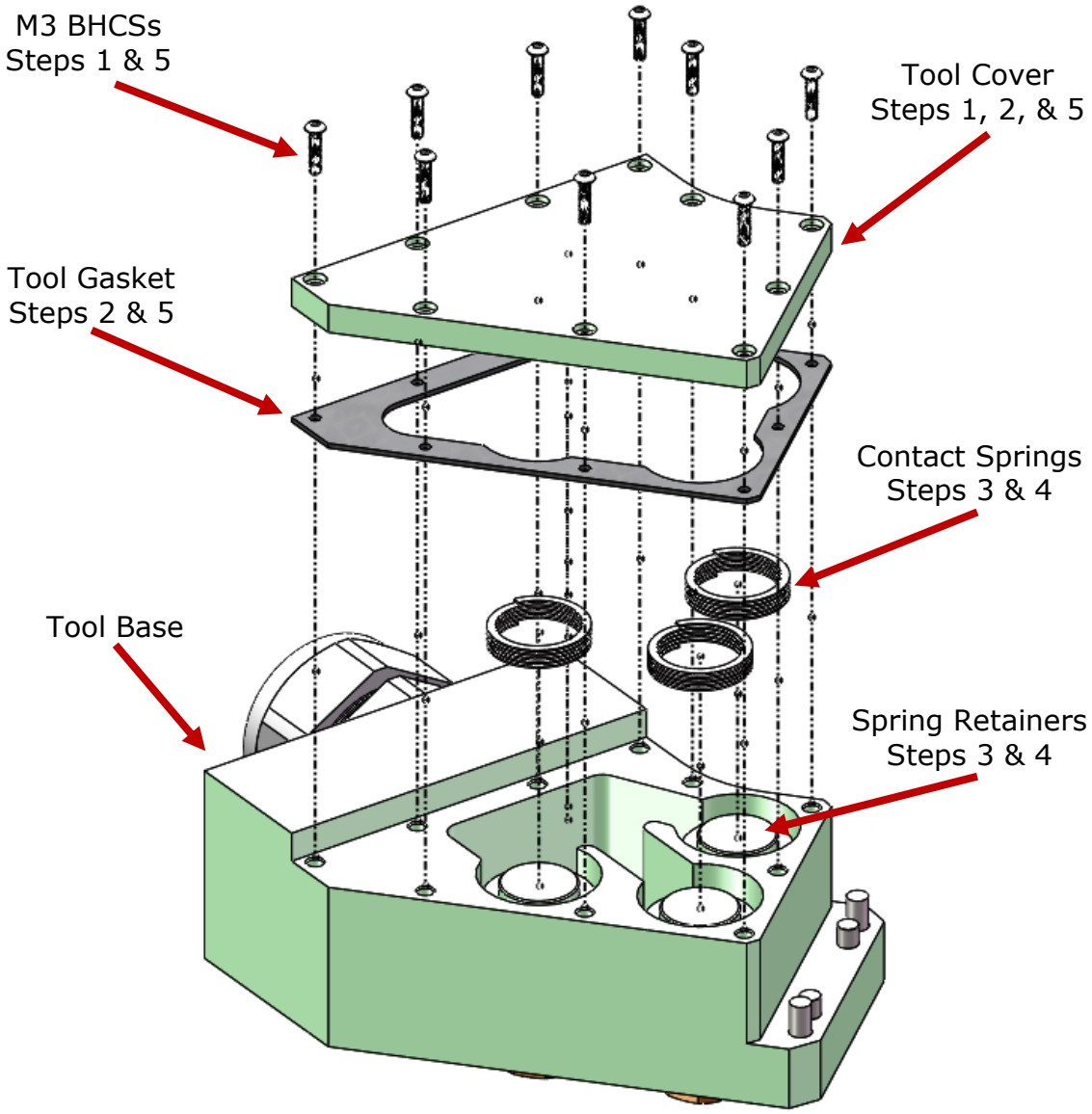


Figure 9.3-1. Contact Spring Replacement (Tool Side)

NOTICE

M3 SCREWS HAVE A RECOMMENDED TORQUE OF 0.56 Nm (5 IN-LB).

10 INFORMATIONAL DOCUMENTS

The documents in this section can assist with installation, use, and identification of replacement parts for the HIKVA Module. Please contact **APPLIED ROBOTICS Technical Support** if you have any questions.

