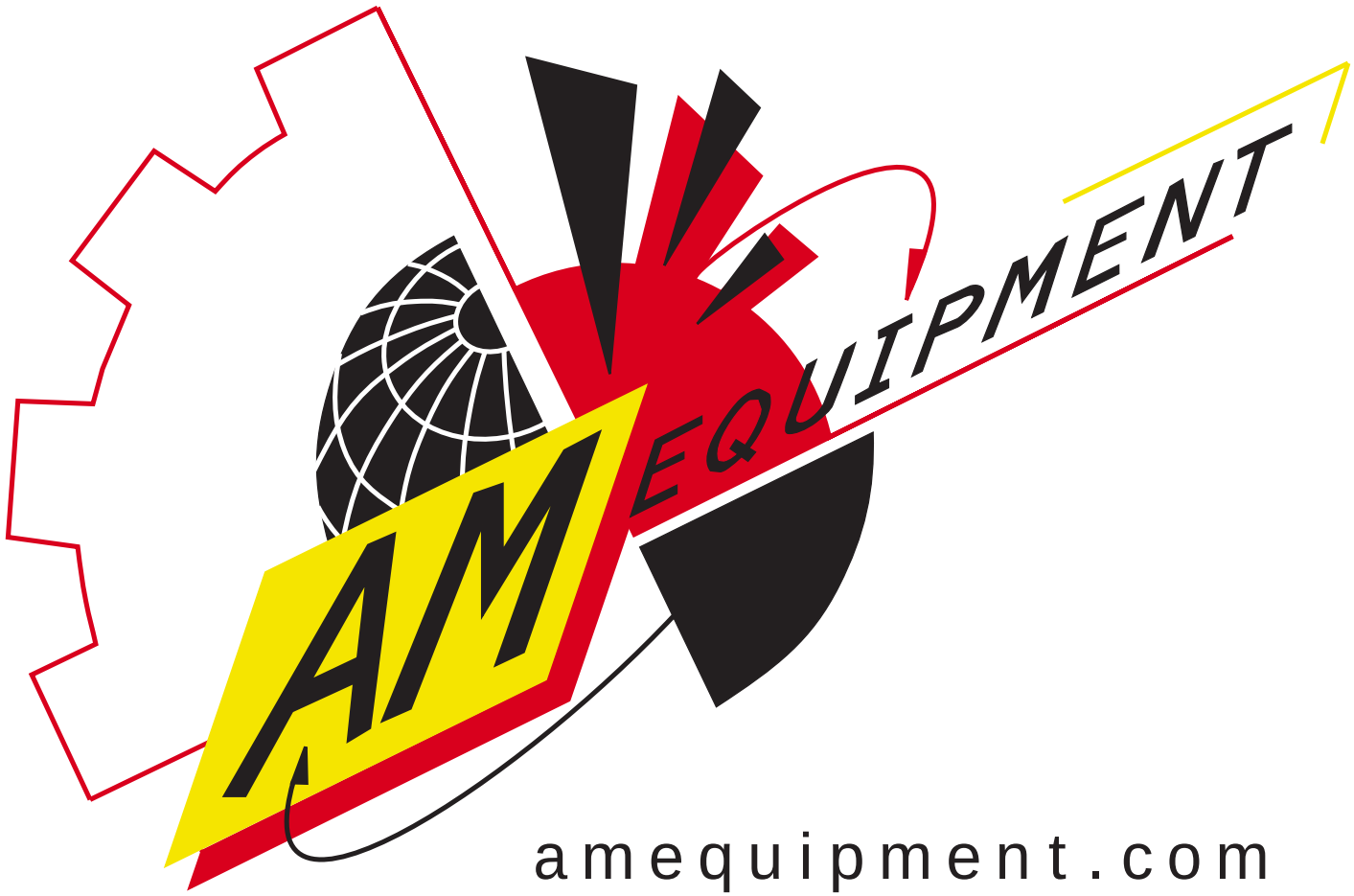


amequipment.com

Phone: (541) 327-1546 FAX: (541) 327-3480

AM Equipment President, Ted Powell

amequipment.com

“Quality is our driving force.

In a world of many choices, AM Equipment manufactures electric motors and motor systems that are the power within the finest vehicles and machines made today. Since 1953, AM Equipment has offered the best in technology development, production, and cost reduction. I personally invite you to look at our products and to contact us. We are here for *your* service.”

Our Mission

AM Equipment supplies wiper systems, motor systems, and electrical components for recreational, industrial, marine, heavy trucking, and mass-transit vehicles world-wide. AM Equipment is committed to the improvement of all its processes and to increasing product value while decreasing cost. We, at AM Equipment, hold ourselves accountable to our customers and to the successful application and continued use of all our products.

AM Equipment’s facilities are located in Oregon’s beautiful Willamette Valley. The Jefferson, Oregon location is set amongst old-growth pines and surrounded by the pleasant rural Oregon atmosphere.

Phone: (541) 327-1546 FAX: (541) 327-3480

Our History

- Albany Magneto was founded in 1953 as an auto- electric and small engine and equipment dealership in Albany, Oregon.
- In 1987, Albany Magneto Equipment started doing business as "AM Equipment" and gave up small engine parts to focus on whole-saling auto-electric and wiper products to aftermarket and OEM accounts.
- In 1995, the company focused on value-added wiper products supported by team-oriented customer service. AM Equipment also added a Fractional Horsepower Motors Department and a Parts Distribution Center for aftermarket replacement parts.
- In May of 1996, AM Equipment moved into its present facilities in Jefferson, Oregon (402 East Hazel St.).
- In 1999, AM Equipment began to develop its own manufacturing of core product components.
- In 2001, AM Equipment was furnishing motors and systems completely made from its own components.
- In May of 2002, AM Equipment obtained ISO 9001-2000 certification.
- In 2003, AM Equipment added Plant 2 to its facilities.

A mechanized, ergonomic work-cell was designed in-house for our innovative new Two-Pivot wiper system, the *2P.*

AM Equipment's R&D department has an on-site SAE standard wet-testing lab.

Phone: (541) 327-1546 FAX: (541) 327-3480

PERRY JOHNSON REGISTRARS, INC.

Certificate of Registration

Perry Johnson Registrars, Inc., has assessed the Quality Management System of:

AM Equipment
402 East Hazel, Jefferson, OR 97352 United States

(Hereinafter called the Organization) and hereby declares that Organization is in conformance with:

ISO 9001:2000

This Registration is in respect to the following scope of supply:

Design, Manufacture and Assembly of Windshield Wiper Systems and Fractional Horsepower Motors

Such products shall be manufactured by the Organization at, or such processes or services shall be offered at or from, only the address given above. This Registration is granted subject to the system rules governing the Registration referred to above, and the Organization hereby covenants with the Assessment body duty to observe and comply with the said rules.

For PJR:

Terry Boboige

Terry Boboige, President

Perry Johnson Registrars, Inc. (PJR)
26555 Evergreen, Suite 1340
Southfield, Michigan 48076
(248) 358-3388

UKAS QUALITY MANAGEMENT 105

MGMT. SYS. RvA C118

ANAB ACCREDITED

PERRY JOHNSON REGISTRARS, INC.

The validity of this certificate is mandated through ongoing surveillance.

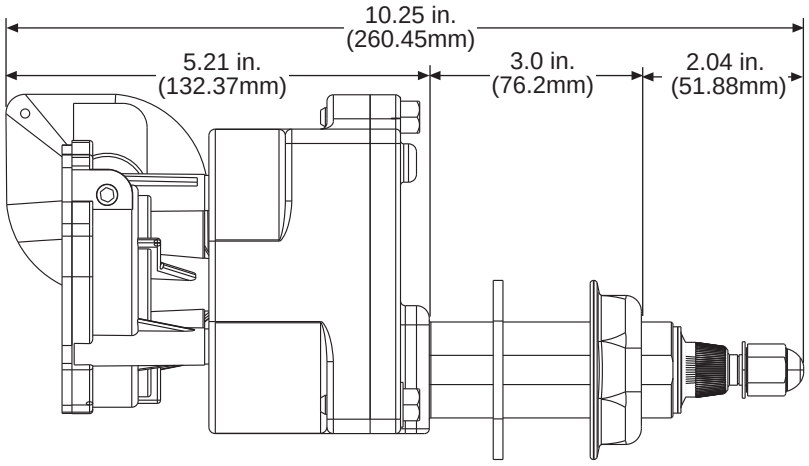
Effective Date:	Expiration Date:	Certificate No:
July 7, 2008	July 6, 2011	C2008-01507

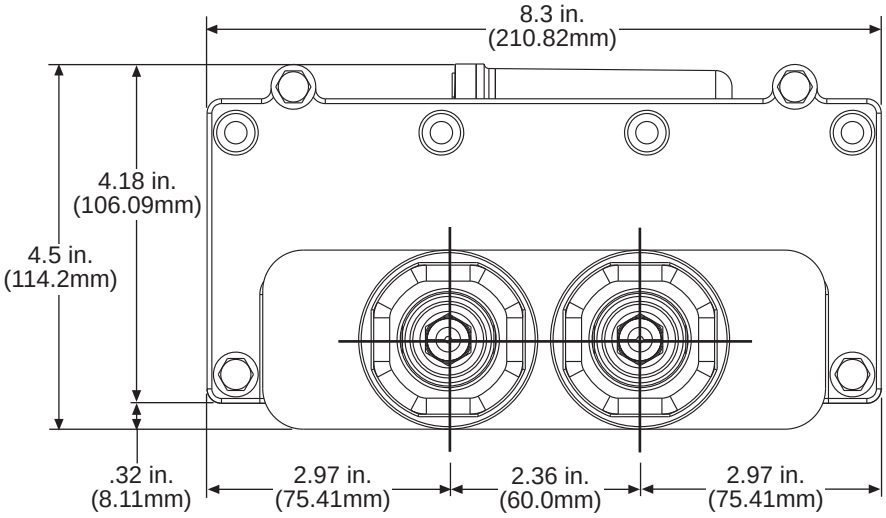
Double Driver Pantograph Wiper System

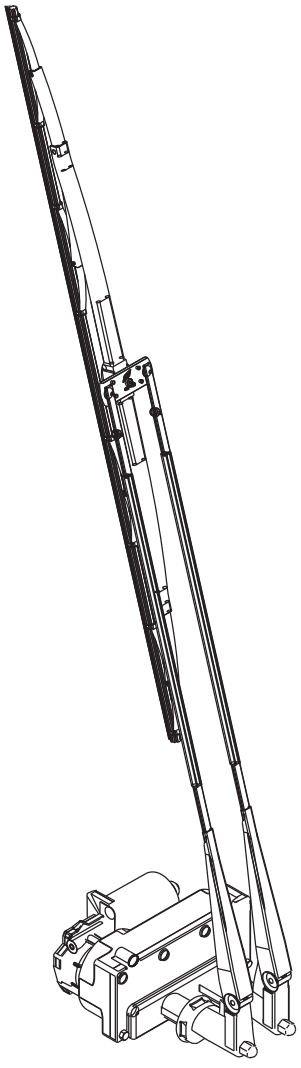
amequipment.com

2D

- Heavy-duty, industrial design
- Ideal for large glass pantograph wiper systems
- Dampened motion for smooth performance and durability
- Internal mechanism generates less friction than traditional systems
- Stronger, bigger 17mm pivot shaft with needle bearings
- Twin-driven wiper arm drives single blade in both directions
- Nominal sweep angles available from 55° to 80°
- Capable of driving up to 38 in. (960mm) arms and 48 in. (1200mm) blades
- Powerful and adaptable bolt-on unit
- Compact size fits in current installation space
- May be mounted right-side-up or upsidedown
- Fully enclosed casing for safety and for protection from weather and foreign objects
- Powered by a 38Nm dynamic park motor
- Available in 12V and 24V, and low and high-side switched
  *Optional stainless steel pivot shaft







Pivot Body Diameter:
1.13 in. (28.6mm)

Patents Applied For

Available Arm Lengths	
27 in. (690mm)	32 in. (810mm)
28 in. (710mm)	33 in. (840mm)
29 in. (730mm)	34 in. (860mm)
30 in. (760mm)	35 in. (890mm)
31 in. (790mm)	36 in. (915mm)

