SECTION 12 23 00 - Interior Shutters\*

FIELD ASSEMBLED ROLLER SHADES

Display hidden notes to specifier. (Don't know how? [Click Here](https://www.arcat.com/sd/display_hidden_notes.shtml))

*Copyright 2020 - 2022 ARCAT, Inc. - All rights reserved*

\*\* NOTE TO SPECIFIER \*\* Legrand: Wattstopper; Vantage lighting and shading control products.  
This section is based on the products of Legrand: Wattstopper, which is located at:2240 Campbell Creek Blvd., Suite 110Richardson, TX 75082Toll Free Tel: 800-879-8585Email: [request info (charles.knuffke@legrand.us)](https://arcat.com/rfi?action=email&company=Legrand%253A%252BWattstopper&message=RE%253A%2520Spec%2520Question%2520(12494wat)%253A%2520&coid=36455&spec=12494wat&rep=&fax=)  
Web: <https://www.legrand.us/wattstopper.aspx>   
 [ [Click Here](https://arcat.com/company/legrand-wattstopper-36455) ] for additional information.  
Wattstopper, a product line of Legrand, offers the most comprehensive line of simple, scalable, and flexible energy efficient lighting and shading controls and solutions for commercial and residential applications. The Wattstopper range of products, programs, and services have been helping customers save energy, meet green initiatives, and comply with energy codes for more than 30 years.  
A leading provider of products and systems for electrical installations and information networks wherever people live and work, Legrand delivers an unequaled depth and breadth of innovative solutions. Legrand North America and Legrand Canada companies include: Cablofil, Electrorack, Middle Atlantic, On Q, Ortronics, Pass & Seymour, Vantage and Wiremold.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. ES Motorized Roller Shades System
    2. DS Open Roll Shade System
    3. SS Fascia or Pocket Shade System
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 06 10 00 - Rough Carpentry.
    2. Section 07 90 00 - Joint Protection.
    3. Section 09 21 16.33 - Gypsum Board Area Separation Wall Assemblies.
    4. Section 09 51 23 - Acoustical Tile Ceilings.
    5. Section 09 90 00 - Painting and Coating
    6. Section 23 09 00 - Instrumentation and Control for HVAC.
    7. Section 26 05 00 - Common Work Results for Electrical.
    8. Section 26 09 43 - Network Lighting Controls.
    9. Section 26 09 43 - Network Lighting Controls.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. NFPA 70 - National Electrical Code; National Fire Protection Association.
    2. NEMA - National Electrical Manufacturers Association
    3. FCC emission standards
    4. UL - Underwriters Laboratories, Inc. Listings
    5. UL 2043 - Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products Installed in Air-Handling Spaces.
    6. UL 20 - General Use Switches, Plug Load Controls
    7. UL 924 - Standard for Emergency Lighting and Power Equipment
    8. ULC - Underwriter Laboratories of Canada Listings
    9. UL GREENGUARD Certification Program (GreenGuard Gold).
    10. LEED -Leadership in Energy and Environment Design is an internationally recognized third-party green building certification program.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 33 13 - Certificates
     2. Product Data: Manufacturer's data sheets on each product specified, including:
        1. Preparation instructions and recommendations.
        2. Installation and maintenance instructions.
        3. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
        4. Storage and handling requirements and recommendations.
        5. Mounting details and installation methods.
        6. Typical wiring diagrams including integration of motor controllers with building management system, audiovisual and lighting control systems as applicable.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for projects with complex requirements for window treatment. Delete if not required.

* + 1. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraphs if LEED is not applicable.

* + 1. LEED Submittals: Documentation of how the requirements of Credit will be met.
    2. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on Drawings, field verified window dimensions, quantities, type of shades, controls, shadeband material, color, and include opening sizes and key to typical mounting details.

\*\* NOTE TO SPECIFIER \*\* Delete Selection Samples paragraph if colors and shade fabrics have already been selected.

* + 1. Selection Samples: For each finish product specified, two complete sets of shadeband material options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.
    2. Verification Samples: For each finish product specified, two complete sets of shade components demonstrating compliance with specified requirements. Shadeband material sample and aluminum finish sample as selected, representing actual product, color, and patterns. Mark face of material to indicate interior faces.
    3. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.
    4. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
    5. Closeout Submittals Operation and Maintenance Data: For roller shades, motor operators, and control systems.
  1. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in design and manufacturing of manual and motorized shading systems and distributed lighting control systems with a minimum of 25 years documented experience.
     2. Installer Qualifications: Company certified by the Legrand and specializing in installation of networked lighting control products with minimum 3 years documented experience.
     3. System Components: Demonstrate that individual components have undergone quality control and testing prior to shipping.
     4. NFPA Flame-Test: Passes NFPA 701. Materials tested to match products proposed for use.

\*\* NOTE TO SPECIFIER \*\* Select the following two paragraph if required for motorized products specified.

* + 1. Motor operators, controls, and controllers to be certified by a Nationally Recognized Testing laboratory (NRTL) to provide UL or ETL recognized or listed wired AC and DC powered motors and components.
    2. Demonstrate that motors operators, controls, and controllers provided can connect to the internet with an acceptable level of security and ensure that that devices that allow for communication between the controls system hierarchy or the internet is certified by ioXt Alliance and listed on the ioXt website's current Certified Product Page under Ecosystem - Network Lighting Controls.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: One of each type of roller shade assembly specified for evaluation of mounting, appearance, and accessories.
       1. Locate mock-up in windows designated by Architect.
       2. Do not proceed with remaining work until mock-up is accepted by Architect.
       3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

\*\* NOTE TO SPECIFIER \*\* Pre-Installation Meeting is recommended but not mandatory. Select if required and delete if not required.

* 1. PRE-INSTALLATION MEETINGS
     1. Convene a minimum two weeks prior to commencing Work of this section. Meeting to be attended by Contractor, Architect, system installer, factory authorized manufacturer's representative, and representative of all trades related to the system installation.
        1. Review installation procedures and coordination required with related Work.
        2. Inspect and make notes of job conditions prior to installation:
  2. DELIVERY, STORAGE, AND HANDLING
     1. Deliver products in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.
     2. Store fabric, tube, and motor units flat on a flat horizontal surface to prevent sagging and deformation/twisting of contents, until ready for installation.
     3. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.
  3. SEQUENCING
     1. Ensure locating templates and information required for installation of products re furnished to affected trades in time to prevent interruption of construction progress.
     2. Ensure products are supplied to affected trades in time to prevent interruption of construction progress.
  4. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
     2. Do not install shade units until interior painting, wet work, ceilings, window pockets, and mechanical/electrical work above window site is complete before installation.
  5. WARRANTY

\*\* NOTE TO SPECIFIER \*\* The following paragraph applies only to DS and SS Systems with DLM and QIS motors.

* + 1. Hardware, Including Shade Brackets, Metal Extrusions, and Manual Clutches: 25 years.

\*\* NOTE TO SPECIFIER \*\* The following paragraph applies only to ES System with Somfy motors.

* + 1. Shade Motors, Controls, and Power Supplies Manufactured by Others: 8 years.
    2. Fabrics Used as Part of Shade System; for interior use only, regardless of whether fabrics are rated for outdoor/exterior use:
       1. Mermet Fabrics Except GreenScreen: 10 years.
       2. Mermet GreenScreen Fabric: 5 years.
       3. Phifer Fabrics: 25 years.
       4. All Others: 5 years.

\*\* NOTE TO SPECIFIER \*\* Include the following article for use with DLM Motors and Controls only. Delete if not required. Coordinate with Section 26 09 43 - Distributed Digital Lighting Controls for lighting and shading integration into digital shading systems.

* 1. MAINTENANCE AND OPERATIONAL SERVICES
     1. Remote Access and Enhanced Warranty for Networked Lighting Controls System:
        1. Configure to allow Manufacturer remote access to lighting and shading control system. Include: Cellular modem and antenna, cellular service contract, and connections to enable communication to specified system.
        2. Remote Access Program: Automatically triggers a First Year Enhanced Warranty Agreement starting upon Owner acceptance after control system startup.
           1. Owner's authorized site contact can request Manufacturer to check system for proper operation and make any desired programmable changes.
           2. Manufacturer to provide a phone number for customer calls concerning remote accessible systems, and support organization capable of enabling cellular communication to system for troubleshooting and making requested changes.
           3. Users making a request for remote support on the system will be fully verified by the Remote Operations Center (ROC) before remote support or system changes are provided.
           4. Access to be via secured VPN connection to private lighting control network completely isolated from Owner's internal network.
        3. Remote Access Program may be continued by Owner after the first year.
           1. If Owner discontinues the enhanced warranty, the cellular contract will lapse. Hardware components, remain property of the Owner in situ so they can be re-activated at a later time should Owner desire.
        4. Manufacturer's Remote Access Capability:
           1. Initial system diagnostics through LMCS Software to detect fault conditions in hardware or connected devices.
           2. Access to devices via LMCS Software allowing device feature programmability such as scheduling of Time-of-Day Events, and programming individual device parameters to meet Sequence of Operation requirements.
           3. Access to LMSM Segment Manager browser-based interface; if included on project. Verify system is setup per project documentation, and functional operations are working as specified.
           4. On Demand Access to Manufacturer Technical Support: Via a Remote Operations Center (ROC). For troubleshooting, diagnostics, and configuration/programming assistance.
           5. Client training and adjusting the Lighting and Shading Control System after building occupancy.
           6. Remote Site Readiness Check (SRC): Discovery of devices connected to the lighting and shading control network during installation.

DLM Networked projects with a RACCESS cellular modem and having successfully completed the Site Readiness Check (SRC) process will receive priority scheduling (a SRC is successful if 80 percent or more of the networked devices are found on the network during discovery).

After Scheduled On-Site Startup: Manufacturer startup work for a site with a successful SRC will be remote, or via complimentary return trips.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if "Remote Access and Enhanced Warranty for Networked Lighting and Shading Controls" is specified above. Delete if not required.

* + 1. Manufacturer�s Technology-Enabled Service Contract: Continued system support, post installation. Secure accessible remote support and onsite support. Service Contract coverage levels and features apply immediately upon completion of startup and supersede any enhanced remote support offered by the Manufacturer during first year after startup.
       1. Requires a RACCESS (Remote Access) secure cellular connection for Manufacturer to remote access lighting control system for troubleshooting, diagnostics, and configuration/programming assistance. Manufacturer to ensure cellular plan keeps modem active through chosen Technology-Enabled Service Contract's duration.
       2. If Customer Does Not Renew Service Contract: Cellular service will lapse. Hardware components will remain in situ and can be re-activated later should customer desire.
       3. Technology-Enabled Service Contract Specifics:

\*\* NOTE TO SPECIFIER \*\* Delete one of the two following paragraphs; whichever is not required.

* + - * 1. "Connect Plus" Service Contract: Includes the following.

Priority access to Manufacturer technical support via a Remote Operations Center

Semi-Annual System Backup: LMCS and Segment Manager software.

Semi-annual Device Health Checks: Identifies bypassed, disconnected, or not functioning devices, with recommendations for resolution.

Annual onsite training by a certified factory-trained technician.

Semi-annual Tuning Visits: Optimize lighting and shading configuration, fine tune operation sequences, or make system programming changes.

Three day onsite response time for unscheduled emergency visits provided by factory-trained technicians.

* + - * 1. "Connect Prime" Service Contract: Includes the following.

Priority Access 24/7 to Manufacturer technical support via a Remote Operations Center.

Quarterly System Backup: LMCS and Segment Manager software.