DECLARATIONS
• Declaration of Incorporation for Partly Completed Machinery

DRAWINGS		
SIDE	**DRAWING NUMBER**	**DESCRIPTION**
Robot	1800040A	E-R-HIKVA-LH-180-RF/TAE1
Tool	1800041A	E-T-HIKVA-LH-180-PG-3X

Declaration of Incorporation of Partly Completed Machinery (Annex II 1 B of EC Machinery Directive 2006/42/EC)

Description and identification of the partly completed machinery:

XChange – EPSILON Series Tool Changers & Utility Modules

Fulfills the following function:

Allows industrial robots (and other automated equipment) to automatically change their end of arm tooling under programmed control without the need of human intervention. These products are intended to be incorporated into machinery supplied by others.

The following essential requirements of EC Machinery Directive 2006/42/EC (Annex I) have been applied and fulfilled:

Section 1.1.2.	Principles of safety integration
Section 1.1.3.	Materials and products
Section 1.1.5.	Design of machinery to facilitate its handling
Section 1.2.1.	Safety and reliability of control systems
Section 1.2.6.	Failure of the power supply
Section 1.3.2	Risk of break-up during operation
Section 1.3.3.	Risks due to falling or ejected objects
Section 1.3.4.	Risks due to surfaces, edges or angles
Section 1.3.7.	Risks related to moving parts
Section 1.3.9.	Risks of uncontrolled movements
Section 1.5.1.	Risks due to electricity supply
Section 1.5.3.	Risks due to energy supply other than electricity (air pressure)
Section 1.5.8.	Risks due to noise
Section 1.5.10.	Risks due to non-ionizing radiation
Section 1.6.4.	Operator intervention
Section 1.7.1.	Information and warnings on the machinery
Section 1.7.2.	Warning of residual risks
Section 1.7.3.	Marking of machinery
Section 1.7.4.	Instructions.

The partly completed machinery has been designed and manufactured according to the following harmonized standards:

EN ISO 12100-1	Safety of machinery - Basic concepts, general principles for design Part 1: Basic terminology, methodology
EN ISO 12100-2	Safety of machinery - Basic concepts, general principles for design Part 2: technical principles

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EN ISO 10218-2	Robots and robotic devices — Safety requirements for industrial robots — Part 2: Robot systems and integration
EN ISO 60204-1	Safety of machinery. Electrical equipment of machines. General requirements
EN 61000-6-2	Electromagnetic compatibility (EMC) - Generic standards. Immunity for industrial environments
EN 61000-6-4	Electromagnetic compatibility (EMC) - Generic standards. Emission standard for industrial environments
EN 61000-4-2	Electromagnetic compatibility (EMC). Testing and measurement techniques. Electrostatic discharge immunity test
EN 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use -- Part 1: General requirements

The relevant technical documentation has been compiled in accordance with Annex VII, Part B of EC Machinery Directive 2006/42/EC. We undertake, in response to a reasoned request, to supply it in electronic form to the market surveillance authorities within a reasonable period.

The party authorized to compile the technical documentation is:

Giovanni Patrini, at Effecto Group SpA

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive.

Stefan Casey
Vice President, Engineering

APRIL 20, 2018
Date

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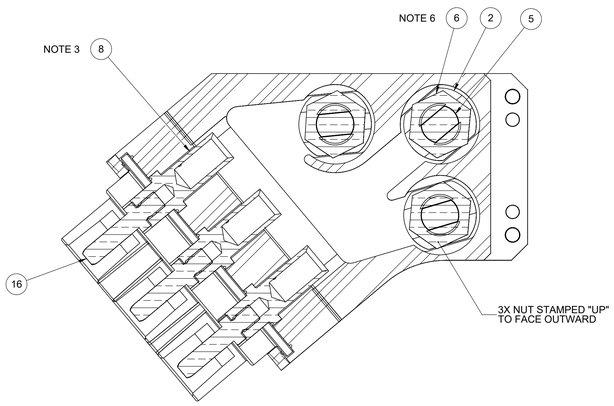
SIZE	DRAWING NUMBER	REV
E	1800040A	00

REVISIONS						
ZONE	REV	DESCRIPTION	DR	CHK	DATE	ECR/ESR NO.
	00	RELEASE FOR MANUFACTURE	PS	TM	10/30/2018	SCAY-ARKGCQ



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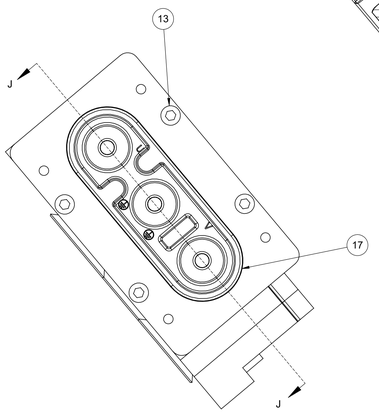

