

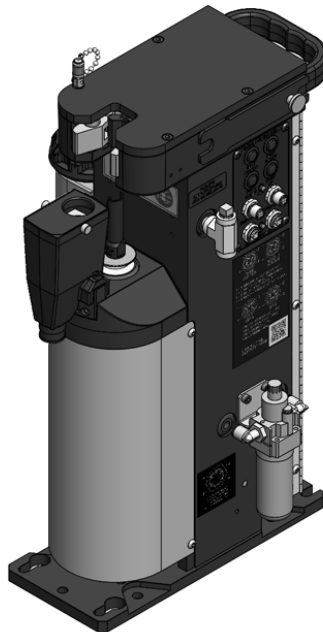
TOUGH GUN® TT4E Reamer

OWNER'S MANUAL

March 2024

OM-TT4E-1.5

Ethernet Equipped Robotic Nozzle
Cleaning Station, MIG (GMAW) Welding
Peripheral



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 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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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.



TOUGH GUN® TT4 Reamer safety label definitions:



Warning! CUT & CRUSH Keep hands clear of all moving parts.



Warning! ROTATING CUTTER Keeps hands clear. Disconnect power before servicing.



Warning! AUTOMATIC START Equipment starts automatically. Disconnect power before servicing or opening access door.




DISCONNECT POWER before servicing.




CONSULT YOUR SERVICE MANUAL before servicing.

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.
- Turn off welding power source before changing contact tip or gun parts.
- Keep all covers and handle securely in place.



MOVING PARTS can injure.

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



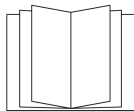
NOISE can damage hearing.

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.



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.

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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.



Définitions des étiquettes de sécurité de l'alésoir TOUGH GUN® TT4:



Avertissement! COUPER ET ÉCRASER Gardez les mains à l'écart de toutes les pièces mobiles.



Avertissement! COUPE ROTATIVE Garde les mains dégagées. Débranchez l'alimentation avant l'entretien.



Avertissement! DÉMARRAGE AUTOMATIQUE L'équipement démarre automatiquement. Débranchez l'alimentation avant d'effectuer l'entretien ou d'ouvrir la porte d'accès.




DÉBRANCHEZ L'ALIMENTATION avant l'entretien.





CONSULTEZ VOTRE MANUEL D'ENTRETIEN avant l'entretien.

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 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.
- 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 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.



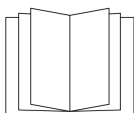
Le BRUIT peut endommager l'ouïe.

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 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.

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.



Definiciones de las etiquetas de seguridad del escariador TOUGH GUN® TT4:



Advertencia! CORTAR Y APLASTAR Mantenga las manos alejadas de todas las piezas móviles.



¡Advertencia! CORTADOR GIRATORIO Mantiene las manos despejadas. Desconecte la energía antes de dar servicio.



¡Advertencia! ARRANQUE AUTOMÁTICO El equipo arranca automáticamente. Desconecte la energía antes de dar servicio o abrir la puerta de acceso.




DESCONECTE LA CORRIENTE antes de dar servicio.





CONSULTE SU MANUAL DE SERVICIO antes de realizar el mantenimiento.

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.
- 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.

Las PIEZAS MÓVILES pueden provocar lesiones.



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

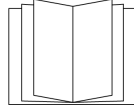
EL RUIDO puede trastornar su oído.

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.

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.

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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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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:
 - 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

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)

Protocols Supported:

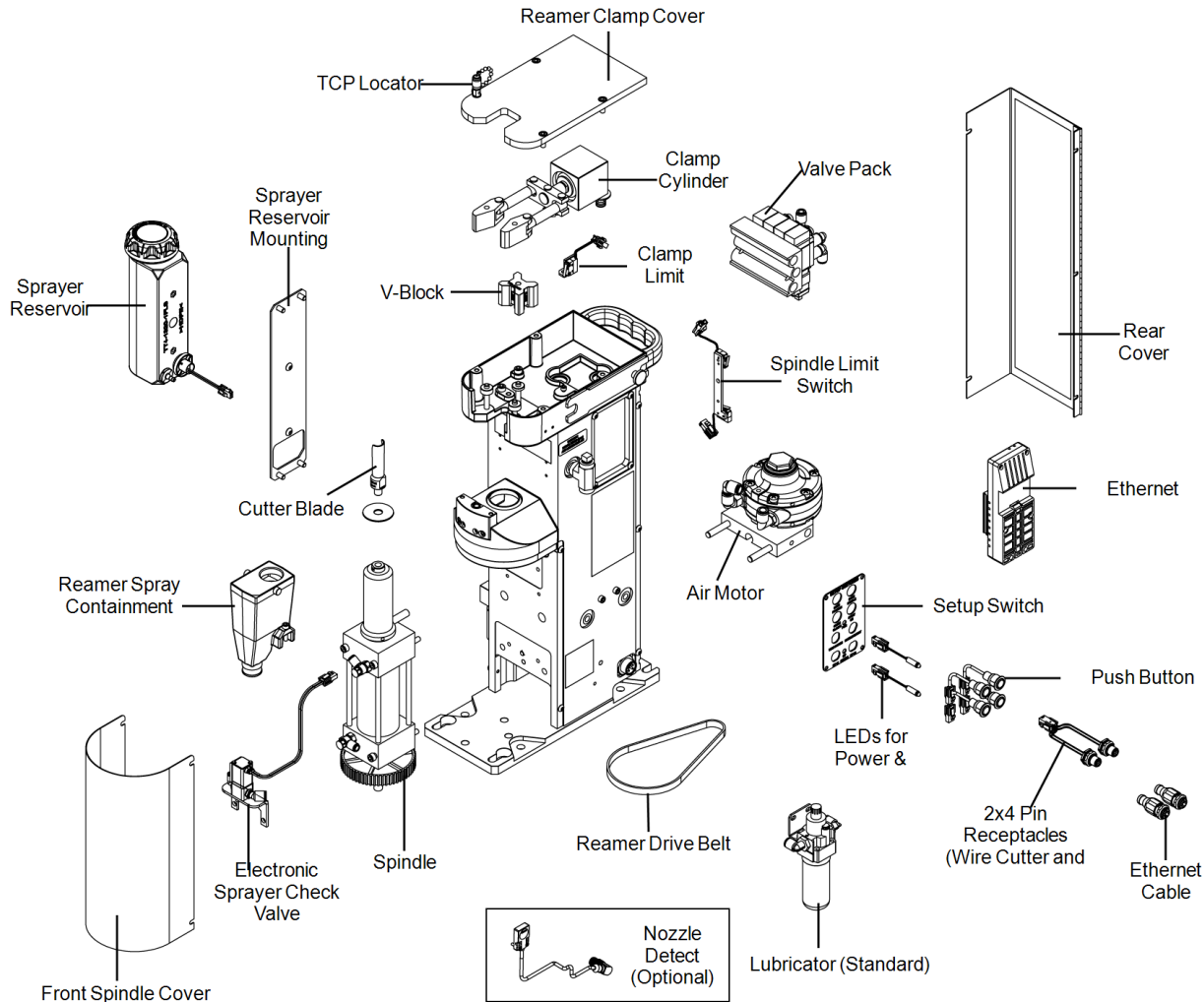
Ethernet/IP

PROFINET

Modbus TCP/IP

5-1 System Components

For complete parts list, please see Section 10 — Parts List on page 51.



SECTION 6 — INSTALLATION

6-1 Installing the Reamer



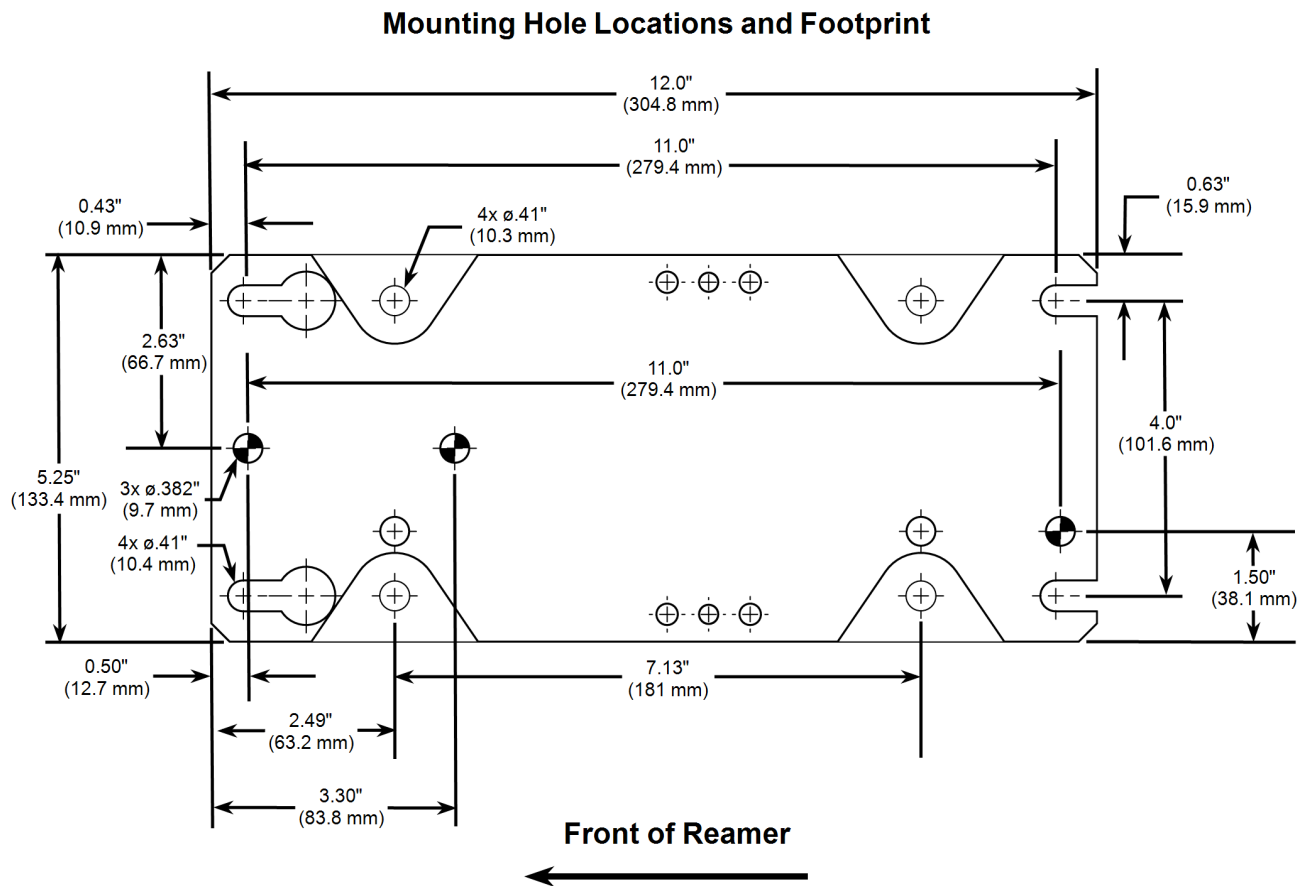
WARNING: Ensure power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

A. To Mount TOUGH GUN TT4E 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.

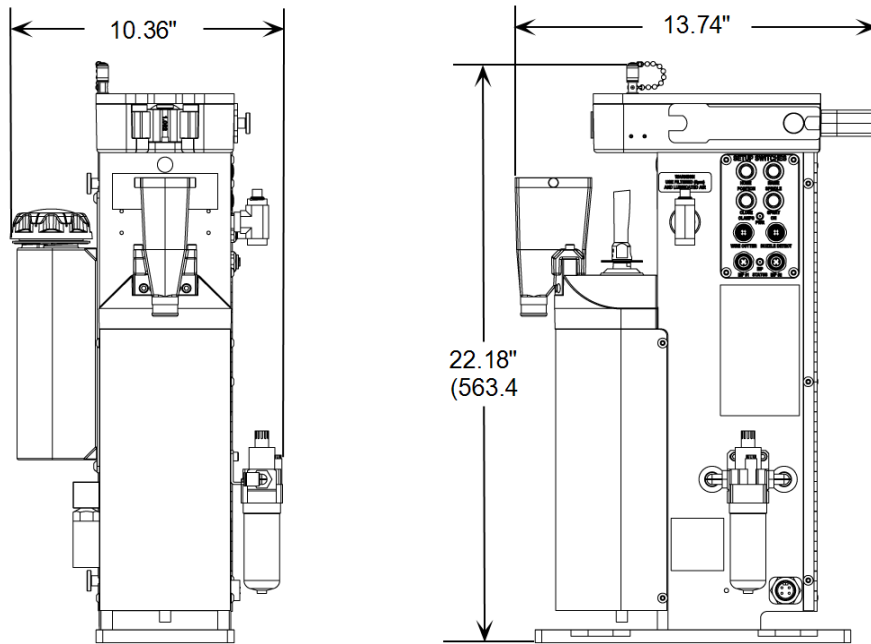
1. Affix the reamer base to a sturdy platform using four (4) M10x1.5x25 mm bolts provided.

Figure 6-A



NOTE: The reamer can be mounted on an angle (no more than 45°) and can be mounted overhead, only by using the multi-feed adapter kit (part # TT4-MF-100). Ensure debris falls away from the clamp housing.

Reamer Dimensions



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 T-fitting located on the side of the reamer.

6-2 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 WC-400 wire cutter base to the top of the reamer, or other sturdy platform using the same three (3) M6x1.0x20 mm Socket Head Cap Screws (SHCS) that are securing the clamp housing cover onto the reamer. (see Figure 6-D)
3. If mounting a WC-100 wire cutter to the reamer, use three (3) M6x1.0x25 mm SHCS.
4. Thread the M12 connector into the 4-Pin receptacle labelled "Wire Cutter" located on the Setup Switch plate (on the side of the reamer).

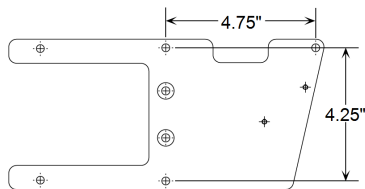


Figure 6-C

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. Remove the 1/4" NPT plug on the T-fitting located on the side of the reamer.
3. Install air fitting WC-100-28 onto the top of the T-fitting.
4. Install the supplied 810-1-2 air line from the wire cutter valve to the WC-100-28 air fitting.

