

TG300

*TRUNKGUARD™ Series Fieldbus Device Couplers
(Zone 1 Locations)*

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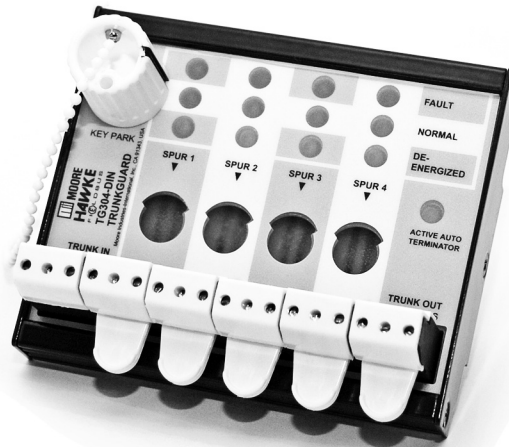


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Introduction

Device Couplers provide easy and practical mechanisms for implementing fieldbus systems. TRUNKGUARD Series 300 Device Couplers (TG300) simplify the use of fieldbus devices in Zone 1 by allowing “live” access for maintenance and eliminating the need for Exd junction boxes.

The TG300 Series offers our patented Automatic Segment Termination feature and a key-operated magnetic interlock which permits one spur at a time to be de-energized and worked on without shutting down the entire segment.

TRUNKGUARD Device Couplers provide electronic and fully auto-resetting spur short-circuit protection that prevents a segment failure that maybe caused by a short circuit to any field device. Utilizing a unique “Fold-Back” technique, any spur that attempts to draw more than 48mA is automatically switched off and not permitted any current flow until the fault is removed. With removal of the spur short circuit, TRUNKGUARD automatically reconnects the spur to the fieldbus segment within 20 microseconds.

The Automatic Segment Termination feature eliminates segment failure from under or over termination which is generally the most common cause for delay in starting up fieldbus projects. The auto-terminator also assures that local parts of a segment will continue to function even if there is a downstream cable break.

About this Manual

Wherever you see a “**Note**”, “**Caution**” or “**WARNING**” pay particular attention.

WARNING - Hazardous procedure or condition that could injure the operator.

Caution - Hazardous procedure or condition that could damage or destroy the unit.

Note - Information that is helpful for a procedure, condition, or operation of the unit.

DIN Units

TG300-DIN units are designed to fit onto a 32mm (EN50035) G-type and 35mm (EN50022) Top Hat DIN-rail and may be mounted at any angle and in such a way as to allow easy access to terminal receptacles and to keep LEDs visible. These units are not weatherproof and outdoor placement will require an external enclosure. Any enclosure which meets the requirements of the location in relation to electrical and mechanical safety may be used.

For Zone 1 applications an external enclosure is required. The enclosure and glands must be certified for increased safety and suitable for Zone 1 use, IP64 protection minimum. All MooreHawke TG300 enclosures are suitable for Zone 1.

Device Coupler Enclosures

Standard enclosures are available in GRP (Glass Reinforced Polyester with side-entry cable glands). These enclosures provide IP66/NEMA Type 4X protection.

Standard cable glands are nickel-plated brass, and can be ordered for use with un-armored or armored cable. Compound seal glands (for cable with inter-core spaces, i.e., unfilled cable), and quick connect plugs and sockets are also available. Field devices are individually connected directly to terminals via spur cables through a variety of cable gland options.

Installation

The enclosure should be mounted to a flat surface using the internal mounting holes or via external

