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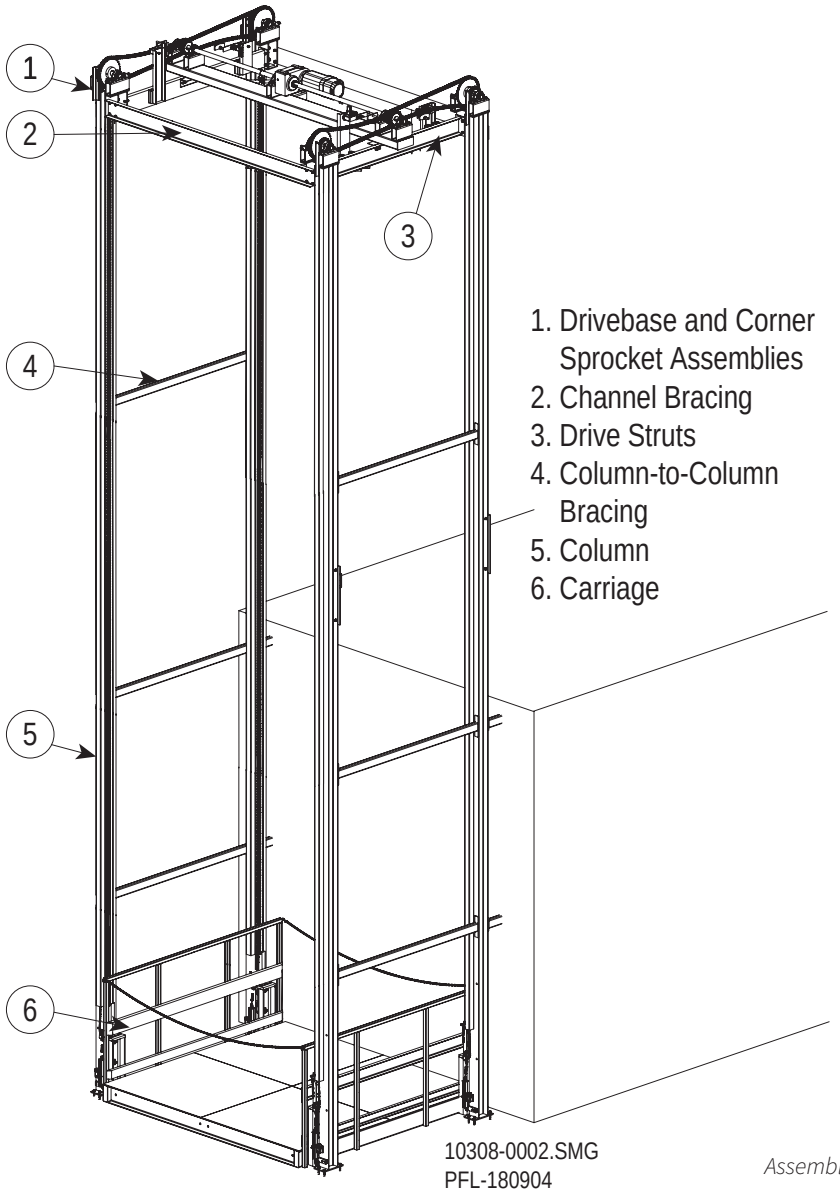
Mechanical Overview

Each Series F (mechanical) Vertical Reciprocating Conveyor (VRC) consist of four (4) columns, a drivebase assembly with a gearmotor reducer, drive shaft with four (4) corner lift sprocket assemblies, a moving carriage deck, and if furnished, interlocked safety gates or doors. See Figure 7-1. In addition, a main control panel, and one push-button station per level are furnished. For more information on the electrical components, see Section 8 in this manual.

Lift Columns

The frame for the Series F consists of four (4) 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. Exact bracing varies by application.

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.



