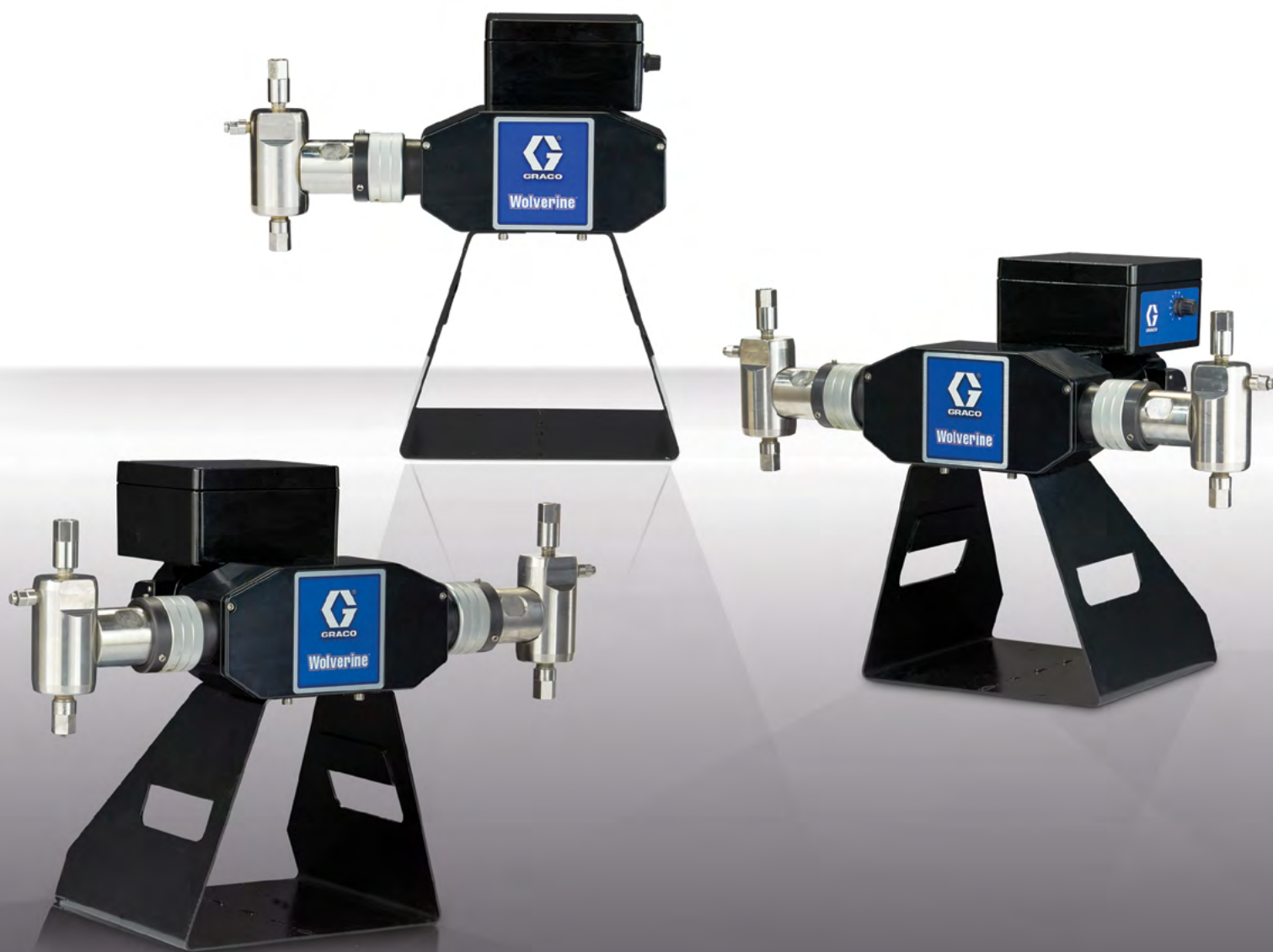




Chemical Injection

Wolverine® AC and DC Operated Variable Speed Pumps



PROVEN QUALITY. LEADING TECHNOLOGY.

Wolverine® Variable Speed Pumps

Features and Benefits

The variable speed Wolverine pump provides continuous injection for an even dispersion of chemicals.

Pump Capabilities

Flow rates are adjusted between 10 and 100% by a control dial on the motor eliminating the need for a localized controllers. The fluid heads are interchangeable between all Wolverine Advanced series pumps.