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Specifications

<p>Communications FOUNDATION fieldbus™ H1 and PROFIBUS PA</p>	<p>Performance (continued) termination, specify the -MT option with the MooreHawke model number (e.g. TG308-DIN-MT). Also separately specify a TRK-TERM Trunk Terminator for mounting on the final device coupler in the segment.)</p>	<p>Cable Glands (Device Couplers with Enclosures) Type: Armored/Unarmored Material: Nickel-plated brass</p>
<p>Performance Supply Voltage: 10 to 32Vdc Maximum Segment Current: 800mA Maximum Quiescent Current: TG304: 13mA@32V_{FB}; 5mA@16V_{FB}; TG308: 23mA@32V_{FB}; 10mA@16V_{FB} * 3mA less with -MT option Maximum Spur Output Current: I_{sim} =48mA Spur Short Circuit Load: I_{sc} =5mA (32V), 3mA (16V) Spur Voltage Drop: 0.7V@20mA Maximum Voltage Drop Trunk IN to OUT: 0.7V Terminator: 100Ω/1μF (Internal Automatic Segment Termination is standard; For manual</p>	<p>Indicators Spur: GREEN (normal) RED (fault) YELLOW (de-energized) Auto-Terminator: YELLOW LED is ON when auto-termination is activated</p> <p>Terminals Type: EEx e approved terminals with IP30 shrouds and fillers Wire Size: Handles sizes between 0.8-2.5mm²/12-24AWG</p>	<p>Ambient Conditions Operating: -40°C to +70°C (-40°F to +158°F) Storage: -40°C to +85°C (-40°F to +185°F) Relative Humidity: 0-95%, non-condensing Surge Protection: EN61326, EN61000-4-5 1KV (1.2/50μsec) RFI/EMI Immunity: 10V/m@80-1000MHz, 1kHz AM (IEC61326) Vibration: (EN 60068-2-6): 1g max acceleration, 10-150Hz Shock: (EN 60068-2-27): 15g max. acceleration, 11ms</p>

*Auto-terminator function not applicable with -MT option.

Figure 1. DIN-Rail Mounting Installation Dimensions

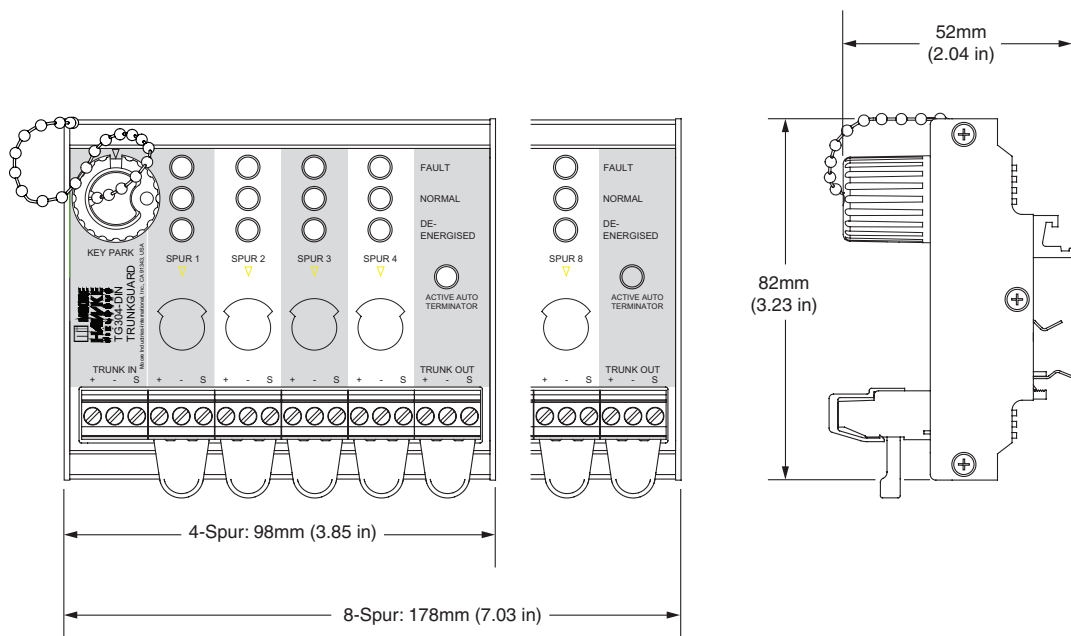
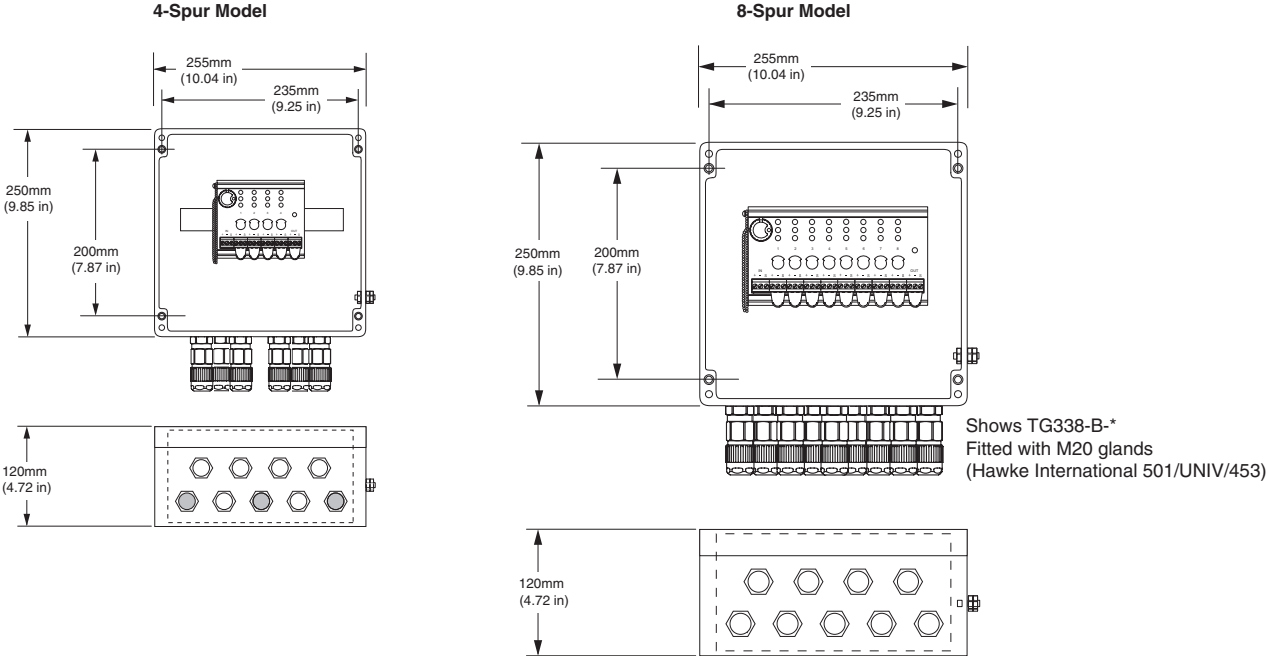


