Read entire manual
before installing

STS 300 Series Electronic Indicating Ground Assembly

Installation and Operating Instructions

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Digital Copy

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Description

The STS 300 Series Electronic Indicating Ground Assembly consists of an electronic assembly housed in a cast aluminum enclosure of explosion-proof and dust-ignition-proof design. A 15-100 foot length of flexible cord with a clamp is attached to the exterior of the device for making a connection to tanker trucks, drums, or other vessels. A coiled cord is also available for easier cord management. The monitoring ground integrity circuit is intrinsically safe for Class I, Div I, Group D; Class II, Div I, Groups E, F, and G hazardous locations.

The STS 300 will indicate a proper ground has been established on a vehicle or drum for the handling of hazardous materials such as flammable liquids like gasoline or products that generate dust. The ground clamp will also safely dissipate any unwanted static charge. The STS 300 provides permissive control with pumps and control circuits to inhibit the transfer of these materials unless a proper earth ground is established.

Model Designation

The STS 300 has many different options, and each system is marked on the front nameplate designating its specific configuration. The following is an example of how to interpret the model number:

G = STS 300 Series Electronic Indicating Ground Assembly
2 = Voltage (2=120VAC, 4=240VAC, 12=12VDC, 24=24VDC)
L = Indicator Light Type (L=LED, I=Incandescent)
C = Cable Type (C=Coil, S=Straight)
25 = Cable Length (in Feet)
KA = Clamp Style
-XXX = Any additional options or accessories

Installation

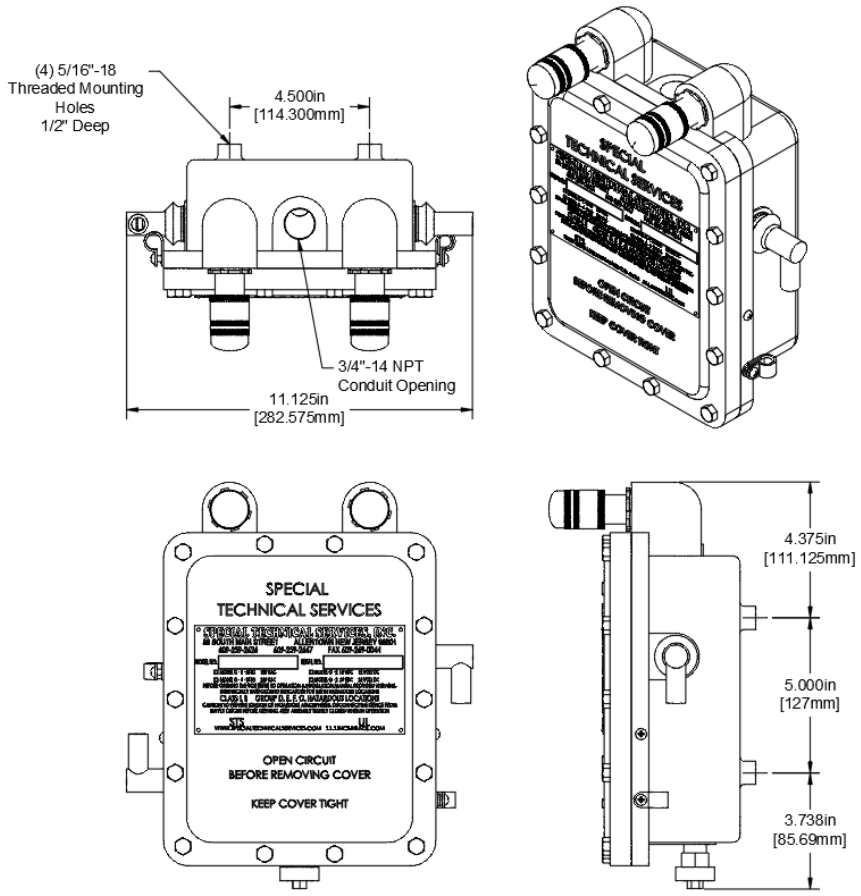
The STS 300 Series Electronic Indicating Ground Assembly is fully assembled and tested prior to shipment. Installation requires mounting, connecting power conductors, and auxiliary control circuits (if used). Installation of this equipment should be performed by a licensed and qualified person and according to all applicable requirements and codes of the country of installation.

Keep cover tightly closed when circuits are energized!

ALWAYS disconnect power and ventilate area before opening enclosure!