Motor

High efficiency 12 or 24VDC brushless motors use less amperage draw than traditional brushed DC motors. This helps eliminate the need for extra batteries and solar panels in solar powered chemical injection systems. The DC motors are rated for use in Hazardous (Classified) Locations. The AC motors are rated for ordinary location.*

* Power inverters available for AC motors. Please see B32717 and B32718 in the Buyer's Guide

Accurate Control

Precision stroke adjustment between 1/4 in to 1 in (6.4 mm to 25.4 mm) ensures accurate injection rates.

Chemical Compatibility

HNBR, FKM, FKM-ETP, and FFKM plunger packings and check valve seals can handle some of the most aggressive chemicals.

Standards

The DC operated motors are rated for use in Division 2 Hazardous (Classified) Locations per the following standards.





Class I, Group A & B,
Class II, Group C & D



Class I, Group A & B,
Class II, Group C & D



Wolverine Variable Speed Duplex

Models	Voltage	Motor	Plunger Size	Maximum Working Pressure psi (MPa, bar)	Motor Approvals
A281xx	12 VDC	Variable Speed Brushless	3/16 in.	10,000 (69.0, 690)	 Class I, Division 2 Groups A, B, C, D
			1/4 in.	6000 (41.3, 413)	
			3/8 in.	2500 (17.2, 172)	
			1/2 in.	1250 (8.6, 86)	
			5/8 in.	900 (6.2, 62)	
			3/4 in.	600 (4.1, 41)	
A283xx	24 VDC	Variable Speed Brushless	3/16 in.	10,000 (69.0, 690)	 Class I, Division 2 Groups A, B, C, D
			1/4 in.	6000 (41.3, 413)	
			3/8 in.	2500 (17.2, 172)	
			1/2 in.	1250 (8.6, 86)	
			5/8 in.	900 (6.2, 62)	
			3/4 in.	600 (4.1, 41)	
A285xx	115 VAC	Variable Speed AC	3/16 in.	10,000 (69.0, 690)	
			1/4 in.	6000 (41.3, 413)	
			3/8 in.	2500 (17.2, 172)	
			1/2 in.	1250 (8.6, 86)	
			5/8 in.	900 (6.2, 62)	
			3/4 in.	600 (4.1, 41)	

Ordering Information

Wolverine Variable Speed, 12 VDC, 1/5 hp, Simplex			
Seals / Plunger Size	1/4"	3/8"	1/2"
FKM	A28102	A28101	A28100
HNBR	A28116	A28115	A28114
FFKM	A28123	A28122	A28121

Wolverine Variable Speed, 12 VDC, 1/5 hp, Duplex			
Seals / Plunger Size	1/4"	3/8"	1/2"
FKM	A28130	A28129	A28128
HNBR	A28144	A28143	A28142
FFKM	A28151	A28150	A28149

Wolverine Variable Speed, 24 VDC, 1/5 hp, Simplex			
Seals / Plunger Size	1/4"	3/8"	1/2"
FKM	A28302	A28301	A28300
HNBR	A28316	A28315	A28314
FFKM	A28323	A28322	A28321

Wolverine Variable Speed, 24 VDC, 1/5 hp, Duplex			
Seals / Plunger Size	1/4"	3/8"	1/2"
FKM	A28330	A28329	A28328
HNBR	A28344	A28343	A28342
FFKM	A28351	A28350	A28349

Wolverine Variable Speed, 115 VAC, 1/5 hp, Simplex			
Seals / Plunger Size	1/4"	3/8"	1/2"
FKM	A28502	A28501	A28500
HNBR	A28516	A28515	A28514
FFKM	A28523	A28522	A28521

Wolverine Variable Speed, 115 VAC, 1/5 hp, Duplex			
Seals / Plunger Size	1/4"	3/8"	1/2"
FKM	A28530	A28529	A28528
HNBR	A28544	A28543	A28542
FFKM	A28551	A28550	A28549

Wolverine Variable Speed Fluid Modules with Chromex Coated Plunger Rods						
Seals / Plunger Size	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"
FKM	A30300	A30400	A30500	A30600	A30700	A30800
HNBR	A30302	A30402	A30502	A30602	A30702	A30802
FKM-ETP	A30301	A30401	A30501	A30601	A30701	A30801
FFKM	A30303	A30403	A30503	A30603	A30703	A30803

