RAYNOR – Sectional Overhead Doors
SECTION 08 36 13 - SECTIONAL OVERHEAD DOORS

"Specifier Notes" may be hidden or shown by using "Tools"/"Options"/"View"/"Hidden Text".

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Commercial sectional doors.

B. Electric Operators

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications: Miscellaneous for steel supports.

B. Section 06 10 00 - Rough Carpentry. Door opening jamb and head members

C. Section 08 71 00 - Door Hardware: Hardware, locks, access panels.

D. Section 09 90 00 - Painting: Field painting.

E. Section 11 12 00 - Parking Control Equipment: Parking control equipment for remote door controls.

F. Section 26 05 00 - Common Work Results for Electrical.

1.3 REFERENCES

A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

C. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

D. ANSI/DASMA 105 – American National Standard Institute Test Method for Thermal Transmittance and Air Infiltration of Garage Doors

E. ASTM A 123 – Standard Specification for Zinc (hot-dipped galvanized) coatings on iron and steel products.

F. ASTM A 229 - Steel wire, oil-tempered for mechanical springs.

G. ASTM E 330 - Structural performance of exterior windows, curtain walls, and doors by uniform static air pressure difference.

H. ASTM E 413 - Classification for Rating Sound Insulation

I. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element.

J. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

K. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

L. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

M. ANSI/DASMA 108 - Standard Method for Testing Sectional Garage Doors, Rolling Doors and Flexible Doors: Determination of Structural Performance Under Uniform Static Air Pressure Difference

N. ANSI/DASMA 102 - Specifications for Sectional Overhead-Type Doors

O. ANSI/DASMA 115 - Standard Method for Testing Sectional Doors, Rolling Doors, and Flexible Doors: Determination of Structural Performance Under Missile Impact and Cyclic Wind Pressure

P. FDA 21 CFR 177.1520 - Olefin polymers

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Performance Standards: Provide test data validating the following:
   1. Door Section: Gloss retention, fade resistance, FDA compliance, cold crack performance, load to rebound, dent resistance impact.
   2. Drive Train: Spring cycle life, track, hinges, rollers, cable assembly, cable strength.
   3. Door Assembly: Thermal performance, deflection, wind load.

D. Shop Drawings:
   1. Provide drawings indicating track details, head and jamb conditions, spring shafts, anchorage, accessories, finish colors, patterns and textures, operator mounts and other related information.
   2. Regulatory Requirements and Approvals: Provide shop drawings in compliance with local Authority having Jurisdiction (AHJ).

E. Certifications:
   1. Submit manufacturer's certificate that products meet or exceed specified requirements.

2. Submit installer qualifications.

F. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

G. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Utilize an authorized installer of door manufacturer who has demonstrated experience on projects of similar size and complexity.

B. Manufacturer Qualifications: Company with a minimum of five-year experience in producing the specified type of doors.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. 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 recommended limits.

1.8 WARRANTY

A. Provide manufacturer’s standard warranty against defects in material and workmanship, as further described with each model in Part 2 of this Section.

B. Raynor warrants ControlHoist electrical operator and component parts for two (2) years against defects in material and workmanship when purchased as operator only.

C. Raynor warrants ControlHoist electrical operator and component parts against defects in material and workmanship for three (3) years, on the operator only, when purchased with any model of Raynor commercial sectional door.

D. Raynor warrants Onyx (OXJ, OXH & OXT) electrical operator for five (5) years against defects in material and workmanship.

E. Raynor warrants Onyx Light – Trolley (OLT) electrical operator for (1) year against defects in material and workmanship.