Available Blade Lengths
28 in. (700mm)
32 in. (800mm)
36 in. (900mm)
40 in. (1000mm)
45 in. (1150mm)

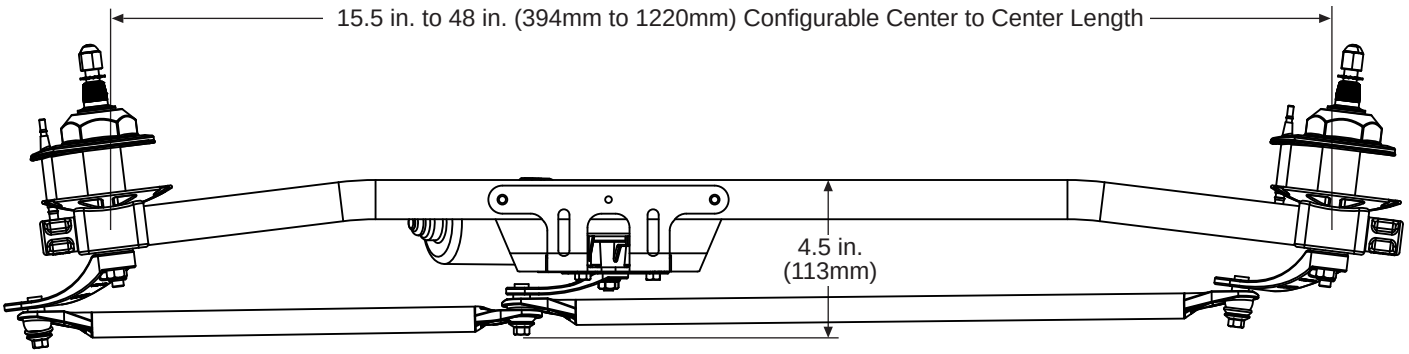
Phone: (541) 327-1546 FAX: (541) 327-3480

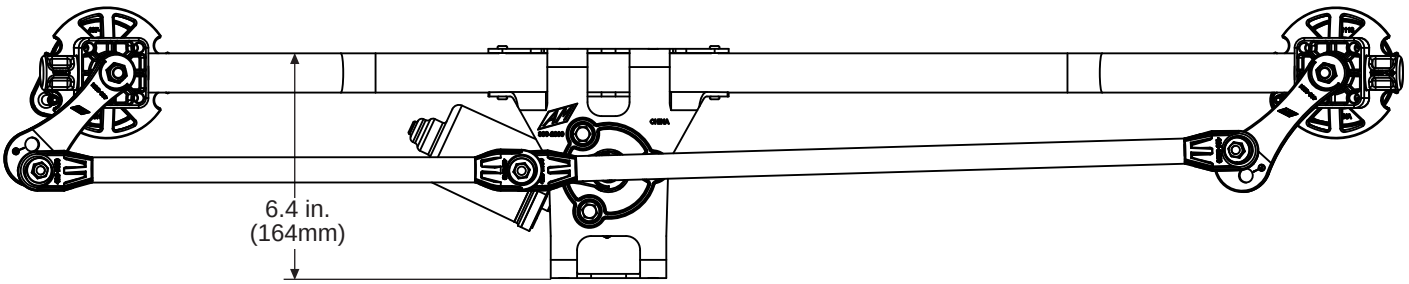
Two Pivot Radial Wiper System

amequipment.com

2P

- Unique tubular tandem radial wiper system
- Supports up to 30 in. (760mm) arms and 32 in. (800mm) blades
- Sweep angles available from 73° to 106°
- Configurable for the majority of cap designs
- Stringer angles made to accommodate cap radius
- Exceeds SAE standard durability tests
- Tubular steel stringer available from 15.5 in. (394mm) to 48 in. (1220mm) in center to center length
- Adjustable support brackets
- Cast steel motor-mount bracket can be positioned in different locations to circumvent obstacles
- Bigger, stronger 17mm pivot shaft with needle bearings and cast aluminum housing
- Cast steel pivot shaft lever and drive arm provide better control and minimize pattern growth
- Stacking delrin link ends fit 16mm spherical bearings to minimize cantilever forces and friction
- Disc mounting system allows ease of installation and minimizes distortion of fiberglass cap
- 3.6 in. (91.5mm) self-adjusting inner support disc adapts to manufacturers' variations in cap radius
- 3.84 in. (97.5mm) outer disc incorporates bulkhead fitting for cleaner appearance
- Powered by a heavy-duty 38Nm dynamic park motor for less amp draw
- Available in 12V or 24V and low or high side switched





Pivot Body Diameter:
1.13 in. (28.6mm)

Patents Applied For

Phone: (541) 327-1546 FAX: (541) 327-3480

2P Radial Hookslot Arms

amequipment.com

2P

- For use with 2P tandem radial wiper system
- Hookslot connector for quick blade installation
- Heavy duty design
- “Three-tower” ajustable washer nozzle
- Available in 27” (685), 29” (735), and 30” (760) lengths
- Arm bend available in 16° and 33°

Hookslot Arm with 16° Bend	
Part #	Arm length*
345-0227	27” (685)
345-0229	29” (735)
345-0230	30” (760)

Hookslot Arm with 33° Bend	
Part #	Arm length*
345-0127	27” (685)
345-0129	29” (735)
345-0130	30” (760)

*Arm length is measured from center of installed blade to center of pivot shaft mounting hole

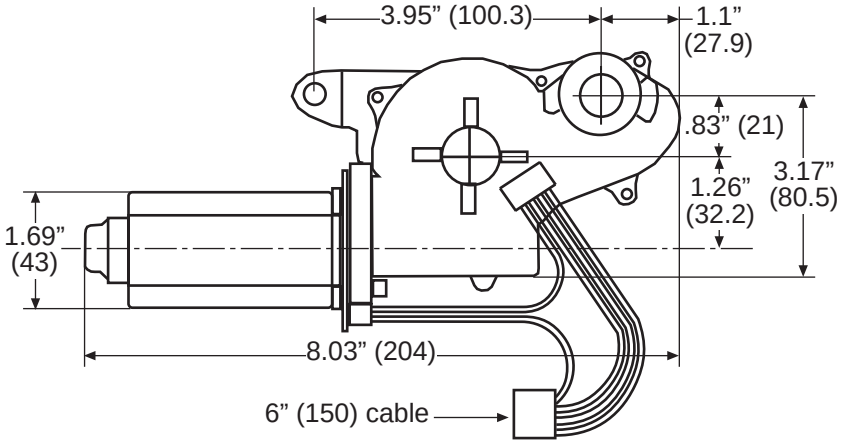
Frameless Blades

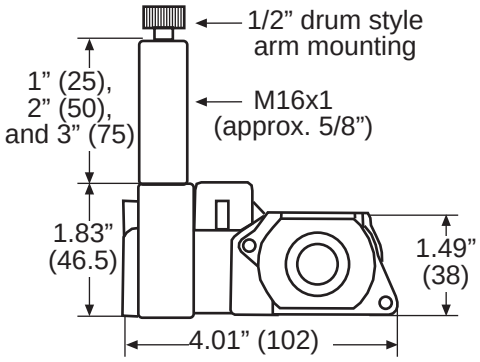
- For use with hookslot style arm
- Aerodynamic, lightweight, one-piece design
- Corrosion resistant, all-season blade
- Available in up 32” (800 mm) lengths

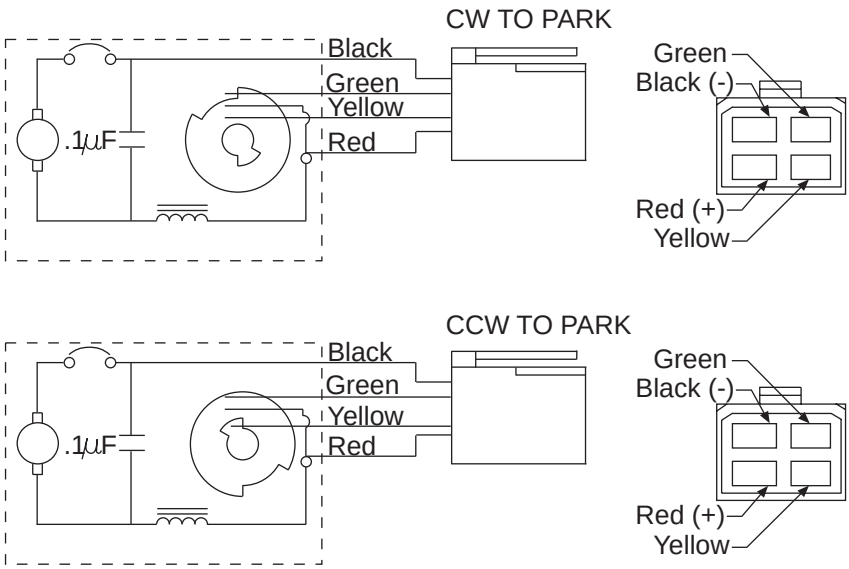
208 Series Oscillating Wiper Motor

amequipment.com

- 8 Nm (see conversion table on reference information page)
- Available in 65°, 85°, 100°, or 110° sweep angles
- Configurable for clockwise or counterclockwise park by changing terminal location in mating wiring harness
- Standard RFI suppression and circuit breaker
- 1” (25 mm), 2” (50 mm), and 3” (75 mm) pivot shaft lengths available
- Brass pivot body
- Stainless steel pivot shaft
- Marine grade specification
- Available in 12V or 24V







Mating block #317-1065
Mating terminals #317-1055

CW to park		CCW to park	
PK	(-)	NU	(-)
NU	(+)	PK	(+)

NU = not used
PK = park
(-) = ground
(+) = battery

Phone: (541) 327-1546 FAX: (541) 327-3480

801-1026 Rev. 2 03/06

208 Series Wiper Motor Part Numbers

- Technical assistance is available for additional information

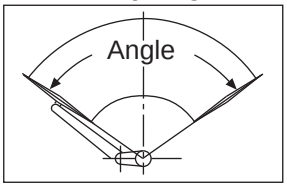
amequipment.com

12V motors			
Part #	Shaft length	Sweep angle	Max arm/blade*
208-2003	1” (25)	110°	15” (380)/ 15” (380)
208-2203	2” (50)		
208-2403	3” (75)		
208-2002	1” (25)	100°	16” (400)/ 16” (400)
208-2202	2” (50)		
208-2402	3” (75)		
208-2001	1” (25)	85°	17” (430)/ 17” (430)
208-2201	2” (50)		
208-2401	3” (75)		
208-2000	1” (25)	65°	18” (450)/ 18” (450)
208-2200	2” (50)		
208-2400	3” (75)		

24V motors			
Part #	Shaft length	Sweep angle	Max arm/blade*
208-2103	1” (25)	110°	15” (380)/ 15” (380)
208-2303	2” (50)		
208-2503	3” (75)		
208-2102	1” (25)	100°	16” (400)/ 16” (400)
208-2302	2” (50)		
208-2502	3” (75)		
208-2101	1” (25)	85°	17” (430)/ 17” (430)
208-2301	2” (50)		
208-2501	3” (75)		
208-2100	1” (25)	65°	18” (450)/ 18” (450)
208-2300	2” (50)		
208-2500	3” (75)		

* Warning: Maximum arm and blade length combinations are based upon 1.5 oz. of pressure per inch of blade length (.17N/cm). Applications may vary. Arms may be radial or pantograph.