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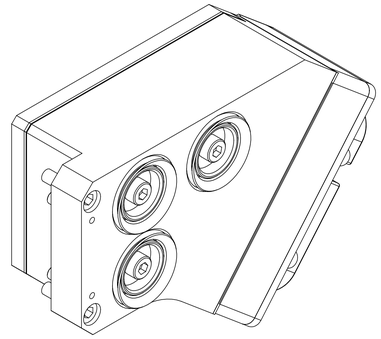
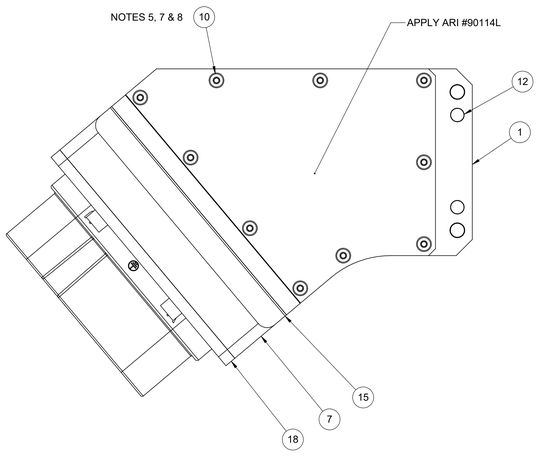
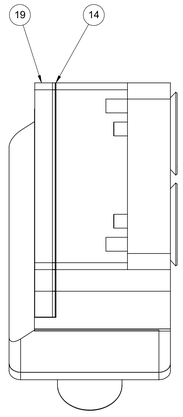
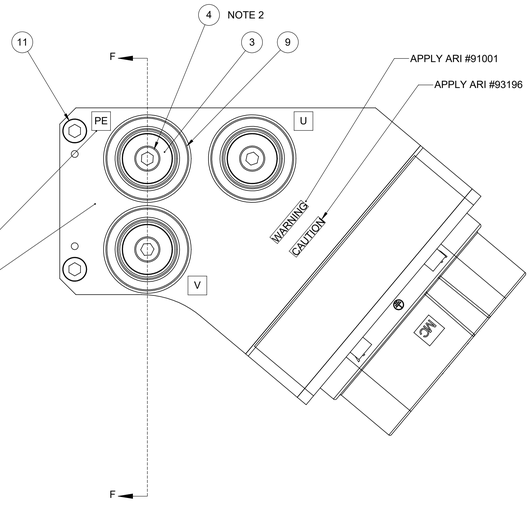
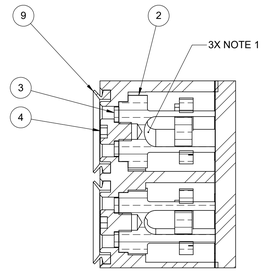