Wolverine Variable Speed Fluid Modules with Ceramic Coated Plunger Rods						
Seals / Plunger Size	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"
FKM	A30310	A30410	A30510	A30610	A30710	A30810
HNBR	A30312	A30412	A30512	A30612	A30712	A30812
FKM-ETP	A30311	A30411	A30511	A30611	A30711	A30811
FFKM	A30313	A30413	A30513	A30613	A30713	A30813

Wolverine Variable Speed Drive Modules, 12 VDC, 1/11 Hp Motor						
	Simplex (50)	Simplex (70)	Duplex (55)	Duplex (75)	Duplex (57)	Duplex (77)
12 VAC	A30200	A30203	A30201	A30204	A30202	A30205
24 VAC	A30210	A30213	A30211	A30214	A30212	A30215
115 VAC	A30260	A30263	A30261	A30264	A30262	A30265

(50) Used for simplex pumps with 1/4", 3/8" and 1/2" plunger sizes.

(70) Used for simplex pumps with 3/16", 5/8" and 3/4" plunger sizes.

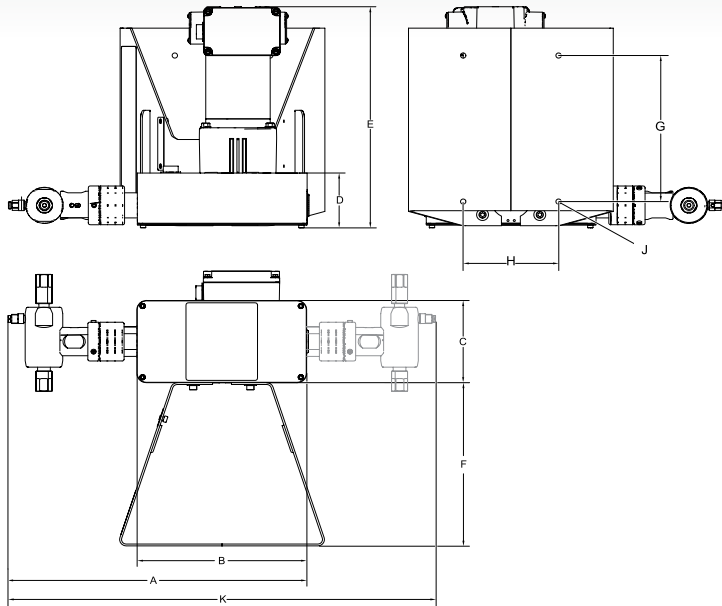
(55) Used for duplex pumps with 1/4", 3/8" and 1/2" plunger sizes.

(77) Used for duplex pumps with 3/16", 5/8" and 3/4" plunger sizes.

(57) Used for duplex pumps with 1/4", 3/8" and 1/2" plunger sizes on one side and 3/16", 5/8" and 3/4" plunger sizes on the opposite side.

(75) Used for duplex pumps with 3/16", 5/8" and 3/4" plunger sizes on one side and 1/4", 3/8" and 1/2" plunger sizes on the opposite side.

Dimensions



A	B	C	D	E	F	G	H	J	K
16.3 in. (41.4 cm)	8.9 in. (22.6 cm)	4.5 in. (11.4 cm)	2.85 in. (7.2 cm)	11.9 in. (30.2 cm)	8.9 in. (22.7 cm)	8.0 in. (20.3 cm)	5.0 in. (12.7 cm)	0.281 in. dia (0.714 cm)	23.7 in. (60.2 cm)

Configurations

Fluid Plunger Sizes

- 3/16 in (4.76 mm)
- 1/4 in (6.35 mm)
- 3/8 in (9.5 mm)
- 1/2 in (12.7 mm)
- 5/8 in (15.9 mm)
- 3/4 in (19.1 mm)

Drivetrain

- Simplex
- Duplex

Input Power Types

- 12 VDC
- 24 VDC
- 115 VAC

Electric Motor Sizes

- 1/5 hp (VDC)
- 1/5 hp (VAC)