F. Raynor warrants Onyx Light – Jackshaft (OLD & OLS) electrical operator for (2) years against defects in material and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Raynor, which is located at: 1101 East River Rd. P. O. Box 448; Dixon, IL 61021-0448; Toll Free Tel: 800-4-RAYNOR; Tel: 815-288-1431; Fax: 888-598-4790; Email: architectsupport@raynor.com; Web: www.raynor.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 SECTIONAL RIBBED PAN DOOR

A. **SteelForm S24 as manufactured by Raynor Garage Doors**:

1. Doors:
   a. Operation:
      1) Provide doors designed for manual operation.
      2) Provide doors designed for hand chain operation.
      3) Provide doors designed for electric motor operation.
   b. Jamb Construction:
      1) Steel jambs with self-tapping fasteners.
      2) Wood jambs with lag screw fasteners.
      3) Masonry jambs with anchor bolt fasteners.
   c. Structural Performance Requirements:
      1) Wind Loads: 10.0 psf design load/15.0 psf test load standard.
      2) Wind Loads: Uniform pressure of: _____ psf.
2. Sections:
   a. **SteelForm S24**:
      1) Section end stiles and center stiles to be minimum 16 gauge galvanized steel. End stiles and center stiles to be riveted to outside face with stainless steel rivets and resistance welded to interior rail.
      2) Material: Steel pan construction, 2 inches (51 mm) thick, roll- formed from 24 gauge commercial quality, hot-dipped galvanized (G60) steel complying with ASTM A 653. Exterior of door to have two deep ribs, four pencil grooves, and roll-formed tongue-and-groove joints for weathertight closure.
      3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat.
         a) Color: White polyester paint.
         b) Color: Dark Brown - High performance (70%) PVDF coating (TRINAR® or equivalent) paint.
         c) ColorWave Enamel paint finish, color as selected by Architect from Raynor's ColorWave post paint process featuring 1500 colors of Sherwin Williams Polane Enamel paint.
            1) Color: _____.
   b. Insulation:
      1) Expanded polystyrene with R-value of 7.70 with white impact-resistant textured covers.
      2) Expanded polystyrene with R-value of 7.70 with 26 gauge hot-dipped galvanized steel covers, stucco embossed and painted gray.

3) Expanded polystyrene with R-value of 7.70 with 24 gauge hot-dipped galvanized steel covers, painted gray/white.

c. Seals: Bottom of door to have flexible U-shaped vinyl seal retained in aluminum rail. Optional blade seal on top section to prevent airflow above header

d. Trussing: Doors designed to withstand specified windload. Deflection of door in horizontal position to be maximum of 1/120th of door width.

3. Windows: Locations to comply with door elevation drawings.
   a. 24 inches by 8 inches (610 mm by 203 mm) rectangular window encased in a two-piece black frame.
   b. Glazing: Windows to be provided as follows:
      1) Glass consisting of one pane of 1/8 inch (3.2 mm) thick DSB glass.
      2) Glass consisting of one pane of 1/8 inch (3.2 mm) thick Tempered glass.
      3) Glass consisting of one pane of 1/8 inch (3.2 mm) thick Acrylic glass.
      4) Glass consisting of one pane of 1/8 inch (3.2 mm) thick Lexan glass.
   c. Glazing: Windows to be provided with insulated glazing units as follows:
      1) Glass consisting of two panes of 1/8 inch (3.2 mm) thick DSB glass.
      2) Glass consisting of two panes of 1/8 inch (3.2 mm) thick DSB glass with breather tube.
      3) Glass consisting of two panes of 1/8 inch (3.2 mm) thick Tempered glass.
4. Glazing: Full-view window consisting of aluminum stile and rail construction and color matched to door exterior with powdercoat paint. Full View to be provided as follows:
   a. Impact Rated Glazing: Provide as follows.
      1) 11/32 inch (8.7 mm) Clear Impact Glass
      2) 11/32 inch (8.7 mm) Tinted Bronze Impact Glass
      3) 11/32 inch (8.7 mm) Tinted Gray Impact Glass
      4) 11/32 inch (8.7 mm) Tinted Green Impact Glass
      5) 11/32 inch (8.7 mm) White Interlayer Impact Glass
   b. Non-Impact Rated Glazing: Provide as follows:
      1) <u>1/8 inch single pane glazing options</u>
         a) 1/8 inch (3.2 mm) **Clear Glass** consisting of one pane of 1/8 inch (3.2 mm) DSB non-insulated glass.
         b) 1/8 inch (3.2 mm) **Clear Tempered Glass** consisting of one pane of 1/8 inch (3.2 mm) non-insulated glass.
         c) 1/8 inch (3.2 mm) **Clear Acrylic** consisting of one pane of 1/8 inch (3.2 mm) Acrylic glazing.
         d) 1/8 inch (3.2 mm) **Clear Lexan** consisting of one pane of 1/8 inch (3.2 mm) Lexan glazing.
         e) 1/8 inch (3.2 mm) **Smoked Grey Tinted Lexan** consisting of one pane of 1/8 inch (3.2 mm) Lexan glazing.
         f) 1/8 inch (3.2 mm) **Smoked Grey Tinted Glass** consisting of one pane of 1/8 inch (3.2 mm) non-insulated glass.
         g) 1/8 inch (3.2 mm) **Smoked Grey Tinted Tempered** Glass consisting of one pane of 1/8 inch (3.2 mm) non-insulated glass.
         h) 1/8 inch (3.2 mm) **Satin Glass** consisting of one pane of 1/8 inch (3.2 mm) non-insulated glass.
         i) 1/8 inch (3.2 mm) **Satin Tempered Glass** consisting of one pane