Figure 2. GRP (Glass Reinforced Polyester) Enclosure Installation Dimensions



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mounting feet (where supplied), in a location where the risk of external mechanical damage is minimized.

Cable type and cable glands should be selected in accordance with the intended Zone of installation.

Cables should be brought to the device coupler in such a way as to prevent external water from running into the cable entry position. For cables coming vertically down to a device coupler, it is good practice to continue down past the device coupler and return upwards to the cable entry position. All cables should be supported within 250mm (9.84 in) of the cable entry position by a cable tray or other support. This is particularly important with armored cable.

Once the installation and wiring has been completed, the terminal covers and shrouds (if removed) must be replaced and the enclosure should be properly closed and secured.

Wiring Connections

TG300 units have terminals for either four or eight hazardous area devices, as well as TRUNK IN and TRUNK OUT terminals. For multiple TRUNKGUARD units, TRUNK OUT can be looped into any adjacent TRUNK IN. Segment termination is automatically provided by the final active TG300 unit. No additional or external fieldbus terminator is required.

All wiring connections are made directly to Exe terminals. Cables should be stripped to expose no more than 8mm (0.31 in) of conductor and inserted into bootlace ferrules for full insertion into the terminal opening so that no conductor remains exposed.

Caution:

Terminals are originally supplied fitted with non-conducting shrouds and terminal entry fillers. These components are designed to prevent accidental contact with live parts, and should be retained for further use. Unused terminals must have the shrouds/entry fillers restored before the unit is energized in the hazardous area.

LEDs indicate the status of each spur as either “Normal” (GREEN), “Fault” (RED) or “De-Energized” (YELLOW). “Normal” shows that the spur has voltage for device operation and that spur current is within limits. “Fault” indicates that the short circuit protection has been activated for that spur.

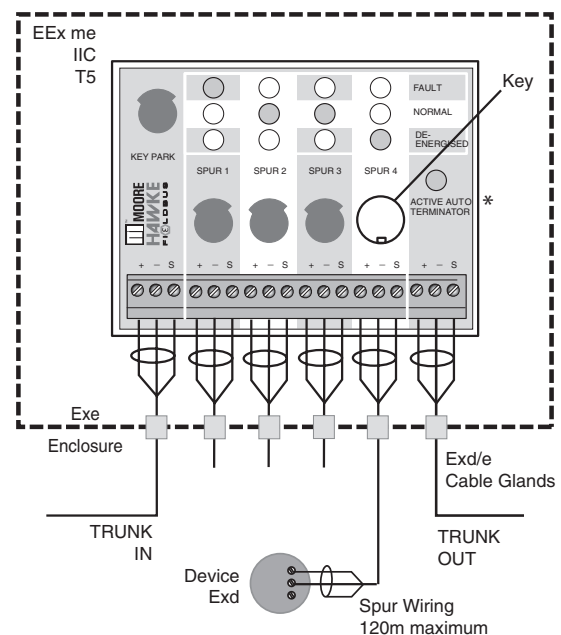
WARNING:

No access is permitted to TRUNK IN or TRUNK OUT terminals while the segment is powered.

