

Mechanical Overview

Each Series M (mechanical) Vertical Reciprocating Conveyor (VRC) consist of two (2) columns, a drivebase assembly with a gearmotor reducer, drive shaft with two (2) lift sprocket assemblies, a moving carriage deck, and if furnished, interlocked safety gates or doors. In addition, a main control panel and typically at least one push-button station per level are furnished. For more information on the electrical components, see Section 8 in this manual.

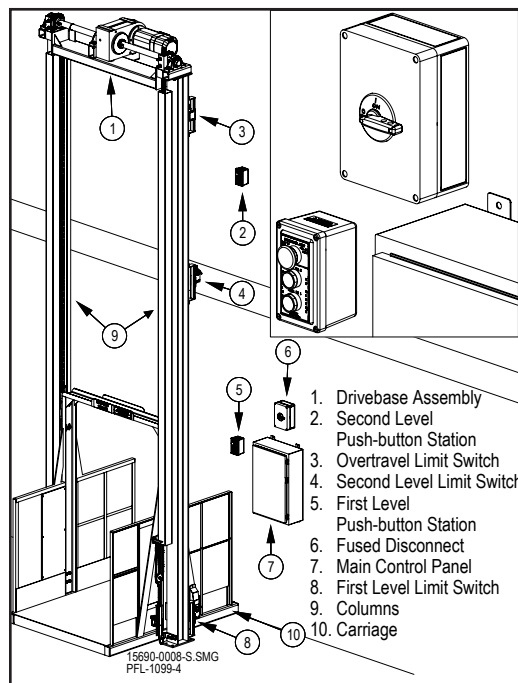
Lift Columns

The Series M consists of two (2) vertical upright columns. These are anchored to the floor at the lower floor level, positioned by the drivebase at the top, and braced to the building structure at the upper and intermediate levels.

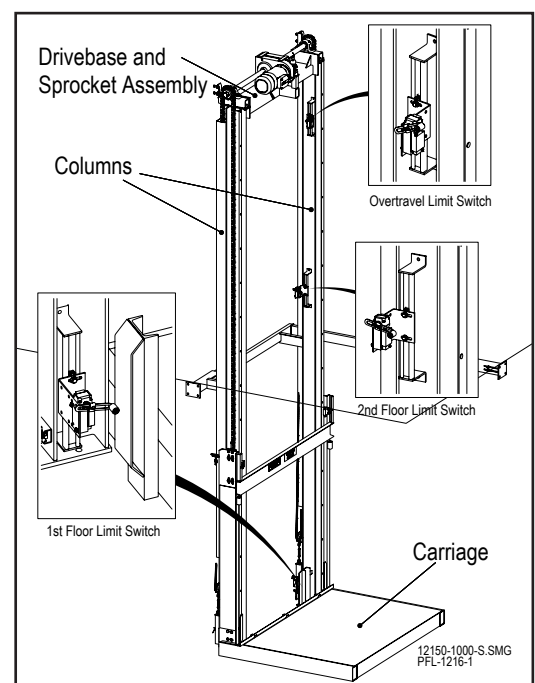
Each column has a guide angle welded to one flange of the column to form a track. A chain tube guard is welded to the face of the other flange.

Straddle / Cantilever Configuration

There are two (2) configuration types available for this model. “Straddle” has a column located on each side of the carriage. The guide angles face each other allowing the carriage to ride between them. See Figure 7-1. “Cantilever” has both columns located at the back of the carriage. See Figure 7-2. There is no difference in the operation or maintenance between these models.



Straddle Orientation Figure 7-1



Cantilever Orientation Figure 7-2

Drivebase Assembly

The drivebase assembly consists of a motor, brake, gearmotor reducer (commonly referred to as a gear motor assembly), lift sprockets, a drive shaft, bearings, and a support structure. Roller lift chains connect to tensioner chains and chain tensioners complete the components. See Figure 7-3 and Figure 7-4.