Sweep angle



Parts included with 208 motor listed below for replacement.
407-1065 Brass nut
407-1067 Rubber washer
407-1066 Stainless washer
315-1010 Hardware kit includes: # 407-1065 # 407-1067 # 407-1066

Terminal voltage	Rated voltage	12V/24V
	Test voltage	13.5V/27.0V
No load	Current	2A Max/1.0A
	Start voltage	10V Max
	Temp. rise	40˚C Max
Load	Oper. speed	34-39 CPM
	Current	3A Max/1.5A
Lock	Torque	8±1Nm
	Current	10±0.5A

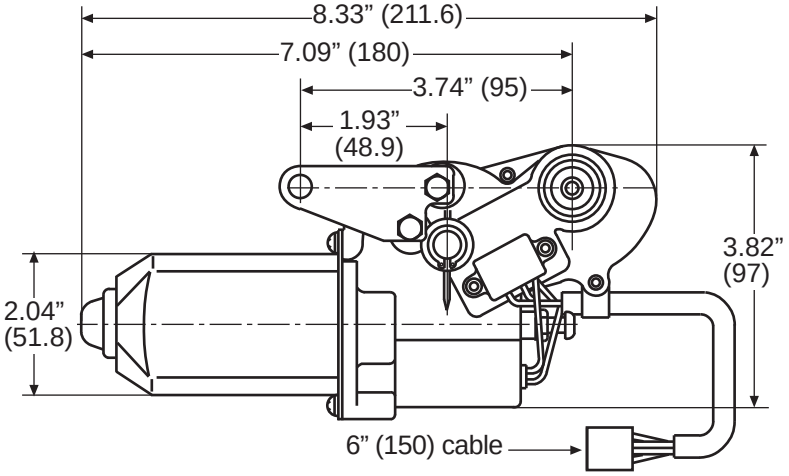
Phone: (541) 327-1546 FAX: (541) 327-3480

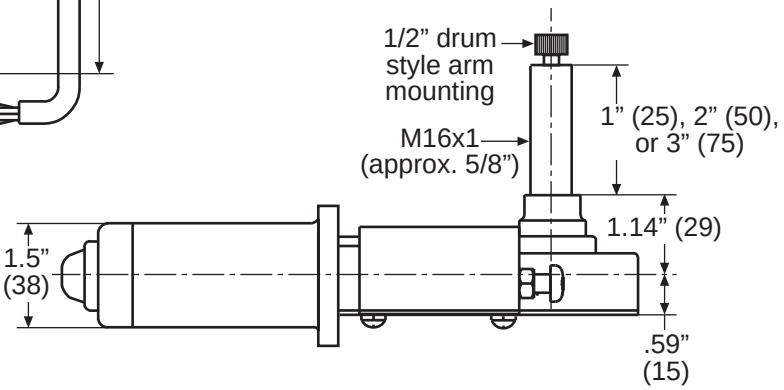
801-1026 Rev. 2 03/06

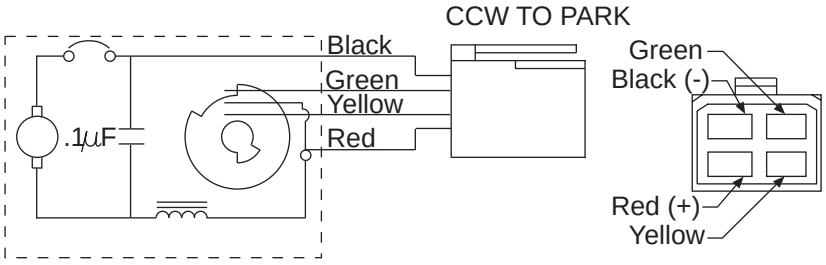
212 Series Oscillating Wiper Motor

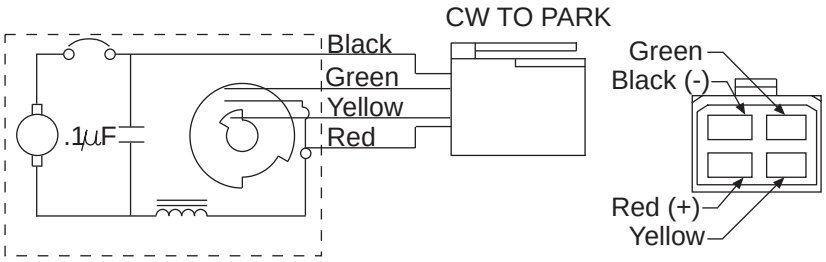
amequipment.com

- 12 Nm (see conversion table on reference information page)
- Available in 65°, 85°, 100°, or 110° sweep angles
- Configurable for clockwise or counterclockwise park by changing the terminal location in the mating wiring harness
- Standard RFI suppression and circuit breaker
- 1” (25 mm), 2” (50 mm), and 3” (75 mm) pivot shaft lengths available
- Brass pivot body
- Stainless steel pivot shaft
- Marine gradespecifications
- Available in 12V and 24V



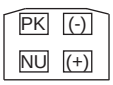




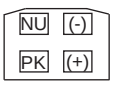


Mating block #317-1065
Mating terminals #317-1055

CCW to park



CW to park



NU = not used
PK = park
(-) = ground
(+) = battery

Phone: (541) 327-1546 FAX: (541) 327-3480

801-1028 Rev. 2 03/06

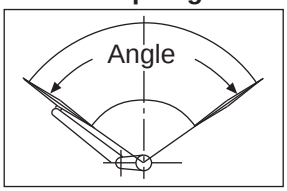
212 Series Wiper Motor Part Numbers

- Technical assistance is available for additional information

amequipment.com

12V motors			
Part #	Shaft length	Sweep angle	Max arm/blade*
212-2003	1” (25)	110°	18” (460)/ 18” (460)
212-2203	2” (50)		
212-2403	3” (75)		
212-2002	1” (25)	100°	19” (480)/ 19” (480)
212-2202	2” (50)		
212-2402	3” (75)		
212-2001	1” (25)	85°	20” (500)/ 20” (500)
212-2201	2” (50)		
212-2401	3” (75)		
212-2000	1” (25)	65°	22” (550)/ 22” (550)
212-2200	2” (50)		
212-2400	3” (75)		

Sweep angle



Parts included with 212 motor listed below for replacement.
407-1065 Brass nut
407-1067 Rubber washer
407-1066 Stainless washer
315-1010 Hardware kit includes: # 407-1065 # 407-1067 # 407-1066

24V motors (special order)			
Part #	Shaft length	Sweep angle	Max arm/blade*
212-2103	1” (25)	110°	18” (460)/ 18” (460)
212-2303	2” (50)		
212-2503	3” (75)		
212-2102	1” (25)	100°	19” (480)/ 19” (480)
212-2302	2” (50)		
212-2502	3” (75)		
212-2101	1” (25)	85°	20” (500)/ 20” (500)
212-2301	2” (50)		
212-2501	3” (75)		
212-2100	1” (25)	65°	22” (550)/ 22” (550)
212-2300	2” (50)		
212-2500	3” (75)		

* Warning: Maximum arm and blade length combinations are based upon 1.5 oz. of pressure per inch of blade length (.17N/cm). Applications may vary. Arms may be radial or pantograph.

Terminal voltage	Rated voltage	12V/24V
	Test voltage	13.5V/27.0V
No load	Current	2.5A Max/1.25A
	Start voltage	10V Max
	Temp. rise	40˚C Max
Load	Oper. speed	40-45 CPM
	Current	4A Max/2.0A
Lock	Torque	12±1Nm
	Current	15±0.5A

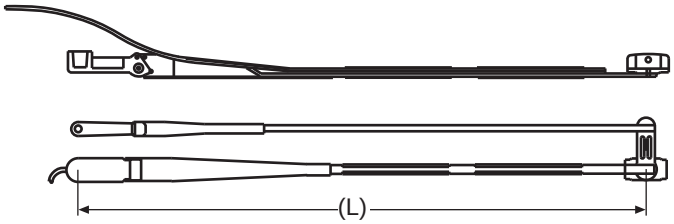
Phone: (541) 327-1546 FAX: (541) 327-3480

801-1028 Rev. 2 03/06

208 & 212 Series Pantograph Wiper Arms

- Made of corrosion-resistant stainless steel flatwire
- Flip back for cleaning
- Includes blade mounting bolt (402-1111) and nut (402-1112)

amequipment.com

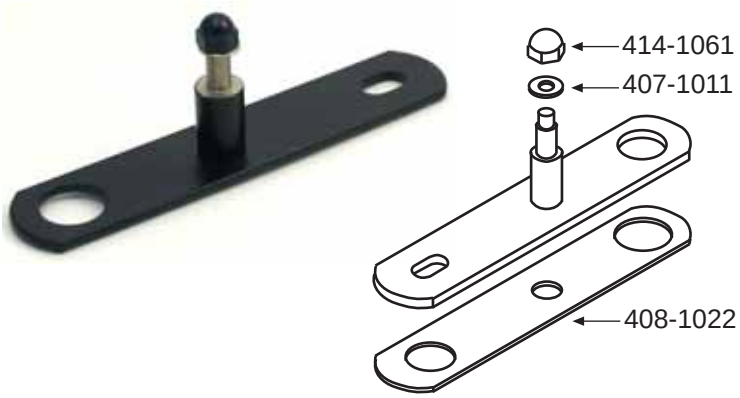


208 Pantograph arms, wet	
Part #	Arm length (L)
341-3140	14” (355)
341-3150	15” (380)
341-3160	16” (405)
208 Pantograph arms, dry	
Part #	Arm length (L)
341-1140	14” (355)
341-1150	15” (380)
341-1160	16” (405)

212 Pantograph arms, wet		212 Pantograph arms, dry	
Part #	Arm length (L)	Part #	Arm length (L)
341-3140	14” (355)	341-1140	14” (355)
341-3150	15” (380)	341-1150	15” (380)
341-3160	16” (405)	341-1160	16” (405)
341-3170	17” (430)	341-1170	17” (430)
341-3180	18” (455)	341-1180	18” (455)
341-3190	19” (483)	341-1190	19” (483)
341-3200	20” (508)	341-1200	20” (508)
341-3210	21” (533)	341-1210	21” (533)
341-3220	22” (559)	341-1220	22” (559)

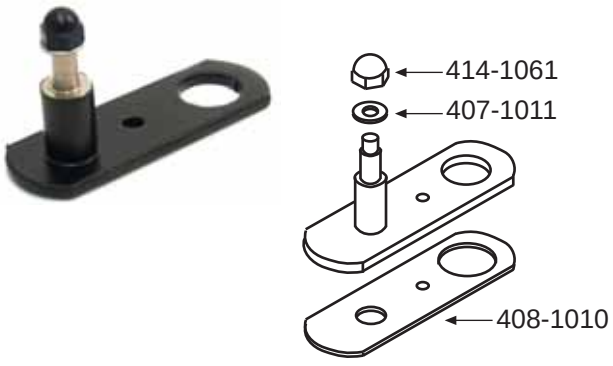
*To convert dry arms to wet arms, use wet kit: part #313-1008

Pantograph adapter for mounting with through-bolt in fiberglass and glass



Pantograph adapter kit 305-1021 includes adapter,cap nut (414-1061), washer (407-1011), and gasket (408-1022)

Pantograph adapter for mounting in metal with self-tapping screw



Pantograph adapter kit 305-1015 includes adapter,cap nut (414-1061), washer (407-1011), and gasket (408-1010)

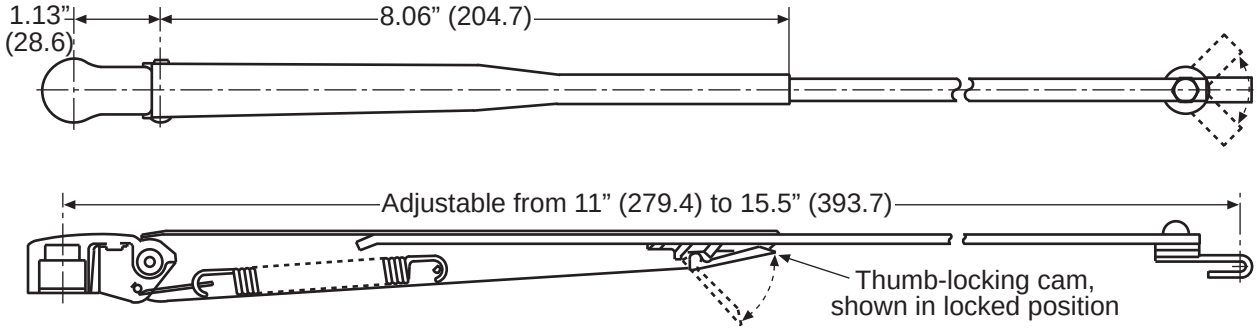
Phone: (541) 327-1546 FAX: (541) 327-3480

