

Series - S Track Busway Installation, Operation, And Maintenance Manual

250A -1200A S5 US SYSTEMS

Starline
A brand of  legrand

Revision Register

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Table of Contents

SECTION 1: PRODUCT SPECIFICATION	4
Series – S5 Track Busway Specifications	5
SECTION 2: INSTALLATION INSTRUCTIONS	14
System Layout.....	15
Feed Lug Reference Chart.....	15
Ground Options.....	21
End Feed Installation	22
Joint Kit Installation	23
Hanger Bolt Installation.....	24
SECTION 3: PLUG-IN INSERTION INSTRUCTIONS.....	25
Plug-In Unit Insertion	26
Closure Strip Insertion	27
Seal Assembly Instructions	28
Flange Bolt Tightening	29
Series - S Enclosure Style Options.....	30
Series - S5 Plug-in Unit Clearances	31
SECTION 4: FIELD SERVICES AND WARRANTY.....	33
Starline Services.....	34
Standard Factory Warranty	37
Standard Factory Warranty Process	37
SECTION 5: MAINTENANCE.....	38
Starline Busway Recommended Maintenance.....	39

1

Section 1: Product Specification



Series – S5 Track Busway Specifications

1 SUMMARY

- 1.1 This specification covers the electrical characteristics and general requirements for an IP54-Rated track busway system, hereafter referred to as the “Series – S5 Busway” or the “S5 System”. The system shall be designed primarily for power distribution of electrical power. Once installed, Series – S5 Busway will provide a simple, versatile, fast and economic means of distributing power. Loads fed from Series – S5 Busway plug-in units can be added or removed without shutting down the busway. The following specification only applies to Series – S5 Busway.
- 1.2 Specification includes:
 - 1.2.1 Three-phase Series – S5 Busway with the following features:
 - 1.2.1.1 Extruded aluminum busway housing with conductors
 - 1.2.1.2 Power feed
 - 1.2.1.3 Plug-in units for power distribution
 - 1.2.1.4 Monitoring
 - 1.2.1.5 Installation tool and joint kits
 - 1.2.1.6 Optional accessories

2 STANDARDS AND CERTIFICATION

- 2.1 The S5 System shall be designed and manufactured to the following standards:
 - 2.1.1 Electrical Testing Laboratories (ETL) (US/Canada) Certified to UL 857.
 - 2.1.2 International Electrotechnical Commission (IEC) Standard, IEC 61439-1, edition 2.0 – Low Voltage Switchgear and Controlgear Assemblies, Part 1: Type Tested and Partially Type Tested Assemblies
 - 2.1.3 International Electrotechnical Commission (IEC) Standard, IEC 61439-6, edition 1.0 – Low Voltage Switchgear and Controlgear Assemblies, Part 6: Particular Requirements for Busbar Trunking Systems (Busways).
 - 2.1.4 CE (Europe) Certified to IEC 61439-1 and IEC 61439-6.
 - 2.1.5 NOM (Mexico) Certified to NOM-003-SCFI-2000
 - 2.1.6 National Electric Code (NEC) – Article 368 – Busways
 - 2.1.7 National Fire Protection Agency (NFPA) – 70, National Electric Code (NEC)
 - 2.1.8 National Electrical Manufacturers Association (NEMA) – AB1, Molded Case Circuit Breakers and Molded Case Switches (if applicable)

- 2.1.9 National Electrical Manufacturers Association (NEMA) – KS-1, Enclosed and Miscellaneous Distribution Equipment Switches (600 VAC) (if applicable)
- 2.1.10 International Electrotechnical Commission (IEC) – 60529, Degrees of Protection Provided by Enclosures (IP Code)
- 2.1.11 National Electrical Manufacturers Association (NEMA) – 250, Enclosures for Electrical Equipment (1000 Volts Maximum)
- 2.1.12 NEMA BU 1.1. "General Instructions for Proper Handling, Installation, Operation and Maintenance of Busway Rated 600V or less"

3 SYSTEM DESCRIPTION

3.1 Electrical Requirements

- 3.1.1 System voltage: up to 600V
- 3.1.2 Frequency: 50/60 Hz.
- 3.1.3 Ampacity: 250, 400, 500, 600, 800, 1000 and 1200
- 3.1.4 Neutral Ampacity: Minimum of 100% of rating (optional 200% rating for 250A, 400A)
- 3.1.5 Short circuit rating of each busway must be:
 - 3.1.5.1 250A System: 35kAIC up to 600V
 - 3.1.5.2 400A System: 42kAIC up to 600V
 - 3.1.5.3 400A Compact System: 35kAIC at 600V
 - 3.1.5.4 500A System: 42kAIC up to 600V
 - 3.1.5.5 600A System: 42kAIC up to 600V
 - 3.1.5.6 800A Hybrid System: 65kAIC up to 600V
 - 3.1.5.7 800A Copper System: 42kAIC up to 600V, 50kAIC up to 480V
 - 3.1.5.8 1000A System: 65kAIC up to 600V, 75kAIC up to 480V
 - 3.1.5.9 1200A System: 65kAIC up to 600V, 75kAIC up to 480V
- 3.1.6 Conductors: 3 phase conductors, 1 neutral conductor solid copper, tin plated
- 3.1.7 Grounding: Aluminum casing or 1 dedicated conductor solid copper, tin plated

3.2 Operational Requirements

- 3.2.1 Environmental Conditions: Series – S5 Busway shall be capable of operating continuously in the following environmental conditions without mechanical or electrical damage, degradation or derating of operating capability.

- 3.2.1.1 Series – S5 Busway shall operate with continuous load with no derating up to 40 degrees Celsius, 0.95 multiplier at 45 degrees C., 0.90 multiplier at 50 degrees C, 0.85 at 55 degrees C and 0.825 at 60 degrees C
- 3.2.1.2 Relative humidity: 0 to 95 percent, noncondensing
- 3.2.1.3 Altitude: Sea level to 6600 feet (2000m)
- 3.2.1.4 Dusty or wet environments requiring up to IP54 or NEMA 3R ingress protection ratings
- 3.2.1.5 Indoor or “protected outdoor” environments where the system is not directly exposed to weather elements (rain, sleet, snow, ice, sun, etc.)
- 3.2.2 Safety and Security Requirements: The S5 System shall include the following minimum features:
 - 3.2.2.1 Minimum IP54 ingress protection rating for Series – S5 Busway and plug-in units
 - 3.2.2.2 Minimum NEMA 3R enclosure rating for Series – S5 Busway and plug-in units
 - 3.2.2.3 Floor visible and operable circuit breakers to meet NEC 404.7 and 404.8
 - 3.2.2.4 Circuit breaker lockout feature
 - 3.2.2.5 Enclosure locking feature for plug-in units for safety and security
 - 3.2.2.6 UV light and corrosion resistant system components
- 3.3 Manufacturers Qualification
 - 3.3.1 A minimum of 30 years’ experience in the manufacturing of the busway products.
- 3.4 Manufacturing Requirements
 - 3.4.1 All S5 System components and accessories shall be manufactured by Starline Holdings, LLC.

Starline Holdings, LLC
168 Georgetown Rd.
Canonsburg, PA 15317
(724) 597-7800

4 SUBMITTALS

- 4.1 Submittals shall be in accordance with specified procedures. Submit shop drawing and product data for record purposes prior to shipment. Shop drawings for S5 Systems must include:
 - 4.1.1 Detailed equipment assemblies and dimensions, weights, location and identification of each field connection
 - 4.1.2 Wiring Connection: For power and monitoring wiring
 - 4.1.3 Orientation of plug-in units face in final installation
 - 4.1.4 Include plug-in schedule with detailed description
- 4.2 Provide electrical characteristics and connection requirements for the system and accessories.
- 4.3 Indicate special receiving and handling procedures.

5 WARRANTY

- 5.1 Series – S5 Busway manufacturer shall guarantee the entire system against defective material and workmanship for a period of one (1) year from date of shipment.
- 5.2 Additional years of warranty and ability for start-up services must be an option if required per drawings.
- 5.3 Warranty shall only cover S5 System components manufactured by Starline Holdings LLC, and with a minimum IP54 rating. Use of any aftermarket components is strictly prohibited
- 5.4 Series – S5 Busway shall only be installed in a vertical orientation with the open access channel facing downward. This is required to ensure the product meets the ingress protection requirements. Improper installation can result in system damage and void the product warranty

6 PRODUCT COMPONENTS

- 6.1 Series – S5 Busway Housing
 - 6.1.1 Extruded aluminum housing certified to serve as a 100% ground. Standard housing lengths are 5 and 10 feet. Additional lengths can be provided upon factory consultation. The housing should be properly extruded with a slot to receive rod mount hangers to hang from a ceiling. This housing should be open on the bottom to accept plug-in units anywhere along its length. The open channel must be sealed between plug-in units utilizing the manufacturer's closure strip.
 - 6.1.2 Busway housing shall be protected against corrosion utilizing protective coating (per MIL-DTL-5541), while maintaining case grounding capability with the option for powder coating.