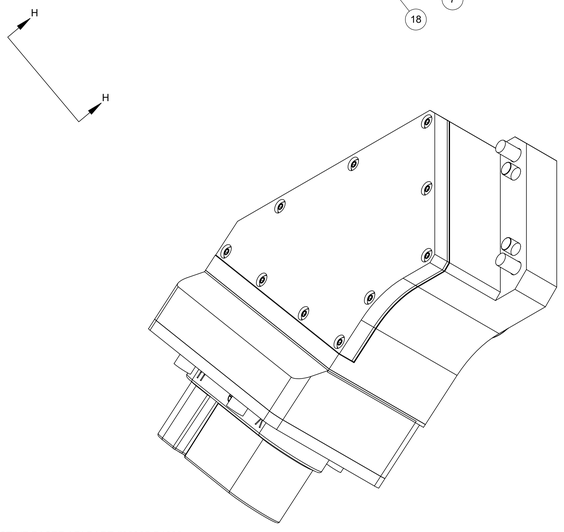




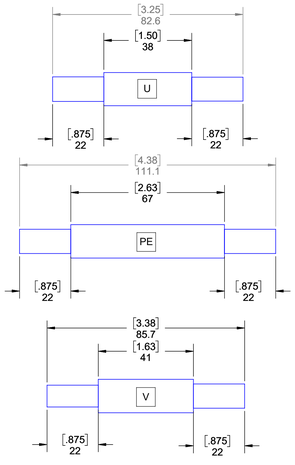


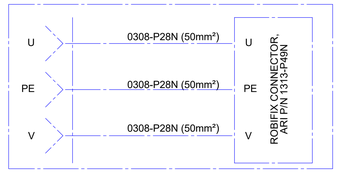


SECTION F-F



CABLE STRIP LENGTHS





WIRING SCHEMATIC

NOTES
1. APPLY CONDUCTIVE PASTE ARI PART #86005-P1208.
2. TORQUE TO 10 lbf-in (1.13 Nm).
3. CRIMP USING ARI #0307-P60N, USE INSERTS MARKED 14.5.
4. ALL DOWELS ARE INSERTED TO 50% OF OVERALL LENGTH (+/- .5MM) UNLESS OTHERWISE NOTED.
5. APPLY LOCTITE 222 ARI #86005-P1020.
6. TORQUE TO 9.2 lbf-ft (12.43 Nm).
7. TORQUE TO 5 lbf-in (.56 Nm).
8. ALL ITEMS TO RECIEVE LOCTITE ARE TO BE THOROUGHLY CLEANED FROM GREASE AND OIL. USE PRIMER "N" BEFORE APPLYING ANY LOCTITE THREAD LOCKERS.

ITEM NO.	QTY	PART NO.	DESCRIPTION
19	1	1800077M	COVER, E-R/T-HIKVA
18	1	1800082M	PLATE, MOUNT RF-TAE1 HIKVA
17	1	1313-P49N	CONNECTOR. ROBIFIX TAE1-57
16	3	1313-P77N	CONTACT, PIN HIKVA (S8/M8-41 AG)
15	1	1800080M	GASKET, ADAPTOR RF-TAE1 HIKVA
14	1	1800078M	GASKET, COVER E-R/T-HIKVA
13	8	48029	SCR, SOC HD CAP M5 X 20 (SS)
12	2	41580	DOWEL, M6 X 12 (HARD STL) m6
11	2	48038	SCR, SOC HD CAP M6 X 20 (SS)
10	10	1800095P	SCR, BUT HD SOC CAP M3 X 14 (SS)
9	3	1800084P	V-RING, V-28A NITRILE
8	3	1800081M	CONTACT, RF-TAE1 HIKVA
7	1	1800079M	ADAPTOR, RF-TAE1 HIKVA
6	3	0405-B31N	NUT, LOCK SIGMA HIKVA 300A
5	3	0405-B32N	LUG, CONTACT HIKVA SIGMA 300A
4	3	99506-B1030	SCREW, INSULATOR ROBOT HIKVA
3	3	98502-B1025	CONTACT, TIP ROBOT HIKVA
2	3	0405-C29N	CONTACT, ROBOT HIKVA SIGMA 300A
1	1	1800076M	BASE, E-R-HIKVA-LH-180-RF-TAE1

THIRD ANGLE PROJECTION

METRIC

UNLESS OTHERWISE SPECIFIED:

UNTOLERANCED DIMS ARE BASIC

.25 A B C

⌖ ∅ .25M A B C

ALL HOLE DIAMETERS +/- 0.25

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

ALL SURFACE FINISHES 1.6Ra

MAT'L: Material <not specified>

SURFACE TREATMENT: -

DIM. AND TOLERANCING IN ACCORDANCE WITH ASMEY 14.5-2009

DR:	P. SLAVINSKI
CHK:	T. MARCELLA
ENG:	P. SLAVINSKI
MFG:	M. DUDNATH
QC:	M. DUDNATH

3D MODEL NUMBER: 1800040A

SCALE: 1:1

DO NOT SCALE DRAWING

ISO 9001 REGISTERED

Applied Robotics™ Solutions in reach
648 Saratoga Rd. Glenville, NY 12302
www.appliedrobotics.com

