

TOUGH GUN® TA3 Robotic Air-Cooled MIG Gun

OWNER'S MANUAL

February 2022

OM-TA3-3.2-A

Robotic, Air-Cooled, ThruArm™ MIG
(GMAW) Welding Gun



Tregaskiss.com/TechnicalSupport
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Thank You for Choosing Tregaskiss

Thank you for selecting a Tregaskiss product. Before installing, compare the equipment received against the invoice to verify that the shipment is complete and undamaged. It is the responsibility of the purchaser to file all claims of damage or loss that may have occurred during transit with the carrier.

The owner's manual contains general information, instructions and maintenance to help better maintain your MIG gun or peripheral. Please read, understand and follow all safety precautions.

While every precaution has been taken to assure the accuracy of this owner's manual, Tregaskiss assumes no responsibility for errors or omissions. Tregaskiss assumes no liability for damages resulting from the use of information contained herein. The information presented in this owner's manual is accurate to the best of our knowledge at the time of printing. Please reference Tregaskiss.com for updated material.

For customer support and special applications, please call the Tregaskiss Customer Service Department at 1-855-MIGWELD (644-9353) (US & Canada) or +1-519-737-3000 (International), fax 1-519-737-1530, or email at cs@itwmig.com. Our trained Customer Service Team is available between 8:00 a.m. and 5:30 p.m. EST, and will answer your product application or repair questions.

Tregaskiss manufactures premium robotic MIG (GMAW) welding guns, peripherals and consumables. For more information on other premium Tregaskiss products, contact your local Tregaskiss distributor or visit us on the web at Tregaskiss.com.

Subject to Change – The information presented in this manual is accurate to the best of our knowledge at the time of printing. Please visit Tregaskiss.com for the most up-to-date information.

Additional Material – For additional support materials such as spec sheets, troubleshooting information, how-to guides and videos, animations, online configurators and much more, please visit Tregaskiss.com.

Scan this QR Code with your smart phone for immediate access to Tregaskiss.com/TechnicalSupport



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DECLARATION OF CONFORMITY

for European Community (CE marked) products



Tregaskiss, 2570 North Talbot Rd., Oldcastle, Ontario N0R 1L0 Canada declares that the product(s) identified in this declaration conform to the essential requirements and provisions of the stated Council Directive(s) and Standard(s).

Product/Apparatus Identification:

Product	Stock Number
Tregaskiss TOUGH GUN TA3 Series	TA1XXXXXXXXX (Configurable #)

Council Directives:

- 2006/95/EC Low Voltage
- 2011/65/EU Restriction of the use of certain hazardous substances in electrical and

Electronic equipment standards:

- IEC 60974-7:2013 Arc welding equipment – Part 7: Torches

Signatory:

March 22, 2017

David A. Werba
MANAGER, PRODUCT DESIGN COMPLIANCE

Date of Declaration

SECTION 1 — SAFETY PRECAUTIONS — READ BEFORE USING



Protect yourself and others from injury – read, follow, and save these important safety precautions and operating instructions.

1-1 Symbol Usage



DANGER! – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE – Indicates statements not related to personal injury.

 – Indicates special instructions.



This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2 Arc Welding Hazards



The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in section 1-4 Principal Safety Standards on page 3, and in welding power source Owner's Manual. Read and follow all Safety Standards.



Only qualified persons should install, operate, maintain, and repair this equipment. A qualified person is defined as one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated ability to solve or resolve problems relating to the subject matter, the work, or the project and has received safety training to recognize and avoid the hazards involved.



During operation, keep everybody, especially children, away.

ELECTRIC SHOCK can kill.

- Always wear dry insulating gloves.
- Insulate yourself from work and ground.
- Do not touch live electrode or electrical parts.



- Replace worn, damaged, or cracked guns or cables.
- Turn off welding power source before changing contact tip or gun parts.
- Keep all covers and handle securely in place.

FUMES AND GASES can be hazardous.

- Keep your head out of the fumes.
- Ventilate area, or use breathing device. The recommended way to determine adequate ventilation is to sample for the composition and quantity of fumes and gases to which personnel are exposed.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.



MOVING PARTS can injure.

- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.



WELDING can cause fire or explosion.

- Do not weld near flammable material.
- Do not weld on containers that have held combustibles, or on closed containers such as tanks, drums, or pipes unless they are properly prepared according to AWS F4.1 and AWS A6.0 (see Safety Standards).
- Watch for fire; keep extinguisher nearby.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.



BUILDUP OF GAS can injure or kill.

- Shut off compressed gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.



ARC RAYS can burn eyes and skin.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.



- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare and sparks; warn others not to watch the arc.
- Wear body protection made from leather or flame-resistant clothing (FRC). Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.

HOT PARTS can burn.

- Allow gun to cool before touching.
- Do not touch hot metal.
- Protect hot metal from contact by others.



NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.



- Check for noise level limits exceeding those specified by OSHA.
- Use approved ear plugs or ear muffs if noise level is high.
- Warn others nearby about noise hazard.

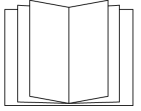
WELDING WIRE can injure.

- Keep hands and body away from gun tip when trigger is pressed.



READ INSTRUCTIONS.

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the Manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform installation, maintenance, and service according to the Owner's Manuals, industry standards, and national, state, and local codes.



1-3 California Proposition 65 Warnings



WARNING: This product can expose you to chemicals including lead, which are known to the state of California to cause cancer and birth defects or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov.

1-4 Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, American Welding Society standard ANSI Standard Z49.1. Website: www.aws.org.

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute. Website: www.ansi.org.

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1. Website: www.aws.org.

National Electrical Code, NFPA Standard 70 from National Fire Protection Association. Website: www.nfpa.org.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1 from Compressed Gas Association. Website: www.cganet.com.

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2 from Canadian Standards Association. Website: www.csagroup.org.

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B from National Fire Protection Association. Website: www.nfpa.org.

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910.177 Subpart N, Part 1910 Subpart Q, and Part 1926, Subpart J. Website: www.osha.gov.

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1-5 EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). The current from arc welding (and allied processes including spot welding, gouging, plasma arc cutting, and induction heating operations) creates an EMF field around the welding circuit. EMF fields may interfere with some medical implants, e.g. Pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, restrict access for passersby or conduct individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.

3. Do not coil or drape cables around your body.
4. Keep head and trunk as far away from the equipment in the welding circuit as possible.
5. Connect work clamp to workpiece as close to the weld as possible.
6. Do not work next to, sit or lean on the welding power source.
7. Do not weld whilst carrying the welding power source wire feeder.

About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 — CONSIGNES DE SÉCURITÉ — LIRE AVANT UTILISATION



Pour écarter les risques de blessure pour vous-même et pour autrui — lire, appliquer et ranger en lieu sûr ces consignes relatives aux précautions de sécurité et au mode opératoire.

2-1 Symboles utilisés



DANGER! – Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.



Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

AVIS – Indique des déclarations pas en relation avec des blessures personnelles.

 – Indique des instructions spécifiques.



Ce groupe de symboles veut dire Avertissement! Attention! DANGER DE CHOC ELECTRIQUE, PIECES EN MOUVEMENT, et PIECES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

2-2 Dangers relatifs au soudage à l'arc



Les symboles donnés ci-après sont utilisés dans tout le manuel pour attirer l'attention sur les dangers possibles et pour indiquer le type de danger dont il s'agit. Quand on voit le symbole, prendre garde et suivre les directives correspondantes pour éviter le danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les Normes de sécurité principales, et dans le Guide d'utilisation de la source de courant de soudage. Lire et suivre toutes les Normes de sécurité.



L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées. Une personne qualifiée est définie comme celle qui, par la possession d'un diplôme reconnu, d'un certificat ou d'un statut professionnel, ou qui, par une connaissance, une formation et une expérience approfondies, a démontré avec succès sa capacité à résoudre les problèmes liés à la tâche, le travail ou le projet et a reçu une formation en sécurité afin de reconnaître et d'éviter les risques inhérents.



Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.

UN CHOC ÉLECTRIQUE peut tuer.



- Porter toujours des gants secs et isolants.
- S'isoler de la pièce et de la terre.
- Ne jamais toucher une électrode ou des pièces électriques sous tension.
- Remplacer les pistolets ou câbles de soudage qui sont endommagés, usés ou craquelés.
- Mettre la soudeuse hors tension avant de remplacer un bec contact ou des pièces de pistolet.
- S'assurer que tous les couvercles et poignées sont fermement assujettis.

LES FUMÉES ET LES GAZ peuvent être dangereux.



- Garder la tête hors des fumées.
- Aérer la zone de travail ou porter un appareil respiratoire. Pour déterminer la bonne ventilation, il est recommandé de procéder à un prélèvement pour la composition et la quantité de fumées et de gaz auxquels est exposé le personnel.
- Lire et comprendre les fiches de données de sécurité et les instructions du fabricant concernant les adhésifs, les revêtements, les nettoyants, les consommables, les produits de refroidissement, les dégraissants, les flux et les métaux.

Les PIÈCES MOBILES peuvent causer des blessures.



- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.

Le SOUDAGE peut provoquer un incendie ou une explosion.



- Ne pas souder à proximité de matériaux inflammables
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 et AWS A6.0 (voir les Normes de Sécurité).
- Prendre garde aux incendies et toujours avoir un extincteur à proximité.

- Lire et comprendre les fiches de données de sécurité et les instructions du fabricant concernant les adhésifs, les revêtements, les nettoyants, les consommables, les produits de refroidissement, les dégraissateurs, les flux et les métaux.

L'ACCUMULATION DE GAZ risquent de provoquer des blessures ou même la mort.



- Fermer l'alimentation du gaz comprimé en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.

LE RAYONNEMENT DE L'ARC peut brûler les yeux et la peau.



Le rayonnement de l'arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

- Porter un casque de soudage approuvé muni de verres filtrants approprié pour protéger visage et yeux pendant le soudage (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des lunettes de sécurité avec écrans latéraux même sous votre casque.
- Avoir recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements les éblouissements et les étincelles ; prévenir toute personne sur les lieux de ne pas regarder l'arc.
- Porter une protection corporelle en cuir ou des vêtements ignifuges (FRC). La protection du corps comporte des vêtements sans huile, comme des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.

LES PIÈCES CHAUDES peuvent provoquer des brûlures.



- Laisser refroidir le pistolet avant de le toucher.
- Ne pas toucher d'objets métalliques chauds.
- Abriter les objets métalliques contre tout contact par les personnes à proximité.

Le BRUIT peut endommager l'ouïe.

Le bruit des processus et des équipements peut affecter l'ouïe.



- Vérifier si les niveaux de bruit excèdent les limites spécifiées par l'OSHA.
- Utiliser des bouches-oreilles ou des serre-tête antibruit approuvés si le niveau de bruit est élevé.

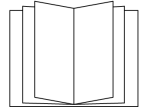
- Avertir les personnes à proximité au sujet du danger inhérent au bruit.

LES FILS DE SOUDAGE peuvent provoquer des blessures.



- Éloigner les mains et le corps de la buse du pistolet après avoir appuyé sur la gâchette.

LIRE LES INSTRUCTIONS.



- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que les pièces de remplacement provenant du fabricant.
- Effectuer l'installation, l'entretien et toute intervention selon les manuels d'utilisateurs, les normes nationales, provinciales et de l'industrie, ainsi que les codes municipaux.

2-3 Proposition californienne 65 avertissements



AVERTISSEMENT – Ce produit peut vous exposer à des produits chimiques tels que le plomb, reconnus par l'État de Californie comme cancérigènes et sources de malformations ou d'autres troubles de la reproduction

Pour plus d'informations, consulter www.P65Warnings.ca.gov.

2-4 Principales normes de sécurité

Safety in Welding, Cutting, and Allied Processes, American Welding Society standard ANSI Standard Z49.1. Website: www.aws.org.

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute. Website: www.ansi.org.

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1 from Global Engineering Documents. Website: www.aws.org.

National Electrical Code, NFPA Standard 70 from National Fire Protection Association. Website: www.nfpa.org.

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OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910.177 Subpart N, Part 1910 Subpart Q, and Part 1926, Subpart J. Website: www.osha.gov.

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2-5 Informations relatives aux CEM

Le courant électrique qui traverse tout conducteur génère des champs électromagnétiques (CEM) à certains endroits. Le courant issu d'un soudage à l'arc (et de procédés connexes, y compris le soudage par points, le gougeage, le découpage plasma et les opérations de chauffage par induction) crée un champ électromagnétique (CEM) autour du circuit de soudage. Les champs électromagnétiques produits peuvent causer interférence à certains implants médicaux, p. ex. les stimulateurs cardiaques. Des mesures de protection pour les porteurs d'implants médicaux doivent être prises: par exemple, des restrictions d'accès pour les passants ou une évaluation individuelle des risques pour les soudeurs. Tous les soudeurs doivent appliquer les procédures suivantes pour minimiser l'exposition aux CEM provenant du circuit de soudage:

1. Rassembler les câbles en les torsadant ou en les attachant avec du ruban adhésif ou avec une housse.
2. Ne pas se tenir au milieu des câbles de soudage. Disposer les câbles d'un côté et à distance de l'opérateur.