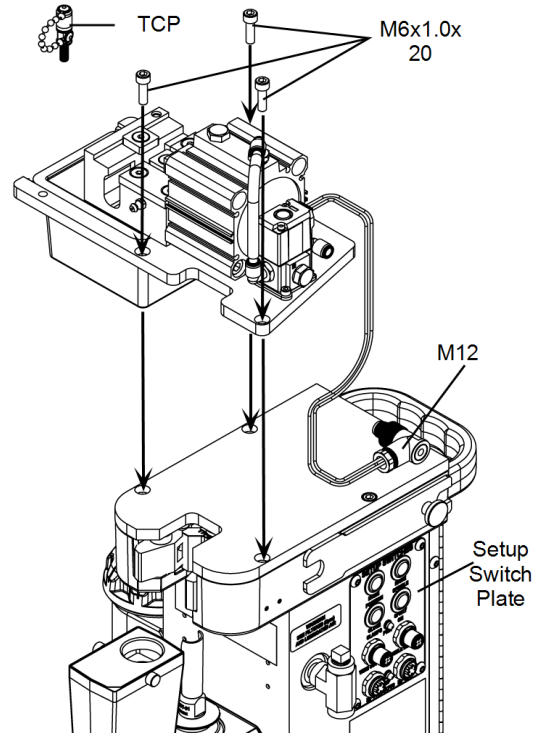


Figure 6-D

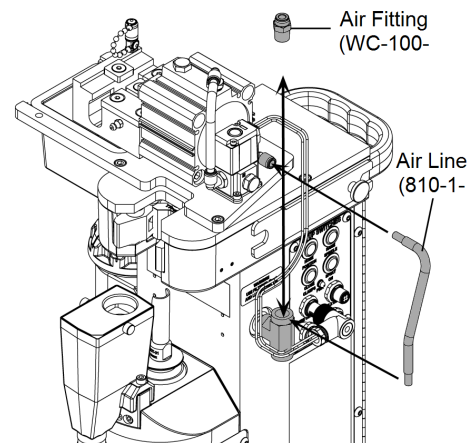


Figure 6-E

6-3 Installing Nozzle Detect



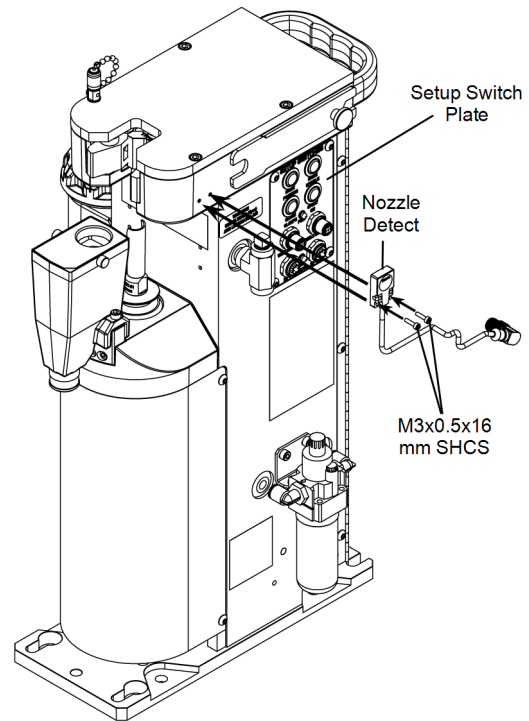
WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

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 $\pm \leq 2\%$ (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 nozzle detect cable into the receptacle labeled "Nozzle Detect" located on the Setup Switch plate.

Figure 6-F



SECTION 7 — SETUP

7-1 Air Motor Lubricator



WARNING: The reservoir is dry or empty and needs to be filled prior to first start of the unit. The TOUGH GUN Reamer **must be operated with lubricated air** using the air motor lubricator. The lubricator should be set to feed one drop of oil for every 100-150 CFM of air going through the motor (approximately 1 drop every 10-20 cycles or 1 drop per two minutes of operation). The recommended lubricant to be used is a hydraulic light oil with ISO VG 32 specification (SAE 10W).

7-2 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:

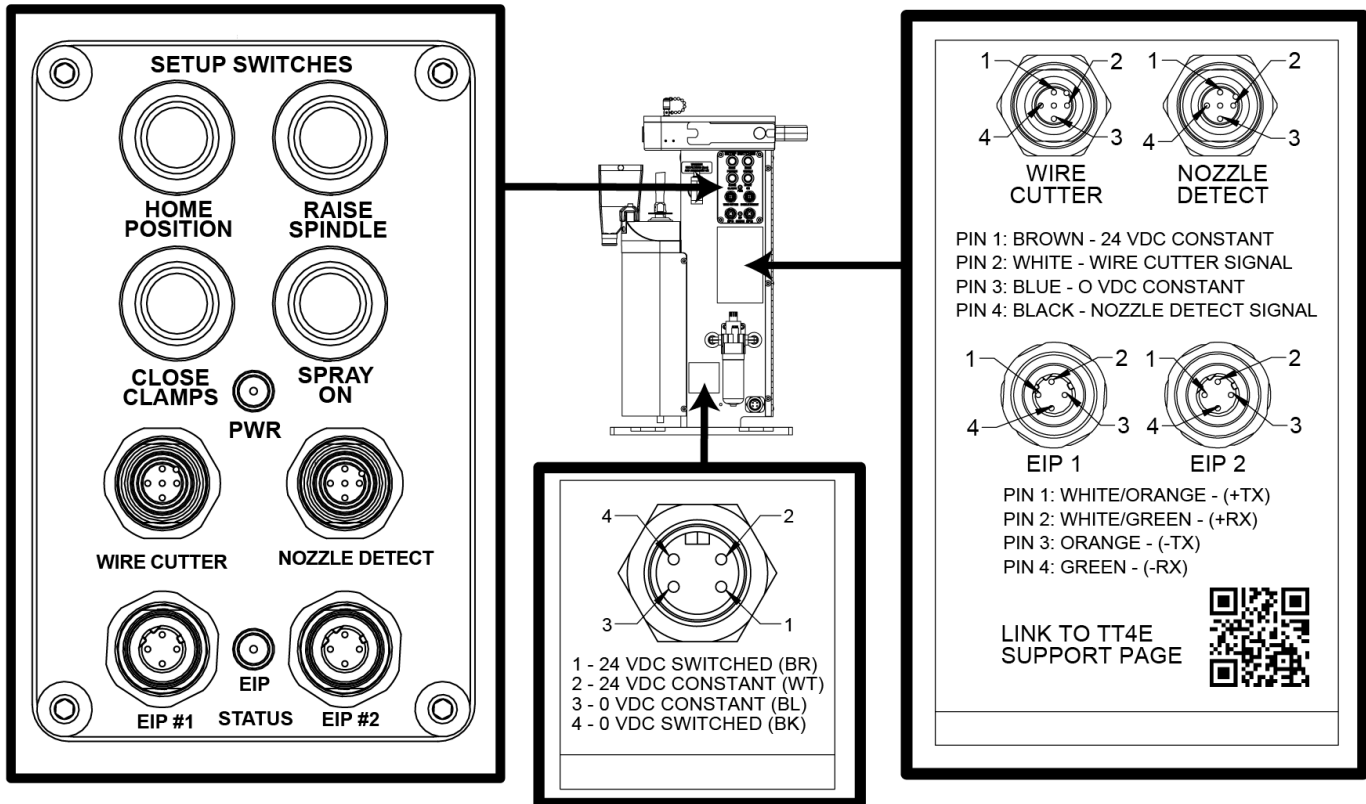
1. Loosen the two (2) M5 thumb screws to open the hinged rear access door. It is not necessary to fully remove the thumb screws.
2. The rear access door can be completely removed if accessibility is an issue. To do so, using a 3 mm Allen wrench, remove the (3) BHCS which fasten the hinge to the frame.

7-3 Wiring Interface Connections



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

Figure 7-A



7-4 Ethernet Module Specifications



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

The Ethernet module (part # TT3E-2310) is a multiprotocol communication adaptor which supports the following networking standards:

- Ethernet/IP
- PROFINET
- Modbus TCP/IP

The factory default setting is that all communication protocols are enabled. After power-up, a multiprotocol device is listening on all necessary ports to detect which kind of network is in use.

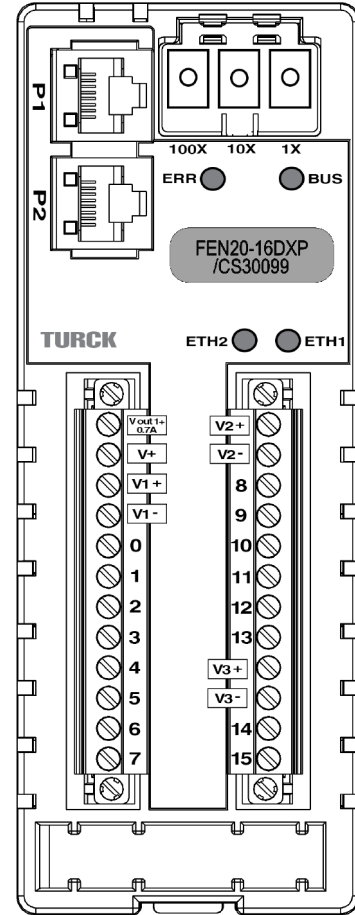
Some key features of the Ethernet module are as follows:

- It is an integrated Ethernet switch;
- 10 Mbps / 100 Mbps supported;
- 3x separate I/O power supply groups that are galvanically separated;
- 24 VDC;
- Up to 1A outputs;
- 2x RJ45 sockets.

The TT3E-2310 wiring / pinout diagram shown in Figure 7-B is as follows:

- V1+ powers I/O 0 to 7
- V2+ powers I/O 8 to 13
- V3+ powers I/O 14 and 15
- Specific I/O functions are listed in 7-9 Data Map on page 26.
- 4x Status LEDs (see for color legend):
 - ERR - Status of the circuits
 - BUS - Connection to a network
 - ETH 1 & 2 - Connection speed / link

Figure 7-B



TT3E-2310 Wiring/Pinout Diagram

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7-5 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.

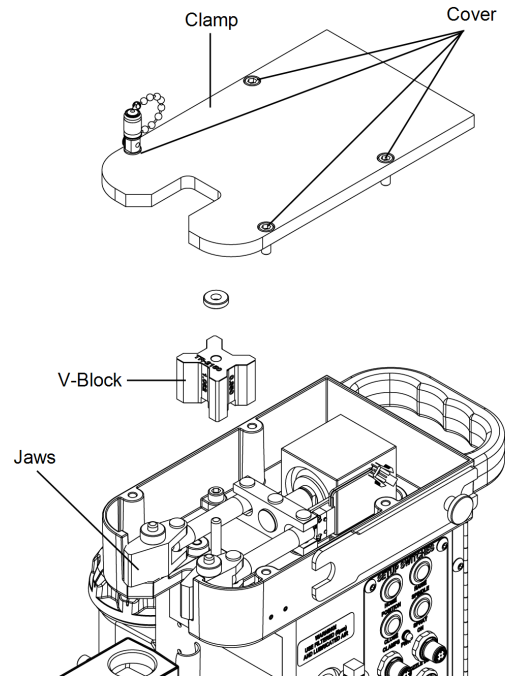
1. Remove the four (4) cover screws at the top of the reamer.
2. Lift the clamp cover off completely.
3. Lift and rotate the v-block so the desired size faces outward from between the front jaws.

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"	0.984"	1.125"
TR-2162	0.780"	0.813"	0.875"	1.000"

Numbers are stamped into the v-blocks. The number refers to the outside diameter of the nozzle.

Figure 7-C



7-6 Setting Up Nozzle Heights for Cutter Blade Insertion



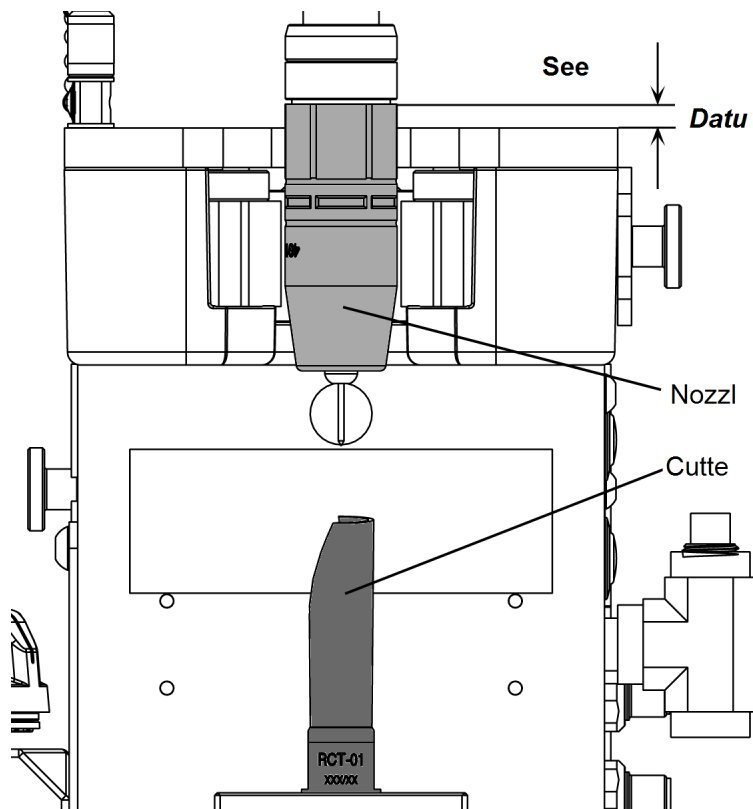
A. Setting Nozzle heights

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	404-20, 404-26, 404-30, 404-32 , D-ATSH, D-ATTH	
RCT-13	3/4" (19.05 mm)	0.375"	9.53 mm
RCT-01	5/8" (15.88 mm)	0.225"	5.72 mm
RCT-04	1/2" (12.7 mm)	0.125"	3.18 mm