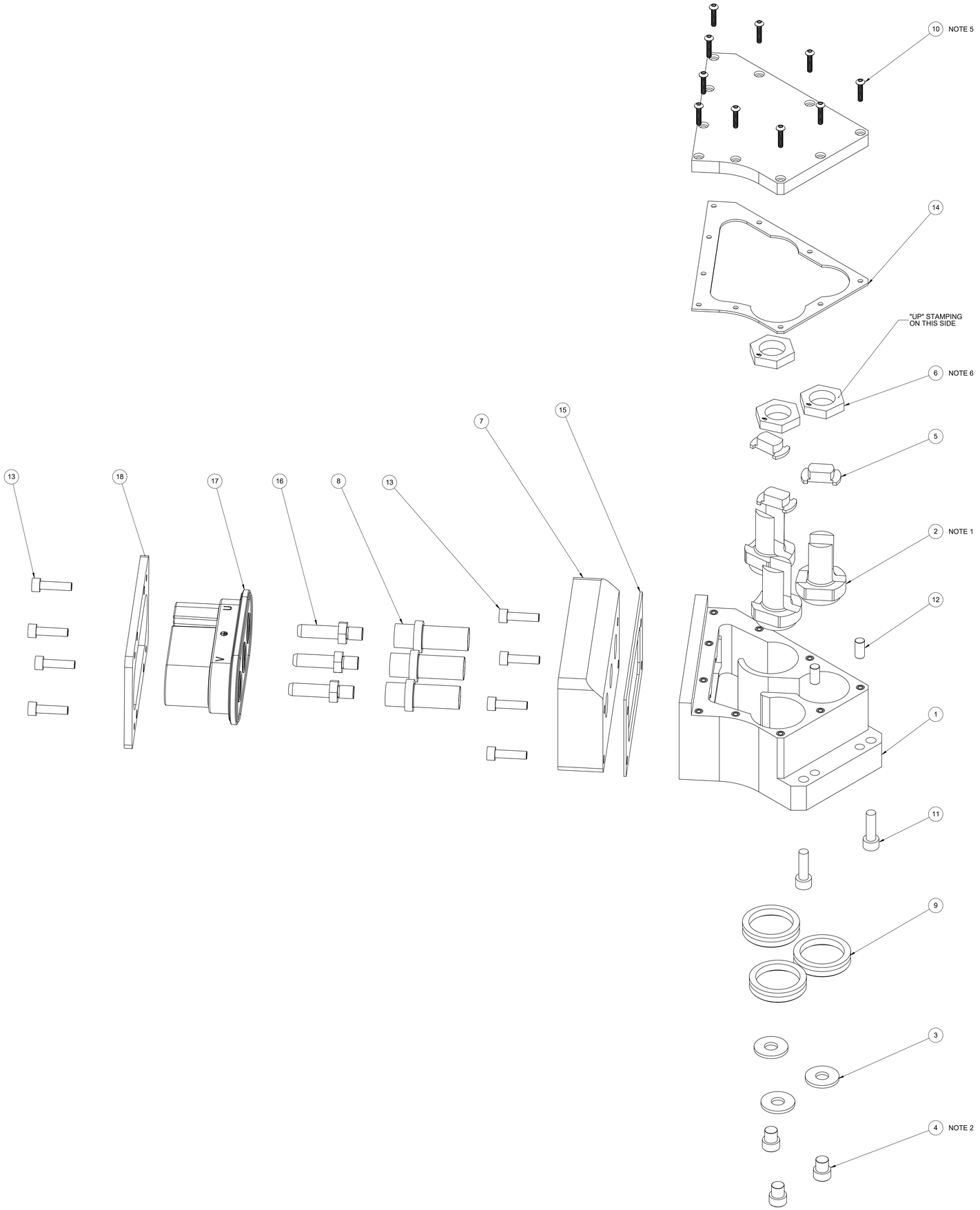
TITLE: E-R-HIKVA-LH-180-RF/TAE1 - -

SIZE	DRAWING NUMBER	REV
E	1800040A	00

WEIGHT: 1.77 kg | RoHs COMPLIANT: - | SHT. 1 OF 2

PRINT DATE 1/4/2019

SIZE	DRAWING NUMBER	REV
E	1800040A	00



THIRD ANGLE PROJECTION	METRIC	DR: P. SLAVINSKI	Applied Robotics™ Solutions in reach
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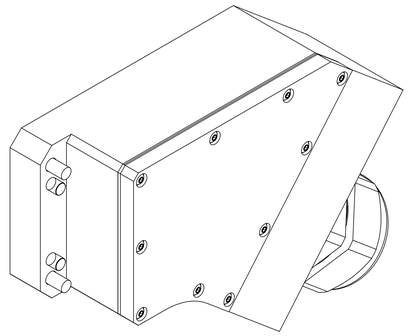
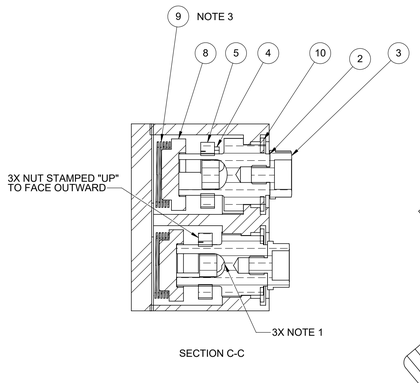
PRINT DATE 1/4/2019	MAT'L: Material <not specified> SURFACE TREATMENT: -	SCALE: 1:1 DO NOT SCALE DRAWING	TITLE: E-R-HIKVA-LH-180-RF/TAE1 - -
DIM. AND TOLERANCING IN ACCORDANCE WITH ASMEY 14.5-2009	ISO 9001 REGISTERED		SIZE E · DRAWING NUMBER 1800040A · REV 00
		WEIGHT: 1.77 kg · RoHs COMPLIANT: - · SHT. 2 OF 2	