801-1027 Rev. 5 11/07

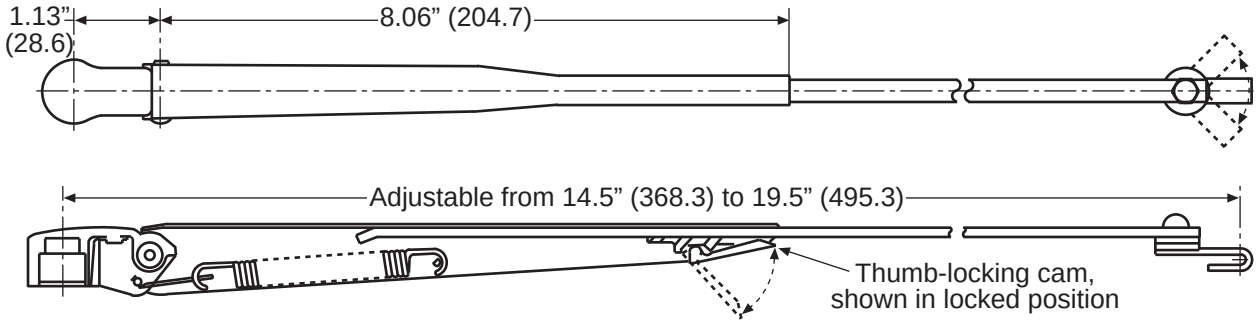
208 & 212 Series Adjustable Radial Wiper Arms

- Made of corrosion-resistant stainless steel flatwire
- Flip back for cleaning
- Hook blade connection
- Rotatable head
- Black finish
- Two sizes available
- Compatible with 208 and 212 motors
- Also available for 230 series motors

Part #341-5001 (for 230 series motors use part #301-5003)



Part #341-5002 (for 230 series motors use part #301-5004)

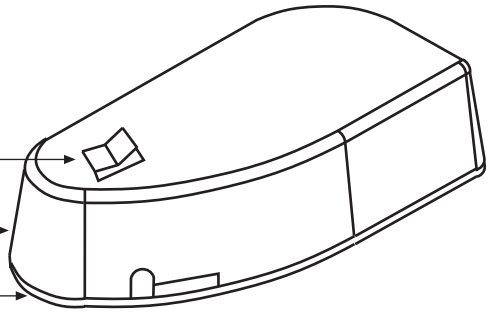


Graphite black motor cover for 208 & 212 motors

334-1008 assembly includes:
334-1006 cover
334-1007 base plate
310-1066 switch with wire harness

334-1009 assembly includes:
334-1006 cover
334-1007 base plate

334-1012 assembly: same as 334--1009 only in Sand color.



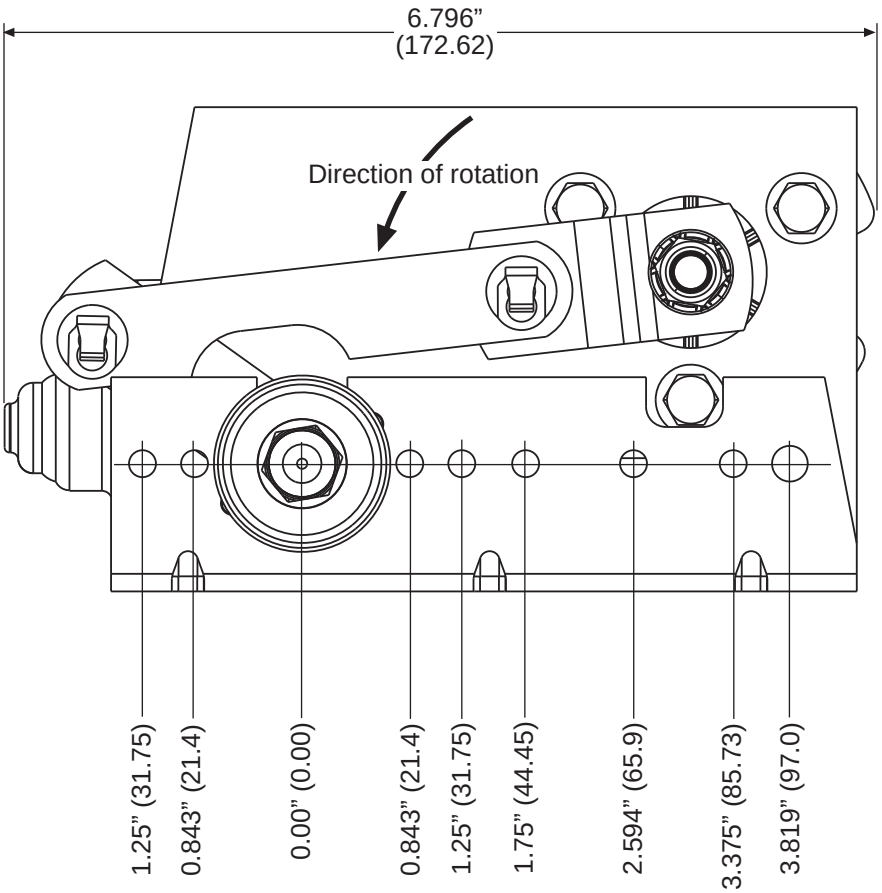
Phone: (541) 327-1546 FAX: (541) 327-3480

801-1027 Rev. 5 11/07

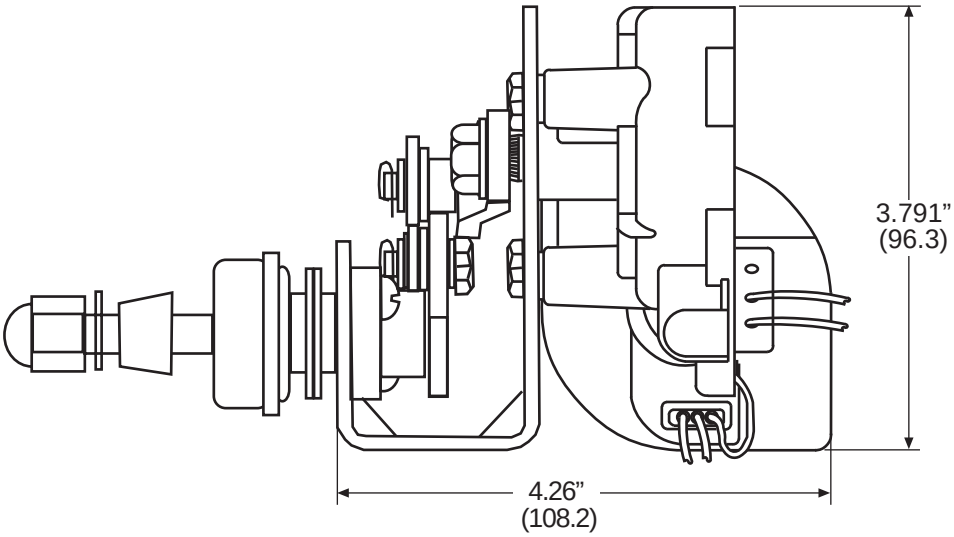
230 Series Standard Left Hand Unitized Assembly

amequipment.com

- Sweep angles available from 36° to 118°
- Drives arms and blades up to 28” (700 mm)
- Configurable for radial or pantograph arms
- Available in 12V and 24V
- Powerful, adaptable, bolt-on unit
- May be mounted up, down, sideways, or diagonally



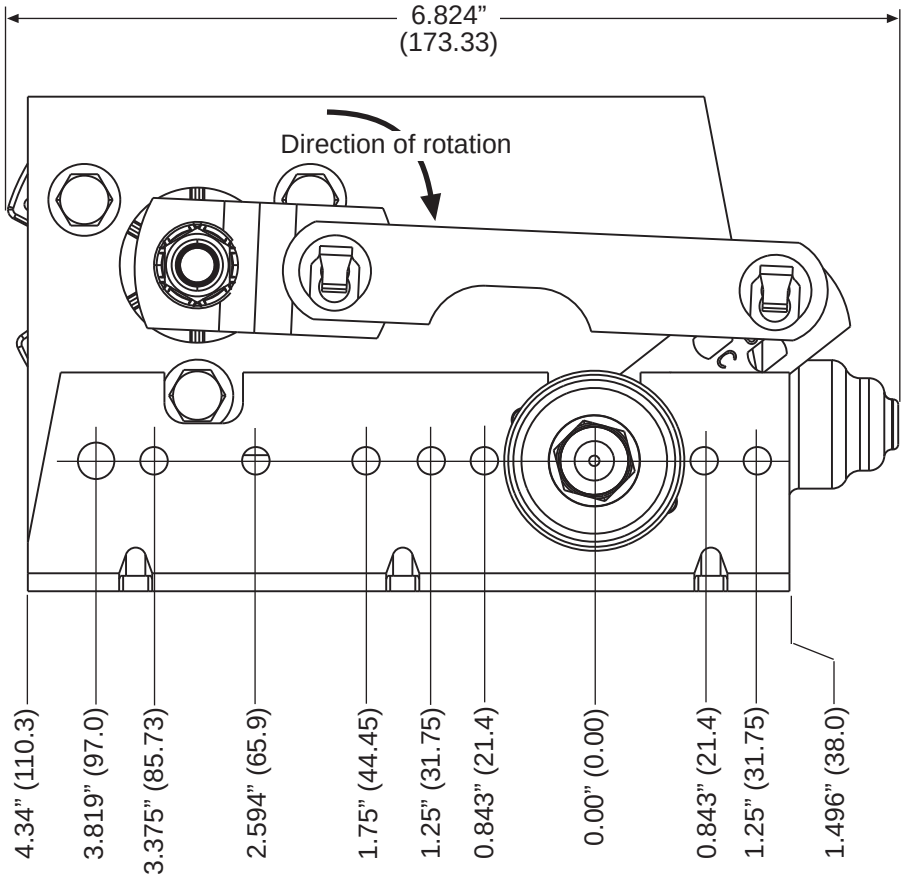
Shown in CCW to park position



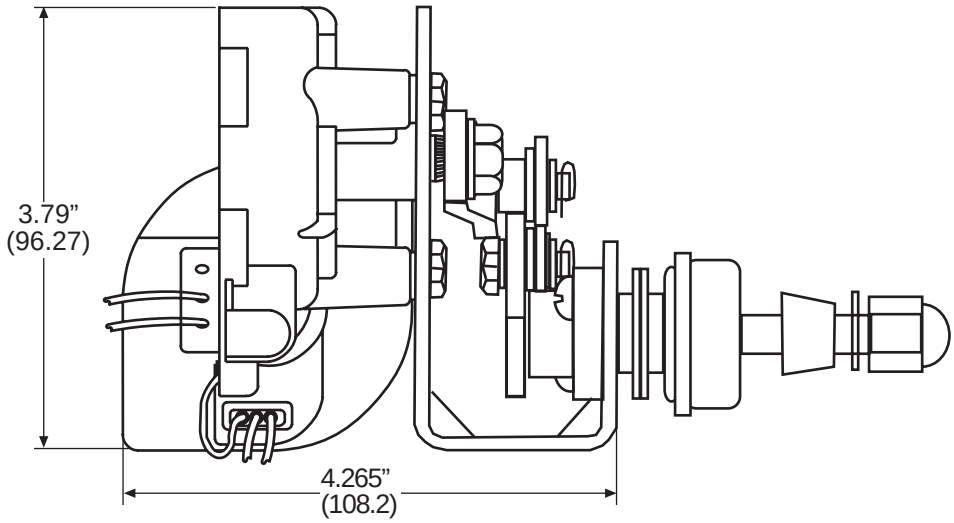
Phone: (541) 327-1546 FAX: (541) 327-3480

230 Series Right Hand Unitized Assembly

- Sweep angles available from 36° to 118°
- Drives arms and blades up to 28” (700 mm)
- Configurable for radial or pantograph arms
- Available in 12V and 24V
- Powerful, adaptable, bolt-on unit
- May be mounted up, down, sideways, or diagonally



Shown in CW to park position



Phone: (541) 327-1546 FAX: (541) 327-3480

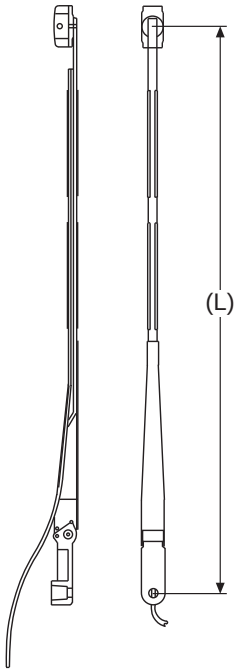
230 Series Radial and Pantograph Wiper Arms

- Made of corrosion-resistant stainless steel flatwire

*Pantograph arms require a pantograph adapter and bridge
**On all arms, specify length and wet or dry

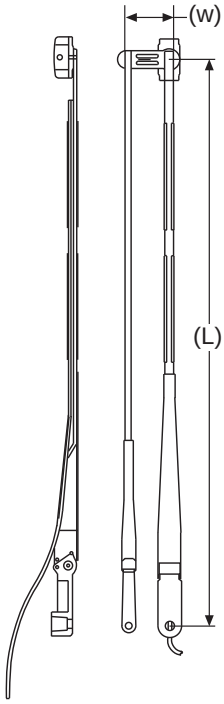
amequipment.com

Radial arms, dry	
Part #	Length L
301-0140	14” (355)
301-0150	15” (380)
301-0160	16” (405)
301-0170	17” (430)
301-0180	18” (455)
301-0190	19” (485)
301-0200	20” (510)
301-0210	21” (535)
301-0220	22” (560)
301-0230	23” (585)
301-0240	24” (610)
301-0250	25” (635)
301-0260	26” (660)
301-0270	27” (685)
301-0280	28” (710)



Radial arms, wet	
Part #	Length L
301-7140	14” (355)
301-7150	15” (380)
301-7160	16” (405)
301-7170	17” (430)
301-7180	18” (455)
301-7190	19” (485)
301-7200	20” (510)
301-7210	21” (535)
301-7220	22” (560)
301-7230	23” (585)
301-7240	24” (610)
301-7250	25” (635)
301-7260	26” (660)
301-7270	27” (685)
301-7280	28” (710)

Pantograph arms, dry	
Part #	Arm length L/ bridge width W
301-1140	14” (355)/ 1.25”
301-1150	15” (380)/ 1.25”
301-1160	16” (405)/ 1.25”
301-1170	17” (430)/ 1.25”
301-1180	18” (455)/ 1.25”
301-1190	19” (485)/ 1.25”
301-1200	20” (510)/ 1.25”
301-1210	21” (535)/ 1.25”
301-1220	22” (560)/ 1.25”
301-1230	23” (585)/ 1.25”
301-1240	24” (610)/ 1.25”
301-1250	25” (635)/ 1.25”
301-1260	26” (660)/ 1.25”
301-1270	27” (685)/ 1.25”
301-1280	28” (710)/ 1.25”
301-2240	24” (610)/ 1.75”
301-2250	25” (635)/ 1.75”
301-2260	26” (660)/ 1.75”
301-2270	27” (685)/ 1.75”
301-2280	28” (710)/ 1.75”



Pantograph arms, wet	
Part #	Arm length L/ bridge width W
301-3140	14” (355)/ 1.25”
301-3150	15” (380)/ 1.25”
301-3160	16” (405)/ 1.25”
301-3170	17” (430)/ 1.25”
301-3180	18” (455)/ 1.25”
301-3190	19” (485)/ 1.25”
301-3200	20” (510)/ 1.25”
301-3210	21” (535)/ 1.25”
301-3220	22” (560)/ 1.25”
301-3230	23” (585)/ 1.25”
301-3240	24” (610)/ 1.25”
301-3250	25” (635)/ 1.25”
301-3260	26” (660)/ 1.25”
301-3270	27” (685)/ 1.25”
301-3280	28” (710)/ 1.25”
301-4240	24” (610)/ 1.75”
301-4250	25” (635)/ 1.75”
301-4260	26” (660)/ 1.75”
301-4270	27” (685)/ 1.75”
301-4280	28” (710)/ 1.75”

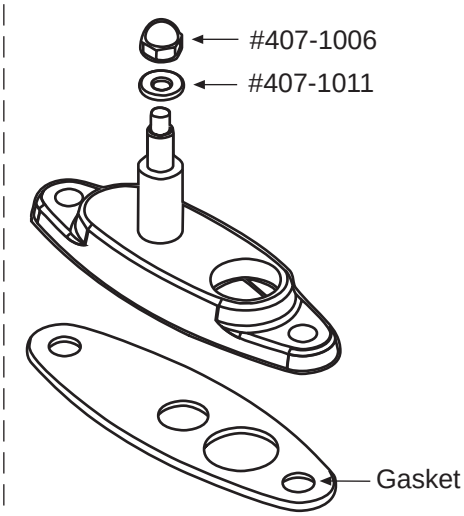
Phone: (541) 327-1546 FAX: (541) 327-3480

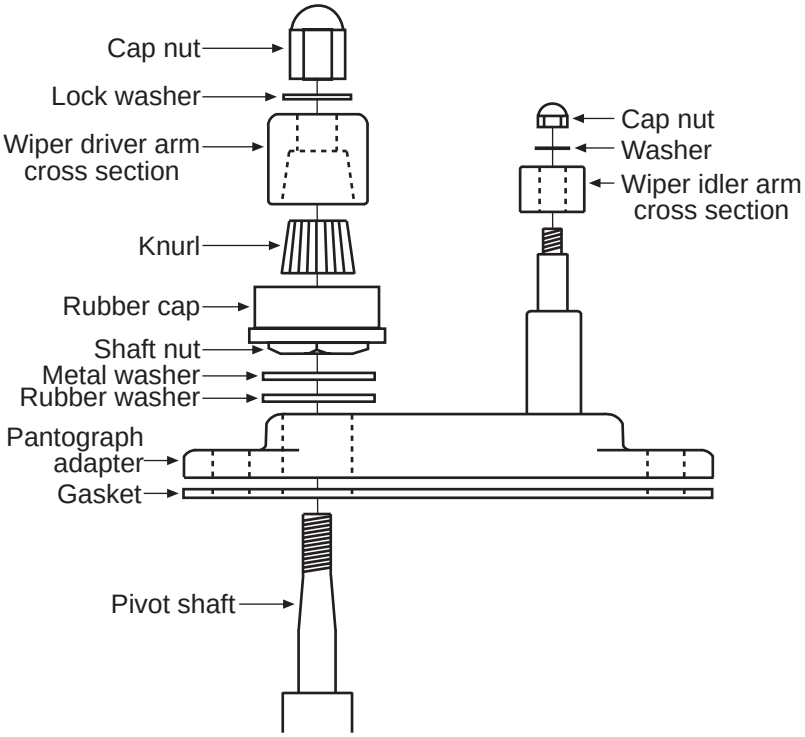
230 Series Pantograph Adapters

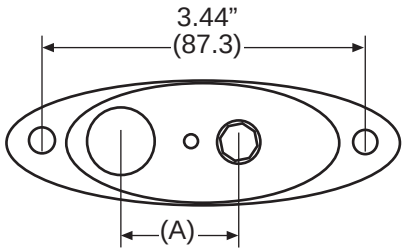
- Allows the use of a pantograph wiper arm (double arm) on the 230 series unitized assembly

amequipment.com

Pantograph adapter part numbers:
#305-1002 (A) = 1.25” (31.8)
#305-1007 (A) = 1.75” (44.5)





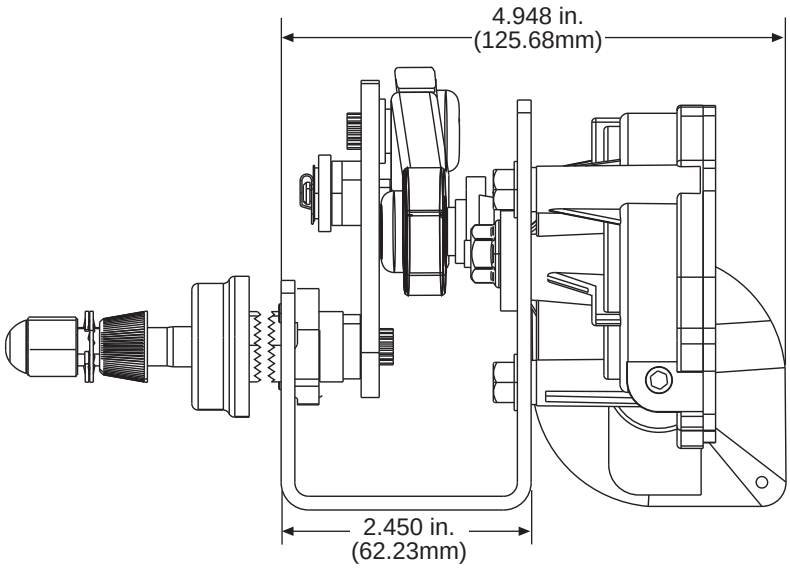


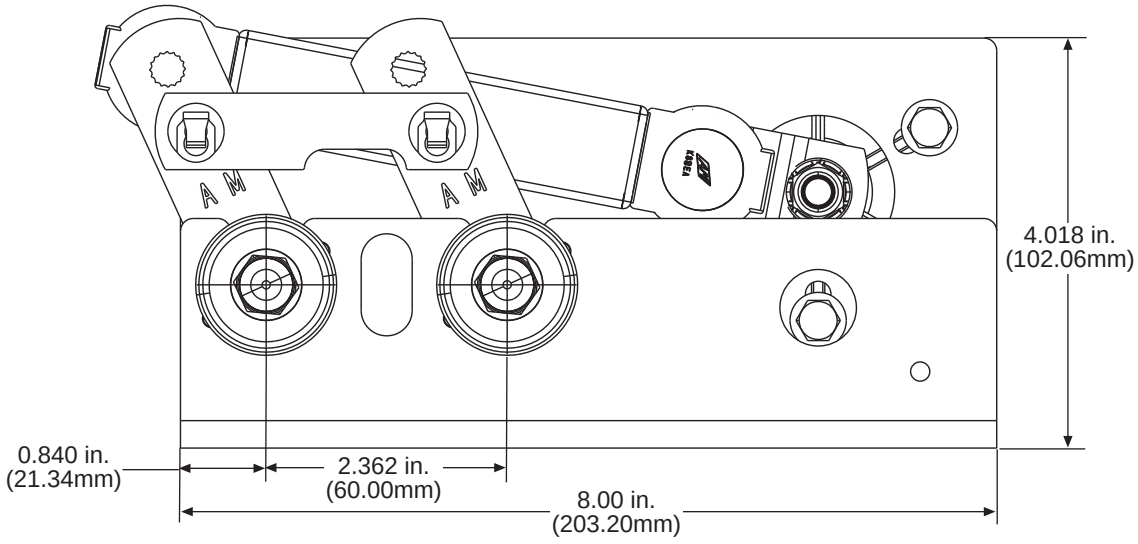
Phone: (541) 327-1546 FAX: (541) 327-3480

Double Driver Pantograph Wiper System

- Heavy-duty, industrial design
- Ideal for large glass pantograph wiper systems
- SAE durability tested
- Robust dual pivot shafts
- Balanced, twin-driven wiper arm drives single blade in both directions
- Sweep angles available from 43° to 97°
- Capable of driving up to 36 in. (915mm) arms and 32 in. (800mm) blades
- Powerful and adaptable bolt-on unit
- May be mounted right-side-up or upsidedown
- Available in left hand and right hand configurations
- Available in CW and CCW park
- Powered by a 38Nm dynamic park motor
- Available in 12V and 24V, and low and high-side switched

*Use with AME standard double driver arms.