3. Ne pas courber et ne pas entourer les câbles autour de votre corps.
4. Maintenir la tête et le torse aussi loin que possible du matériel du circuit de soudage.
5. Connecter la pince sur la pièce aussi près que possible de la soudure.
6. Ne pas travailler à proximité d'une source de soudage, ni s'asseoir ou se pencher dessus.
7. Ne pas souder tout en portant la source de soudage ou le dévidoir.

En ce qui concerne les implants médicaux :

Les porteurs d'implants doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.

SECTION 3 — PRECAUCIONES DE SEGURIDAD — LEA ANTES DE USAR



Protéjase usted mismo y a otros contra lesiones — lea, cumpla y conserve estas importantes precauciones de seguridad e instrucciones de utilización.

3-1 Uso de símbolos



PELIGRO! – Indica una situación peligrosa que, si no se la evita, resultará en muerte o lesión grave. Los peligros posibles se muestran en los símbolos adjuntos o se explican en el texto.



Indica una situación peligrosa que, si no se la evita, podría resultar en muerte o lesión grave. Los peligros posibles se muestran en los símbolos adjuntos, o se explican en el texto.

AVISO – Indica precauciones no relacionadas a lesiones personales.

 – Indica instrucciones especiales.



Este grupo de símbolos significa ¡Advertencia!, ¡Cuidado! CHOQUE O DESCARGA ELÉCTRICA, PIEZAS QUE SE MUEVEN, y peligros de PARTES CALIENTES. Consulte los símbolos y las instrucciones relacionadas que aparecen a continuación para ver las acciones necesarias para evitar estos peligros.

3-2 Peligros en soldadura de arco



Los símbolos mostrados abajo se usan en todo este manual para llamar la atención a e identificar los posibles peligros. Cuando vea el símbolo, preste atención y siga las instrucciones relacionadas para evitar el peligro. La información de seguridad dada abajo es solamente un resumen de la información más completa de seguridad que se encuentra en los estándares de seguridad, y la fuente de alimentación para soldadura del Manual del usuario. Lea y siga todas las normas de seguridad.



Solamente personal cualificado debe instalar, utilizar, mantener y reparar este equipo. La definición de personal cualificado es cualquier persona que, debido a que posee un título, un certificado o una posición profesional reconocida, o gracias a su gran conocimiento, capacitación y experiencia, haya demostrado con éxito la capacidad para solucionar o resolver problemas relacionados con el trabajo, el proyecto o el tema en cuestión, además de haber asistido a una capacitación en seguridad para reconocer y evitar los peligros que implica el proceso.



Durante su operación mantenga lejos a todos, especialmente a los niños.

UNA DESCARGA ELÉCTRICA puede matarlo.



- Siempre use guantes aislantes secos.
- Aíslese usted mismo del trabajo y la tierra.
- No toque electrodo eléctricamente vivo o partes eléctricamente vivas.
- Reemplace antorchas o cables desgastados, dañados o rotos.
- Repare o reemplace aislamiento de la pistola o del cable que esté desgastado, dañado o agrietado.
- Apague la máquina de soldar antes de cambiar los tubos de contacto o piezas de la antorcha.
- Mantenga todas las tapas y asa bien seguras en sitio.

HUMO y GASES pueden ser peligrosos.



- Mantenga su cabeza fuera del humo.
- Ventile el lugar o use un aparato para respirar. El método recomendado para determinar la ventilación adecuada es tomar muestras de la composición y cantidad de humos y gases a los que está expuesto el personal.
- Lea y entienda las Hojas de datos del material (SDS) y las instrucciones del fabricante relacionadas con los adhesivos, metales, consumibles, recubrimientos, limpiadores, refrigerantes, desengrasadores, fundentes y metales.

Las PIEZAS MÓVILES pueden provocar lesiones.



- Aléjese de toda parte en movimiento.
- Aléjese de todo punto que pellizque, tal como rodillos impulsados.

EL SOLDAR puede causar fuego o explosión.



- No suelde cerca de material inflamable
- No suelde en recipientes que han contenido combustibles, ni en recipientes cerrados como tanques, tambores o tuberías, a menos que estén preparados correctamente de acuerdo con la norma AWS F4.1 y AWS A6.0 (vea las normas de seguridad).
- Siempre mire que no haya fuego y mantenga un extinguidor de fuego cerca.
- Lea y entienda las Hojas de datos del material (SDS) y las instrucciones del fabricante relacionadas con los adhesivos, metales, consumibles, recubrimientos, limpiadores, refrigerantes, desengrasadores, fundentes y metales.

EL AMONTONAMIENTO DE GAS puede enfermarle o matarle.



- Cierre el suministro de gas comprimido cuando no lo use.
- Siempre dé ventilación a espacios cerrados o use un respirador aprobado que reemplaza el aire.

LOS RAYOS DEL ARCO pueden quemar sus ojos y piel.



Los rayos del arco de un proceso de suelda producen un calor intenso y rayos ultravioletas fuertes que pueden quemar los ojos y la piel. Las chispas se escapan de la soldadura.

- Use una careta para soldar aprobada equipada con un filtro de protección apropiado para proteger su cara y ojos de los rayos del arco y de las chispas mientras esté soldando o mirando. (véase los estándares de seguridad ANSI Z49.1 y Z87.1).
- Use anteojos de seguridad aprobados que tengan protección lateral.
- Use pantallas de protección o barreras para proteger a otros del destello, reflejos y chispas, alerte a otros que no miren el arco.
- Use protección para el cuerpo hecha de cuero o de prendas resistentes a las llamas (FRC). Entre la protección para el cuerpo se incluye la ropa sin aceite, como guantes de cuero, una camisa gruesa, pantalones sin vuelta, calzado alto y una gorra.

PARTES CALIENTES pueden causar quemaduras severas.



- Permita que la antorcha se enfríe antes de tocarla.
- No toque metal caliente.
- Proteja a otros del contacto con el metal caliente.

EL RUIDO puede trastornar su oído.



Ruido proveniente de algunos procesos o equipo puede dañar el oído.

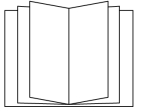
- Chequee los límites del nivel del ruido si exceden aquellos especificados por OSHA.
- Use tapas para los oídos o cubiertas para los oídos si el nivel del ruido es demasiado alto.
- Advierta a otros que estén cerca acerca del peligro del ruido.

El ALAMBRE de SOLDAR puede causarle heridas.



- Mantenga las manos y el cuerpo lejos del tubo de contacto de la antorcha cuando se haya presionado el gatillo.

LEER INSTRUCCIONES.



- Lea y siga cuidadosamente las instrucciones contenidas en todas las etiquetas y en el Manual del usuario antes de instalar, utilizar o realizar tareas de mantenimiento en la unidad. Lea la información de seguridad incluida en la primera parte del manual y en cada sección.
- Utilice únicamente piezas de reemplazo legítimas del fabricante.
- Los trabajos de instalación y mantenimiento deben ser ejecutados de acuerdo con las instrucciones del manual del usuario, las normas del sector y los códigos nacionales, estatales y locales.

3-3 Advertencias de la Proposición 65 del estado de California



ADVERTENCIA: Este producto puede exponerlo a químicos, incluso plomo, que el estado de California conoce como causantes de cáncer, defectos de nacimiento u otros daños reproductivos.

Para obtener más información, acceda a www.P65Warnings.ca.gov.

3-4 Estándares principales de seguridad

Safety in Welding, Cutting, and Allied Processes, American Welding Society standard ANSI Standard Z49.1. Website: www.aws.org.

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute. Website: www.ansi.org.

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1 from Global Engineering Documents. Website: www.aws.org.

National Electrical Code, NFPA Standard 70 from National Fire Protection Association. Website: www.nfpa.org.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1 from Compressed Gas Association. Website: www.cganet.com.

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2 from Canadian Standards Association. Website: www.csagroup.org.

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B from National Fire Protection Association. Website: www.nfpa.org.

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910.177 Subpart N, Part 1910 Subpart Q, and Part 1926, Subpart J. Website: www.osha.gov.

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3-5 Información sobre los campos electromagnéticos (EMF)

La corriente que fluye a través de un conductor genera campos eléctricos y magnéticos (EMF) localizados. La corriente del arco de soldadura (y otras técnicas afines como la soldadura por puntos, el ranurado, el corte por plasma y el calentamiento por inducción) genera un campo EMF alrededor del circuito de soldadura. Los campos EMF pueden interferir con algunos dispositivos médicos implantados como, por ejemplo, los marcapasos. Por lo tanto, se deben tomar medidas de protección para las personas que utilizan estos implantes médicos. Por ejemplo, aplique restricciones al acceso de personas que pasan por las cercanías o realice evaluaciones de riesgo individuales para los soldadores. Todos los soldadores deben seguir los procedimientos que se indican a continuación con el objeto de minimizar la exposición a los campos EMF generados por el circuito de soldadura:

1. Mantenga los cables juntos retorciéndolos entre sí o uniéndolos mediante cintas o una cubierta para cables.
2. No ubique su cuerpo entre los cables de soldadura. Disponga los cables a un lado y apartelos del operario.

3. No enrolle ni cuelgue los cables sobre su cuerpo.
4. Mantenga la cabeza y el tronco tan apartados del equipo del circuito de soldadura como le sea posible.
5. Conecte la pinza de masa en la pieza lo más cerca posible de la soldadura.
6. No trabaje cerca de la fuente de alimentación para soldadura, ni se siente o recueste sobre ella.
7. No suelde mientras transporta la fuente de alimentación o el alimentador de alambre.

Acerca de los aparatos médicos implantados:

Las personas que usen aparatos médico implantados deben consultar con su médico y el fabricante del aparato antes de llevar a cabo o acercarse a soldadura de arco, soldadura de punto, ranurar, hacer corte por plasma, u operaciones de calentamiento por inducción. Si su doctor lo permite, entonces siga los procedimientos de arriba.

SECTION 4 — PRODUCT WARRANTY

4-1 Product Warranty

Limited Warranty

Tregaskiss' Products shall, from the date of original purchase (or, solely with respect to Low Stress Robotic Unicables packaged with any Tregaskiss® Robotic MIG Gun, from the date the product goes into production for its intended use) and for the period set forth below, be free from defects in material and workmanship. To obtain repair or replacement of any Product, the covered Product must be delivered, transportation pre-paid by Purchaser, to the address specified by Tregaskiss on its Returned Materials Authorization, with: (i) written proof of warranty coverage (e.g., Purchaser dated purchase order); (ii) serial number on product (if any); (iii) the Product's installed location within Purchaser's facility and usage of the Product; and (iv) written specification of any alleged defect(s). In the event the foregoing materials are not timely provided to Tregaskiss by claimant, warranty coverage will be determined by Tregaskiss, in its sole discretion. For the avoidance of doubt, the warranty period for any Product or part/component of any Product that is replaced or repaired by Tregaskiss under the foregoing warranty is not extended or renewed at the time of such replacement or repair. **The Warranty against defects does not apply to: (1) consumable components or ordinary wear items; (2) products which are improperly altered, modified, stored, installed, operated, handled, used or neglected or use of the Products with equipment, components or parts not specified or supplied by Tregaskiss or contemplated under the Product documentation; or (3) Products which have not been operated, maintained, and repaired pursuant to Product documentation provided by Tregaskiss. Purchaser shall pay Tregaskiss for all warranty claim costs incurred by Tregaskiss (including inspection, labor, parts, testing, scrap and freight) due to warranty claims submitted by Purchaser which are not covered by Tregaskiss' warranty.**

- Bernard® BTB Semi-Automatic Air-Cooled MIG Guns: **1 year**;
Lifetime warranty on straight handles, straight handle switches, and rear strain relief
- Bernard® W-Gun™ and T-Gun™ Semi-Automatic Water-Cooled MIG Guns: **180 days**
- Bernard® TGX® Chassis and Bernard TGX Ready To Weld MIG Guns: **90 days**
- Tregaskiss® Robotic MIG Guns and Components: **1 year**
- Tregaskiss® Automatic MIG Guns: **1 year**
- Tregaskiss® TOUGH GUN® Reamer: **1 year**
 - When factory-equipped with lubricator: **2 years** when factory-equipped with lubricator
 - When (i) factory-equipped with lubricator and (ii) used exclusively with Tregaskiss® TOUGH GARD® Anti-Spatter Liquid: **3 years** when both (i) and (ii)
- Tregaskiss® TOUGH GUN® Robotic Peripheral (Clutch, Sprayer, Wire Cutter, Arms): **1 year**
- Tregaskiss® Low-Stress Robotic Unicables (LSR Unicables): **6 months**

Service Warranty

Tregaskiss warrants the Services shall conform to any mutually agreed upon specifications or statements of work. Purchaser's sole remedy, and Tregaskiss's sole liability, for a breach of the foregoing warranty is for Tregaskiss, at its option, to re-perform the Services or credit Purchaser's account for such Services.

Limitation of Liability and Remedies

TREGASKISS WILL NOT BE LIABLE, AND PURCHASER WAIVES ALL CLAIMS AGAINST TREGASKISS FOR INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, DOWN TIME, LOST PROFITS OR COMMERCIAL LOSSES, WHETHER OR NOT BASED UPON TREGASKISS' NEGLIGENCE OR BREACH OF WARRANTY OR STRICT LIABILITY IN TORT OR ANY OTHER CAUSE OF ACTION. IN NO EVENT WILL TREGASKISS' LIABILITY IN CONNECTION WITH THE AGREEMENT OR SALE OF TREGASKISS' PRODUCTS OR SERVICES EXCEED THE PURCHASE PRICE OF THE SPECIFIC PRODUCTS OR SERVICES AS TO WHICH THE CLAIM IS MADE.