Quarterly Device Health Checks: Identifies bypassed, disconnected, or not functioning devices, with recommendations for resolution.

Semi-annual onsite training by certified factory-trained technician.

Quarterly Tuning Visits: Optimize lighting and shading configuration, fine tune operation sequences, or make system programming changes.

Next day onsite response time for unscheduled emergency visits provided by factory-trained technicians.

\*\* NOTE TO SPECIFIER \*\* Options for length if service contract are 1, 2, 3, 4, and 5 years.

* + - 1. Length of Technology-Enabled Service Contract: \_\_\_ year.
  1. EXTRA MATERIALS
     1. See Section 01 60 00 - Product Requirements.
     2. Extra maintenance materials that match products installed, packaged with protective covering for storage, and identified with labels describing contents.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Legrand: Wattstopper, which is located at:2240 Campbell Creek Blvd., Suite 110Richardson, TX 75082Toll Free Tel: 800-879-8585Email: [request info (charles.knuffke@legrand.us)](https://arcat.com/rfi?action=email&company=Legrand%253A%252BWattstopper&message=RE%253A%2520Spec%2520Question%2520(12494wat)%253A%2520&coid=36455&spec=12494wat&rep=&fax=);Web: <https://www.legrand.us/wattstopper.aspx>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
    3. Products specified in this section to be provided by a single manufacturer.

\*\* NOTE TO SPECIFIER \*\* Select Shading System required from the following paragraphs and delete those not required. The ES series is a motorized and banded shading solution for single, dual, coupled, and oversized motorized shades. The ES series hardware provides a series of different sized brackets and coupler combinations that allow for standalone and coupled shades for straight, curved, or even 90 degree windows for nearly any sized shade. The ES facia system is independent from the brackets that allows for fascia alignment regardless of bracket placement needs. There is an additional raceway system that allows for vented pocket installations. The Somfy motors can operate independently with local controls or together with a Wattstopper lighting control system to provide integrated and automated system control with lighting.

* 1. ES MOTORIZED POWERED ROLLER SHADES
     1. Legrand ES Motorized Shades System: Quiet motorized family of roller shades, brackets, tubes, specialized mounting brackets, couplers, fascia and closure, side channels, pockets, motors, and related components and accessories.

\*\* NOTE TO SPECIFIER \*\* Manufacturer offers motorized roller shades in three product families, 4 inch, 5 inch, and 6 inch, to cover windows of varying sizes, usage of different shadeband fabric with associated weight, and to allow for usage of either a single shade mounted on one bracket or double shades using sunscreen and opaque (blackout) in one assembly. Select the paragraphs for the shade system, fabric types and configurations indicated on the Drawings and delete those that are not applicable.

* + 1. Product Types and Maximum Sizes: Provide shade product family, type, and maximum sizes applicable to the products specified and indicated on the Drawing. Height and width limitations shall be as follows:
       1. Single Roller Shade System: Mounted on one bracket.
          1. Series: 4 inch. (WxH): Up to 130 x 120 inch (330 x 304.8 cm).

Shadeband Fabric Material: Polyester.

* + - * 1. Series: 4 inch. (WxH): Up to 130 x 200 inch (330 x 508 cm).

Shadeband Fabric Material: Opaque (blackout).

* + - * 1. Series: 4 inch. (WxH): Up to 130 x 150 inch (330 x 381 cm).

Shadeband Fabric Material: Fiberglass.

* + - * 1. Series: 5 and 6 inch. (WxH): Up to 175 x 300 inch (444.5 x 762 cm).

Shadeband Fabric Material: Polyester.

* + - * 1. Series: 5 and 6 inch. Shade (WxH): Up to 175 x 400 inch (444.5 x 1016 cm).

Shadeband Fabric Material: Opaque (blackout).

* + - * 1. Series: 5 and 6 inch. Shade (WxH): Up to 175 x 400 inch (444.5 x 914.4 cm).

Shadeband Fabric Material: Fiberglass.

* + - 1. Double Roller Shade System: Mounted on special double shade bracket.
         1. Series: 4, 5, 6 inch. Shade (WxH): Up to 120 x 150 inch (304.8 x 381 cm).

Shadeband Fabric Material: Polyester.

* + - * 1. Series: 4, 5, 6 inch. Shade (WxH): Up to 120 x 150 inch (304.8 x 381 cm).

Shadeband Fabric Material: Opaque (blackout).

* + - * 1. Series: 4, 5, 6 inch. Shade (WxH): Up to 120 x 150 inch (304.8 x 381 cm).

Shadeband Fabric Material: Fiberglass.

* + - 1. Two Single Shade Brackets for Double Shade Installation: Mounted on two single shade brackets installed for double shades.
         1. For 2 families of 4, 5, and 6 inch. (WxH): To 175 x 150 inch (444.5 x 381 cm).

Shadeband Fabric Material: Polyester.

* + - * 1. For 2 families of 4, 5, and 6 inch. (WxH): To 175 x 150 inch (444.5 x 381 cm).

Shadeband Fabric Material: Opaque (blackout).

* + - * 1. For 2 families of 4, 5, and 6 inch. (WxH): To 175 x 150 inch (444.5 x 381 cm).

Shadeband Fabric Material: Fiberglass.

* + 1. Motorized Operation of a Roller Shade Within the Shade Tube and Shade Assembly:
       1. Drive System: Motor controlled with specified controls for remote operation.
          1. Operated via line-voltage power supplied by branch circuits located near the top of the window. Quiet Operation: Less than 38 dba at three ft.
       2. Communication with Motor: Via data wiring using different protocols or remote controlled via RF signals.
          1. Control will allow for single shade or groups of shades to be operated remotely with customizable stopping points besides full up and down.
          2. Shade Versatility Options

Interconnection to different control systems such as third-party manufacturers' control/integration systems.

Building automation systems for increasing energy efficiency and occupant comfort.

Lighting control systems.

Wall switches.

Handheld remotes as required by project Architect.

* + - 1. Motor Selection: Based on control criteria, sizing of window, weight of fabric, project requirements for large shades, and/or need for quiet operation.
      2. Manufacturer to provide line voltage motors with sufficient lifting capacity for specified shade and capable of either Dry-Contact, RS 485, or RF control to meet project requirements.
    1. Assembly: Field assembled shade tube and shade assembly consisting of end brackets, appropriately sized motor installed as required, shade tube, extruded aluminum fascia, hembar, shade fabric material, regular or reverse roll of shade material, and attachment brackets for on-site installation.
       1. Attachment Brackets: For 4, 5, and 6 inch series of roller shades within the motorized shade family. Roller shade assembly to be ready for installation using brackets to match motor drive selection. Specialty brackets for unique installations and monumental shades and blackout channels for blackout shades are also available.
          1. Motor and Idler End Brackets: For left or right motor drive installation.

Fabrication: Punched steel.

Mounting Holes: Slotted for 1/4 inch (6 mm) adjustability.

Bracket Plate: One size for 4 inch roller shade series, and one size for 5 and 6 inch roller shade series.

* + - * 1. Adjustable Idler End Bracket: Allow for mechanical adjustment of idler depth from 0 to 3/4 inch (19 mm) increments for unique installation situations.

For left or right applications.

One size for 4 inch series, and one size for 5 and 6 inch series.

* + - * 1. Coupler Brackets: For linking together separate roller shades, so one motor can lift the shades.

Up to 6 linked shades may be powered from one motor.

Fabrication: Punched steel.

Mounting Holes: Slotted for 1/4 inch (6 mm) adjustability.

Vertical Adjustment: 1/4 inch (6 mm).

Installation flexibility to minimize light gaps and ensure alignment across the shades being linked by the axle within the coupler bracket.

Total Light Gap Adjustment: Up to 3/4 inch (19 mm) to compensate for unique installations.

One size for 4 inch series, and one size for 5 and 6 inch series.

Available for single or double roller shade combinations.

* + - * 1. Corner Mounting Bracket with 90 Degree Coupler Bracket: For roller shade installation at intersection of two elevations. Fabrication: Punched steel.

Adjustment: Lateral: Up to 1/8 inch (3 mm). Vertical: 1/4 inch (6 mm).

For flexibility minimizing light gaps and insuring alignment across two shades being linked by the axle within the coupler bracket.

Coupler Brackets: One size for 4 inch series, and one size for 5 and 6 inch series.

Available for single or double roller shade combinations.

* + - * 1. Flexible Axle Coupler Bracket: For roller shade installation covering window and wall curves, not more than 45 degrees. Fabrication: Punched steel.

Adjustment: Lateral: Up to 1/8 inch (3 mm). Vertical: 1/4 inch (6 mm).

For flexibility in minimizing light gaps and insuring alignment across the two shades being linked by the axle within the coupler bracket.

One size for 4 inch series, and one size for 5 and 6 inch series.

Available for single or double roller shade combinations.

* + - * 1. End Brackets: Accepts fascia end plates with attachment by mechanical capture and fasteners. Adhesive tape or clipping in place is not acceptable.
    1. Shade Tube: Extruded T5 6005 aluminum. Wall Thickness: 1/16 inch (1.52 mm).
       1. Continuous Screw Fins: 3/16 inch (5 mm) high, for strength.
          1. Spaced equidistant on tube and placed according to weight and sizing characteristics necessary for intended shade to be supported.
       2. Manufacturer: To select tube of diameter and size so deflection due to weight of shade material and shade size is not visible, assuring good performance.
    2. Fascia and End Caps: Extruded T6 6063 or 6360 aluminum with front towards room interior. Thickness: 1/16 inch (1.7 mm). Two continuous screw flutes. Anodized, powder coated or custom painted. Suitable for regular or reverse roll. Reverse fascia towards window, is available as an option.
       1. Fascia: 4, 5, and 6 inch (102, 127, and 152 mm) sizes.
       2. Fascia Height: Joins into combinations up to 12 inches (305 mm). The bottom of one piece aligns with top of another piece. A separate pre-manufactured joiner connects the single pieces into one panel for entire length of segment.
          1. Architect to specify height of fascia up to 12 inches (305 mm)
       3. Fascia hangers for roller shade families to support available fascia sizes. Ceiling or wall surface installation. Fascia to be attached via No. 8, 3/4 inch (19 mm) screws.
       4. End Caps: Varying sizes to fit the 4 inch and the 5 and 6 inch series roller shades.
          1. Varieties: 4, 5, 6, 8,10, and 12 inch (102, 127, 152, 203, 254, and 305 mm)
          2. T6 6063 or 6360 aluminum. Attached via press fit and screws.
       5. Fascia Attachment: 2-part process. First: Friction fit fascia into fabric, tube, and motor shade unit. Second: lock-down of fascia to bracket with hidden/concealed screws; No. 8, 3/4 inch (19 mm) screws to the roller shade bracket.
       6. Fascia and End Cap Colors: Extruded aluminum with plastic end finials.

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Exposed Hembar: Extruded T6 6360 aluminum with plastic end finials, attached in factory to shadeband material (fabric). Exposed hembar and shadeband wrapped and sealed hembars are supplied with both ends of hembar sealed.
       1. Hembar:

\*\* NOTE TO SPECIFIER \*\* Delete hembar options not required. If multiple configurations are required indicate the location of each on the Drawings or in the Schedule at the end of this section

* + - * 1. Exposed.
        2. Concealed, Fabric Wrapped with open ends.
        3. Wrapped and sealed. Fabric Wrapped with fabric sealed ends.
      1. Exterior Hembar Colors: Extruded aluminum with plastic end finials.

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Shadeband Material Attachment to Roller Shade Tube in Factory:

\*\* NOTE TO SPECIFIER \*\* Delete attachment method not required. Selection of method can be by Specifier preference or dependent on project requirements and size of finished shade fabric, tube, and motor units.