Use of the DISCONN Key to physically de-energize an individual spur, allows wiring activity without affecting other devices on the segment, even in the hazardous area. The “De-Energized” (YELLOW) LED can only be activated if the DISCONN Key interlock has operated correctly, providing a positive indication of safety for temporary wiring access. The DISCONN Key can be locked in position, if required. Wiring terminals have shrouds and fillers to ensure all live parts are covered to IP30, and these must be refitted before returning the unit into service.

Segment connections (TRUNK IN and TRUNK OUT)

Figure 4. Typical TG300 Series Device Coupler Hook-Up



*Auto-terminator function not applicable with -MT option.

may be made only while the trunk is de-energized or under normal Zone 1 working practices (typically, under local supervision by gas detectors, etc). Spur connections can be made while the TG300 unit is energized only if the DISCONN Key is activated and only the YELLOW LED is ON for that spur. Alternatively, the whole segment should be de-energized.

If the GREEN LED is ON at the same time as the YELLOW LED is ON, the segment has not been de-energized and no wiring work is permitted without removing power to that segment. If the RED LED is ON, then follow the steps in the *Testing and Troubleshooting* section.

Field devices should be certified/approved for use in hazardous areas (e.g. EEx d in Zone 1) and are typically connected using armored, braided or toughened-sheath cabling. MooreHawke cable glands are EEx d and EEx e approved, but need to be sized for the appropriate armored or toughened cable. Earth continuity plates are provided, bonded to an external earth stud.

DISCONN Key

The DISCONN Key contains the magnet used to operate the magnetic interlock which permits individual fieldbus devices to be de-energized and worked on without de-powering the entire segment. You must have the DISCONN Key fully inserted into the spur receptacle for the spur to be de-energized.

Recommended Ground Wiring Practices

Moore Industries recommends the following ground wiring practices:

- Any MooreHawke product in a metal case or housing should be grounded.
- The protective earth conductor must be connected to a system safety earth ground before making any other connections.
- The maximum length of unshielded input and output signal wiring should be 2 inches.
- Some local electrical codes or facility practices may require the Shield to be connected to Ground at more than one location. Follow proper local guidelines.

Fieldbus segment cable Shields for spurs and trunks are gathered together in the device coupler and then wired through the trunk cable to the next device coupler and eventually to the fieldbus power conditioner. Single point Grounding is recommended for segment shields. Grounding of the segment shield usually occurs at the power conditioner.

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CE Conformity

Installation of any Moore Hawke products that carry CE marking **must** adhere to the guidelines in *Recommended Ground Wiring Practices* section in order to meet the EN 61326 requirements set forth in applicable EMC directive.

ATEX Installation Drawing

The installation diagrams located in the back of this manual must be used to augment the installation instructions described earlier in this manual for units that are to operate per ATEX requirements.

Testing and Troubleshooting

Testing of the TG300 series should only be performed in the safe area. Refer to Table 1 regarding LED indications of fault conditions.

In the **safe area**, the following tests may be applied:

1. Apply fieldbus power supply of 10-30Vdc to TRUNK-IN with no other trunk or spur wiring connected.

Normal indications include:

GREEN LEDs: ON

YELLOW LEDs: OFF

RED LEDs: OFF

Active Auto Terminator LED: ON*

2. Insert DISCONN Key in to each spur one at a time, switch key position and check that the YELLOW LED turns ON, and the GREEN LED turns off. Remove DISCONN Key and place in Key Park.

3. Check the Auto-Terminator* by putting a load (1kohm, minimum) across the TRUNK OUT terminals. The YELLOW LED should turn OFF.

Caution:

Do not short any terminals if power conditioner output can be more than 800mA.