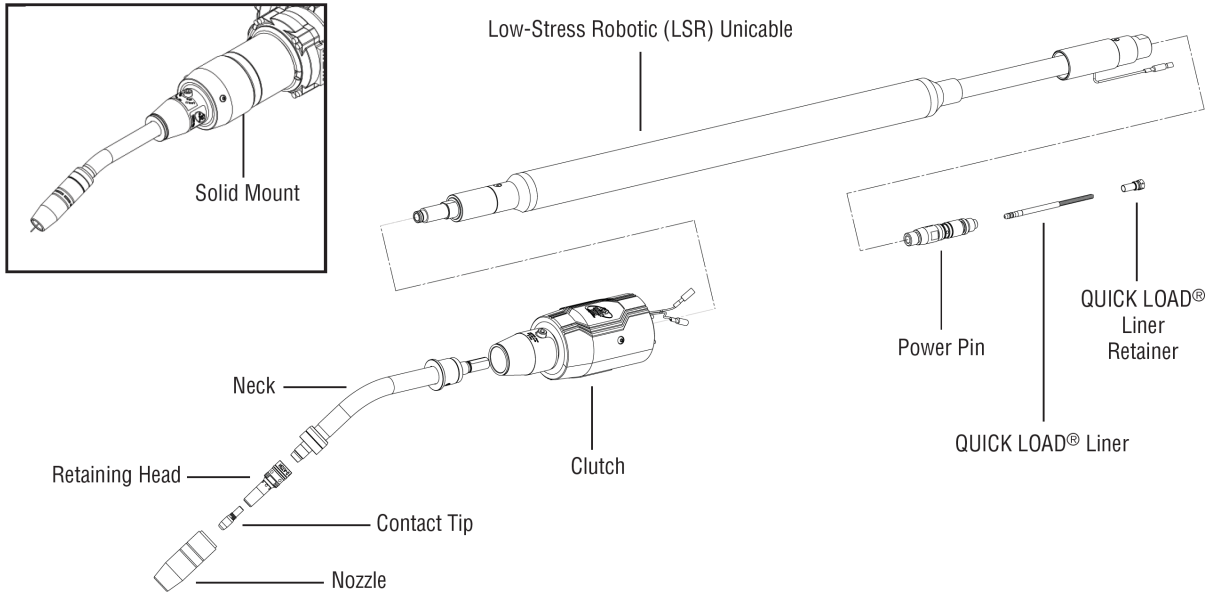
SECTION 5 — SPECIFICATIONS

5-1 System Components

Robotic MIG Gun for GMAW Welding

Duty Cycle Rating: 100%: 350 amps with Mixed Gases

For complete parts list, please see Section 9 — Parts List on page 34.



5-2 Through-Arm Robotic Articulation Limits for LSR Uncables

Axis		Articulation Limits
5		+/- 90°
4+6		+/- 270°

NOTE: Any articulation beyond these limits is considered abuse of the cable and will accelerate LSR uncable wear.

SECTION 6 — INSTALLATION

6-1 Installing Gun to Robot



1. Position the robot with the wrist and top axis as shown in Figure 6-A to properly complete the gun installation.
2. Loosen feeder adjustment bolts so the feeder slides freely.
3. Remove the outer cover:
 - a. Unthread (3) M4 SBHCS using a 2.5 mm Allen wrench (see Figure 6-B).
 - b. Unthread (1) M3 SHCS using a 2.5 mm Allen wrench and pull apart both cover halves (see Figure 6-B).
 - c. Insulating disc should remain in place, located by a dowel.
4. Install spacer to robot face if applicable.
5. Locate assembly onto robot mounting face using dowel pin as a guide.
6. Fully seat insulating disc on robot wrist.
NOTE: Do not use the fasteners to pull the face of the insulating disc to the face of the robot wrist, as damage will occur.
IMPORTANT: Ensure space is uniform all the way around the robot wrist before proceeding (see Figure 6-D).
7. Using the supplied tightening pattern in Figure 6-E, insert M4x20 (x6) bolts through insulating disc and mounting flange into robot face. Thread bolts clockwise using a 3 mm ball-nose Allen wrench (ball end) to 45 in-lbs (5 Nm).
8. Reinstall outer cover in reverse order of instructions in steps 3a through 3c above.

Figure 6-A

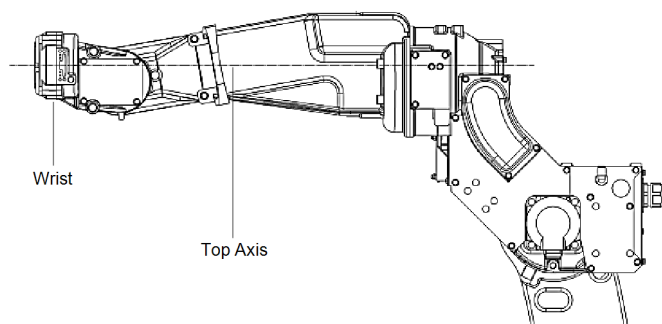


Figure 6-B

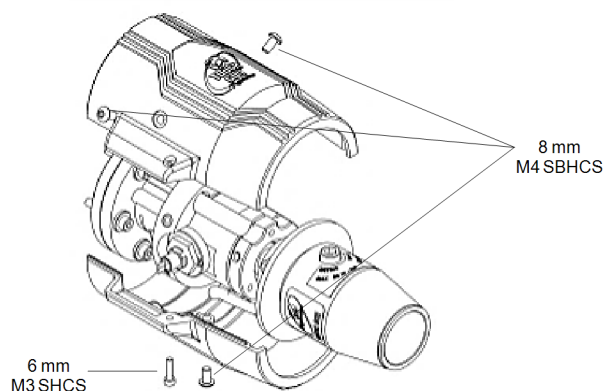


Figure 6-C

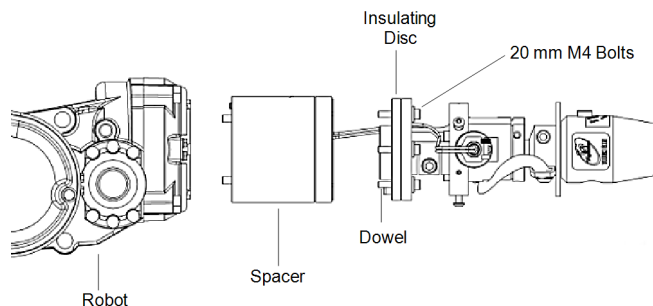


Figure 6-D

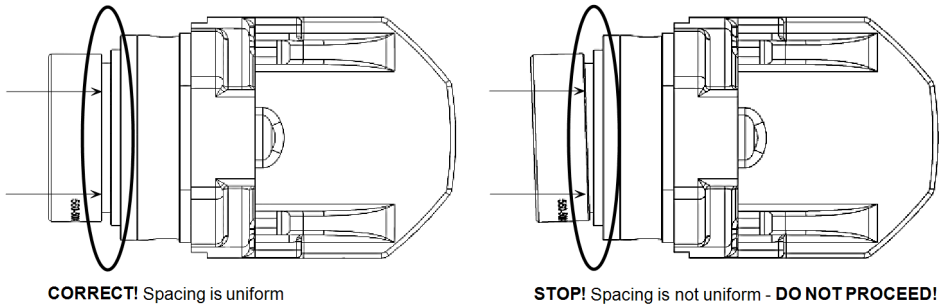
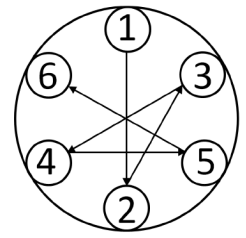


Figure 6-E



6-2 Installing Power Pin to Unicable

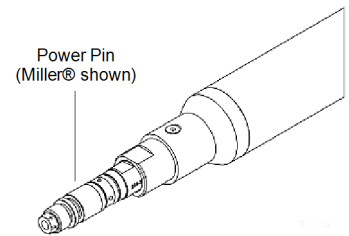


A. Standard Power Pins

NOTE: Power pins incorporate a taper to seat and lock the pin to the rear handle block. Make sure the power pin is tightened in the block with a wrench to ensure the pin is secure and will not come loose.

1. Thread power pin into the adaptor of the LSR Unicable.
2. Tighten the power pin into the rear block using a 1" (25 mm) wrench on the rear block and a 5/8" (16 mm) or 3/4" (19 mm) wrench on the power pin.
3. Torque to 18 ft-lbs.

Figure 6-F

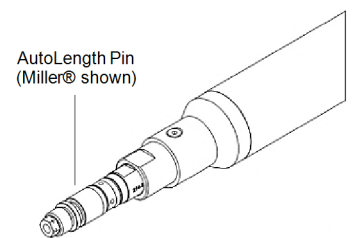


B. AutoLength™ Pins

NOTE: The AutoLength Pin is designed specifically for use with QUICK LOAD® Liners. *Do not attempt to use with any other type of liner.*

1. Thread AutoLength Pin into the adaptor of the LSR Unicable.
2. Tighten the AutoLength Pin into the rear block using a 1" (25 mm) wrench on the rear block and a 5/8" (16 mm) or 3/4" (19 mm) wrench on the AutoLength Pin.
3. Torque to 18 ft-lbs.

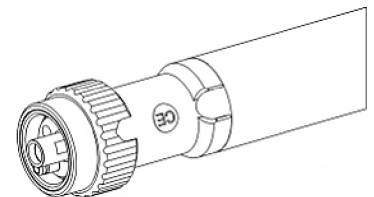
Figure 6-G



C. Euro Connections

NOTE: The Euro connection comes factory-installed.
No installation required.

Figure 6-H



6-3 Installing Low-Stress Robotic (LSR) Unicable



1. Insert LSR Unicable through the wrist and arm of the robot (refer to Figure 6-J) and leave 6" of uncable hanging out of the wrist (not applicable to Motoman® robots).
2. Insert uncable connector into flange cable connector. Ensure components are fully seated.
3. Fully insert the LSR Unicable into the MIG gun connector housing and secure by tightening M6x20 SHCS using a 5 mm Allen wrench to 80 in-lbs (9 Nm).
4. Connect wire connectors (non-polarity specific).

IMPORTANT: Leave a slack loop around flange for articulation.

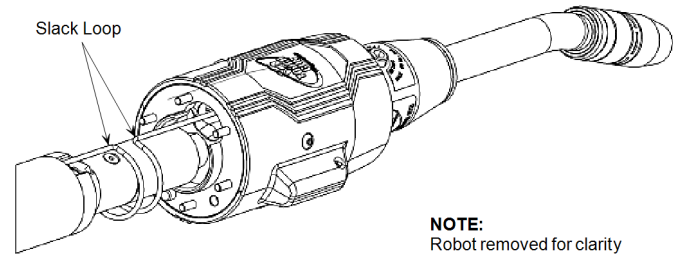


Figure 6-I

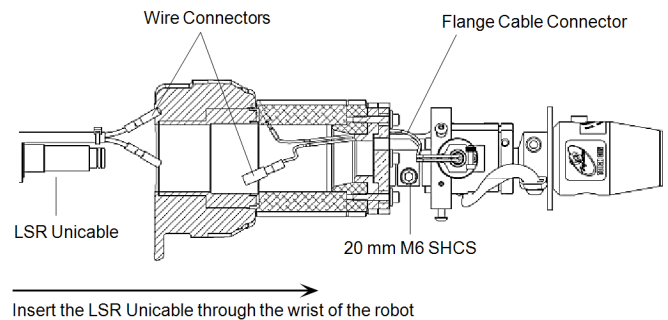


Figure 6-J

6-4 Installing the Neck



1. Align dowels on neck with keyway in connector housing and insert neck into the connector housing until it is fully seated.
2. Tighten neck bolt clockwise with a 5 mm Allen wrench and torque to 60 in-lbs (7 Nm).