* + - 1. Attachment Method: Double sided tape for insuring shadeband material lays flat.
      2. Attachment Method: By hidden spline with lightweight small profile plastic extrusion attached to shadeband material and inserted into a groove machined into roller tube.
      3. Finished Shades: Fabricated with one complete wrap of material minimum to cover attachment of the shade and material to the shade tube. Wrap length will vary due to size of shade, size of tube, and factory assembly conditions.
    1. Closure for Pockets: Provide matching trim plate of finished T6 6063 aluminum, to conceal most of the roller shade opening.
       1. Attached to fascia via a secure continuous overlap/underlap fabricated groove.
       2. Available for attachment to fascia options offered by manufacturer.
       3. Manufacturer to offer width of closure based upon single or dual shade and regular or reverse roll as specified.
       4. Connector Plates: To butt seams of closures together for tight and secure fit.
       5. Specific location for routing and attaching low-voltage cabling and plastic "zip" cable tie hold downs for effective cable management, when motorized shades are utilized.

\*\*NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - 1. Finish: Clear Anodized.
      2. Finish: Gloss White.
      3. Finish: Beige.
      4. Finish: Dark Grey.
      5. Finish: Black.
      6. Finish: Light Bronze.
      7. Finish: Ceiling White.
      8. Finish: Charcoal.
      9. Finish: Dark Bronze.
      10. Finish: Color as selected by the Architect.
    1. Shade Fabric:

\*\* NOTE TO SPECIFIER \*\* Refer to Legrand's Roller Shades Memo Samples at <https://store.samplingproduct.com/10389/tags/index/1543> for a complete list of available shade fabrics and selection guidelines. Select the Shade Fabrics required and include below or use the Schedule at the end of this section if required for multiple fabrics. For dual roller shades, choose two, and indicate which is for front roller and which is for back roller.

* + - 1. Light Filtering Fabric: \_\_\_\_\_\_\_\_.
      2. Room Darkening Fabrics: \_\_\_\_\_\_\_.
      3. Color and Pattern: As indicated in Color Schedule on Drawings.
      4. Color and Pattern: As selected by Architect from manufacturer's standard range.
    1. Intelligent Motors:

\*\*NOTE TO SPECIFIER \*\* Select AC Line Voltage Motor or DC Motor or both. Line voltage intelligent motors provide simplified installation and wiring, and stronger torque motors with greater lifting capacity. If both are selected identify the location of each on the Drawings.

* + - 1. AC Line Voltage Motors: Sonesse Intelligent Motor by Somfy Systems. Tubular, asynchronous, built in reversible capacitor, brushless 110 VAC, 60 Hz, 1-phase, thermally protected, permanently lubricated gearbox, and maintenance free.
         1. Torque Lifting Capacity: 4 to 35 Nm.
         2. Controller: Embedded microprocessor. Onboard serial communications port.
      2. DC Low Voltage Motors: Sonesse Intelligent Motor by Somfy Systems. Tubular, thermally protected, permanently lubricated gearbox, and maintenance free.
         1. Torque Lifting Capacity: 2 Nm minimum. Fits a tube diameter of 31 mm.
         2. Embedded microprocessor-based controller.
         3. Onboard serial communications port.
      3. Intelligent Motor Characteristics:
         1. Standards Compliance; UL, CUL recognized. Meets CSA standards.
         2. Rated for interior and exterior applications.
         3. No external mechanical components (springs) required.

\*\* NOTE TO SPECIFIER \*\* Delete power and communication options not required. Disconnect plug is optional. Delete if not required.

* + - * 1. Power: AC line voltage.

Motor Lifting Capacity Line Voltage Motors: 4 Nm torque or greater

* + - * 1. Power: DC low voltage.

Motor Lifting Capacity Low Voltage Motors: 2 Nm torque or greater

* + - * 1. Communication: Wired.

Customizable length of power and communication wire.

Disconnect plug.

* + - * 1. Communication: Wireless.
        2. Compatible with industry standard hardware.
        3. Adaptable to varying tube diameters with snap-on adapters.
        4. Field-Interchangeable: Inserts into either tube end to adapt to wire locations.
        5. Digital Encoder: Deliver precise alignment; plus or minus 2 mm accuracy.

Systems using a "time function" for positioning are not acceptable.

* + - * 1. Operating Sound Level Rating at 3 ft Distance: 44 dBA or better.
        2. Electronically set 16 unique stopping points; locked into non-volatile memory.
        3. Capable of being positioned at fully-up, fully-down or any position between 0-100 percent in 0.5 percent increments.
        4. Motor Electrical Components: Tested to withstand a 15 kV electrostatic discharge without damage or memory loss.
        5. Factory-Assigned Individual Unique Addresses: Configurable over network without physically accessing motor.
        6. Onboard Communication Port: For bi-directional communication; status updates, configuration, and PC operation with applicable software.
        7. 16-User Configurable Group Addresses: Electronically stored and locked in non-volatile memory.
    1. Shade Drive Assembly: Factory installed motor, inspected, pre-tested, with limits preset. Motors of different lifting capacities are available depending on shade material weight and window size to be covered.
       1. Motors: Placed inside tubes with appropriate drive attachments and brackets to be part of complete fabric, tube and motor units that ship complete, ready to install into two attachment brackets fastened to building structure.
          1. Line Voltage: 120 VAC, 60 Hz powered type.
          2. Quiet Operation: 38 dBA or less at 3 ft.

Operation to be free of clicks and gear sounds during operation.

* + - * 1. Upper and Limit Presets set by:

Buttons on motor if Dry-contact control capable.

Limit setting device connected to motor if RS 485 capable.

Handheld remote if RF controlled capable.

* + - * 1. Programmable intermediate shade positions allowing for customized and matching stop points of shade stored into memory.
        2. Encoder-based drive for precise positioning.
        3. Built-in thermal limit protection of four minutes.
        4. Rating: IP 31. Interior use. Operating Temperature Range: 32 to 140 degrees F (0 to 60 degrees C).
        5. RF Controlled Motors: SOMFY RTS type. Antenna built-into power cord, without use of external connection.
        6. Dry-Contact and RS 485 Capable Motors: Small connector on motor head for connection to control networks.
        7. Power cord that is factory installed and integral to the tubular UL listed and tested motor.
        8. Manufacturer is to provide power lead lengths with factory installed connectors and options for customizable lengths and different power connectors.
        9. Motors to be installed as left or right drive, inside shade tube

\*\* NOTE TO SPECIFIER \*\* There are numerous methods to control motorized shades and a variety of motors. Control options may include direct-wired control via switches, single shade control or multiple shade control via hard-wired switches, timer, and light sensor control; integration with third-party manufacturer control or audio-visual systems via RS-232/RS-485, interconnection with Building Automation Systems and Lighting Control Systems via BACnet, and direct operation with other Legrand products. Select the control method required and delete those not required. Contact a Legrand Sales Consultant for more information and detail.

* + 1. Control of Shades:
       1. User Interface Hard-Wired Switches:
          1. To fit standard decorator paddle switch plates and fit standard junction boxes.
          2. Four Buttons: Up, down, preset 1, and preset 2.

Preset Buttons: Customizable. Factory Preset: 33 and 65 percent of shade height based on lower limit.

* + - * 1. Hard-Wired Switch Color: White.
        2. Hard-Wired Switch Color: Ivory.
      1. Dry-Contact Motor Control: Interconnection cable for use by others to control operation of dry contact shade motor via other system.
      2. RF Controlled Motors:
         1. To be SOMFY RTS RF-controlled.
         2. RTS Product Line Includes:

Handheld single shade RTS remotes,

Handheld five shade RTS remotes,

Wall-mounted single shade RTS remotes,

Wall-mounted five shade RTS remotes,

Hand held and wall mounted remotes available in White or Black colors,

Sun Sensor RTS compatible units,

Time clock RTS compatible units,

RTS dry-contact interfaces,

Building Automation RTS interfaces,

Smart Phone and "App" interfaces.

* + - 1. RS 485 Digital Network Controlled Motors: For interconnection to other systems, operational flexibility and control, and the following features.
         1. Individually addressable motors via the digital network.
         2. Digital network wiring topology allowing for "daisy-chaining."
         3. Bi-directional communication along RS 485 network.
         4. Interconnection with third party systems for control.
         5. Network interconnection with Building Automation and Lighting Control Systems via RS-485 or BACnet interfaces.
      2. Automated Lighting Control System: Features as specified in Section 26 01 00 - Operation and Maintenance of Electrical Systems.

\*\* NOTE TO SPECIFIER \*\* The Designer Series (DS) is an open roll (no fascia) shade solution for manual or motorized single and coupled shades. There are brackets for any mounting application and the shades can be coupled. System is for Small to Medium width shades up to 156 inches. There are two different energy efficient motorized options - DLM or QIS that allow for local control and integration with Legrand lighting control and automation platforms. There are decorative bracket endcap and hembar options for designed spaces.

* 1. DS SERIES OPEN ROLL SHADE SYSTEM
     1. Legrand DS Designer Series open shade system. An open roll roller shade bracket system. Options for motorized operation, manual operation, and convertible manual to motorized (MTM) operated. DS Bracket System: Universal mounting brackets that can be mounted inside or outside the window or top or back mounted. Provide the following Systems in locations indicated on the Drawings.

\*\* NOTE TO SPECIFIER \*\* Delete systems not required.

* + - 1. Manual Operation: System allows for standalone manual chain operated shades
      2. Manual to Motorized Convertible Operation.
         1. Brackets for shades up to 10 ft (3.048 m) wide by 10 ft (3.048 m) tall.
         2. Allows for manual chain operated shades or manual chain operated shade to be converted to a motorized shade.

Replace manual clutch and chain system with motor and controls.

* + - 1. Low Voltage Motorized Shading System with DLM Motors and Controls.
         1. Shade Brackets for up to 13 ft (3.962 m) wide by 15 ft (4.572 m) tall. Can be banded, up to 7 panels.
      2. Low Voltage Motorized Shading System with QIS Motors and Controls.
         1. Shade Brackets for up to 13 ft (3.962 m) wide by 15 ft (4.572 m) tall. Can be banded, up to 7 panels.

\*\* NOTE TO SPECIFIER \*\* Delete the base shade configurations not required from the following paragraphs and subparagraphs. If multiple configurations are required indicate location of each on the Drawings or in the Schedule at the end of this section. Consult with Manufacturer if configurations are required for unusually shaped windows, corner applications, or various pocket designs.

* + 1. Base Shade Configurations: No Fascia. 2.6 Roll Up Diameter (RUD).
       1. RLR-DS-1-MA-C-S: Manual Inside Top Mount. Standard Roll. Bracket Dimensions (DxWxH): 3-1/16 x 1-3/8 x 3-7/8 inches.
       2. RLR-DS-1-MA-C-R: Manual Inside Top Mount. Reverse Roll. Bracket Dimensions (DxWxH): 3-1/16 x 1-3/8 x 3-7/8 inches.
       3. RLR-DS-1-MA-A-S: Manual Outside Back Mount. Standard Roll. Bracket Dimensions (DxWxH): 3-7/8 x 1-3/8 x 2-3/4 inches.
       4. RLR-DS-1-MA-A-R: Manual Outside Back Mount. Reverse Roll. Bracket Dimensions (DxWxH): 3-3/4 x 1-3/8 x 2-3/4 inches.
       5. RLR-DS-1-MO-D-C-S: Motorized Inside Top Mount. Standard Roll. Bracket Dimensions (DxWxH): 3-1/16 x 1-3/8 x 3-7/8 inches.
       6. RLR-DS-1-MO-D-C-R: Motorized Inside Top Mount. Reverse Roll. Bracket Dimensions (DxWxH): 3-1/16 x 1-3/8 x 3-7/8 inches.
       7. RLR-DS-1-MO-D-A-S: Motorized Outside Back Mount. Standard Roll. Bracket Dimensions (DxWxH): 3-7/8 x 1-3/8 x 2-3/4 inches.
       8. RLR-DS-1-MO-D-A-R: Motorized Outside Back Mount. Reverse Roll. Bracket Dimensions (DxWxH): 3-3/4 x 1-3/8 x 2-3/4 inches.
       9. RLR-DS-1-MO-D-C-S-B: Motorized Inside Top Mount. Standard Roll. Coupled. Bracket Dimensions (DxWxH): 3-1/16 x 1-3/8 x 3-7/8 inches. Coupler Dimensions (DxH): 3-5/8 x 3-3/4 inches.
       10. RLR-DS-1-MO-D-A-S-B: Motorized Outside Back Mount. Standard Roll. Coupled. Bracket Dimensions (DxWxH): 3-7/8 x 1-3/8 x 2-3/4 inches. Coupler Dimensions (DXH): 3-7/16 x 3-5/8 inches.
    2. Base Shade Configurations: No Fascia. 3.3 Roll Up Diameter (RUD).
       1. RLR-DS-2-MA-C-S: Manual Inside Top Mount. Standard Roll. Bracket Dimensions (DxWxH): 3-15/16 x 1-3/8 x 3-3/4 inches.
       2. RLR-DS-2-MA-C-R: Manual Inside Top Mount. Reverse Roll. Bracket Dimensions (DxWxH): 3-15/16 x 1-3/8 x 3-3/4 inches.
       3. RLR-DS-2-MA-A-S: Manual Outside Back Mount. Standard Roll. Bracket Dimensions: 3-3/4 x 1-3/8 x 2-3/4 inches.
       4. RLR-DS-2-MA-A-R: Manual Outside Back Mount. Reverse Roll. Bracket Dimensions (DxWxH): 4-3/8 x 1-3/8 x 2-3/4 inches.
       5. RLR-DS-2-MO-D-C-S: Motorized Inside Top Mount. Standard Roll. Bracket Dimensions (DxWxH): 3-15/16 x 1-3/8 x 3-3/4 inches.
       6. RLR-DS-2-MO-D-C-R: Motorized Inside Top Mount. Reverse Roll. Bracket Dimensions (DxWxH): 3-15/16 x 1-3/8 x 3-3/4 inches.
       7. RLR-DS-2-MO-D-A-S: Motorized Outside Back Mount. Standard Roll. Bracket Dimensions (DxWxH): 3-3/4 x 1-3/8 x 2-3/4 inches.
       8. RLR-DS-2-MO-D-A-R: Motorized Outside Back Mount. Reverse Roll. Bracket Dimensions (DxWxH): 4-3/8 x 1-3/8 x 2-3/4 inches.
       9. RLR-DS-2-MO-D-C-S-B: Motorized Inside Top Mount. Standard Roll. Coupled. Bracket Dimensions (DxWxH): 3-15/16 x 1-3/8 x 3-3/4 inches. Coupler Dimensions (DxH): 3-5/8 x 4-1/8 inches.
       10. RLR-DS-2-MO-D-A-S-B: Motorized Outside Back Mount. Standard Roll. Coupled. Bracket Dimensions (DxWxH): 3-3/4 x 1-3/8 x 2-3/4 inches. Coupler Dimensions (DxH): 3-3/4 x 3-5/8 inches.
    3. Base Shade Configurations: No Fascia. 4.3 Roll Up Diameter (RUD).
       1. RLR-DS-3-MO-D-C-S: Motorized Inside Top Mount. Standard Roll. Bracket Dimensions (DxWxH): 3-7/8 x 1-3/8 x 4-1/4 inches.
       2. RLR-DS-3-MO-D-C-R: Motorized Inside Top Mount. Reverse Roll. Bracket Dimensions (DxWxH): 3-7/8 x 1-3/8 x 4-1/4 inches.
       3. RLR-DS-3-MO-D-A-S: Motorized Outside Back Mount. Standard Roll. Bracket Dimensions (DxWxH): 4-1/4 x 1-3/8 x 2-3/4 inches.
       4. RLR-DS-3-MO-D-A-R: Motorized Outside Back Mount. Reverse Roll. Bracket Dimensions (DxWxH): 5-3/8 x 1-3/8 x 2-3/4 inches.
    4. Shade Fabric:

\*\* NOTE TO SPECIFIER \*\* Refer to Legrand's Roller Shades Memo Samples at https://store.samplingproduct.com/10389/tags/index/1543 for available shade fabrics and selection guidelines. Select Fabrics rand include below or use the Schedule at the end of this section to define locations of multiple fabrics. Where dual roller shades are specified, choose two, and indicate which is for front roller and which is for back roller.

* + - 1. Light Filtering Fabrics: \_\_\_\_\_\_\_\_.
      2. Room Darkening Fabrics: \_\_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Delete color and pattern option not required.

* + - 1. Color and pattern: As indicated in Color Schedule on Drawings.
      2. Color and pattern: As selected by Architect from manufacturer's standard range.
    1. Shade Options:

\*\* NOTE TO SPECIFIER \*\* Delete options not required. If multiple configurations are required indicate locations on the Drawings or in the Schedule at the end of this section.

* + - 1. Hembar: Extruded T6 6360 aluminum with plastic end finials.
         1. Round Hembar for Wrapped, Coupled and Larger shades.
         2. Round Hembar for Exposed, Coupled and Larger shades.
         3. Oval Hembar for Exposed Single and Smaller shades.
      2. Exterior Hembar Colors: Extruded aluminum with plastic end finials.
         1. Finish: Silver.
         2. Finish: White.
         3. Finish: Sand.
         4. Finish: Black.
         5. Finish: Bronze.
         6. Finish: Color as selected by the Architect.
      3. Fabric Drop: Standard Roll.
      4. Fabric Drop: Reverse Roll.
      5. Drive Side: Left.
      6. Drive Side: Right.
      7. Mounting: Outside.
      8. Mounting: Inside.
      9. Mounting: Top.
      10. Mounting: Back.
    1. Mounting Bracket and Coupler Versions:
       1. Bracket versions and couplers to suit shade layout indicated on Drawings.
       2. Brackets to suit the mount and roll-up diameter as indicated on Drawings.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraph if not required.

* + 1. Converting Manual Shades to Motorized Shades:
       1. Provide motorized inserts. Motors to shades to be motorized as indicated on the Drawings.

\*\* NOTE TO SPECIFIER \*\* Delete the DLM Motors paragraph or the QIS Shade Drive Assembly paragraph, whichever is not required.

* + 1. DLM Motors:
       1. Self-configuring digital devices incorporating a wired connection and wireless Bluetooth low energy technology built-in for a variety of control options.
          1. A counter-balance spring design allows shade to use less energy and extremely quiet operation.
          2. Shades may be manually pulled into position using the hembar.
          3. Low motors powered by 24 to 36 VDC coming from DLM room controller power supply. A number of wired switch options for control of the shades.
       2. Operation: 2 different gear ratios to support shades of different sizes.
          1. The 40:1 gear ratio motor (LMSH-MCA140) are used on smaller shades.
          2. The 73:1 gear ratio motors (LMSH-MCA173) are required for larger and coupled shades.
          3. A counter-balance spring designed for the weight of the shade and motor type.
          4. Motor and Spring Assembly: Specified and tested by the factory.
          5. Plug n' Go (PnG) Operation: The MCA (motor control assemblies) will automatically join the network, set a default upper and lower shade limit, and be assigned to any shade switches on the project.

Settings can be customized later by using the Push n' Learn (PnL) and Pull n' Save (PnS) procedures found in shade controller power supply or shade switch installation instructions.

* + - * 1. Automated Start Up Procedures: To save installation and startup time by defaulting to an initial system configuration based on installed components.
      1. Technical Specifications:
         1. Standards Compliance: UL and cUL listed; UL/C-UL Ratings: 36 VDC, 0.12 A, Class 2 Supply.
         2. Input voltage: 24/36 VDC. Connect to LMSH-PS602 or LMSH-PS610 Power Supply.
         3. Current Consumption: 250 mA, 6W
         4. Speed/Torque: LMSH-MCA140: 38 RPM/10 N-cm
         5. Speed/Torque: LMSH-MCA173: 29 RPM/15 N-cm
         6. Connection to Shade Bus: 4-Conductor wire whip with female terminal (power and data over four wires.
         7. Cable Whip Length: 13 inches.
         8. Motors Status LED: Tricolor (RGB).
         9. Minimum Shade Size: 16 inches wide.
         10. Maximum Shade Size: 15 foot wide by 20 foot tall.
         11. Operating Temperature: 32 to 120 degrees F (0 to 50 degrees C).
         12. Storage Temperature: Minus 20 to 180 degrees F (Minus 28 to 82 degrees C).
         13. Relative Humidity: 5 to 95 percent, non-condensing.
         14. IP Rating: IP44.
      2. Controls:
         1. LMSH-MCA140: DLM Motor Control Assembly, 24V, 40:1 Gear Ratio, 36 inch wire whip.
         2. LMSH-MCA173: DLM Motor Control Assembly, 36V, 73:1 Gear Ratio, 36 inch wire whip.
         3. Able to be installed left or right drive, inside shade tube.
         4. Motors are not damaged when a user "pulls down" on shade hembar when power or control is not engaged.
         5. Shade Cassette System: Enables users to send shade all the way open, all the way down, or stop at a fixed position via a prescribed sequence of "tugs" or pulling on the hembar without damaging motor, drive, brackets, or roller shade.
      3. DLM-Based Low Voltage Wall Switches: LMSH Series.
         1. Self-configuring digital low voltage devices for manual control of DLM based shades from one or more locations.
         2. Shades to be part of a Digital Lighting Management (DLM) system.

Control any shade motors connected to DLM shade room controllers.

Motors and power supplies are connected using a four-wire shade bus with pre-configured cables and simple to configure bus system.

Switches connect using standard DLM in-room-bus (IRB) RJ45 cables for foolproof installation.

* + - * 1. Switch Operation: Class 2 power supplied to a DLM local network by one or more shade room controllers.

Switches send a digital signal for shade control when a user presses a pushbutton.

Plug n' Go (PnG) automatic configuration assigns shades to the switch buttons upon system startup.

Shade default upper and lower limits are assigned during PnG.

Two additional programming procedures allow for customization of the motorized shade system.

Press n' Learn allows switch button assignments and functions to be reconfigured.

Press n' Save allows installer to change shade upper and lower limits.

* + - * 1. Specifications:

UL and cUL listed. FCC part 15 compliant.

Input Voltage: 24 VDC from DLM local network.

Current consumption: 5 mA.

DLM local network connection: 2 RJ45 ports.

Control Buttons: 1, 2, 4, or 5. Each with LED status indicator.

Hidden configuration button to access Push n' Learn and Pull n' Save configurations.

Infrared (IR) transceiver.

Operating Conditions: Indoor use only; 32 to 131 degrees F (0 to 55 degrees C); 5 to 95 percent RH, non-condensing

Programmable top and bottom shade limits.

Wired Switches:

1-Rocker Wall Switch.

2-Button Wall Switch.

4-Button Wall Switch.

4-Button Plus Rocker Wall Switch.