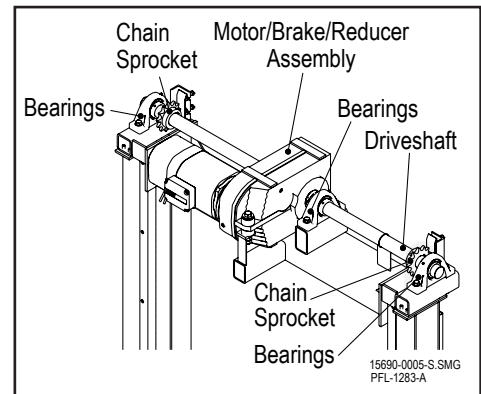
Inside each column, one end of a lift chain connects to an upper wheelblock assembly which is bolted to the carriage upright.

The lift chain goes up and over the lift sprocket at the top of the column drivebase assembly, then proceeds downward through the chain guard (chain tube), and connects to the smaller tensioner chain.

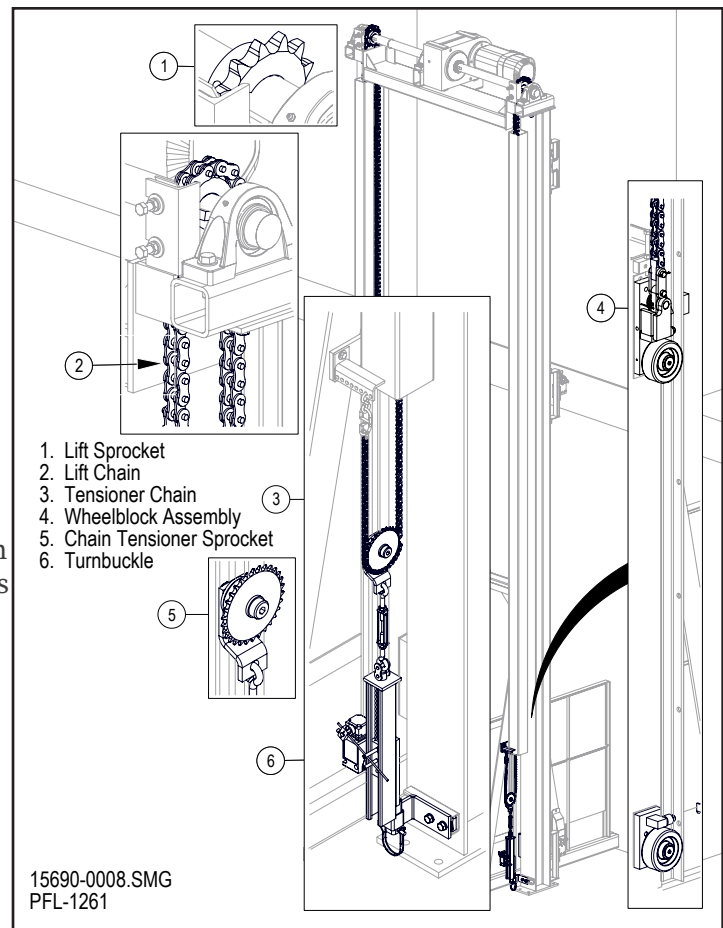
The tensioner chain then travels around the small chain tensioner sprocket and back up to the carriage to fasten to a chain tensioner bracket (shown in Figure 7-4, Item 5) or bolt on the upper wheelblock.

The tensioner sprocket is spring-loaded by the chain tensioner which maintains tension on the chain/tensioner combination. If the lift chain is pulled too tight or becomes slack, the chain tensioner limit switch is activated to shut off power to the VRC.

The chain tensioner is adjusted at a turnbuckle on the chain tensioner assembly.



Drivebase Assembly Figure 7-3



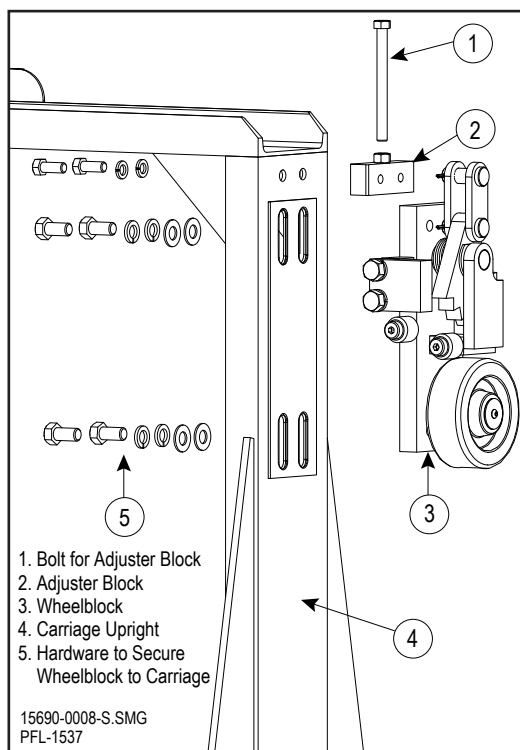
Lift Chain Tensioner Assembly
Figure 7-4

NOTICE

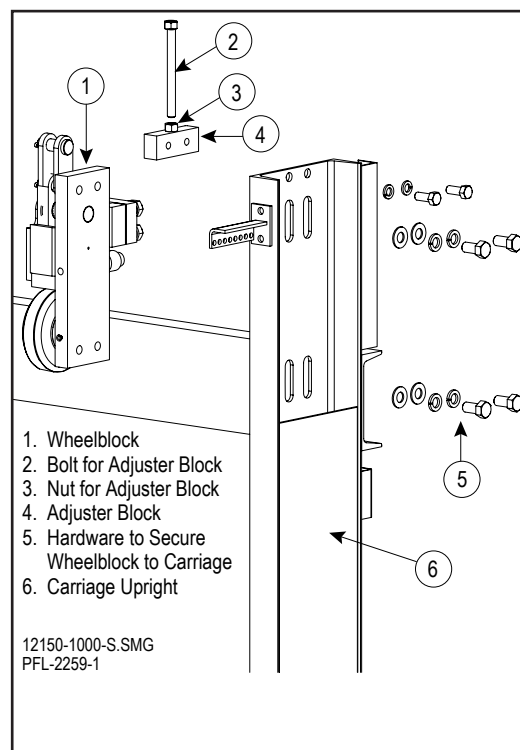
This VRC uses special high strength chain. Do not use standard ANSI roller chain or connecting links as a replacement. Contact PFlow Industries, Inc. Product Support Department for the required chain specification.

Upper Wheelblocks

Two (2) upper wheelblocks are bolted to the carriage uprights. This allows the wheels to ride within the lift columns and guide the carriage travel. See Figure 7-5 for straddle VRCs and Figure 7-6 for cantilever VRCs.



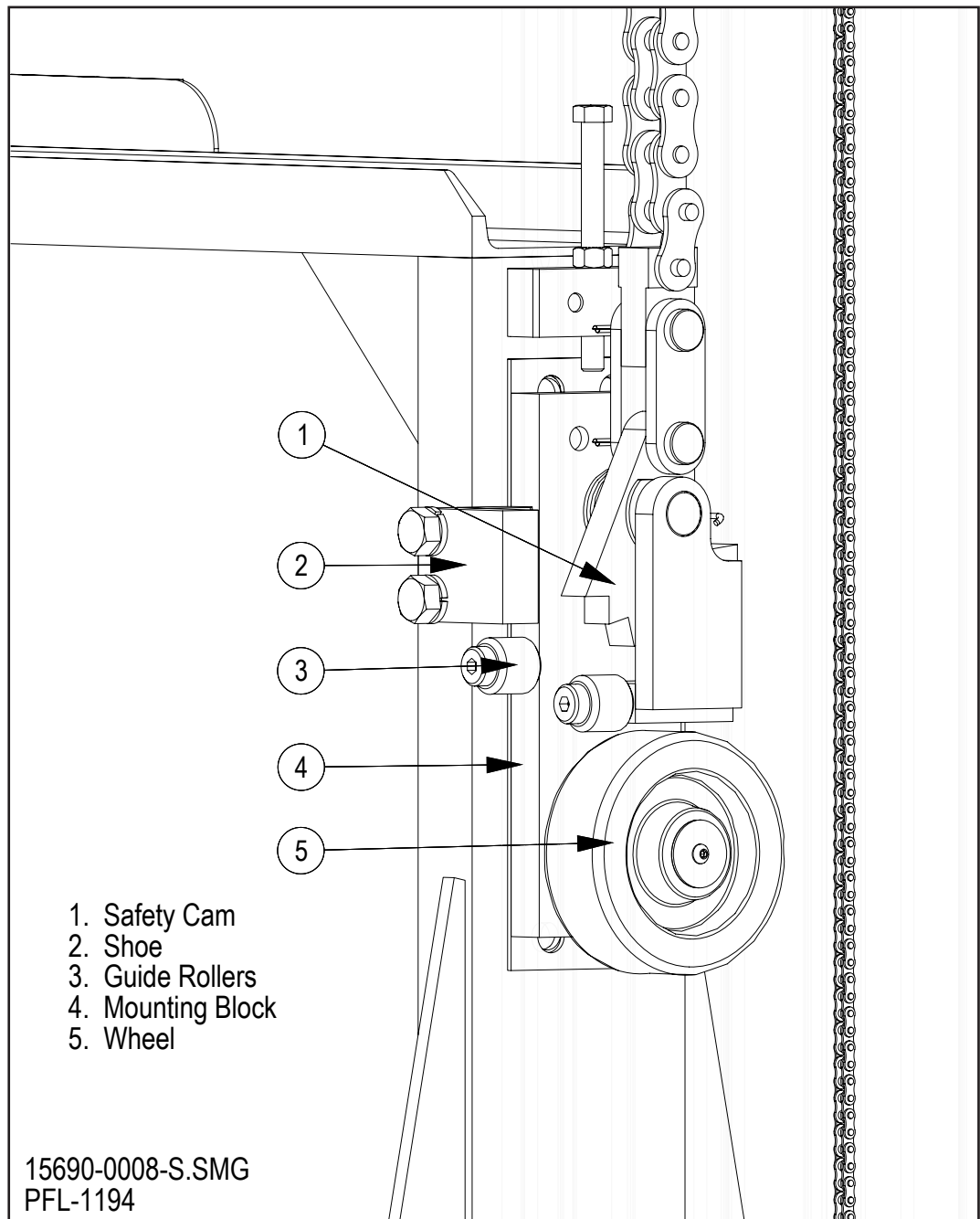
Straddle Orientation Figure 7-5



Cantilever Orientation Figure 7-6

Upper Wheelblocks

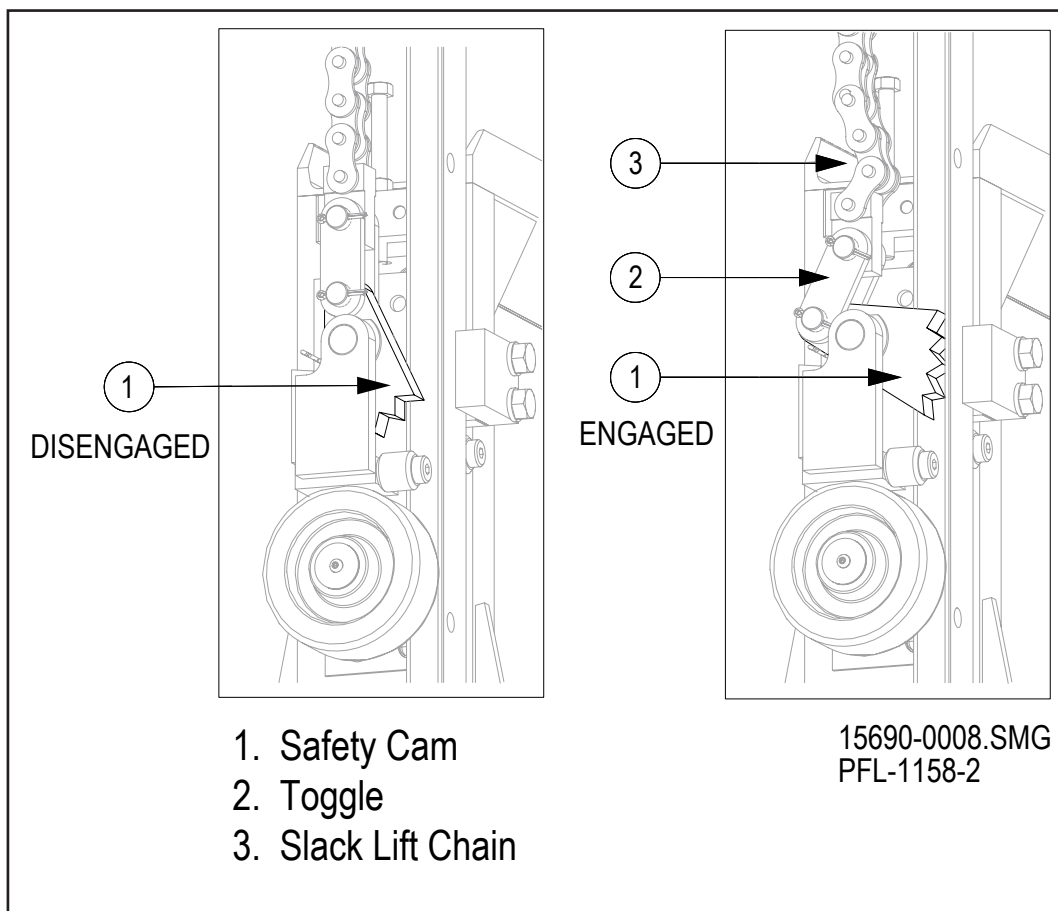
Each upper wheelblock has a mounting base block, a wheel, and two (2) guide rollers. The guide rollers locate the wheelblocks within the guide angle. Each upper wheelblock has a safety cam with teeth and a wheelblock shoe. The wheelblock shoe (bolted to the wheelblock base) fits around the outside of the column guide angle track while the steel safety cam is pivoted on the wheelblock mounting block. It is torsion spring-loaded. See Figure 7-7.



Upper Wheelblock Figure 7-7

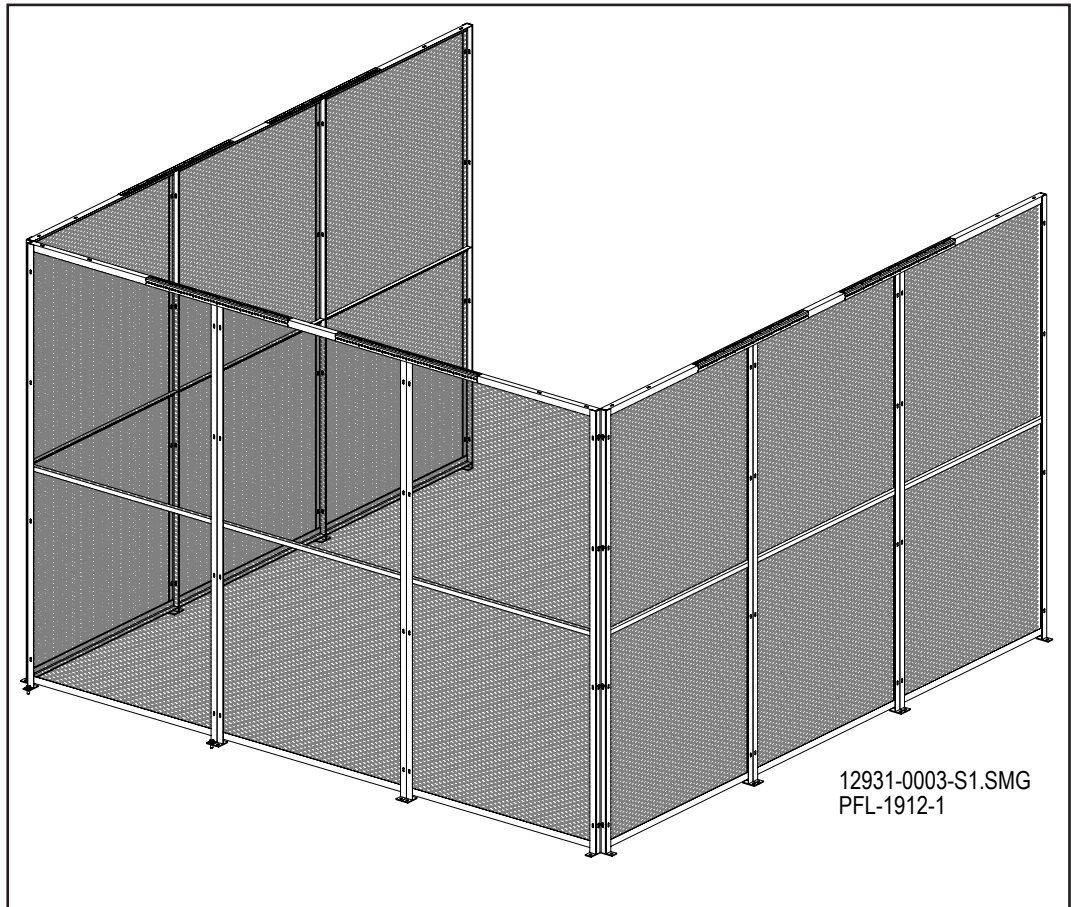
**Wheelblock
Safety Cam
Function**

If the lift chain breaks or becomes slack, the safety cam will pivot into a jam position with the column guide angle to stop the carriage from falling. The guide shoe on the outside of the guide angle track helps wedge the guide angle track wheelblock shoe and the safety cam teeth. See Figure 7-8.

*Wheelblock Safety Cam Figure 7-8*

Enclosures

In accordance with ASME B20.1-2015, Section I-3.9, PFlow Industries, Inc. supplies standard 8' (2438mm) tall enclosure panels to be installed around the Vertical Reciprocating Conveyor (VRC) as required by site conditions. The enclosure panels are steel with 1-1/2" (38mm) angle frame and 16 gauge flattened expanded metal designed to reject a ball 2" (51mm) in diameter. PFlow Industries, Inc. standard enclosure panels are typically 8' tall (2438mm). Full height enclosures (FHE) are furnished when designed for site specific requirements. See Figure 7-9.