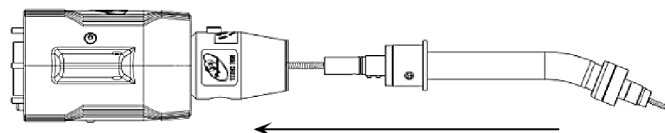


Figure 6-K

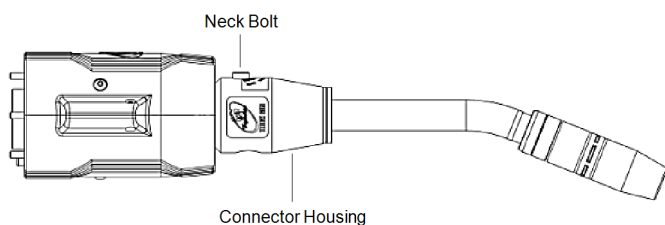


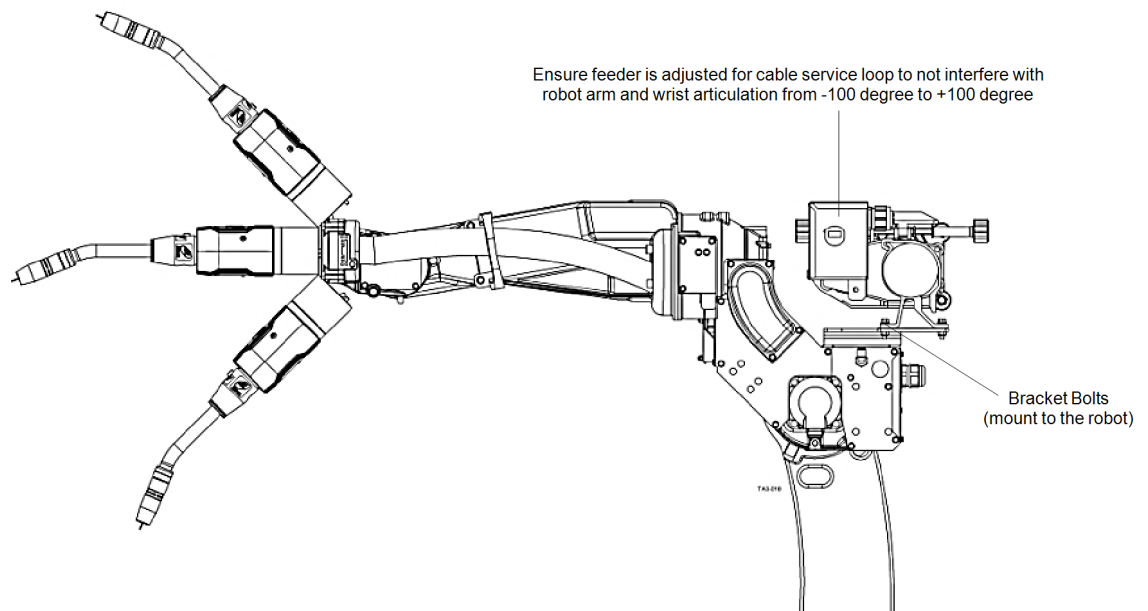
Figure 6-L

6-5 Installing Gun to Wire Feeder



1. Ensure that the bolts clamping the feeder to the bracket on the robot are loosened.
2. Install power pin on the rear of the unicable into the feeder.
3. Slide the feeder toward the front of the robot. This will create a necessary curve in the cable to allow for proper operation.
REMINDER: The robot's top axis must be at 180 degrees during installation.
4. Articulate the wrist and allow cable to push / pull feeder into a neutral position. **NOTE:** The feeder should be pressed forward far enough that the centerline of the unicable should bow at its highest point and not interfere with the robotic casting / through-arm cover.
5. Once wrist articulation has been verified, tighten feeder bracket bolts to manufacturer's recommendations to ensure that feeder remains in the proper position.
6. Tighten feeder into position.

Figure 6-M



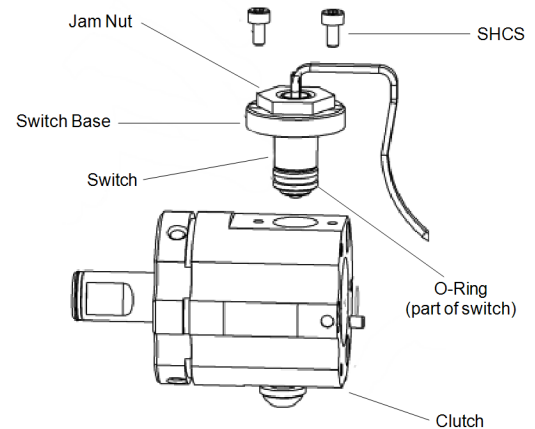
6-6 Installing / Adjusting the Clutch Limit Switch



1. Feed wires of switch through center holes of switch base and jam nut as shown in Figure 6-N.
2. Thread switch base far enough down on the switch body so that the switch will not bottom out when the assembly is fastened to the clutch.
3. Position switch assembly (with o-ring) in the clutch housing.
4. Insert the two M3x0.5x6 Hex SHCS into the holes in the switch base and fasten assembly to the clutch.
5. Adjust switch by rotating switch itself in the switch base to the appropriate depth. Check normally closed switch using ohmmeter to set desired level of sensitivity.
6. Once desired sensitivity is achieved, lock position of switch by torquing jam nut to 50 in-lbs (5.6 Nm) against switch base.

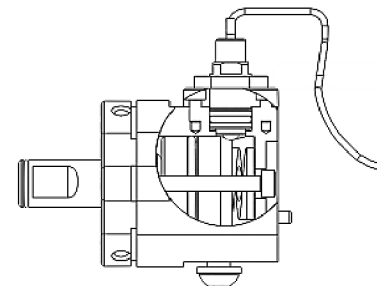
NOTE: Specialty tools (thin/ground down 11/16" wrench) may be required to perform these tasks.

Figure 6-N



Exploded View

Figure 6-O

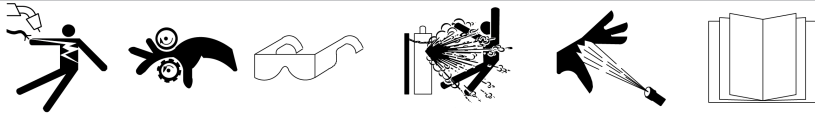


Finished Assembly

AS-714 Clutch Properties

1. **Force and moments:**
Fz Axial Load: 200 lbs.
Fx/Fy Bending Load: 160 lbs.
Mz Torsion Load: 100 in.-lbs.
2. **Range of travel:**
X and Y direction = $\pm 10^\circ$
Z direction = 0.250"
3. **Weight:** 0.65 lbs. / 0.3 kg
4. **Trip Activation Points:**
X and Y direction = $\pm 2^\circ$
Z direction = ± 0.012 "
(Rotation about Z axis 360°)

6-7 Connecting Wire Brake and/or Air Blast



A. Wire Brake

1. Route wire brake air line to designated control valve in your facility (not provided).
2. 40-60 psi air supply required for proper operation.

B. Air Blast

1. Route air blast air line to designated control valve in your facility (not provided).
2. 80-100 psi air supply required for proper operation.

SECTION 7 — REPLACEMENT

7-1 Changing Consumables

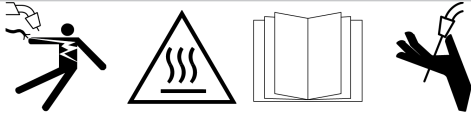
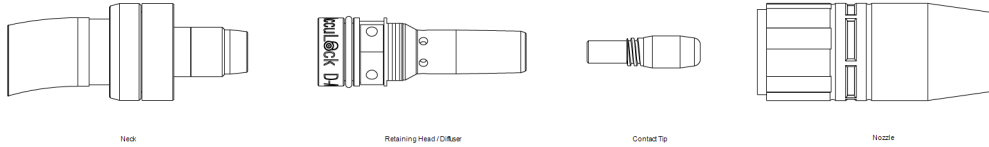


Figure 7-A



IMPORTANT NOTES:

- Neck insulator **MUST** be in place before welding to properly insulate neck armor.
- Check all parts to ensure that connections are tight before welding.
- The retaining head / diffuser **MUST** be tightened with a 5/8" (16 mm) wrench to prevent the contact tip from overheating.
- **DO NOT** use pliers to remove or tighten the retaining head / diffuser or scoring may result.

A. Changing the Nozzle

1. Pull slip-on nozzles off with a twisting motion.
2. When installing the nozzle, ensure that it is fully seated.

B. Changing the Contact Tip

1. Thread the contact tip into the retaining head / diffuser.
2. Torque to 30 in-lbs (3.5 Nm)
3. The Tregaskiss Tip Tool (part #450-18 for TOUGH LOCK heavy duty tips, or part # T-ALTOOL for AccuLock tips) or a pair of weld pliers are the optimal tools for contact tip installation.

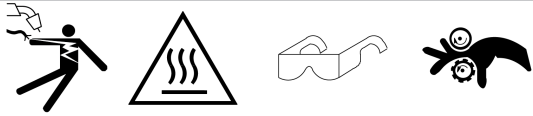
C. Changing the Retaining Head / Diffuser

1. Thread the retaining head / diffuser onto neck with a 5/8" (16 mm) wrench.
2. Torque to 80 in-lbs (9 Nm).
IMPORTANT: DO NOT use pliers to remove or tighten the heavy duty retaining head / diffuser or scoring may result.

D. Changing the Neck Insulator

1. The neck insulator is pressed onto the neck by hand with the aluminum side towards the neck and the black insulation towards the nozzle.

7-2 Changing the Neck



1. Insert new neck over the liner and into connector housing until neck is fully seated.
2. Tighten neck bolt clockwise with a 5 mm Allen wrench and torque to 60 in-lbs (7 Nm).

IMPORTANT: For best results, install the neck without the consumables so that the liner can pass through easily.

3. Trim liner (see section 7-3 Changing the Liner on page 21).
4. Install front-end consumables (see section 7-1 Changing Consumables on page 19).

Figure 7-B

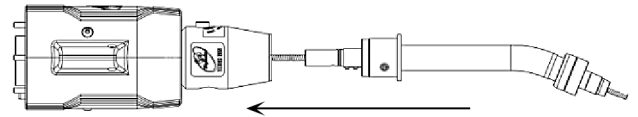
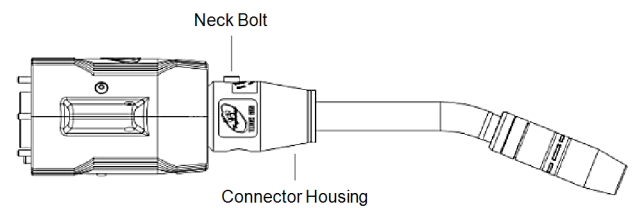
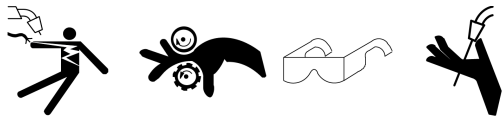


Figure 7-C



7-3 Changing the Liner



A. Changing QUICK LOAD® Liner

NOTE: Ensure power supply is off before proceeding.

1. Remove consumables (nozzle, contact tip and retaining head / diffuser) (see 7-1 Changing Consumables on page 19).
2. Remove existing QUICK LOAD Liner by pulling it out from the neck.
3. Insert the new QUICK LOAD Liner through the neck using the welding wire as a guide. Short strokes will prevent kinking.
4. Once the liner stops feeding, give it an extra push until it bottoms out in the liner retainer in the power pin to ensure it is inserted completely. **NOTE:** Be careful not to kink the liner.
5. Push liner back into gun and hold in place. Using liner gauge, trim liner to a 1/2" stick-out. **HELPFUL HINT:** Before cutting the liner with wire inside, mark the liner using the gauge and then pull the liner out beyond the end of the welding wire; then cut the liner and push it back into place securely. This will help with feeding the wire through the contact tip afterward.
6. Remove any burr that may obstruct wire feed.
7. Reinstall front-end consumables onto neck.

Figure 7-D

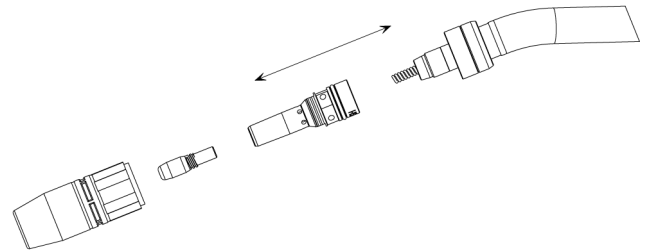


Figure 7-E

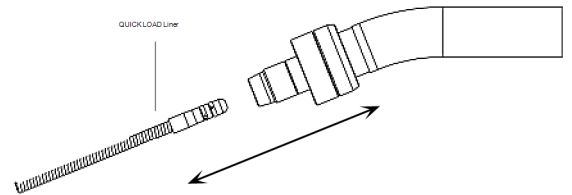
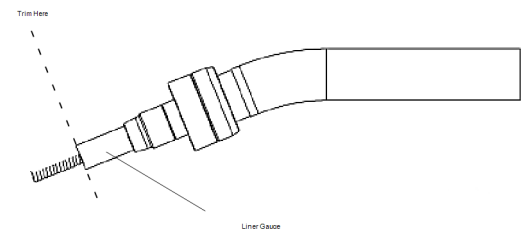


Figure 7-F

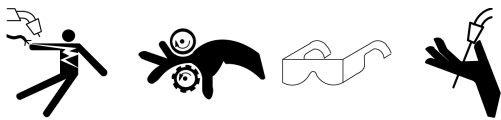


B. Changing QUICK LOAD Liner in the AutoLength™ System

NOTE: Ensure power supply is off before proceeding.

1. Remove consumables (nozzle, contact tip and retaining head / diffuser) (see 7-1 Changing Consumables on page 19).
2. Remove existing QUICK LOAD Liner by pulling it out from the neck.
3. Insert new QUICK LOAD Liner through the neck using the welding wire as a guide. Short strokes will prevent kinking.
4. Feed the liner into the gun until it engages with the liner retainer inside the AutoLength Pin. Place the liner gauge onto the end of the QUICK LOAD Liner and press flush with the end of the neck.
5. Push the QUICK LOAD Liner into the gun until the liner will not go any further. **NOTE:** Liner will be pushed in by approximately one additional inch.
6. Using the liner gauge, trim the liner with a 1/2" stick-out. **NOTE:** After trimming, the liner will stick out of the neck by approximately 1 1/2". This is normal, as the liner will be pushed back into the neck when the consumables are installed.
7. Feed wire through the MIG gun.
8. Reinstall front-end consumables.

