

National Reach. Local Service.

Section 14550

Vertical Reciprocating Conveyors

PART 1 GENERAL

* 1. SECTION INCLUDES:
1. Vertical Reciprocating Conveyor (VRC)
	1. RELATED SECTIONS:
2. Section 00 33 00 -- Cast–in-Place Concrete: Concrete shaftway and anchor placement.
3. Section 04 22 00 – Concrete Unit Masonry: Masonry shaftway and anchor placement.
4. Section 06 10 00 - Rough Carpentry: Blocking in framed construction for lift attachment.
5. Section 09 21 00 - Gypsum Board Assemblies: Gypsum shaft walls.
6. Division 16 – Electrical: Lighting and wiring connections at top of shaft.
7. Division 16 – Electrical: Electrical power service and wiring connections.
	1. REFERENCES:
8. American Society of Mechanical Engineers (ASME) B20.1 Safety Standard for Conveyors and Related Equipment
9. National Fire Protection Agency (NFPA) – NFPA 70 – National Electrical Code
10. National Electrical Manufacturers Association (NEMA)
	1. SUBMITTALS:
11. Submit under provisions of Section 01 30 00 – Administrative Requirements.
12. Submit product data:
	1. Product drawings
	2. Product specifications
	3. Anchorage details
		1. Wall anchor bolt axial loading
		2. Wall anchor bolt transverse shear
		3. Foundation anchor bolt shear loading
		4. Foundation area axial loading
13. Drawings shall include:
	1. Plans, elevations, and sections of the VRC
	2. Anchorage requirements
	3. Recommended pit dimensions
14. Closeout Submittals provided with equipment
	1. Electrical schematic drawings
	2. Installation manual
	3. Owner’s manual including operating instructions, exploded parts diagram, service and troubleshooting guidelines
	4. QUALITY ASSURANCE:
15. Manufacturer: Company shall employ personnel with not less than ten (10) years of experience in the design and fabrication of lifting devices.
16. Technical Services: Manufacturer and authorized distributors shall work with architects, engineers and contractors to adapt the vertical reciprocating conveyor to the design and structural requirements of the building, site, and code requirements.
17. Unit must be tested in factory before shipment.
18. Vertical reciprocating conveyor shall meet or exceed the national standards.
19. Installer Qualifications: Manufacturer and distributor approved representatives with a proven history of installation of similar equipment. Installation company shall have qualified people available to ensure fulfillment of maintenance and callback service.
	1. DELIVERY, STORAGE, AND HANDLING:
20. Products to be stored in manufacturer’s unopened packaging until ready for installation.
21. Components stored off the ground in a dry covered space, protected from weather conditions.
	1. WARRANTY:
22. The Symmetry Elevating Solutions VRC is warranted to be free of material defect and workmanship beginning from the date of shipment with the following minimums:
	1. Structure—Five (5) years
	2. Electrical—One (1) year
	3. Mechanical—One (1) year
	4. Hydraulic—One (1) year
	5. Labor—Not included
23. The VPL-ML unit shall have a FOUR (4) year limited parts warranty covering replacement of defective parts of the basic unit, including all electrical and drive system components, at no cost. Labor costs required to replace parts is not included. Preventative maintenance agreement required.
	1. MAINTENANCE
24. Maintenance of the VRC unit shall consist of regular cleaning, inspection, and adjustment of the unit at intervals not longer than every six (6) months, abiding by the maintenance control log. Provide maintenance contract for the following years:
	1. Five (5) years (for Symmetry Elevating Solutions VRC)
	2. Four (4) years (for model VPL-ML)

PART 2 PRODUCT

* 1. MANUFACTURER:
1. Acceptable Manufacturer: Bella Elevator LLC 10000 N Galena Rd Peoria IL 61615

Email: customerservice@symmetryelevator.com

Toll Free: 877-568-5804

Website: <https://symmetryelevators.com/vertical-reciprocating-conveyor/>

U.S. OWNED AND OPERATED: Manufacturer must be a registered U.S. owned company with manufacturing operations located in the United States of America.