- 6.1.3 All conductors shall be made of copper, or of a hybrid (copper/aluminum) material, and sized to handle 100% of its rating continuously up to the maximum ambient temperature. The conductors shall be electrically isolated from the housing. All insulators must be UL and IEC compliant.
 - 6.1.3.1 Ground conductor: An internal, 100% ground conductor is to be supplied if shown on the drawings
 - 6.1.3.2 Oversized neutral: An oversized, 200% neutral conductor shall be supplied, where applicable, if shown on the drawings
- 6.1.4 Busway housing sections shall be joined together by a 'press fit' that requires no bolted connection and no future maintenance. These housing sections at these "joint" locations shall include a smooth flat machined surface to accommodate the manufacturer's specified Series – S5 joint kit with appropriate sealing components.
- 6.1.5 Busway shall have an included data channel built into the housing to accommodate optional, color-coded data cabling accessories
- 6.1.6 Busway housing shall be available in standard silver, red, blue, black, white or custom RAL colors
- 6.2 Series – S5 Power Feeds
 - 6.2.1 The power feed shall provide the connections from the incoming cables to the busway system. The power feed shall have an internal connection to a section of busway conductors. End feeds and above feeds shall be available depending upon desired feed location. Feeds shall have the option to be designed with mechanical or compression type lugs.
 - 6.2.2 Power feeds shall be provided by the manufacturer with appropriate hangers, gland plates, and sealing components to meet IP54 and NEMA 3R requirements.
- 6.3 Series – S5 Plug-In Units
 - 6.3.1 Plug-in units shall be polarized to avoid incorrect installation
 - 6.3.2 Plug-in units can be added, removed or repositioned without de-energizing the busway
 - 6.3.3 Plug-in units shall use circuit protection as directed in the schedule on the project drawings
 - 6.3.4 Plug-in units shall be capable of being built with customer-specified circuit protection, outlets and accessories
 - 6.3.5 Plug-in units shall have a soldered wire connection on each stab that picks up power from the busway. This wire shall then be directly connected to the line side of the circuit breaker. The use of crimp connectors is prohibited

- 6.3.6 Plug-in units shall be "turn-n-lock" style, to allow for seamless insertion into the busway
- 6.3.7 Plug-in units shall be supported with bolt-on tabs to secure units to the busway
- 6.3.8 Plug-in units that include drop cords shall be manufactured with cord grips and receptacles as specified in the drawings
- 6.3.9 Plug-in units shall be configured by the manufacturer to balance the load based on quantity of plug-in unit types provided
- 6.3.10 Plug-in units shall have a minimum of 10kAIC and the ability to obtain a maximum of 200kAIC
- 6.3.11 Plug-in units shall be rated to IP54 and NEMA 3R. Plug-in units are interchangeable within the S5 System
- 6.3.12 Plug-in units shall be available with optional, revenue grade metering devices
- 6.3.13 Plug-in units' authenticity shall be proven by the presence of a Starline ratings label
- 6.3.14 Plug-in units shall require a Series – S5 specified seal assembly system between the plug-in unit and the busway housing. Standard track busway plug-in units are not compatible with Series – S5 Busway
- 6.3.15 Plug-in units shall be designed to maintain visibility of breaker status, through either a transparent cover and/or manufacturer designed breaker handle system

6.4 Accessories (*OPTIONAL*)

- 6.4.1 Integrated cable management solutions as part of the aluminum housing, capable of handling accessories such as the data channel cover, hinged wire way, data cable strap, and multi-use mounting bracket
 - 6.4.1.1 Data channel covers are color-coded for integrated cable management solutions

6.5 Monitoring (*OPTIONAL*)

- 6.5.1 Power Feed Monitoring: The power feed is to be provided with the following power measurements and remote monitoring interface:
 - 6.5.1.1 Input Voltage (L/L and L/N)
 - 6.5.1.2 Current per Phase (Min/Max)
 - 6.5.1.3 Voltage per Phase (Min/Max)
 - 6.5.1.4 Neutral Current
 - 6.5.1.5 Power Factor
 - 6.5.1.6 Frequency
 - 6.5.1.7 Power (Active, Reactive, Apparent)

- 6.5.1.8 Demand (kWH)
- 6.5.1.9 Current Peak Demand
- 6.5.1.10 Power/End Feed Lug Temperature
- 6.5.1.11 Communications is Modbus RTU, Modbus TCP, Ethernet SNMP, BACnet and optional wireless

6.5.2 Plug-In Unit Monitoring: The plug-in units as indicated on the schedule on the project drawings shall have the following power measurements and remote monitoring interface.

- 6.5.2.1 Input Voltage (L/L and L/N)
- 6.5.2.2 Current per Phase (Min/Max)
- 6.5.2.3 Voltage per Phase (Min/Max)
- 6.5.2.4 Power Factor
- 6.5.2.5 Frequency
- 6.5.2.6 Power (Active, Reactive, Apparent)
- 6.5.2.7 Demand (kWH)
- 6.5.2.8 Current Peak Demand
- 6.5.2.9 Accuracy is better than 0.5%
- 6.5.2.10 Communications is Modbus RTU, Modbus TCP, Ethernet SNMP, BACnet and optional wireless plus available daisy chain Ethernet topology
- 6.5.2.11 Optional display

7 INSTALLATION

- 7.1 The contractor shall install Series – S5 Busway in accordance with the manufacturer's instructions
 - 7.1.1 End feeds to be bottom or side fed only – never from the top
 - 7.1.2 Busway runs shall consist of lengths as shown on the drawings
 - 7.1.3 The plug-in unit orientation shall be indicated on the drawings
 - 7.1.4 Hanging of the busway: The system shall be hung from a structure above or beside the busway, using the supplied busway hangers. The hangers shall connect to the busway, and to an all-thread rod provided by the installing contractor. The maximum spacing between hangers along the busway is 10 feet
 - 7.1.4.1 Series – S5 Busway shall only be installed in a vertical orientation with the open access channel facing downward

- 7.1.5 Connecting busway sections: The installer will use a joint kit designed specifically for Series – S5 Busway to combine two sections of busway. This kit includes housing couplers, coupler covers, bus connector set and joint seal. An installation tool must be ordered from the manufacturer to properly connect a busway joint. Once connected, the joint requires no bolted connection or further maintenance
- 7.1.6 Terminating busway runs: Series – S5 Busway end caps shall be required at the end of each run
- 7.1.7 Sealing the open access channel: The closure strip is a required component of the S5 System. The closure strip must be cut and fitted per the manufacturer's installation instructions to adequately cover ingress of the open channel. Closure Strip is included with each ordered housing section of Series – S5 Busway, and can be field modified for fit.

8 DELIVERY, STORAGE AND HANDLING

- 8.1 Deliver, store and handle busway assemblies according to NEMA BU 1.1. "General Instructions for Proper Handling, Installation, Operation and Maintenance of Busway Rated 600V or less" and/or according with the manufacturer's instructions.

9 FIELD QUALITY CONTROL

- 9.1 Manufacturers Field Services: The S5 System shall be accompanied with a required service package of Level 3 Commissioning. Additional service packages with features including both on-site and post-installation support are available. These services include:
 - 9.1.1 On-site Training
 - 9.1.1.1 Pre-installation site visit and contractor training with a Starline Certified Technician prior to installation to ensure best practices are followed throughout the installation process
 - 9.1.2 Installation Inspection, Commissioning and Certification
 - 9.1.2.1 Level 3 Commissioning
 - 9.1.2.1.1 Inspection of each run of busway to ensure all parts are installed as intended
 - 9.1.2.1.2 Inspection of each joint and connection point of the busway
 - 9.1.2.1.3 Inspection of the conduit entry to each busway power feed verifying no strain on the feed
 - 9.1.2.1.4 Ensure that the busway is correctly and safely mounted
 - 9.1.2.1.5 Verify the ends of the busway have been capped off

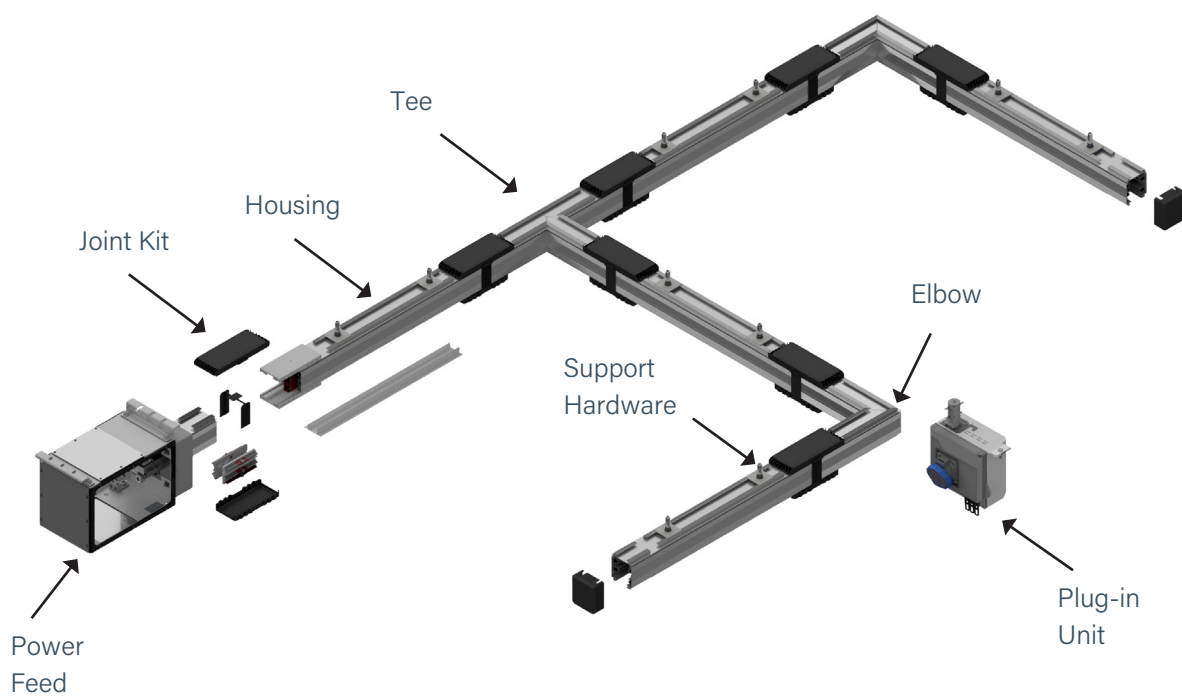
- correctly
- 9.1.2.1.6 Verify correct connection at power feeds according to single-line diagram
- 9.1.2.1.7 Completion and submission of L2 system startup checklist
- 9.1.2.1.8 Perform insulation resistance tests of each busway, phase to phase, and phase to ground (Megger) tests
- 9.1.2.1.9 A Starline Technician will submit a full report and certification of findings
- 9.1.2.1.10 All Initial Series – S5 installations must be reviewed and commissioned by an approved Starline manufacturing representative.
- 9.1.2.2 Level 4 Commissioning
 - 9.1.2.2.1 Starline Certified Technicians will exercise and operate the Starline busway by providing load testing
 - 9.1.2.2.2 Thermal scanning is performed as load is applied and documented, verifying the busway has been installed correctly and all components are torqued and functioning as intended
 - 9.1.2.2.3 Additional Starline warranty is provided upon completion
- 9.1.3 9.1.3 IR Scanning and other ongoing support
- 9.1.4 9.1.4 Meter Programming
- 9.1.5 9.1.5 Extended Warranty Programs (Inspection & Commissioning)
- 9.1.6 9.1.6 24/7 Emergency Service and Phone Support