7-4 Changing the Euro Connection



1. Remove M5x6 mm countersunk fasteners.
2. Slide the hand nut over the Euro power pin body.
3. Torque the power pin body to the threaded end of the unicable at 18 ft-lbs (24 Nm) using 7/8" and 13/16" wrenches.
NOTE: You may have to pull back on the outer conduit to achieve this.
4. Once the power pin body is in place, pull the conduit down over it. Rotate the conduit so that the holes on the power pin line up with the holes on the plastic end of the conduit.
5. Reinstall fasteners.

Figure 7-G

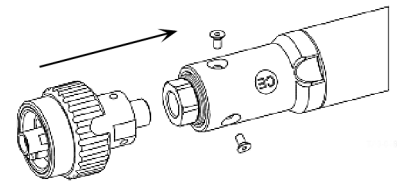
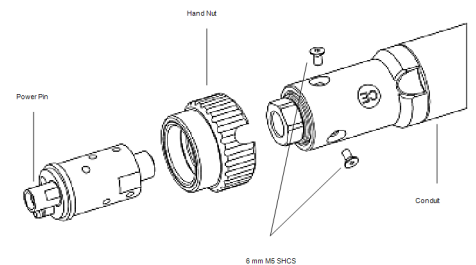
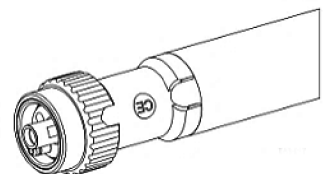


Figure 7-H



7-5 Changing TOUGH GUN I.C.E.™ Components

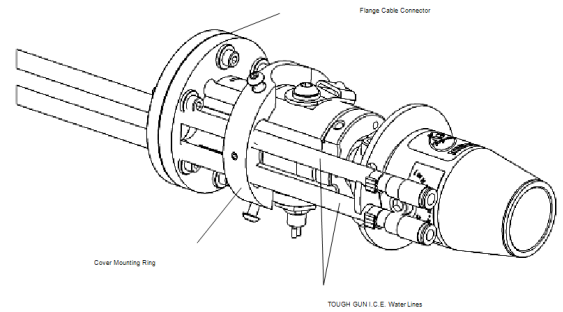


A. Changing the Water Lines

NOTE: Make sure water supply is turned off before changing the water lines.

1. Remove the outer cover.
2. Pull the water lines through the flange cable connector and cover mounting ring.
3. Replace the outer cover.

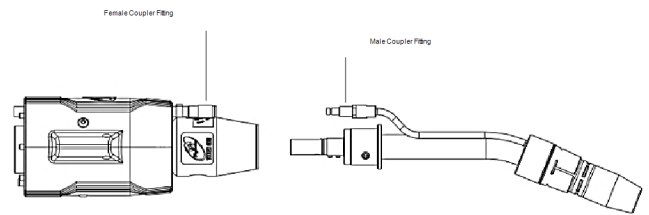
Figure 7-I



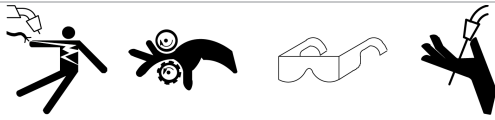
B. Installing the Neck

1. Align dowels on neck with keyway in connector housing and insert neck into the connector housing until it is fully seated.
2. Connect neck male coupler fitting to water line female coupler fitting.
3. Tighten neck bolt clockwise with a 5 mm Allen wrench and torque to 60 in-lbs (7 Nm).

Figure 7-J



7-6 Replacing the Wire Brake



1. Remove power pin from feeder.
2. Trim and remove excess wire.
3. Remove front-end consumables and neck, including jump liner.
4. Shut off and disconnect 1/8" air supply at the wire brake pushing unit (see Figure 7-K).
5. Unthread and remove the wire brake pushing unit to allow the wire guide to be released (see Figure 7-L).
6. Carefully slide the wire guide using the wire guide tool out of the gun body (see Figure 7-M).
7. Inspect for wear and swap for proper wire size as required.
NOTE: 0.035"-0.045" with one guide, 0.052"-1/16" with another.
8. Reinstall appropriate wire guide using the wire guide tool with the flats oriented (see Figure 7-M). Align the hole with pushing unit pin (see Figure 7-L).
9. Reinstall the wire brake pushing unit by threading it in until it stops, and then reconnect the air lines and turn on the air pressure.
10. Reinstall power pin to feeder.
11. Reinstall consumables and neck, including the jump liner.
12. Feed wire through the gun.
13. Disconnect drive rolls to allow wire to be pulled through the gun. Pull 6'-8' out of the gun. **NOTE:** The wire should pull through the gun easily. If the wire binds, double check the wire guide to ensure it's the proper size.
14. Activate the wire brake via the robot controller and attempt to pull additional wire out from gun. **NOTE:** The wire should no longer move.

Figure 7-K

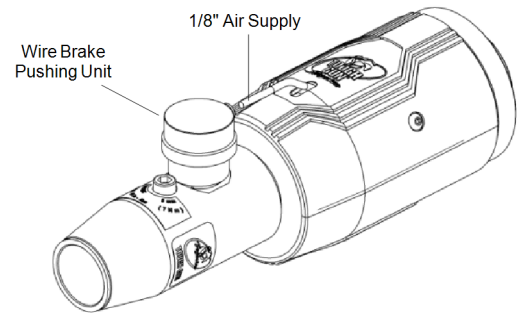


Figure 7-L

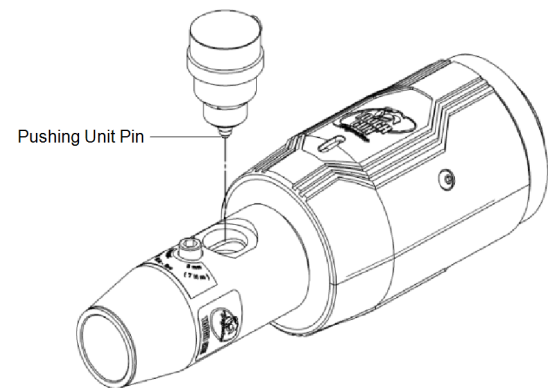
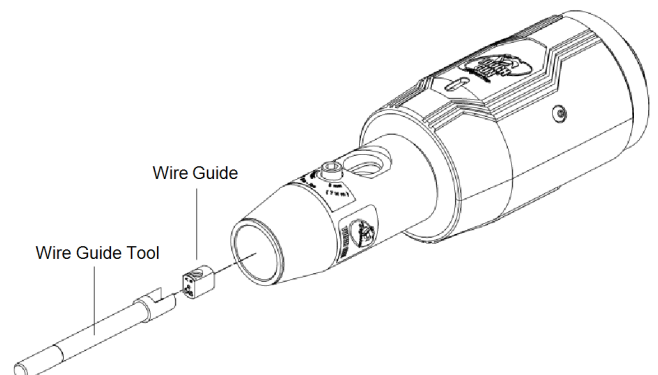
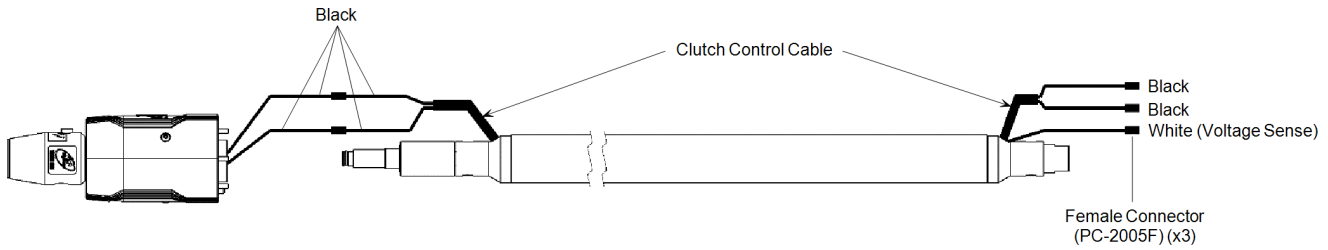


Figure 7-M



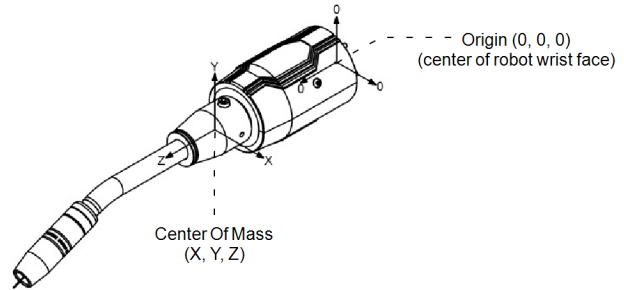
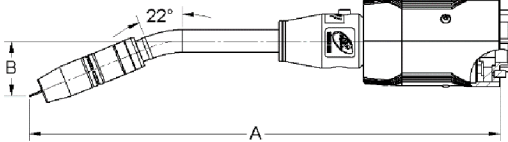
SECTION 8 — TECHNICAL DATA

8-1 Wiring Diagram



8-2 Center of Mass Coordinates - 22 Degree (Clutch)

*Wire Stick-Out = 15 mm



Clutch - 22 Degree

405-22QC	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	402-32 mm	46.89 mm	-0.692 mm	-4.564 mm	126.288 mm	1.758 kg
OTC (AII B4, AII B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	411.85 mm	46.89 mm	-0.644 mm	-4.307 mm	128.337 mm	1.863 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	470.27 mm	46.89 mm	-0.573 mm	-3.763 mm	166.186 mm	2.126 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	507.50 mm	46.89 mm	-0.500 mm	-3.179 mm	181.804 mm	2.431 kg
Kawasaki (BA006N)	487.71 mm	46.89 mm	-0.559 mm	-3.753 mm	174.717 mm	2.199 kg
KUKA (KR16 arc HW)	414.31 mm	46.89 mm	-0.645 mm	-4.259 mm	128.799 mm	1.865 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	516.00 mm	47.00 mm	-0.288 mm	-2.078 mm	160.523 mm	2.994 kg
405-22QCL	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	460.11 mm	46.89 mm	-0.669 mm	-4.405 mm	140.520 mm	1.817 kg

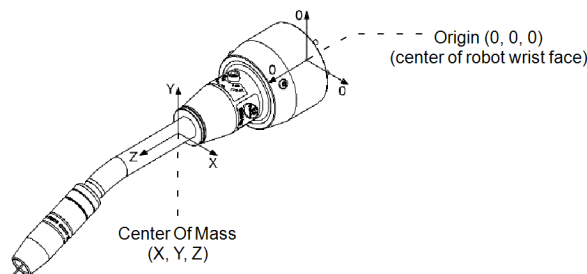
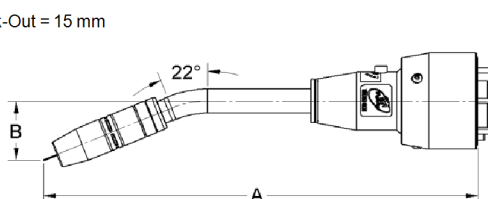
OTC (All B4, All B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	469.63 mm	46.89 mm	-0.624 mm	-4.165 mm	142.025 mm	1.922 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	528.05 mm	46.89 mm	-0.557 mm	-3.650 mm	178.782 mm	2.185 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	565.28mm	46.89 mm	-0.488 mm	-3.096 mm	193.370 mm	2.490 kg
Kawasaki (BA006N)	545.50 mm	46.89 mm	-0.542 mm	-3.637 mm	187.803 mm	2.269 kg
KUKA (KR16 arc HW)	472.09 mm	46.89 mm	-0.622 mm	-4.105 mm	143.150 mm	1.935 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	574.00 mm	47.00 mm	-0.281 mm	-2.028 mm	171.665 mm	3.068 kg
405-22QCL1	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	515.46 mm	46.89 mm	-0.646 mm	-4.248 mm	155.801 mm	1.884 kg
OTC (All B4, All B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	524.98 mm	46.89 mm	-0.603 mm	-4.025 mm	156.772 mm	1.989 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	583.40 mm	46.89 mm	-0.540 mm	-3.541 mm	192.450 mm	2.252 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	620.63 mm	46.89 mm	-0.476 mm	-3.015 mm	205.999 mm	2.557 kg
Kawasaki (BA006N)	600.84 mm	46.89 mm	-0.526 mm	-3.533 mm	201.226 mm	2.336 kg
KUKA (KR16 arc HW)	527.44 mm	46.89 mm	-0.601 mm	-3.968 mm	157.850 mm	2.002 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	629.00 mm	47.00 mm	-0.274 mm	-1.982 mm	183.132 mm	3.139 kg