Table 1. LED Indications

If	Then
All LEDs are OFF	Check polarity of TRUNK IN
	Check that voltage at TRUNK IN is >10V
	Check for short circuits in the trunk cable
	Check that the segment power supply is operating correctly
If	Then
Any red LED is ON	Disconnect that individual spur using DISCONN key
	Check for a short circuit on that spur cable
	Check for a core-to-shield fault on that spur cable
	Locate and repair any spur fault before reconnecting that spur

*Auto-terminator function not applicable with -MT option.

Operation

Each spur has three LEDs indicating the following states: *Normal*, *Fault* and *De-Energized*.

During normal operation, the GREEN LEDs should be ON for all spur connections.

If any RED LED(s) are ON, the affected spur(s) have fault(s) in external wiring or field device(s). Please refer to the *Testing and Troubleshooting* section..

Use the DISCONN Key to de-energize that spur, remove the wiring and then re-energize it by removing the DISCONN Key. This spur now has no device connected, and the GREEN LED should turn ON with the RED LED turning OFF. Use this to confirm a fault in the spur wiring or field device.

Segment termination is automatically provided by the last TG300 unit connected in the segment, and operation is indicated by a YELLOW LED labeled *Active Auto Terminator**.

Maintenance

The TG300 series contain no user serviceable parts. Non-functioning units should be returned to Moore Industries for replacement or repair.

WARNING:

Substitution of components may impair the device coupler, wiring and field device suitability for hazardous area applications.

Note:

When returning non-functioning units only the DIN-Rail mounted electronics should be returned. It is normally prudent to retain the enclosure, glands, and connectors with their terminals attached when a device coupler is changed out in the field.

TG300 enclosures have weatherproof seals on enclosure lids and on cable glands; these should be periodically inspected to verify correct operation. Any significant water entry should be investigated and corrected in order to prevent malfunction.

In high humidity environments, it may be appropriate to have enclosure breathers fitted so that internal condensation does not lead to equipment malfunction.

Customer Support

If service assistance is ever required for an instrument in your application, refer to the back cover of this manual for the telephone numbers to MooreHawke Customer Service Department.

If possible, make a note of the model number of the unit before calling. For fastest assistance, have the following available: serial number, job number or purchase order number.

*Auto-terminator function not applicable with -MT option.