Colors: White, Black, Gray, Ivory, Light Almond.

* + - 1. DLM Shade System Wiring Components: Preconfigured shade bus connections, customized wiring, shade bus extenders and testers, non-plenum and plenum rated local network cables as required.
         1. The shade bus shade supports an open topology wiring structure using passive shade bus connectors, extenders, and cables.
      2. DLM Based Shade Room Controllers: Self-configuring digital devices providing low voltage power and control for up to two to ten motorized shades.
         1. Accepts 120/277 VAC input line voltage and are typically mounted in the ceiling to a four-square junction box.
         2. Provides power and control for shades on the shade bus and integrates switches on the shade In-Room-Bus (IRB).
         3. Features:

Distributed shade control system reduces lengthy homerun wiring.

Two controller options allows system flexibility when setting up a shade room network.

Controller: LMSH-PS610 for up to 10 shades.

Controller: LMSH-PS602 for up to two shades.

Buttons for shade control and system configuration allow testing and control of the system while installing the shades.

Plug n' Go automatic configuration along with Push n' Save and Push n' Learn for system personalization.

Plug to other components (switches) using Cat 5e cables with RJ45 connectors eliminating wiring errors.

Four wire shade bus with preconfigured wires simplifies wiring to shade motors. The wiring system is plug and play.

Provides option for creating groups and astronomic schedules independent of integration with other systems or lighting controls.

Component of Digital Lighting Management integrated shade and lighting control system.

* + - * 1. Specifications:

Standards Compliance: UL and cUL listed.

Input voltage: 120/277VAC, 50/60Hz.

Shade Bus Ports: 1 (LMSH-PS602), 2 (LMSH-PS610).

Shade Bus Voltage: 24 V (LMSH-PS602), 36 V (LMSH-PS610).

Shade Capacity: Up to 2 (LMSH-PS602) or 10 (LMSH-PS610) DLM-based shade motors.

Connection to the DLM Local Network: 2 RJ-45 ports.

Local Network Characteristics when using shade controller:

Shade Network provides low voltage power to shade motors over Shade Bus cables, up to 1,000 ft (or 2 x 500 ft) max.

DLM Local Network In-Room Bus (IRB) provides low voltage power to switches over Cat 5e cable LMRJ;

Class 2 output to DLM local network: 24 VDC, 150 mA.

DLM Local Network Parameters:

Maximum current: 800 mA.

Cat 5e cable: 150 ft per device to 1,000 ft max - Up to 64 loads and communicating devices.

Operating conditions: for indoor use only; 32-131 degrees F (0-55 degrees C); 5-95 percent RH, non-condensing.

* + 1. Connection When Using A DLM Shade Control System:
       1. LMSH-PS6xx Shade Controllers:
          1. 4-wire shade bus for power and control of shades.
          2. DLM IRB network using Cat5e for connection to wall switches and other shade power supplies.
          3. Pre-terminated cable assemblies for the shade bus and local IRB network for plug and play in a single room or area.
       2. Install controllers so switch and shade bus wire bus limits are not exceeded.
          1. Shade Bus Limit: 1000 ft. Motor to Shade Controller: 500 ft. maximum.
          2. DLM Bus Limit: 1000 ft.
       3. If connected to an LMSH-PS602 shade room controller, a single shade can connect directly to the controller. To connect a second shade, use the LMSH-SBE4 Shade Bus Extender or splitter.
       4. If connected to an LMSH-PS610 shade room controller, two shades can connect directly to the controller. To connect additional shades (up to 10 total), use the LMSH-SBE4 Shade Bus Extender or splitter.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraphs for QIS motors and shade control systems, as applicable. Delete if not applicable.

* + 1. QIS Shade Drive Assembly: Factory installed motor, inspected, pre-tested, with limits preset. Motors of different lifting capacity are available depending on shade material weight and size of window to be covered. Other shade motor drive assembly features include:
       1. Motor is inside a tube with special springs as part of a complete shade cassette unit assembled in factory, inspected, tested, motor limits set, and shipped complete, ready for installation into the two attachment brackets fastened to building structure.
          1. DC type featuring quiet operation of less than 38 dbA at 3 ft.
          2. Digital bidirectional communication.
          3. 98 programmable shade positions for customized and matching shade stop points.
          4. Encoder-based drive for precise positioning; plus or minus 1/16 inch (1.6 mm).
          5. Power Supply: 24 VDC.
          6. Limits to be electronic and not manual type.
          7. 24 AWG Cat5e or Cat6 for shade power and communications in one cable.
       2. Shades standard with 6 inch (152 mm) pre-assembled connector in any gender.
          1. Connector wire Length: 4 inches (102 mm).
          2. Connector wire Length: 35 inches (0.889 M).
       3. Motors to be installed left or right drive, inside shade tube.
       4. Motors are not to be damaged when a user "pulls down" on shade hembar when power or control is not engaged.
       5. Shade Cassette System: Enables user to send shade all the way open, all the way down, or to stop at a fixed position via a prescribed sequence of "tugs" or pulls on the hembar without damaging the motor, drive, brackets, or roller shade.
       6. Allow installer to set lower and upper limits or return to a master shade reset to default upper and lower limits.
    2. Power and Communication Panels:
       1. Low voltage motors are interconnected via 24 AWG Cat5e or Cat6 cabling for power and control within a single cable.
       2. Provide a tested and designed system capable of a distance between power and communication panel and shades of 750 feet (229 m) for the farthest shade.
          1. Maximum distance between a power and communication panel and a hard-wired switch is 1,000 feet (304.8 M).
          2. Utilize type RJ-45 connectors, and straight thru wiring with no crossing of conductors at different cable ends.
       3. Power 8 shades; DC output of 24 VDC, 7.5 Amps.
          1. AC input requirements: 100 to 200 Volts at 2.5 Amps via separate power supply connected to power and communication panel.
          2. Associated low-voltage motors must not require any other AC power supply or transformer for DC power, along the network or at the shade motor location.
       4. Panels can be joined together daisy-chain style, RS-485 to control more shades, switches, and zones. Twelve panels may be connected to control 96 shades.
       5. Interconnection to building management systems, automated lighting systems, third party manufacturers, and other Legrand systems for daylight integration and lighting control is to be seamless and effected by RS-485, RS-232, BACnet, or Dry Contact protocols and parameters.
       6. Shade Motors offer individual addressing to facilitate usage with systems by others via RS485 and BACnet protocols.
       7. Panel are controlled by a hard-wired switch for simplified user control and interfacing.
       8. A special cable adapter for installations where a two-wire cabling system is required. System shall provide power.

\*\* NOTE TO SPECIFIER \*\* There are numerous methods to control motorized shades and a variety of motors. Control options may include direct-wired control via switches, single shade control or multiple shade control via hard-wired switches, timer, and light sensor control; integration with third-party manufacturer control or audio-visual systems via RS-232/RS-485, interconnection with Building Automation Systems and Lighting Control Systems via BACnet, and direct operation with other Legrand products specified in Section 26 09 43 - Network Lighting Controls. Contact a Legrand Solarfective Sales Consultant for more information and detail.

* + 1. Control of Shades:
       1. User Interface: Hard-wired switches.
          1. To fit standard decorator type paddle switch plates and junction boxes.

Four Buttons: Up, down, preset 1 preset 2.

Preset Buttons: Customizable. Factory Preset: 33 and 65 percent of shade height based on lower limit.

Colors: White, Light Ivory, Ivory, Gray, and Black.

* + - 1. Automated Lighting Control System with Features as specified in Section 26 09 43 - Network Lighting Controls.

\*\* NOTE TO SPECIFIER \*\* The Spec Series (SS) is a fascia shade solution for manual or motorized single, dual, and coupled shades. There are brackets for any mounting application and bottom load brackets for pockets. Custom extruded pockets are available for all sized shades supported by SS brackets. The fascia system is clipped on to the brackets for easy installation. System is for small to medium width shades up to 156 inches. The ES fascia can be used in place of the SS fascia for more customized fascia needs. There are two different energy efficient motorized options - DLM or QIS that allow for local control and integration with Legrand lighting control and automation platforms.

* 1. SS SERIES FASCIA SHADE SYSTEM
     1. Legrand SS Specification Series fascia, shade system: A fascia roll roller shade bracket system with options for motor operated shades, manually operated shades, and convertible manual to motorized (MTM) operated shades. Provide the following Systems in the locations indicated on the Drawings.
        1. Operation:

\*\* NOTE TO SPECIFIER \*\* Delete operation systems options not required.

* + - * 1. Manual: System allows for standalone manual chain operated shades.
        2. Manual to Motorized Convertible:

Manual-to-Motorized brackets for shades up to 10 ft wide by 10 ft tall.

Converts standalone manual chain operated shades or manual chain operated shades to motorized shades.

Remove clutch and chain and add motor and controls.

* + - * 1. Low Voltage Motorized Shading System with DLM Motors and Controls.

Motorized only brackets for shades up to 15 ft. wide by 20 ft. tall.

Can be banded, up to 6 panels.

* + - * 1. Low Voltage Motorized Shading System with QIS Motors and Controls.

Motorized only brackets for shades up to 15 ft. wide by 20 ft. tall.

Can be banded, up to 6 panels.

\*\* NOTE TO SPECIFIER \*\* Delete base shade configuration types not required from the following paragraphs and subparagraphs. If multiple configurations are required indicate location of each on the Drawings or in the Schedule at the end of this section. Consult with manufacturer for configurations for unusually shaped windows, corner applications, or various pocket designs.