10 DOCUMENTATION

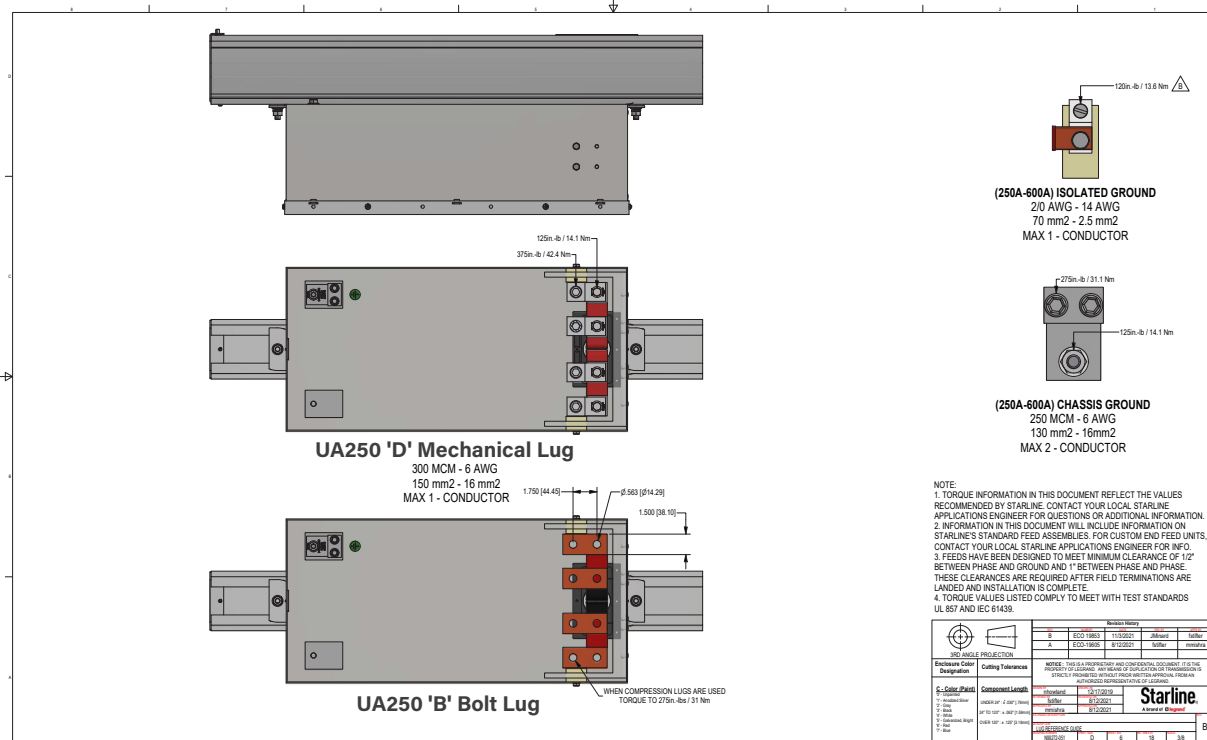
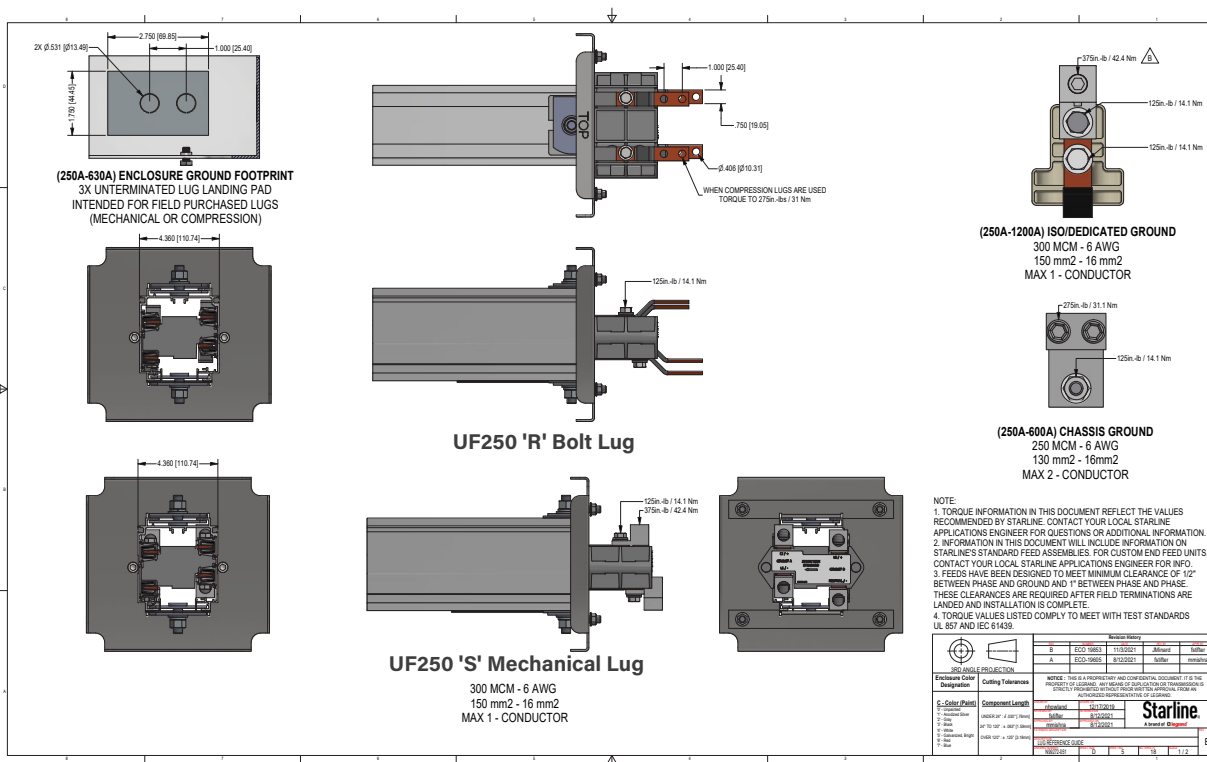
- 10.1 The following documentation shall be available to assist in product selection and installation, and is available for download at <http://downloads.starlinepower.com/>:
 - 10.1.1 Track Busway Product Selection Guide
 - 10.1.2 10.1.2 Operation, Installation and Maintenance Manuals
- 10.2 Product drawings shall be rendered and provided at the time of ordering

Section 2: Installation Instructions

S5 System Layout



Feed Lug Reference Chart



(250A-630A) ENCLOSURE GROUND FOOTPRINT
3X UNTERMINATED LUG LANDING PAD
INTENDED FOR FIELD PURCHASED LUGS
(MECHANICAL OR COMPRESSION)

CF400 'S' Mechanical Lug
(2) 250 MCM - 1/0 or (1) 600 MCM - 4 AWG
(2) 120 mm² - 50 mm² or (1) 300 mm² - 25 mm²
MAX 2 - CONDUCTOR

(250A-1200A) ISO/DEDICATED GROUND
300 MCM - 6 AWG
150 mm² - 16 mm²
MAX 1 - CONDUCTOR

CF400 'B' Bolt Lug

(250A-600A) CHASSIS GROUND
250 MCM - 6 AWG
130 mm² - 16mm²
MAX 2 - CONDUCTOR

NOTE:
1. TORQUE INFORMATION IN THIS DOCUMENT REFLECT THE VALUES RECOMMENDED BY STARLINE. CONTACT YOUR LOCAL STARLINE APPLICATIONS ENGINEER FOR QUESTIONS OR ADDITIONAL INFORMATION.
2. INFORMATION IN THIS DOCUMENT WILL INCLUDE INFORMATION ON STARLINE'S STANDARD FEED ASSEMBLIES. FOR CUSTOM END FEED UNITS, CONTACT YOUR LOCAL STARLINE APPLICATIONS ENGINEER FOR INFO.
3. FEEDS HAVE BEEN DESIGNED TO MEET MINIMUM CLEARANCE OF 1/2" BETWEEN PHASE AND GROUND AND 1" BETWEEN PHASE AND PHASE. THESE CLEARANCES ARE REQUIRED AFTER FIELD TERMINATIONS ARE LANDED AND INSTALLATION IS COMPLETE.
4. TORQUE VALUES LISTED COMPLY TO MEET WITH TEST STANDARDS UL 857 AND IEC 61439.