Mounting

Four 5/16”-18 mounting holes are provided on the back of the enclosure to secure to a Unistrut type support. The optimal height of the installation is eye-level of the operator, with the indicator lights easily visible to the operator. A seal fitting (not included) is required immediately before the supply conduit enters the top of the enclosure. After wiring and testing, the seal fitting is required to be filled with the proper sealing compound. Failure to do so could result in vapors and liquids being able to enter the enclosure causing damage, explosion, and bodily harm. The (14) 5/16”-18 bolts that secure the cover should be torqued to 11 ft-lb (1.24 N/m).

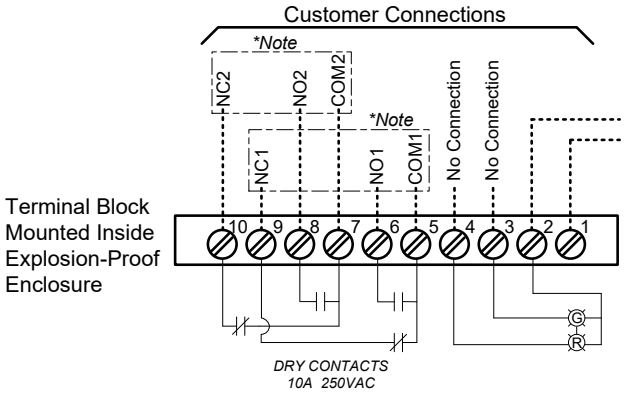


Electrical Connections

The supply voltage should be in accordance with the rating specified on the nameplate on the front cover. Connect supply voltage to terminals 1 & 2. There are no connections to terminals 3 & 4. Connect Normally Open (NO) and Normally Closed (NC) contacts to interlocking control contactors to permit the operation of pumps or valves when a proper ground is detected. Do not connect these contacts directly to motor loads.

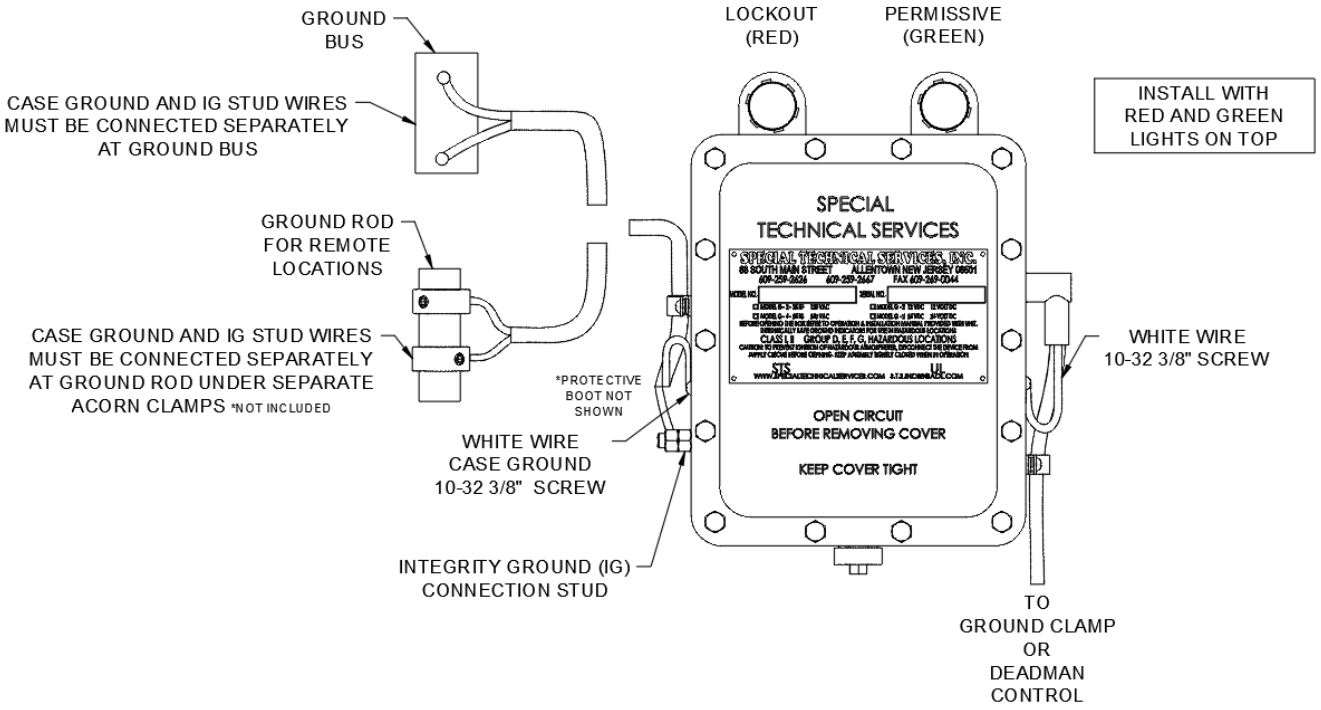
For AC systems, do not connect a 240VAC power source to a 120VAC rated board, this will open a non-replaceable safety fuse, disabling the unit entirely.