of 1/8 inch (3.2 mm) non-insulated glass.

j) 1/8 inch (3.2 mm) **Bronze Tinted Glass** consisting of one pane of 1/8 inch (3.2 mm) non-insulated glass.

k) 1/8 inch (3.2 mm) **Bronze Tinted Tempered Glass** consisting of one pane of 1/8 inch (3.2 mm) non-insulated glass.

l) 1/8 inch (3.2 mm) **Black Privacy Glass** consisting of one pane of 1/8 inch (3.2 mm) non-insulated glass.

m) 1/8 inch (3.2 mm) **Black Privacy Tempered Glass** consisting of one pane of 1/8 inch (3.2 mm) non-insulated glass.

n) 1/8 inch (3.2 mm) **Raised Clear Glass** consisting of one pane of 1/8 inch (3.2 mm) non-insulated glass.

o) 1/8 inch (3.2 mm) **Raised Clear Tempered Glass** consisting of one pane of 1/8 inch (3.2 mm) non-insulated glass.

2) <u>3/16 inch single pane glazing options</u>

a) 3/16 inch (4.8 mm) **Clear Glass** consisting of one pane of 3/16 inch (4.8 mm) non-insulated glass.

b) 3/16 inch (4.88 mm) **Clear Tempered Glass** consisting of one pane of 3/16 inch (4.88 mm) non-insulated glass.

3) <u>1/4 inch single pane glazing options</u>

a) 1/4 inch (6.4 mm) **Clear Glass** consisting of one pane of 1/4 inch (6.4 mm) non-insulated glass.

b) 1/4 inch (6.4 mm) **Clear Tempered Glass** consisting of one pane of 1/4 inch (6.4 mm) non-insulated glass.

c) 1/4 inch (6.4 mm) **Clear Laminated Glass** consisting of one pane of 1/4 inch (6.4 mm) non-insulated glass.

d) 1/4 inch (6.4 mm) **Clear Acrylic** consisting of one pane of 1/4 inch (6.4 mm) Acrylic glazing.

e) 1/4 inch (6.4 mm) **Clear Lexan** consisting of one pane of 1/4 inch (6.4 mm) Lexan glazing

f) 1/4 inch (6.4 mm) **Clear Wire Glass** consisting of one pane of 1/4 inch (6.4 mm) non-insulated glass.

g) 1/4 inch (6.4 mm) **Bronze Tinted Laminated Glass** consisting of one pane of 1/4 inch (6.4 mm) non-insulated glass.

h) 1/4 inch (6.4 mm) **Smoked Grey Tinted Laminated Glass** consisting of one pane of 1/4 inch (6.4 mm) non-insulated glass.

i) 1/4 inch (6.4 mm) **Satin Laminated Glass** consisting of one pane of 1/4 inch (6.4 mm) non-insulated glass.

j) 1/4 inch (6.4 mm) **White Laminated Glass** consisting of one pane of 1/4 inch (6.4 mm) non-insulated glass.