Enclosure Color Designation	Cutting Tolerances	Component Labels	Starline
B	ECO 10001	1150001	Yellow
A	ECO 10001	8100001	Yellow

Starline
A brand of Legrand

(250A-630A) ENCLOSURE GROUND FOOTPRINT
3X UNTERMINATED LUG LANDING PAD
INTENDED FOR FIELD PURCHASED LUGS
(MECHANICAL OR COMPRESSION)

UF400 'R' Bolt Lug

(250A-1200A) ISO/DEDICATED GROUND
300 MCM - 6 AWG
150 mm² - 16 mm²
MAX 1 - CONDUCTOR

UF400 'S' Mechanical Lug
(2) 250 MCM - 1/0 or (1) 600 MCM - 4 AWG
(2) 120 mm² - 50 mm² or (1) 300 mm² - 25 mm²
MAX 2 - CONDUCTOR

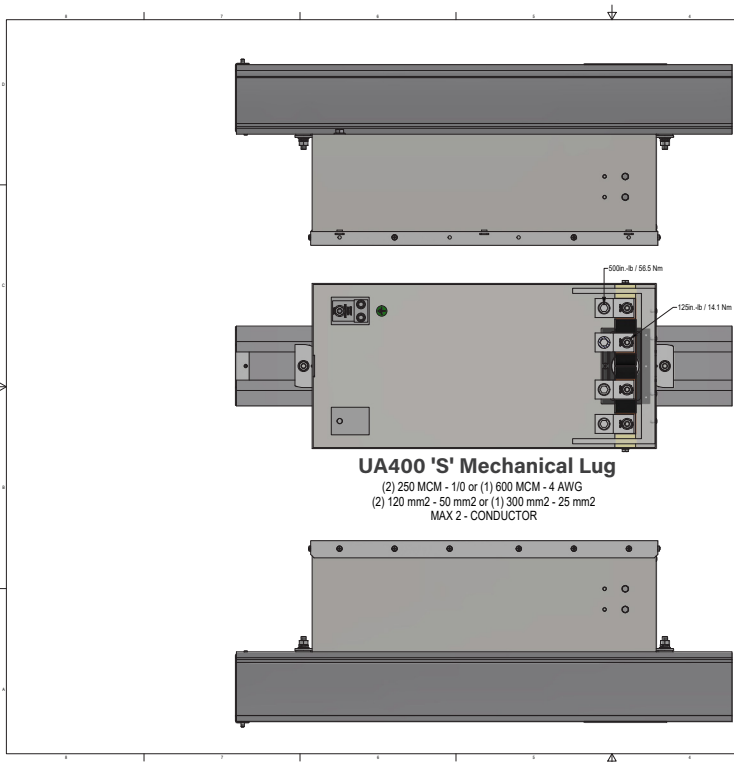
(250A-600A) CHASSIS GROUND
250 MCM - 6 AWG
130 mm² - 16mm²
MAX 2 - CONDUCTOR

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Enclosure Color Designation	Cutting Tolerances	Component Labels	Starline
B	ECO 10001	1150001	Yellow
A	ECO 10001	8100001	Yellow

Starline
A brand of Legrand

Feed Lug Reference Chart



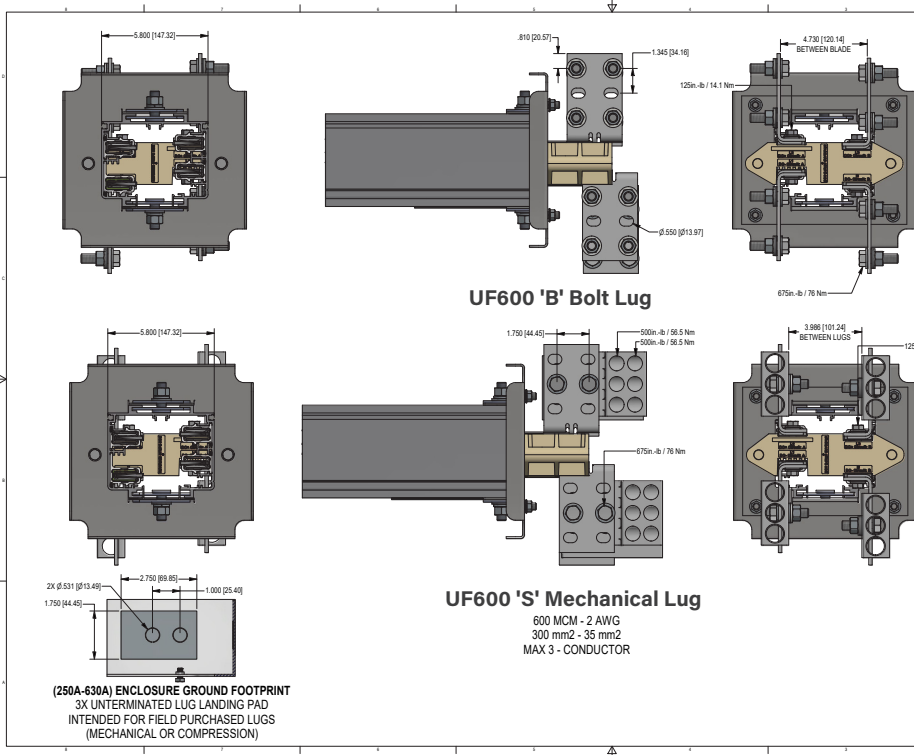
UA400 'S' Mechanical Lug
 (2) 250 MCM - 1/0 or (1) 600 MCM - 4 AWG
 (2) 120 mm² - 50 mm² or (1) 300 mm² - 25 mm²
 MAX 2 - CONDUCTOR

(250A-1200A) ISO/DEDICATED GROUND
 300 MCM - 6 AWG
 150 mm² - 16 mm²
 MAX 1 - CONDUCTOR

(250A-600A) CHASSIS GROUND
 250 MCM - 6 AWG
 130 mm² - 16 mm²
 MAX 2 - CONDUCTOR

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Enclosure Color Designation	Cutting Tolerances	Component Length	Starline
Gray (P10)	±0.005" (±0.127 mm)	Standard	Starline
Black (P10)	±0.005" (±0.127 mm)	Standard	Starline
White (P10)	±0.005" (±0.127 mm)	Standard	Starline
Blue (P10)	±0.005" (±0.127 mm)	Standard	Starline
Green (P10)	±0.005" (±0.127 mm)	Standard	Starline
Yellow (P10)	±0.005" (±0.127 mm)	Standard	Starline
Orange (P10)	±0.005" (±0.127 mm)	Standard	Starline
Red (P10)	±0.005" (±0.127 mm)	Standard	Starline
Purple (P10)	±0.005" (±0.127 mm)	Standard	Starline
Pink (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Blue (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Green (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Yellow (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Orange (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Red (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Purple (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Pink (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Gray (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Black (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light White (P10)	±0.005" (±0.127 mm)	Standard	Starline
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Light Gray (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Black (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light White (P10)	±0.005" (±0.127 mm)	Standard	Starline



UF600 'B' Bolt Lug
 600 MCM - 2 AWG
 300 mm² - 35 mm²
 MAX 3 - CONDUCTOR

UF600 'S' Mechanical Lug
 600 MCM - 2 AWG
 300 mm² - 35 mm²
 MAX 3 - CONDUCTOR

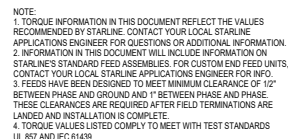
(250A-1200A) ISO/DEDICATED GROUND
 300 MCM - 6 AWG
 150 mm² - 16 mm²
 MAX 1 - CONDUCTOR

(250A-600A) CHASSIS GROUND
 250 MCM - 6 AWG
 130 mm² - 16 mm²
 MAX 2 - CONDUCTOR

(250A-630A) ENCLOSURE GROUND FOOTPRINT
 3X UNTERMINATED LUG LANDING PAD
 INTENDED FOR FIELD PURCHASED LUGS
 (MECHANICAL OR COMPRESSION)

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 4. TORQUE VALUES LISTED COMPLY TO MEET WITH TEST STANDARDS UL 857 AND IEC 61439.

Enclosure Color Designation	Cutting Tolerances	Component Length	Starline
Gray (P10)	±0.005" (±0.127 mm)	Standard	Starline
Black (P10)	±0.005" (±0.127 mm)	Standard	Starline
White (P10)	±0.005" (±0.127 mm)	Standard	Starline
Blue (P10)	±0.005" (±0.127 mm)	Standard	Starline
Green (P10)	±0.005" (±0.127 mm)	Standard	Starline
Yellow (P10)	±0.005" (±0.127 mm)	Standard	Starline
Orange (P10)	±0.005" (±0.127 mm)	Standard	Starline
Red (P10)	±0.005" (±0.127 mm)	Standard	Starline
Purple (P10)	±0.005" (±0.127 mm)	Standard	Starline
Pink (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Blue (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Green (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Yellow (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Orange (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Red (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Purple (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Pink (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Gray (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Black (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light White (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Blue (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Green (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Yellow (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Orange (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Red (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Purple (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Pink (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Gray (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light Black (P10)	±0.005" (±0.127 mm)	Standard	Starline
Light White (P10)	±0.005" (±0.127 mm)	Standard	Starline



FIRST ANGLE PROJECTION

Revision History				
REV	DESCRIPTION	DATE	BY	CHKD
A	ECO TMR85	11/2/2021	Admiral	Admiral
B	ECO TMR85	8/12/2021	Isahar	Isahar

Envelope Color Designation

Cutting Tolerances

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C-Color (Paint)

- 1 - Anodized Silver
- 2 - Black
- 3 - Black
- 4 - Black
- 5 - Silver/Black, Single
- 6 - Silver
- 7 - Silver/Black

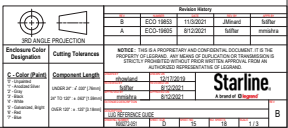
Component Length

UNDER 2" : 1/16" (1mm)
2" TO 12" : 1/32" (0.5mm)
OVER 12" : 1/16" (1mm)