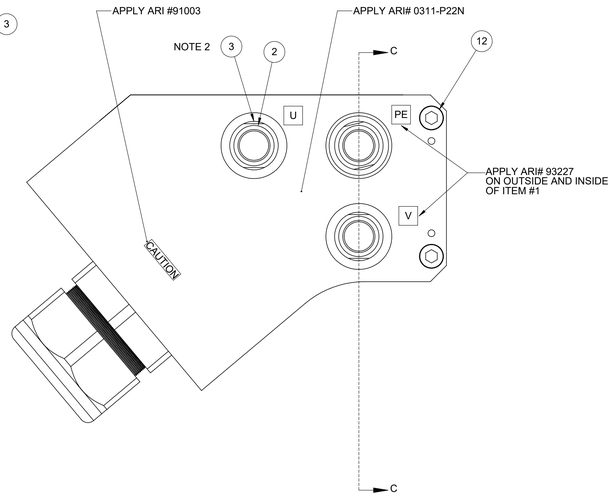
SIZE	DRAWING NUMBER	REV
E	1800041A	00

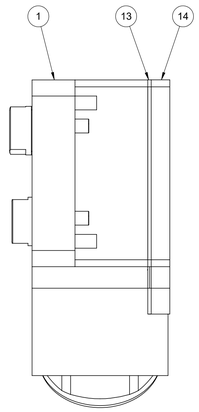
REVISIONS						
ZONE	REV	DESCRIPTION	DR	CHK	DATE	ECR/ESR NO.
	00	RELEASE FOR MANUFACTURE	PS	TM	10/30/2018	SCAY-ARKGCQ

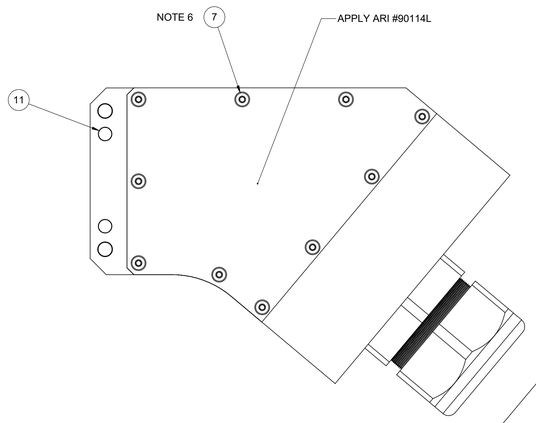


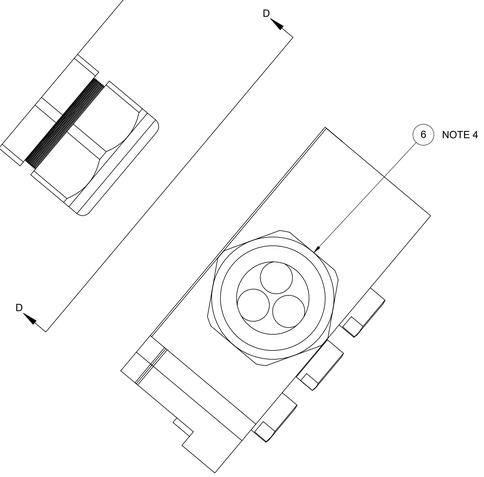


SECTION C-C

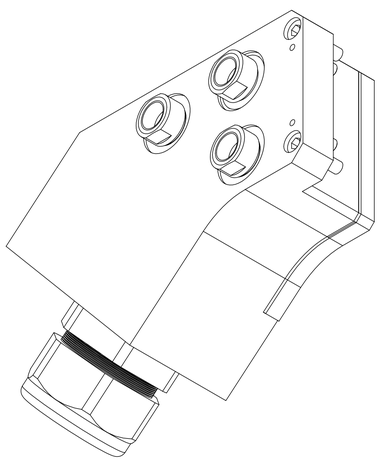






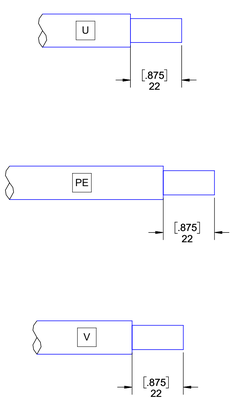


VIEW D-D



WIRE SUPPLIED BY CUSTOMER
50mm² MAX (#1 AWG)