4) <u>1/2 inch insulated glazing options</u>

a) 1/2 inch (12.69 mm) **Insulated Clear Glass** consisting of two panes of 1/8 inch (3.2 mm) DSB insulated glass.

b) 1/2 inch (12.69 mm) **Insulated Clear Glass with Breather Tube** consisting of two panes of 1/8 inch (3.2 mm) DSB insulated glass.

c) 1/2 inch (12.69 mm**) Insulated Clear Tempered Glass** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.

d) 1/2 inch (12.69 mm) **Insulated Clear Tempered Glass with Breather Tube** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.
e) 1/2 inch (12.69 mm) **Insulated Bronze Tinted Glass** consisting of two panes of 1/8 inch (3.2 mm) DSB insulated glass.
f) 1/2 inch (12.69 mm) **Insulated Bronze Tinted Tempered Glass** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.
g) 1/2 inch (12.69 mm) **Insulated Smoked Grey Tinted Glass** consisting of two panes of 1/8 inch (3.2 mm) DSB insulated glass.
h) 1/2 inch (12.69 mm) **Insulated Smoked Grey Tinted Tempered Glass** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.
i) 1/2 inch (12.69 mm) **Insulated Satin Glass** consisting of two panes of 1/8 inch (3.2 mm) DSB insulated glass.
j) 1/2 inch (12.69 mm) **Insulated Satin Tempered Glass** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.
k) 1/2 inch (12.69 mm) **Insulated Raised Obscure Glass** consisting of two panes of 1/8 inch (3.2 mm) DSB insulated glass.
l) 1/2 inch (12.69 mm) **Insulated Raised Obscure Tempered Glass** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.
m) 1/2 inch (12.69 mm) **Insulated Low E DSB Glass** consisting of two panes of 1/8 inch (3.2 mm) DSB insulated glass.
n) 1/2 inch (12.69 mm**) Insulated Low E Tempered Glass** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.
o) 1/2 inch (12.69 mm) **Insulated Solarban 60 Low E Glass** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.
p) 1/2 inch (12.69 mm) **Insulated Solarban 60 Low E Tempered Glass** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.
q) 1/2 inch (12.69 mm) **Insulated Bronze Tinted Low E DSB Glass** consisting of two panes of 1/8 inch (3.2 mm) DSB insulated glass.
r) 1/2 inch (12.69 mm) **Insulated Bronze Tinted Low E Tempered Glass** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.
s) 1/2 inch (12.69 mm) **Insulated Smoked Grey Tinted Low E DSB** Glass consisting of two panes of 1/8 inch (3.2 mm) DSB insulated glass.
t) 1/2 inch (12.69 mm) **Insulated Smoked Grey Tinted Low E Tempered Glass** consisting of two panes of 1/8 inch (3.2 mm) Tempered insulated glass.

5. Track:
   a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weatherseal.
   b. Configuration Type: Normal Headroom.