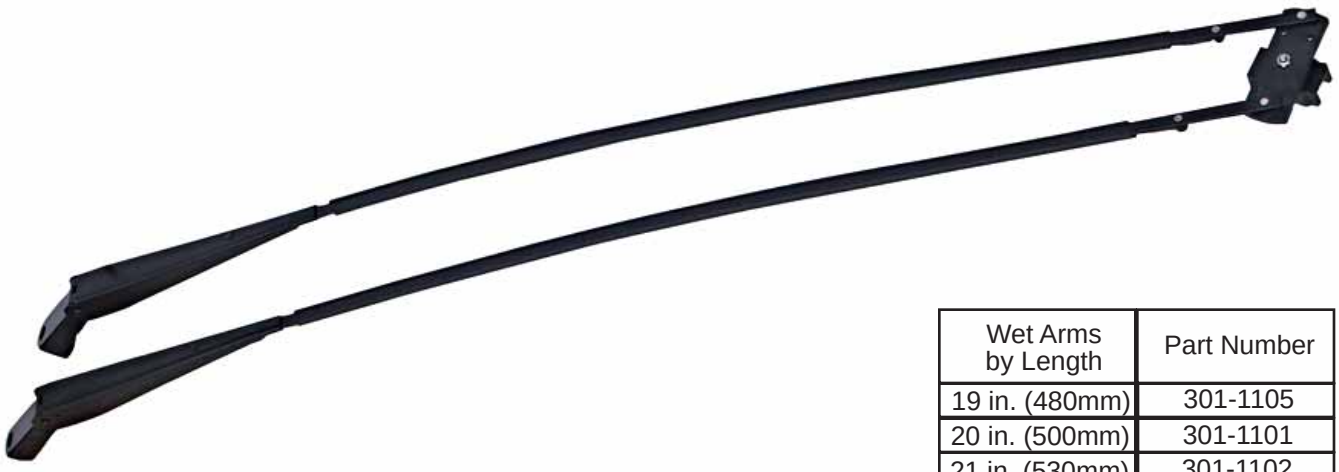
Phone: (541) 327-1546 FAX: (541) 327-3480

Double Driver Standard Pantograph Arms

- Heavy-duty, industrial design
- Ideal for large glass pantograph wiper systems
- Balanced, twin-driven wiper arm drives single blade in both directions
- Arm lengths available from 19 in. (480mm) to 36 in. (915mm)
- Available as a wet or dry arm
- Standard black powder coat finish

*Use with AME double driver motor assemblies

amequipment.com



Wet Arms by Length	Part Number
19 in. (480mm)	301-1105
20 in. (500mm)	301-1101
21 in. (530mm)	301-1102
22 in. (560mm)	301-1103
23 in. (580mm)	301-1104
24 in. (610mm)	301-1065
25 in. (630mm)	301-1097
26 in. (660mm)	301-1098
27 in. (690mm)	301-1069
28 in. (710mm)	301-1070
29 in. (730mm)	301-1071
30 in. (760mm)	301-1072
31 in. (790mm)	301-1073
32 in. (810mm)	301-1074
33 in. (840mm)	301-1075
34 in. (860mm)	301-1076
35 in. (890mm)	301-1099
36 in. (915mm)	301-1095

Double Driver Bulkhead Fitting Adapter Plate

- Steel plate with black powder coat finish
- Brass fittings available in two lengths
- Includes rubber gasket, 1/8 in. ID hose, and 3/16 in. ID hose T coupling for routing to washer pump
- For use with double driver motor assembly and wet arms

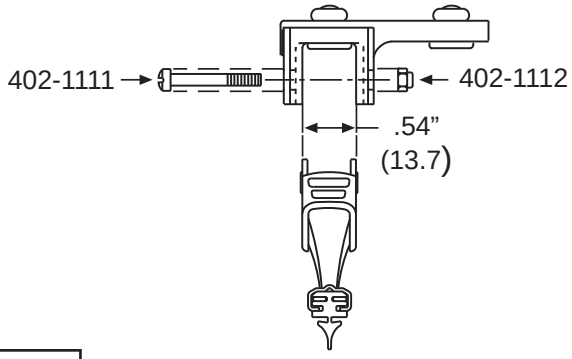
Fitting Length	Part Number
2.5 in. (64mm)	305-1020
3.5 in. (89mm)	305-1023

Phone: (541) 327-1546 FAX: (541) 327-3480

Standard Flex Wiper Blades

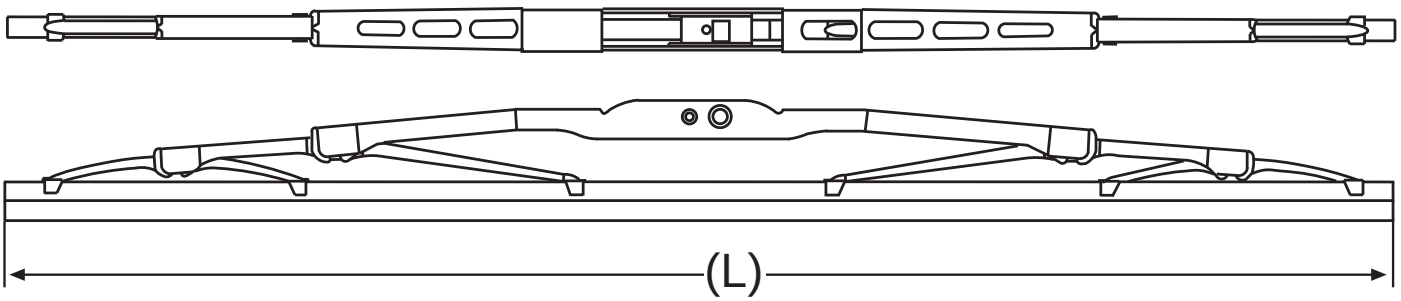
- Flexible for flat or curved glass
- Refillable molded wiper elements
- Galvanized, powder coated frames for corrosion resistance
- Compatible with 208, 212, 230, and Double Driver arms

amequipment.com



Part #	Blade length L
302-1120	12” (300)
302-1130	13” (330)
302-1140	14” (350)
302-1150	15” (380)
302-1160	16” (400)
302-1170	17” (430)
302-1180	18” (450)
302-1190	19” (480)
302-1200	20” (500)
302-1210	21” (530)
302-1220	22” (550)
302-1240	24” (600)
302-1260	26” (650)
302-1280	28” (700)
302-1320	32” (800)

Compatability Chart	
Motor Series	Max blade L
208	18” (450)
212	22” (550)
230	28” (700)
Double Driver	32” (800)

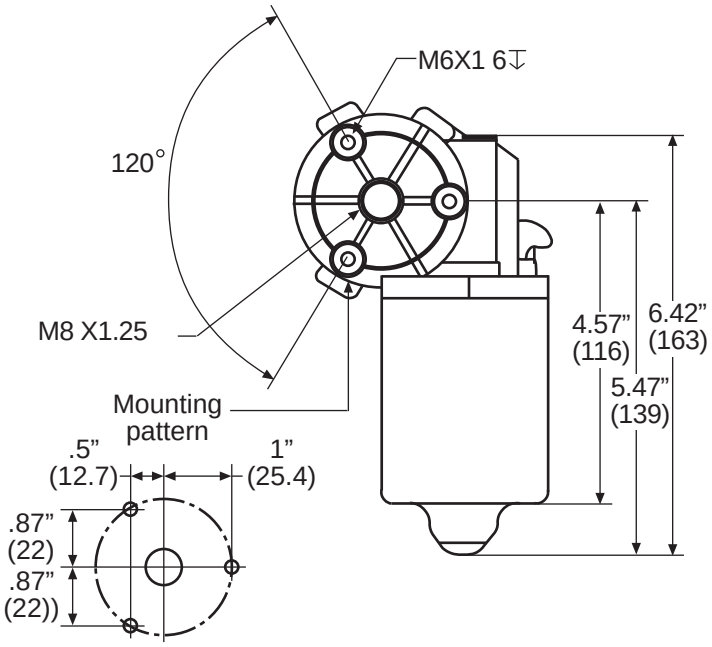


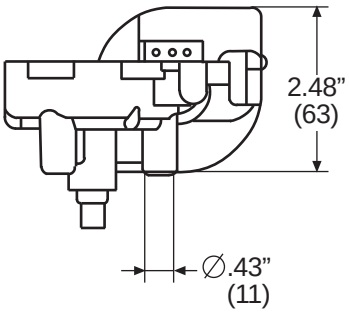
Phone: (541) 327-1546 FAX: (541) 327-3480

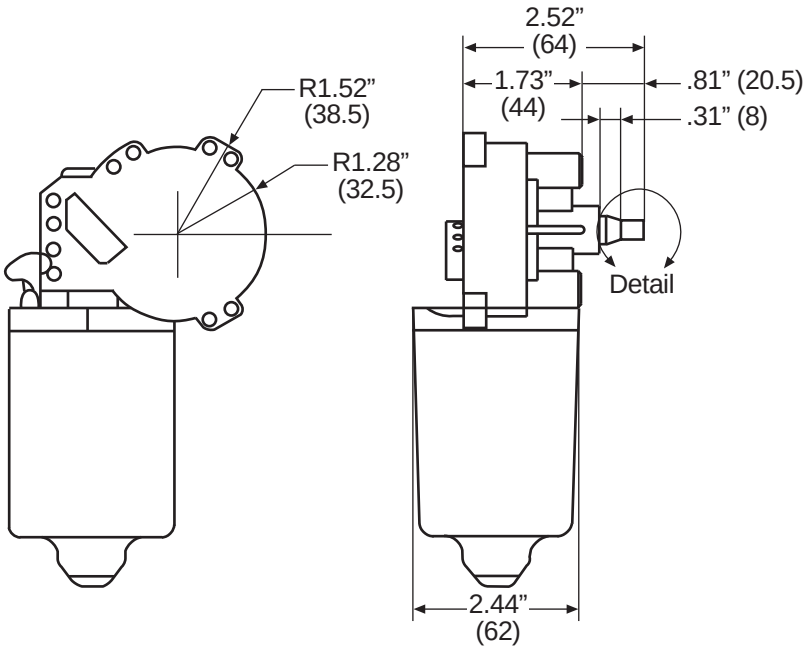
230 Series Standard Left Hand Motor

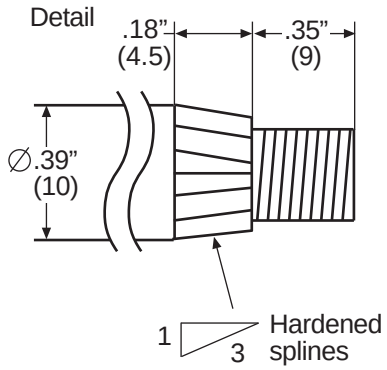
amequipment.com

- 30 Nm (see conversion table on reference information page)
- SAE standard durability tested
- Compact size will retrofit into existing space
- RFI suppression standard
- Water-resistant motor and plug connectors
- Available in dynamic park or coast to park
- Available in 12V or 24V
- Available in low or high side switched
- A variety of pigtail adapter cords available
  *Wiring information on 230 unitized page









Part numbers:

230-1001	12V, dynamic park
230-1002	12V, coast to park
230-1003	12V, dynamic park, low side switched
230-1004	24V, dynamic park
230-1005	24V, coast to park
230-1006	24V, dynamic park, low side switched