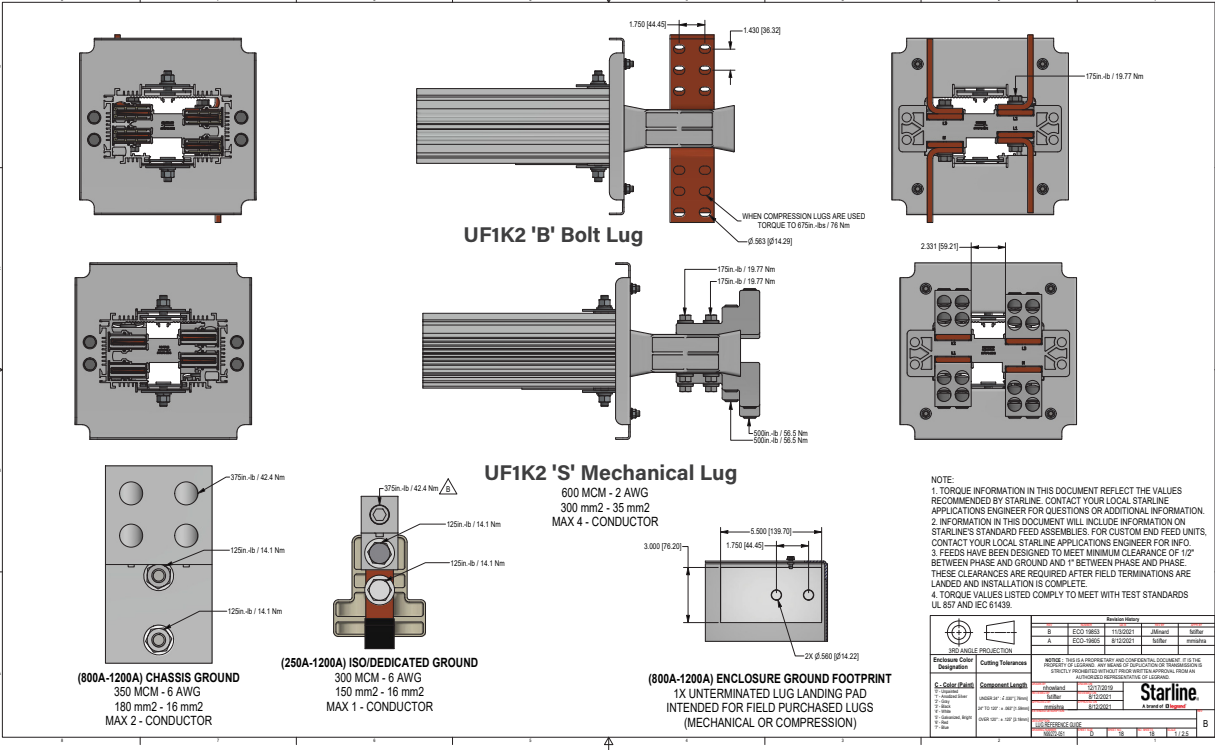
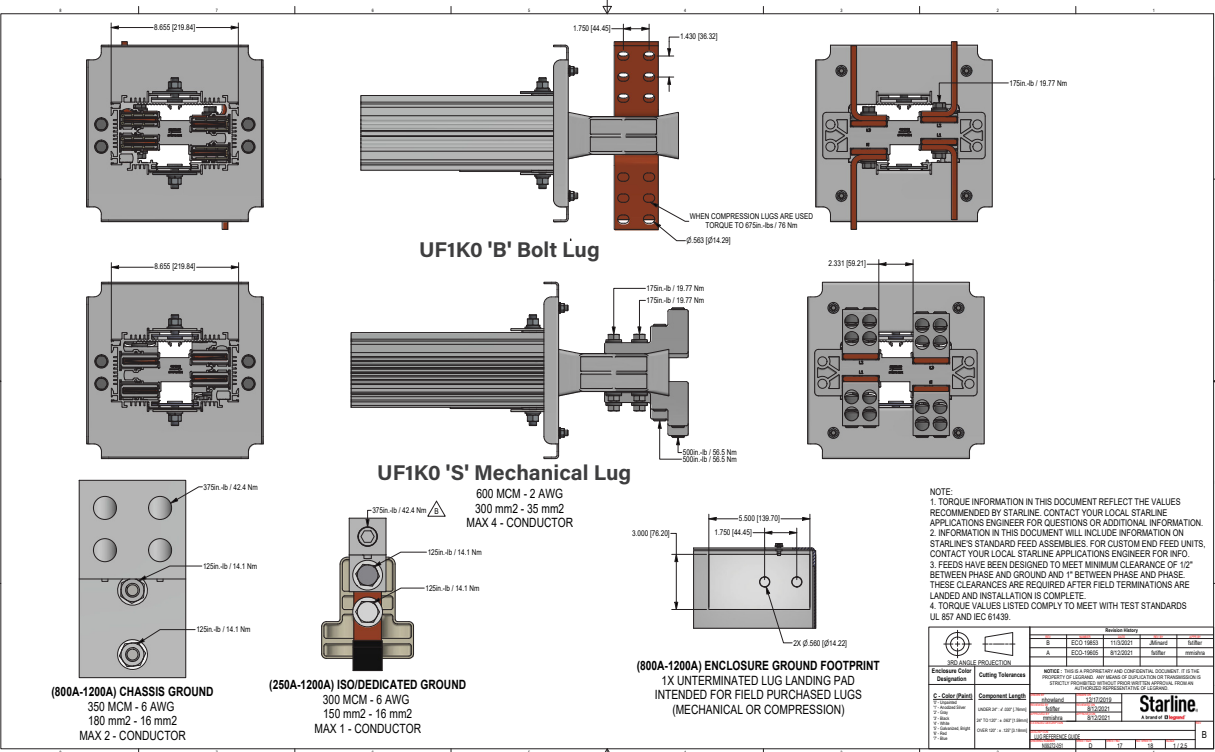
Material	Part Number
Isahar	81270009
Isahar	81270021
Isahar	81270021

Starline.
A brand of **Legalink**

LEG-REFERENCE GUIDE



Feed Lug Reference Chart



S5 Ground Options

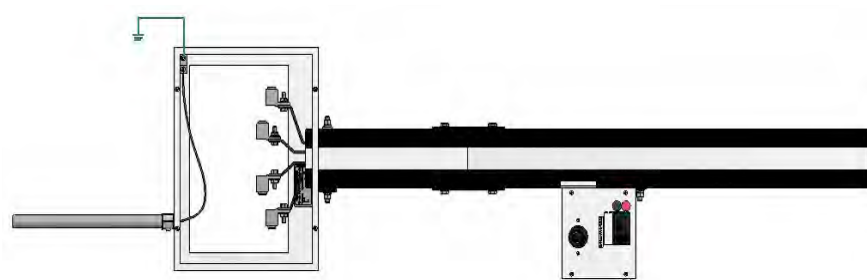
FAQ CASE GROUND, DEDICATED GROUND, ISOLATED GROUND

CASE GROUND

Uses aluminum housing and no extra copper bar.

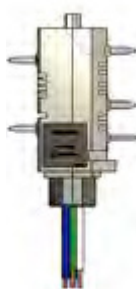


S5

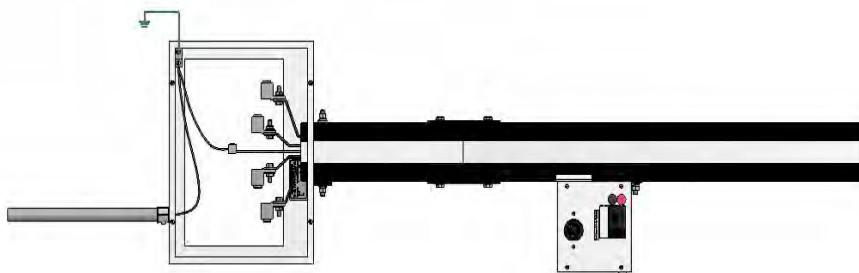


DEDICATED GROUND

Extra bar in busway for ground. Everything tied together inside plugs. Bar and housing at same potential.



S5 with ground

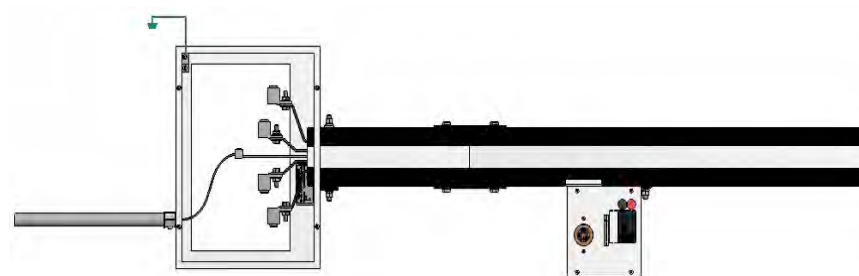


ISOLATED GROUND

Orange receptacles in plugs. Case ground isolated from copper ground bar. Isolated ground carried back to panel by others.



S5 with ground



S5 End Feed Installation

Warning: Make sure the power is off before making your wire connections inside the End Feed Box.

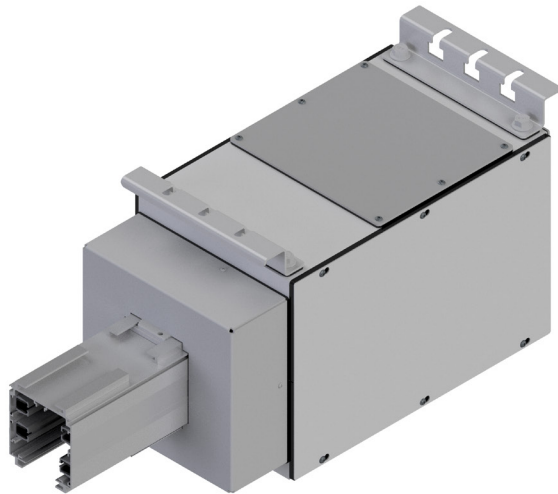
Power feed units are used to make field wiring connections to the end of a busway run for 250 - 1200A Series - S systems. The feed unit may be installed before or after hanging the busway. It is recommended to begin the busway installation where the power connections are to be made.

To install, simply join the feeder section to the run of busway using the S5 joint kit, which includes housing couplers, bus connectors, joint seal and joint covers. Secure the housing coupler.

To connect to power, drill or punch holes as needed and use appropriately sized and rated conduit fittings (e.g. liquid-tight with minimum IP67 ratings), ensuring they're installed per the conduit fitting manufacturer's instructions. Fittings are not provided with power feed unit.

Pressure wire connectors are provided in the box which accept up to 300MCM size cable. Heat shrinkable tubing for covering wire connections is provided. Slip this tubing over each cable. Make wiring connections paying close attention to the phase designations of the busway.

Slide tubing over the joint to cover live electrical parts, and heat to shrink. Make sure that all electrical connections are secure before you close the lid on the end feed unit. Secure the cover with the screws provided.



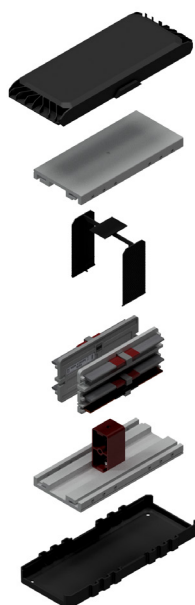
S5 Joint Kit Installation

For connection of adjacent Busway sections. One Kit is required at each joint. Each Kit is comprised of housing couplers, bus connectors, joint covers and a joint seal. Specify configuration to match busway configuration.