c. Configuration Type: Low Headroom.
d. Configuration Type: Vertical Lift.
e. Configuration Type: Lift-Clearance.
f. Configuration Type: Incline.
g. Configuration Type: Contour.
h. Track Size: 2 inches (51 mm).
    1) Jamb Type: Wood only.
        a) Mounting: Adjustable track brackets.
    2) Jamb Type: Steel, wood, or masonry.
        a) Mounting: Floor-to-header angles. 13 gauge (2.2 mm) minimum continuous angles from floor to door header. Angle Size: 2-5/16 x 4 inches (59 x 102 mm)
        b) Mounting: Floor-to-shaft angles. 13 gauge (2.2 mm) minimum continuous angles from floor, past header, up to door shaft. Angle Size: 2-5/16 x 4 inches (59 x 102 mm).
        c) Mounting: QuikClip. Clip-Angle brackets pre-assembled to 13 gauge (2.2 mm) minimum continuous angle from floor to door header and continuous angle from door header to door shaft. Angle Size: 2-5/16 x 1-1/4 inches (59 x 32 mm).
i. Track Size: 3 inches (76 mm).
    1) Jamb Type: Steel, wood, or masonry.
        a) Mounting: Floor-to-header angles. 13 gauge (2.2 mm) minimum continuous angles from floor to door header. Angle Size: 3-1/2 x 5 inches (89 x 127 mm) on 3-inch track.
        b) Mounting: Floor-to-shaft angles. 13 gauge (2.2 mm) minimum continuous angles from floor, past header, up to door shaft. Angle Size: 3-1/2 x 5 inches (89 x 127 mm) on 3-inch track.
        c) Mounting: QuikClip. Clip-Angle brackets pre-assembled to 13 gauge (2.2 mm) minimum continuous angle from floor to door header and continuous angle from door header to door shaft. Angle Size: 3-1/2 x 1-1/4 inches (89 x 32 mm) on 3-inch track.
j. Finish:
    1) Galvanized.
    2) ArmorBrite Powdercoat Finish: Color as selected by Architect
        a) Color: _____.

6. Counterbalance:
    a. Counterbalance System: Provided with aircraft-type, galvanized steel lifting cables with minimum safety factor of 5. Torsion Springs consisting of heavy-duty oil-tempered wire torsion springs on a continuous ball-bearing cross-header shaft.
        1) Spring Cycle Requirements: Standard 10,000 cycles.
        2) Spring Cycle Requirements: High cycle: _____ cycles.
7. Hardware:
    a. Hinges and Brackets: Fabricated from galvanized steel.
    b. Track Rollers: 2 inches (50.8 mm) diameter consistent with track size, with hardened steel ball bearings.
    c. Track Rollers: 3 inches (76.2 mm) diameter consistent with track size, with hardened steel ball bearings.

d. Perimeter Seal: Provide complete weather stripping system to reduce air infiltration. Weather stripping shall be replaceable.
   1) For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.
   2) For angle mounted doors provide angle clip-on seal.
e. Furnish door system with locks: Exterior lock with five-pin tumbler cylinder, night latch and steel bar engaging track.
f. Furnish door system with locks: Interior lock with dead bolt provided with hole to receive padlock provided by Owner.

8. SteelForm Limited Warranty: Raynor warrants the door sections against defects in material and workmanship, and deterioration due to rust-through for ten years from date of delivery to the original purchaser. Window components are warranted against defects in material and workmanship for one year from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer's full standard limited warranty documentation.

2.3 ELECTRIC OPERATORS

A. ControlHoist as manufactured by Raynor Garage Doors:
   1. Model:
      a. Raynor ControlHoist Optima:
         1) Type: Jackshaft with manual chain hoist.
         2) Type: Trolley.
         3) Motor Horsepower Rating: Continuous 1/2 HP.
         4) Motor Horsepower Rating: Continuous 3/4 HP.
         5) Motor Horsepower Rating: Continuous 1 HP.
         6) Motor Horsepower Rating: Continuous 1-1/2 HP.
         7) Motor Horsepower Rating: Continuous 2 HP.
         8) Electrical Requirements: 115 volt single phase.
         9) Electrical Requirements: 230 volt single phase.
         10) Electrical Requirements: 208-230 volt three phase.
         11) Electrical Requirements: 460 volt three phase.
         12) Duty Cycle: 30 cycles/hour or 300 cycles/day.
         13) Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, mid stop and lock bar sensor capability.
            a) Provide three button momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).
            b) Custom wiring.
         14) Entrapment protection:
            a) Wired Monitored electric reversing edge extending full width of door.
            b) Wireless Monitored electric reversing edge extending full width of door.
            c) NEMA 1 Monitored photo electric eyes mounted on jambs.
            d) NEMA 4X Monitored photo electric eyes mounted on jambs.