DO NOT SCALE DRAWING

DRAWN	C. Whan	8/10
CHECKED	VG	8/10
CHECKED	W. Tchan	8/10
SCALE	NONE	

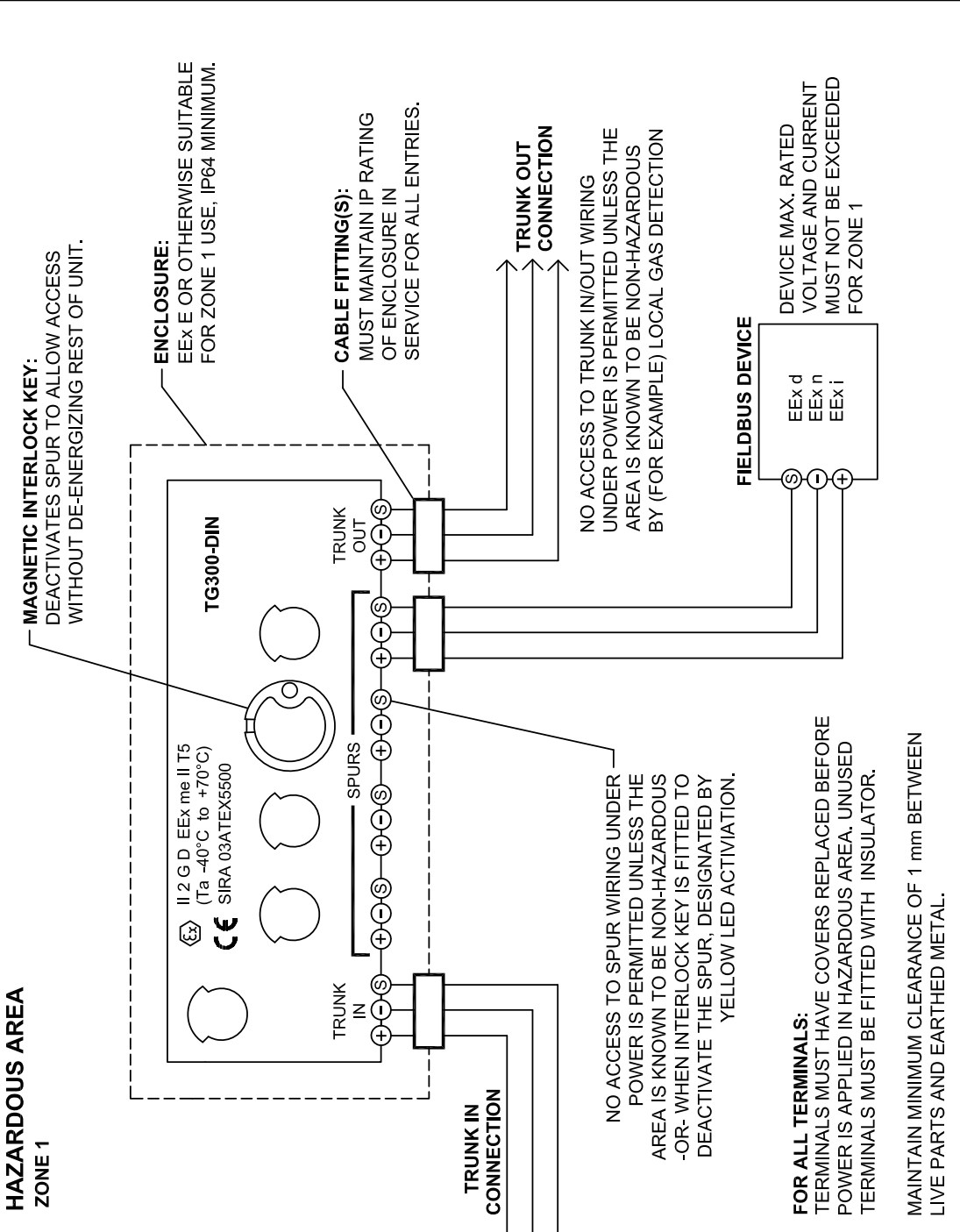
CATEGORY: CONTROL DRAWING
 TITLE: TG300 SERIES INSTALLATION DIAGRAM, ATEX

DRAWING NUMBER	TG300--ATEX	REVISION	C
REVISED BY	ECO 16968	DATE	5/13
		BY	cw
		APPROVAL	CB

NOTICE RE PROPRIETARY INFORMATION: This drawing and the information contained herein are the proprietary property of Moore Industries International, Inc. (MI) and should not be reproduced or disclosed to any third party without the written consent of an authorized officer of MI.

NON-HAZARDOUS AREA

HAZARDOUS AREA ZONE 1



WHERE ENGLISH IS NOT A LANGUAGE OF THE COUNTRY IN WHICH THE EQUIPMENT IS BEING USED, PLEASE APPLY TO MooreHawke FOR A SUITABLE TRANSLATION.

INSTALLATION MAY ONLY BE CARRIED OUT BY SUITABLY TRAINED PERSONNEL AND IN ACCORDANCE WITH NATIONAL WIRING REGULATIONS OR CODES OF PRACTICE. USER REPAIR OF TG300-DIN UNIT IS NOT POSSIBLE.

FOR ALL TERMINALS:
 TERMINALS MUST HAVE COVERS REPLACED BEFORE POWER IS APPLIED IN HAZARDOUS AREA. UNUSED TERMINALS MUST BE FITTED WITH INSULATOR.

MAINTAIN MINIMUM CLEARANCE OF 1 mm BETWEEN LIVE PARTS AND EARTHED METAL.

IF ANY OTHER CIRCUITS PRESENT, THEY SHALL BE SUITABLY APPROVED FOR THE HAZARDOUS AREA OF INSTALLATION AND WHEN ENCLOSURE IS OPENED, ALL LIVE PARTS SHALL BE PROTECTED TO IP30 MINIMUM.

RETURN PROCEDURES

To return equipment to Moore Industries for repair, follow these four steps:

1. Call Moore Industries and request a Returned Material Authorization (RMA) number.

Warranty Repair –

If you are unsure if your unit is still under warranty, we can use the unit's serial number to verify the warranty status for you over the phone. Be sure to include the RMA number on all documentation.

Non-Warranty Repair –

If your unit is out of warranty, be prepared to give us a Purchase Order number when you call. In most cases, we will be able to quote you the repair costs at that time.

The repair price you are quoted will be a "Not To Exceed" price, which means that the actual repair costs may be less than the quote. Be sure to include the RMA number on all documentation.