Motor Frequency

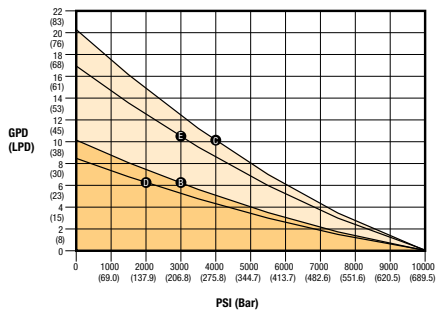
- Variable

Performance Curves

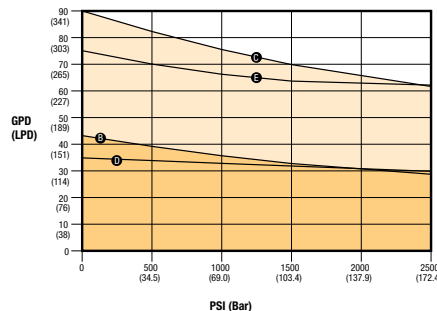
KEY

- B-DC Advanced Simplex
- C-DC Advanced Duplex
- D-AC Advanced Simplex
- E-AC Advanced Duplex

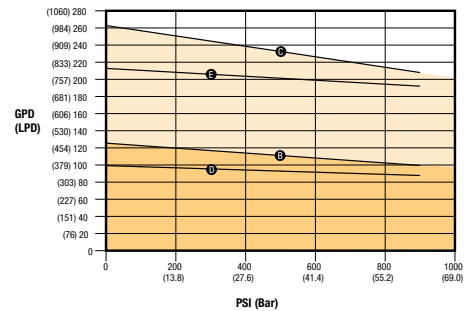
3/16 Inch Plunger



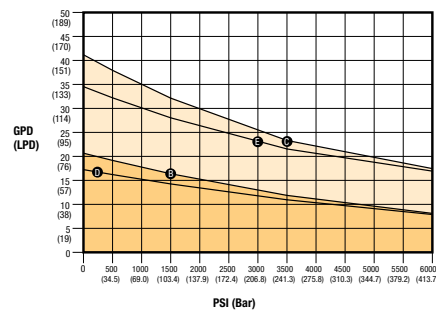
3/8 Inch Plunger



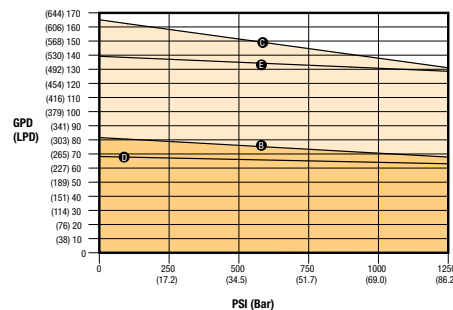
5/8 Inch Plunger



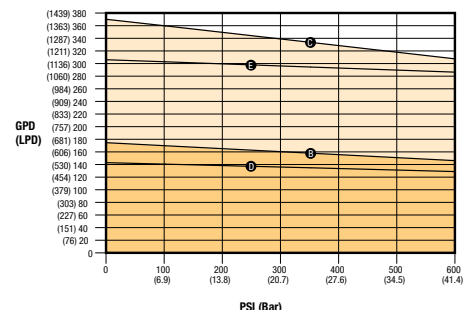
1/4 Inch Plunger



1/2 Inch Plunger



3/4 Inch Plunger



All written and visual data contained in this document are based on the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.

Call today for product information or to request a demonstration:

866.552.1868, email oilandgas@graco.com or visit us at www.graco.com.

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Harrier® + Smart Controller & Chemical Management System

Remote monitoring solutions with tank level capabilities for chemical injection systems



Graco's Harrier+ controller with remote pump control and tank level monitoring helps you reduce expenses and closely monitor your chemical injection systems! Remotely monitor and control key chemical injection system parameters like pressures, flow rates, voltage and tank levels to ensure your chemical injection system is operating efficiently.

PROVEN QUALITY. LEADING TECHNOLOGY.

Automation is Key!

Chemical treatment for wells and pipelines changes as oil and gas production shifts. Whether your chemical injection equipment is being used in upstream, midstream or downstream applications, chemicals are becoming one of the top operating expenses for field Operators and End-Users.

In order to minimize downtime, increase your production efficiency, maintain operational safety and improve data collection, **you need to automate.**



Automation alone won't deliver process reliability. You need automation that is reliable, provides diagnostics for remote monitoring and delivers the data needed to drive better decisions.

Graco's Harrier+ controller with chemical management solutions allows you to collect critical well site data. This data can then be used to improve both operational visibility and asset utilization. Armed with detailed insight into everyday operations, producers can make more informed decisions — allowing them to optimize chemical usage for the greatest yield.