* + 1. Base Shade Configurations with Fascia: 2.6 Roll Up Diameter (RUD).
       1. RLR-SS-1-MA-C-S-F: Manual Inside Top Mount. Standard Roll. Bracket Dimensions (DxWxH): 3-1/2 x 1-3/8 x 3-7/8 inches.
       2. RLR-SS-1-MA-C-R-F: Manual Inside Top Mount. Reverse Roll. Bracket Dimensions (DxWxH): 3-1/2 x 1-3/8 x 3-7/8 inches.
       3. RLR-SS-1-MA-A-S-F: Manual Outside Back Mount. Standard Roll. Bracket Dimensions (DxWxH): 3-7/8 inches Deep,1-3/8 x 3-7/8 inches.
       4. RLR-SS-1-MA-A-R-F: Manual Outside Back Mount. Reverse Roll. Bracket Dimensions (DxWxH): 3-7/8 x 1-3/8 x 3-7/8 inches.
       5. RLR-SS-1-MA-A-S-F-TB: Manual Outside Back Mount. Standard Roll, with top/back fascia: Bracket Dimensions (DxWxH): 3-7/8 x 1-3/8 x 3-7/8 inches.
       6. RLR-SS-1-MO-D-C-S-F: Motorized Inside Top Mount. Standard Roll Bracket Dimensions (DxWxH): 3-5/16 x 1-1/8 x 3-7/8 inches.
       7. RLR-SS-1-MO-D-C-R-F: Motorized Inside Back Mount. Reverse Roll: Bracket Dimensions (DxWxH): 3-5/16 x 1-1/8 x 3-7/8 inches.
       8. RLR-SS-1-MO-D-A-S-F: Motorized Outside Top Mount. Standard Roll: Bracket Dimensions (DxWxH): 3-5/16 x 1-1/8 x 3-7/8 inches.
       9. RLR-SS-1-MO-D-A-R-F: Motorized Outside Back Mount. Reverse Roll: Bracket Dimensions (DxWxH): 3-5/16 x 1-1/8 x 3-7/8 inches.
       10. RLR-SS-1-MO-G-S: Motorized Top Mount. Standard Roll in a Pocket: Bracket Dimensions (DxWxH): 3-5/16 x 1-1/8 x 3-7/8 inches High
       11. RLR-SS-1-MO-G-R: Motorized Top Mount. Reverse Roll in a Pocket. Bracket Dimensions (DxWxH): 3-5/16 x 1-1/8 x 3-7/8 inches High
       12. RLR-SS-1-MO-D-A-S-F-TB: Motorized Outside Back Mount. Standard Roll, with top/back fascia for room darkening: Bracket Dimensions (DxWxH): 3-5/16 x 1-1/8 x 3-7/8 inches.
       13. RLR-SS-4-MO-D-C-S-F: Dual Motorized Inside Top Mount Standard Roll Bracket Dimensions (DxWxH): 4-3/16 x 1-7/8 x 6-3/4 inches.
       14. RLR-SS-4-MO-D-A-S-F: Dual Motorized Outside Back Mount Standard Roll. Bracket Dimensions (DxWxH): 4-3/16 x 1-7/8 x 6-3/4 inches.
    2. Base Shade Configurations with Fascia: 3.3 Roll Up Diameter (RUD)
       1. RLR-SS-2-MA-C-S-F: Manual Inside Top Mount. Standard Roll. Bracket Dimensions (DxWxH): 4-3/16 x 1-3/8 x 4-3/16 inches.
       2. RLR-SS-2-MA-C-R-F: Manual Inside Top Mount. Reverse Roll. Bracket Dimensions (DxWxH): 4-3/16 x 1-3/8 x 4-3/16 inches.
       3. RLR-SS-2-MA-A-S-F: Manual Outside Back Mount. Standard Roll. Bracket Dimensions (DxWxH): 4-1/2 x 1-3/8 x 4-3/16 inches.
       4. RLR-SS-2-MA-A-R-F: Manual Outside Back Mount. Reverse Roll. Bracket Dimensions (DxWxH): 4-1/2 x 1-3/8 x 4-3/16 inches.
       5. RLR-SS-2-MA-A-S-F-TB: Manual Outside Back Mount. Standard Roll, with top/back fascia: Bracket Dimensions (DxWxH): 4-1/2 x 1-3/8 x 4-3/16 inches.
       6. RLR-SS-2-MO-D-C-S-F: Motorized Inside Top Mount. Standard Roll. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       7. RLR-SS-2-MO-D-C-R-F: Motorized Inside Top Mount. Reverse Roll. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       8. RLR-SS-2-MO-D-A-S-F: Motorized Outside Back Mount. Standard Roll: Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       9. RLR-SS-2-MO-D-A-R-F: Motorized Outside Back Mount. Reverse Roll: Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       10. RLR-SS-2-MO-D-S-B-F: Motorized Inside Top Mount. Standard Roll. Coupled: Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches. Coupler Dimensions: 3-5/16 x 4-1/8 inches.
       11. RLR-SS-2-MO-A-S-B-F: Motorized Outside Back Mount. Standard Roll. Coupled: Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches High Coupler Dimensions: 3-5/16 x 4-1/8 inches.
       12. RLR-SS-2-MO-D-G-S-F: Motorized Top Mount. Standard Roll in a Pocket. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       13. RLR-SS-2-MO-D-G-R-F: Motorized Top Mount. Reverse Roll in a Pocket. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       14. RLR-SS-2-MO-D-A-S-F-TB: Motorized Outside Back Mount. Standard Roll, showing top/back fascia for room darkening. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       15. RLR-SS-2-MA-C-S-F: Manual Inside Top Mount. Standard Roll. Bracket Dimensions (DxWxH): 4-3/16 x 1-3/8 x 4-3/16 inches.
       16. RLR-SS-2-MA-C-R-F: Manual Inside Top Mount. Reverse Roll. Bracket Dimensions (DxWxH): 4-3/16 x 1-3/8 x 4-3/16 inches.
       17. RLR-SS-2-MA-A-S-F: Manual Outside Back Mount. Standard Roll. Bracket Dimensions (DxWxH): 4-1/2 x 1-3/8 x 4-3/16 inches.
       18. RLR-SS-2-MA-A-R-F: Manual Outside Back Mount. Reverse Roll. Bracket Dimensions (DxWxH): 4-1/2 x 1-3/8 x 4-3/16 inches.
       19. RLR-SS-2-MA-A-S-F-TB: Manual Outside Back Mount. Standard Roll, with top/back fascia. Bracket Dimensions (DxWxH): 4-1/2 x 1-3/8 x 4-3/16 inches.
       20. RLR-SS-2-MO-D-C-S-F: Motorized Inside Top Mount. Standard Roll. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       21. RLR-SS-2-MO-D-C-R-F: Motorized Inside Top Mount. Reverse Roll. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       22. RLR-SS-2-MO-D-A-S-F: Motorized Outside Back Mount. Standard Roll. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       23. RLR-SS-2-MO-D-A-R-F: Motorized Outside Back Mount. Reverse Roll. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       24. RLR-SS-2-MO-D-S-B-F: Motorized Inside Top Mount. Standard Roll. Coupled. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches. Coupler Dimensions: 3-5/16 x 4-1/8 inches.
       25. RLR-SS-2-MO-A-S-B-F: Motorized Outside Back Mount. Standard Roll. Coupled. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches High Coupler Dimensions: 3-5/16 x 4-1/8 inches.
       26. RLR-SS-2-MO-D-G-S-F: Motorized Top Mount. Standard Roll in a Pocket. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       27. RLR-SS-2-MO-D-G-R-F: Motorized Top Mount. Reverse Roll in a Pocket. Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       28. RLR-SS-2-MO-D-A-S-F-TB: Motorized Outside Back Mount. Standard Roll, showing top/back fascia for room darkening Bracket Dimensions (DxWxH): 5-3/16 x 1-1/8 x 5-7/8 inches.
       29. RLR-SS-5-MO-D-C-S-F: Dual Motorized Inside Top Mount Standard Roll Bracket Dimensions (DxWxH): 4-13/16 x 1-7/8 x 7-13/16 inches.
       30. RLR-SS-5-MO-D-A-S-F: Dual Motorized Outside Back Mount Standard Roll. Bracket Dimensions (DxWxH): 4-13/16 x 1-7/8 x 7-13/16 inches.
    3. Base Shade Configurations with Fascia: 4.3 Roll Up Diameter (RUD)
       1. RLR-SS-3-MO-D-C-S-F: Motorized Inside Top Mount Standard Roll. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       2. RLR-SS-3-MO-D-C-R-F: Motorized Inside Top Mount Reverse Roll. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       3. RLR-SS-3-MO-D-A-S-F: Motorized Outside Back Mount Standard Roll. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       4. RLR-SS-3-MO-D-A-R-F: Motorized Outside Back Mount Reverse Roll. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       5. RLR-SS-3-MO-D-G-R-F: Motorized Top Mount Standard Roll in a Pocket. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       6. RLR-SS-3-MO-D-A-S-F-TB: Motorized Top Mount Reverse Roll in a Pocket. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       7. RLR-SS-3-MO-D-C-S-F: Motorized Inside Top Mount Standard Roll. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       8. RLR-SS-3-MO-D-C-R-F: Motorized Inside Top Mount Reverse Roll. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       9. RLR-SS-3-MO-D-A-S-F: Motorized Outside Back Mount Standard Roll. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       10. RLR-SS-3-MO-D-A-R-F: Motorized Outside Back Mount Reverse Roll. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       11. RLR-SS-3-MO-D-G-R-F: Motorized Top Mount Standard Roll in a Pocket . Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       12. RLR-SS-3-MO-D-A-S-F-TB: Motorized Top Mount Reverse Roll in a Pocket. Bracket Dimensions (DxWxH): 4 x 1-1/8 x 4-1/8 inches.
       13. RLR-SS-6-MO-D-G-S: Dual Motorized Top Mount Standard Roll in a Pocket . Bracket Dimensions (DxWxH): 5-3/4 x 1-1/2 x 9-11/16 inches.
    4. Shade Fabric:

\*\* NOTE TO SPECIFIER \*\* Refer to Legrand's Roller Shades Memo Samples at https://store.samplingproduct.com/10389/tags/index/1543 for available shade fabrics and selection guidelines. Select shade fabrics required and include below or use the Schedule at the end of this section if required to define fabric locations. Where dual roller shades are specified, choose two, and indicate which is for front roller and which is for back roller.

* + - 1. Light Filtering Fabric: \_\_\_\_\_\_\_\_.
      2. Room Darkening Fabrics: \_\_\_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Delete color and pattern option not required.

* + - 1. Color and Pattern: As indicated in Color Schedule on Drawings.
      2. Color and Pattern: As selected by Architect from manufacturer's standard range.
    1. Shade Options:

\*\* NOTE TO SPECIFIER \*\* Select the Options required from the following and delete those not applicable. If multiple configurations are required indicate the location of each on the Drawings or in the Schedule at the end of this section.

* + - 1. Hembar: Extruded T6 6360 aluminum with plastic end finials.
         1. Round: Exposed. For coupled and larger shades.
         2. Round: Wrapped. For Wrapped, coupled and larger shades.
         3. Oval: Exposed. For single and smaller shades.
      2. Exterior Hembar Colors: Extruded aluminum with plastic end finials.
         1. Finish: Silver.
         2. Finish: White.
         3. Finish: Sand.
         4. Finish: Black.
         5. Finish: Bronze.
         6. Finish: Color as selected by the Architect.
      3. Fabric Drop: Standard Roll.
      4. Fabric Drop: Reverse Roll.
      5. Drive Side: Left.
      6. Drive Side: Right.
      7. Standard Fascia: 3.3 inch Dual.
      8. Standard Fascia: 2.6 inch Dual.
      9. Standard Fascia: 4.3 inch.
      10. Standard Fascia: 3.3 inch.
      11. Standard Fascia: 2.6 inch.
      12. Reverse Roll Fascia: 4.3 inch Reverse Roll.
      13. Reverse Roll Fascia: 3.3 inch Reverse Roll.
      14. Reverse Roll Fascia: 2.6 inch Reverse Roll.
      15. Manual To Motorized Fascia: 3.3 inch.
      16. Manual To Motorized Fascia: 2.6 inch.
      17. Top and Back Fascia: 3.3 inch. For room darkening applications using Manual-to-Motorized bracket.
      18. Top and Back Fascia: 2.6 inch. For room darkening applications using Manual-to-Motorized bracket.
      19. Side Channel: With wool pile for room darkening. Works with any hembar.
      20. Sill Rail: With wool pile for room darkening. Works with any hembar.
      21. Pockets: 4.3 inch. Can be clipped together for pockets longer than 160 inches.
      22. Pockets: 3.3 inch. Can be clipped together for pockets longer than 160 inches.
      23. Pockets: Lip.
    1. Mounting Bracket and Coupler Versions:
       1. Provide to suit shade layout indicated on Drawings.
       2. Provide to suit the mount and roll-up diameter as indicated on the Drawings.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraph if not converting manual shades to motorized shades.

* + 1. Converting Manual Shades To Motorized Shades:
       1. Provide motorized inserts and motors to shades to be motorized as indicated on the Drawings.

\*\* NOTE TO SPECIFIER \*\* Delete the DLM Motors paragraph or the QIS Shade Drive Assembly paragraph, whichever is not required.

* + 1. DLM Motors: Self-configuring digital devices incorporating a wired connection and wireless Bluetooth low energy technology built-in for a variety of control options.
       1. Counter-balance spring design allows shade to use less energy and extremely quiet operation.
          1. Allows shades to be manually pulled into position using the hembar.
          2. Low Motors: Powered by 24 to 36 VDC coming from the DLM room controller power supply. There are a number of wired switch options for shade control.
       2. Operation: 2 different gear ratios support shades of different sizes.
          1. The 40:1 gear ratio motor (LMSH-MCA140) for smaller shades.
          2. The 73:1 gear ratio motors (LMSH-MCA173) for larger and coupled shades.
          3. Motors use counter-balance springs designed for shade weight and motor type.
          4. Specified and tested by the factory.
          5. When using Plug n' Go (PnG) operation the motor control assemblies will automatically join the network, set a default upper and lower shade limit, and be assigned to any shade switches on the project.

These settings can be customized by using the Push n' Learn (PnL) and Pull n' Save (PnS) procedures found in shade controller power supply or shade switch installation instructions.

* + - * 1. Automated start up procedures save installation and startup time by defaulting to a default initial system configuration based on installed components.
      1. Technical Specifications:
         1. Standards Compliance: UL and cUL listed.
         2. UL/C-UL Ratings: 36 VDC, 0.12 A, Class 2 Supply.
         3. Input Voltage: 24/36VDC, Connect to LMSH-PS602 or LMSH-PS610 Power Supply.
         4. Current Consumption: 250 mA, 6W.
         5. Speed/Torque:

LMSH-MCA140: 38 RPM/10 N-cm.

LMSH-MCA173: 29 RPM/15 N-cm.

* + - * 1. Connection to Shade Bus: 4-Conductor wire whip with female terminal (power and data over four wires).
        2. Cable Whip Length: 13 inches.
        3. Motors Status LED: Tricolor (RGB).
        4. Minimum Shade Size: 16 inches wide.
        5. Maximum Shade Size: 15 foot wide by 20 foot tall.
        6. Operating Temperature: 32 to 120 degrees F (0 to 50 degrees C).
        7. Storage Temperature: Minus 20 to 180 degrees F (Minus 28 to 82 degrees C).
        8. Relative Humidity: 5 to 95 percent non-condensing.
        9. IP Rating: IP44.
      1. Controls:
         1. DLM Motor Control Assemblies:

LMSH-MCA140: 24 V, 40:1 Gear Ratio, 13 inch wire whip.

LMSH-MCA173: 36 V, 73:1 Gear Ratio, 13 inch wire whip.

* + - * 1. May be installed left or right drive, inside shade tube.
        2. Motors are not damaged when a user "pulls down" on shade hembar when power or control is not engaged.
        3. Shade Cassette System: Enables user to send shade all the way open, all the way down, or stop at a fixed position via a prescribed sequence of "tugs" or pulls on hembar without damaging the motor, drive, brackets, or roller shade.
      1. DLM-Based Low Voltage Wall Switches: LMSH Series
         1. Self-configuring digital low voltage devices for manual control of DLM based shades from one or more locations.
         2. Shades to be part of a Digital Lighting Management (DLM) system.

Control any shade motors connected to DLM shade room controllers.

Motors and power supplies are connected using a four-wire shade bus with pre-configured cables and simple to configure bus system.

Switches connect using standard DLM in-room-bus (IRB) RJ45 cables for foolproof installation.

* + - * 1. Switch Operation: Class 2 power supplied to a DLM local network by one or more shade room controllers.

Switches send a digital signal for shade control when a user presses a pushbutton.

Plug n' Go (PnG) automatic configuration assigns shades to the switch buttons upon system startup.

Shade default upper and lower limits are assigned during PnG.

Two additional programming procedures allow for customization of the motorized shade system.

Press n' Learn allows switch button assignments and functions to be reconfigured.

Press n' Save allows installer to change shade upper and lower limits.

* + - * 1. Specifications:

UL and cUL listed. FCC part 15 compliant.

Input Voltage: 24 VDC from DLM local network.

Current consumption: 5 mA.

DLM local network connection: 2 RJ45 ports.

Control Buttons: 1, 2, 4, or 5. Each with LED status indicator.

Hidden configuration button to access Push n' Learn and Pull n' Save configurations.

Infrared (IR) transceiver.

Operating Conditions: Indoor use only; 32 to 131 degrees F (0 to 55 degrees C); 5 to 95 percent RH, non-condensing

Programmable top and bottom shade limits.

Wired Switches:

1-Rocker Wall Switch.

2-Button Wall Switch.

4-Button Wall Switch.

4-Button Plus Rocker Wall Switch.

Colors: White, Black, Gray, Ivory, Light Almond.

* + - 1. DLM Shade System Wiring Components: Preconfigured shade bus connections, customized wiring, shade bus extenders and testers, non-plenum and plenum rated local network cables as required.
         1. The shade bus shade supports an open topology wiring structure using passive shade bus connectors, extenders, and cables.
      2. DLM Based Shade Room Controllers: Self-configuring digital devices providing low voltage power and control for up to two to ten motorized shades.
         1. Accepts 120/277 VAC input line voltage and are typically mounted in the ceiling to a four-square junction box.
         2. Provides power and control for shades on the shade bus and integrates switches on the shade In-Room-Bus (IRB).
         3. Features:

Distributed shade control system reduces lengthy homerun wiring.

Two controller options allows system flexibility when setting up a shade room network.

Controller: LMSH-PS610 for up to 10 shades.

Controller: LMSH-PS602 for up to two shades.

Buttons for shade control and system configuration allow testing and control of the system while installing the shades.

Plug n' Go automatic configuration along with Push n' Save and Push n' Learn for system personalization.

Plug to other components (switches) using Cat 5e cables with RJ45 connectors eliminating wiring errors.

Four wire shade bus with preconfigured wires simplifies wiring to shade motors. The wiring system is plug and play.

Provides option for creating groups and astronomic schedules independent of integration with other systems or lighting controls.

Component of Digital Lighting Management integrated shade and lighting control system.

* + - * 1. Specifications:

Standards Compliance: UL and cUL listed.

Input voltage: 120/277VAC, 50/60Hz.

Shade Bus Ports: 1 (LMSH-PS602), 2 (LMSH-PS610).

Shade Bus Voltage: 24 V (LMSH-PS602), 36 V (LMSH-PS610).

Shade Capacity: Up to 2 (LMSH-PS602) or 10 (LMSH-PS610) DLM-based shade motors.

Connection to the DLM Local Network: 2 RJ-45 ports.

Local Network Characteristics when using shade controller:

Shade Network provides low voltage power to shade motors over Shade Bus cables, up to 1,000 ft (or 2 x 500 ft) max.

DLM Local Network In-Room Bus (IRB) provides low voltage power to switches over Cat 5e cable LMRJ;

Class 2 output to DLM local network: 24 VDC, 150 mA.

DLM Local Network Parameters:

Maximum current: 800 mA.

Cat 5e cable: 150 ft per device to 1,000 ft max - Up to 64 loads and communicating devices.

Operating conditions: for indoor use only; 32-131 degrees F (0-55 degrees C); 5-95 percent RH, non-condensing.

* + 1. Connection When Using A DLM Shade Control System:
       1. LMSH-PS6xx Shade Controllers:
          1. 4-wire shade bus for power and control of shades.
          2. DLM IRB network using Cat5e for connection to wall switches and other shade power supplies.
          3. Pre-terminated cable assemblies for the shade bus and local IRB network for plug and play in a single room or area.
       2. Install controllers so switch and shade bus wire bus limits are not exceeded.
          1. Shade Bus Limit: 1000 ft. Motor to Shade Controller: 500 ft. maximum.
          2. DLM Bus Limit: 1000 ft.
       3. If connected to an LMSH-PS602 shade room controller, a single shade can connect directly to the controller. To connect a second shade, use the LMSH-SBE4 Shade Bus Extender or splitter.
       4. If connected to an LMSH-PS610 shade room controller, two shades can connect directly to the controller. To connect additional shades (up to 10 total), use the LMSH-SBE4 Shade Bus Extender or splitter.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraphs for QIS motors and shade control systems, as applicable. Delete if not applicable.

* + 1. QIS Shade Drive Assembly: Factory installed motor, inspected, pre-tested, with limits preset. Motors of different lifting capacity are available depending on shade material weight and size of window to be covered. Other shade motor drive assembly features include:
       1. Motor is inside a tube with special springs as part of a complete shade cassette unit assembled in factory, inspected, tested, motor limits set, and shipped complete, ready for installation into the two attachment brackets fastened to building structure.
          1. DC type featuring quiet operation of less than 38 dbA at 3 ft.
          2. Digital bidirectional communication.
          3. 98 programmable shade positions for customized and matching shade stop points.
          4. Encoder-based drive for precise positioning; plus or minus 1/16 inch (1.6 mm).
          5. Power Supply: 24 VDC.
          6. Limits to be electronic and not manual type.
          7. 24 AWG Cat5e or Cat6 for shade power and communications in one cable.
       2. Shades standard with 6 inch (152 mm) pre-assembled connector in any gender.
          1. Connector wire Length: 4 inches (102 mm).
          2. Connector wire Length: 35 inches (0.889 M).
       3. Motors to be installed left or right drive, inside shade tube.
       4. Motors are not to be damaged when a user "pulls down" on shade hembar when power or control is not engaged.
       5. Shade Cassette System: Enables user to send shade all the way open, all the way down, or to stop at a fixed position via a prescribed sequence of "tugs" or pulls on the hembar without damaging the motor, drive, brackets, or roller shade.
       6. Allow installer to set lower and upper limits or return to a master shade reset to default upper and lower limits.
    2. Connection When Using A QIS And Architectural Dimming Shade Control System:
       1. The Qadvanced Intelligent System (QIS) Power and Communication Panel provides power and control for hardwired low voltage QIS shade motors. The shade motors, switches and power panels are inter-connected using easy to wire Cat 5e wiring.
       2. Use RJ45 ports to connect a total of 8 shades or wall switches to a single panel.
       3. Can be connected to Legrand automation or third party systems for shade control via an RS485.
       4. Eight panels can be connected to create a distributed network of shades and controls.
  1. SOURCE QUALITY CONTROL
     1. Motor Manufacturer Factory Quality Control Process:
        1. Motor Testing and Approval: Completed by one or more global safety testing laboratories including, but not limited to: UL, CUL, TUV, ETL, CE, and VDE.
        2. Prior to Shipping: Each motor to pass testing having no defects in wiring and operation including:
           1. Assembled Motor: Test design specifications when installed in various end products.
           2. Product installation testing.
           3. Product safety tests.
           4. Product performance tests.
           5. Life cycle testing for endurance and reliability.
           6. Embedded software tests.
           7. Heat and fire resistance tests.
           8. Water and oxidation resistance tests.
           9. Climate tests, temperature, and humidity.
           10. Acoustic tests, sound level and quality.
           11. Radio frequency tests, transmission, and reception.
           12. Electromechanical capability, CEM.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until substrates have been properly prepared.
      2. Examine areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, blocking.
      3. Identify locations of connections to building electrical system, and other conditions affecting performance of the Work.
      4. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
   2. PREPARATION

\*\* NOTE TO SPECIFIER \*\* Include one of the following paragraphs. Delete if not applicable.

* + 1. Coordinate requirements for blocking and structural supports to ensure adequate means for installation of window shades.
    2. Coordinate requirements for blocking, construction of shade pockets, and structural supports to ensure adequate means for installation of window shades.

\*\* NOTE TO SPECIFIER \*\* Include one or more of the following paragraphs for window shades with headboxes recessed in ceilings. Delete those not applicable.