An optional power on/off switch rated for the environmental conditions can be installed to disconnect power to the unit while not in use. This will extend the life of the indicating bulbs.



Model	G2	G4	G12	G24
Nominal Voltage	120VAC	240VAC	12VDC	24VDC
Min Voltage	102VAC	204VAC	9VDC	18VDC
Max Voltage	130VAC	240VAC	15VDC	30VDC
Connection	N	L	-	-
Connection	L	L	+	+

*NOTE: NO: NORMALLY OPEN CONTACT THAT CLOSES WHEN GROUND IS ESTABLISHED
NC: NORMALLY CLOSED CONTACT THAT OPENS WHEN GROUND IS ESTABLISHED



Clamp Stowage Plate Installation

1. Remove contents from the kit bag (see included card for detailed instructions)
2a. For single point systems, remove the two bottom or side center bolts on the enclosure.
2b. For multipoint systems, remove the two bottom center bolts on enclosure
3. Place the Stowage Plate over the cover and align the two mounting holes
4. Add the (2) 5/16” flat washers (supplied) and fasten with the original enclosure bolts
5. Tighten the bolts to 11 ft-lbs. Do not overtighten.

Operation and Care

Attach the grounding clamp at the end of the ground cable to the metal frame of vehicle, vessel, railcar, barge, etc. The red light should turn off, and the green light should turn on when a proper ground connection is made. At the same time, all auxiliary contacts will change state, allowing pump, blower, etc. to operate.

The indicator lights operate the following during normal conditions:

Red	Green	Status
ON	OFF	A good ground connection is not verified, and the controller is in a non-permissive state, do not begin operation
OFF	ON	A good ground connection is verified, and the controller is in permissive state, operation may begin
OFF	OFF	No power to the grounding system, controller is in the non-permissive state, do not begin operation

Both the ground cable and operator cable should be inspected regularly to ensure there is no damage to the insulation. Damaged insulation may impair the proper operation of the grounding device. All hardware should also be inspected to ensure proper tightness. Please refer to the Maintenance Schedule on page 6 for all recommended maintenance and servicing.

Replacement Parts List

Circuit Board			
Part Number	**Voltage**	**Grounding System**	**Options**
CH-12	12 DC	G12	None
CH-24	24 VDC	G24	None
CH-120	120 VAC	G2	None
CH-240	240 AC	G4	None

Replacement Bulbs			
Part Number	**Voltage**	**Type**	**Color**
BI-12	12 VDC	Incandescent	Clear
BI-24	24 VDC		
BI-120	120 VAC		
BI-240	240 VAC		
BL-120W	120 VAC	LED	
BL-240W	240 VAC		
BL-DC	12/24 VDC		

Control Relay		
Part Number	**Voltage**	**Grounding System**
RL-12	12 VDC	G12
RL-24	24 VDC	G24
RL-120	120 VAC	G2
RL-240	240 VAC	G4

Replacement Lamps		
Part Number	**Description**	**Color**
ST-1-GA	Complete Lamp Assembly	Green
ST-1-GC	Lens Cover Only	Green
ST-1-RA	Complete Lamp Assembly	Red
ST-1-RC	Lens Cover Only	Red

Repair Parts & Kits	
FU-5	Fuse 5 Amp
MHW-0015	1/2" Nylon Strap
MHW-0016	3/8" Nylon Strap
RK-1	K78160A Clamp Repair Kit
RK-2	K78160ASRS Clamp Repair Kit
RK-3	Spring Repair Kit for K78160A
RK-4	Strain Release Strap Replacement Kit
RK-6	Isolated Point Repair Kit
RK-7	CP-1 Repair Kit
RK-10	PC Board Mounting Screws
RK-11	Single Clamp Stowage Plate with Hardware
RK-16	Multipoint Stowage Plate with Hardware
RK-17	Stainless Steel Hardware Conversion Kit
RK-19	StaticMag Holster Kit
RK-21	Rubber Boot and Nylon Strap Kit
RK-22	CB-250IP Stowage Hook
K78166	Phenolic Stud Repair Kit
N18660	N18660 Boot for Cable Stud
MSC-0031	Retracting Reel Ratchet Lock Mechanism
MSC-0011	Breather Drain

Replacement Ground Cables w/ Clamps			
Part Number	**Length ft (m)**	**Cord Type**	**Clamp or Switch**
CA-25	25 (7.62)	Coil	None
CA-25K			K78160A
CA-25KSRS			K78160A SRS Strain Release
CA-25GATIP			GATIP
CA-25REB			REB-IP
CA-25DBGP			Dual Ball Plug
CA-25SM3			StaticMag IP
CA-25DMS14			DMS-14 Deadman Switch
CA-25S		Straight	None
CA-25SK			K78160A
CA-25SKSRS			K78160A SRS Strain Release
CA-25SGATIP			GATIP
CA-25SREB			REB-IP
CA-25SDBGP			Dual Ball Plug
CA-25SSM3			StaticMag IP
CA-25SDMS14			DMS-14 Deadman Switch
CA-35	35 (10.67)	Coil	None
CA-35K			K78160A
CA-35KSRS			K78160A SRS Strain Release
CA-35GATIP			GATIP
CA-35REB			REB-IP
CA-35DBGP			Dual Ball Plug
CA-35SM3			StaticMag IP
CA-35DMS14			DMS-14 Deadman Switch
CA-35S		Straight	None
CA-35SK			K78160A
CA-35SKSRS			K78160A SRS Strain Release
CA-35SGATIP			GATIP
CA-35SREB			REB-IP
CA-35SDBGP			Dual Ball Plug
CA-35SSM3			StaticMag IP
CA-35SDMS14			DMS-14 Deadman Switch
CA-50	50 (15.24)	Coil	None
CA-50K			K78160A
CA-50KSRS			K78160A SRS Strain Release
CA-50GATIP			GATIP
CA-50REB			REB-IP
CA-50DBGP			Dual Ball Plug
CA-50SM3			StaticMag IP
CA-50DMS14			DMS-14 Deadman Switch
CA-50S		Straight	None
CA-50SK			K78160A
CA-50SKSRS			K78160A SRS Strain Release
CA-50SGATIP			GATIP
CA-50SREB			REB-IP
CA-50SDBGP			Dual Ball Plug
CA-50SSM3			StaticMag IP
CA-50SDMS14			DMS-14 Deadman Switch

Clamps	
Part Number	**Description**
K78160A	Aluminum Ground Clamp
K78160ASRS	Aluminum Ground Clamp w/ Strain Release
ASY-0043	GAT-IP Clamp
REB-IP	REB-IP Clamp
CP-1	Dual Ball Plug
SM3-135IP	StaticMag IP
DMS-14	Deadman Switch - Standard
CB-250IP	Bronze C Clamp, 2.50" Opening w/ Isolated Point

Maintenance Schedule

TASKS TO BE PERFORMED	Daily	Weekly	Monthly	Annually
External Assembly				
Check enclosure for damage				X
Check enclosure cover bolts are free from excessive corrosion			X	
Verify breather is installed and undamaged				X
Verify red lens cap is not cracked or damaged	X			
Verify green lens cap is not cracked or damaged	X			
Verify neoprene boots are installed properly on both sides of the enclosure			X	
Verify neoprene boots are not damaged or cracked on the enclosure			X	
Check Ground Cable insulation is free from damage	X			
Check Ground Cable is properly connected to stud and case			X	
Check Clamp Cable insulation is free from damage	X			
Check Clamp Cable is properly connected to stud and enclosure			X	
Check Clamp Cable is properly secured to the enclosure by white strap			X	
Check Clamp Cable is correctly terminated at the clamp		X		
Check Clamp Cable is correctly secured at clamp with white strap and zip ties		X		
Check Clamp Points are not worn and are free from corrosion		X		
Check Clamp Point insulators are not damaged		X		
Check Clamp Strain Release is secured to the cable at proper length (if applicable)		X		
Check Clamp Cable wire terminals are crimped and secured at the clamp		X		
Check Clamp Brass Screw is free from corrosion		X		
Internal Assembly				
Check PCB mounting screws are properly installed				X
Verify wiring from PCB to stud connected to Clamp Cable				X
Verify wiring from PCB to stud connected to Ground Cable				X
Check PCB is free from corrosion or water damage				X
Inspect relay contacts and internals are free from corrosion or water damage				X
Operational Test				
Verify the red lamp (ON) when source voltage is applied	X			
Verify the green lamp (OFF) when source voltage is applied	X			
Measure disconnected dry NC contacts resistance in a de-energized state (<1 Ω)				X
Verify green lamp (ON) when ground connection is made	X			
Verify red lamp (OFF) when ground connection is made	X			
Measure disconnected dry NO contacts resistance in an energized state (<1 Ω)				X

Troubleshooting

Condition	Possible Cause
No lights ON	• Incorrect or no power to control unit • Burned out light bulb • Input fuse F2 blown • Fuse F1 or F2 mounting clips are loose • Fault or damage in controller wiring or PCB
Green light ON when the system is not attached to vehicle or drum	• Incorrect installation of lens caps (Red on the left, Green on the right) • The isolating washer on clamp is missing or damaged • Stainless steel points are set at improper depth and are touching • Fault or damage in controller wiring
Red light ON when the system is attached to vehicle or drum	• High resistance between vehicle/drum and ground • Stainless steel points are not making contact with the metallic surface • Integrity ground cable not properly connected to a valid grounding point • Damage to any wiring outside of the explosion-proof enclosure • Fault or damage of K1 relay • Input fuse F1 blown • Photoreceptor is out of alignment to the green LED; a slight angular misalignment or tilt will cause the sensor to miss the light beam entirely
Light stations alternate in rapid succession	• Grounding clamp is not secure at attachment point • Fuse F1 or F2 mounting clips are loose • Photoreceptor is out of alignment to the green LED; a slight angular misalignment or tilt will cause the sensor to miss the light beam entirely • For 120VAC systems, verify the power supply selector switch is set for 120VAC

Call or email us for additional support

Additional Accessories

Accessory		Description
Retracting Reel	Standard Duty	Our standard duty retractable reel is built from steel and is lighter and smaller than our heavy-duty reel. Easy to install and easy to operate, this can use cable lengths from 25 ft. to 50 ft. Our standard duty reels have ratchet controlled spring rewind for precise distances. Built to meet a NEMA 4 rating, this style reel is best for areas where there is slight protection from physical damage, such as on the ceiling or behind a concrete barricade.
	Heavy Duty	Built entirely out of steel, the heavy-duty retractable reel is optimal for harsh environments where excessive wear and tear may occur. Easy to install and easy to operate, this can use cable lengths from 25 ft. to 100 ft. The reels have either fully automatic or ratchet controlled spring rewind. This rugged and watertight design is best for applications such as mounted to trucks or not protected by a roof.
Deadman Feature	Standard	Our standard Deadman Control option requires the handle to be activated in addition to an acceptable ground to enable the permissive interlock circuits in the ground monitoring system. As soon as an operator releases the handle, the system will open all contacts and indicate a red light.

Technical Specifications

Monitoring System

Power Supply (marked on nameplate)	120VAC Model: 102-130VAC, 50/60Hz 240VAC Model: 204-240VAC, 50/60Hz 12VDC Model: 9-15VDC 24VDC Model: 18-30VDC
Power Rating	5 Watts
Temperature range	-40°F to 130°F (-40°C to 55°C)
Fused Protection	5 Amps
Enclosure Type	NEMA 7, 8, & 9
Average Weight	23 lbs. (10 kg)
Certification/Approvals	UL 913 & UL 1203 Standards Class I, Division I, Group D Class II, Division I, Groups E, F, G
Monitoring Circuit	Intrinsically Safe
Loop Resistance of Clamp to Grounding Point	≤ 5 Ohms (continuously monitored)
Output Relay Contact Rating	2 Voltage Free (dry) Form C contacts (DPDT) Maximum contact rating: 10A, 277VAC 15A, 120VAC 15A, 30VDC
Integrity Lights	Status Indicator Lights: Red: Non-permissive Green: Permissive

Integrity Ground Cable

Type	Service Grade
Conductors	2 x 14 AWG Stranded Copper
Length	8ft

Operator Cable

Coil Cable

Type	Service Grade
Conductors	2 x 16 AWG Stranded Copper
Length	25 ft., 35 ft. or 50 ft.

Straight Cable

Type	Service Grade
Conductors	2 x 14 AWG Stranded Copper
Length	10ft. to 100 ft.

Multipoint Cable

Type	Service Grade
Conductors	2 x 16 AWG Stranded Copper
Length	10ft. to 25ft.

Grounding Clamp

Clamp Contacts	Stainless Steel
Clamp Body	Aluminum or Bronze