Reducing Operating Expenses with Harrier+

How well are you managing your chemical usage?

Inadequate chemical management can often times lead to premature well and pipeline issues or failures. This may result in increased chemical usage or higher service and repair costs.

Graco's Harrier+ smart controller minimizes interrupted operation. It gives End-Users and Operators the ability to collect well site data, remotely control their chemical injection system, and analyze the data necessary to manage chemical usage, increase efficiency, reduce their operating expenses, and prevent revenue losses.



Product Features

- Time, Cycle and Flow run modes
- Cellular and Modbus communications
- Data management via the Harrier+ portal for cellular units
- Tank level monitoring
- Flow verification for leak detection
- Operates with DC and AC pumps
- Classified for hazardous location Class 1, Division 2, Groups A, B, C, D, T4
- CE marked for use outside of North America

Remote Monitoring



Collect, monitor, and analyze critical data either through Cellular via a web-based portal or connect to an existing SCADA system.

Chemical Management



Adjust chemical inventory based on data collected from well sites using the tank level sensor with the Harrier+ controller.

Flow Verification



Ensure chemical injection assets are properly and efficiently operating to help reduce downtime.

Saves Money



Reduce operating expenses by minimizing downtime, optimising chemical usage and increasing efficiency.

Tank Level Monitoring Solution

The Graco tank level monitor and Harrier+ combination puts tank and chemical injection information at the user's fingertip, whether on-site or 1000 miles away. Not only can you monitor your chemical usage but you can also ensure proper pump operation and verification.

How does Graco's tank level monitoring work?

The tank level sensor is a pressure transducer that connects directly into the chemical tank. The pressure is then converted to an analog signal which the Harrier+ controller correlates to a tank level. The data collected by the controller can then be tracked and manipulated via its controller portal or a connected SCADA system.

Chemical Monitoring

Ensure your chemical tank has an adequate chemical supply with real-time monitoring of your chemical tank level.



Flow Verification

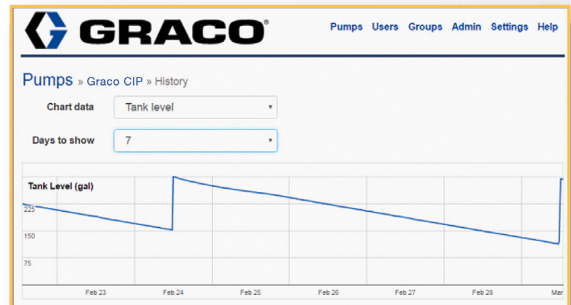
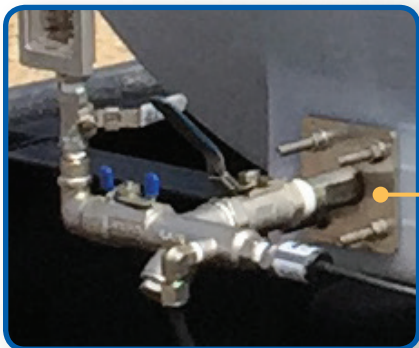
If your chemical tank level and total pump volumes do not match up within a given threshold, the Harrier+ controller will trigger an alarm.

Accurate

Once your chemical injection system is setup and properly calibrated, the accuracy between chemical volume in your tank and chemical pump output is within +/- 1%.

Tank Selection Methods

Whether you have a uniform or a custom chemical tank, the Harrier+ controller can be setup to handle any shape tank.



Harrier+ Web Portal

The Harrier+ Web Portal provides 24/7 critical well site data such as local chemical inventory information for connected chemical tanks.



Fast Payback of Cost!

Graco's Harrier + Chemical Management System Automation has quick financial payback by:

- Avoiding unnecessary trips to the well or pipeline site to check on chemical injection equipment and chemical tank levels.
- Ensuring adequate chemical volume and usage to avoid well or pipelines from freezing and plugging.
- Preventing cost of production downtime.

Justifying the cost on average to upgrade to the Graco well site automation solution is straight forward.

Average cost to
upgrade to Harrier+
Automation Solution

\$1500

**A COST OF
ONLY 6 TRIPS
TO THE FIELD!**

Based on an average \$250
per trip to one well site



Reliable. Remote. Reduce.