CABLE STRIP LENGTHS



NOTES
1. APPLY CONDUCTIVE PASTE ARI PART # 86005-P1208
2. TORQUE ITEM #4 ARI PART #98502-B1027 TO 70 IN/LB
3. REPLACE CONTACT SPRINGS EVERY 250,000 CYCLES (ITEM #9 ARI #96506-P1031).
4. TORQUE TO 44 lbf-in (5 Nm)
5. ALL DOWELS ARE INSERTED TO 50% OF OVERALL LENGTH (+/- .5MM) UNLESS OTHERWISE NOTED.
6. CUSTOMER TO APPLY LOCTITE 222 OR EQUIVALENT AFTER WIRING.
7. TORQUE TO 5 lbf-in (.56 Nm)

ITEM NO.	QTY	PART NO.	DESCRIPTION
14	1	1800077M	COVER, E-R/T-HIKVA
13	1	1800078M	GASKET, COVER E-R/T-HIKVA
12	2	48038	SCR, SOC HD CAP M6 X 20 (SS)
11	2	41580	DOWEL, M6 X 12 (HARD STL) m6
10	3	96502-B1092	SEAL, CONTACT
9	3	96506-P1031	SPRING, WAVE SMALLEY
8	3	0405-B36N	RETAINER, SPRING
7	10	1800095P	SCR, BUT HD SOC CAP M3 X 14 (SS)
6	1	1007-P87N	STRAIN RELIEF, PG36
5	3	0405-B31N	NUT, LOCK SIGMA HIKVA 300A
4	3	0405-B32N	LUG, CONTACT HIKVA SIGMA 300A
3	3	98502-B1027	CONTACT, TIP TLNG O3 EURO-HI-KVA
2	3	1800388M	CONTACT, TOOL HIKVA EPSILON 300A
1	1	1800083M	BASE, E-T-HIKVA-LH-180-PG-3X

THIRD ANGLE PROJECTION

METRIC

UNLESS OTHERWISE SPECIFIED:
UNTOLERANCED DIMS ARE BASIC
.25 A B C
⌀ .25M A B C
ALL HOLE DIAMETERS +/- 0.25
INTERNAL RADIS & BROKEN EDGES TO BE .13-.38
ALL SURFACE FINISHES 1.6Ra