1. No Substitutions Allowed.
2. Request for substitutions will be considered in accordance with provisions of section 01600.
	1. Symmetry Elevating Solutions: Vertical Reciprocating Conveyor (VRC):
3. A General Description: The VRC is designed for lifting heights up to 36 feet.  The unit can be mounted either directly to the floor or in a shallow pit. The VRC shall be a modular design requiring no welding for installation.
	1. Material conveying system for:
		1. General material conveyance
			1. Capacity:
				1. Indicate capacity up to 6000 lbs\_\_\_\_\_\_\_\_\_\_\_\_\_
				2. Deflection under load: no portion of the VRC shall exhibit permanent deformations while loaded to its maximum rated capacity
			2. Speed: 15 feet per minute (fpm)
			3. Nominal Platform Size:
				1. Custom Size \_\_\_\_\_ wide x \_\_\_\_\_ long
		2. Casket Lift
			1. Capacity:
				1. 750 lbs
				2. 1000 lbs
				3. Alternate capacity up to 6000 lbs
				4. Deflection under load: no portion of the VRC shall exhibit permanent deformations while loaded to its maximum rated capacity
			2. Speed: 15 feet per minute (fpm)
			3. Nominal Platform Size:
				1. 36” wide x 96” long
				2. 42” wide x 96” long
				3. 48” wide x 96” long
				4. Custom Size \_\_\_\_\_ wide x \_\_\_\_\_ long
		3. Kegevator
			1. Capacity:
				1. 750 lbs
				2. 3000 lbs
				3. Alternate capacity up to 6000 lbs
				4. Deflection under load: no portion of the VRC shall exhibit permanent deformations while loaded to its maximum rated capacity
			2. Speed: 15 feet per minute (fpm)
			3. Nominal Platform Size:
				1. 48” wide x 60” long
				2. 60” wide x 60” long
				3. Custom Size \_\_\_\_\_ wide x \_\_\_\_\_ long
			4. Optional stainless steel platform and side walls
	2. Mast type
		1. 1320 Single mast VRC
		2. 1520 Telescopic mast VRC
4. Vertical Travel: \_\_\_\_\_\_\_ inches, measured from lowest finished floor to uppermost finished floor.
5. Pit Depth (recommended 6-8 inches deep)\_\_\_\_inches
	1. Optional stationary ramp
	2. Optional floor mount (no pit or ramp)
6. Operating Levels: up to 5 levels (not less than 20” between floors)
7. Platform Configuration:
	1. Straight Through
	2. Enter/Exit same side
	3. 90 Degree
8. Lifting Means:
	1. Drive mechanism shall be a 2:1 chain hydraulic equipped with an instantaneous slack chain safety device.
	2. Hydraulic connections shall be metal and have rated pressure that withstands the working pressure with a 4 times safety factor. Low pressure fittings used for installation and priming are permitted to be plastic.
	3. Factory supplied oil collection means, pressure gauge, oil impregnated sleeve bearing sprockets
9. Hydraulic Power Unit (HPU)
	1. A pressure compensated flow control valve shall be included to provide for safe lowering of the load.
	2. A manual lowering valve is required to lower the platform in case of a failure in the electrical power supply.
	3. A pressure relief valve shall be provided to protect the hydraulic system from excessive pressure due to overloading or jam situations.
	4. A priming valve shall be provided to allow for simple pump start-up.
	5. Motor:
	6. Motor horsepower shall be sized for the rated full load and specified speed.
	7. All motors are TEFC with ambient temperature ratings from -13° to 104° Fahrenheit and shall be designed for continuous duty with a 1.15 service factor.
10. Controller:
	1. NEMA 1 Controller (standard):
		1. NEMA 3R
		2. NEMA 4
		3. NEMA 12
		4. NEMA 13
	2. Power Supply:
		1. 240 VAC, 60 Hz, single phase (standard)
		2. 208 VAC, 60 Hz, Single Phase
		3. 480 VAC, 60 Hz, Single Phase
		4. 240 VAC, 60 Hz, Three Phase
		5. 208 VAC, 60 Hz, Three Phase
		6. 480 VAC, 60 Hz, Three Phase
	3. Owner or owner’s agent shall terminate high voltage power within 10 feet of the location designated for installation of the VRC with an electrical disconnect meeting NEC requirements (disconnect provided by others).
11. Safeties:
	1. Slack/Broken chain safety device and safety switch
	2. Overload relief valve
	3. Overtravel stop brackets
	4. Emergency stop switch on control stations
	5. Velocity fuse
	6. Keyswitch on controls
	7. Manual lowering valve
	8. 48” tall platform walls on non-loading sides
	9. Snap chains shall be mounted on the operating ends of the platform