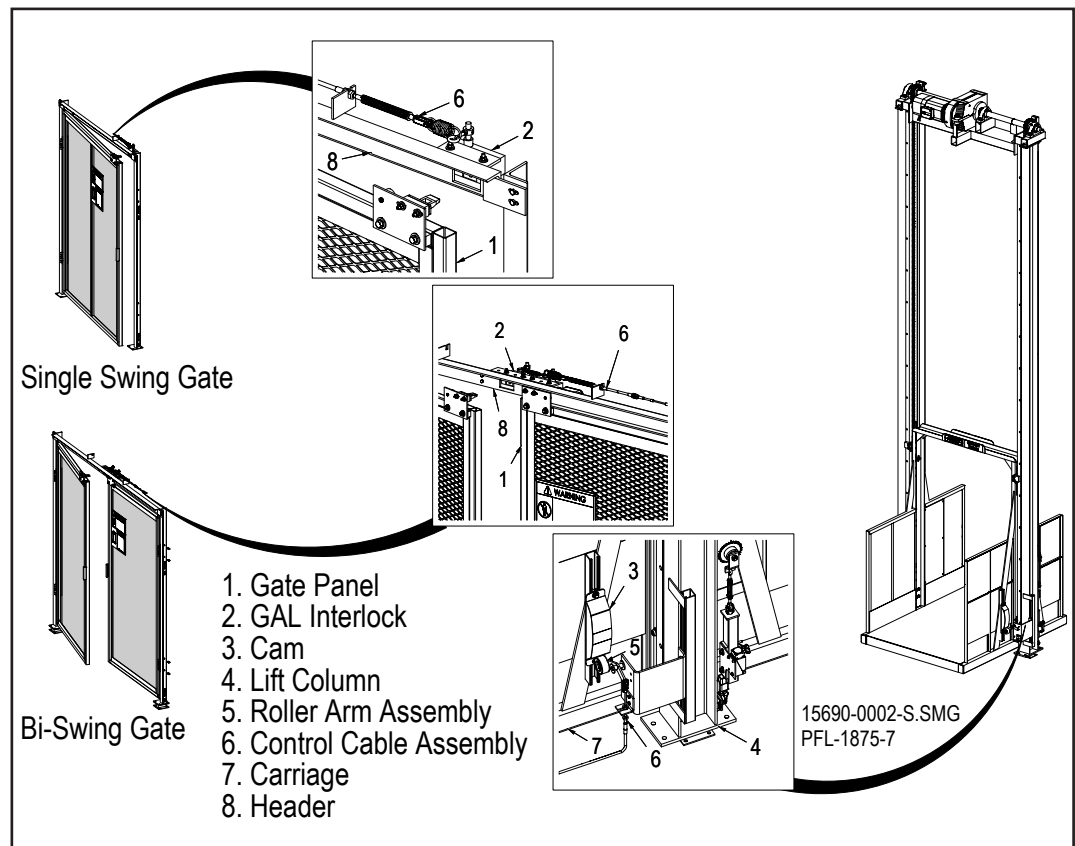
Floor Level Enclosures Figure 7-9

Gate Assemblies

A safety gate assembly or door is provided at each level opening accessing in the lift area. All gates and/or doors accessing the lift area are electromechanically interlocked. When a gate or door is open the interlock prevents movement of the carriage away from the respective level. When the carriage is not present at a level, opening the gate or door is prevented by the mechanical interlock. See Figure 7-10.

PFlow Industries, Inc. offers various styles of interlocks depending upon the gate type and application.

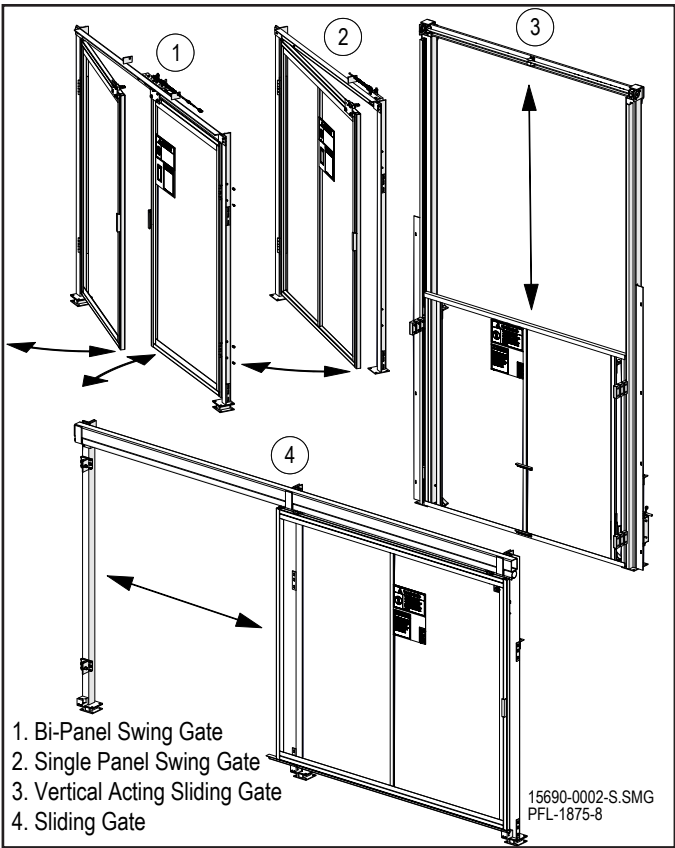
The parts section of this manual contains views with part numbers.