Note: Coast to park and dynamic park motors are not interchangable

Phone: (541) 327-1546 FAX: (541) 327-3480

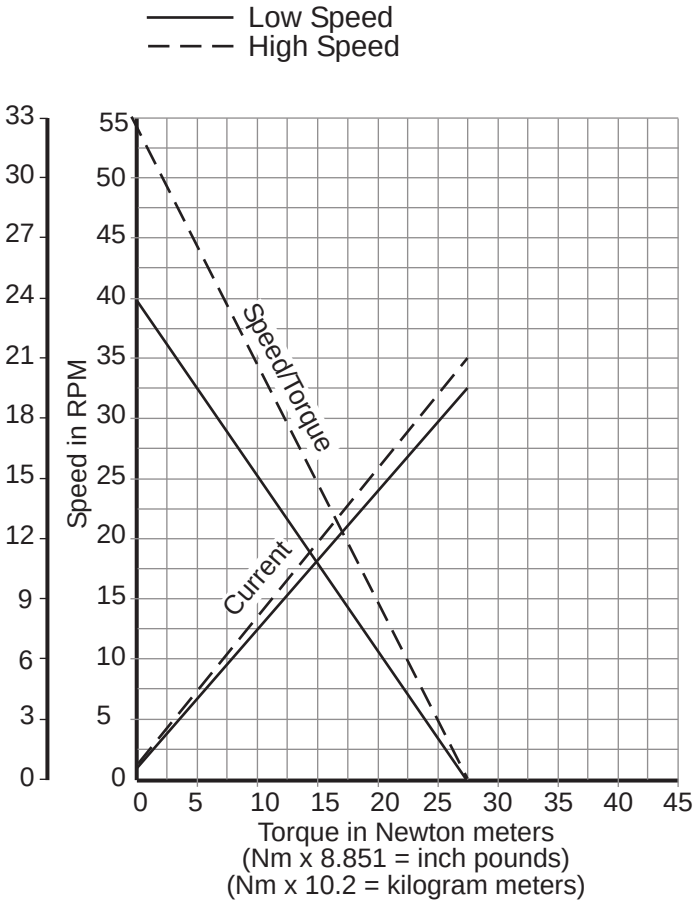
801-1030 Rev. 5 07/08

230 Series Standard Left Hand Motor

amequipment.com

Test Data

Low Speed CCW Motor Shaft Rotation		
Data Point	Data Type	Value Range
No Load	Current (A)	1.0 - 0.8
	Speed (rpm)	46.7 - 38.2
Stall Load	Torque (Nm)	33.5 - 27.4
	Current (A)	20.2 - 16.5
Peak Power	Power (W)	36.6 -30.0
	Torque (Nm)	16.3 - 13.3
Nominal (Peak Efficiency)	Power (W)	18.8 nominal
	Speed (rpm)	34.8 nominal
	Current (A)	3.7 nominal
	Torque (Nm)	5.2 nominal
Clockwise Motor Shaft Rotation		
Data Point	Data Type	Value Range
No Load	Current (A)	1.6 - 1.3
	Speed (rpm)	68.0 - 55.6
Stall Load	Torque (Nm)	28.6 - 23.4
	Current (A)	22.7 - 18.6
Peak Power	Power (W)	44.7 - 36.5
	Torque (Nm)	14.5 - 11.9
Nominal (Peak Efficiency)	Power (W)	25.1 nominal
	Speed (rpm)	49.2 nominal
	Current (A)	4.7 nominal
	Torque (Nm)	5.0 nominal



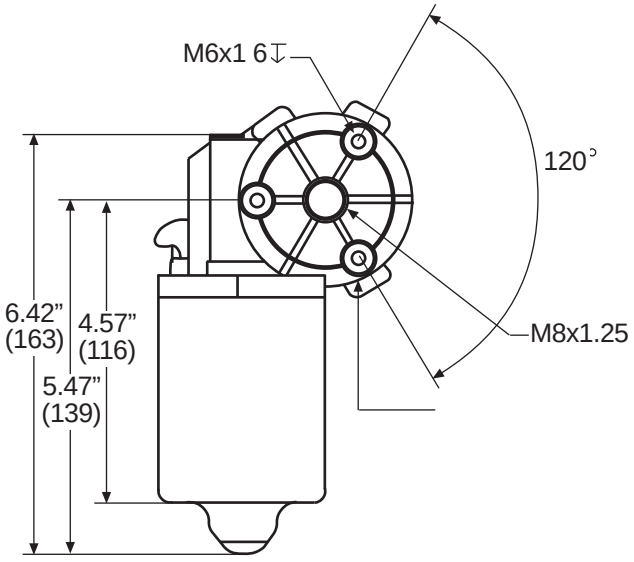
Phone: (541) 327-1546 FAX: (541) 327-3480

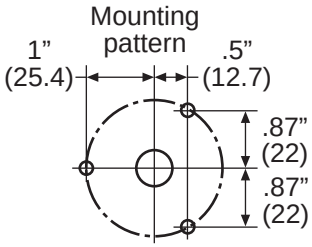
801-1030 Rev. 5 07/08

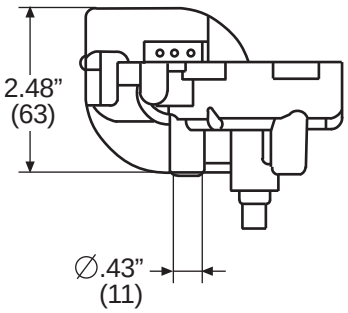
230 Series Right Hand Motor

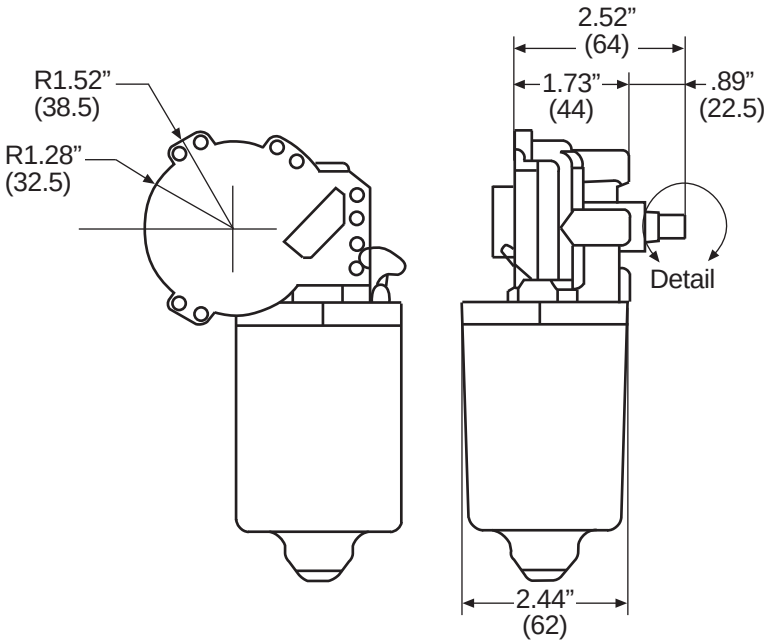
amequipment.com

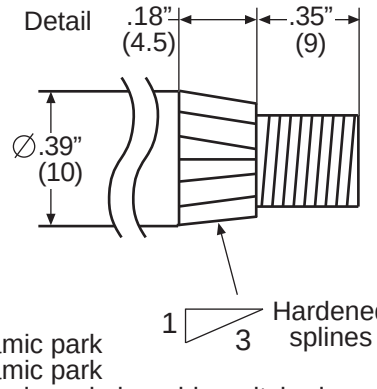
- 30 Nm (see conversion table on reference information page)
- SAE standard durability tested
- Compact size will retrofit into existing space
- Standard RFI suppression
- Water-resistant motor and plug connectors
- Available in dynamic park or coast to park
- Available in 12V or 24V
- Available in low or high side switched
- A variety of pigtail adapter cords available
  *Wiring information on 230 unitized page











Part numbers:

230-2001	12V, dynamic park
230-2002	24V, dynamic park
230-2003	12V, dynamic park, low side switched
230-2004	24V, dynamic park, low side switched
230-2005	12V, coast to park
230-2006	24V, coast to park
230-2007	12V, coast to park, low side switched
230-2008	24V, coast to park, low side switched

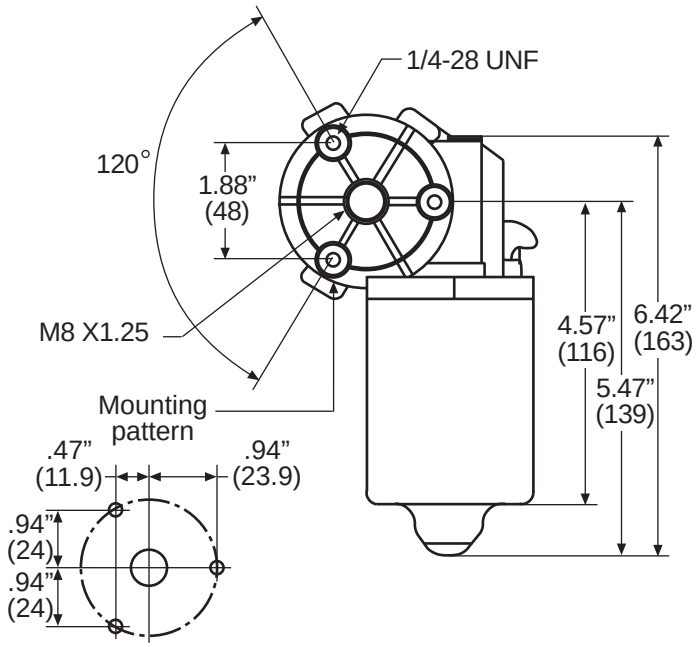
Note: Coast to park and dynamic park motors are not interchangable

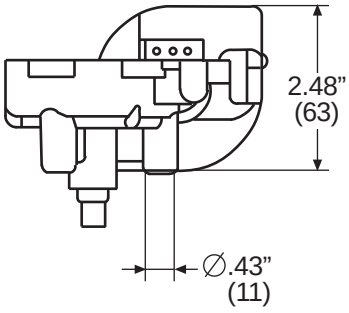
Phone: (541) 327-1546 FAX: (541) 327-3480

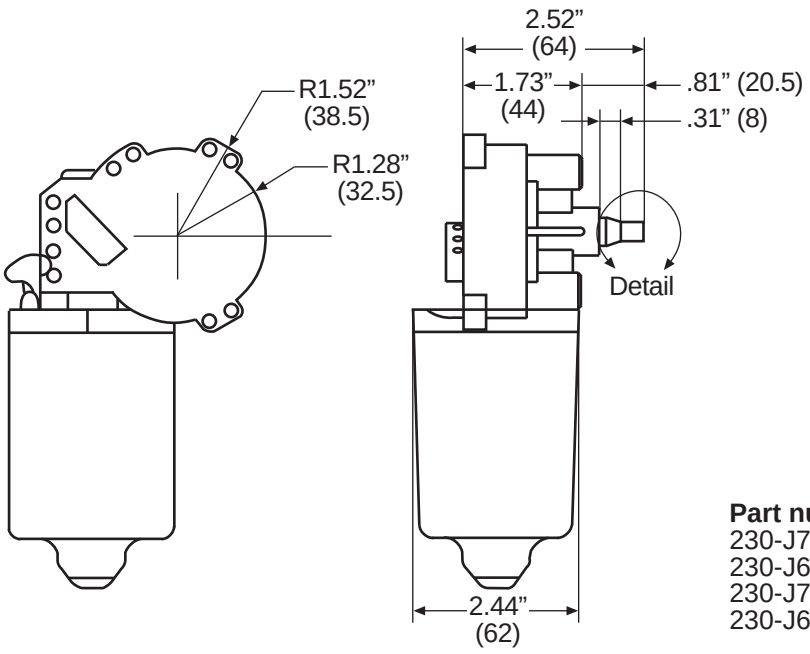
WJ Replacement 230 Series Left Hand Motor

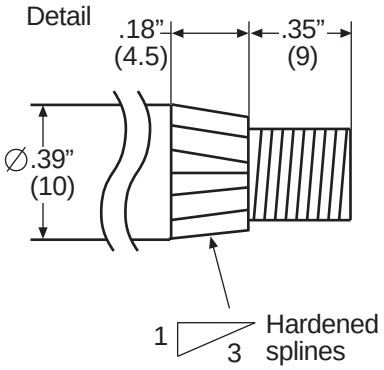
amequipment.com

- 30 Nm (see conversion table on reference information page)
- SAE standard durability tested
- Will retrofit into existing WJ applications
- Standard RFI suppression
- Water-resistant motor and plug connectors
- Available in dynamic park or coast to park
- Available in 12V or 24V
- Available in low or high side switched
- A variety of pigtail adapter cords available









Part numbers:

230-J791	12V, dynamic park
230-J652	12V, coast to park
230-J714	12V, coast to park, low side switched
230-J661	24V, coast to park