2. Provide us with the following documentation:
 - a) A note listing the symptoms that indicate the unit needs repair
 - b) Complete shipping information for return of the equipment after repair
 - c) The name and phone number of the person to contact if questions arise at the factory
3. Use sufficient packing material and carefully pack the equipment in a sturdy shipping container.
4. Ship the equipment to the Moore Industries location nearest you.

The returned equipment will be inspected and tested at the factory. A Moore Industries representative will contact the person designated on your documentation if more information is needed. The repaired equipment, or its replacement, will be returned to you in accordance with the shipping instructions furnished in your documentation.

WARRANTY DISCLAIMER

THE COMPANY MAKES NO EXPRESS, IMPLIED OR STATUTORY WARRANTIES (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY GOODS OR SERVICES SOLD BY THE COMPANY. THE COMPANY DISCLAIMS ALL WARRANTIES ARISING FROM ANY COURSE OF DEALING OR TRADE USAGE, AND ANY BUYER OF GOODS OR SERVICES FROM THE COMPANY ACKNOWLEDGES THAT THERE ARE NO WARRANTIES IMPLIED BY CUSTOM OR USAGE IN THE TRADE OF THE BUYER AND OF THE COMPANY, AND THAT ANY PRIOR DEALINGS OF THE BUYER WITH THE COMPANY DO NOT IMPLY THAT THE COMPANY WARRANTS THE GOODS OR SERVICES IN ANY WAY.

ANY BUYER OF GOODS OR SERVICES FROM THE COMPANY AGREES WITH THE COMPANY THAT THE SOLE AND EXCLUSIVE REMEDIES FOR BREACH OF ANY WARRANTY CONCERNING THE GOODS OR SERVICES SHALL BE FOR THE COMPANY, AT ITS OPTION, TO REPAIR OR REPLACE THE GOODS OR SERVICES OR REFUND THE PURCHASE PRICE. THE COMPANY SHALL IN NO EVENT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES EVEN IF THE COMPANY FAILS IN ANY ATTEMPT TO REMEDY DEFECTS IN THE GOODS OR SERVICES, BUT IN SUCH CASE THE BUYER SHALL BE ENTITLED TO NO MORE THAN A REFUND OF ALL MONIES PAID TO THE COMPANY BY THE BUYER FOR PURCHASE OF THE GOODS OR SERVICES.

ANY CAUSE OF ACTION FOR BREACH OF ANY WARRANTY BY THE COMPANY SHALL BE BARRED UNLESS THE COMPANY RECEIVES FROM THE BUYER A WRITTEN NOTICE OF THE ALLEGED DEFECT OR BREACH WITHIN TEN DAYS FROM THE EARLIEST DATE ON WHICH THE BUYER COULD REASONABLY HAVE DISCOVERED THE ALLEGED DEFECT OR BREACH, AND NO ACTION FOR THE BREACH OF ANY WARRANTY SHALL BE COMMENCED BY THE BUYER ANY LATER THAN TWELVE MONTHS FROM THE EARLIEST DATE ON WHICH THE BUYER COULD REASONABLY HAVE DISCOVERED THE ALLEGED DEFECT OR BREACH.

RETURN POLICY

For a period of thirty-six (36) months from the date of shipment, and under normal conditions of use and service, Moore Industries ("The Company") will at its option replace, repair or refund the purchase price for any of its manufactured products found, upon return to the Company (transportation charges prepaid and otherwise in accordance with the return procedures established by The Company), to be defective in material or workmanship. This policy extends to the original Buyer only and not to Buyer's customers or the users of Buyer's products, unless Buyer is an engineering contractor in which case the policy shall extend to Buyer's immediate customer only. This policy shall not apply if the product has been subject to alteration, misuse, accident, neglect or improper application, installation, or operation. THE COMPANY SHALL IN NO EVENT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.



WORLDWIDE • www.miinet.com

United States • info@miinet.com
Tel: (818) 894-7111 • FAX: (818) 891-2816

Australia • sales@mooreind.com.au
Tel: (02) 8536-7200 • FAX: (02) 9525-7296

Belgium • info@mooreind.be
Tel: 03/448.10.18 • FAX: 03/440.17.97

The Netherlands • sales@mooreind.nl
Tel: (0)344-617971 • FAX: (0)344-615920

China • sales@mooreind.sh.cn
Tel: 86-21-62491499 • FAX: 86-21-62490635

United Kingdom • sales@mooreind.com
Tel: 01293 514488 • FAX: 01293 536852