Assembled F Series
Figure 7-1

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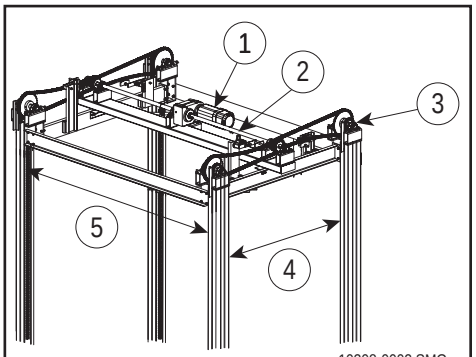
Drivebase Assembly

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 chains connect the drive sprocket on the shaft of the drivebase assembly to the larger driven sprocket on the corner assemblies on top of each column. The lift chains connect to tensioner chains and chain tensioners complete the components. See Figure 7-2, Figure 7-3, and Figure 7-4.

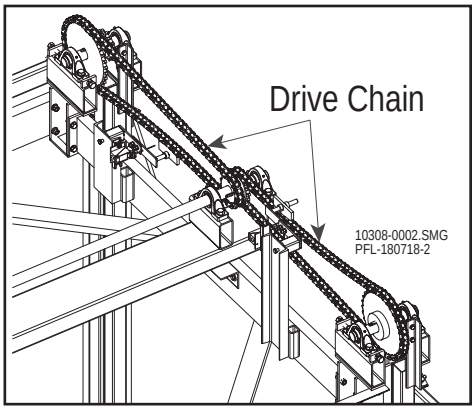
NOTICE

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.

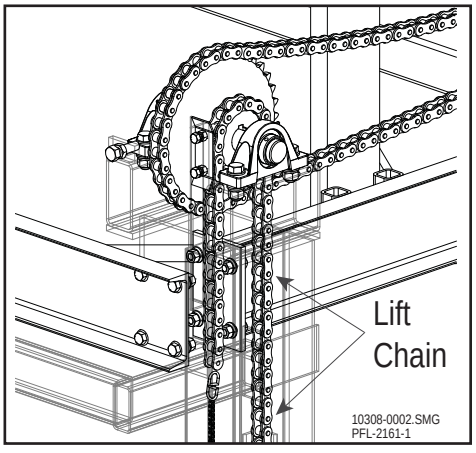


1. Motor/Brake/Reducer Assembly
2. Driveshaft
3. Corner Chain Sprocket Assembly
4. Length (column to column)
5. Width (guide angle to guide angle)

Drivebase Assembly Figure 7-2



Drive Chain Figure 7-3



Lift Chain Figure 7-4

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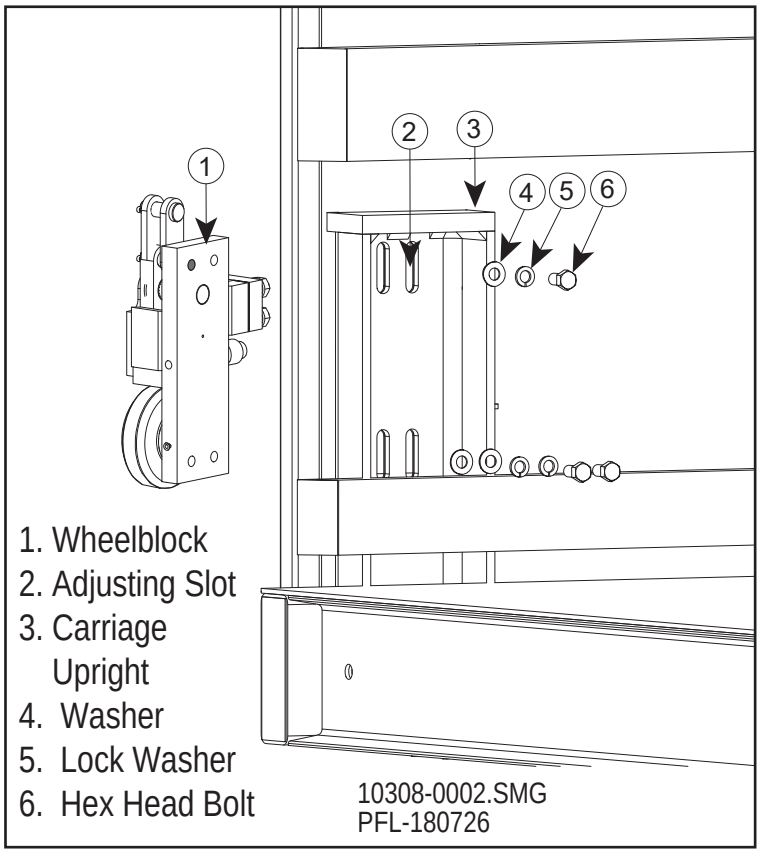
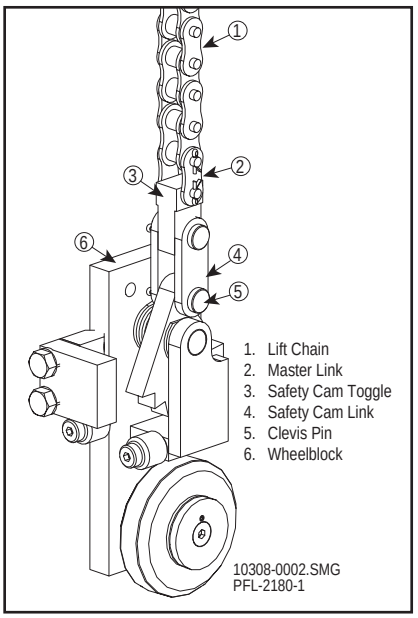
Wheelblock Assembly

Inside each of the four (4) columns, one end of a lift chain connects to a wheelblock assembly which is bolted to the carriage upright. This allows the wheels to ride within the lift columns and guide the carriage travel.

Each wheelblock has a mounting base block, a wheel, and two (2) guide rollers. The guide rollers locate the wheelblocks within the guide angle. Each 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 7-5 and Figure 7-6.



Wheelblock Bolted to Carriage Figure 7-5



Lift Chain Attached to the Wheelblock Figure 7-6

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Lift Chains

Inside each column, the ends of the lift chains connects to a wheelblock assembly which is bolted to the carriage upright.

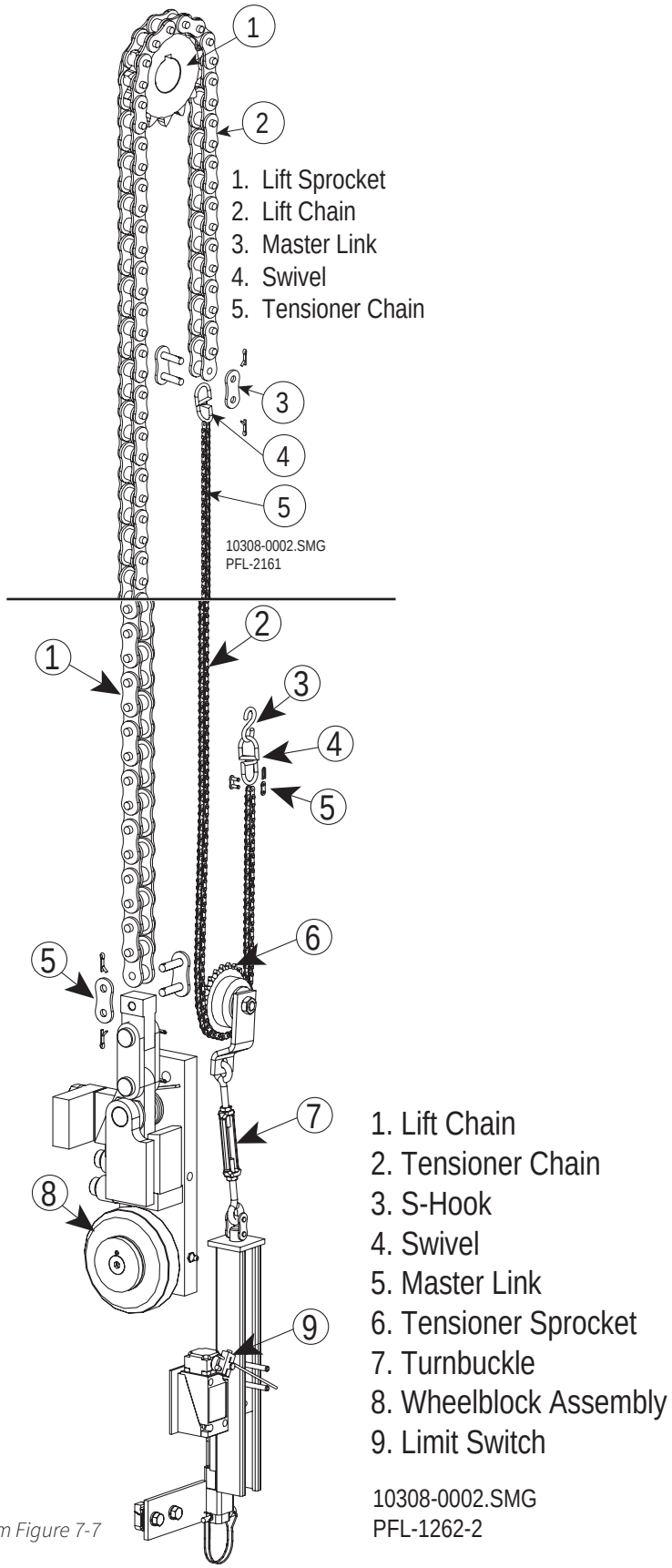
The lift chains goes up and over the lift sprocket at the top of the column drivebase assembly, then proceeds downward through the chain guard (chain tube), and connects to the smaller tensioner chain.