MAT'L: Material <not specified>

SURFACE TREATMENT: -

DIM. AND TOLERANCING IN ACCORDANCE WITH ASMEY 14.5-2009

DR:	P. SLAVINSKI
CHK:	T. MARCELLA
ENG:	P. SLAVINSKI
MFG:	M. DUDNATH
QC:	M. DUDNATH

3D MODEL NUMBER: 1800041A

SCALE: 1:1

DO NOT SCALE DRAWING

ISO 9001 REGISTERED

PRINT DATE 1/4/2019

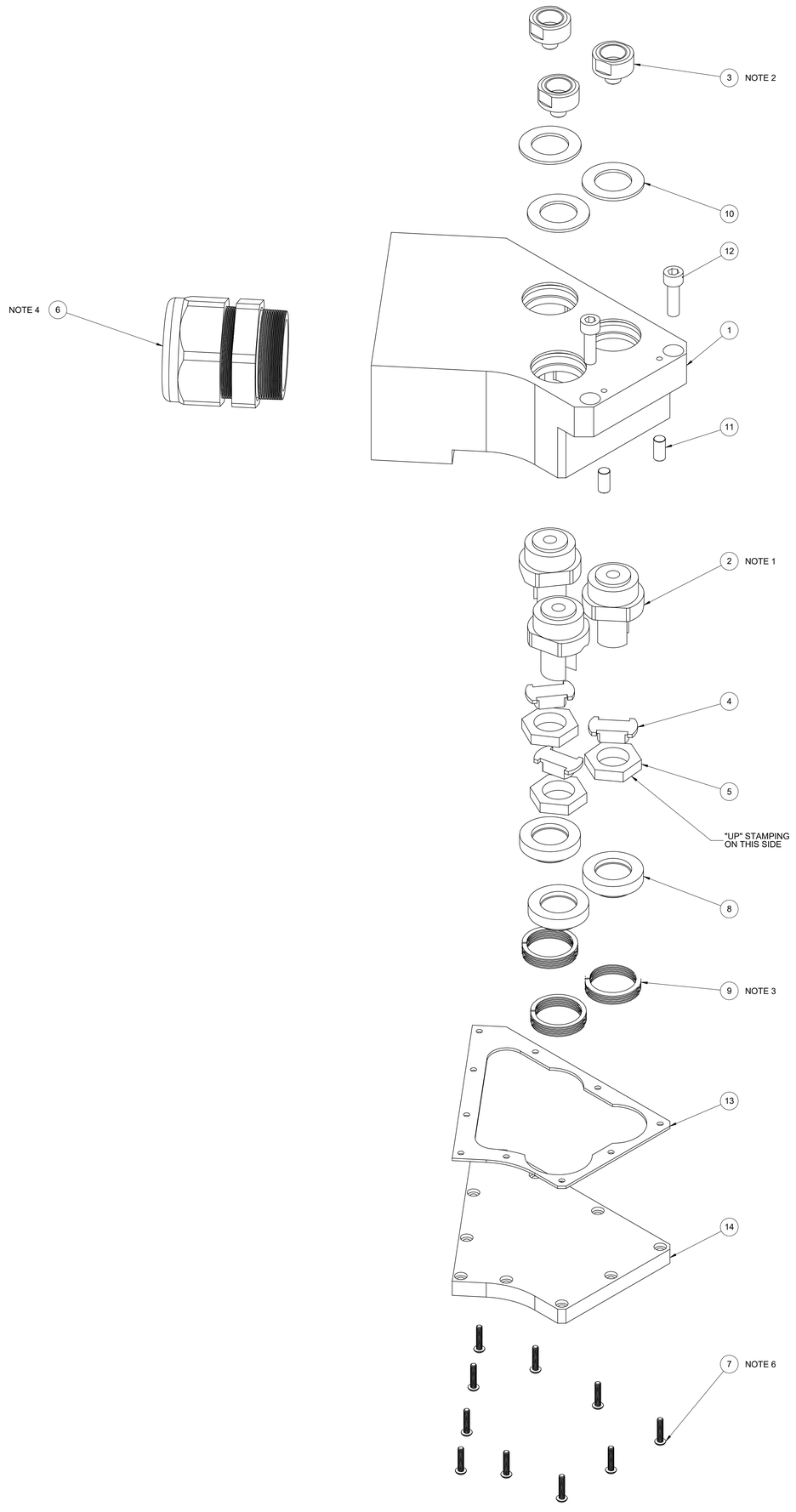
Applied Robotics™ Solutions in reach
648 Saratoga Rd. Glenville, NY 12302
www.appliedrobotics.com

TITLE: E-T-HIKVA-LH-180-PG-3X - -

SIZE	DRAWING NUMBER	REV
E	1800041A	00

WEIGHT: 1.76 kg | RoHs COMPLIANT: - | SHT. 1 OF 2

SIZE	DRAWING NUMBER	REV
E	1800041A	00



THIRD ANGLE PROJECTION

METRIC

UNLESS OTHERWISE SPECIFIED:

UNTOLERANCED DIMS ARE BASIC

.25 A B C

⌖ Ø .25 M A B C

ALL HOLE DIAMETERS +/- 0.25

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

ALL SURFACE FINISHES 1.6Ra

MAT'L: Material <not specified>

SURFACE TREATMENT: -

DR:	P. SLAVINSKI
CHK:	T. MARCELLA
ENG:	P. SLAVINSKI
MFG:	M. DUDNATH
QC:	M. DUDNATH

3D MODEL NUMBER: 1800041A

SCALE: 1:2

DO NOT SCALE DRAWING

ISO 9001 REGISTERED

PRINT DATE 1/4/2019

DIM. AND TOLERANCING IN ACCORDANCE WITH ASME Y 14.5-2009

Applied Robotics™ Solutions in reach
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www.appliedrobotics.com

TITLE: E-T-HIKVA-LH-180-PG-3X
-
-

SIZE	DRAWING NUMBER	REV
E	1800041A	00

WEIGHT: 1.76 kg | RoHs COMPLIANT: - | SHT. 2 OF 2