b. Raynor ControlHoist Standard:
   1) Type: Jackshaft.
   2) Type: Jackshaft with manual chain hoist.
   3) Type: Trolley.
   4) Motor Horsepower Rating: Continuous 1/3 HP.
   5) Motor Horsepower Rating: Continuous 1/2 HP.
   6) Motor Horsepower Rating: Continuous 3/4 HP.
   7) Electrical Requirements: 115 volt single phase.
   8) Electrical Requirements: 230 volt single phase.
   9) Electrical Requirements: 208-230 volt three phase.
   10) Electrical Requirements: 460 volt three phase.
   11) Duty Cycle: 30 cycles/hour or 300 cycles/day.
   12) Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, mid stop and lock bar sensor capability.
      a) Provide three button momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).
      b) Custom wiring.
   13) Entrapment protection:
      a) Wired Monitored electric reversing edge extending full width of door.
      b) Wireless Monitored electric reversing edge extending full width of door.
      c) NEMA 1 Monitored photo electric eyes mounted on jambs.
      d) NEMA 4X Monitored photo electric eyes mounted on jambs.

c. Raynor ControlHoist Basic:
   1) Type: Jackshaft.
   2) Type: Jackshaft with manual chain hoist.
   3) Type: Trolley.
   4) Motor Horsepower Rating: Intermittent 1/2 HP.
   5) Electrical Requirements: 115 volt single phase.
   6) Duty Cycle: 14 cycles/hour.
   7) Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, mid stop and lock bar sensor capability.
      a) Provide three button momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).
   8) Entrapment protection:
      a) Wired Monitored electric reversing edge extending full width of door.
      b) Wireless Monitored electric reversing edge extending full width of door.
      c) NEMA 1 Monitored photo electric eyes mounted on jambs.
      d) NEMA 4X Monitored photo electric eyes mounted on jambs.

B. ONYX and ONYX LIGHT commercial operators:
   1. Raynor ONYX:

a. Type:
    1. Jackshaft without manual chain hoist.
    2. Jackshaft with manual chain hoist.
    3. Trolley.
b. Rating:
    1. 700 lb. (1/2 hp equivalent)
    2. 1200 lb. (3/4 hp equivalent)
c. Electrical Requirements:
    1. 120 volt single phase.
    2. 240 volt single phase or three phase.
    3. 480 volt three phase.
    4. 208 volt single phase or three phase (via transformer).
    5. 600 volt three phase (via transformer).
d. Duty Cycle:
    1. 20 cycles per hour / 90 cycles per day.
    2. 30 cycles per hour / 150 cycles per day.
e. Accessory power: 24 VDC.
f. Control:
    1. Wall controller: 3 button floor level with LCD display.
    2. Provisions for timer to close.
    3. Mid stop.
    4. Momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).
g. Motor: DC type with soft start and stop.
h. Brake: Dynamic.
i. Battery backup capable.
j. Enclosure: NEMA Type 1.
k. Circuit board: solid state logic.
l. Diagnostics: Onboard.
m. Wifi: Built in.
n. Internet connectivity: myQ and myQ Facility.
o. Security: Security+ 2.0.
p. Entrapment protection:
    1. Monitored entrapment protection inputs: Three.
        a. NEMA 1 Monitored photo electric eyes mounted on jambs.
        b. NEMA 4X Monitored photo electric eyes mounted on jambs.
        c. Monitored light curtain.
        d. Wireless Monitored electric reversing edge extending full width of door.
        e. Wired Monitored electric reversing edge extending full width of door.
q. Limit system: Electronic Limits.
r. Inputs: Programmable.
s. Remote controls

2. Raynor ONYX Light:
    a. Light Duty Jackshaft for Commercial Sectional Doors
        1. Type: Jackshaft without manual chain hoist
        2. Rating: 14 foot maximum height, 16 foot maximum width, 650 pounds maximum
        3. Electrical Requirements: 120 volt single phase.
        4. Duty Cycle: Maximum 10 cycles per hour and 25 cycles per day.
        5. Control: One push button type.