Insert the pair of housing couplers onto one housing section. Insert the joint seal onto the same section of housing, and bring the two housing sections together. The housing coupler and the hanger channel of the busway are polarized; ensure they are aligned before inserting them. Position the bottom coupler away from the joint, and align the busway with the adjacent busway section. Center the top housing coupler around the joint and tighten the set screws securely. Next, begin to install the bus connector kit by inserting the A-B bus connector inside the slot of the busway. Ensure the connector is centered on the joint and push the bus connector in until secure. Insert the installation tool inside the slot of the busway at the joint. Position the collar around the busway housing so that the radius on the tool is positioned against the bus connector cover. Using the lever, rotate the installation tool and release. Work toward the end of the blade cover until the copper blades are firmly seeded into channels. Repeat each of these steps for the other side of the bus connector.

Next, attach the joint covers to the busway directly above and below the top and bottom housing couplers.

For further assistance, refer to the installation video here: <https://youtu.be/SJf-8P6QUao>



Hanger Bolt Installation

There are two standard hanger options for mounting Starline Busway. UBRHT5-1 (Figure 1) is the standard hanger for supporting Starline busway via 1/2" threaded rod. UBHT5-1 (Figure 2) is most commonly seen when hanging via unistrut. At a minimum, 10 ft. (3m) intervals support the busway via support hardware. Once the hanger is placed in the mounting channel and the support hardware is installed, tighten down with 3/4" wrench. UBSHT5-4 (Figure 3) is a one piece slotted hanger compatible with 1/2 -13 UNC threaded rod. Hanger Bolt UBRHT5-2 (Figure 4) is used for support in Gordon Grid applications. UBRHT5-3 (Figure 5) is intended for use in Seismic applications.

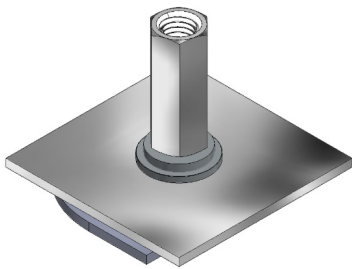


Figure 1: UBRHT5-1

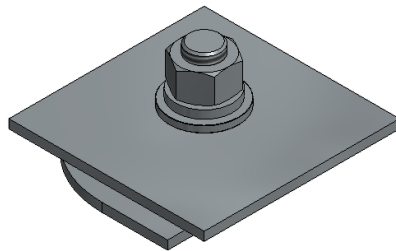


Figure 2: UBHT5-1

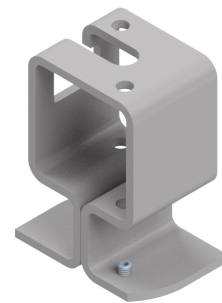


Figure 3: UBSHT5-4

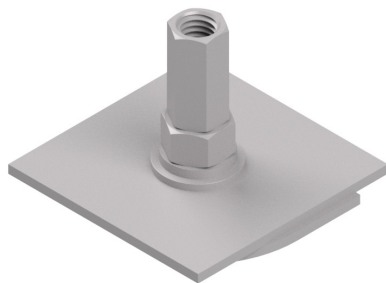


Figure 4: UBRHT5-2

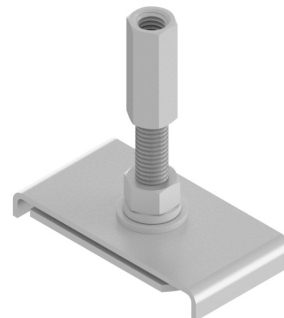


Figure 5: UBRHT5-3

Section 3: Plug-In Insertion Instructions

S5 Plug-in Insertion Instructions

PLUG-IN UNIT INSERTION

Insert plug-in unit into the busway's open channel. Rotate the plug-in unit to engage the paddle head with the conductors. Once engaged, slide the bolt into the flange groove to support the weight of the plug. Tighten the bolt loosely with your fingers. Do not overtighten.



Step 1



Step 2



Step 3



Step 4

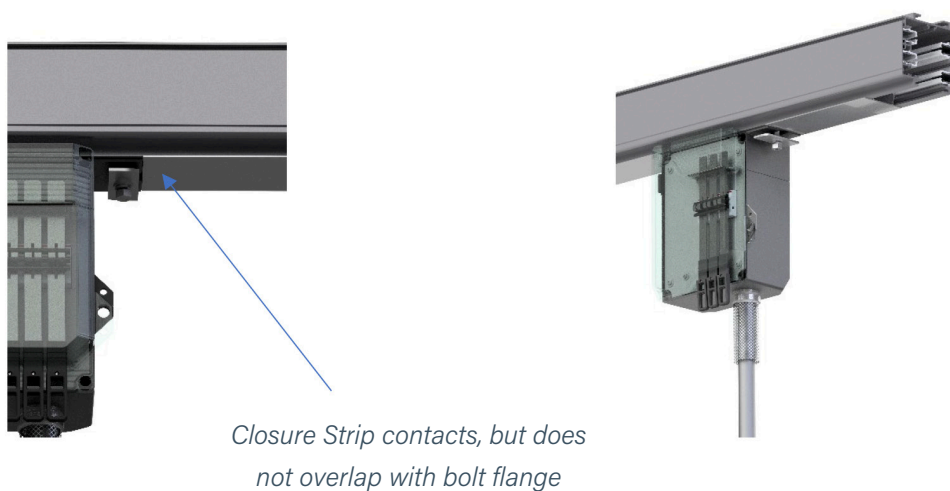


Step 5

S5 Plug-in Insertion Instructions

CLOSURE STRIP INSERTION

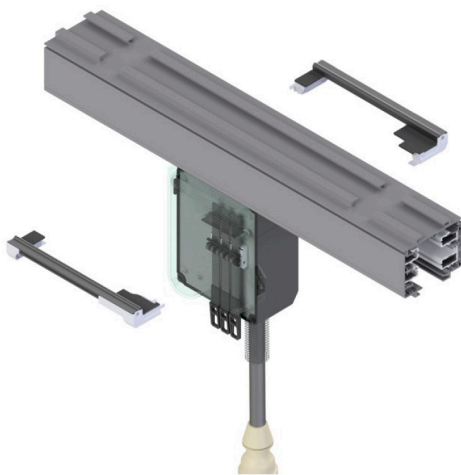
Insert the closure strip into the open channel on each side of the plug-in unit. Slide the closure strip to within 1/16 inch of each side of the plug in unit. Do not overlap the plug-in unit flange with the closure strip. The objects may abut, but not overlap. Final location of plug-in units must be determined before closure strip is measured and field cut.



S5 Plug-in Insertion Instructions

SEAL ASSEMBLY INSTRUCTIONS

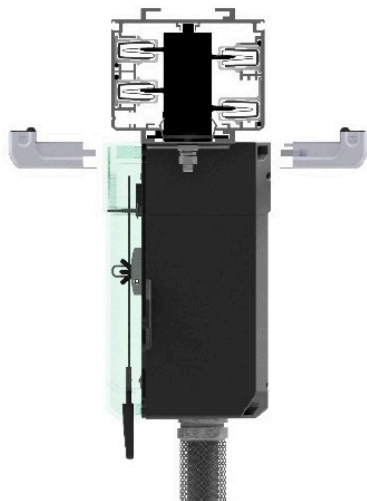
Insert tap off seal assembly on both the front and back of the plug in unit. The seal should fit in between the plug-in unit enclosure and the busway housing, enclosing any exposed gaps. Ensure that the seal is secured on each side of the plug in unit.



Step 1



Step 2



Step 3

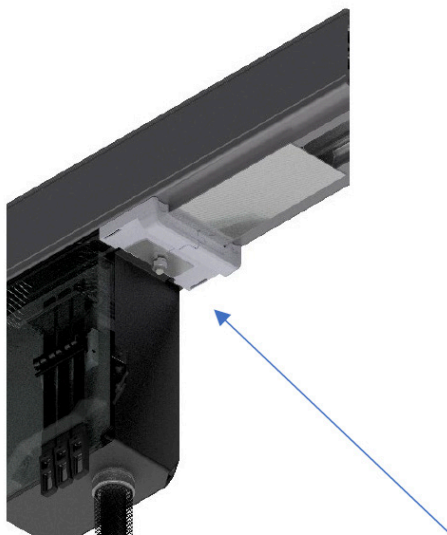


Step 4

S5 Plug-in Insertion Instructions

FLANGE BOLT TIGHTENING

Take an adjustable wrench or ratchet wrench and 9mm socket and tighten down flange bolt to 18 ft lbs. Once tightened, the plug assembly is complete and ready for power distribution.



Tighten the 3/8-16 bolt to a torque rating of 18 ft lbs.