	10. Grounded electrical system with upper and lower limit switches.
12. Signs: All signage shall meet the requirements set forth in the VRC application guidelines as referenced by ASME B 20.1.
13. Enclosure:
	1. Guarding on all non-operating sides shall be by safety enclosures a minimum of 96” high consisting of material which will reject a sphere ¾” in diameter.
		1. Enclosure provided by VRC manufacturer
		2. Shaft constructed on site by others
14. Landing doors or gates are required at each level:
	1. Single Swing
		1. Expanded metal gate
		2. Fire rated door
	2. Double Swing
		1. Expanded metal gate
		2. Fire rated door
	3. Vertical lift up gate
	4. Upper level hatch door (model 1520 Telescopic mast only)
	5. Upper level hatch cover (model 1520 Telescopic mast only)
	6. All doors/gates shall be equipped with an electro-mechanical interlock to keep doors closed and locked when the platform is not at the landing
15. Components:
	1. Modular bolt-together structural steel mast requires no field welding.
	2. Platform shall be constructed of 3/16” A36 structural steel minimum hot rolled steel.
	3. Platform side panels shall be 48 inches high, side panel framework shall be a minimum of 1 ½ inch steel angle framework. Solid infill panels shall be a minimum of 16 gauge steel.
	4. Carriage platform supports shall be a minimum of 4 x 3 x ¼” A500 structural tubing
	5. Machined steel wheels with sealed ball bearings shall be used for axial carriage guidance and Steel cam followers with needle bearings shall be used for horizontal stability.
16. Control stations:
	1. Illuminated control switches shall be installed at each loading zone and located so that the controls are not accessible from the platform
	2. An illuminated emergency stop switch shall be provided on the controls with an audible alarm.
	3. “Deck Here” indicator light
	4. Keyswitch to turn control station on and off
	5. Operation Type:
		1. Automatic (not available on model 1520 Telescopic masts)
		2. Constant pressure.
	6. Control station shall be
		1. Flush mounted brushed stainless steel with steel enclosure
		2. NEMA Rated fiberglass reinforced thermoset polyester
			1. NEMA 4X
			2. NEMA 12
			3. NEMA 13
	7. Symmetry Model VPL-ML:
17. General Description: The VRC is designed for lifting heights up to 20 feet.  The unit can be mounted either directly to the floor or in a shallow pit. The VRC drive shall be self-contained within the lifting tower.
	1. Box lift
		1. Capacity:
			1. 750 lbs
			2. 1000 lbs (up to 192” of travel)
			3. Deflection under load: no portion of the VRC shall exhibit permanent deformations while loaded to its maximum rated capacity
		2. Speed: See Drive System
		3. Nominal Platform Size:
			1. 36” deep x 48” wide
			2. 42” deep x 60” wide
			3. Custom Size \_\_\_\_\_ deep x \_\_\_\_\_ wide
	2. ML Enclosure Lift
		1. Capacity:
			1. 750 lbs
			2. 1000 lbs (up to 192” travel)
			3. Deflection under load: no portion of the VRC shall exhibit permanent deformations while loaded to its maximum rated capacity
		2. Speed: See Drive System
		3. Nominal Platform Size:
			1. 36” deep x 48” wide
			2. 42” deep x 60” wide
			3. Custom Size \_\_\_\_\_ deep x \_\_\_\_\_ wide
	3. ML Shaftway Lift
		1. Capacity:
			1. 750 lbs
			2. 1000 lbs (up to 192” travel)
			3. Deflection under load: no portion of the VRC shall exhibit permanent deformations while loaded to its maximum rated capacity
		2. Speed: See Drive System
		3. Nominal Platform Size:
			1. 36” deep x 48” wide
			2. 42” deep x 60” wide
			3. Custom Size \_\_\_\_\_ deep x \_\_\_\_\_ wide
18. Vertical Travel: \_\_\_\_\_\_\_ inches, measured from lowest finished floor to uppermost finished floor.
19. Pit Depth (recommended 3-4 inches deep)\_\_\_\_inches
	1. Optional stationary ramp
	2. Optional floor mount (no pit or ramp)
20. Operating Levels: up to 5 levels
21. Platform Configuration:
	1. Straight Through
	2. Enter/Exit same side
	3. 90 Degree
22. Drive System
	1. Standard Acme Screw Drive:
		1. Travel speed: 10 fpm.
		2. Travel distance: \_\_\_\_\_\_\_\_\_ inches (maximum travel is 168 inches)
		3. Motor: 1 ½ HP, 115 volt, 1 phase.
		4. Power Supply:
			1. 115 VAC, 25 Amp, Single Phase.
			2. 230 VAC, 15 Amp, Single Phase.
		5. Battery powered platform lowering device which automatically activates in the event of power failure.