Built for reliable 24/7 service in tough remote areas while reducing the cost of operations by eliminating the need for on-site monitoring.

Example of a System Configuration

NEMA Rated Harrier+ Control Box

The Harrier+ controller includes remote connectivity, allowing you to monitor, control and optimize your system away from your injection site.

Solar Panels

Class 1, Division 2 panels for Hazardous Location and panels for General Purpose applications.

Wolverine

Chemical Injection Electric Pump
UL recognized,
Class 1, Div. 1 and
Class 1, Div. 2 options

Pressure Sensor

Output pressure changes will be read by the Harrier+ controller and will trigger notification alarms.

Tank Level Sensor

Pressure transducer that sends an analog signal to the Harrier+ controller.

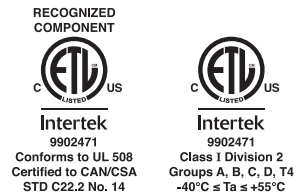
NEMA Rated Battery Boxes

Separate two-battery NEMA boxes for solar applications.

Technical Specifications

Harrier+ Chemical Injection Controllers

Operating Mode	Inputs
Time (ON/OFF)	Pump cycle counter for FLOW mode
Cycle (ON cycles & OFF time)	Battery voltage monitor
Flow (Adaptive Flow Control)	Auxiliary RUN enable/disable
Analog Flow (based on 4-20 mA input)	Alarm input switch #1 (configurable: normally open or closed)
	Alarm input switch #2 (configurable: normally open or closed)
	Pressure transducer (6,000 psi)
	Analog in 4-20 mA to control injection rate
	Temperature
	Tank level monitor
Tank Level Monitor	Outputs
Real time monitor	Analog out (configuration: 4-20 mA or 0-10 VDC)
Any tank shape	Pump control (AC or DC)
Customizable alarms and notifications	
Multiple tanks	
Flow accuracy and verification	
Displays	Communications
Current volume	Cellular
Maximum volume	Modem types: GSM USA, CDMA, GSM Global
Membrane Material	Remote operation and rate adjustment
	Historical charts (pumping rate/day, battery voltage, fluid pressure, monthly report, tank level)
	Configurable email notifications, alarms and maintenance reminders
Electric Ratings	SCADA
Durable solid state switching	Modbus communication
Voltage input	
9 to 26 VDC	
100 to 240 VAC (50/60 Hz)	
Pump output	
25 amps DC	
5 amps @ 120 VAC	
3 amps @ 240 VAC	



Ordering Information

DC Operated Harrier+ Controller

Kit No.	Description
B32627	Harrier+ Controller, DC Power, Cellular – USA only
B32629	Harrier+ Controller, DC Power, Cellular – Global (<i>limited use in USA</i>)
B32631	Harrier+ Controller, DC Power, SCADA via Modbus
B32643	Harrier+ Controller, DC Power, CDMA

Tank Level Monitor Parts and Kits

Kit No.	Description
B32771	Tank Level Kit (includes 14 ft. wire harness and sensor)
B32773	Tank Level Wire Harness Kit (14 ft. long)
B32868	Tank Level Wire Harness Kit (28 ft. long)
B32849	Tank Level Sensor Only Kit

AC Operated Harrier+ Controller

Kit No.	Description
B32628	Harrier+ Controller, AC Power, Cellular – USA only
B32630	Harrier+ Controller, AC Power, Cellular – Global (<i>limited use in USA</i>)
B32632	Harrier+ Controller, AC Power, SCADA via Modbus
B32644	Harrier+ Controller, AC Power, CDMA

Accessories

Kit No.	Description
B32699	Harrier+ High Gain Antenna



ABOUT GRACO

PROVEN QUALITY. LEADING TECHNOLOGY.

Founded in 1926, Graco is a world leader in fluid handling systems and components. Graco products move, measure, control, dispense and apply a wide range of fluids and viscous materials used in vehicle lubrication, commercial and industrial settings.

The company's success is based on its unwavering commitment to technical excellence, world-class manufacturing and unparalleled customer service. Working closely with qualified distributors, Graco offers systems, products and technology that set the quality standard in a wide range of fluid handling solutions. Graco provides equipment for spray finishing, protective coating, paint circulation, lubrication, and dispensing sealants and adhesives, along with power application equipment for the contractor industry. Graco's ongoing investment in fluid management and control will continue to provide innovative solutions to a diverse global market.

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