

Read entire manual  
before installing

# STS 300 Series Electronic Indicating Ground Assembly

## Installation and Operating Instructions



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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 ft 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, Group D; Class II, 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.



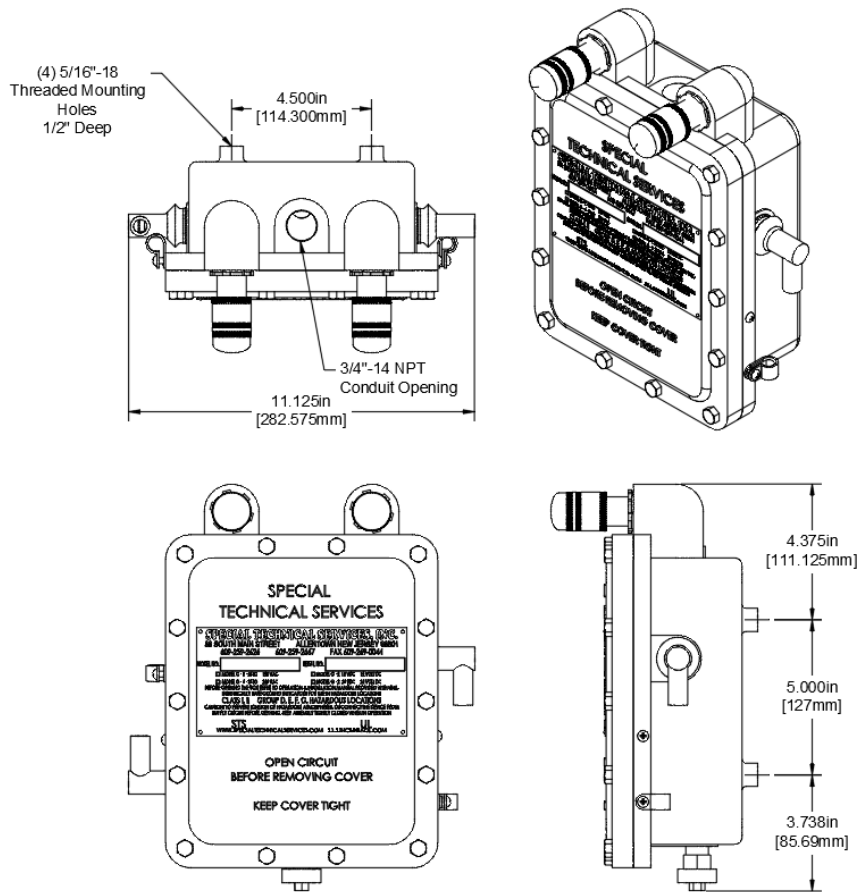
**Keep cover tightly closed when circuits are energized!**



**ALWAYS disconnect power and ventilate area before opening enclosure!**

## Mounting

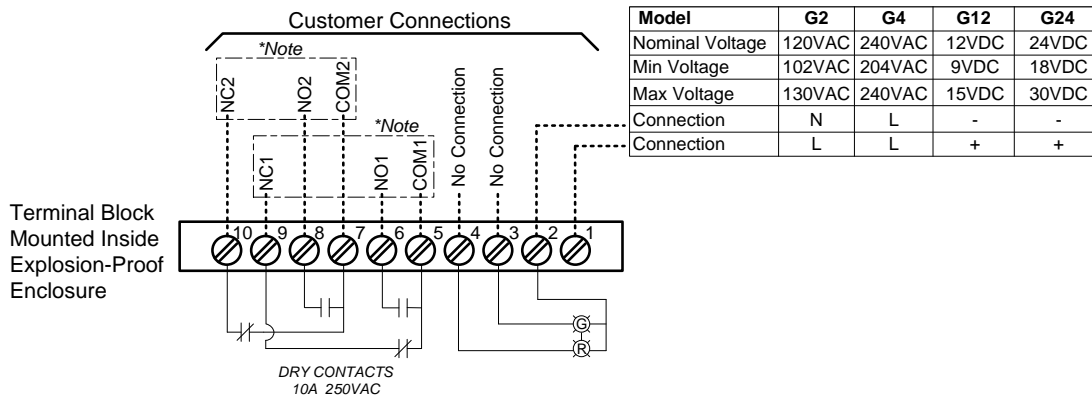
Four 5/16"-18 mounting holes are provided on the back of the enclosure to secure to a Unistrut type support. The optimal height of the installation is eye-level of the operator, with the indicator lights easily visible to the operator. A seal fitting (not included) is required immediately before the 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

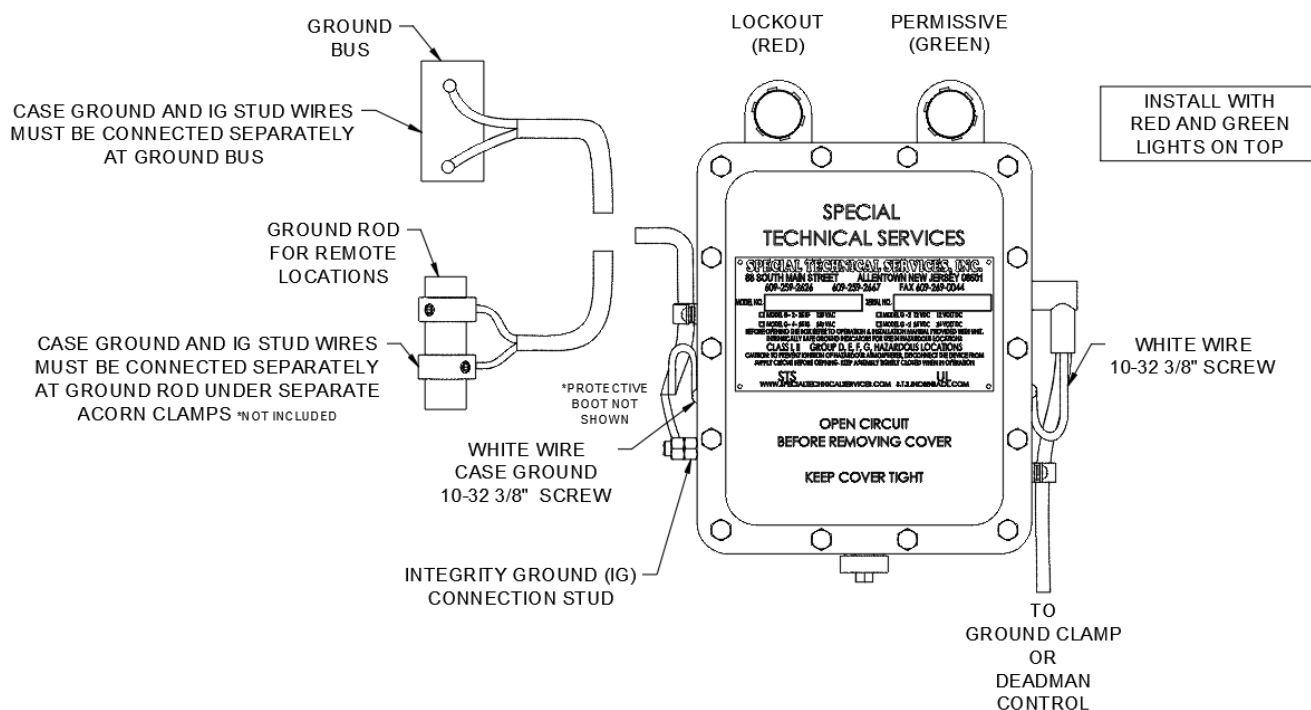
The supply voltage should be in accordance with the rating specified on the nameplate on the front cover. Connect supply voltage to terminals 1 & 2. There are no connections to terminals 3 & 4. Connect Normally Open (NO) and Normally Closed (NC) contacts to interlocking control contactors to permit the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

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



## 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 ground cables 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

<b>Circuit Board</b>			
Part Number	Voltage	Grounding System	Options
CH-12	12 DC	G12	None
CH-12DM			Deadman
CH-24	24 VDC	G24	None
CH-24DM			Deadman
CH-120	120 VAC	G2	None
CH-120DM			Deadman
CH-240	240 AC	G4	None
CH-240DM			Deadman

<b>Replacement Light Bulbs</b>			
Part Number	Voltage	Type	Color
BI-12	12 VDC	Incandescent	Clear
BI-24	24 VDC		
BI-120	120 VAC		
BI-240	240 VAC		
BL-120G	120 VAC	LED	Green
BL-120R			Red
BL-DC	12/24 VDC		White

<b>Control Relay</b>		
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

<b>Replacement Lamps</b>		
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

<b>Replacement Fuses</b>	
Part Number	Description
FU-1	Fuse 1 Amp
FU-5	Fuse 5 Amp

<b>Deadman Switch</b>	
Part Number	Description
DMS-14	STS RD14 Deadman Switch, Standard
DMS-15	STS RD15 Deadman Switch, Cast Aluminum

<b>Retractable Cable Reel</b>		
Part Number	Duty	Description
AW-7-25K	Standard	25 ft Cable with K78160A Clamp
AW-7-50K	Standard	50 ft Cable with K78160A Clamp
GW-7-25K	Heavy	25 ft Cable with K78160A Clamp
GW-7-50K	Heavy	50 ft Cable with K78160A Clamp
GW-7-100K	Heavy	100 ft Cable with K78160A Clamp

<b>Replacement Cords</b>					
Part Number	Length ft (m)	Cord Type	Clamp or Switch		
CA-15SK	15 (4.57)	Straight	K78160A		
CA-25	25 (7.62)	Coil	None		
CA-25DBGP			Dual Ball Plug		
CA-25GATIP			GATIP		
CA-25K			K78160A		
CA-25KSRS			K78160A SRS Strain Release		
CA-25DMS14		DMS-14 Deadman Switch			
CA-25DMS15		DMS-15 Deadman Switch			
CA-25S		Straight	None		
CA-25DBGP			Dual Ball Plug		
CA-25SK			K78160A		
CA-25SKSRS	K78160A SRS Strain Release				
CA-25SDMS14	DMS-14 Deadman Switch				
CA-25SDMS15	DMS-15 Deadman Switch				
CA-35	35 (10.67)	Coil	None		
CA-35K			K78160A		
CA-35S		Straight	None		
CA-35SDBGP			Dual Ball Plug		
CA-35SK			K78160A		
CA-35KSRS			K78160A SRS Strain Release		
CA-50			50 (15.24)	Coil	None
CA-50K					K78160A
CA-50DMS14				DMS-14 Deadman Switch	
CA-50DMS15				DMS-15 Deadman Switch	
CA-50S	Straight	None			
CA-50SDBGP		Dual Ball Plug			
CA-50SK		K78160A			
CA-50SKSRS		K78160A SRS Strain Release			
CA-50SDMS14		DMS-14 Deadman Switch			
CA-50SDMS15		DMS-15 Deadman Switch			

<b>Replacement Ground Clamps</b>	
Part Number	Description
K78160A	Aluminum Ground Clamp with Isolated Points
K78160ASRS	Aluminum Ground Clamp w/strain relief and release
CP-1	#1 Contactor Plug, Dual Ball
REB	Aluminum Ground Clamp
REB-IP	Aluminum Ground Clamp with Isolated Points
VUD-IP	Aluminum Ground Clamp with Isolated Points
GAT-IP	Aluminum GAT Clamp with Isolated Points
G40-IP	Bronze Ground Clamp with Isolated Points

<b>Clamp Replacement Parts</b>	
Part Number	Description
K7817512	K7817512 1/2" Nylon Strap
K7817538	K7817538 3/8" Nylon Strap
KH-1	Handle for K Clamp (isolated point side)
KH-2	Handle for K Clamp (2 point side)
RK-1	Repair Kit for K78160A Clamp
RK-2	Repair Kit for K78160ASRS Clamp
IP Kit	IP Kit consists of 2 washers/1 tube

<b>Miscellaneous</b>	
Part Number	Description
K78166	Phenolic Stud, Phenolic Bushing Ring, Brass Bolt and Nut
IN-NT	Brass Insulator Nut
IN-ST	Phenolic Insulator Stud Bushing
N18660	Rubber Protection Boot for Cable Stud
EP-0416	Clamp Stowage Plate

## Maintenance Schedule

TASKS TO BE PERFORMED	Daily	Weekly	Monthly	Annually
<b>External Assembly</b>				
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		
<b>Internal Assembly</b>				
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
<b>Operational Test</b>				
Verify the red lamp (ON) when source voltage is applied	X			
Verify the green lamp (OFF) when source voltage is applied	X			
Measure dry NC contacts resistance in a de-energized state				X
Verify green lamp (ON) when ground connection is made	X			
Verify red lamp (OFF) when ground connection is made	X			
Measure dry NO contacts resistance in an energized state				X

## Troubleshooting

Condition	Possible Cause
No lights ON	<ul style="list-style-type: none"> <li>No power to control unit</li> <li>Burned out light bulb</li> <li>Input fuse F2 blown</li> <li>Fault or damage in controller wiring or PCB</li> </ul>
Green light ON when the system is not attached to vehicle or drum	<ul style="list-style-type: none"> <li>Incorrect installation of lens caps (Red on the left, Green on the right)</li> <li>The isolating washer on clamp is missing or damaged</li> <li>Stainless steel points are set at improper depth and are touching</li> <li>Fault or damage in controller wiring</li> </ul>
Red light ON when the system is attached to vehicle or drum	<ul style="list-style-type: none"> <li>High resistance between vehicle/drum and ground</li> <li>Stainless steel points are not making contact with the metallic surface</li> <li>Integrity ground cable not connected to a valid grounding point</li> <li>Damage to any wiring outside of the explosion-proof enclosure</li> <li>Fault or damage of K1 relay</li> <li>Input fuse F1 blown</li> </ul>

Call or email us for additional support

## Additional Accessories

Accessory		Description
Retracting Reel	Standard Duty	Our standard duty retractable reel is built from cast aluminum, which 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 depresses the handle, the system will open all contacts and indicate a red light.
	Timing	The enhanced Deadman option is to also have an integrated timer to ensure the operator has not defeated the Deadman control by tampering with the handle. After an adjustable time delay (15 seconds to 10 minutes) the operator must reactivate the handle to continue.

## 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 Intrinsically Safe
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	3 x 16 AWG Stranded Copper
Length	25 ft. or 50 ft.

#### Straight Cable

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

### Grounding Clamp

Clamp Contacts	Stainless Steel
Clamp Body	Aluminum or Bronze