The tensioner chain then travels around the small chain tensioner sprocket and back up to the carriage to fasten to a bolt on the standoff on the carriage upright.

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.

See Figure 7-7.



Lift Chain System Figure 7-7

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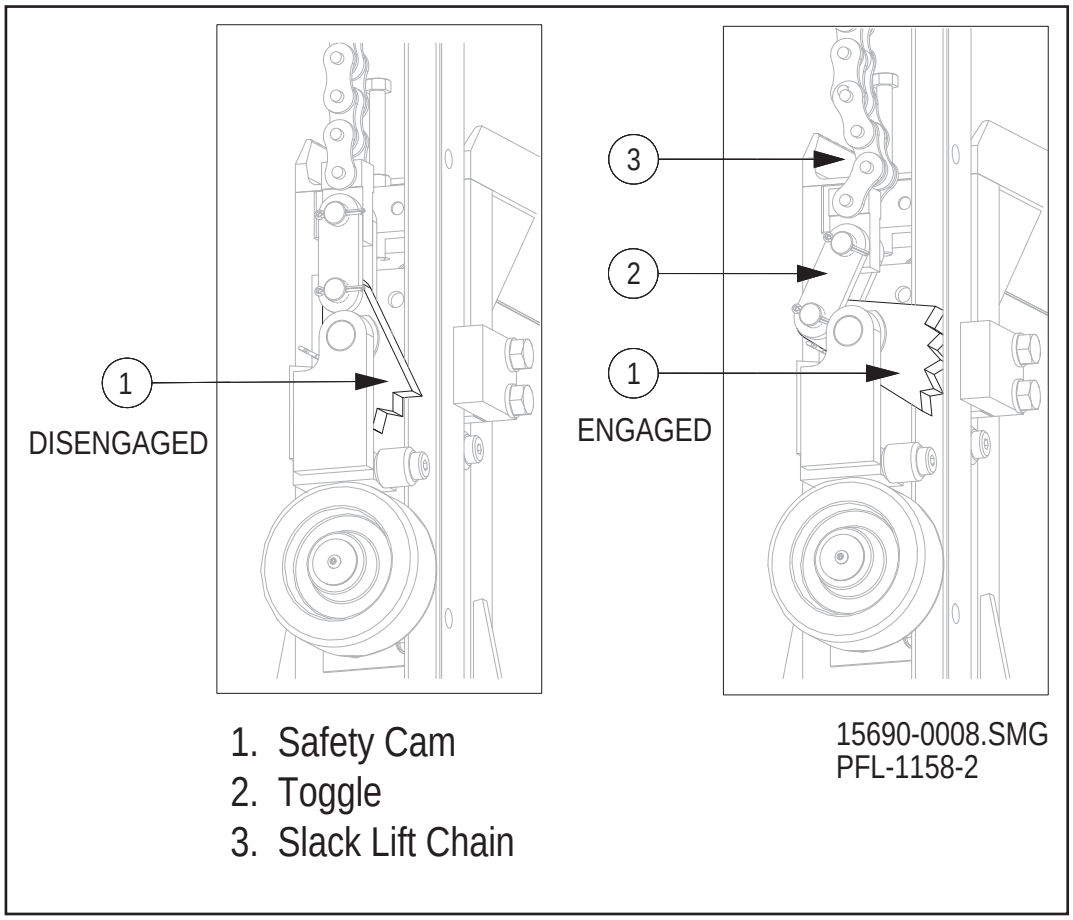
Wheelblock Safety Cam Function

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

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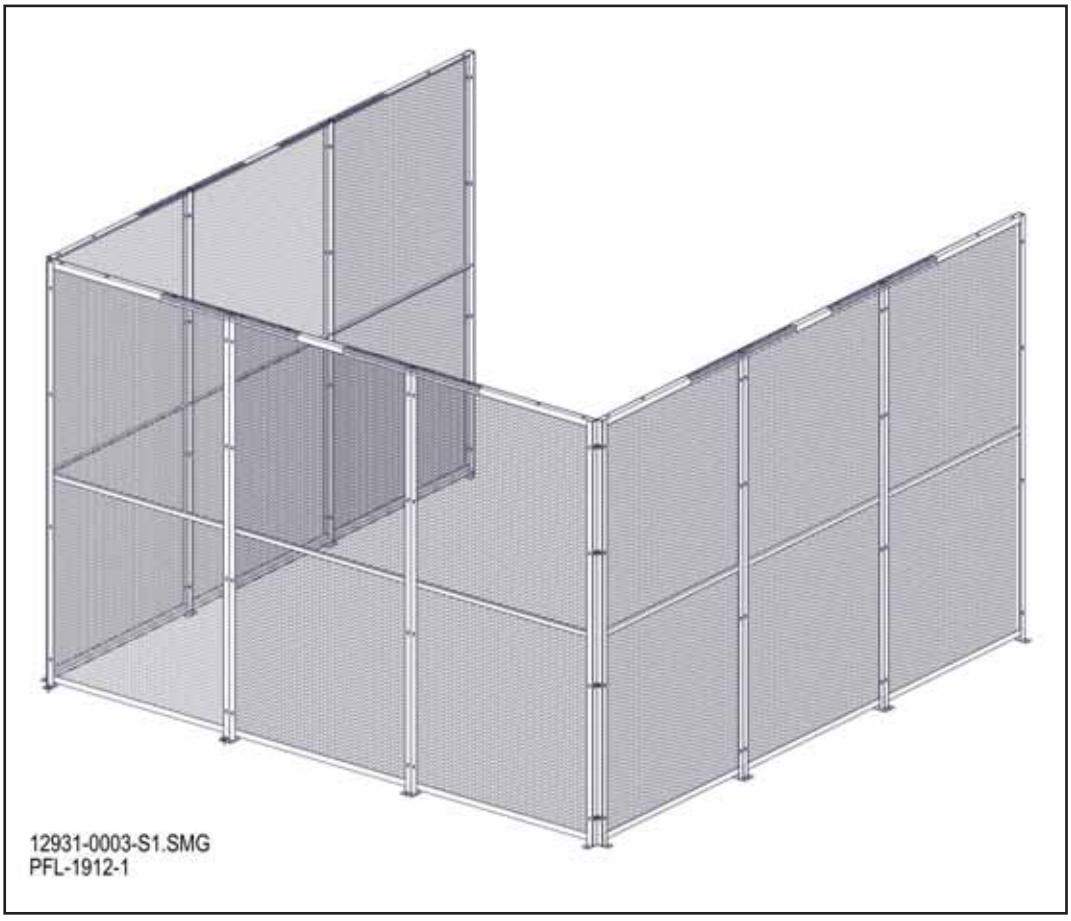
Enclosures

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

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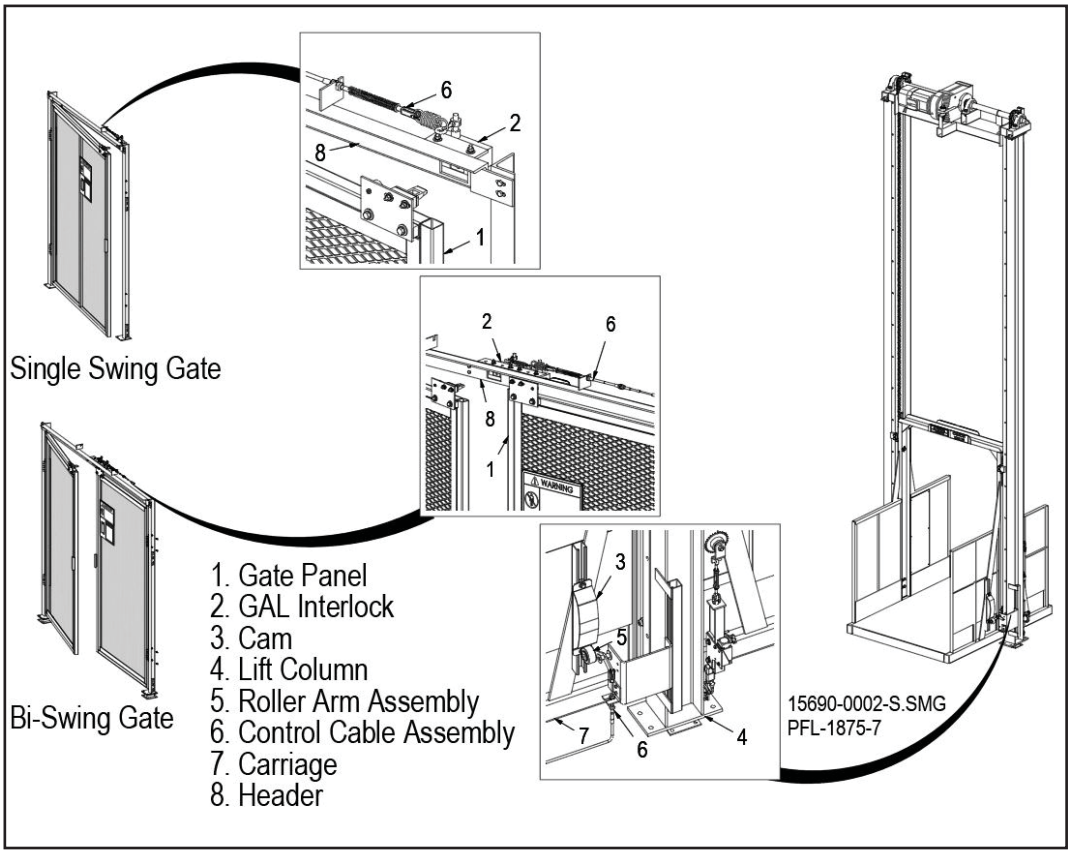
Gate Assemblies