Clutch with Wire Brake - 22 Degree						
405-22QC	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	439.15 mm	46.89 mm	-0.619 mm	-2.155 mm	139.523 mm	2.155 kg
OTC (All B4, All B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	448.68 mm	46.89 mm	-0.583 mm	-2.064 mm	142.285 mm	2.259 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	507.10 mm	46.89 mm	-0.528 mm	-1.828 mm	181.903 mm	2.523 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	544.33 mm	46.89 mm	-0.471 mm	-1.537 mm	198.857 mm	2.828 kg
Kawasaki (BA006N)	524.54 mm	46.89 mm	-0.518 mm	-1.877 mm	191.197 mm	2.596 kg
KUKA (KR16 arc HW)	451.14 mm	46.89 mm	-0.583 mm	-2.018 mm	142.892 mm	2.262 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	553.00 mm	47.00 mm	-0.258 mm	-1.273 mm	178.382 mm	3.330 kg
405-22QCL	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	496.94 mm	46.89 mm	-0.602 mm	-2.088mm	151.835 mm	2.214 kg
OTC (All B4, All B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	506.46 mm	46.89 mm	-0.568 mm	-2.003 mm	154.215 mm	2.319 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	564.88 mm	46.89 mm	-0.516 mm	-1.779 mm	193.047 mm	2.582 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	602.11 mm	46.89 mm	-0.462 mm	-1.499 mm	209.239 mm	2.887 kg
Kawasaki (BA006N)	582.33 mm	46.89 mm	-0.505 mm	-1.828 mm	202.868 mm	2.666 kg
KUKA (KR16 arc HW)	508.92 mm	46.89 mm	-0.566 mm	-1.957 mm	155.481 mm	2.332 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	611.00 mm	47.00 mm	-0.253 mm	-1.245 mm	188.834 mm	3.405 kg

405-22QCL1	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	552.29 mm	46.89 mm	0.584 mm	-2.027 mm	165.206 mm	2.281 kg
OTC (AII B4, AII B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	561.81 mm	46.89 mm	-0.552 mm	-1.947 mm	167.200 mm	2.385 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	620.23 mm	46.89 mm	-0.503 mm	-1.734 mm	205.237 mm	2.649 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	657.46 mm	46.89 mm	-0.451 mm	-1.465 mm	220.646 mm	2.954 kg
Kawasaki (BA006N)	637.67 mm	46.89 mm	-0.492 mm	-1.783 mm	214.876 mm	2.733 kg
KUKA (KR16 arc HW)	564.27 mm	46.89 mm	-0.550 mm	-1.902 mm	168.433 mm	2.398 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	666.00 mm	47.00 mm	-0.248 mm	-1.219 mm	199.593 mm	3.476 kg

8-3 Center of Mass Coordinates - 22 Degree (Solid Mount)

*Wire Stick-Out = 15 mm



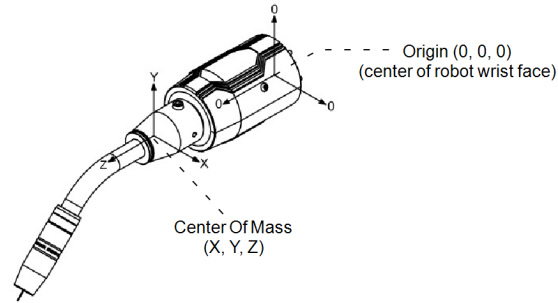
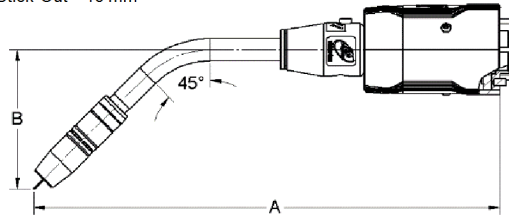
Solid Mount - 22 Degree						
405-22QC	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	346.96 mm	46.89 mm	0.018 mm	-4.257 mm	100.620 mm	1.518 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	356.48 mm	46.89 mm	0.017 mm	-3.963 mm	103.929 mm	1.613 kg
ABB (IRB2600ID, IRB1660ID)	359.15 mm	46.89 mm	0.016 mm	-3.783 mm	100.571 mm	1.713 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	414.90 mm	46.89 mm	0.014 mm	-3.411 mm	141.956 mm	1.886 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	452.39 mm	46.89 mm	0.012 mm	-2.814 mm	158.759 mm	2.191 kg
Kawasaki (BA006N)	431.55 mm	46.89 mm	-0.000 mm	-3.415 mm	150.336 mm	1.960 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	459.00 mm	47.00 mm	-0.002 mm	-2.253 mm	139.707 mm	2.821 kg
405-22QCL	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	404.74 mm	46.89 mm	0.017 mm	-4.085 mm	115.902 mm	1.577 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	414.27 mm	46.89 mm	0.016 mm	-3.811 mm	118.568 mm	1.672 kg
ABB (IRB2600ID, IRB1660ID)	416.94 mm	46.89 mm	0.015 mm	-3.646 mm	114.581 mm	1.772 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	472.69 mm	46.89 mm	0.014 mm	-3.297 mm	155.158 mm	1.945 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	510.17 mm	46.89 mm	0.012 mm	-2.732 mm	170.715 mm	2.250 kg
Kawasaki (BA006N)	489.34 mm	46.89 mm	-0.000 mm	-3.297 mm	163.871 mm	2.030 kg

KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	517.00 mm	47.00 mm	-0.002 mm	-2.195 mm	150.583 mm	2.895 kg
405-22QCL1	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	460.09 mm	46.89 mm	0.016 mm	-3.919 mm	132.160 mm	1.644 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	469.62 mm	46.89 mm	0.015 mm	-3.664 mm	134.207 mm	1.739 kg
ABB (IRB2600ID, IRB1660ID)	472.28 mm	46.89 mm	0.015 mm	-3.513 mm	129.607 mm	1.839 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	528.04 mm	46.89 mm	0.013 mm	-3.187 mm	169.399 mm	2.012 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	565.52 mm	46.89 mm	0.012 mm	-2.653 mm	183.714 mm	2.317 kg
Kawasaki (BA006N)	544.68 mm	46.89 mm	-0.000 mm	-3.192 mm	177.798 mm	2.097 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	572.00 mm	47.00 mm	-0.002 mm	-2.142 mm	161.854 mm	2.966 kg

Solid Mount with Wire Brake - 22 Degree						
405-22QC	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	382.77 mm	46.89 mm	0.009 mm	-2.337 mm	112.054 mm	1.859 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	392.30 mm	46.89 mm	0.009 mm	-2.187 mm	115.894 mm	1.953 kg
ABB (IRB2600ID, IRB1660ID)	394.96 mm	46.89 mm	0.008 mm	-2.124 mm	112.948 mm	2.054 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	450.72 mm	46.89 mm	0.008 mm	-1.937 mm	155.569 mm	2.226 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	488.20 mm	46.89 mm	0.007 mm	-1.599 mm	173.513 mm	2.532 kg
Kawasaki (BA006N)	467.37 mm	46.89 mm	-0.004 mm	-1.989 mm	164.572 mm	2.301 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	495.00 mm	47.00 mm	-0.002 mm	-1.386 mm	154.351 mm	3.158 kg
405-22QCL	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	440.56 mm	46.89 mm	0.009 mm	-2.255 mm	125.376 mm	1.918 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	450.08 mm	46.89 mm	0.009 mm	-2.113 mm	128.758 mm	2.012 kg
ABB (IRB2600ID, IRB1660ID)	452.75 mm	46.89 mm	0.008 mm	-2.055 mm	125.357 mm	2.113 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	508.50 mm	46.89 mm	0.007 mm	-1.879 mm	167.380 mm	2.286 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	545.99 mm	46.89 mm	0.007 mm	-1.555 mm	184.379 mm	2.591 kg
Kawasaki (BA006N)	525.15 mm	46.89 mm	-0.003 mm	-1.930 mm	176.799 mm	2.370 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	553.00 mm	47.00 mm	-0.002 mm	-1.353 mm	164.578 mm	3.233 kg
405-22QCL1	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	495.90 mm	46.89 mm	0.009 mm	-2.179 mm	139.733 mm	1.985 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	505.43 mm	46.89 mm	0.008 mm	-2.045 mm	142.661 mm	2.079 kg
ABB (IRB2600ID, IRB1660ID)	508.10 mm	46.89 mm	0.008 mm	-1.992 mm	138.805 mm	2.180 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	563.85 mm	46.89 mm	0.007 mm	-1.825 mm	180.231 mm	2.352 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	601.33 mm	46.89 mm	0.006 mm	-1.516 mm	196.270 mm	2.658 kg
Kawasaki (BA006N)	580.50 mm	46.89 mm	-0.003 mm	-1.877 mm	189.409 mm	2.437 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	608.00 mm	47.00 mm	-0.002 mm	-1.324 mm	175.169 mm	3.304 kg

8-4 Center of Mass Coordinates - 45 Degree (Clutch)

*Wire Stick-Out = 15 mm



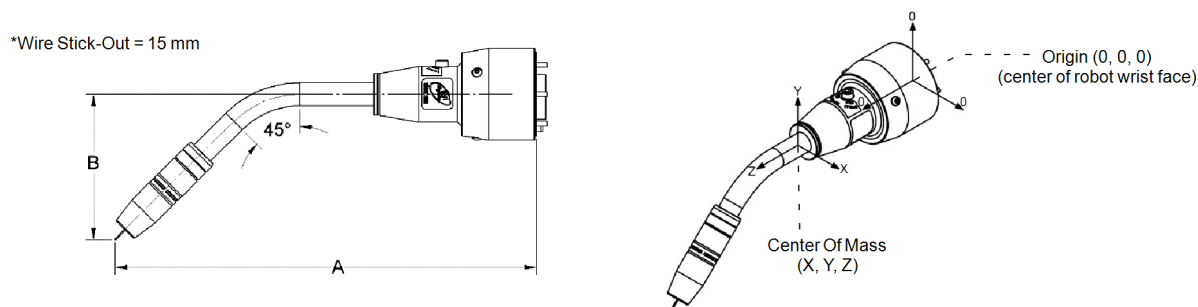
Clutch - 45 Degree						
405-45QC	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	354.61 mm	100.35 mm	-0.706 mm	-9.227 mm	118.853 mm	1.724 kg
OTC (AII B4, AII B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	364.13 mm	100.35 mm	-0.656 mm	-8.699 mm	121.188 mm	1.829 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	422.55 mm	100.35 mm	-0.582 mm	-7.591 mm	159.603 mm	2.092 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	459.78mm	100.35 mm	-1.008 mm	-6.514 mm	175.753 mm	2.397 kg
Kawasaki (BA006N)	439.99 mm	100.35 mm	-0.565 mm	-7.450 mm	169.082 mm	2.177 kg
KUKA (KR16 arc HW)	366.58 mm	100.35 mm	-0.653 mm	-8.629 mm	122.475 mm	1.843 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	496.00 mm	100.00 mm	-0.290 mm	-4.830 mm	155.906 mm	2.970 kg
405-45QCL	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	401.69 mm	120.24 mm	-0.679 mm	-11.994 mm	131.757 mm	1.792 kg
OTC (AII B4, AII B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	411.22 mm	120.24 mm	-0.633 mm	-11.333 mm	133.639 mm	1.897 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	469.64 mm	120.24 mm	-0.564 mm	-9.939 mm	171.168 mm	2.160 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	506.86 mm	120.24 mm	-0.994 mm	-8.601 mm	186.469 mm	2.465 kg
Kawasaki (BA006N)	487.08 mm	120.24 mm	-0.548 mm	-9.699 mm	180.374 mm	2.244 kg
KUKA (KR16 arc HW)	413.67 mm	120.24 mm	-0.630 mm	-11.229 mm	134.800 mm	1.910 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	516.00 mm	120.00 mm	-0.283 mm	-6.589 mm	165.600 mm	3.042 kg
405-45QCL1	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	457.04 mm	120.24 mm	-0.655 mm	-11.563 mm	146.815 mm	1.859 kg
OTC (AII B4, AII B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	466.56 mm	120.24 mm	-0.0611 mm	-10.947 mm	148.157 mm	1.964 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	524.98 mm	120.24 mm	-0.547 mm	-9.640 mm	184.597 mm	2.227 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	562.21 mm	120.24 mm	-0.981 mm	-8.373 mm	198.860 mm	2.532 kg
Kawasaki (BA006N)	542.42 mm	120.24 mm	-0.532 mm	-9.418 mm	193.560 mm	2.311 kg
KUKA (KR16 arc HW)	469.02 mm	120.24 mm	-0.609 mm	-10.849 mm	149.270 mm	1.977 kg

KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	571.00 mm	120.00 mm	-0.277 mm	-6.438 mm	176.833 mm	3.113 kg
405-45QCL2	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	507.03 mm	120.24 mm	-0.634 mm	-11.199 mm	161.171 mm	1.920 kg
OTC (AII B4, AII B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	516.55 mm	120.24 mm	-0.593 mm	-10.620 mm	162.015 mm	2.024 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	574.97 mm	120.24 mm	-0.532 mm	-9.385 mm	197.442 mm	2.287 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	612.20 mm	120.24 mm	-0.969 mm	-8.178 mm	210.728 mm	2.592 kg
Kawasaki (BA006N)	592.41 mm	120.24 mm	-0.518 mm	-9.178 mm	206.171 mm	2.372 kg
KUKA (KR16 arc HW)	519.00 mm	120.24 mm	-0.591 mm	-10.527 mm	163.084 mm	2.037 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	621.00 mm	120.00 mm	-0.271 mm	-6.308 mm	187.612 mm	3.177 kg

Clutch with Wire Brake - 45 Degree						
405-45QC	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	391.44 mm	100.35 mm	-0.629 mm	-5.907 mm	133.101 mm	2.121 kg
OTC (AII B4, AII B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	400.96 mm	100.35 mm	-0.592 mm	-5.639 mm	136.062 mm	2.226 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	459.38 mm	100.35 mm	-0.536 mm	-5.022 mm	176.082 mm	2.489 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	496.26 mm	100.35mm	-0.477 mm	-4.379 mm	193.426 mm	2.794 kg
Kawasaki (BA006N)	476.82 mm	100.35 mm	-0.523 mm	-4.989 mm	186.257 mm	2.574 kg
KUKA (KR16 arc HW)	403.41 mm	100.35 mm	-0.589 mm	-5.591 mm	137.464 mm	2.240 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	505.00 mm	100.00 mm	-0.260 mm	-3.739 mm	174.100 mm	3.307 kg
405-45QCL	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	438.52 mm	120.24 mm	-0.609 mm	-8.276 mm	144.369 mm	2.189 kg
OTC (AII B4, AII B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	448.05 mm	120.24 mm	-0.574 mm	-7.908 mm	147.012 mm	2.294 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	506.47 mm	120.24 mm	-0.521 mm	-7.074 mm	186.395 mm	2.557 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	543.35 mm	120.24 mm	-0.966 mm	-6.227 mm	202.763 mm	2.862 kg
Kawasaki (BA006N)	523.91 mm	120.24 mm	-0.509 mm	-6.962 mm	196.350 mm	2.641 kg
KUKA (KR16 arc HW)	450.50 mm	120.24 mm	-0.572 mm	-7.832 mm	148.303 mm	2.307 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	553.00 mm	120.00 mm	-0.255 mm	-5.346 mm	193.220 mm	3.378 kg
405-45QCL1	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	493.87 mm	120.24 mm	-0.591 mm	-8.031 mm	157.497 mm	2.256 kg
OTC (AII B4, AII B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	503.39 mm	120.24 mm	-0.558 mm	-7.684 mm	159.753 mm	2.361 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	561.81 mm	120.24 mm	-0.508 mm	-6.894 mm	198.344 mm	2.624 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	598.69 mm	120.24 mm	-0.955 mm	-6.085 mm	213.935 mm	2.929 kg
Kawasaki (BA006N)	579.23 mm	120.24 mm	-0.497 mm	-6.790 mm	208.119 mm	2.708 kg

KUKA (KR16 arc HW)	505.85 mm	120.24 mm	-0.556 mm	-7.611 mm	161.011 mm	2.374 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	608.00 mm	120.00 mm	-0.250 mm	-5.235 mm	193.753 mm	3.450 kg
405-45QCL2	A	B	X	Y	Z	Weight
Motoman, OTC (AX-V4, AX-V4L), KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	543.86 mm	120.24 mm	-0.575 mm	-7.821 mm	170.076 mm	2.316 kg
OTC (AII B4, AII B4L, FD B4, FD B4L), COMAU (Smart5 Arc6)	553.38 mm	120.24 mm	-0.544 mm	-7.492 mm	171.970 mm	2.421 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	611.80 mm	120.24 mm	-0.497 mm	-6.739 mm	209.809 mm	2.684 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	648.68 mm	120.24 mm	-0.946 mm	-5.962 mm	224.661 mm	2.989 kg
Kawasaki (BA006N)	629.24 mm	120.24 mm	-0.486 mm	-6.642 mm	219.409 mm	2.768 kg
KUKA (KR16 arc HW)	555.83 mm	120.24 mm	-0.542 mm	-7.422 mm	173.196 mm	2.434 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	658.00 mm	120.00 mm	-0.245 mm	-5.139 mm	203.863 mm	3.514 kg

8-5 Center of Mass Coordinates - 45 Degree (Solid Mount)



Solid Mount - 45 Degree						
405-45QC	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	299.24 mm	100.35 mm	0.017 mm	-9.666 mm	92.663 mm	1.484 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	308.77 mm	100.35 mm	0.016 mm	-9.042 mm	96.313 mm	1.579 kg
ABB (IRB2600ID, IRB1660ID)	311.43 mm	100.35 mm	0.015 mm	-8.555 mm	90.623 mm	1.679 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	367.19 mm	100.35 mm	0.014 mm	-7.731 mm	135.091 mm	1.852 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	404.67 mm	100.35 mm	0.012 mm	-6.514 mm	152.540 mm	2.157 kg
Kawasaki (BA006N)	383.83 mm	100.35 mm	0.000 mm	-7.565 mm	144.367 mm	1.938 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	412.00 mm	100.00 mm	0.002 mm	-5.177 mm	135.108 mm	2.797 kg
405-45QCL	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	346.33 mm	120.24 mm	0.017 mm	-12.841 mm	106.279 mm	1.553 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	355.85 mm	120.24 mm	0.016 mm	-12.062 mm	109.393 mm	1.647 kg
ABB (IRB2600ID, IRB1660ID)	358.52 mm	120.24 mm	0.015 mm	-11.419 mm	103.171 mm	1.747 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	414.27 mm	120.24 mm	0.014 mm	-10.367 mm	147.006 mm	1.920 kg

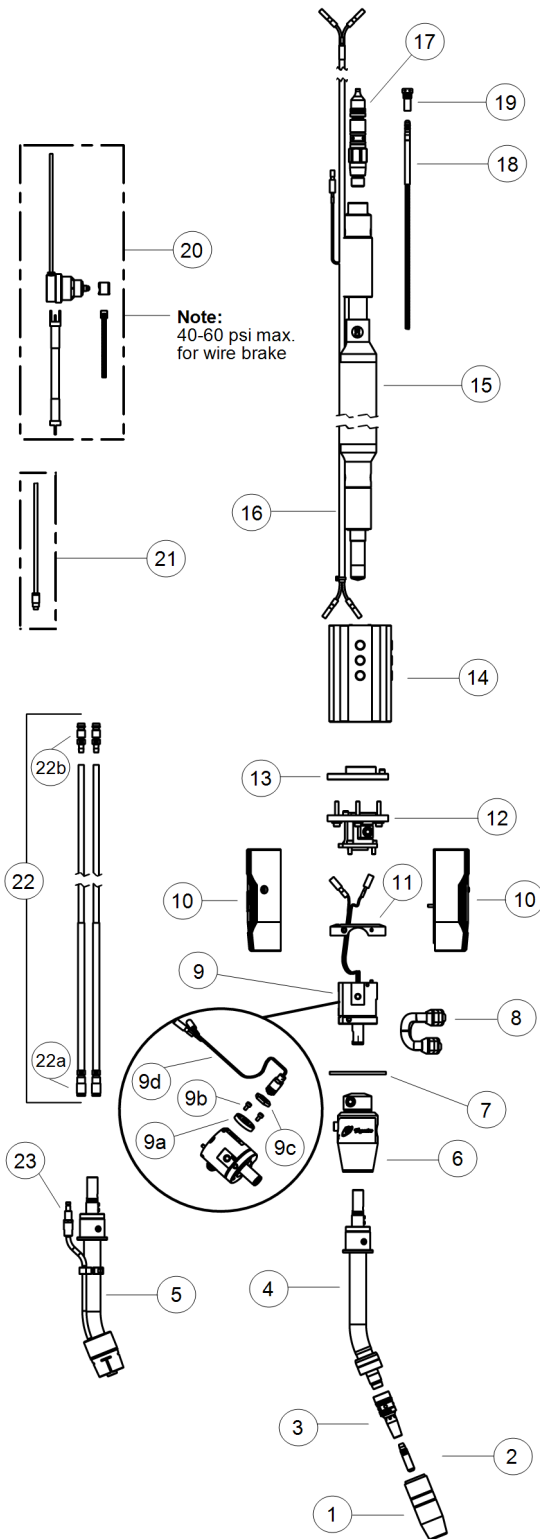
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	451.76 mm	120.24 mm	0.012 mm	-8.826 mm	163.435 mm	2.225 kg
Kawasaki (BA006N)	430.92 mm	120.24 mm	0.000 mm	-10.078 mm	155.956 mm	2.005 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	459.00 mm	120.00 mm	0.002 mm	-7.033 mm	144.484 mm	2.869 kg
405-45QCL1	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	401.67 mm	120.24 mm	0.016 mm	-12.311 mm	122.333 mm	1.619 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	411.20 mm	120.24 mm	0.015 mm	-11.591 mm	124.813 mm	1.714 kg
ABB (IRB2600ID, IRB1660ID)	413.87 mm	120.24 mm	0.014 mm	-10.998 mm	117.996 mm	1.814 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	469.62 mm	120.24 mm	0.013 mm	-10.018 mm	161.005 mm	1.987 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	507.10 mm	120.24 mm	0.011 mm	-8.568 mm	176.185 mm	2.292 kg
Kawasaki (BA006N)	486.26 mm	120.24 mm	0.000 mm	-9.753 mm	169.640 mm	2.072 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	514.00 mm	120.00 mm	0.002 mm	-6.863 mm	155.507 mm	2.940 kg
405-45QCL2	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	451.66 mm	120.24 mm	0.016 mm	-11.868 mm	137.627 mm	1.680 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	461.19 mm	120.24 mm	0.015 mm	-11.196 mm	139.533 mm	1.774 kg
ABB (IRB2600ID, IRB1660ID)	463.85 mm	120.24 mm	0.014 mm	-10.644 mm	132.118 mm	1.875 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	519.61 mm	120.24 mm	0.013 mm	-9.722 mm	174.416 mm	2.048 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	557.09 mm	120.24 mm	0.011 mm	-8.348 mm	188.430 mm	2.353 kg
Kawasaki (BA006N)	536.25 mm	120.24 mm	0.000 mm	-9.476 mm	182.754 mm	2.132 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	564.00 mm	120.00 mm	0.002 mm	-6.716 mm	166.141 mm	3.000 kg

Solid Mount with Wire Brake - 45 Degree						
405-45QC	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	335.06 mm	100.35 mm	0.009 mm	-6.702 mm	105.127 mm	1.825 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	344.58 mm	100.35 mm	0.009 mm	-6.335 mm	109.207 mm	1.919 kg
ABB (IRB2600ID, IRB1660ID)	347.25 mm	100.35 mm	0.008 mm	-6.064 mm	106.501 mm	2.020 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	403.00 mm	100.35 mm	0.008 mm	-5.564 mm	149.427 mm	2.192 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	440.14 mm	100.35 mm	0.007 mm	-4.778 mm	167.505 mm	2.498 kg
Kawasaki (BA006N)	419.65 mm	100.35 mm	-0.004 mm	-5.505 mm	159.286 mm	2.279 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	447.00 mm	100.00 mm	0.002 mm	-3.988 mm	150.089 mm	3.135 kg
405-45QCL	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	382.14 mm	120.24 mm	0.009 mm	-9.413 mm	117.136 mm	1.893 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	391.67 mm	120.24 mm	0.009 mm	-8.930 mm	120.832 mm	1.987 kg
ABB (IRB2600ID, IRB1660ID)	394.33 mm	120.24 mm	0.008 mm	-8.543 mm	117.741 mm	2.088 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	450.09 mm	120.24 mm	0.008 mm	-7.869 mm	160.195 mm	2.261 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	487.22 mm	120.24 mm	0.007 mm	-6.829 mm	177.499 mm	2.566 kg

Kawasaki (BA006N)	466.73 mm	120.24 mm	-0.003 mm	-7.712 mm	169.789 mm	2.345 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	494.00 mm	120.00 mm	0.002 mm	-5.675 mm	158.942 mm	3.206 kg
405-45QCL1	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	437.49 mm	120.24 mm	0.009 mm	-9.092 mm	131.253 mm	1.960 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	447.01 mm	120.24 mm	0.008 mm	-8.639 mm	134.491 mm	2.054 kg
ABB (IRB2600ID, IRB1660ID)	449.68 mm	120.24 mm	0.008 mm	-8.278 mm	130.941 mm	2.155 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	505.43 mm	120.24 mm	0.007 mm	-7.643 mm	172.797 mm	2.327 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	542.57 mm	120.24 mm	0.007 mm	-6.656 mm	189.144 mm	2.633 kg
Kawasaki (BA006N)	522.08 mm	120.24 mm	-0.003 mm	-7.498 mm	182.152 mm	2.412 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	550.00 mm	120.00 mm	0.002 mm	-5.552 mm	169.293 mm	3.278 kg
405-45QCL2	A	B	X	Y	Z	Weight
Motoman, KUKA (KR5 HW, KR16 L8 HW), Panasonic (TB1800WGIII)	487.47 mm	120.24 mm	0.009 mm	-8.820 mm	144.775 mm	2.020 kg
ABB (IRB1600ID, IRB1520ID), KUKA (KR16 arc HW)	497.00 mm	120.24 mm	0.008 mm	-8.392 mm	147.589 mm	2.115 kg
ABB (IRB2600ID, IRB1660ID)	499.67 mm	120.24 mm	0.008 mm	-8.052 mm	143.614 mm	2.215 kg
Panasonic (TM-1100, TM-1400, TM-1600, TM-1800, TM-2000)	555.42 mm	120.24 mm	0.007 mm	-7.449 mm	184.905 mm	2.388 kg
Motoman (MA1440, MA2010, MA3120, MH24, AR Series)	592.55 mm	120.24 mm	0.007 mm	-6.507 mm	200.346 mm	2.693 kg
Kawasaki (BA006N)	572.06 mm	120.24 mm	-0.003 mm	-7.315 mm	194.030 mm	2.473 kg
KUKA (KR6 R11820HW, KR8 R1420HW, KR8 1620HW, KR8 R2100HW)	600.00 mm	120.00 mm	0.002 mm	-5.445 mm	179.277 mm	3.342 kg

SECTION 9 — PARTS LIST

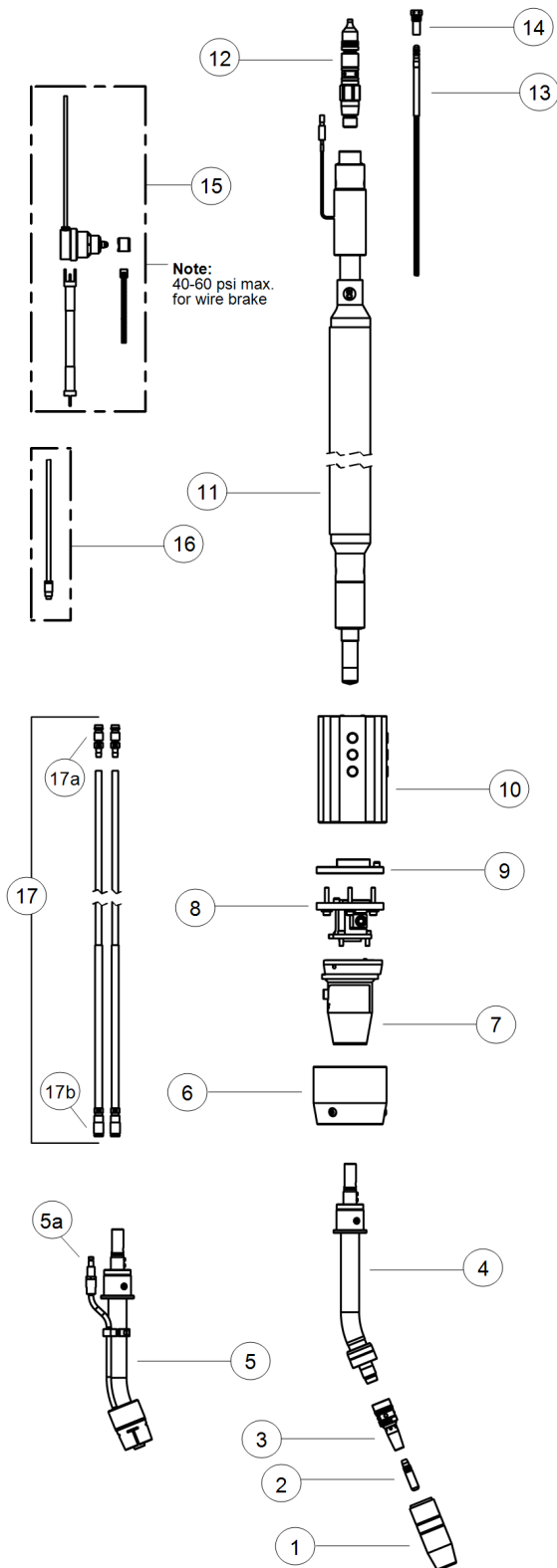
9-1 Clutch System



ITEM	PART #	DESCRIPTION
1	See SP-TA3	Nozzle
2	See SP-TA3	Contact tip
3	See SP-TA3	Retaining head / diffuser
4	See SP-TA3	Neck, air-cooled
5	See SP-TA3	Neck, TOUGH GUN I.C.E.™
6	580-2	Connector housing
	580-7-045	Connector housing (for guns equipped with wire brake; 0.045" wire)
	580-7-116	Connector housing (for guns equipped with wire brake; 1/16" wire)
7	580-2-3	Rubber washer
8	580-4	Shunt cable
9	AS-714	Clutch
9a	AS-714-7-2	Switch base
9b	Not Sellable	M3x0.5-6LG SHCS
9c	AS-714-7-3	Hex nut
9d	AS-714-9	Clutch switch
10	580-5A	Outer cover kit
	580-5B	Outer cover kit for guns equipped with TOUGH GUN I.C.E. Technology
	580-5C	Outer cover kit for guns equipped with wire brake
	580-5D	Outer cover kit for guns equipped with TOUGH GUN I.C.E. and wire brake
11	AS-114-3	Mounting ring
12	580-19	Cable connector kit, Motoman®
	580-20	Cable connector kit, KUKA®
	580-21	Cable connector kit, Panasonic® TB1800WGIII
13	See SP-TA3	Insulating disc
14	See SP-TA3	Spacer
15	See SP-TA3	LSR Unicable
16	AS-714-19	Control cable, 60 inch
	AS-714-24	Control cable, 82 inch
	AS-714-26	Control cable, 120 inch
17	See SP-TA3	Power pin
18	See SP-TA3	Liner
19	See SP-TA3	Liner retainer
20	WB-045*	Wire brake kit option for 0.045" wire
	WB-116*	Wire brake kit option for 1/16" wire
21	580-A	Air blast kit option
22	580-30	TOUGH GUN I.C.E. water lines
22a	580-30-2	Quick connect brass fitting (TOUGH GUN I.C.E. component)
	580-30-5	Clamp (TOUGH GUN I.C.E. component)
22b	580-30-6	Quick connect brass fitting (TOUGH GUN I.C.E. component)
	580-30-4	Clamp (TOUGH GUN I.C.E. component)
23	590-8	Water line fittings (TOUGH GUN I.C.E. components)

*580-7-045 or 580-7-116 (see Item 6 above) required if retrofitting wire brake

9-2 Solid Mount System



ITEM	PART #	DESCRIPTION
1	See SP-TA3	Nozzle
2	See SP-TA3	Contact tip
3	See SP-TA3	Retaining head / diffuser
4	See SP-TA3	Neck, air-cooled
5	See SP-TA3	Neck, TOUGH GUN I.C.E. (only available for select FANUC®, ABB® and Panasonic® models)
5a	590-8	Water line fittings (TOUGH GUN I.C.E. components)
6	580-300-5	Outer cover kit
	I580-300-5-1	Outer cover kit, TOUGH GUN I.C.E.
7	580-2S	Connector housing
	580-2SW	Connector housing (for guns equipped with wire brake)
8	580-19	Cable connector kit, Motoman®
	580-20	Cable connector kit, KUKA®
	580-21	Cable connector kit, Panasonic® TB1800WGIII
9	See SP-TA3	Insulating disc
10	See SP-TA3	Spacer
11	See SP-TA3	LSR Unicable
12	See SP-TA3	Power pin
13	See SP-TA3	Liner
14	See SP-TA3	Liner retainer
15	WB-045*	Wire brake kit option for 0.045" wire
	WB-116*	Wire brake kit option for 1/16" wire
16	580-A	Air blast kit option
17	580-30	TOUGH GUN I.C.E. water lines
17a	580-30-2	Quick connect brass fitting (TOUGH GUN I.C.E. component)
	580-30-5	Clamp (TOUGH GUN I.C.E. component)
17b	580-30-6	Quick connect brass fitting (TOUGH GUN I.C.E. component)
	580-30-4	Clamp (TOUGH GUN I.C.E. component)

*580-2SW (see Item 7 above) is required if retrofitting wire brake

SECTION 10 — TROUBLESHOOTING

10-1 Troubleshooting Table

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Electrode does not feed.	1. Feeder relay. 2. Broken control lead. 3. Poor adaptor connection. 4. Improper / worn drive roll. 5. Drive roll tension misadjusted. 6. Burn back to contact tip. 7. Wrong size liner. 8. Buildup inside of liner.	1. Consult feeder manufacturer. 2. a. Test and connect spare control lead. b. Install new cable. 3. Test and replace leads and/or contact pins. 4. Replace drive roll. 5. Adjust tension at feeder. 6. See 'Contact tip burn back'. 7. Replace with correct size. 8. Replace liner or clean out with compressed air, check condition of electrode.
2. Contact tip burn back.	1. Improper voltage and/or wire feed speed. 2. Erratic wire feeding. 3. Improper tip stickout. 4. Improper electrode stickout. 5. Faulty ground.	1. Adjust parameters. 2. See 'Erratic wire feeding'. 3. Adjust nozzle / tip relationship. 4. Adjust wire stickout. 5. Replace cables and/or connections.
3. Tip disengages from the gas diffuser.	1. Worn retaining head / diffuser. 2. Improper tip installation. 3. Extreme heat or duty cycle.	1. Replace tip and/or gas diffuser / retaining head / diffuser. 2. Install as per section 7-1 Changing Consumables on page 19. 3. Replace with heavy duty consumables. See appropriate Spec Sheet for details.
4. Short contact tip life.	1. Contact tip size 2. Electrode eroding contact tip. 3. Exceeding duty cycle.	1. Replace with proper size. 2. Inspect and/or change drive rolls. 3. Replace with properly rated Tregaskiss MIG Gun.
5. Erratic arc.	1. Worn contact tip. 2. Buildup inside of liner. 3. Wrong tip size. 4. Not enough bend in neck.	1. Replace contact tip. 2. Replace liner, check condition of electrode. 3. Replace with correct tip size. 4. Replace with 45° neck.
6. Erratic wire feeding.	1. Buildup inside of liner. 2. Wrong size liner. 3. Improper drive roll size. 4. Worn drive roll. 5. Improper guide tube relationship. 6. Improper wire guide diameter. 7. Gaps at liner junctions. 8. Feeder malfunction. 9. Worn contact tip.	1. Replace liner, check condition of electrode. 2. Replace with new liner of proper size. 3. Replace with proper size drive roll. 4. a. Replace with new drive roll. b. Repair worn drive roll. 5. a. Adjust / replace guide as close to drive rolls as possible. b. Eliminate all gaps in electrode path. 6. Replace with proper guide diameter. 7. a. Replace with new liner trimmed as per section 7-3 Changing the Liner on page 21. b. Replace guide tube / liner trimming as close to mating component as possible. 8. Consult feeder manufacturer. 9. Inspect and replace.*
7. Extreme spatter.	1. Improper machine parameters. 2. Improper tip installation. 3. Improper shielding gas coverage. 4. Contaminated wire or workpiece.	1. Adjust parameters. 2. Adjust nozzle / tip relationship. 3. a. Verify shielding gas coverage. b. Verify gas mixture. 4. Clean wire and workpiece.

8. Porosity in weld.	1. Insulator worn. 2. Gas diffuser damaged 3. Extreme heat or duty cycle. 4. Solenoid faulty. 5. No gas. 6. Flow improperly set. 7. Gas ports plugged. 8. Ruptured gas hose. 9. Control circuit loss. 10. Worn, cut or missing o-rings. 11. Loose fittings.	1. Replace nozzle / insulator. 2. Replace gas diffuser or o-rings. 3. Replace with heavy duty consumables. 4. Replace solenoid. 5. a. Install full tanks. b. Check supply. c. Check for hose leaks. 6. Adjust flow. 7. a. Clean or replace gas diffuser. b. Clean nozzle. 8. Repair or replace cable or line. 9. See 'Electrode does not feed'. 10. Replace o-rings. 11. Tighten gun and cable connections to specified torque. See Section 7 — Replacement on page 19.
9. Gun running hot.	1. Exceeding duty cycle. 2. Loose or poor power connection.	1. a. Replace with properly rated Tregaskiss MIG Gun. b. Decrease parameters to within gun rating. 2. a. Clean, tighten or replace cable grounding connection. b. Tighten gun and cable connections to specified torque. See Section 7 — Replacement on page 19.
10. Liner is discolored.	1. Short circuit to electrode. 2. Broken copper stranding in power cable.	1. Isolate electrode reel from feeder and drive block. Consult feeder manufacturer's manual. 2. Replace unicable.
11. Sporadic feeding of aluminum electrode.	1. Tip galling. 2. Synthetic liner melting. 3. Wire deformed by feeder rolls.	1. Inspect and replace the contact tip.* 2. a. Replace liner. b. Replace with composite liner. c. Replace the neck and jump liner. 3. Adjust drive rolls as per feeder manufacturer's manual.

**In some cases with aluminum and mild steels, it may be necessary to use a contact tip with either a larger or smaller bore size.*

NOTES

ADDITIONAL SUPPORT MATERIALS

For additional support materials such as Spec Sheets, troubleshooting information, how-to guides and videos, animations, online configurators and much more, please visit Tregaskiss. Scan the QR Code with your smart phone for immediate access to Tregaskiss.com/TechnicalSupport.



Scan to view the TOUGH GUN® TA3 MIG Gun Owner's Manual



Scan to view the TOUGH GUN® TA3 MIG Gun Spec Sheet



Scan to view the AccuLock™ R (Robotic) Consumables Spec Sheet



Scan to view the TOUGH LOCK® Consumables Spec Sheet



Scan to view the QUICK LOAD® Liners & AutoLength™ Pins Spec Sheet



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