6. Motor: DC type with soft start and stop.
7. Battery Back-up capable
8. Enclosure: NEMA Type 1.
9. Circuit Board: solid state logic.
10. Diagnostics: Onboard.
11. Wifi: Built in.
12. Internet connectivity: myQ and myQ Facility.
13. Security: Security+ 2.0
14. Entrapment protection:
    a. Monitored entrapment protection inputs: One.
        1. NEMA 1 Monitored photo electric eyes mounted on jambs.
        2. Monitored light curtain.
15. Limit system: Electronic Limits.
16. Remote controls
17. Cable tension monitor.
18. Automatic power door lock.
19. Remote LED light.

b. Light Duty Jackshaft for Commercial Sectional Dock Doors
    1. Type: Jackshaft without manual chain hoist
    2. Rating: 14 foot maximum height, 16 foot maximum width, 300 pounds maximum
    3. Electrical Requirements: 120 volt single phase.
    4. Duty Cycle: Maximum 10 cycles per hour and 25 cycles per day.
    5. Control:
        a. Three push button type.
        b. Provisions for timer to close.
    6. Motor: DC type with soft start and stop.
    7. Battery Back-up capable
    8. Enclosure: NEMA Type 1.
    9. Circuit Board: solid state logic.
    10. Diagnostics: Onboard.
    11. Wifi: Built in.
    12. Internet connectivity: myQ and myQ Facility.
    13. Security: Security+ 2.0
    14. Entrapment protection:
        a. Monitored entrapment protection inputs: One.
            1. NEMA 1 Monitored photo electric eyes mounted on jambs.
            2. Monitored light curtain.
    15. Auxiliary box (connect up to 5 sensors to monitor dock levelers and other accessories thru myQ Facility)
    16. Limit system: Electronic Limits.
    17. Remote controls.
    18. Cable tension monitor.
    19. Automatic power door lock.
    20. Remote LED light.
c. Light Duty Trolley for Commercial Sectional Doors
    1. Type: Trolley.
    2. Rating: 14 foot maximum height, 16 foot maximum width, 650 pounds maximum

3. Electrical Requirements: 120 volt single phase.
4. Duty Cycle: Maximum 8 cycles per hour and 25 cycles per day
5. Control: single push button, NEMA 1 enclosure.
6. Enclosure: NEMA Type 1.
7. Circuit Board: solid state logic.
8. Wifi: Built in.
9. Internet connectivity: myQ.
10. Security: Security+ 2.0
11. Entrapment protection:
    a. Monitored entrapment protection inputs: One.
        1. NEMA 1 Monitored photo electric eyes mounted on jambs.
        2. Monitored light curtain.
12. Limit system: Electronic Limits.
13. Remote controls

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared. Verify that site conditions are acceptable for installation of doors, operators, controls and accessories. Ensure that openings are square, flush and plumb.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. General: Install door, track and operating equipment complete with all necessary accessories and hardware according to shop drawings, manufacturer's instructions.

B. Lubricate bearings and sliding parts, and adjust doors for proper operation, balance, clearance and similar requirements.

3.4 PROTECTION

A. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove and legally dispose of construction debris from project site.

B. Remove temporary coverings and protection of adjacent work areas. Repair or replace installed products damaged prior to or during installation.

C. Lubricate bearings and sliding parts, assure weather tight fit around door perimeter and adjust doors for proper operation, balance, clearance and similar requirements. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION