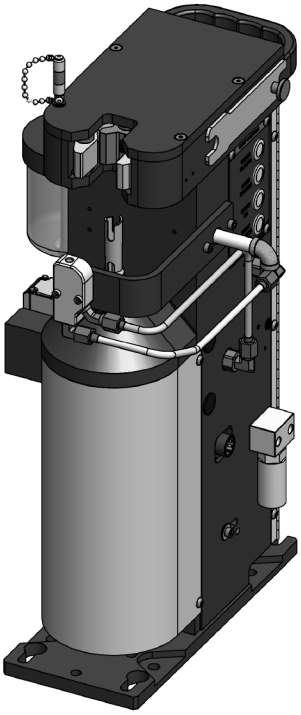
TOUGH GUN®
TT3 Reamer

OWNER'S MANUAL

May 2021 **OM-TT3-1.6**

Serial #TT-22000 and above | Robotic Nozzle Cleaning Station, MIG (GMAW) Welding Peripheral



Tregaskiss®

Tregaskiss.com/TechnicalSupport
1-855-MIGWELD (644-9353) (US & Canada)
+1-519-737-3000 (International)

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. 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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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. 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 Principal 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 durable, flame-resistant material (leather, heavy cotton, wool). Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.

NOISE can damage hearing.

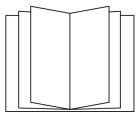
Noise from some processes or equipment can damage hearing.

- 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 from Global Engineering Documents. Website: www.global.ihs.com.

Safe Practices for Welding and Cutting Containers that have Held Combustibles, American Welding Society Standard AWS A6.0 from Global Engineering Documents. Website: www.global.ihs.com.

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

1-6 Commercial Warranty

Product is warranted to be free from defects in material and workmanship for the period specified below after the sale by an authorized Buyer.

- 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® Fixed Automatic MIG Guns **1 year**
- Tregaskiss® TOUGH GUN® Reamer: **1 year**
- Tregaskiss® TOUGH GUN® Reamer when factory-equipped with Lubricator: **2 years**
- Tregaskiss® TOUGH GUN® Reamer when factory-equipped with Lubricator and used only with Tregaskiss® TOUGH GARD® Anti-Spatter Liquid: **3 years**
- Tregaskiss® Robotic Peripherals (Clutch, Sprayer, Wire Cutter, Mounting Arms): **1 year**
- Tregaskiss® TOUGH GARD® Anti-Spatter Multi-Feed System: **180 days**

Bernard and Tregaskiss reserve the right to repair, replace, or refund the purchase price of non-conforming product. Product found not defective will be returned to the Buyer after notification by the Bernard and Tregaskiss Customer Service department. Any TOUGH GUN Reamer component part replaced or repaired pursuant to the Warranty herein shall be further warranted for a period of six months after delivery of the replacement.

Bernard and Tregaskiss make no other warranty of any kind, expressed or implied, including, but not limited to the warranties of merchantability or fitness for any purpose. Bernard and Tregaskiss shall not be liable under any circumstances to Buyer, or to any person who shall purchase from Buyer, for damages of any kind, including, but not limited to any direct, indirect incidental or consequential damages or loss of production or loss of profits resulting from any cause whatsoever, including, but not limited to any delay, act, error or omission of Bernard or Tregaskiss.

Genuine Bernard® or Tregaskiss® parts must be used for safety and performance reasons or the warranty becomes invalid. Warranty shall not apply if accident, abuse, or misuse damages of a product, or if a product is modified in any way except by authorized Bernard and Tregaskiss personnel. Use as directed.

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 peutdonner la mort ou des blessures graves. Les dangers possiblessont montrés par les symboles joints ou sont expliquésdans 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 cidessous afin de connaître les mesures à prendre pour éviter tout danger.

2-2 Dangers relatifs au soudage à l'arc

Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les onsignes de sécurité présentées ci-après ne font que résumer les informations contenues dans la section 2-4 Principales normes de sécurité on page 7. Veuillez lire et respecter toutes ces 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 VAPEURS ET LES FUMÉES peuvent être nocives.

- Éloigner sa tête des endroits renfermant des vapeurs.
- 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 dégraisseurs, 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.

Ne pas souder à proximité de matériaux inflammables.

- 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 dégraisseurs, les flux et les métaux.

L'ACCUMULATION DE VAPEURS peut causer des lésions ou la mort.

- Quand on n'utilise pas le gaz comprimé de protection, fermer le robinet de la bouteille.
- Assurer toujours la ventilation des zones fermées ou utiliser un appareil respiratoire avec alimentation en air.

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 un équipement de protection pour le corps fait d'un matériau résistant et ignifuge (cuir, coton robuste, laine). La protection du corps comporte des vêtements sans huile comme par ex. 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'ouie.

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 bouche-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.

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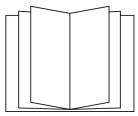
LES FILS DE SOUDAGE peuvent provoquer des blessures.

- 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 rechange recommandées par le constructeur.
- 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.

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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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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, podríaresultar en muerte o lesión grave. Los peligros posiblesse muestran en los símbolos adjuntos, o se explican en eltexto.

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

Se usan los símbolos mostrados abajo por todo éste manual para llamar la atención e identificar a peligros posibles. Cuando usted vea este símbolo, tenga cuidado, y siga a 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 de seguridad de sección 3-4 Estándares principales de seguridad on page 10. Lea y siga todas los estándares 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 de soldar aprobada que tenga un matiz apropiado de lente-filtro para proteger su cara y ojos 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 ropa de protección adecuada para el cuerpo, de material durable y resistente a la llama (cuero, algodón grueso o lana). La ropa de protección para el cuerpo incluye guantes de cuero, camisa de trabajo, pantalones sin botamanga (vuelta), botas de seguridad y una gorra; ninguno de estos elementos debe contener compuestos derivados del petróleo.

PARTES CALIENTES puedan 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.

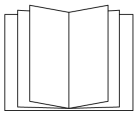
Ruido proveniente de algunos procesos o equipo puede dañar el oído.

- 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.global.ihs.com.

Safe Practices for Welding and Cutting Containers that have Held Combustibles, American Welding Society Standard AWS A6.0 from Global Engineering Documents. Website: www.global.ihs.com.

National Electrical Code, NFPA Standard 70 from National Fire Protection Association. Website: www.nfpa.org and www.sparky.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 apártelos 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 — SPECIFICATIONS

4-1 System Components

Robotic Peripheral for GMAW Welding

Rated Voltage: 24 VDC

Operating Voltage: ±10% of rated voltage

Power Consumption: Max. wattage in operation 5.3 W

Anti-Spatter Requirements: Water-based anti-spatter liquid must be used. Oil-based anti-spatter solution will compromise performance.

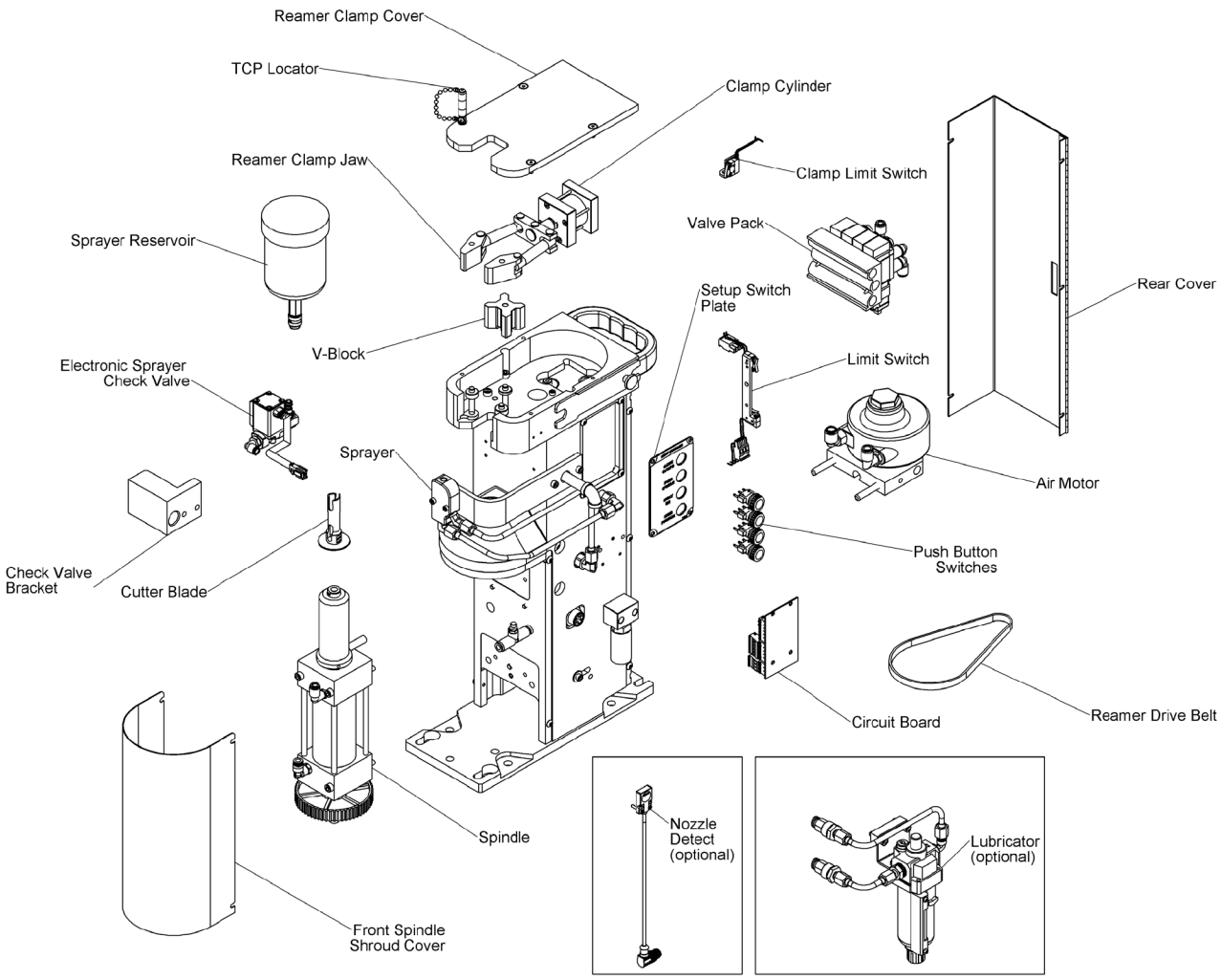
Air Requirements:

Min. 80 to max. 100 psi (5.5 to 7.0 bar) at 16 CFM (450 LPM)

Air Motor (at min. air requirement):

Stall torque at 80 psi (5.5 bar) = 83 in-lbs (9.4 Nm)

For complete parts list, please see Section 10 — Parts List on page 34.



5-1 Installing the Reamer

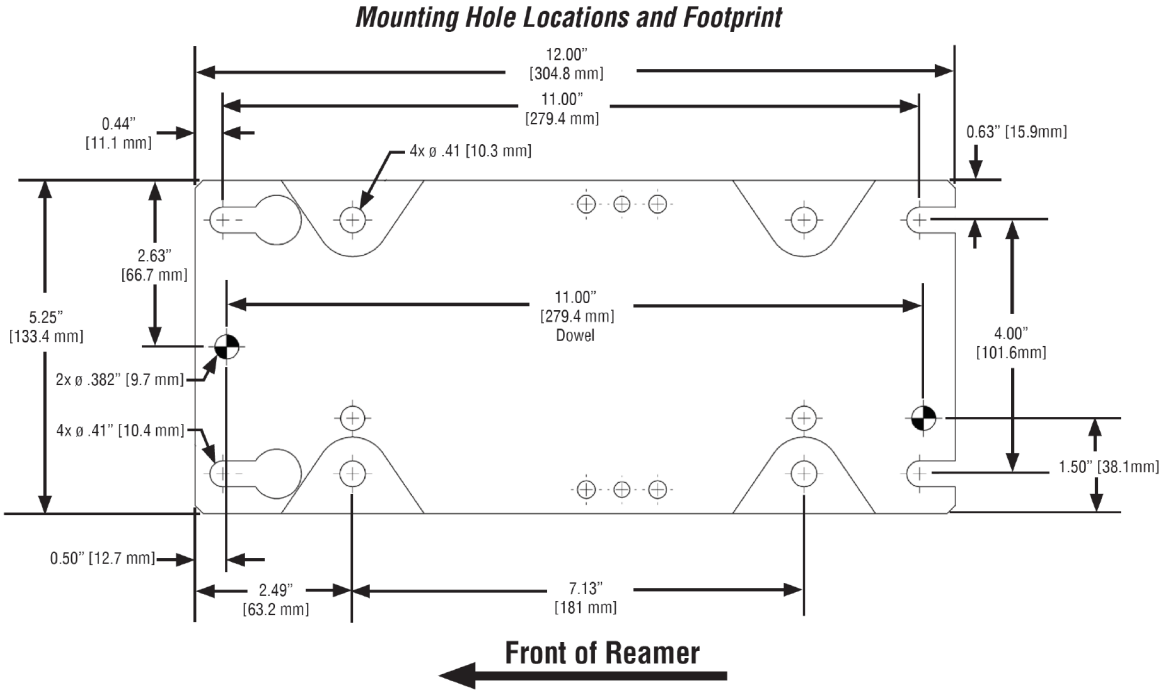
WARNING: Ensure power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

A. To Mount TOUGH GUN TT3 Reamer

The TOUGH GUN Reamer should be installed within the weld cell where it is clear of all tooling and convenient for the robot to access the unit.

1. Affix the reamer base to a sturdy platform using four (4) M10x1.5x25mm bolts (not provided).

Figure 5-A



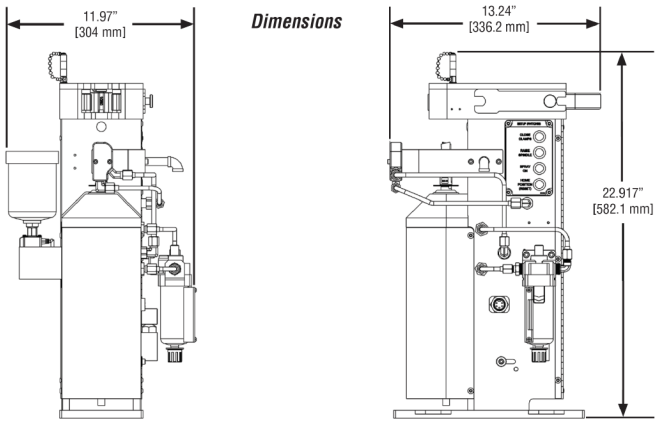
NOTE: The reamer can be mounted overhead or on an angle as long as debris falls away from the clamp housing.

B. To Connect Air Supply

NOTE: Push the HOME POSITION button before connecting air line.

1. Use only dry, filtered, lubricated air. **IMPORTANT:** Requirements: 80-100 psi at 16 CFM (5.5-7.0 bar at 450 LPM) at the reamer during operation.
2. Use an air supply line with an inside diameter of 3/8". Connect to a 1/4" NPT elbow located on the side of the reamer.

Figure 5-B



5-2 Installing the Wire Cutter

WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

A. Mounting Wire Cutter

1. The wire cutter should be installed within the weld cell where it is clear of all tooling and convenient for the robot to access the unit. The base plate has been designed for mounting on top of the TOUGH GUN Reamer. Be sure to consider movable fixtures and the confines of the robot.
2. Attach the wire cutter base to the top of the reamer, or other sturdy platform using three (3) 10-24 x 3/4” bolts (for reamer serial numbers up to 11,299) or three (3) M5 x 0.8 x 25 mm long Flat Head Cap Screw (FHCS) (for reamer serial numbers 11,300 and up) in the holes provided.

Figure 5-C

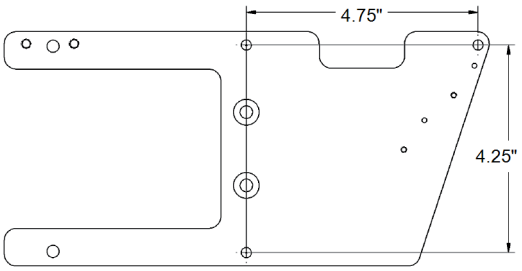
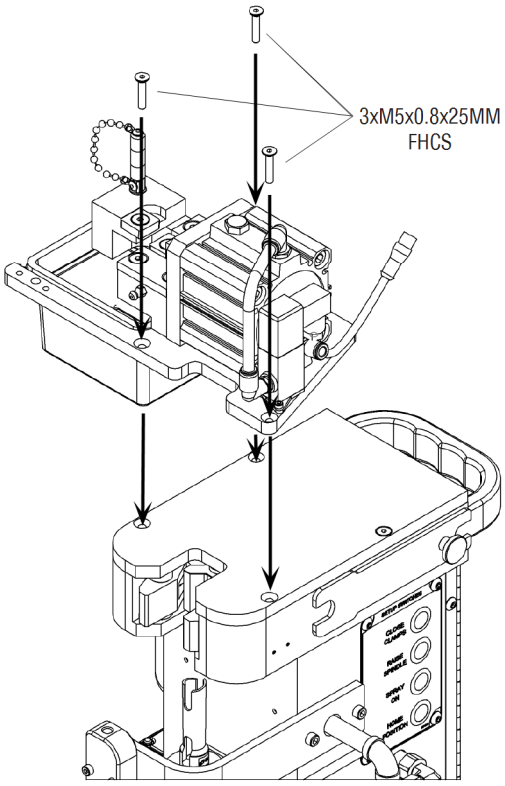


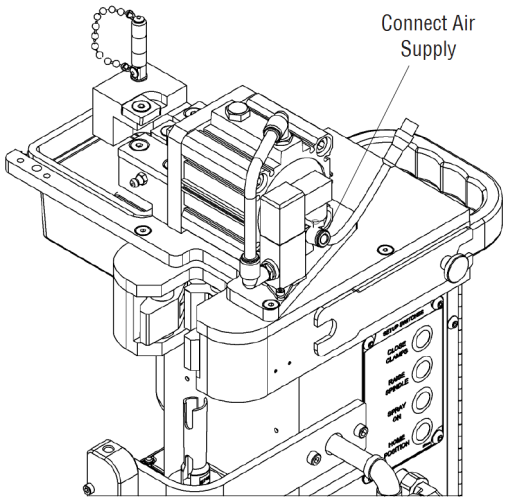
Figure 5-D



B. Connecting Air Supply

1. Use only dry filtered air.
   IMPORTANT: Requirements – 80-100 psi at 16 CFM (5.5-7.0 bar at 450 LPM) at the wire cutter.
2. Use an air supply line with an inside diameter of 1/4” and connect to 1/8” female NPT inlet located on the side of the valve.

Figure 5-E



5-3 Installing Nozzle Detect

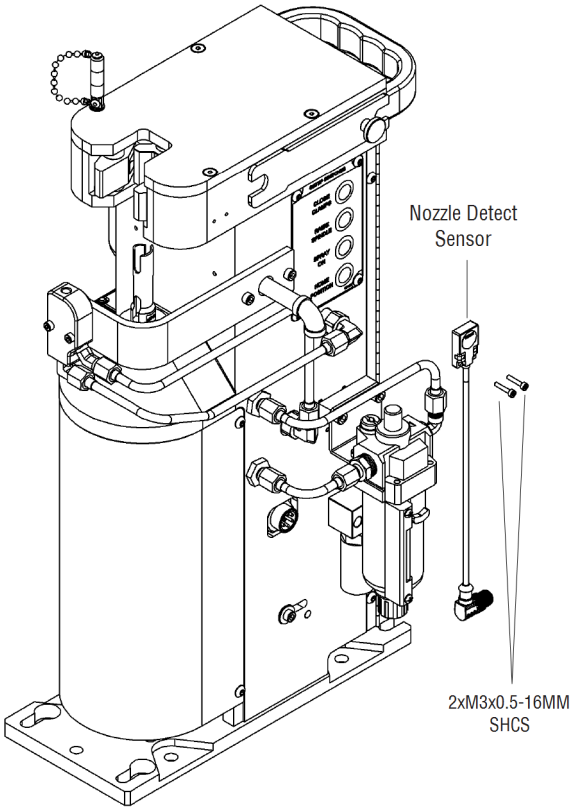
WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

NOTE: This nozzle detect sensor has a sensing range of 5 mm and can detect any metallic part that comes within this sensing range. The accuracy is ± ≤2% (0.1 mm). The circuit is normally open until the sensor detects a metallic part within its sensing range. The green LED on the sensor will always be on if there is power to the reamer.

A. Mounting Nozzle Detect

1. Using two (2) M3x0.5x16 mm SHCS, attach the nozzle detect to the side of the clamp housing in the two threaded holes. Torque to 8-10 in-lbs.
2. Connect the supplied 4 Pin cable to the sensor and wire back to PLC / Robot Controller for monitoring.

Figure 5-F



6-1 Air Motor Lubricator

WARNING: The TOUGH GUN Reamer **must be operated with lubricated air** using either the air motor lubricator option or a suitable alternative system installed by the customer. The lubricator should be set to feed one drop of oil for every 50-75 CFM of air going through the motor (approximately 1 drop every 5-10 cycles or 1 drop per minute of operation). The lubricant can be air motor oil or light grade hydraulic oil with a viscosity rating of 150 VC 15-20 (SAE 5W).

6-2 Accessing Electrical and Pneumatic Controls

WARNING: Ensure power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

To access the electronic circuit board for installation or service for the TOUGH GUN Reamer:

1. Remove reservoir (if equipped) and loosen the two (2) BHCS using a 3 mm Allen wrench to open the hinged rear access door.
2. The rear access door can be completely removed if accessibility is an issue. To do so, using a 3 mm Allen wrench, remove the (3) BHCS which fasten the hinge to the frame.

6-3 Wiring Interface Connections

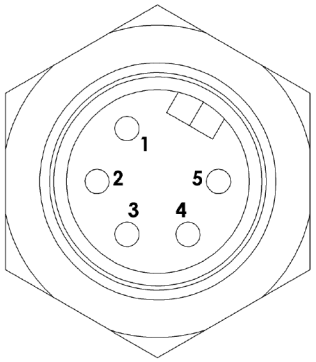
WARNING: The following connection should only be performed by a qualified technician. Damage to equipment will occur if connections are incorrect.

To interface the TOUGH GUN Reamer with the controller, five (5) electrical connections are required:

- ORANGE LEAD: Cycle Start output from PLC / controller (0.25 amp)
- WHITE LEAD: 0 VDC supply 0.5 amp constant
- RED LEAD: 24 VDC supply 0.5 amp constant
- GREEN LEAD: Home Signal Jaws Unclamped input to PLC / controller (0.25 amp)
- BLACK LEAD: Sprayer output from PLC / controller (0.25 amp)

NOTE: The pre-wired interface receptacle uses the above color codes.

Figure 6-A



The circuit board of the reamer is capable of both sourcing or sinking inputs and outputs:

- **Pin 1 (WHITE LEAD): 0 CONSTANT VDC**
  0 VDC operates the board for both Sourcing or Sinking settings
- **Pin 2 (RED LEAD): +24 CONSTANT VDC**
  +24 VDC operates the board for both Sourcing or Sinking settings
- **Pin 3 (GREEN LEAD): Reamer Home signal**
  Choose one of two settings:
  1. Sourcing - When unit is in Home position, reamer sends HIGH signal (+24 VDC) back to PLC / controller
  2. Sinking - When unit is in Home position, reamer sends LOW signal (0 VDC) signal back to PLC / controller
- **Pin 4 (ORANGE LEAD): Cycle Start signal** (signal should be a pulse with a maximum of 0.5 seconds in duration)
  Choose one of two settings:
  1. To initiate the ream cycle, set board to Sourcing, controller sends HIGH signal (+24 VDC) to reamer
  2. To initiate the ream cycle, set board to Sinking, controller sends LOW signal (0 VDC) to reamer
- **Pin 5 (BLACK LEAD): Sprayer Start signal**
  +24 VDC operates the sprayer for both Sourcing or Sinking settings

NOTE: See section 6-4 Inversing Circuit Board Logic on page 18 for more information.

6-4 Inversing Circuit Board Logic

WARNING: Before start-up, ensure that all connections are correct, or damage to the TOUGH GUN Reamer will occur.

The TOUGH GUN Reamer is factory set for Sourcing inputs and outputs.

DEFINITIONS:

- Sinking = signal from PLC / controller is LOW (0 VDC)
- Sourcing = signal from PLC / controller is HIGH (+24 VDC) (see section 9-2 Electrical Schematic on page 33).

The control logic requirement for some installations may require an inverse of the logic provided.

To switch from Sourcing to Sinking:

The switches located inside the rear access door must be accessed. See section 6-2 Accessing Electrical and Pneumatic Controls on page 16 for directions.

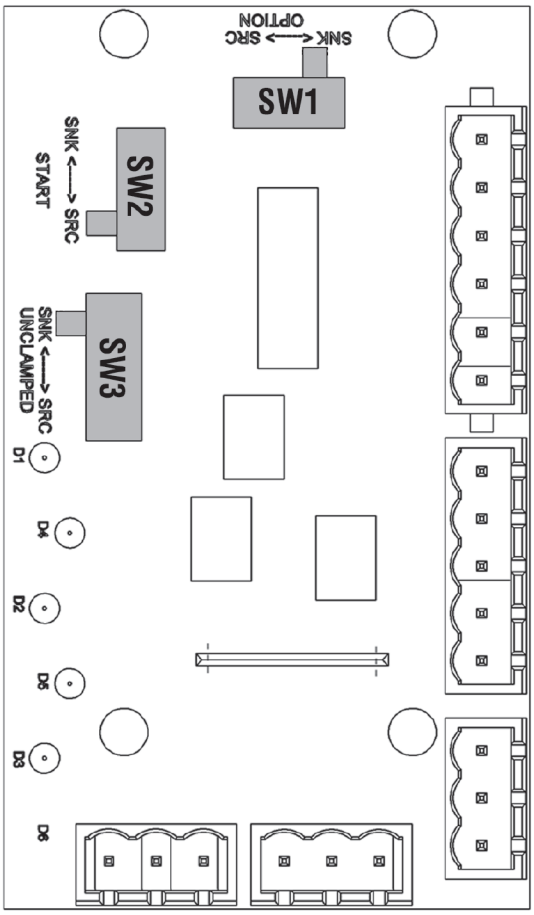
1. Disconnect from power supply.
2. Move the switches to the desired positions (SRC or SNK).
3. Connect power back into the reamer.

IMPORTANT NOTE: Although the circuit board is protected, Tregaskiss suggests disconnecting the power before moving the switches.

The switches are located on the top left hand corner of the circuit board (**SRC** = Sourcing, **SNK** = Sinking)

- **Sprayer signal** can be set to either **SRC** or **SNK** by moving the switch (**SW1 - Option**) to the position indicated in Figure 6-B.
- **Cycle Start signal** can be set to either **SRC** or **SNK** by moving the switch (**SW2 - Start**) to the position indicated in Figure 6-B.
- **Reamer Home signal** can be set to either **SRC** or **SNK** by moving the switch (**SW3 - Unclamped**) to the position indicated in Figure 6-B.

Figure 6-B



6-5 Setting Up V-Block

WARNING: Ensure power and air supply are off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

PRO TIP: Removing and/or installing the top cover will be difficult if the air has not been disconnected. Disconnect the air prior to removing and/or installing the top cover.

1. Remove the four (4) cover screws at the top of the reamer.
2. Lift the clamp cover off completely.
3. Lift and rotate the v-block so the desired size faces outward from between the front jaws.

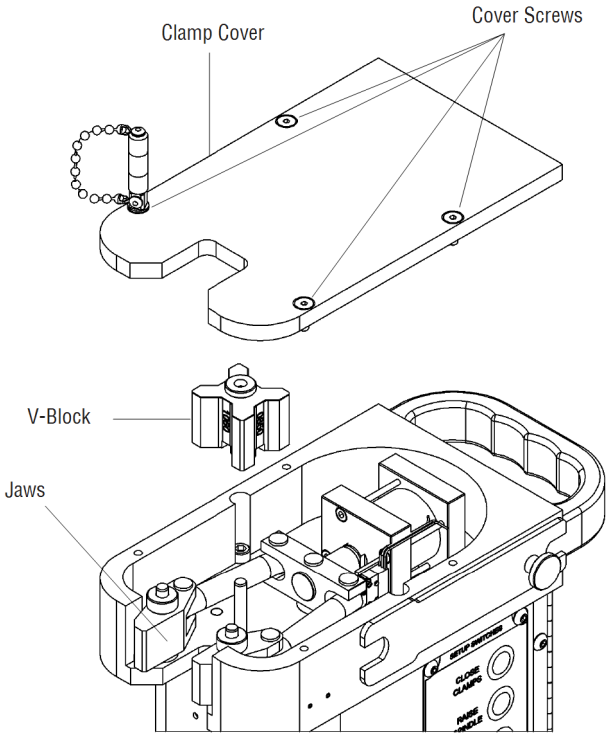
See V-Block Size Chart below:

Part #	Nozzle Outside Diameter for each side of V-block			
TR-2150	0.850"	0.938"	*1.062"	1.106"
TR-2161	0.830"	0.978"	25 mm	1.125"
TR-2162	0.780"	0.813"	0.875"	1.000"

**Part stamped as 1060, not according to its O.D. of 1.062".*

Numbers are stamped into the v-blocks. The number refers to the outside diameter of the nozzle (i.e. 0938 = 0.938" O.D.).

Figure 6-C



6-6 Setting Up Nozzle Heights for Cutter Blade Insertion

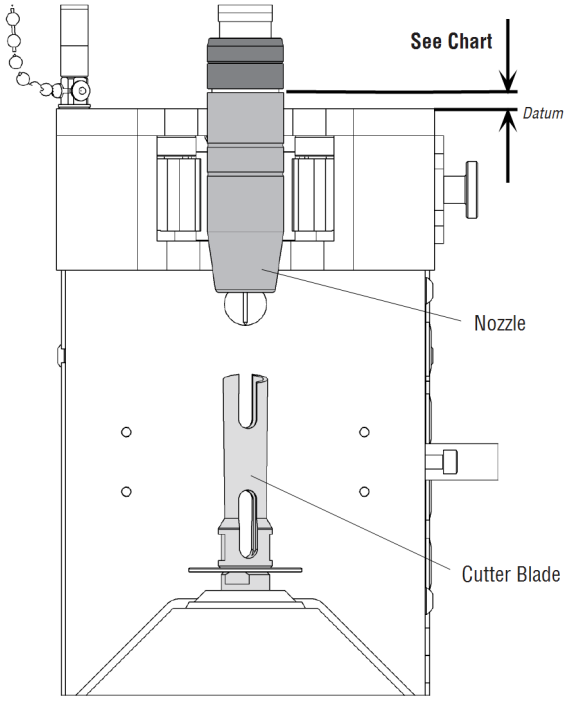
A. Setting Nozzle heights

See the chart below in order to find the correct height to set your nozzle for proper cutter blade insertion:

		Retaining Head / Gas Diffuser					
Cutter Blade	**Nozzle**	**404-3**		**404-20, 404-26, 404-30, 404-32, D-ATSH, D-ATTH**		**454-1**	
RCT-13	3/4" (19.05 mm)	0.110" Below	2.79 mm Below	0.375"	9.53 mm	0.466"	11.84 mm
RCT-01	5/8" (15.88 mm)	0.030"	0.762 mm	0.225"	5.72 mm	0.716"	18.19 mm
RCT-04	1/2" (12.7 mm)	0.219" Below	5.56 mm Below	0.125"	3.18 mm	0.065"	1.65 mm

NOTE: Using the top of the reamer as the datum, the base of the nozzle will either be above or below this datum depending on the nozzle configuration.

Figure 6-D



TOUGH GUN TT3 Reamer

6-7 Setting Up Nozzle Detect

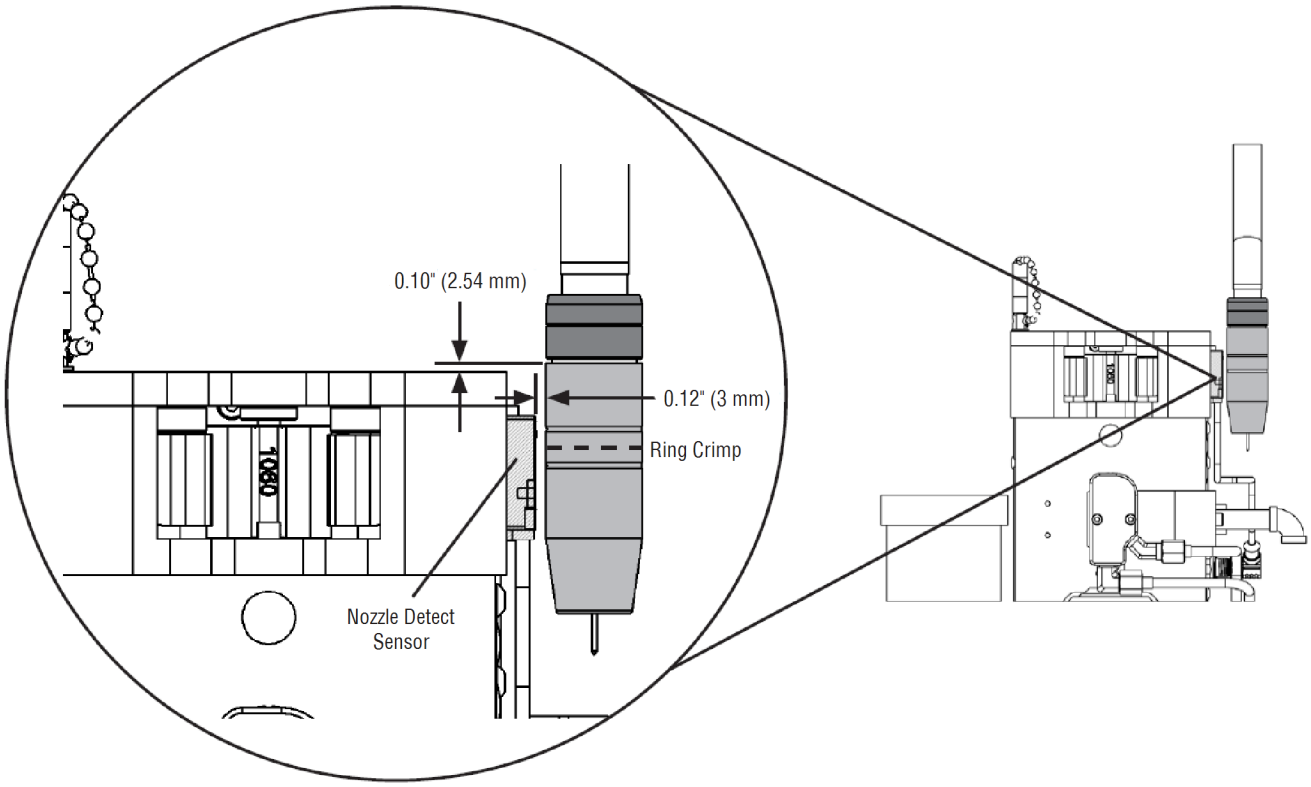
WARNING: Please follow your facility's lockout / tagout procedures.

IMPORTANT: In order for the system to operate properly, the sensor signal must be monitored.

A. Setting Up Nozzle Detect

1. With a nozzle on the gun, move the robot into position beside the nozzle detect sensor.
2. Measure the distance from the tangent face of the nozzle to the face of the nozzle detect sensor, ensuring that it is 3 mm ± 1 mm.
3. The ring crimp on the nozzle should be in line with the center of the sensor (yellow circle portion on the face of the sensor). The vertical distance between the top of the reamer clamp housing and the base of the nozzle outer shell should be approx. 0.10".

Figure 6-E



B. Testing Nozzle Detect

1. Move robot into position beside the nozzle detect sensor (with a nozzle on the torch). The yellow LED should illuminate.
2. Move robot away from the nozzle detect sensor and remove the nozzle (keeping the retaining head on).
3. Move robot back to the programmed position that was used in Step 1 above. The yellow light should not illuminate, indicating that there is no nozzle on the torch.

NOTE: Adjustments may be necessary if you are not using genuine Tregaskiss® consumables. The setup distances may change but the procedure does not change.

Figure 6-F

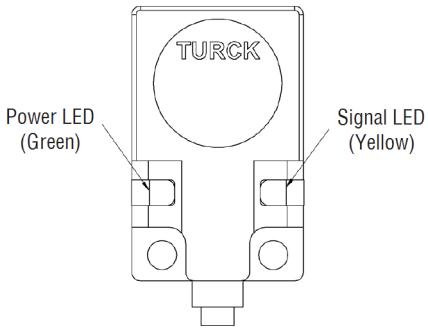


Figure 6-G

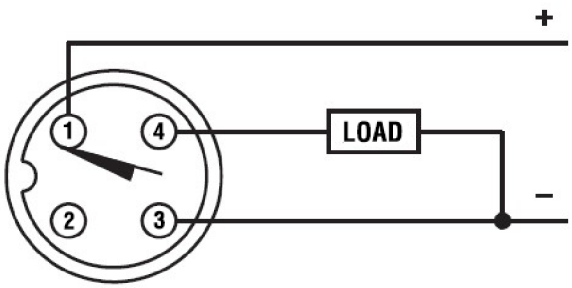
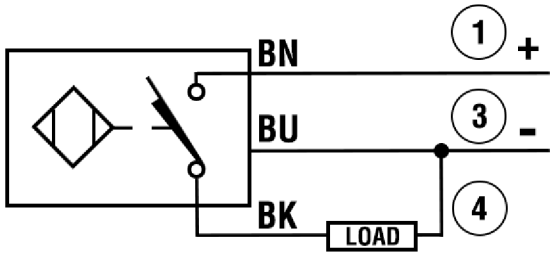


Figure 6-H

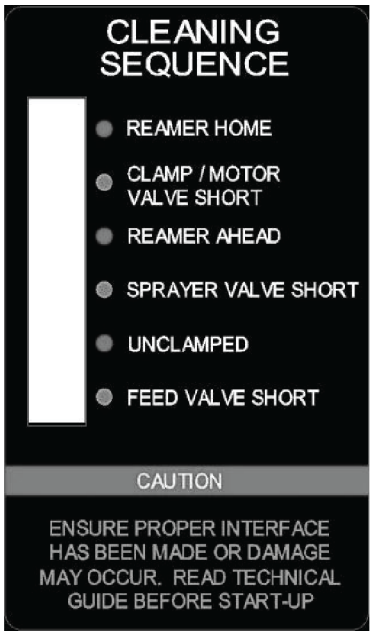


7-1 Understanding L.E.D. Indicators

The L.E.D. indicators mounted on the circuit board of the TOUGH GUN Reamer supply visual information regarding cycle status. This information may be used for both installation and maintenance to verify proper operation. When the TOUGH GUN Reamer is Home, L.E.D. status should appear as labeled in the chart and diagram below.

REAMER HOME	ON	Indicates that the lift cylinder has retracted, the cutter is at the bottom of its stroke, the limit pin is activating the lower limit switch and the clamps are open and the lower limit switch is working properly.
CLAMP / MOTOR VALVE SHORT	OFF	Indicates short with clamp or motor valve when 'ON'.
REAMER AHEAD	OFF	Indicates that the TOUGH GUN Reamer has reached full upper stroke and the limit pin is activating the upper limit switch. Unless the Reamer gets stuck at the top, this L.E.D. will only be 'ON' for a split second before the unit begins to retract and the L.E.D. turns 'OFF'.
SPRAYER VALVE SHORT	OFF	Indicates short with one of the sprayer valves when 'ON'.
UNCLAMPED	ON	Indicates that the clamp cylinder is fully retracted, releasing the clamp mechanism (via the clamp limit switch).
FEED VALVE SHORT	OFF	Indicates short with feed valve (also referred to as "spindle valve") when 'ON'.

Figure 7-A



7-2 Programming Events Sequence

A. Programming Cutter Blade / Reamer Sequence

1. Verify the TOUGH GUN Reamer L.E.D. is showing **Unclamped** and **Reamer Home**.
2. Position the robot to place the MIG gun nozzle so it is tangent to the two (2) angled faces of the v-block, at the proper insertion depth and concentric with the cutter blade (see section 6-6 Setting Up Nozzle Heights for Cutter Blade Insertion on page 20).
3. Cycle Start - Supply output signal from the robot controller / PLC. Pulse output for 0.5 seconds.
4. TOUGH GUN Reamer will perform cleaning cycle.
5. When the Cycle Start signal is supplied to the reamer, **Reamer Home** and **Unclamped** L.E.D.s will turn off. There should be no illuminated L.E.D.s on the board until the reamer reaches the top of its stroke. At this point, the **Reamer Ahead** L.E.D. will illuminate for a split second before the spindle begins to retract.
6. Once the reamer reaches the bottom of the stroke again, the motor will stop spinning, the clamps will open to release the nozzle and the **Reamer Home** and **Unclamped** L.E.D.s will be illuminated again. The PLC should check for the Home signal before letting the robot move.
7. The gun can now be safely removed from the TOUGH GUN Reamer clamps and moved to its spray position.

B. Programming Sprayer Sequence

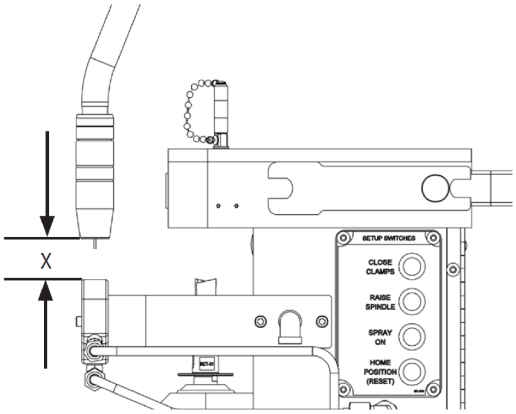
After reaming, center the nozzle above the spray head as shown in Figure 7-B.

X = 1.0" (25.4 mm) when using 1/2" bore nozzles

X = 1.25" (31.75 mm) when using 5/8" bore nozzles

X = 1.5" (38.1 mm) when using 3/4" bore nozzles

Figure 7-B



Supply output signal from robot controller for 0.5 seconds for initial setup. Adjust timer to increase or decrease quantity of anti-spatter compound as required by process.

Important Note: Do not use oil-based anti-spatter solution, as this will compromise performance.

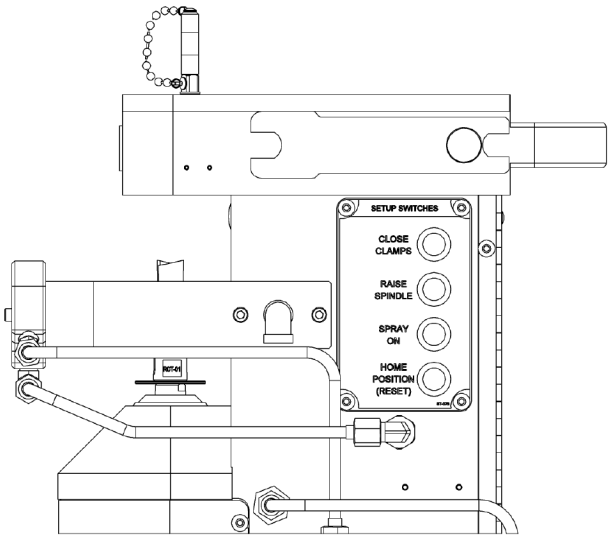
When using TOUGH GARD anti-spatter liquid or other water-based anti-spatter solution, there should be enough to coat inside of nozzle with no drippage. Excessive application of anti-spatter liquid can decrease performance and increase consumption.

IMPORTANT: If MIG gun is equipped with air blast, DO NOT activate air blast when over the spray head. Dirt / spatter may be blown into the spray head orifice, which may hamper spray operation. Air blast can be activated during the reaming sequence.

7-3 Manual Operation

The manual override switches allow confirmation that the lift cylinder, jaw clamping and sprayer air circuits are operational.

Figure 7-C



To manually operate the TOUGH GUN TT3 Reamer:

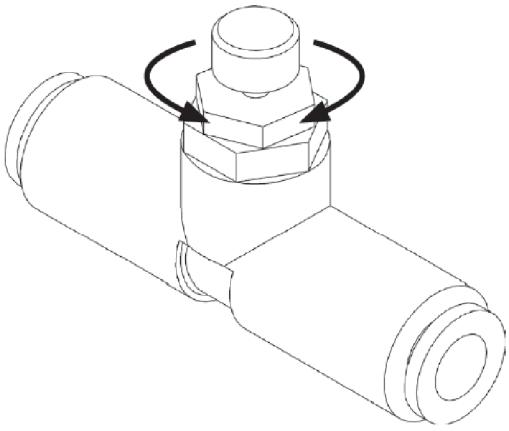
NOTE: The HOME POSITION button should be pressed prior to manual setup to reset all circuitry

1. Locate the setup switches on the air supply side of the reamer (opposite the reservoir).
2. Operate the switches as required.

7-4 Adjusting Flow Control Valves

NOTE: The flow control valve provides a smooth, constant feed of the cutting tool. The feed rate is dependent on the amount of spatter accumulated. If a smaller amount of spatter accumulates, the feed rate can be set faster. A feed rate that is set too fast may stall the motor or damage the cutter blade.

Figure 7-D



To adjust the flow control valve(s):

1. There is a flow control valve for adjusting up speed of the spindle located behind the spindle shroud cover. The down (retract) speed is fixed. The feed rate may require adjustment for different applications.
2. To **increase** the feed rate of the cutter blade, the valve will have to be opened. Turn counterclockwise.
3. To **decrease** the feed rate of the cutter blade, the valve will have to be closed. Turn clockwise.
4. Tighten locking nut once desired setting is achieved.

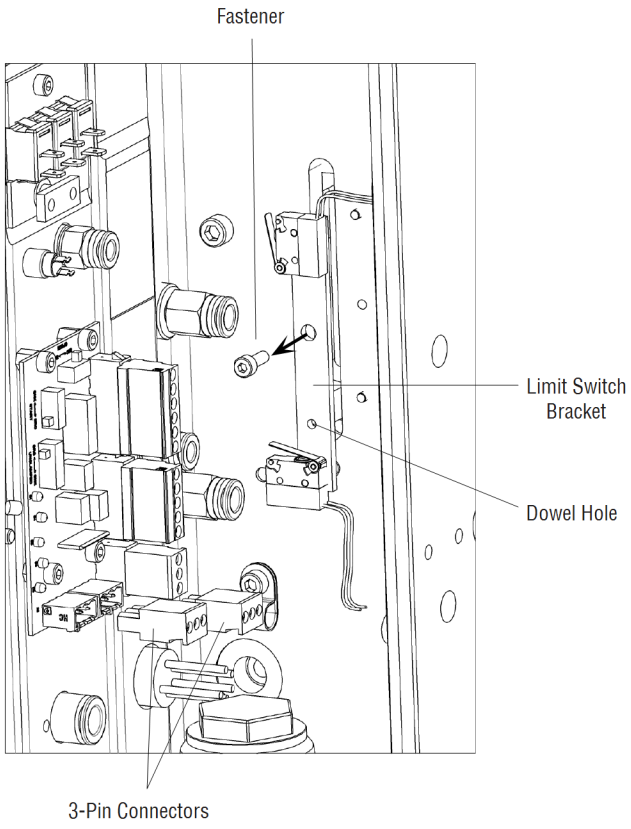
NOTE: For ease of maintenance, the reamer can be removed from the welding environment and serviced in a proper maintenance area. Being able to move the reamer around will assist in the replacement of some parts, such as the motor, spindle limit switch, solenoid valves, etc.

8-1 Replacing the Spindle Limit Switch

WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

1. Open the rear cover.
2. Remove the two (2) lower 3-pin circuit board connectors.
3. Remove the one fastener on the limit switch bracket.
4. Remove assembly and replace with new part. Ensure the actuator is clear of all limit switches when the new assembly is installed.
5. Align the new bracket with the dowel holes on the Reamer frame face, then reinstall fastener.
6. Plug in the tabbed 3-pin circuit board connectors (see section 9-2 Electrical Schematic on page 33).

Figure 8-A

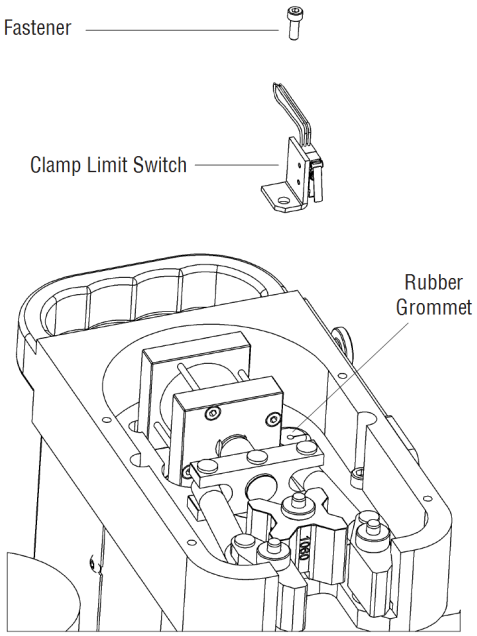


8-2 Replacing the Clamp Limit Switch

WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

1. Remove the top plate of the reamer.
2. Open the rear cover.
3. Disconnect the 3-pin connector from the lower right corner of the circuit board.
4. Loosen the screws and remove the wires from the circuit board connector. Note the wire colors and their positions within the connector.
5. Remove the clamp limit switch fastener and remove assembly (pull the wires through the grommet).
6. Slide the two wires through the grommet into the TOUGH GUN Reamer.
7. Fasten the new clamp limit switch into position.
8. Install the two wires into the new keyed circuit board connector (see section 9-2 Electrical Schematic on page 33).
9. Clip the circuit board connector into location on the circuit board.
10. Reinstall the top plate and close the rear cover.

Figure 8-B

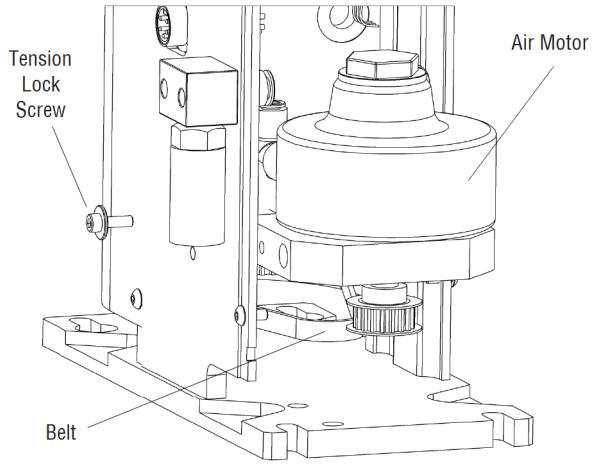


8-3 Replacing the Air Motor

WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

1. Open the rear cover, or remove it completely by removing the five (5) BHCS using a 3 mm Allen wrench.
2. Remove the tension lock screw located on the side of the reamer frame.
3. Push the motor in to release belt tension, and slide the belt off the front pulley at the same time.
4. Disengage belt from the rear pulley.
5. Release the air lines from the quick disconnect air fittings at the front of the motor.
6. Pull the motor out. **IMPORTANT:** Be careful not to lose the belt tension spring.
7. Reverse the order of the above steps for reassembly.

Figure 8-C

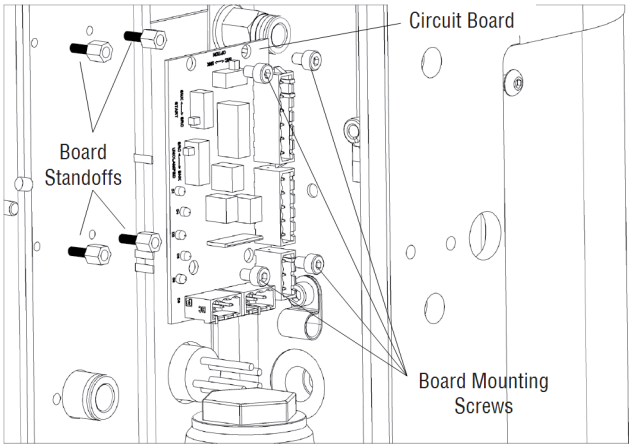


8-4 Replacing the Circuit Board

WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

1. Open the rear cover.
2. Being careful not to damage the wiring. Disconnect all wiring and remove the connectors from the circuit board.
3. Remove the fasteners which secure the circuit board to the standoffs. **IMPORTANT:** Ensure all four (4) standoffs are still attached to the frame.
4. Remove the board from the unit and install the replacement in the same position.
5. Once located in the proper position, secure the circuit board by tightening the four fasteners.
6. Reconnect all wiring and reset sink/source switches to match the configuration of the board that was removed.

Figure 8-D



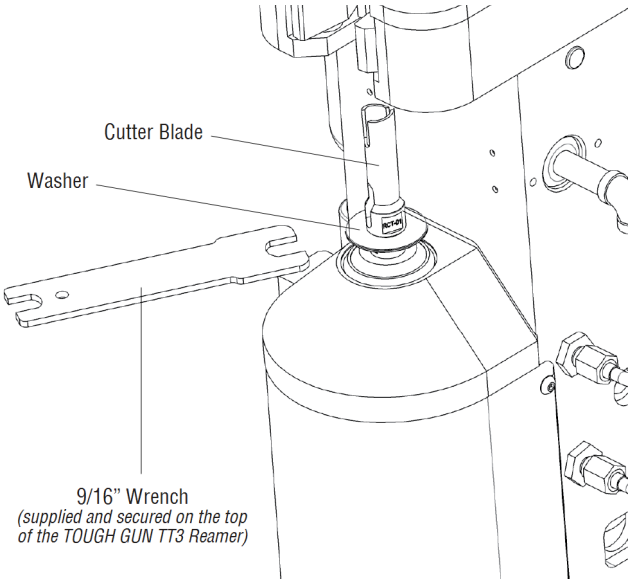
8-5 Replacing the Cutter Blade

WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

A. To Remove the Cutter Blade

1. Remove the cutter blade by using a 5/8" wrench and the supplied 9/16" wrench to turn the cutter blade counterclockwise when viewed from above.
   NOTE: Considerable force may be required to loosen the cutter blade since it tightens naturally as the reamer operates. Rest the 9/16" flat wrench against the reamer frame (below the air connection, and between the sprayer bracket and sprayer supply lines). This prevents slipping while trying to remove the cutter blade.

Figure 8-E



B. To Install the Cutter Blade

1. The cutter blade is installed by threading it clockwise into the top of the spindle shaft. Reuse the old washer.
   NOTE: The application of anti-seize compound to the threads of the reamer will assist in easy removal in the future.

8-6 Replacing the Drive Belt

WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

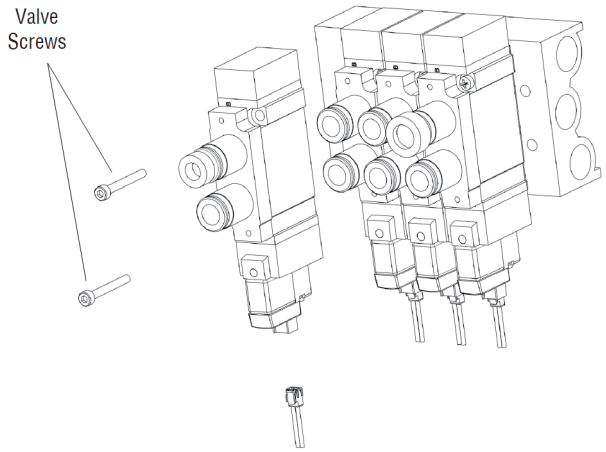
1. Open the rear cover.
2. Loosen the tension lock screw.
3. Push the motor in to release belt tension, and slide the belt off the front pulley at the same time.
4. Remove the belt from the rear pulley.
5. Reverse the order of the above steps for reassembly.

8-7 Replacing the Solenoid Valves

WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

1. Shut off the power to the reamer.
2. Shut off the air supply to the reamer.
3. Open the rear cover.
4. Unplug the electrical connector directly from the bottom of the solenoid valve.
5. Loosen and remove the two (2) solenoid valve screws.
6. Remove the solenoid valve and gasket.
   NOTE: New gasket (included with new valve) must be installed when replacing valve.
7. Install the new gasket and valve and tighten screws to 6 in-lbs.
8. Reconnect the electrical connector to the bottom of the solenoid valve.
9. Close the rear cover.

Figure 8-F



8-8 Scheduled Maintenance

The **TOUGH GUN TT3 Reamer** will require a periodic maintenance program to ensure a reliable service life, as recommended below:

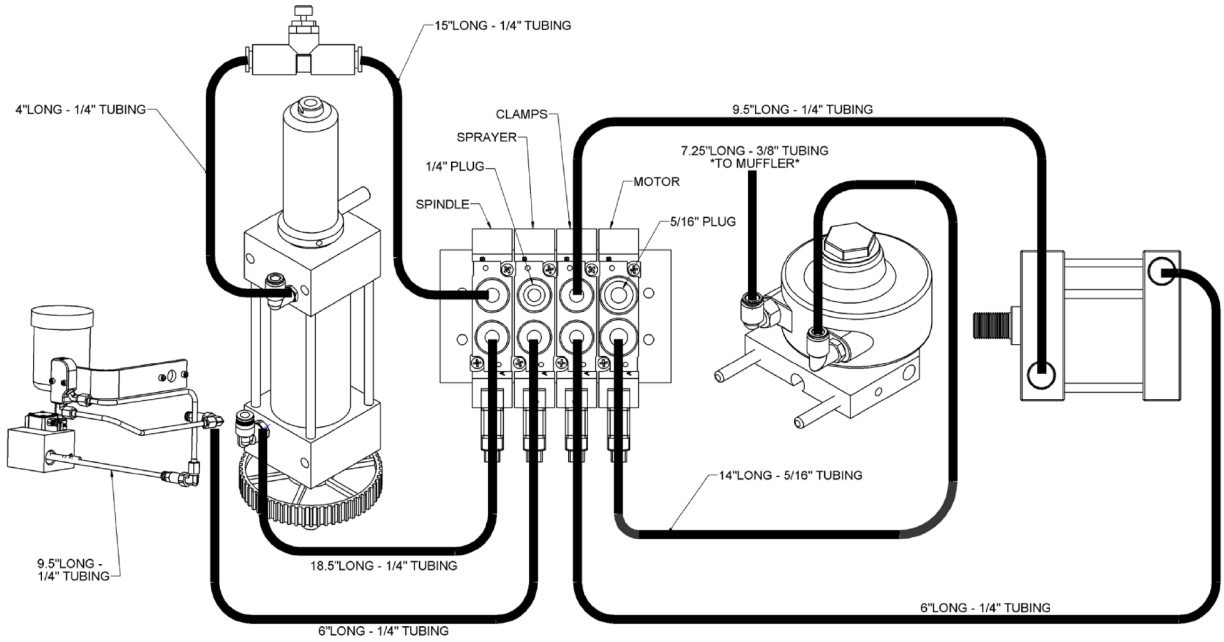
DAILY	
CHECK	The oil level in the lubricator reservoir. *The life of the air motor is dependent on a consistent supply of oil.*
CHECK	The air lines and interface cable for leaks and fraying.
CHECK	The alignment of the nozzle, retaining head/diffuser and gun position.
CHECK	The reservoir to ensure it is full of TOUGH GARD anti-spatter liquid or other water-based anti-spatter solution.
CLEAN	The spindle cover shroud to ensure it is free of spatter.
CLEAN	The reamer clamp jaw and v-block surfaces to ensure proper nozzle alignment.
WEEKLY	
CHECK	The nozzle cutter blade. *The service life of the cutter blade is dependent on the type of application. In lighter duties, the blade may last indefinitely but should be inspected weekly for dullness, clogging and possible breakage.*
CHECK	The lubricator to ensure it is working and is set up properly (i.e. fill oil, clean / replace filter).
CHECK	The LEDs to ensure reamer and controller communication.
CHECK	The sprayer to ensure that the spray coming out of the spray head is normal.
CHECK	The nozzle and retaining head/diffuser (remove from gun) for wear.
CLEAN	The v-block, reamer clamp jaw, and spindle seal with a brush or with compressed air to eliminate blockages.
CLEAN	Wipe clean any debris from the Nozzle Detect Proximity Sensor.
MONTHLY	
CHECK	That the belt tension lock screw is securely tightened.
CHECK	That the belt tension bolt is tightened.
CHECK	The spindle unit for wear.
CHECK	The solenoids and spool them to ensure there are no leaks and that they are operating properly.
CLEAN	The sprayer reservoir to eliminate contamination.
CLEAN	The sprayer head and brush away excess spatter.
CLEAN	Under the top cover.
YEARLY	
INSPECT	The drive belt for any signs of fraying and replace as necessary.
REPLACE	The spindle cap seal and repair any damage to the spindle.
CLEAN	Perform a complete clean-up of the reamer and sprayer.

The **TOUGH GUN Wire Cutter** will require a periodic maintenance program to ensure a reliable service life as recommended below:

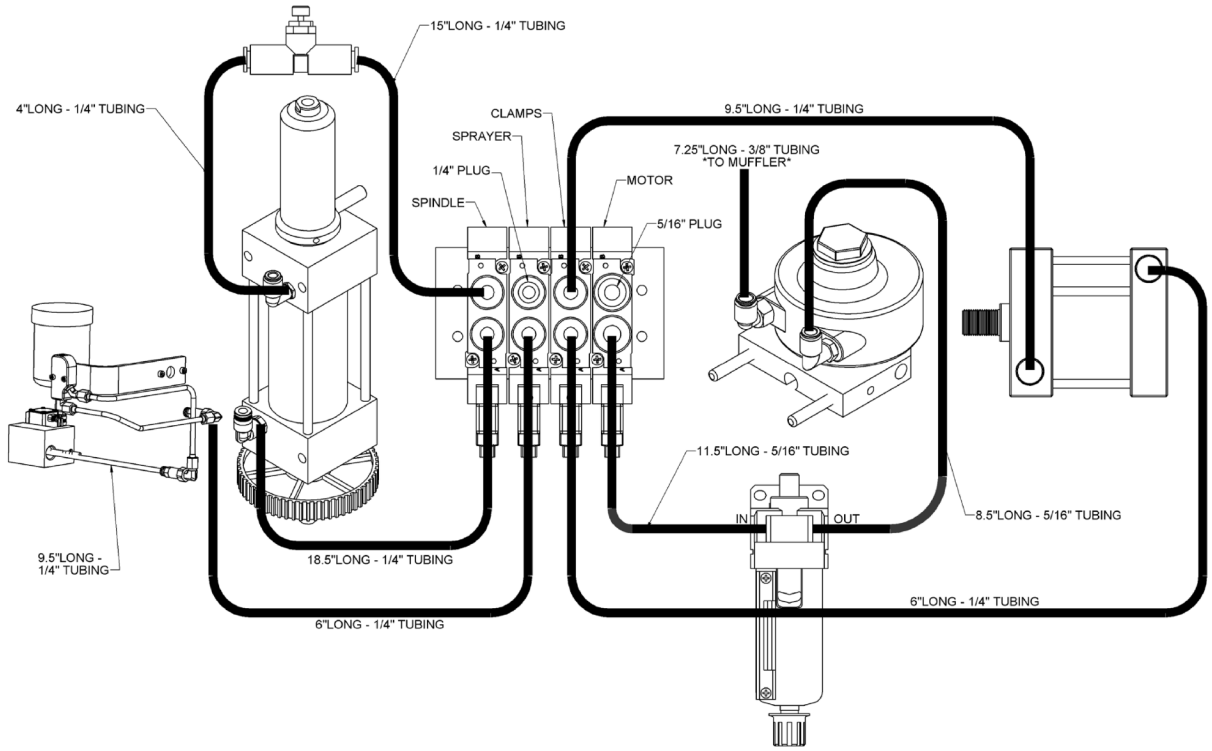
DAILY	
CHECK	The air lines and interface cable for leaks and fraying.
WEEKLY	
CHECK	Check the wire cutter blades for dullness, looseness and possible breakage. *The service life of the cutter blades is dependent on the type of application. In lighter duties, the blades may last indefinitely but should be inspected weekly.*
EMPTY	The wire catcher basket.
QUARTERLY	
LUBRICATE	The sliding surfaces by applying general purpose grease (NLGI Grade 1-2) through the grease fittings located on the sides of the main body.

9-1 Pneumatic Diagrams

A. TOUGH GUN TT3 Reamer

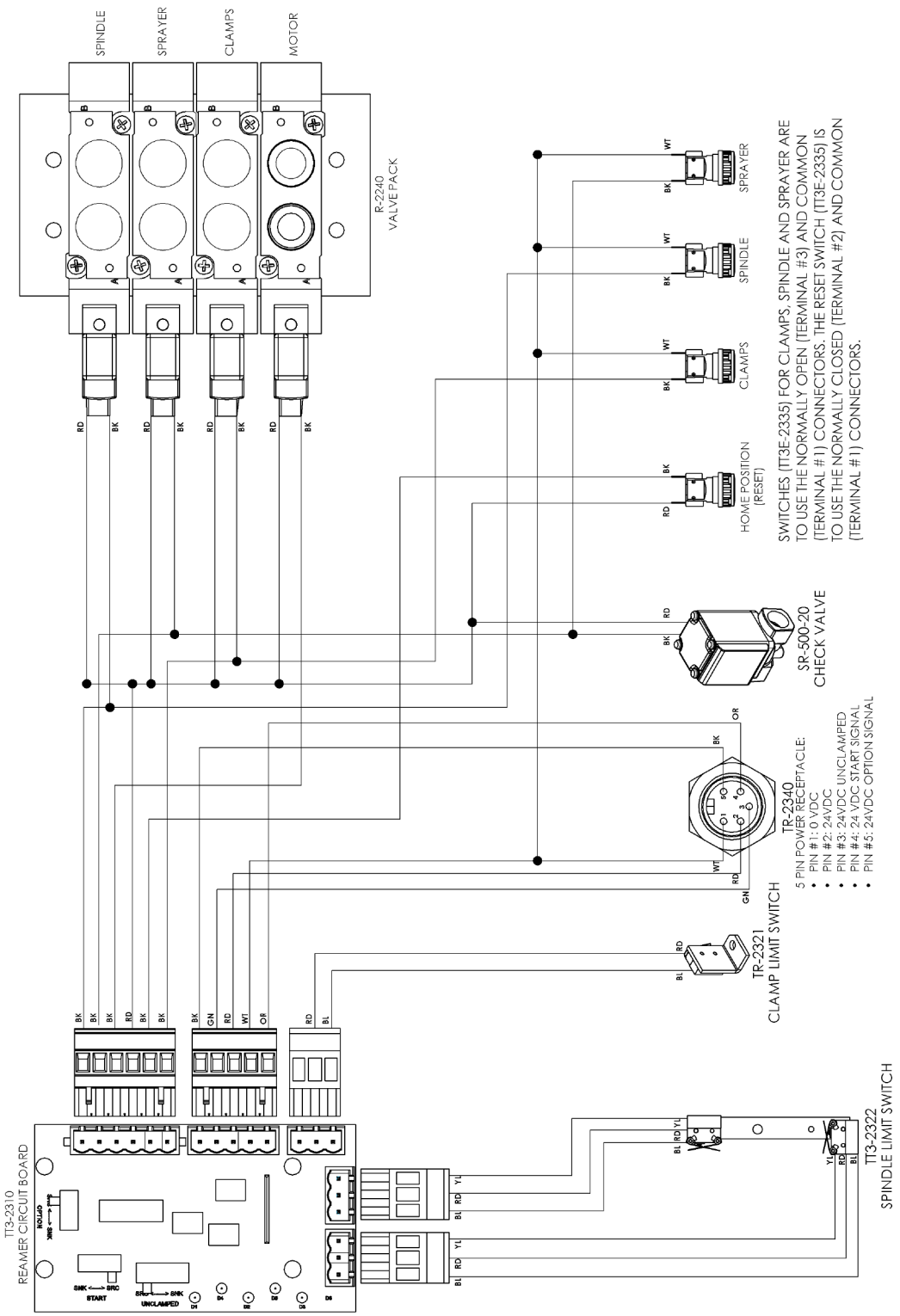


B. TOUGH GUN TT3 Reamer with Lubricator

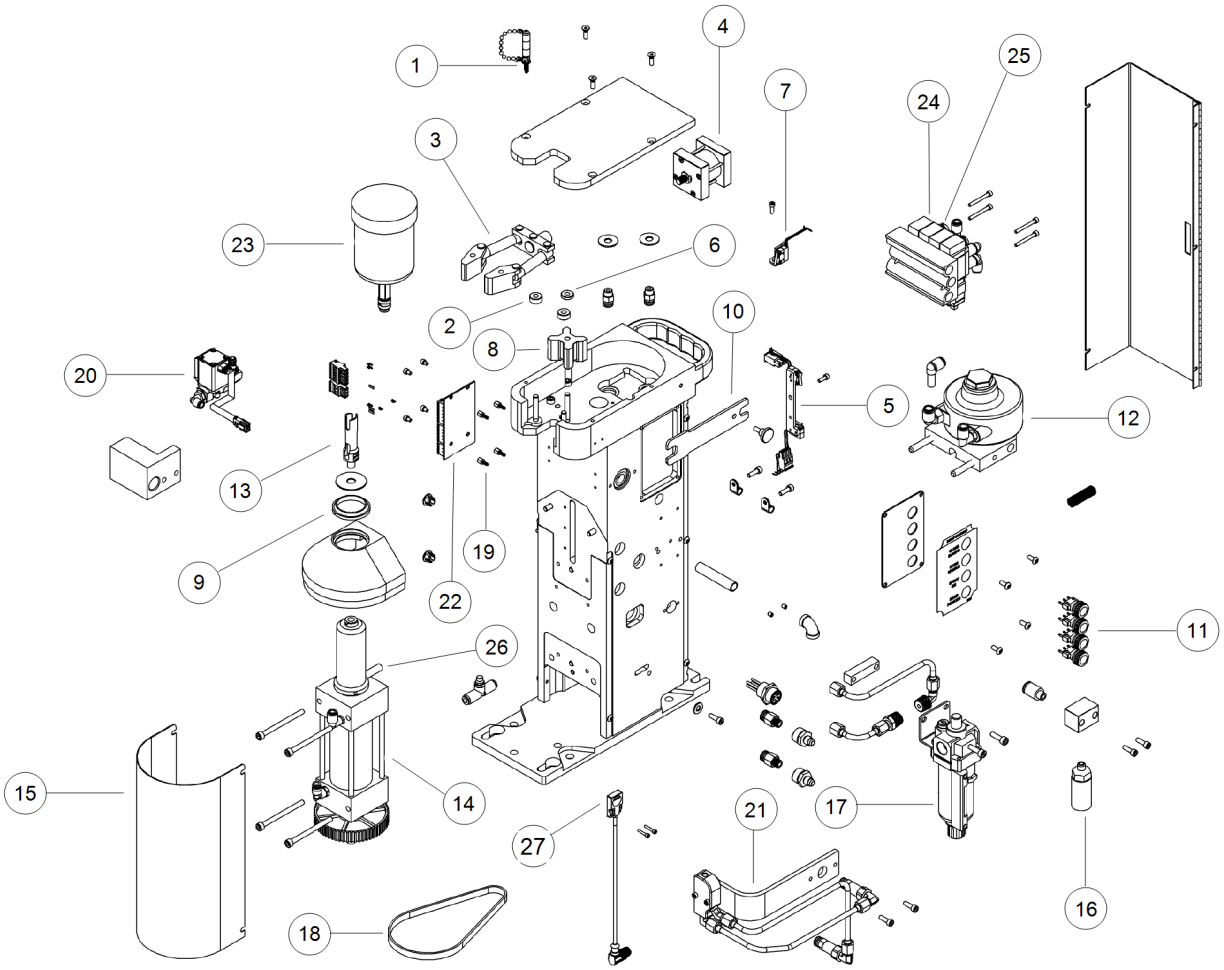


9-2 Electrical Schematic

A. TOUGH GUN TT3 Reamer



A. TOUGH GUN TT3 Reamer

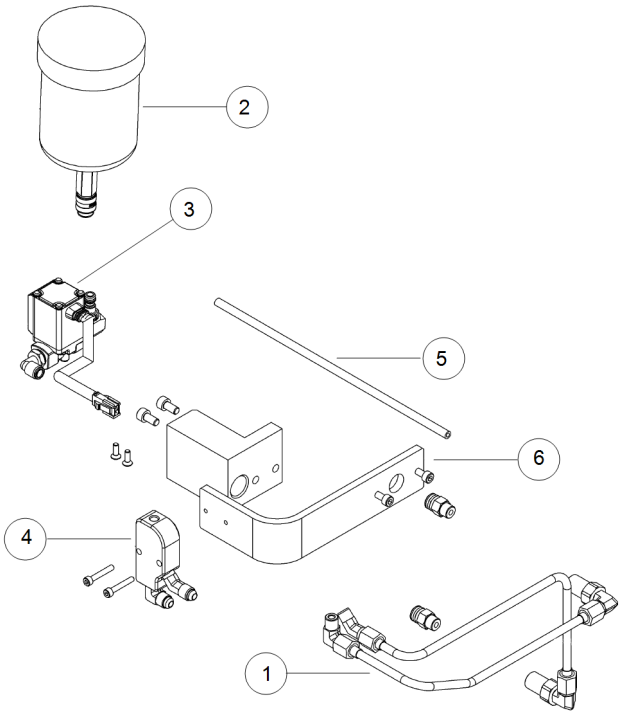


ITEM	PART #	DESCRIPTION
1	RR-707-31	TCP locator assembly
2	TR-2127	Upper jaw spacer
3	TR-2120	Clamp jaw assembly
4	TR-2130	Clamp cylinder
5	TT3-2322	Limit switch assembly
6	TR-2128	V-block spacer
7	TR-2321	Limit switch assembly
8	*See section 6-5*	4-sided v-block
9	TR-2661	Spindle seal
10	TR-2910	Reamer wrench
11	TT3E-2335	Stainless steel push button switch
12	TR-2500	Air motor assembly
13	*See section 6-6*	Cutter blade
14	TT-2400	Spindle
15	TT-2670	Reamer spindle shroud

ITEM	PART #	DESCRIPTION
16	TR-2530	Muffler
17	TT-LUB-SMC	Lubricator with bracket
18	TR-2440	Reamer drive belt
19	R-2310-2	M4 standoff - reamer
20	TT3E-500-20	Sprayer check valve
21	TT3-001-50	Reamer sprayer subassembly
22	TR-2310	Reamer circuit board
23	RR-1320	Reservoir
24	R-2241	1/4" solenoid valve
25	R-2246	5/16" solenoid valve
26	TR-2411	Spindle actuator
27	TT3E-2344	Proximity sensor, 5 mm nozzle detect
NS*	RS-500-5	4 m cable with 3 pole, M12 connector
NS*	TT3-2600-20	Wiring harness, TT3

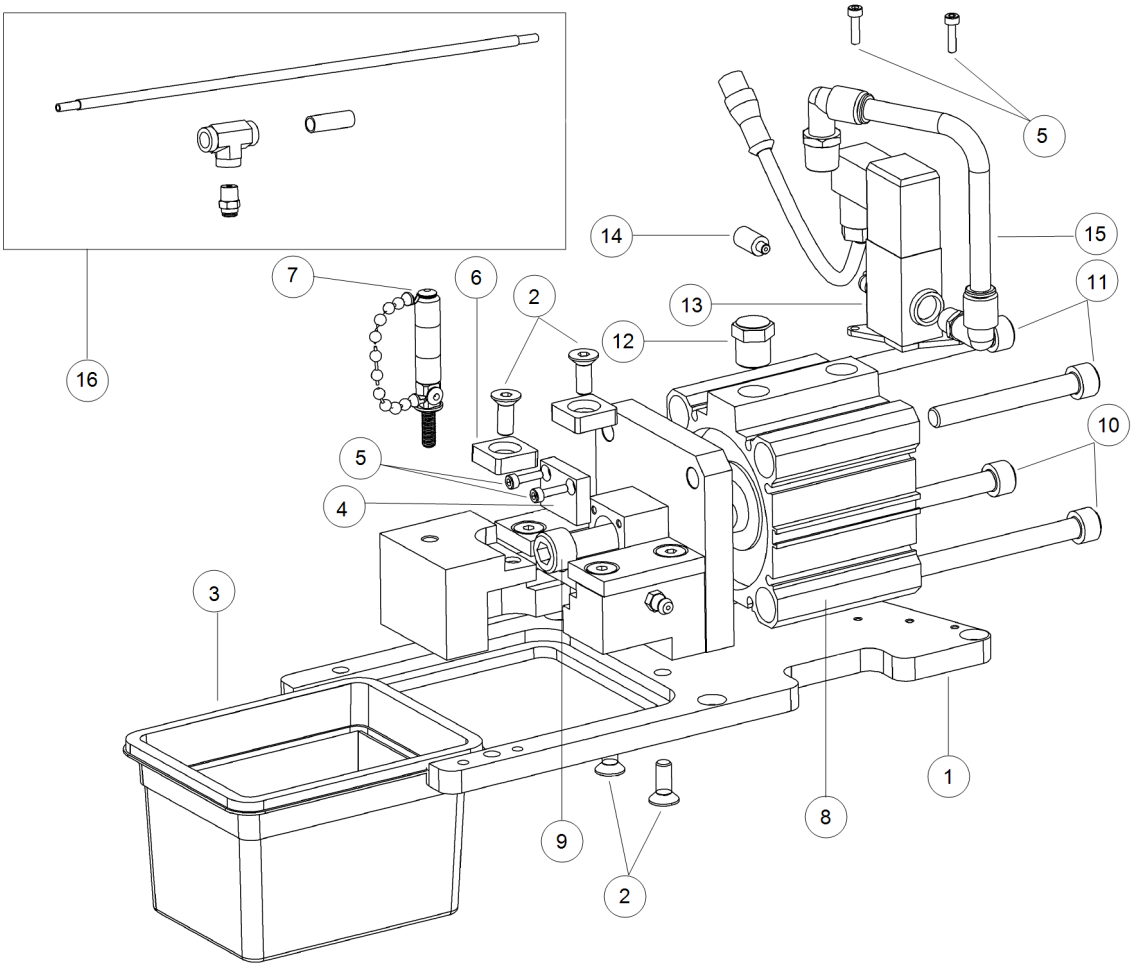
**NS indicates "not shown" in exploded view diagram*

B. TOUGH GUN Sprayer Assembly



ITEM	PART #	DESCRIPTION
1	TT3-001-5	Sprayer steel line kit
2	RR-1320	Reservoir
3	TT3E-500-20	Sprayer check valve
4	TS-500-15	Spray block with fittings
5	*Not Sellable*	1/4" sprayer hose
6	SR-500-1	Sprayer bracket

C. TOUGH GUN Wire Cutter (Part # WC-100)



ITEM	PART #	DESCRIPTION
1	WC-100-8	Wire cutter base plate
2	*Not Sellable*	M6x1x16mm SCHCS
3	WC-100-20	Wire catcher basket
4	WC-100-27	Backing plate
5	*Not Sellable*	M3x0.5x12mm SHCS
6	WC-100-7	Blade *(includes Item 2)*
7	RR-707-30	TCP locator
8	WC-100-31	Cylinder

ITEM	PART #	DESCRIPTION
9	*Not Sellable*	M10x1.5x25mm SHCS
10	*Not Sellable*	M8x1.25x55mm SCHCS
11	*Not Sellable*	M8x1.25x50mm SHCS
12	TR-2221	Breather vent
13	WC-100-24	Solenoid valve, TT3 Reamer
14	WC-100-26	Muffler
15	WC-100-18	Air line kit
16	WC-100-30	Wire cutter installation kit

11-1 TOUGH GUN TT3 Reamer

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. LED signals not activating.	1. Circuit board damaged. 2. Limit switch malfunctioning. 3. Input voltage is incorrect. 4. Broken switch actuator. 5. Sink/Source issue.	1. Replace circuit board. 2. Replace limit switch. 3. Check input voltage and make adjustments as required. 4. Replace actuator spindle. 5. Set switches accurately.
2. Motor stops during operation.	1. Air supply is incorrect. 2. Excessive spatter buildup. 3. Lubricator not installed or adjusted properly. 4. Water in air lines / motor. 5. Improper nozzle orientation. 6. Motor valve failed.	1. Set at 80-100 psi at 16 CFM. 2. **a.** Apply or increase quantity of water-based anti-spatter liquid. Do not use oil-based anti-spatter solution, as this will cause excessive buildup and compromise performance. **b.** Increase frequency of gun cleaning or modify welding parameters. 3. Ensure lubricator is installed and adjusted (see section 6-1 Air Motor Lubricator on page 16). 4. Dryer required for air system. 5. Ensure consumables are concentric with cutter. 6. Replace damaged valve.
3. Pneumatic functions not operative.	1. Air lines damaged or obstructed. 2. Air supply is incorrect. 3. Faulty Home Position switch. 4. Manual switches engaged. 5. Bad valve. 6. No power.	1. Replace air line(s). 2. Check air supply, set at 80-100 psi at 16 CFM. 3. Repair or replace Home Position switch. 4. Turn off manual switches. 5. Replace faulty valve. 6. Reconnect power.
4. Broken cutter.	1. Improper cutter being used. 2. Flow control valve set too fast. 3. Gun improperly aligned in TOUGH GUN Reamer.	1. Repair or replace damaged components. 2. Adjust feed rate, adjust flow control valve. 3. Check v-block / nozzle compatibility chart (refer to *Cutter Blade and V-Block Chart* in the SP-TT3 spec sheet).
5. Reamer stays in UP position.	1. Cutter blade is jammed in gun. 2. Faulty spindle limit switch. 3. Cycle Start signal held on too long.	1. **a.** Checking proper alignment can prevent the blade from jamming. **b.** Repair or replace damaged components. 2. Repair or replace spindle limit switch. 3. Revise program (0.5 sec. pulse).
6. Cycle Complete signal does not activate.	1. Faulty limit switch. 2. Faulty circuit board. 3. Missing / broken spindle actuator. 4. Faulty clamp valve.	1. Check or replace limit switches. 2. Check or replace circuit board. 3. Replace spindle actuator. 4. Replace faulty valve.
7. No air flow / no anti-spatter.	1. Output to unit not functioning. 2. Loss of air supply. 3. Faulty solenoid valve. 4. Sink/Source. 5. Plugged valve.	1. Check output signal and cable. 2. **a.** Check air supply. **b.** Check air line and nozzle for blockage. 3. Check valve and replace if required. 4. Adjust Sink/Source switch for sprayer. 5. If using oil-based anti-spatter solution, switch to TOUGH GARD or other water-based anti-spatter liquid.
8. Air flow but no anti-spatter.	1. Vent blocked on reservoir. 2. Spool in check valve stuck. 3. Fluid hose blocked. 4. Plugged valve.	1. Open vent. 2. Repair or replace check valve. 3. Clean or repair fluid hose. 4. If using oil-based anti-spatter solution, switch to TOUGH GARD or other water-based anti-spatter liquid.
9. Spray head plugged.	1. Debris in spray head.	1. **a.** Clean spray head. **b.** If using oil-based anti-spatter solution, switch to TOUGH GARD or other water-based anti-spatter liquid.

11-2 Lubricator

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Oil fill level low.	1. Oil depleted in bowl.	1. Refill oil bowl to correct level using air motor oil.
2. Incorrect oil drip rate.	1. Drip rate valve not set properly. 2. Filter element clogged. 3. Steel supply lines clogged.	1. Set drip rate valve so that one (1) drop of oil occurs every 5-10 ream cycles. 2. Remove bowl assembly and clean filter element. 3. Remove steel supply lines and clean using compressed air. If damaged, replace steel lines.
3. Air leaks between the bowl and the body.	1. Breakage of bowl o-ring.	1. Replace bowl o-ring. Grease up before assembling.
4. Air leaks from the drainage cock.	1. Foreign matter caught in the threads of the drain cock. 2. Breakage of the seating part of the drain cock.	1. Remove the drain cock and clean threads. 2. Replace the bowl assembly.
5. Too much drain comes from the piping of the outlet side.	1. Drain level reaches the baffle plate.	1. Open the drain cock for draining and replace the element.

11-3 Filter/Regulator

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Pressure is not regulated.	1. Opposite flow direction or opposite installation of filter/regulator. 2. Foreign materials caught in the valve seat.	1. Install piping or filter/regulator correctly as shown in manual. 2. Remove the valve guide to clean the valve and valve seat.
2. Set pressure does not return to zero when pressure handle is loosened.	1. Foreign materials caught in the valve seat.	1. Remove the valve guide to clean the valve and valve seat.
3. Large air resistance reduces flow rate.	1. Clog of the element.	1. Clean the element.
4. Air leaks from the bonnet exhaust port.	1. Diaphragm is damaged. 2. Foreign materials caught in the valve seat. 3. Piston o-ring is damaged.	1. Replace the assembly. 2. Remove the valve guide to clean the valve and valve seat. 3. Replace the piston o-ring or clean. Then grease up the piston o-ring and sliding surface.
5. Air leaks between the bonnet and the body.	1. Loosened bonnet. 2. Diaphragm is damaged.	1. Fasten the bonnet. 2. Replace the assembly.
6. Air leaks between the bowl and the body.	1. Breakage of bowl o-ring.	1. Replace bowl o-ring. Grease up before assembling.
7. Air leaks from the drainage cock.	1. Foreign matter caught in the valve of the drain cock. 2. Breakage of the seating part of the drain cock.	1. Open the drain cock for a few seconds. 2. Replace the bowl assembly.
8. No drainage when the drain cock is open.	1. Blockage of outlet of the drain cock due to solid foreign matter.	1. Replace the bowl assembly.
9. Too much drain comes from the piping of the outlet side.	1. Drain level reaches the baffle plate.	1. Open the drain cock for draining and replace the element.

11-4 Nozzle Detect

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. No LED lights on sensor.	1. Loose connection of power cable. 2. Broken cable. 3. Damaged sensor.	1. Check that the connection is secure. 2. Replace sensor. 3. Replace sensor.
2. No signal from sensor but power LED is illuminated.	1. Nozzle not close enough to sensor.	1. Confirm that robot position is at the correct distance from the sensor (see section 6-7 Setting Up Nozzle Detect on page 21).
3. Both LEDs are always illuminated.	1. Metallic debris on sensor. 2. Nozzle is too close to sensor.	1. Wipe the face of the sensor clean with a rag. 2. Confirm that robot position is at the correct distance from the sensor (see section 6-7 Setting Up Nozzle Detect on page 21).

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® TT3 Reamer Owner's Manual

Scan to view the TOUGH GUN® TT3 Reamer Spec Sheet

Scan to view the TOUGH GUN® Wire Cutter Owner's Manual

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