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

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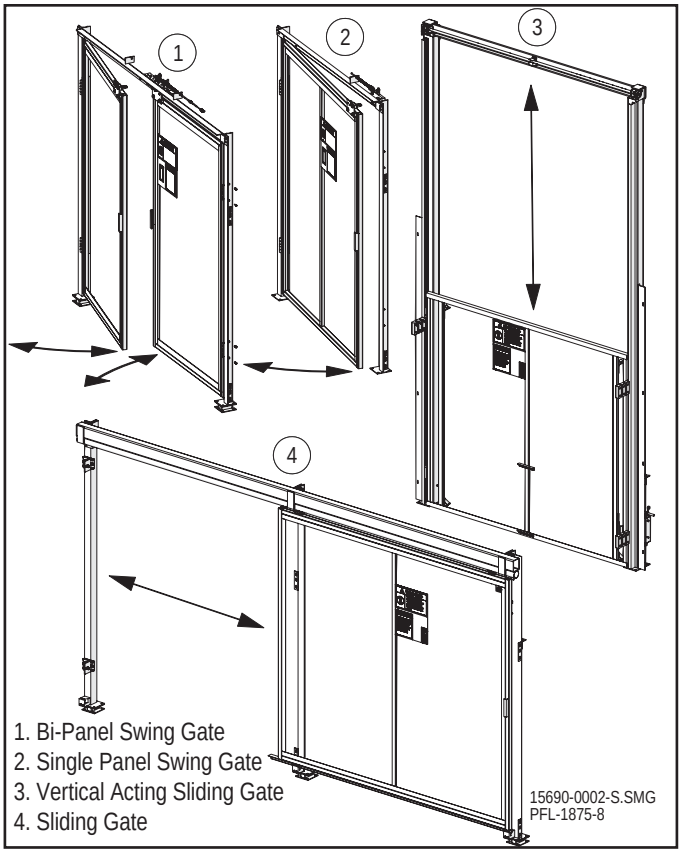
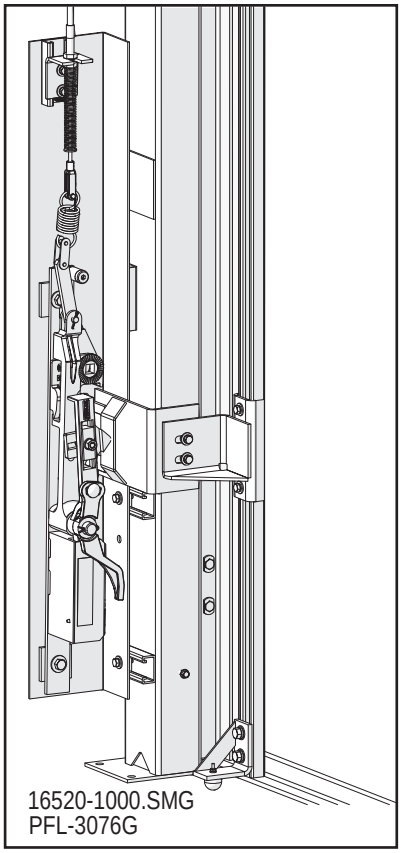
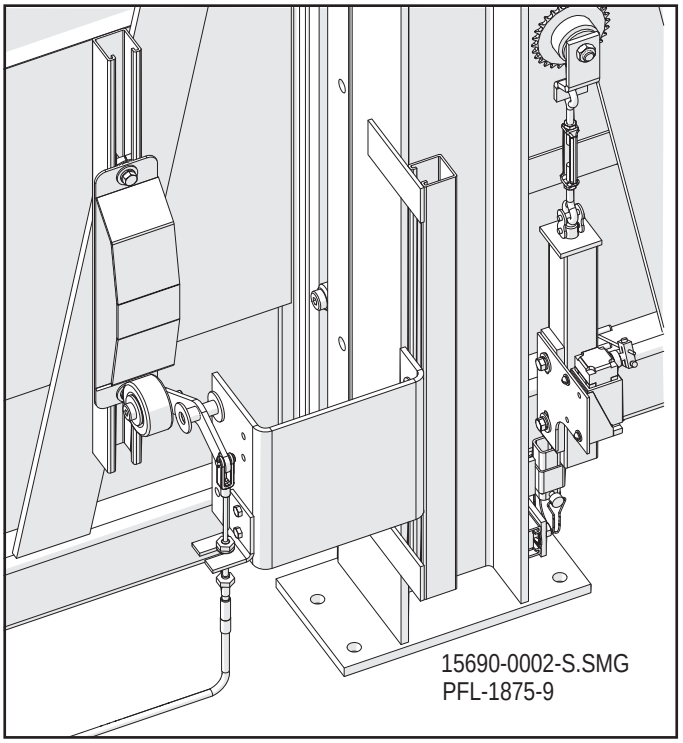
Examples



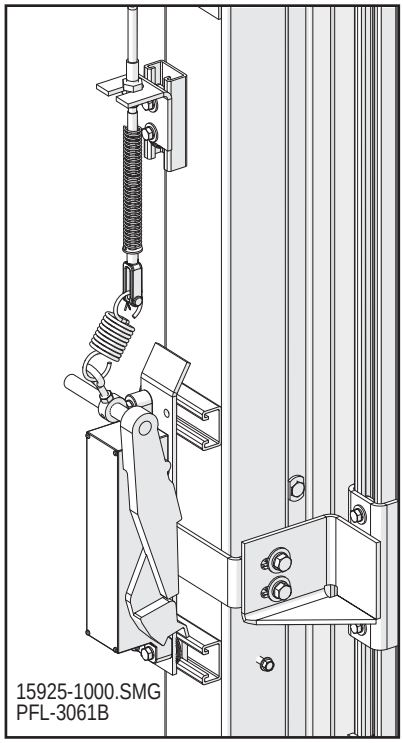
Swing Gate Interlock Examples Figure 7-11



Peelle - VAC Figure 7-12



Cable Actuator Figure 7-13



Anderson - VAC Figure 7-14