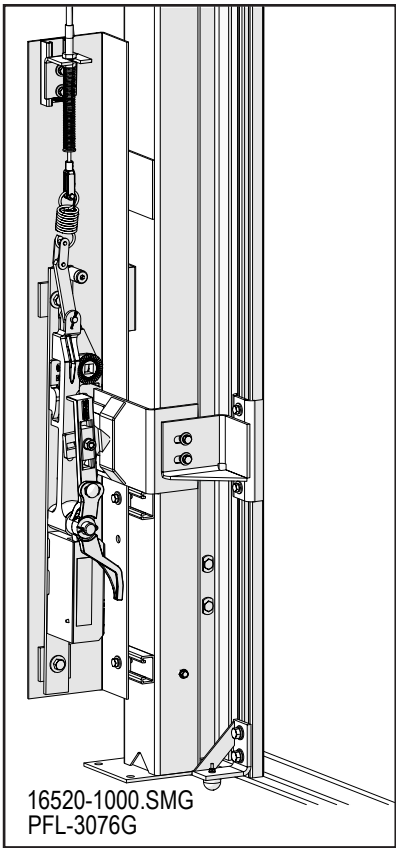
Swing Gate Interlock Examples
Figure 7-10



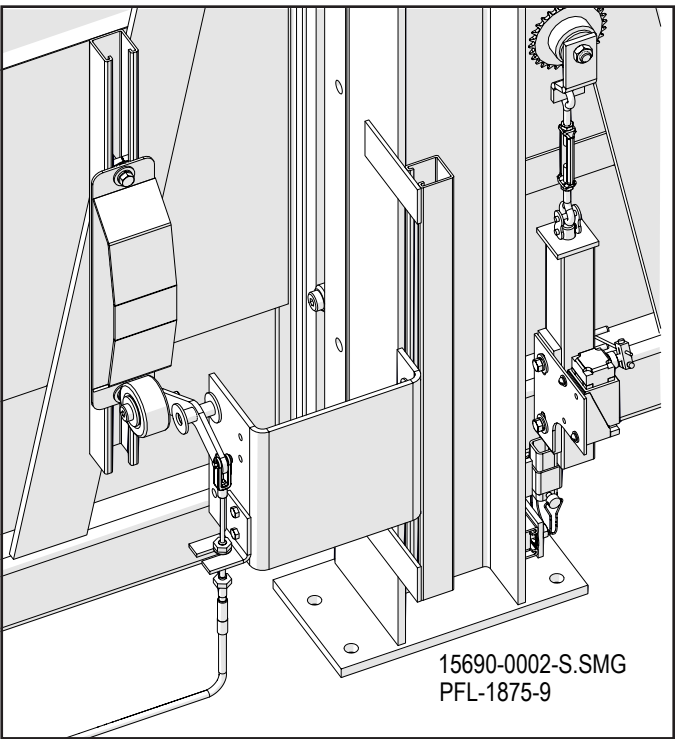
Examples



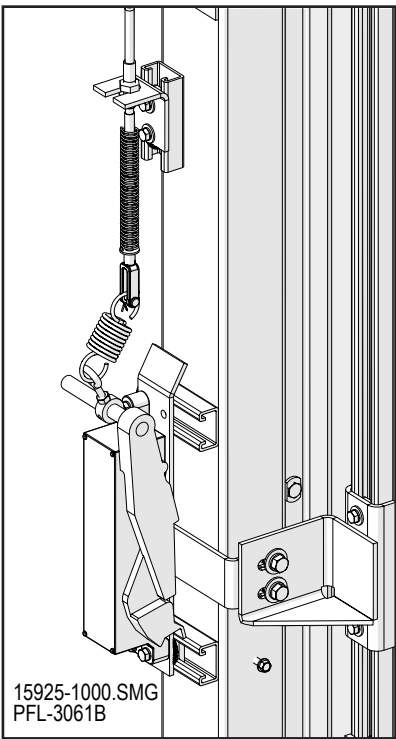
Swing Gate Interlock Examples Figure 7-11



Peelle - VAC Figure 7-12



Cable Actuator Figure 7-13



Anderson - VAC Figure 7-14