For complete video installation instructions, visit: <https://youtu.be/SJf-8P6QUao>

Series - S5 Enclosure Style Options

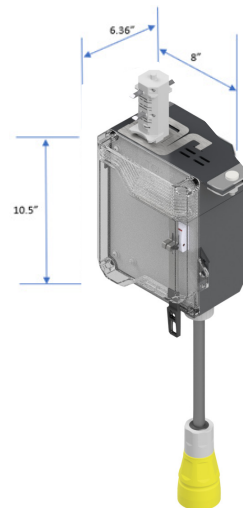
ES1 ENCLOSURE

Dimensions (in):

H: 10.5" | W: 8" | D: 6.36"

Configuration Options:

- Up to 3 Poles
- Up to 3 drop cords
- Meter available
- 1 Bottom-Mounted receptacle



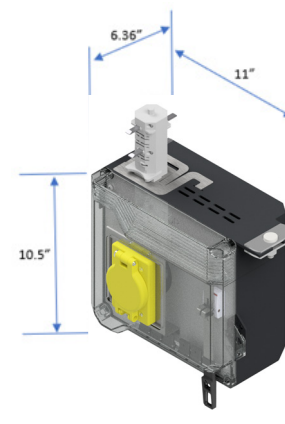
ES2 ENCLOSURE

Dimensions (in):

H: 10.5" | W: 11" | D: 6.36"

Configuration Options:

- Up to 6 Poles
- Up to 6 drop cords
- Meter available
- Up to 1 Front-Mounted or 2 Bottom-Mounted receptacles



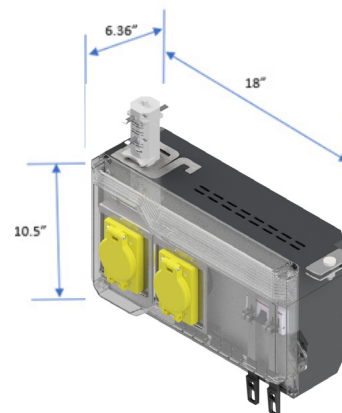
ES3 ENCLOSURE

Dimensions (in):

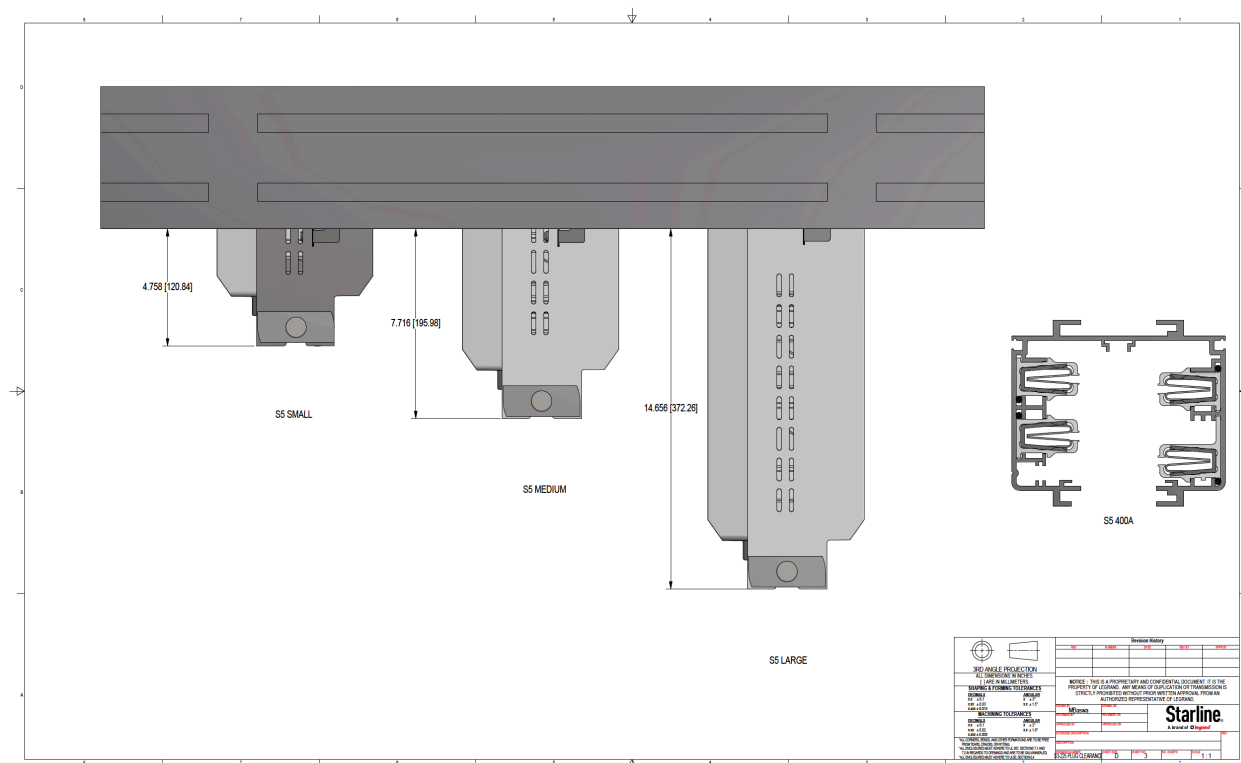
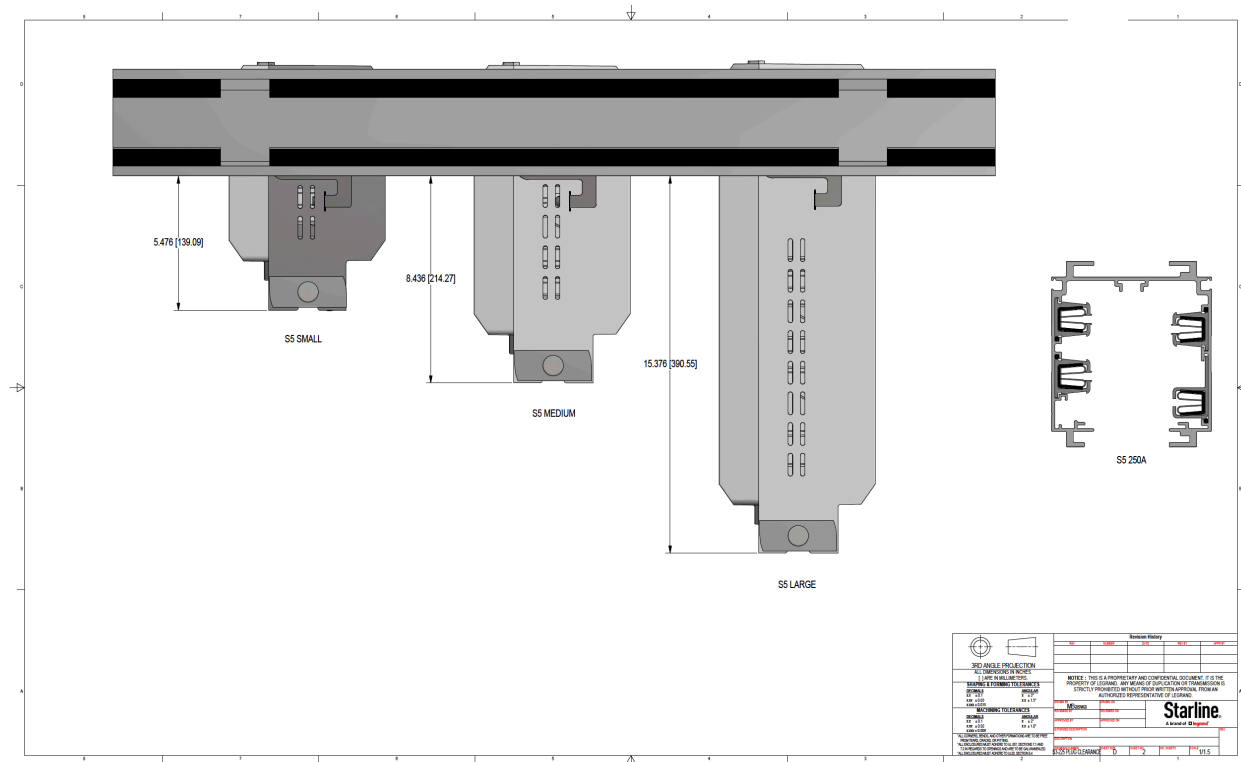
H: 10.5" | W: 18" | D: 6.36"

Configuration Options:

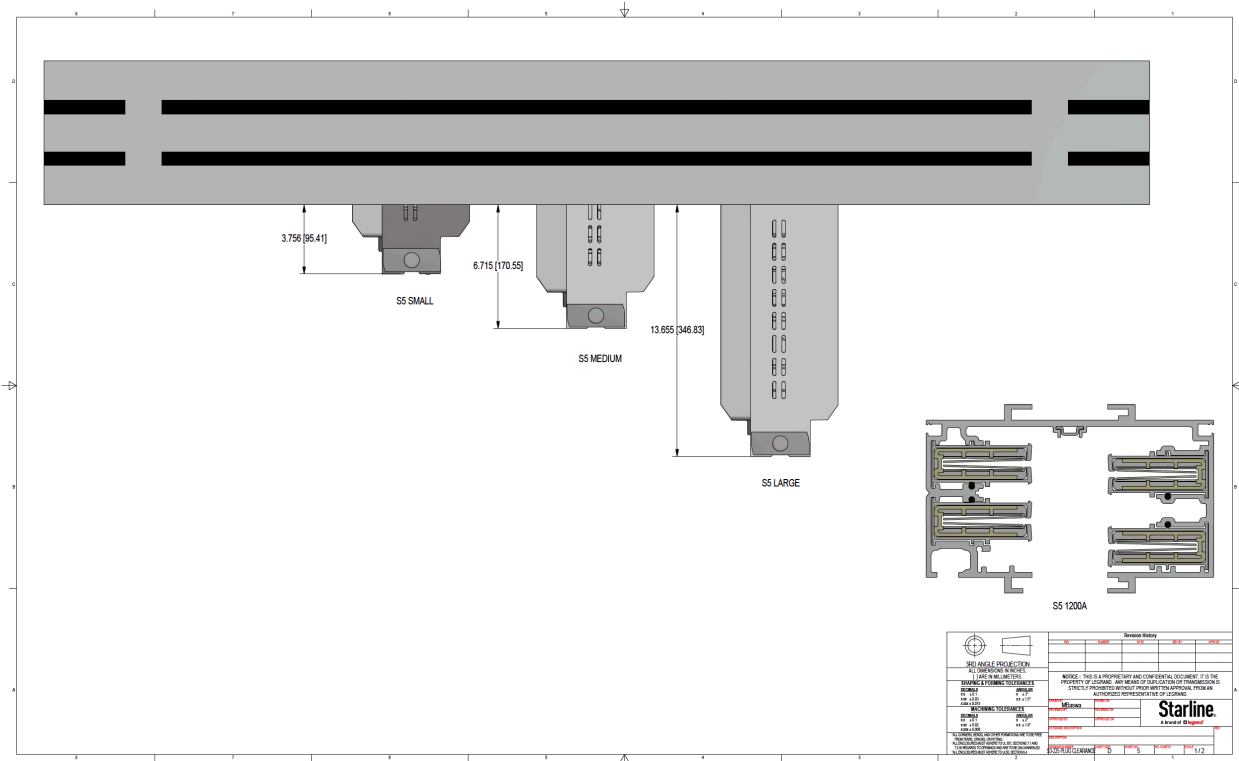
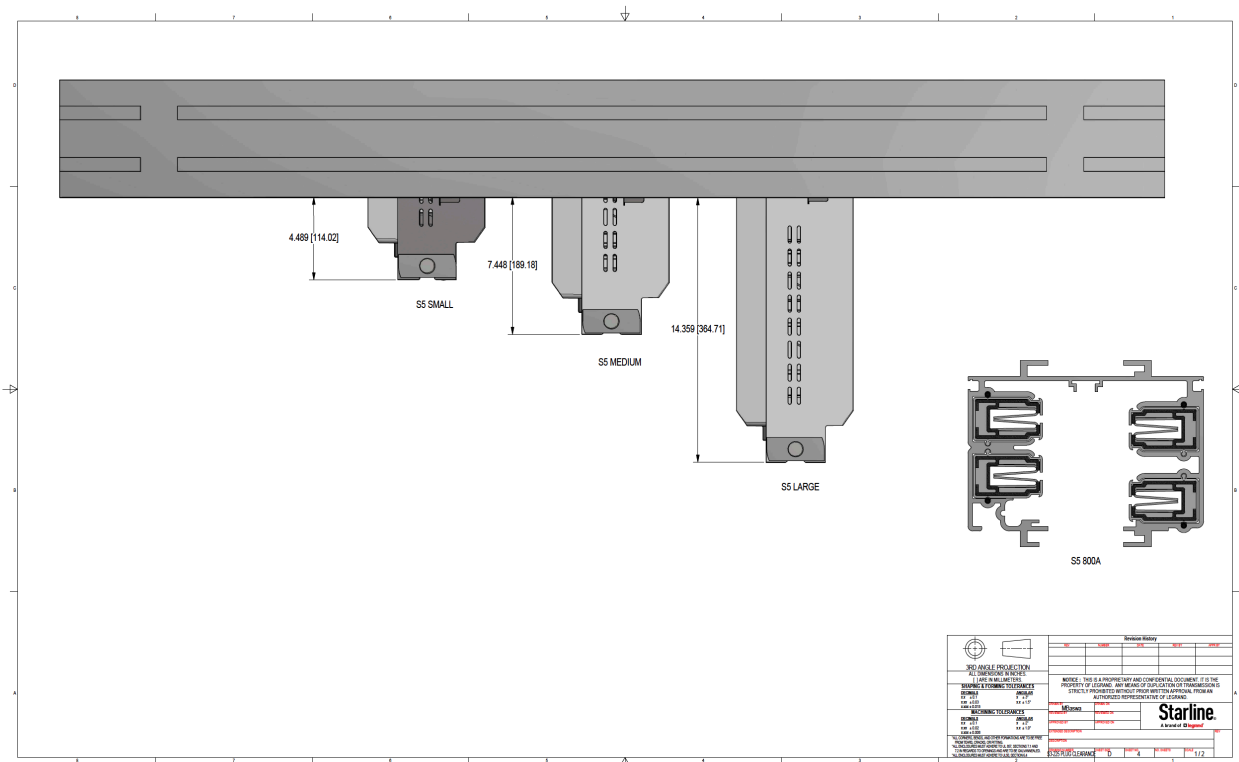
- Up to 9 Poles
- Up to 9 drop cords
- Meter available
- Up to 2 Front-Mounted or 3 Bottom-Mounted receptacles



Series - S5 Plug-in Unit Clearances



Series - S5 Plug-in Unit Clearances



Section 4: Field Services and Warranty

S5 Busway - Services

Regular servicing of busway systems is crucial for ensuring that your system performs at its best. By conducting regular maintenance, you can identify and address any potential issues before they turn into expensive problems, thus saving you time and money in the long run. Regular servicing can help extend the lifespan of your busway system, ensuring that it meets safety standards and complies with regulations. Choose from various offerings and customize a service plan that works best for you.

We are currently offering the following services:

COMMISSIONING AND EQUIPMENT RENTALS

Designing a mission-critical facility involves a significant investment of time and money. Through comprehensive commissioning services, Starline can help guarantee your project delivers the outcomes you expect.

Whether you need rental equipment to test your busway system or certified technicians to perform the testing, Starline has you covered. Choose from our inventory of load bank tap-offs and associated gear, or work with a Starline Engineer to customize and perform a commissioning plan to fit your specific needs.

METER SERVICES

Starline's certified technicians make optimizing your meters' performance and functionality a breeze. Our comprehensive on-site meter programming service includes inspecting, programming, reporting, and optional retrofitting services for your existing systems.

STARTUP AND SYSTEM CERTIFICATION

At Starline, we are committed to ensuring the success of your project. Our team understands the risks associated with the energization of systems, which is why we've designed a rigorous certification process to inspect, test and report on your Starline Busway and Critical Power Monitor ("CPM") products. Our certification process proactively identifies and prevents any potential issues before they happen.

To ensure the long-term success of your project, it is crucial to have Starline-certified technicians inspect and validate the installation before full commissioning. All orders of Series - S systems require a System Start Up and Level 3 commissioning to ensure the installation of the product meets factory standards.

Please refer to Section 9 - Field Quality Control of the Busway Specification for Level 3 Commissioning details.

S5 Busway - Services

TURNKEY INSTALLATION SERVICES

Our trained and factory certified Busbar installers are looking forward to completing your next job. You can order your best-in-class power distribution system and leave the rest to us. Our technicians will complete your installation quickly and safely and will reduce your overall TCO by extending your product warranty.

PREVENTATIVE MAINTENANCE PLANS AND IR SCANNING

Although Starline busway is expertly designed to require less maintenance, NETA ATS and MTS guidelines recommend conducting annual inspections and health assessments on all critical equipment. Yearly preventative maintenance helps to ensure your system's long-term reliability and safety.

Starline's FLIR-certified technicians will create a custom preventative maintenance plan for your specific needs. Our certified technicians will work to:

- Identify thermal anomalies
- Extend equipment lifecycle
- Ensure optimal system performance
- Improve facility safety and operational sustainability

Upon completing your preventative maintenance plan, you may be eligible to extend your product warranty.

ON-SITE INSTALLATION SUPPORT

Starline's on-site installation service makes installing your busway as quick and easy as possible.

Our installation support starts with scheduling a preliminary trip to the installation site. During the initial visit, our certified technicians will train your installing contractor and develop a thorough installation and commissioning plan.

After completing the training, your installing contractor will have a direct line of communication with our installation experts. Our experts can help answer questions and provide hands-on guidance when needed. Opting for Starline's installation support helps mitigate the installation risk and reduces the learning curve typically associated with new installations.

S5 Busway - Services

ON-SITE PRODUCT TRAINING

At Starline, we offer comprehensive on-site product training services facilitated by our team of certified technicians. With their extensive expertise and commitment to upholding our high factory standards, you can confidently rely on them to ensure your and your systems' reliability and operational safety.

Our training programs equip your team with the knowledge and skills necessary to operate and maintain your systems effectively. Through hands-on demonstrations and interactive sessions, our certified technicians will guide your staff in understanding the intricate workings of the products and address any questions or concerns your team may have during the training process.

By choosing our on-site product training services, you are investing in your system's and operations' longterm success.

RECERTIFICATION AND EXTENDED WARRANTY PLANS

Contact your local Starline representative or the factory for information regarding extended warranty plans for Series - S Busway Systems.

Contact your Starline Representative today to add services to your Track Busway order, or download the detailed Statement of Work documents at: downloads.starlinepower.com/services.

Standard Factory Warranty

Contractor/Customer: _____

Customer Order: _____

Seller warrants all products sold by Starline Holdings, LLC to be free from defects in material or workmanship for a period of one year from the date of shipping. Seller's liability on this warranty shall be limited to the repair or replacement of any product which is returned to the Seller, within one year of the date of delivery and which is found by the Seller to be defective in material or workmanship. Customer must have written authorization prior to returning any material to Starline. The Buyer will be responsible for the cost of removing and reinstalling a defective part(s) or its replacement and all labor and material and all other costs or expenses incurred in connection therewith.

Notwithstanding any provision contained herein to the contrary, (i) Buyer's use of any plug-ins, parts and/or components that are not manufactured by Starline with the Products, and/or (ii) if any services and/or warranties are provided by any person/entity other than Starline without Starline's prior written consent, all warranties for all Products shall immediately terminate and be null and void.

Warranty Period: 1 year from delivery date

STANDARD FACTORY WARRANTY PROCESS

1. Customer calls either Starline Rep or Starline direct.
2. Customer Service Specialist will issue Return Material Authorization (RMA).
3. Customer returns warranted item along with copy of RMA.
4. Starline will either rework item or manufacture new item depending on the customer needs.
5. Starline ships item back to customer.
6. Starline will determine reason for failure.
7. Corrective action will be documented.
8. If reason for failure is requested by customer. Starline will send report to customer.
9. All action items from corrective action report must be completed by assigned designer and returned to Quality Department.
10. Quality Assurance Department will track all warranted events and report them to Starline Managers, Directors, and the Executive Team.

Section 5: Maintenance

Starline Busway Recommended Maintenance

Starline Track Busway is designed to be user friendly with no mandatory maintenance required. The joints, end feeds, and plugs also require little to no maintenance. Starline Track Busway uses a boltless connection for the joining of the copper conductors. The joint design uses a U-shaped conductor channel that utilizes a joint kit to connect two housing sections. This connection is mechanically pressed into the slot with the use of installation tools that can be purchased from Starline. The end result is a reliable, heat tested connection at every joint that takes little to no maintenance over the life of the product.

IR inspection of the end feed connections, joints, and plug-in units can be checked at the user's discretion, but is not required by Starline Holdings, LLC.

The S5 System shall be accompanied with a required service package of Level 3 Commissioning.

Starline offers comprehensive on-going service plans that extend the life of the warranty over the duration of the plan. For more information, contact your Starline sales representative or email the factory at service@starlinepower.com.

Starline[®]
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