		6. The drive mechanism shall be a stationary nut on a rotating 1 inches diameter Acme screw with a secondary safety nut.
	2. Accelerated Acme Screw Drive:
		1. Travel speed: 20 fpm.
		2. Travel distance: \_\_\_\_\_\_\_\_\_ inches (maximum travel is 168 inches)
		3. Motor: 1 ½ HP, 115 volt, 1 phase.
		4. Power Supply:
			1. 115 VAC, 25 Amp, Single Phase.
			2. 230 VAC, 15 Amp, Single Phase.
		5. Battery powered platform lowering device which automatically activates in the event of power failure.
		6. The drive mechanism shall be a stationary nut on a rotating 1 inches diameter Acme screw with a secondary safety nut.
	3. Hydraulic Drive:
		1. Travel speed: 17 to 20 fpm.
		2. Motor: 3 HP, 24 VDC. AC powered primary drive.
		3. Power Supply: 115 VAC, 20 Amp, Single Phase
		4. Powered by continuous building mains converted to 24 VDC equipped with auxiliary battery power system.
		5. Drive mechanism shall be a 2:1 chain hydraulic equipped with a type A instantaneous slack chain safety device.
		6. Hydraulic connections shall be metal and have rated pressure that withstands the working pressure with a 5 times safety factor.
		7. Bi-directional leveling, factory supplied oil collection means, Angled pressure gauge, roller bearing sprockets, vibration isolated hydraulic power unit.
23. Lift Components:
	1. Symmetry Elevating Solutions PLC Controller with self diagnostics and digital display. A.W.A.R.E. System (Active Wiring, Accessories, Relay & Electronics Diagnosis) generates on-demand diagnostic codes identifying trouble codes.
	2. The Drive Tower support shall be a combination 7 gauge C Channel, 7 gauge interface plates and 16-gauge exterior skin.
	3. Platform shall be constructed of minimum 12-gauge hot rolled steel. If unit is not installed in a 3-inch pit, a stationary ramp shall be provided.
	4. Platform side panels shall be 42 inches high, side panel framework shall be a minimum of 1 inch x 1 ½ inch steel tubing. Solid infill panels shall be a minimum of 18-gauge steel.
	5. Carriage platform supports shall be a minimum of ½ inch steel
	6. Nonmetallic rollers shall be used for axial carriage guidance and wear pads shall be used for horizontal stability.
	7. Loaded fasteners shall be grade eight or higher. Locking fasteners shall be used in all critical locations.
24. Safety Features/Devices:
	1. Grounded electrical system
	2. Upper final limit switch (Standard and Accelerated Acme Screw Drive).
	3. At all landings, electromechanical interlocks shall be used to keep doors closed when lift is on another floor.
	4. Pit stop switch mounted on Drive Tower.
25. Enclosure:
	1. Guarding on all non-operating sides shall be by safety enclosures a minimum of 96” high consisting of material which will reject a sphere ¾” in diameter.
		1. Enclosure provided by VRC manufacturer
		2. Shaft constructed on site by others
26. Landing doors or gates are required at each level:
	1. Single Swing
		1. Expanded metal gate
		2. Fire rated door
	2. All doors/gates shall be equipped with an electro-mechanical interlock to keep doors closed and locked when the platform is not at the landing
27. Controller:
	1. NEMA 1 controller
	2. Owner or owner’s agent shall terminate high voltage power within 10 feet of the location designated for installation of the VRC with an electrical disconnect switch meeting NEC requirements (disconnect provided by others).
28. Signs: All signage shall meet the requirements set forth in the VRC application guidelines as referenced by ASME B 20.1.
29. Control stations:
	1. Control switches shall be installed at each loading zone and located so that the controls are not accessible from the platform
	2. An illuminated emergency stop switch shall be provided on the controls with an audible alarm.
	3. Keyswitch to turn control station on and off
	4. Operation Type:
		1. Constant pressure
	5. Control station shall be
		1. Flush mounted brushed stainless steel with steel enclosure
		2. NEMA Rated fiberglass reinforced thermoset polyester
			1. NEMA 4X
			2. NEMA 12
			3. NEMA 13
	6. Finishes
30. Finishes:
	1. Finish shall be powder coating, oven baked.
	2. Color:
		1. Ivory (standard)
		2. White
		3. Black
		4. Grey
		5. A selection from 213 RAL colors

PART 3 EXECUTION

* 1. ACCEPTABLE INSTALLERS:
1. Manufacturer and distributor approved representatives with a proven history of installation of similar equipment. Installing company shall have qualified people available to ensure fulfillment of maintenance and callback service.
2. Electrical devices, service and final connections shall be by a qualified electrician.
	1. EXAMINATION:
	2. Preliminary work must be properly prepared, including hoistway construction (if needed), landings and machine space, before installation.
	3. Verify hoistway shaft (if needed) and machine space are the correct size and within acceptable tolerances.
	4. Verify required landings and openings are the correct size and within acceptable tolerances.
	5. When required verify machine room is provided with lighting, light switch, outlets and meets the clear space requirements.
	6. Verify electrical power is available and within acceptable tolerances.
	7. Notify Architect of any inadequate preparation when preliminary work is the responsibility of another installer.
	8. PREPARATION:
3. Clean surfaces thoroughly prior to installation.
4. Prepare surfaces and unit using the methods recommended by the manufacturer for achieving the optimum performance of VRC.
	1. INSTALLATION:
5. A dedicated electrical supply, provided to the disconnect, shall be capable of supplying sufficient power.
6. GC to coordinate “work by others” with VRC contractor
7. The installation of the VRC shall be made in accordance with approved plans and specifications and the manufacturer’s installation instructions.
8. Startup and test unit in accordance with manufacturer’s instructions.
9. Adjust for smooth operation.
	1. FIELD QUALITY CONTROL:
10. Inspection: Upon completion of installation, the VRC shall be inspected to verify that it meets all requirements of Parts 1, 2, and 3 of this Section.
11. Tests:
	1. Operating Load Test: The owner will provide a \_\_\_\_\_ pound test load and load the VRC at the ground level. The loaded VRC platform shall be conveyed to an upper floor level and returned to the ground level to assure proper operation. If the VRC conveyor cannot lift or lower the load, the VRC shall fail the test.
	2. Performance Test: This Test is to be performed in conjunction with Test 1 above. During the demonstration of the lifting and lowering test, the owner shall measure the time required to lift and lower the capacity load. The owner will average times for lifting and lowering the load and calculate the average lifting and lowering speed. If the VRC does not lift the load within 10% of the specified speed, or if the lowering speed exceeds the lifting speed by more than 10%, the VRC shall fail the test.
	3. Stationary Load Test: This test is to be performed in conjunction with Test 1 above. The loaded VRC platform shall remain stationary at an upper level for a minimum of four (4) hours. After the four (4) hour period, the VRC will be inspected for deflection of the components or drift of the platform. If deformation or downward drift is evident, the VRC shall fail the test.
12. Schedule necessary tests with Architect, Owner, Contractor, and any authorities having jurisdiction.
	1. PROTECTION:
13. Protect installed products until completion of project.
14. Touch-up, repair or replace damaged products before substantial completion.
15. Clean unit prior to final inspection.

END OF SECTION