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

Figure 7-D



7-7 Setting Up Nozzle Detect



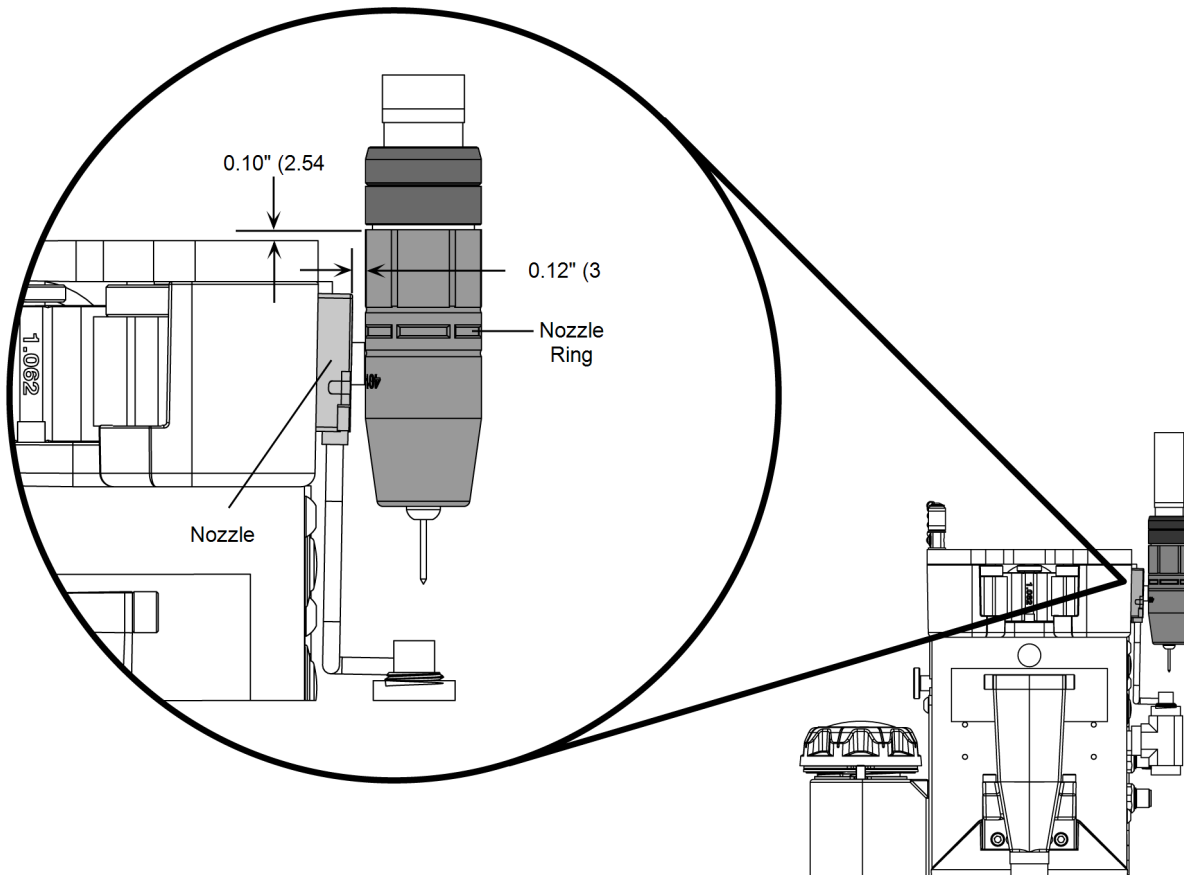
WARNING: Please follow your facility's lockout / tagout procedures.

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 $3 \text{ mm} \pm 1 \text{ mm}$.
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 7-E



B. Testing Nozzle Detect

1. Move robot into position beside the nozzle detect sensor (with a nozzle on the gun). 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 gun.

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 7-F

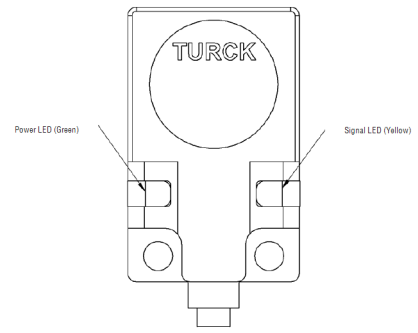


Figure 7-G

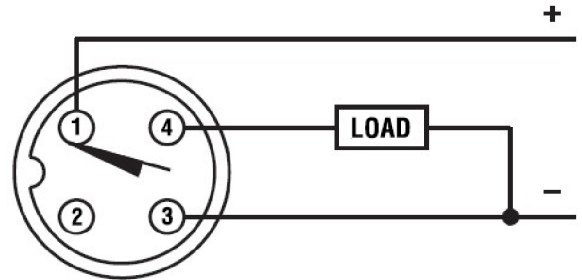
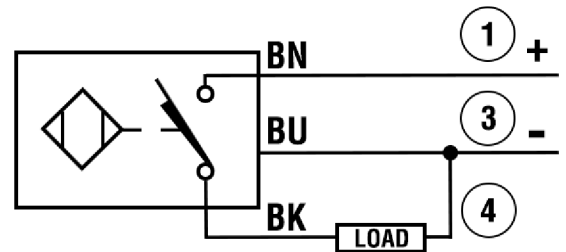


Figure 7-H



7-8 Setting the IP Address

The first step that must be done in order to communicate with the Ethernet module is to change the TCP/IP4 Properties on the computer being used.

The following must be done:

1. Open Network Connection Status through the Network and Sharing Center (if the computer is using Windows based OS).
2. Select the Properties button (see Figure 7-I).
3. Select Internet Protocol Version 4 (TCP/IPv4) and click the Properties button (see Figure 7-J).

Figure 7-I

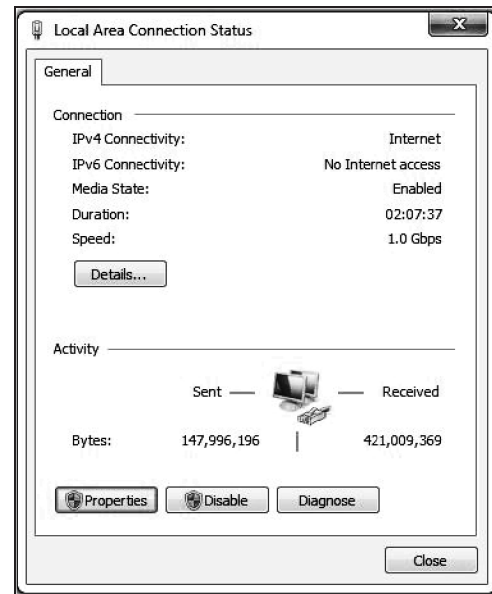
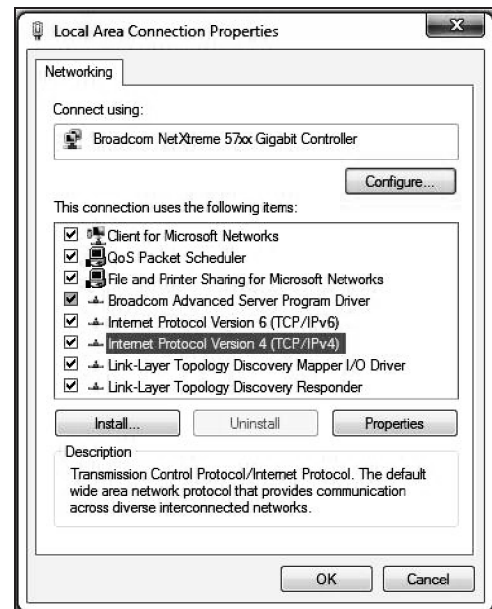
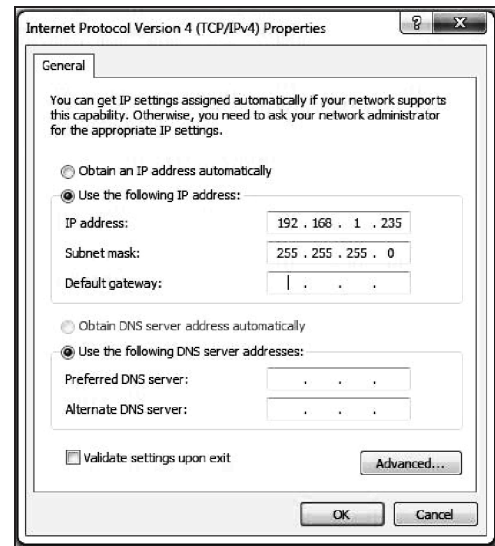


Figure 7-J



4. Once in the Properties window, select the "Use the following IP address" option.
5. The IP address must have the first three octets the same as the Ethernet module.
 - The factory set first three octets are: 192.168.1.
 - The last octet must be between 1 and 254 but cannot be the same as the Ethernet module.
 - The Subnet mask should self-populate, but 255.255.255.0 can be inputted (see Figure 7-K).
6. Once this is completed, communication between the computer and the Ethernet module can occur.

NOTE: To return the computer settings, repeat Steps 1-3 above and then select the "Obtain an IP address automatically" option.



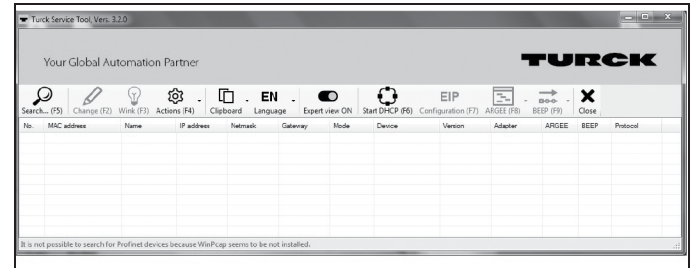
The Ethernet module comes from the factory address as 192.168.1.1. However, there are a number of methods that can be used to set/change the IP address of the Ethernet module.

Each method is outlined below:

A. PGM-DHCP Mode (Preferred Method)

1. Ensure that the rotary switches (located at the top of the module underneath the clear plastic cover) on the module are set to 500 PGM or 600 DHCP.
2. Power on the reamer.
3. Use the TURCK IP Address Search Tool to scan for the IP address of the module. **NOTE:** The TURCK IP Address Search Tool can be found online at www.tregaskiss.com/ReamerTT4E. Find the link under the Software tab or <http://pdb2.turck.de/us/DE/products/0000001a000293cb0002003a> (see Figure 7-L).
4. Once the TURCK IP Address Search Tool is installed, run the program and select the "Search" button.
5. Once the Ethernet module shows up on the list, select it and click the "Change" button.
6. The IP address can then be changed to the desired address.
7. Click "Write to device" and the IP address will be stored in the module's EEPROM memory.

Figure 7-L



B. BOOTP/DHCP Mode

1. Ensure that the rotary switches (located at the top of the module underneath the clear plastic cover) on the module are set to 300 BOOTP or 400 DHCP.
2. Power on the reamer.
3. Using your BOOTP/DHCP software, select the device which you want to address (identified by the MAC address).
4. Create a new entry and assign the IP address to the Ethernet module.
5. The IP address will be saved in the module's EEPROM memory and read from here when the module is powered up.

C. Rotary Switch Method

1. The rotary switches will designate the last octet of the IP address. Rotate the switches to the desired octet (must be between 1 and 254).
2. Power up the reamer.
3. The IP address is now set to the desired octet.

D. Restoring the IP Address to the Default Setting

1. Set all rotary switches to 0.
2. Cycle power.
3. Reamer IP address is now set to 192.168.1.254.

7-9 Data Map



WARNING: I/O 4 is configured to be able to start the reamer cycle without a signal from the PLC. Care must be taken when servicing the reamer so that no accidental short to I/O 4 happens. It is recommended that if servicing the wiring or Ethernet Block, the air supply is turned off.

Below is the Data Map for the Ethernet module (part # TT3E-2310):

		I/O 15	I/O 14	I/O 13	I/O 12	I/O 11	I/O 10	I/O 9	I/O 8	I/O 7	I/O 6	I/O 5	I/O 4	I/O 3	I/O 2	I/O 1	I/O 0
IN										Upper Limit	Lower Limit	Fluid Level Indicator	HW Cycle Start		Reset Button	Nozzle Detect	Clamped
	OUT		Wire Cut			Clamp	Spindle	Motor	Sprayer					PLC Connected			
OUT	Word	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	0		Enable Wire Cut					Sprayer				Enable DS				Reset	Start Cycle
	1	Startup Motor Dwell from PLC (ms)															
	2	Spindle Advance Dwell from PLS (ms)															
3	Sprayer Duration from PLC (ms)																
IN	0	Wire Cut On	Fluid Level Indicator	PLC Connected	Clamp On	Spindle On	Motor On	Sprayer On	Upper Limit	Lower Limit		DS Enabled	Clamp Open	Reset Clear	Nozzle Detect	Error	Running
	1	Current Step															
	2	Startup Motor Dwell - Total (ms)															
	3	Spindle Advance Dwell - Total (ms)															
	4	Sprayer Duration - Total (ms)															
10	Current Program Revision																

A. Programming to the PLC

Download .eds files from our website at www.tregaskiss.com/TT4E within the *Software* tab, labelled **Omron PLCs** and **All other PLCs**.

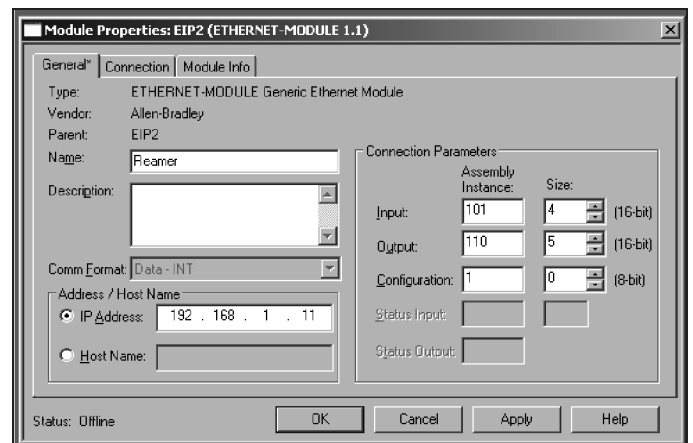
To configure the module within the PLC, add the device and use the following **Connection Parameters** (see Figure 7-M).

	Assembly Instance	Size	
Input:	101	4	(16-bit)
Output:	110	5	(16-bit)
Configuration:	1	0	(8-bit)

The parameters listed above are from the TOUGH GUN TT4E Reamer. For example, the reamer will send 5 outputs (for each word) to the PLC and it will receive 4 inputs (for each word) from the PLC.

NOTE: Name and IP Address shown in Figure 7-M are examples.

Figure 7-M



B. Programming to a Robot Controller

Using the **Data Map** above, all the I/Os shall be assigned according to what is available on the robot controller. The TOUGH GUN TT4E Reamer is a scanner and should be configured using the following additional information (pulled directly from the Ethernet module's configuration .eds file):

- Vendor Code: 48
- Product Type: 12
- Product Code: 31089
- Input Size (words): 5
- Output Size (words): 4
- Assembly Instance (input): 101
- Assembly Instance (output): 110
- Configuration Instance: 1
- Major Revision: 2
- Minor Revision: 7

SECTION 8 — OPERATION

8-1 Understanding L.E.D. Indicators on the Ethernet Module



LEDs are located on the front of the Ethernet module and can be accessed by opening the rear door of the reamer (see section 7-2 Accessing Electrical and Pneumatic Controls on page 16).

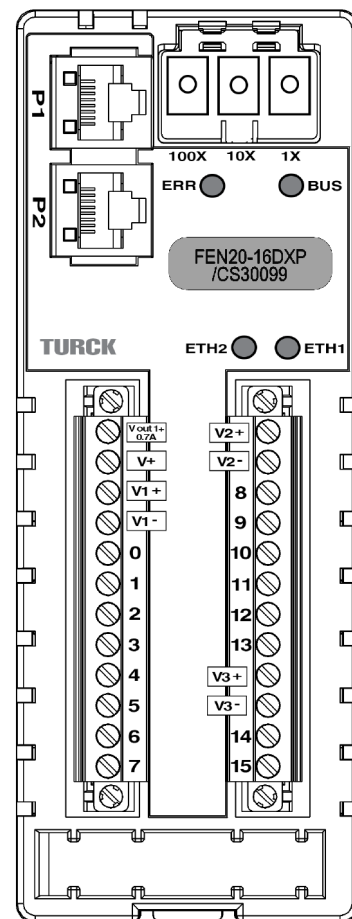
Figure 8-A

LED	Color	Status	Description
ETH1 / ETH2	Green	On	Ethernet link (100 Mbps)
		Flashing	Ethernet communication (100 Mbps)
	Yellow	On	Ethernet link (10 Mbps)
		Flashing	Ethernet communication (10 Mbps)
N/A	Off	No Ethernet link	
BUS	Green	On	Active connection to a master
		Flashing	Ready
	Red	On	IP address conflict or status word is active
		Flashing	Blink/Wink command active
N/A	Off	Power is off	
ERR	Green	On	Diagnostics disabled
	Red	On	Short-circuit
I/O 0 - 15	Green	On	Input / Output is active
	Green	Off	Input / Output is inactive

During normal operation and at the home position, the following LEDs should be illuminated:

1. **ETH1 / ETH2** — Flashing either green or yellow (depending on what connection speed your network is)
2. **BUS** — Flashing green
3. **ERR** — Illuminated solid green
4. **I/O 0, 2, & 6** — Should be illuminated when at the home position

No other LEDs should be illuminated. If there are other illuminated LEDs, consult 11-1 TOUGH GUN TT4E Reamer - Network on page 53



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8-2 Program Logic Chart

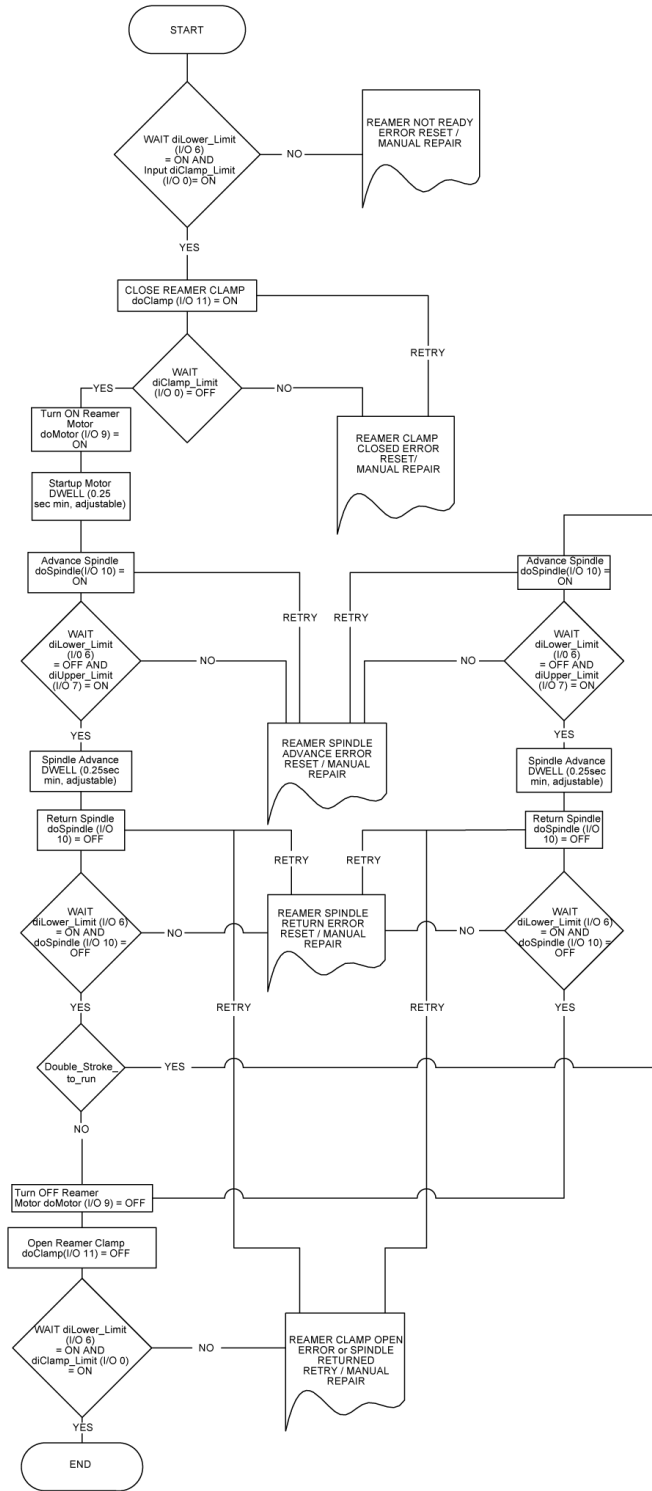
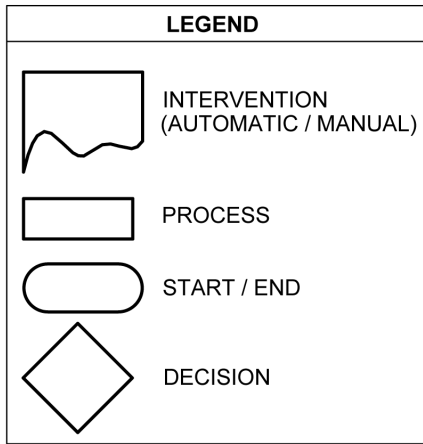
Figure 8-B

The TOUGH GUN TT4E Reamer comes configured with a ream cycle programmed into the Ethernet module. See below for the program logic chart for the ream cycle as well as optional PLC initiated functions.

A. Reamer Cycle Logic

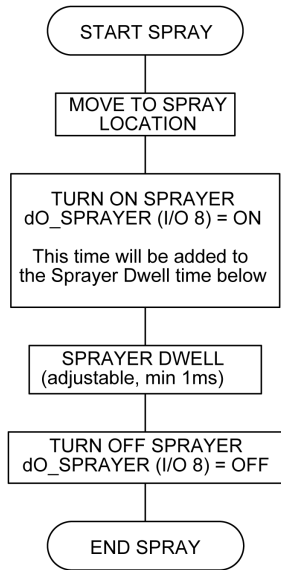
Recommended:

- Motor will not start if robot or PLC is faulted
- Use 24V motion and non-motion power
- Error messages & retry functions fully configurable by user



B. Optional Functions Logic

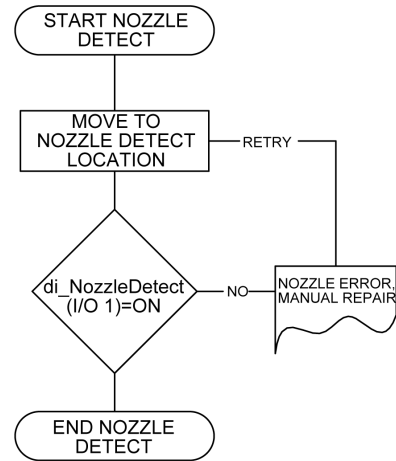
Figure 8-C



EXPLANATION:

- Robot moves gun to spray location.
- Sprayer is turned on and covers the gun consumables with water-based anti-spatter liquid.
- Sprayer dwell time is adjustable through the HMI.

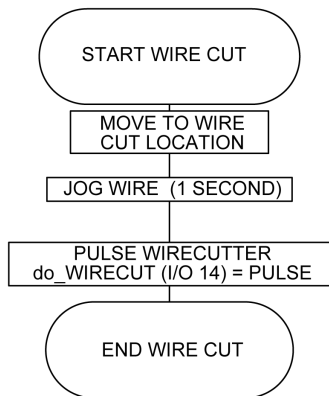
Figure 8-D



EXPLANATION:

- Robot moves gun to nozzle detect location.
- If the nozzle has come off during the welding process, the switch will not be triggered when the robot is in nozzle detect location.

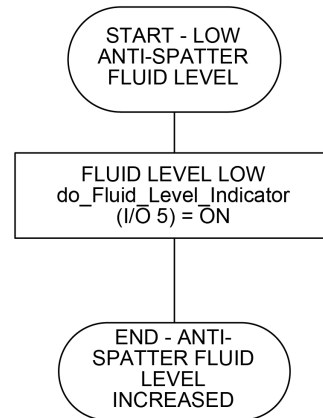
Figure 8-E



EXPLANATION:

- Robot moves gun to wire cut location.
- Robot controller jogs the wire out of the contact tip past the cutter blades.
- Wire cutter is fired and cuts the weld wire before the robot continues.

Figure 8-F



EXPLANATION:

- As the anti-spatter fluid level gets to a low level point, the float switch will close the circuit and creates a signal that fluid is low.
- PLC/Robot to manage the alert to the operator.
- Once fluid is added to the reservoir, the float switch will open and the signal will no longer be present.

8-3 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 7-6 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.

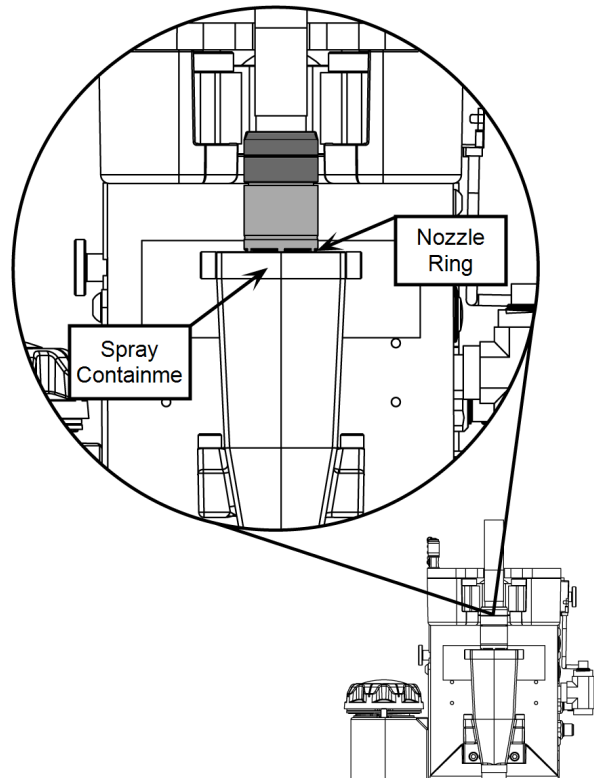
B. Programming Sprayer Sequence

Figure 8-G

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

1. After reaming, center the nozzle above the hole on the cover of the spray containment unit.
2. Insert the gun directly into the spray containment unit until the crimp ring of the nozzle is flush with the top of the spray containment cover. (see Figure 8-G)
3. 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.
4. Retract the gun from the spray containment unit once the spray is complete.

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.



8-4 Manual Operation



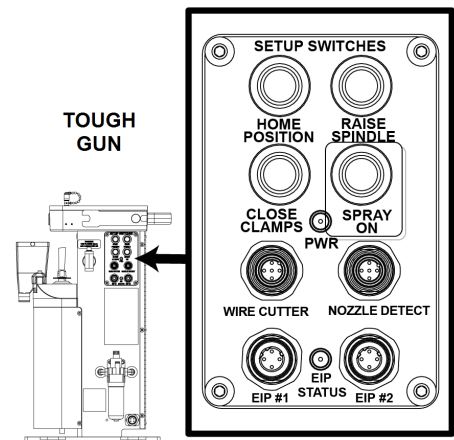
The manual momentary override switches allow confirmation that the lift cylinder, jaw clamping and sprayer air circuits are operational.

Figure 8-H

To manually operate the TOUGH GUN TT4E 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.



8-5 Operation through the HMI



The TOUGH GUN TT4E Reamer has a built-in feature that allows the dwell times for the motor start up, spindle advance and sprayer duration to be changed to user preference.

The reamer also includes the option of Double Stroke. This option will set the reamer up to conduct two sequential plunges into the nozzle bore. All of these options can be accessed through the web browser enabled Human Machine Interface (HMI).

IMPORTANT NOTE: The HMI will only work with an HTML5 enabled browser.

The steps to access the HMI are as follows:

1. Download the *TOUGH GUN TT4E Reamer HMI and Update Program* from www.tregaskiss.com/TT4E (under the *Software* tab), and open the local file folder.
2. Select the *_View HMI.html* file and open it in your default web browser (be sure your web browser supports HTML5) (see Figure 8-I).
3. Once opened, enter the IP address of the reamer you wish to operate (see Figure 8-J).

Figure 8-I

Name	Date modified
_View HMI.html	8/5/2021 10:40 AM
_View Program Mode.html	8/5/2021 10:40 AM
argee_ajax.js	8/5/2021 10:40 AM
argee_compiler.js	8/5/2021 10:40 AM
argee_conf.js	8/5/2021 10:40 AM
argee_env.js	8/5/2021 10:40 AM
argee_library_loader.js	8/5/2021 10:40 AM
argee_print.js	8/5/2021 10:40 AM
argee_sim.js	8/5/2021 10:40 AM
argee_trace.js	8/5/2021 10:40 AM
argee_v_1_3_import.js	8/5/2021 10:40 AM
BLC_modules.js	8/5/2021 10:40 AM
cache.manifest	8/5/2021 10:40 AM
Date.js	8/5/2021 10:40 AM
Evaluator.js	8/5/2021 10:40 AM
FEN20_modules.js	8/5/2021 10:40 AM
flowchart.js	8/5/2021 10:40 AM
JsHashMap.js	8/5/2021 10:40 AM
Stack.js	8/5/2021 10:40 AM
TBEN_modules.js	8/5/2021 10:40 AM
TBEN_S1_modules.js	8/5/2021 10:40 AM
Tokanizer.js	8/5/2021 10:40 AM
util.js	8/5/2021 10:40 AM

Figure 8-J

HMI Mode

ARGEE Device IP Address:

192.168.1.1

Enter HMI Mode

Figure 8-K

Project Title: Tregaskiss Reamer V5.0

Screens

Program Status

Program Setup

4. In the HMI screen, there are two options in the left part of the screen. One for the *Program Status* and one for *Program Setup* (see Figure 8-K). The *Program Status* will give you the real time status of the reamer and the *Program Setup* will allow you to change the dwell times and enable/disable Double Stroke (see Figure 8-L).
5. Once in the Program Setup screen, the right side of the screen will display the various dwell time and Double Stroke options.
6. To enable/disable the Double Stroke, click "Enable Double Stroke from HMI" (see Figure 8-M).

Figure 8-L

Program Status	
Current Step	
	Waiting_to_start_Cycle
Output Status	
PLC CONNECTED	0
Out10_Enable_Motor	0
Out11_Enable_Spindle	0
Out12_Enable_Clamp	0
Out9_Enable_Sprayer	0
Out15_Enable_Wire_Cut	0
Input Status	
In1_Clamp_Open	1
In2_Nozzle_Detected	0
In3_Reset_Button	1
In_4_Fluid_Level_Indicator	0
In5_Hardware_Cycle_Start	0
In7_Lower_Limit	1
In8_Upper_Limit	0
In9_Sprayer_On	0
In10_Motor_On	0
In11_Spindle_On	0
In12_Clamp_On	0
In15_Wire_Cut_On	0

Figure 8-M

Program Setup	
Double Stroke Enabled	
Double Stroke from HMI	0
Double Stroke from PLC	0
Double Stroke Enabled	0
<input type="button" value="Enable Double Stroke from HMI"/>	

- To change the dwell times for the motor start up, spindle and sprayer, insert the desired time (in milliseconds) into the white cell and click the corresponding button below it. The respective total dwell time will be updated instantly in the HMI screen (see Figure 8-N, Figure 8-O, and Figure 8-P).

NOTE: There are pre-programmed minimum dwell times that cannot be changed (250ms for Motor Start Up and Spindle Advance, 1ms for Sprayer Duration). The time inputted by the user in the HMI will not be cumulative with these minimum dwell times.

Figure 8-N

Startup Motor Dwell	
Startup Motor Dwell from HMI	0 ms
Startup Motor Dwell from PLC	0 ms
Startup Motor Dwell Actual	250 ms

Change Startup Motor Dwell to:	<input type="text" value="0"/>	ms
--------------------------------	--------------------------------	----

Store Startup Motor Dwell from HMI

Figure 8-O

Spindle Advance Dwell	
Spindle Advance Dwell from HMI	0 ms
Spindle Advance Dwell from PLC	0 ms
Spindle Advance Dwell Actual	250 ms

Change Startup Motor Dwell to:	<input type="text" value="0"/>	ms
--------------------------------	--------------------------------	----

Store Spindle Advanced Dwell from HMI

Figure 8-P

Sprayer Duration	
Sprayer Duration from HMI	0 ms
Sprayer Duration from PLC	0 ms
Sprayer Duration Actual	1 ms

Change Sprayer Duration to:	<input type="text" value="0"/>	ms
-----------------------------	--------------------------------	----

Store Sprayer Duration from HMI

8-6 Adjusting Flow Control Valves

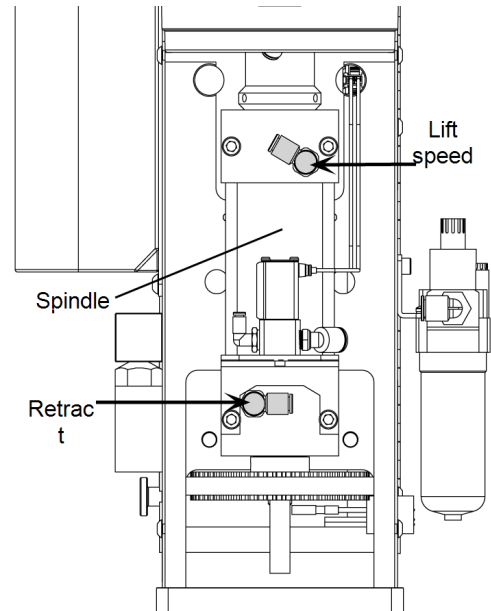


NOTE: The flow control valve provides a smooth, constant feed of the cutting tool. The feed rate is dependent on the amount of spatter accumulated. If a smaller amount of spatter accumulates, the feed rate can be set faster. A feed rate that is set too fast may stall the motor or damage the cutter blade.

To adjust the flow control valve(s):

1. There are flow control valves located on the spindle unit for adjusting the lift/retract speed of the spindle. They are located behind the spindle cover.
2. To increase the feed rate of the cutter blade (lift speed), pull out on the grey knob of the top flow control valve and turn counterclockwise.
3. To increase the retract speed of the cutter blade, pull out on the grey knob of the bottom flow control valve and turn counterclockwise.
4. To decrease either the lift speed or retract speed, turn the respective grey knob clockwise.
5. Once the desired setting is achieved, push the grey knob in to lock it in position.

Figure 8-Q



SECTION 9 — MAINTENANCE

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.

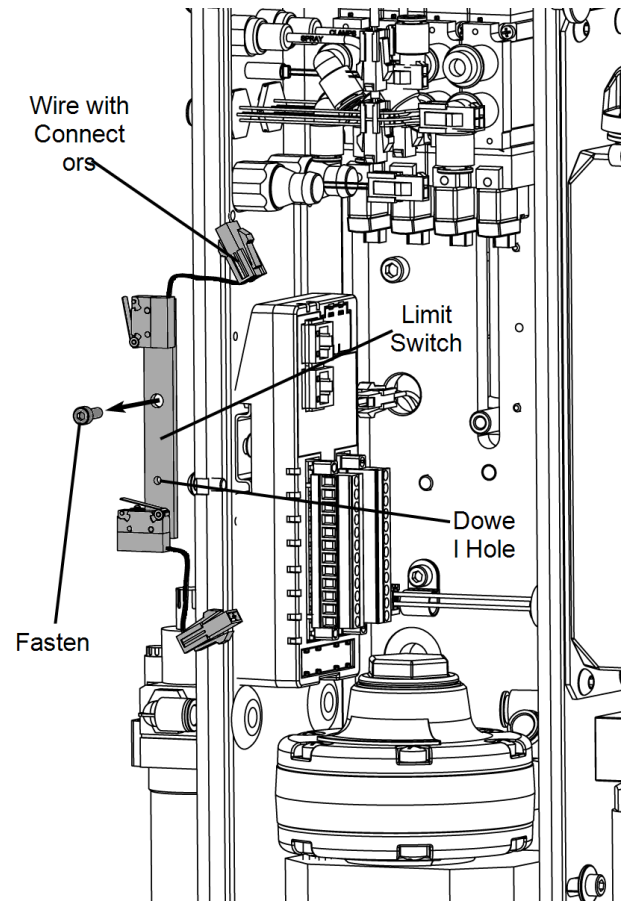
9-1 Replacing the Spindle Limit Switch



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. Disconnect connectors from the wiring harness.
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 hole on the reamer frame face, then reinstall fastener.
6. Reconnect the connectors into the wiring harness (see section 10-2 Electrical Schematic on page 50).

Figure 9-A



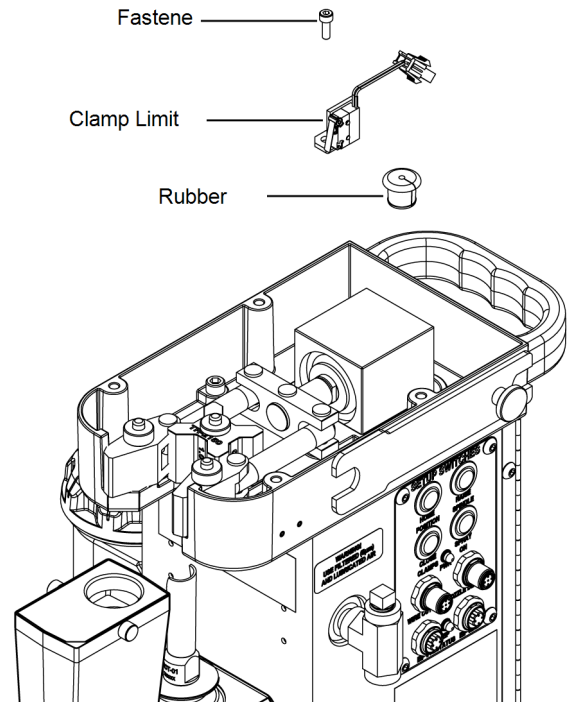
9-2 Replacing the Clamp Limit Switch



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

Figure 9-B

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 (see section 10-2 Electrical Schematic on page 50).
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 10-2 Electrical Schematic on page 50).
9. Clip the circuit board connector into location on the circuit board.
10. Reinstall the top plate and close the rear cover.



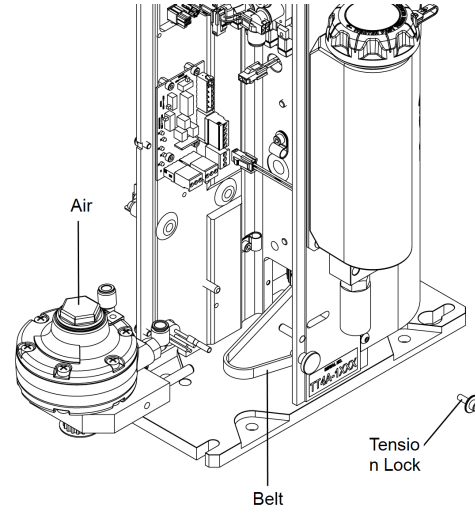
9-3 Replacing the Air Motor



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 by loosening the two (2) thumb screws or remove it completely by removing the three (3) BHCS using a 3 mm Allen wrench.
2. Remove the tension lock screw located on the side of the reamer under the reservoir.
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 9-C



9-4 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.

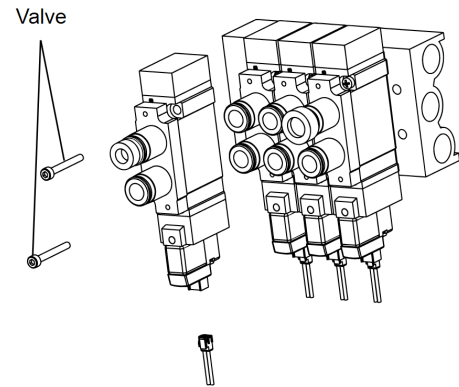
9-5 Replacing the Solenoid Valves



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

Figure 9-D

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.



9-6 Replacing the Ethernet Module



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. Grab the Ethernet module and slide it off the DIN rail.
3. With a flat head screw driver, loosen the (4x) screws that secure the connectors to the Ethernet module.
4. Remove the connectors by using the screw driver and slightly prying the connectors free from the Ethernet module.
5. Remove the (2x) RJ45 Ethernet cables from the module.
6. Reconnect the connectors onto the new Ethernet module and tighten the (4x) screws.
7. Reconnect the (2x) RJ45 Ethernet cables to the module.
8. Place the Ethernet module back onto the DIN rail and slide it back into the reamer until it clicks into place.
9. Close the rear cover.

IMPORTANT NOTE: Depending on the mode selected to identify the IP address of the Ethernet module, the module may have to be re-addressed upon power up.

Figure 9-E

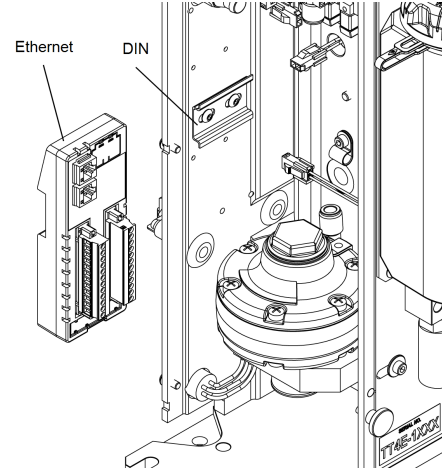
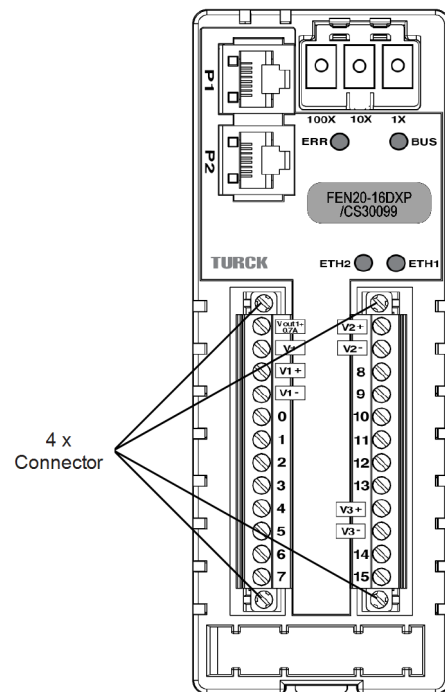


Figure 9-F



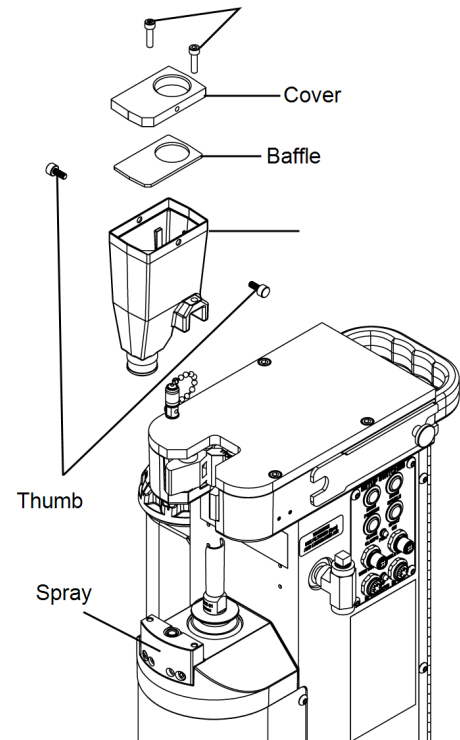
9-7 Removing the Spray Containment Unit



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

1. Remove the two (2) thumb screws on the side of the spray containment unit.
2. Lift the spray containment cover out of the container.
3. The baffle rests on the inside of the container and can be pulled out once the cover is removed.
4. Remove the two (2) M5 SHCS on either side of the spray containment unit that secure it to the spray head.
5. Lift the spray container straight up over the spray head to remove.
6. Installation is the opposite of the removal procedures.

Figure 9-G



9-8 Replacing the Cutter Blade



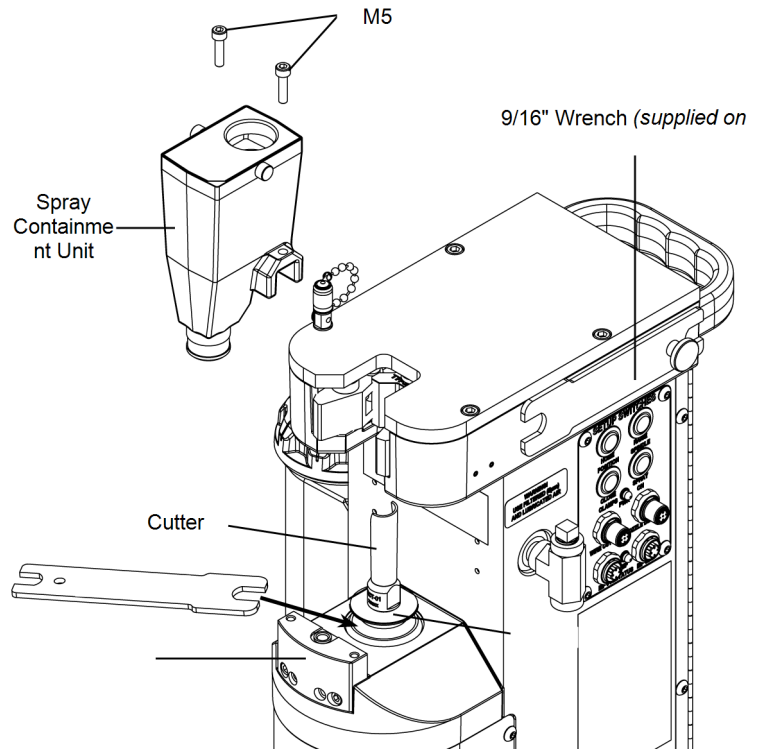
WARNING: Ensure air and power supply is off and disconnected before proceeding. Please follow your facility's lockout / tagout procedures.

Figure 9-H

A. To Remove the Cutter Blade

1. Remove the two (2) M5 SCHS that secure the spray containment unit onto the spray head.
2. Remove the spray containment unit.
3. 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). This prevents slipping while trying to remove the cutter blade.



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.
2. Place the spray containment unit back on the spray head and tighten the two (2) M5 SHCS onto the spray head.

NOTE: The application of anti-seize compound to the threads of the reamer will assist in easy removal in the future.

9-9 Removing the Anti-Spatter Fluid Reservoir



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

Figure 9-I

A. To Remove the Reservoir

1. It is suggested that the reservoir be empty prior to removing it from the reamer.
2. In the event that there is still fluid left in the reservoir, it can be emptied while still secured onto the reamer.
 - a. Remove the front spindle cover by loosening the 4 BHCS on either side of the cover.
 - b. On the right hand side of the sprayer check valve there is a black 5/16" fluid supply line. **Before disconnecting the supply line, have a small container ready to catch the fluid as it drains out.**
 - c. Disconnect the fluid supply line at the quick disconnect fitting. (see Figure 9-I)
 - d. The fluid will begin to flow out of the supply line and into a container.
 - e. Let the fluid drain until it stops.
3. Open the rear cover of the reamer and disconnect the fluid level sensor (two black wires with a 2-Pin connector on them).
4. Remove the four (4) BHCS on the side of the reamer that hold the sprayer reservoir mounting plate onto the reamer. (see Figure 9-J)
5. Carefully pull the reservoir from the side of the reamer.
 - a. While removing, push the fluid supply line inside the reamer to help guide the reservoir connection through the opening under the mounting plate.
6. Once the reservoir is free from the reamer, remove the hose clamp that secures the fluid supply line onto the reservoir.
7. On the back side of the reservoir mounting plate will be two (2) M6 BHCS. Remove these bolts and take the mounting plate off of the reservoir. (see Figure 9-K)

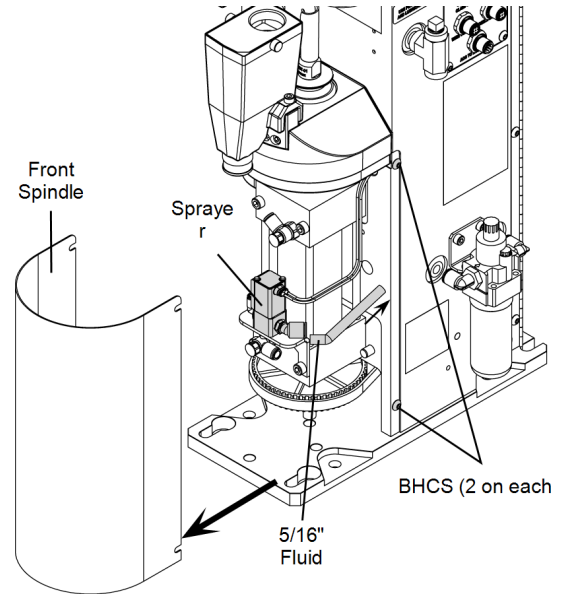
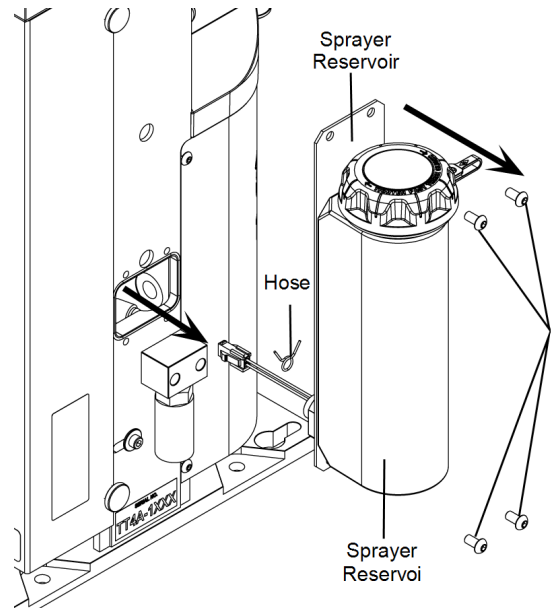


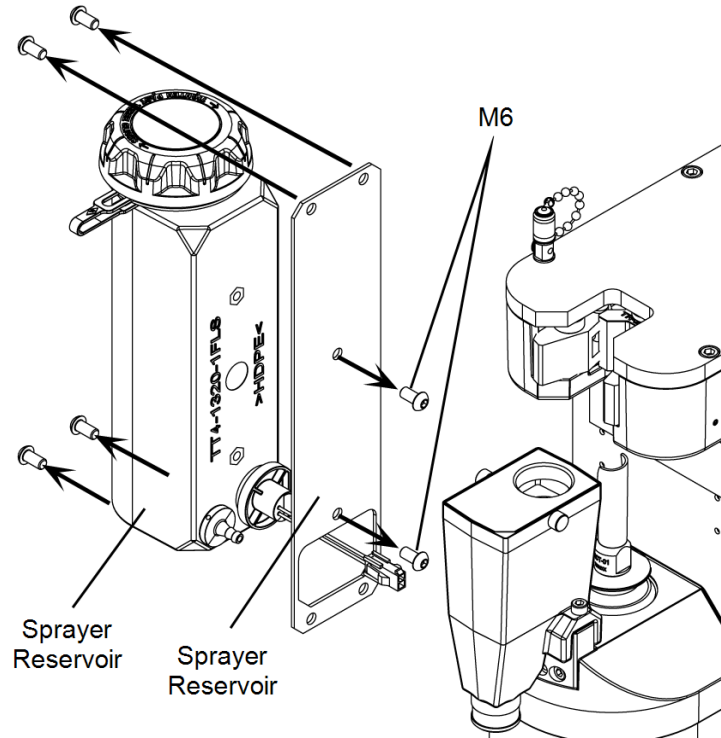
Figure 9-J



B. To Install the Reservoir

1. Installation is the reverse of removal.
 2. Once the fluid supply line is attached to the sprayer check valve, the reamer will have to be re-primed in order to spray liquid.
-

Figure 9-K



9-10 Scheduled Maintenance

The **TOUGH GUN TT4E 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. <i>The life of the air motor is dependent on a consistent supply of oil.</i>
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. <i>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.</i>
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 spray containment unit of any debris buildup inside the container.
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:

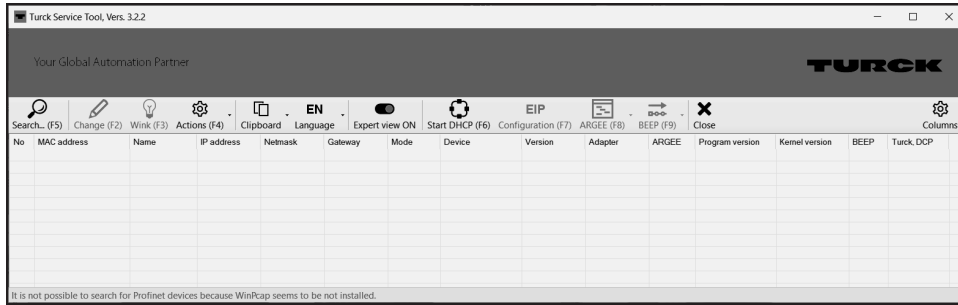
DAILY	
CHECK	The air lines and interface cable for leaks and fraying.
WEEKLY	
CHECK	Check the wire cutter blades for dullness, looseness and possible breakage. <i>The service life of the cutter blades is dependent on the type of application. In lighter duties, the blades may last indefinitely but should be inspected weekly.</i>
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.

9-11 Program Updating

A. Updating ARGEE Software

NOTE: This method will only work for TOUGH GUN TT4E Reamer Robotic Nozzle Cleaning Stations with firmware version 3.6.4.0. The firmware version can be identified by using the TURCK Service Tool under the column labeled "Version".

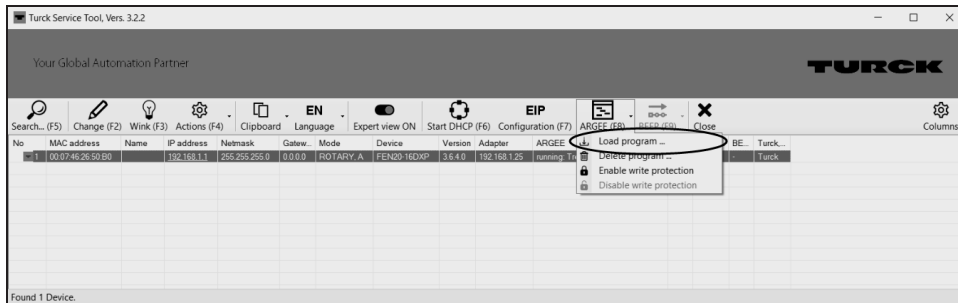
1. Install the TURCK Service Tool from www.tregaskiss.com/TT4E (under the **Software** tab).



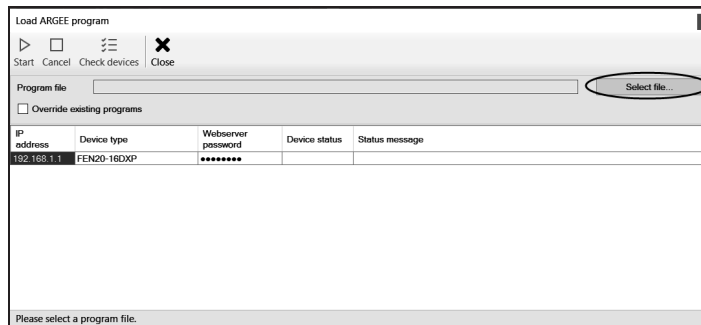
2. Search for all Tregaskiss Reamer units on the network by clicking the "Search" button.



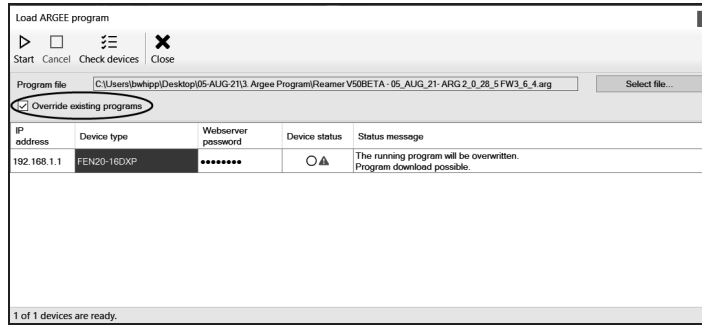
3. Select the reamer from the list and then click the "ARGEE" button in the menu bar.
4. Select the option to "Load Program".



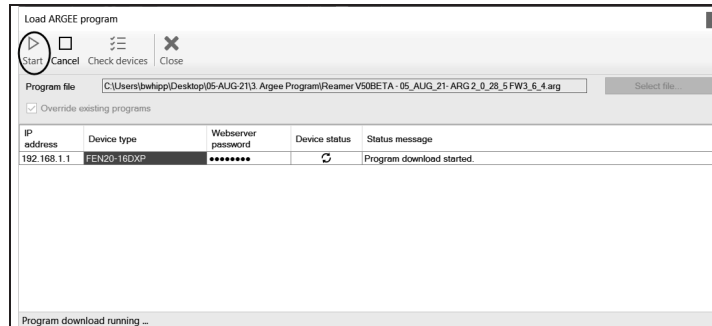
5. Click the "Select File" button and open the ARGEE program you are updating (i.e. Reamer_5.0.arg).



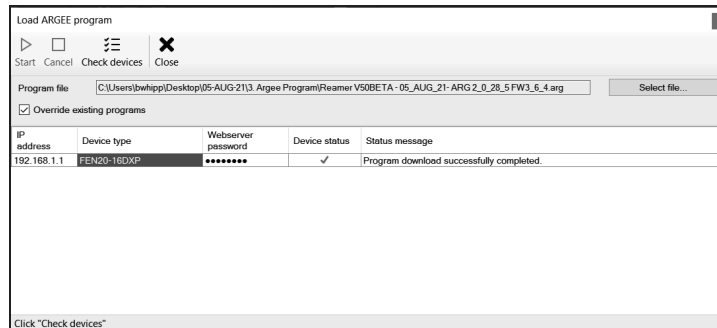
6. Select the box that says "Override existing program".



7. Click the "Start" button in the top left of the menu bar. The program will begin to install the new ARGEE program. Wait until the dialogue box indicates that the program has been loaded into the module.



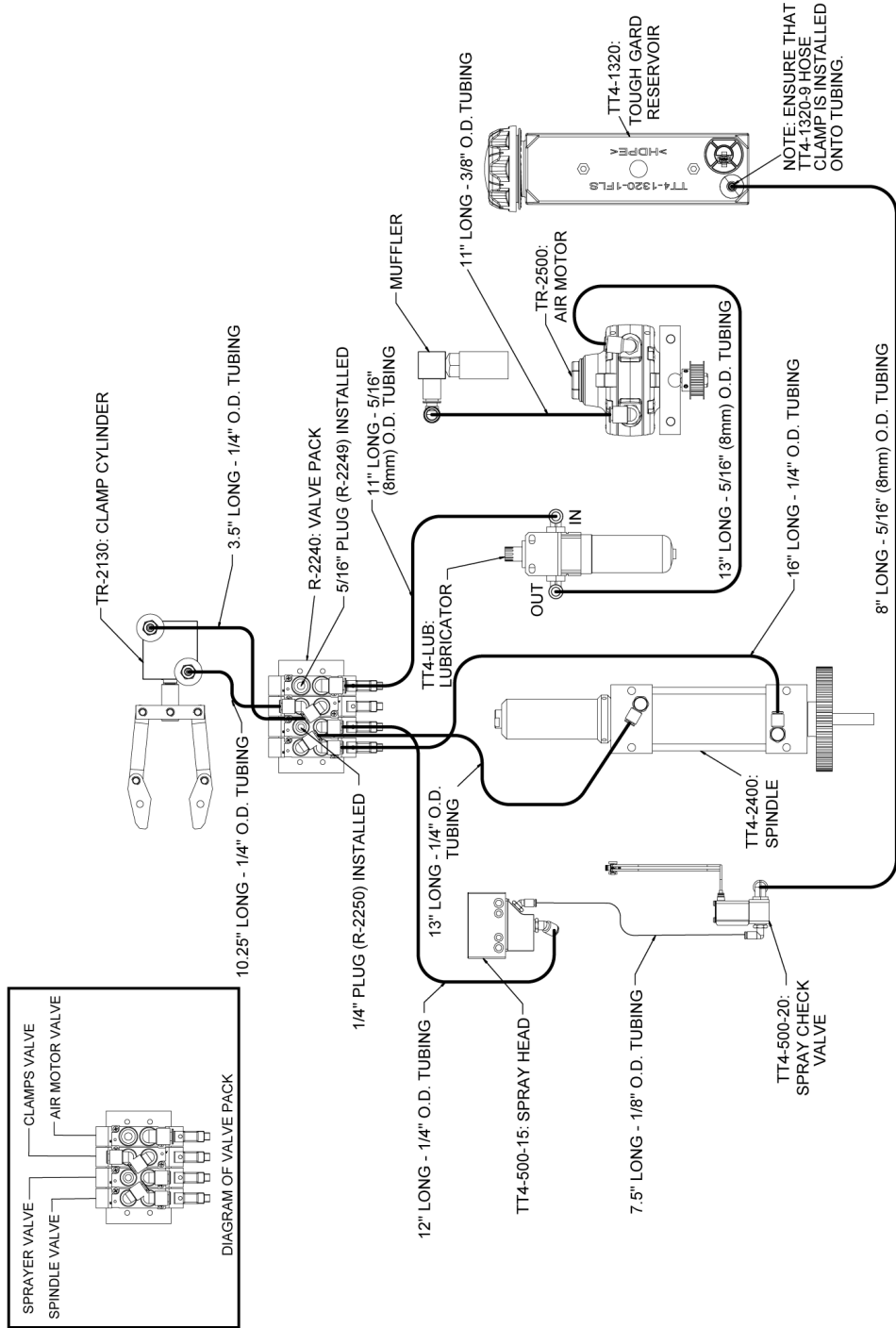
8. The message in the ARGEE column should say "running: Tregaskiss Reamer V5.x", where 'x' represents the ARGEE program version. This confirms that the ARGEE program was loaded successfully.



SECTION 10 — TECHNICAL DATA

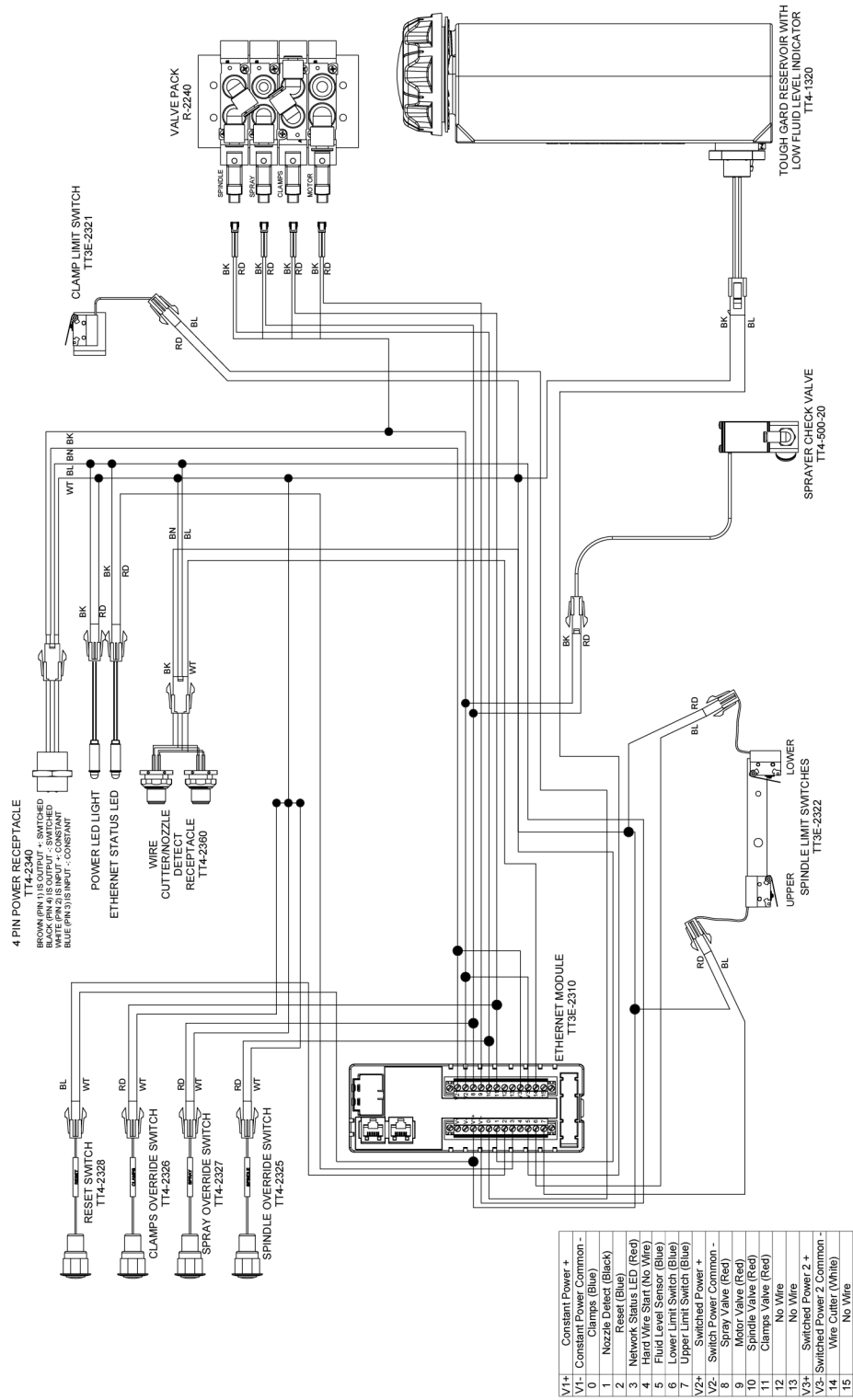
10-1 Pneumatic Diagrams

A. TOUGH GUN TT4E Reamer



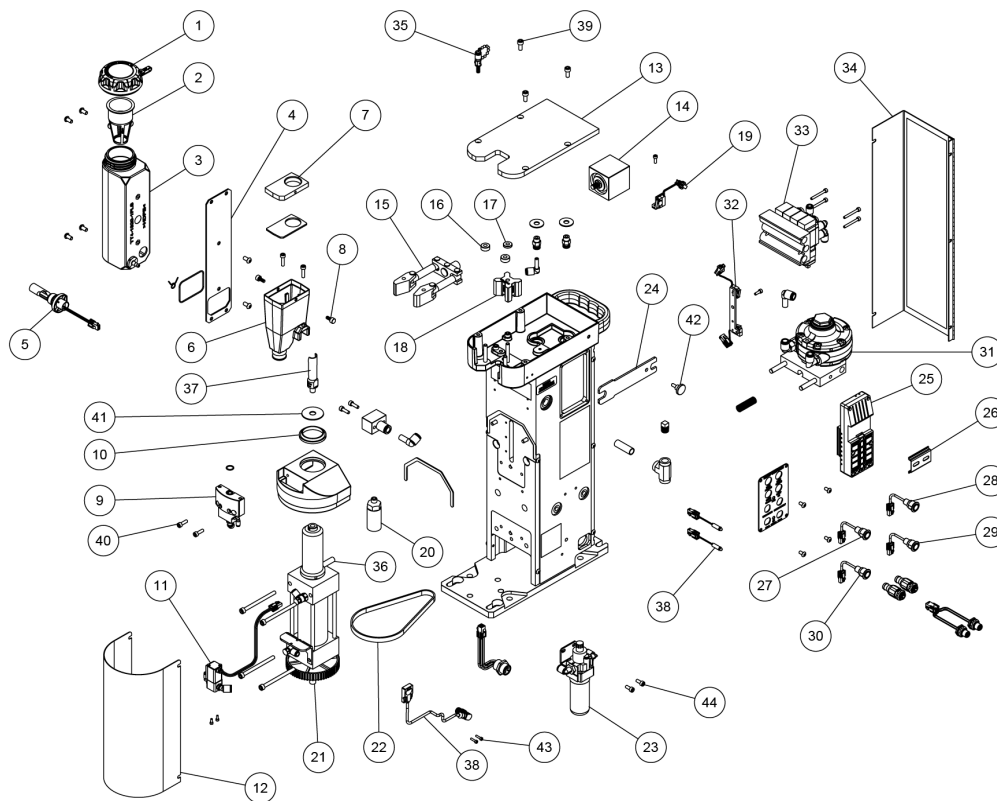
10-2 Electrical Schematic

A. TOUGH GUN TT4E Reamer



SECTION 10 — PARTS LIST

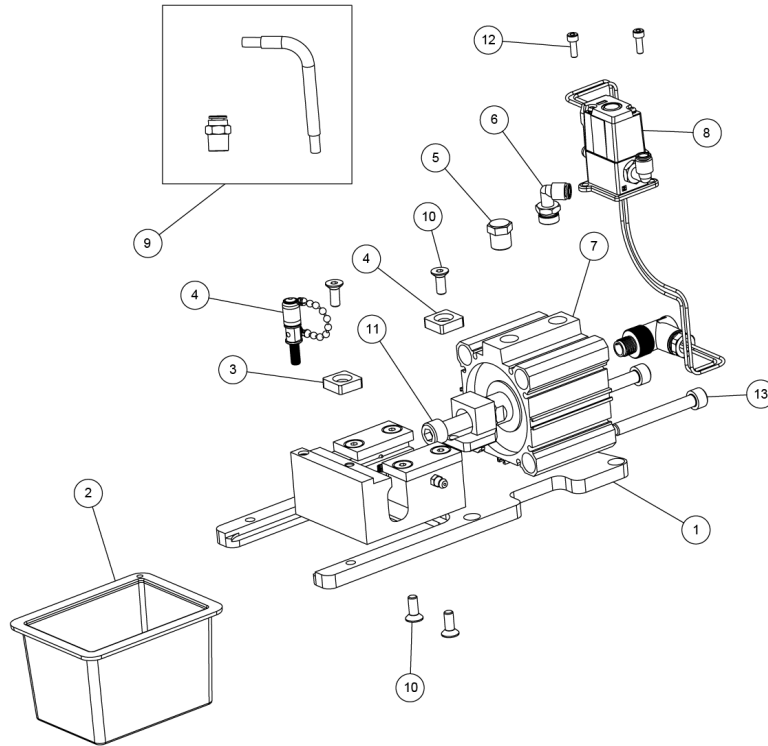
A. TOUGH GUN TT4E Reamer



ITEM	PART #	DESCRIPTION
1	TT4-1320-2	TT4 reamer reservoir cap with tether
2	TT4-1320-3	TT4 reamer sprayer reservoir filter
3	TT4-1320	TT4 reamer sprayer reservoir assembly
4	TT4-1320-5	Mounting plate for TT4 reservoir
5	TT4-1325	TT4 reservoir fluid level sensor
6	TT4-SC-100-1	TT4 reamer spray containment container
7	TT4-SC-100-2	TT4 reamer spray containment cover
8	TT4-SC-100-6	M5x0.8-12mm knurled thumb screw (Qty 2)
9	TT4-500-15	TT4 reamer spray head assembly
10	TR-2661	Spindle seal
11	TT4-500-20	TT4 reamer sprayer check valve assembly
12	TT-2670	Reamer spindle cover
13	TT4-2110	TT4 reamer clamp cover
14	TR-2130	Clamp cylinder
15	TR-2120	Clamp jaw assembly
16	TR-2127	Upper jaw spacer (Qty 2)
17	TR-2128	V-block spacer / low jaw spacer
18	See Section 7-5	4 sided v-block
19	TT3E-2321	Clamp limit switch
20	TR-2530	Muffler
21	TT4-2400	TT4 reamer spindle assembly
22	TR-2440	Reamer drive belt
23	TT4-2250	TT4 reamer air motor lubricator
24	TR-2910	Reamer wrench

ITEM	PART #	DESCRIPTION
25	TT3E-2310	Ethernet module
26	TT3E-2300-1	DIN rail
27	TT4-2328	TT4 reamer push button switch - Reset switch
28	TT4-2325	TT4 reamer push button switch - Spindle switch
29	TT4-2327	TT4 reamer push button switch - Spray switch
30	TT4-2326	TT4 reamer push button switch - Clamps switch
31	TR-2500	Air motor assembly
32	TT3-2322	Limit switch assembly
33	R-2240	Valve pack
34	TT4E-2680	Reamer rear cover assembly
35	TT4-707-30	TT4 reamer TCP locator pin assembly
36	TR-2411	Spindle acuator
37	See Section 7-6	Tregaskiss reamer cutter blade
38	TT3E-2344	Proximity sensor, 5mm nozzle detect
39	Non-sellable	SHCS M6x1.0x20mm long
40	Non-sellable	SHCS M5x0.8x20mm long
41	Non-sellable	Reamer cutter blade washer - M10x40mm, zinc plated steel
42	Non-sellable	Thumb screw - M5x0.8x12mm long, zinc plate (DIN 464)
43	Non-sellable	Nozzle detect sensor fasteners - SHCS M3x0.5x12mm long
44	Non-sellable	SHCS M5x0.8x12mm long
Not Shown	TT4E-2300-2	TT4E reamer green LED light
Not Shown	TT3E-2350-10M	Ethernet 4 pin power cable
Not Shown	TT3E-2345-10M	Ethernet communication cable

B. TOUGH GUN Wire Cutter (Part # WC-400)



ITEM	PART #	DESCRIPTION
1	WC-400-8	Wire cutter base plate
2	WC-100-20	Wire cutter basket - cast aluminum
3	WC-100-7-1	Wire cutter blade (Qty 2)
4	TT4-707-30	TT4 reamer TCP locator pin assembly
5	TR-2221	Breather vent (Qty 2)
6	TT3-2201	1/4" tubing, 90 degree elbow, uni-fit thread (Qty 3)
7	WC-100-31	Cylinder with magnet

ITEM	PART #	DESCRIPTION
8	WC-400-24	Wire cutter air valve
9	WC-400-30	Wire cutter installation kit
10	<i>Non-sellable</i>	SCHCS M6x1x16mm long - black oxide (Qty 8)
11	<i>Non-sellable</i>	SHCS M10x1.5x25mm long - black oxide
12	<i>Non-sellable</i>	SHCS M4x0.7x12mm long - black oxide
13	<i>Non-sellable</i>	SHCS M8x1.25x65mm long

SECTION 11 — TROUBLESHOOTING

11-1 TOUGH GUN TT4E Reamer - Network

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Cannot connect to Ethernet module.	<ol style="list-style-type: none"> Loose connection of RJ45 cables. Incorrect TCP/IPv4 properties. Incorrect IP address. Local firewall preventing connection. 	<ol style="list-style-type: none"> Check that connections are secure. Change the properties through the network connection status on the host computer. Set rotary switches to 600 and cycle power. Then use TURCK IP Address Tool to find correct IP address. Work with network administrator.
2. BUS or ERR LEDs red (flashing or solid).	<ol style="list-style-type: none"> IP address conflict. Circuitry is incorrect. 	<ol style="list-style-type: none"> Ensure IP address is not duplicated within the network. Ensure I/O connector blocks are connected to the Ethernet module.
3. ETH1/ETH2 LEDs on but not flashing.	<ol style="list-style-type: none"> No communication between Ethernet module and network. 	<ol style="list-style-type: none"> Connect Ethernet module to network device so that open communication can happen.
4. ETH1/ETH2 LEDs not illuminated.	<ol style="list-style-type: none"> No connection to the network. 	<ol style="list-style-type: none"> <ol style="list-style-type: none"> Ensure Ethernet module is powered. Check that the physical network connections are secure.

11-2 TOUGH GUN TT4E Reamer - Mechanical

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. LED signals not activating.	<ol style="list-style-type: none"> Circuit board damaged. Limit switch malfunctioning. Input voltage is incorrect. Broken switch actuator. Sink/Source issue. 	<ol style="list-style-type: none"> Replace circuit board. Replace limit switch. Check input voltage and make adjustments as required. Replace actuator spindle. Set switches accurately.
2. Motor stops during operation.	<ol style="list-style-type: none"> Air supply is incorrect. Excessive spatter buildup. Lubricator not installed or adjusted properly. Water in air lines / motor. Improper nozzle orientation. Motor valve failed. 	<ol style="list-style-type: none"> Set at 80-100 psi at 16 CFM. <ol style="list-style-type: none"> 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. Increase frequency of gun cleaning or modify welding parameters. Ensure lubricator is adjusted properly (see section 7-1 Air Motor Lubricator on page 16). Dryer required for air system. Ensure consumables are concentric with cutter. Replace damaged valve.
3. Pneumatic functions not operative.	<ol style="list-style-type: none"> Air lines damaged or obstructed. Air supply is incorrect. Faulty Home Position switch. Manual switches engaged. Bad valve. No power. 	<ol style="list-style-type: none"> Replace air line(s). Check air supply, set at 80-100 psi at 16 CFM. Repair or replace Home Position switch. Turn off manual switches. Replace faulty valve. Reconnect power.
4. Broken cutter.	<ol style="list-style-type: none"> Improper cutter being used. Flow control valve set too fast. Gun improperly aligned in TOUGH GUN Reamer. 	<ol style="list-style-type: none"> Repair or replace damaged components. Adjust feed rate, adjust flow control valve. Check v-block / nozzle compatibility chart (refer to <i>Cutter Blade and V-Block Chart</i> in the SP-TT4 spec sheet).
5. Reamer stays in UP position.	<ol style="list-style-type: none"> Cutter blade is jammed in gun. Faulty spindle limit switch. Cycle Start signal held on too long. 	<ol style="list-style-type: none"> <ol style="list-style-type: none"> Checking proper alignment can prevent the blade from jamming. Repair or replace damaged components. Repair or replace spindle limit switch. Revise program (0.5 sec. pulse).

6. Cycle Complete signal does not activate.	<ol style="list-style-type: none"> 1. Faulty limit switch. 2. Faulty circuit board. 3. Missing / broken spindle actuator. 4. Faulty clamp valve. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Output to unit not functioning. 2. Loss of air supply. 3. Faulty solenoid valve. 4. Sink/Source. 5. Plugged valve. 	<ol style="list-style-type: none"> 1. Check output signal and cable. 2. <ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Vent blocked on reservoir. 2. Spool in check valve stuck. 3. Fluid hose blocked. 4. Plugged valve. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Debris in spray head. 	<ol style="list-style-type: none"> 1. <ol style="list-style-type: none"> a. Clean spray head. b. If using oil-based anti-spatter solution, switch to TOUGH GARD or other water-based anti-spatter liquid.

11-3 Lubricator

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Oil fill level low.	<ol style="list-style-type: none"> 1. Oil depleted in bowl. 	<ol style="list-style-type: none"> 1. Refill oil bowl to correct level using air motor oil.
2. Incorrect oil drip rate.	<ol style="list-style-type: none"> 1. Drip rate valve not set properly. 2. Filter element clogged. 3. Steel supply lines clogged. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Breakage of bowl o-ring. 	<ol style="list-style-type: none"> 1. Replace bowl o-ring. Grease up before assembling.
4. Air leaks from the pressure relief/drain valve.	<ol style="list-style-type: none"> 1. Foreign matter caught in the valve. 2. Breakage of the sealing parts of the valve. 	<ol style="list-style-type: none"> 1. Remove the bowl and clean the inside of the bowl. Flush the valve with a solvent to remove the debris. 2. Replace the bowl assembly.
5. Too much drain comes from the piping of the outlet side.	<ol style="list-style-type: none"> 1. Drain level reaches the baffle plate. 	<ol style="list-style-type: none"> 1. Open the drain cock for draining and replace the element.

11-4 Spray Containment Unit

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Over spray is excessive.	<ol style="list-style-type: none"> 1. Misalignment of gun. 2. Gun not inserted into the spray containment unit far enough. 3. Baffle not installed. 	<ol style="list-style-type: none"> 1. Center the gun to be in the center of the opening on the spray containment unit. 2. Insert gun to the depth specified in 8-3 Programming Events Sequence on page 31 3. Ensure that the internal baffle is installed properly.
2. Fluid and debris are not draining out of the unit.	<ol style="list-style-type: none"> 1. Plugged drain hose. 2. Plugged container/drain hole. 	<ol style="list-style-type: none"> 1. Remove drain hose from the spray containment unit and clear blockage. 2. Remove top cover of the spray containment unit and clean out any debris that is blocking the drain hole.

11-5 Anti-Spatter Fluid Reservoir

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Fluid is leaking from the reservoir.	<ol style="list-style-type: none"> 1. Damaged reservoir. 2. Hose clamp not installed on the outlet tube. 	<ol style="list-style-type: none"> 1. Replace reservoir. 2. Replace hose clamp.
2. Low fluid level signal not present.	<ol style="list-style-type: none"> 1. Wire connections are loose. 2. Faulty sensor. 3. Float stuck in the upward position. 4. Damaged sensor. 	<ol style="list-style-type: none"> 1. Check the 2-pin connector on the inside of the reamer, ensure that it is fully connected to its mating connector. 2. Replace sensor. 3. Open the cap of the reservoir and gently press the float downward. If it does not move, replace the sensor. 4. Replace sensor.

11-6 Filter/Regulator

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Pressure is not regulated.	<ol style="list-style-type: none"> 1. Opposite flow direction or opposite installation of filter/regulator. 2. Foreign materials caught in the valve seat. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Foreign materials caught in the valve seat. 	<ol style="list-style-type: none"> 1. Remove the valve guide to clean the valve and valve seat.
3. Large air resistance reduces flow rate.	<ol style="list-style-type: none"> 1. Clog of the element. 	<ol style="list-style-type: none"> 1. Clean the element.
4. Air leaks from the bonnet exhaust port.	<ol style="list-style-type: none"> 1. Diaphragm is damaged. 2. Foreign materials caught in the valve seat. 3. Piston o-ring is damaged. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Loosened bonnet. 2. Diaphragm is damaged. 	<ol style="list-style-type: none"> 1. Fasten the bonnet. 2. Replace the assembly.
6. Air leaks between the bowl and the body.	<ol style="list-style-type: none"> 1. Breakage of bowl o-ring. 	<ol style="list-style-type: none"> 1. Replace bowl o-ring. Grease up before assembling.
7. Air leaks from the drainage cock.	<ol style="list-style-type: none"> 1. Foreign matter caught in the valve of the drain cock. 2. Breakage of the seating part of the drain cock. 	<ol style="list-style-type: none"> 1. Open the drain cock for a few seconds. 2. Replace the bowl assembly.
8. No drainage when the drain cock is open.	<ol style="list-style-type: none"> 1. Blockage of outlet of the drain cock due to solid foreign matter. 	<ol style="list-style-type: none"> 1. Replace the bowl assembly.
9. Too much drain comes from the piping of the outlet side.	<ol style="list-style-type: none"> 1. Drain level reaches the baffle plate. 	<ol style="list-style-type: none"> 1. Open the drain cock for draining and replace the element.

11-7 Nozzle Detect

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. No LED lights on sensor.	<ol style="list-style-type: none">1. Loose connection of power cable.2. Broken cable.3. Damaged sensor.	<ol style="list-style-type: none">1. Check that the connection is secure.2. Replace sensor.3. Replace sensor.
2. No signal from sensor but power LED is illuminated.	<ol style="list-style-type: none">1. Nozzle not close enough to sensor.	<ol style="list-style-type: none">1. Confirm that robot position is at the correct distance from the sensor (see section 7-7 Setting Up Nozzle Detect on page 21).
3. Both LEDs are always illuminated.	<ol style="list-style-type: none">1. Metallic debris on sensor.2. Nozzle is too close to sensor.	<ol style="list-style-type: none">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 7-7 Setting Up Nozzle Detect on page 21).

11-8 Software

WARNING: When conducting troubleshooting on the TOUGH GUN TT4E Reamer, ensure that all safety and lockout/tagout procedures are followed. Any time service is to be done on a reamer, the reset switch must be pressed to set the program back to its start state.

A testing / troubleshooting program is available for download from www.tregaskiss.com/TT4E (within the **Software** tab).

This useful tool can help in diagnosing the error(s) that may occur as well as being able to diagnose it remotely.

To run the program from any computer:

1. Download the program named "Reamer Online Tester" from www.tregaskiss.com/TT4E (within the **Software** tab).
2. Open the .exe file. **NOTE:** If your firewall attempts to block it, allow it and click "Run".
3. When the program opens, you should see the dialogue box shown in Figure 11-A.
4. Type in the IP address for the Ethernet module you wish to connect to and click "Connect". **NOTE:** Multiple units can be connected by simply running the program again and connecting to the other IP addresses.
5. Once connected, the program will display which version of software is currently installed on the module as well as which step it is on within the program logic.
6. The status lights of all the inputs/outputs will be visible through the program, so there is no need to open up the reamer to view the LEDs on the Ethernet module (see Figure 11-B). **NOTE:** The "Fluid Level Sensor" light will be green when the fluid level is low and will not illuminate then there is sufficient anti-spatter fluid in the reservoir.
7. If "Cycle Start" is pressed, the reamer will run through an entire cycle, stopping only if it encounters an error. The cycle start does not have to be initiated by the PLC. It can be initiated by the test program.
8. If an error is encountered, the step at which it is encountered will be displayed. Using the 8-2 Program Logic Chart on page 29. (see Figure 11-C)
9. This software can be used in conjunction with the Troubleshooting tables in section 11-1 TOUGH GUN TT4E Reamer - Network on page 53 to help in effectively determining and fixing an issue with the reamer.

Figure 11-A

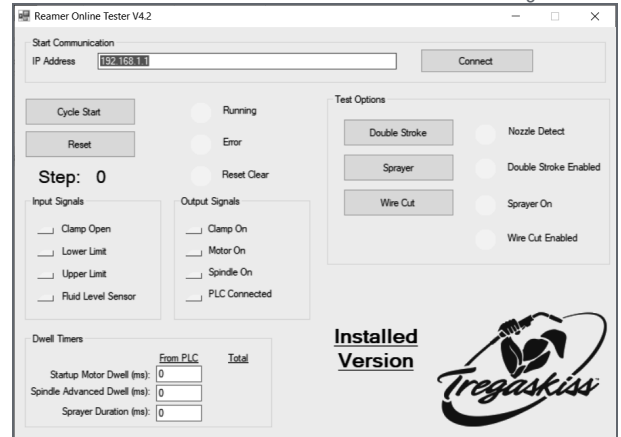
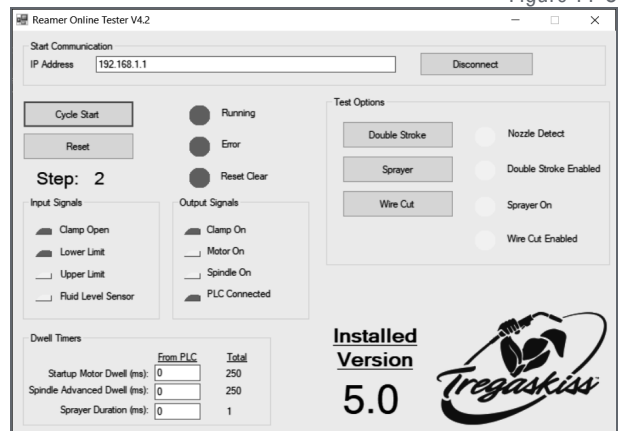


Figure 11-B



Figure 11-C



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



Scan to view the TOUGH GUN® TT4E Reamer Support Page



Scan to view the TOUGH GUN® TT4E Reamer Owner's Manual



Scan to view the TOUGH GUN® TT4 Reamer Spec Sheet



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



Scan to view the TOUGH GARD® Anti-Spatter Multi-Feed System Owner's Manual



Scan to learn about TOUGH GARD® Anti-Spatter Liquid



Scan to learn about Tregaskiss® Robotic Air-Cooled MIG Guns



Tregaskiss
2570 North Talbot Road
Windsor, Ontario N0R 1L0
Canada

Phone: 1-855-MIGWELD (644-9353) (US & Canada)
+1-519-737-3000 (International)
Fax: 1-519-737-1530



For more information, visit us at Tregaskiss.com