* + 1. Coordinate installation of recessed shade pockets with construction of suspended acoustical panel ceilings specified in Section 09 51 23 - Acoustical Tile Ceilings.
    2. Coordinate installation of recessed shade pockets with construction of suspended gypsum board ceilings specified in Section 09 21 16.33 - Gypsum Board Area Separation Wall Assemblies.
    3. Coordinate requirements of Section 26 05 00 - Common Work Results for Electrical for power supply conduit, and wiring required for window shade motors and controls.
  1. INSTALLATION
     1. Install in accordance with manufacturer's instructions.
     2. Install roller shades level, plumb, square, and true. Allow proper clearances for window operation hardware.
     3. Coordinate the work with Section 26 05 00 - Common Work Results for Electrical.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if fascia or separate closure for site constructed recess is being provided. Note fascia is not applicable if pockets are being provided. Delete if not applicable.

* + 1. Install the following items to conceal roller and operating mechanism. Do not use exposed fasteners.

\*\* NOTE TO SPECIFIER \*\* Select items to conceal roller and operating mechanism from the following as applicable. Delete if not applicable.

* + - 1. Fascia.
      2. Closure panels.
      3. Endcaps.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraphs for room darkening shades. Delete if not applicable.

* + 1. Install headbox, side channels, and sill channel with sealant specified in Section 07 90 00 - Joint Protection.
    2. Position shades level, plumb, and at proper height relative to adjacent construction. Secure with fasteners recommended by manufacturer.
    3. Comply with NECA 1 and NECA 130.
    4. Comply with FCC guidelines.

\*\* NOTE TO SPECIFIER \*\* Select the Electrical Connections Paragraph below for hard wired motor-operated roller shades. Delete if not required.

* + 1. Electrical Connections: Connect each roller shade motor operator and stationary control system to building electrical system.
       1. Grounding: Provide electrical grounding in accordance with NFPA 70.

\*\* NOTE TO SPECIFIER \*\* Select the Networked Building Management System Paragraph below when System is included in project. Delete if not required.

* + 1. Networked Building Management System: Connect networked automation controls for motorized equipment to building management system.

\*\* NOTE TO SPECIFIER \*\* Select the Sun, Rain, and Wind Sensor Paragraph below when System is included in project. Delete if not required.

* + 1. Sun, Rain, and Wind Sensor Locations: Mount on exterior according to manufacturer's written instructions.
  1. ADJUSTING
     1. Adjust and balance roller shades and motorized equipment to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
        1. Program each motor-operator control system to Owner-provided program settings.
     2. Commissioning Control Systems: Perform commissioning of integrated automation control systems performed by Legrand/WattStopper Factory Authorized Tech.
  2. TESTING
     1. Test motorized window shades to verify that controls, limit switches, interface to other building systems, and other operating components are functional. Correct deficiencies.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for room darkening shades. Delete if not applicable.

* + 1. Test window shades to verify that operating mechanism, fabric retainer, and other operating components are functional. Correct deficiencies.
       1. Motorized operating mechanism.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for room darkening shades. Delete if not applicable.

* + 1. During daylight hours, lower shades and turn off interior lights. Verify that there are no light leaks at perimeter or within shade assembly. Correct deficiencies.
    2. Demonstrate operation of shades to Owner's designated representatives.
  1. CLEANING AND PROTECTION
     1. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
     2. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
     3. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.
  2. SCHEDULES

\*\* NOTE TO SPECIFIER \*\* Retain Paragraph below if required to suit project requirements. Identify products by name on the Drawings or use this paragraph to define the location of each shade type and mounting to be used using the "Type" designation required on the Drawings. The following are some examples of schedule references for ES, DS and SS series shades. Contact the manufacturer for additional assistance in System Configurations for your project. Edit as required to suit project or delete and identify products on the Drawings.

* + 1. Shade Type S-1 Blackout Shades Without Blackout Channels, Single Roller
       1. SF-ES1 ES Shade 6 with Face Mount Fascia:
          1. Mounting Type: Surface with front fascia as indicated.
          2. Extruded Aluminum 6 inch Fascia.
          3. 4 inch Extruded Aluminum Closure.
          4. Mounting Angle.
          5. End Bracket.
          6. Extruded Aluminum Exterior Hembar.
          7. 2-1/2 inch or 3-1/2 inch Extruded Aluminum Tube.
          8. Fabric: 5 percent Openness as selected by the Architect.
          9. Hembar: Exterior.
          10. Fabric Drop: Standard Roll.
          11. Manual Bypass: Left.
          12. Fascia/Hembar Color: Dark Gray.
    2. Shade Type S2 Blackout Shades Without Blackout Channels, Double Roller.
       1. SF-ES5 ES Shade 4 Dual System with Face Mount Fascia:
          1. Extruded Aluminum 6 inch Fascia.
          2. 4 inch Extruded Aluminum Closure.
          3. Mounting Angle.
          4. End Bracket.
          5. Extruded Aluminum Exterior Hembar.
          6. 2 inch Extruded Aluminum Tube.
          7. Fabric: 10 percent Openness as selected by the Architect.
          8. Fabric: Blackout.
          9. Hembar: Exterior with side channel and sill rail.
          10. Fabric Drop: Reverse Roll.
          11. Chain: Both.
          12. Fascia/Hembar Color: As selected by the Architect.
    3. Shade Type S-3 Blackout Shades With Blackout Channels, Single Roller.
       1. SF-RD6 ES Shade 6 With Ceiling Mount Fascia, Side and Bottom Channels:
          1. Extruded Aluminum 6 inch Fascia.
          2. 4 inch Extruded Aluminum Closure.
          3. Mounting Angle.
          4. End Bracket.
          5. Extruded Aluminum Exterior Hembar.
          6. 2-1/2 inch or 3-1/2 inch Extruded Aluminum Tube.
          7. Fabric: Blackout.
          8. Motorized Blackout Side Channel.
          9. Manual Blackout Bottom Channel.
          10. Hembar: Exterior.
          11. Fabric Drop: Standard Roll.
          12. Manual Bypass: Left.
          13. Fascia/Hembar Color: Dark Gray.
    4. Shade Type S4 Blackout Shades With Blackout Channels, Double Roller.
       1. SF-RD7P ES Shade 4 Dual System In Pocket, Side and Bottom Channel:
          1. Extruded Aluminum 6 inch Fascia.
          2. 4 inch Extruded Aluminum Closure.
          3. End Bracket.
          4. Extruded Aluminum Exterior Hembar.
          5. 2 inch Extruded Aluminum Tube.
          6. Fabric: 10 percent Openness as selected by the Architect.
          7. Fabric: Blackout.
          8. Motorized Blackout Side Channel.
          9. Manual Blackout Bottom Channel.
          10. Hembar: Exterior.
          11. Fabric Drop: Standard Roll.
          12. Manual Bypass: Left.
          13. Fascia/Hembar Color: As selected by the Architect.
    5. Shade Type S-5 Manual Outside Back Mount - Standard Roll.
       1. RLR-DS-1-MA-A-S: 2.6 Roll Up Diameter (RUD):
          1. Mounting Type: Outside the window back surface mounted.
          2. No fascia - DS series is open roll shades only.
          3. For Shade Fabric with up to 2.6 inch Roll Up Diameter.
          4. Manual chain drive on left with counter-balance spring on the right.
          5. Fabric Drop: Standard Roll.
          6. Fabric type and openness as selected by the Architect.
          7. Hembar type and color: Round and fabric wrapped as selected by the Architect.
    6. Shade Type S-6 Motorized Inside Top Mount - Standard Roll.
       1. RLR-DS-2-MO-D-C-S: 3.3 Roll Up Diameter (RUD):
          1. Mounting Type: Inside the window top mounted.
          2. No fascia - DS series is open roll shades only.
          3. For Shade Fabric with up to 2.6 inch Roll Up Diameter.
          4. Motorized using a DLM motor with drive on left and counter-balance spring on the right.
          5. Fabric Drop: Standard Roll.
          6. Fabric type and openness as selected by the Architect.
          7. Hembar type and color: As selected by the Architect.
          8. Automated motorized DLM shading: Activate the built-in groups and schedules feature or connect to DLM Lighting Control system.
    7. Shade Type S-7 Motorized Outside Back Mount - Standard Roll - Coupled.
       1. RLR-DS-2-MO-D-A-S-B: 3.3 Roll Up Diameter (RUD).
          1. Mounting Type: Outside the window back surface mounted.
          2. No fascia - DS series is open roll shades only.
          3. For Shade Fabric with up to 3.3 inch Roll Up Diameter (see RUD chart for fabric and sizes).
          4. Motorized using a DLM motor with drive on far right band and counter-balance spring on the far left band.
          5. Coupled DS shades can support up to 7 bands.
          6. Fabric Drop: Standard Roll.
          7. Fabric type and openness as selected by the Architect.
          8. Hembar type and color: Choices are round or oval and fabric wrapped or open dependent on size of shade and as selected by the Architect.
          9. Automated motorized DLM shading: Activate the built-in groups and schedules feature or connect to DLM Lighting Control system.
    8. Shade Type S-8 Manual Outside Back Mount - Standard Roll, with top/back fascia for Room Darkening Applications.
       1. RLR-SS-1-MA-A-S-F-TB: 2.6 Roll Up Diameter (RUD):
          1. Mounting Type: Outside the window back surface mounted.
          2. Includes appropriately sized fascia for bracket. SS series is designed for clip-on fascia or pockets.
          3. For Shade Fabric with up to 2.6 inch Roll Up Diameter (see RUD chart for fabric and sizes).
          4. Manual chain drive on left with counter-balance spring on the right.
          5. Room darkening applications required a top/back fascia and side and sill rails.
          6. Fabric Drop: Standard Roll.
          7. Fabric type and openness as selected by the Architect.
          8. Hembar type and color: Oval and fabric wrapped or open dependent on size of shade and as selected by the Architect.
          9. Automated motorized DLM shading: Activate the built-in groups and schedules feature or connect to DLM Lighting Control system.
    9. Shade Type S-9 Motorized Top Mount - Standard Roll in a Pocket.
       1. RLR-SS-1-MO-G-S: 2.6 Roll Up Diameter (RUD):
          1. Mounting Type: Inside the window top mounted.
          2. Includes appropriately sized fascia for bracket. SS series is designed for clip-on fascia or pockets.
          3. For Shade Fabric with up to 2.6 inch Roll Up Diameter.
          4. Motorized using a DLM motor with drive on left and counter-balance spring on the right.
          5. Install shade in extruded pocket made by Legrand or drywall pocket by others. Use closure by Legrand to hide shade.
          6. Fabric Drop: Standard Roll.
          7. Fabric type and openness as selected by the Architect.
          8. Hembar type and color: As selected by the Architect.
          9. Automated motorized DLM shading: Activate the built-in groups and schedules feature or connect to DLM Lighting Control system.
    10. Shade Type S-10 Motorized Inside Top Mount Standard Roll.
        1. RLR-SS-4-MO-D-C-S-F: 2.6 Dual Motorized Inside Top Mount Standard Roll:
           1. Mounting Type: Inside the window top mounted. This is a dual shade, two shades on single brackets.
           2. Includes appropriately sized fascia designed for dual brackets. SS series is designed for clip-on fascia or pockets.
           3. For Dual Shade Fabric with up to 2.6 inch Roll Up Diameter.
           4. Motorized using dual DLM motors with drive on left and counter-balance spring on the right.
           5. Fabric Drop: Standard Roll.
           6. Fabric type and openness as selected by the Architect.
           7. Hembar type and color: As selected by the Architect.
           8. Automated motorized DLM shading: Activate the built-in groups and schedules feature or connect to DLM Lighting Control system.

END OF SECTION