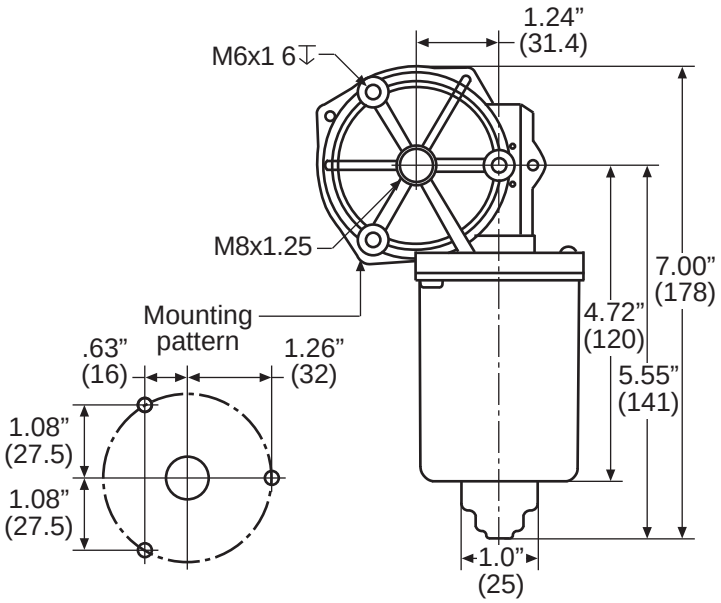
Note: Coast to park and dynamic park motors are not interchangable

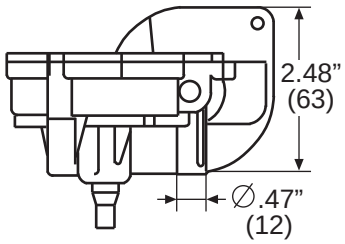
Phone: (541) 327-1546 FAX: (541) 327-3480

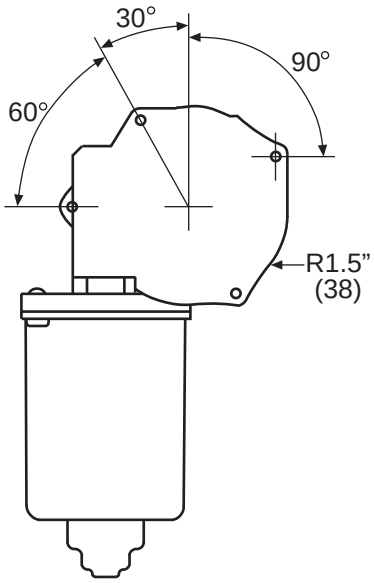
238 Series Motor

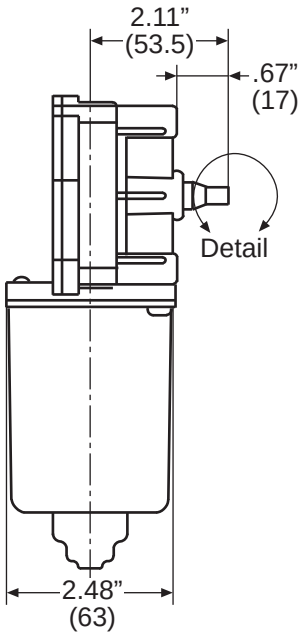
- 38 Nm (see conversion table on reference information page)
- SAE standard durability tested
- Compact size will retrofit into existing space
- Standard RFI suppression
- Water-resistant motor and plug connectors
- Dynamic park
- Available in 12V or 24V
- Available in low or high side switched
- A variety of pigtail adapter cords available

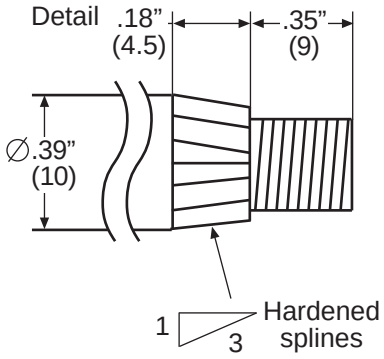
amequipment.com











Part numbers:

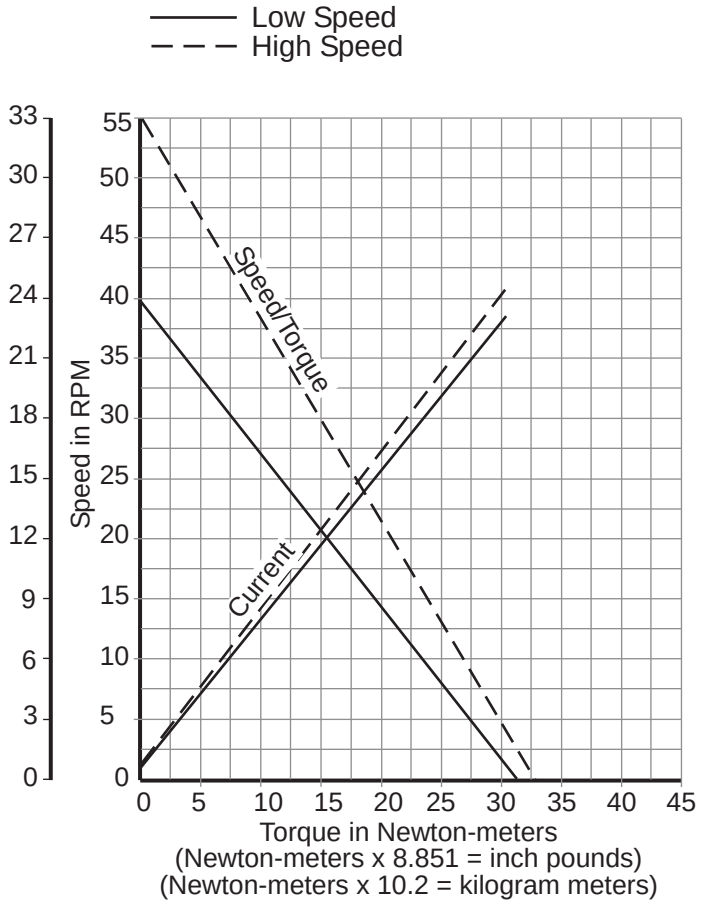
238-1002	12V
238-1003	24V
238-1004	12V, low side switched
238-1005	24V, low side switched

Phone: (541) 327-1546 FAX: (541) 327-3480

801-1032 Rev. 2 11/07

amequipment.com

Low Speed CCW Motor Shaft Rotation		
Data Point	Data Type	Value Range
No Load	Current (A)	1.1 - 0.9
	Speed (rpm)	44.6 - 36.5
Stall Load	Torque (Nm)	43.8 - 35.8
	Current (A)	23.8 - 19.4
Peak Power	Power (W)	45.4 - 37.2
	Torque (Nm)	22.3 - 18.2
Nominal (Peak Efficiency)	Power (W)	21.5 nominal
	Speed (rpm)	33.6 nominal
	Current (A)	3.9 nominal
	Torque (Nm)	6.2 nominal
Clockwise Motor Shaft Rotation		
Data Point	Data Type	Value Range
No Load	Current (A)	1.7 - 1.5
	Speed (rpm)	65.4 - 53.5
Stall Load	Torque (Nm)	37.2 - 30.4
	Current (A)	26.6 - 21.8
Peak Power	Power (W)	53.6 - 43.8
	Torque (Nm)	18.6 - 15.2
Nominal (Peak Efficiency)	Power (W)	31.5 nominal
	Speed (rpm)	46.8 nominal
	Current (A)	5.7 nominal
	Torque (Nm)	6.6 nominal



Phone: (541) 327-1546 FAX: (541) 327-3480

801-1032 Rev. 1 03/06

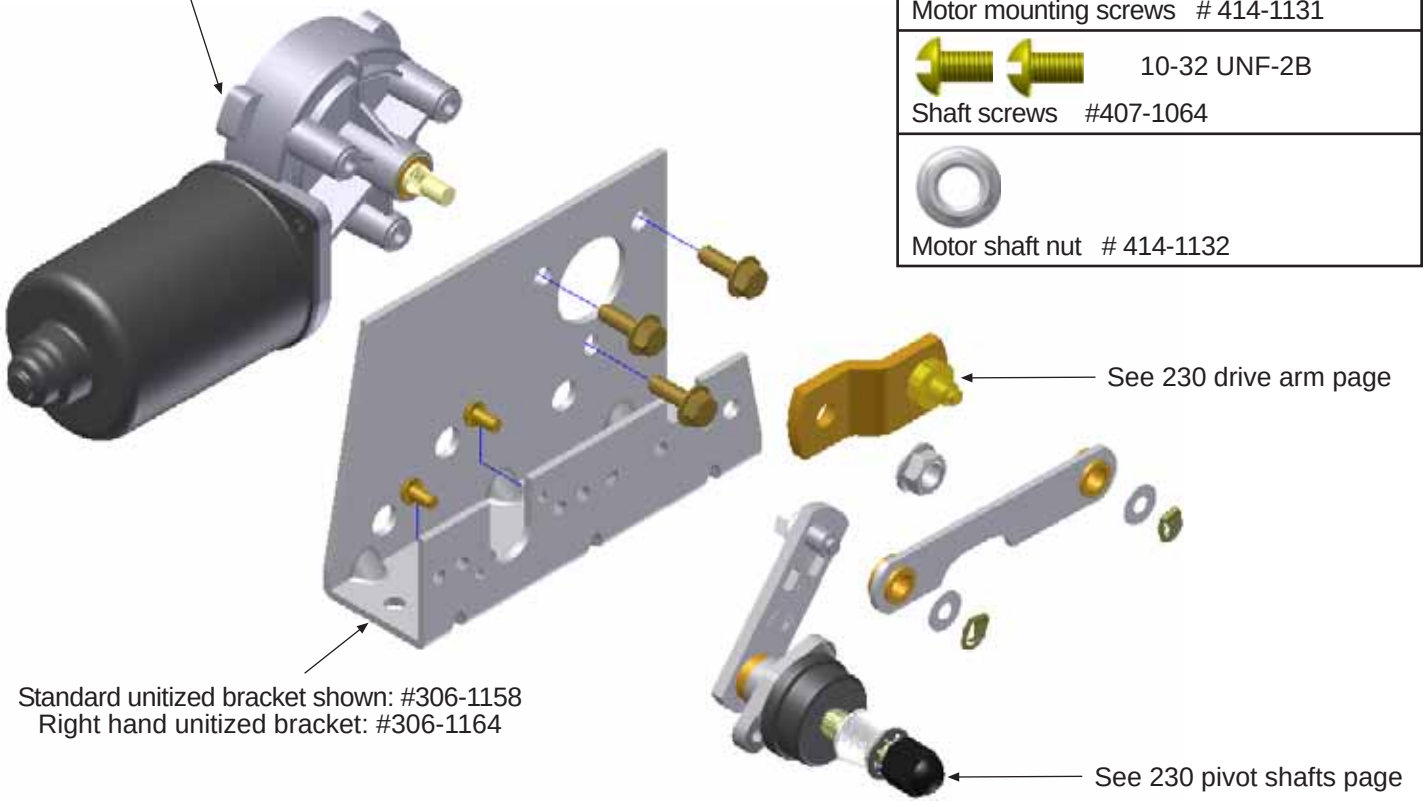
230 Series Hardware

- All hardware shown is available individually or in bulk quantities
- See 230 components pages for additional hardware

amequipment.com

Hardware Kit #315-1007 (bracket and drive arm not included in kit)
 Spring clips #407-1022
 Washers # 414-1005
 Link #307-1022 3.38” (86mm) center to center
 Motor mounting screws # 414-1131
10-32 UNF-2B Shaft screws #407-1064
Motor shaft nut # 414-1132

See 230 wiper motors pages



See 230 drive arm page

See 230 pivot shafts page

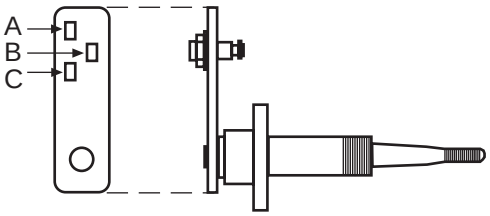
Standard unitized bracket shown: #306-1158
Right hand unitized bracket: #306-1164

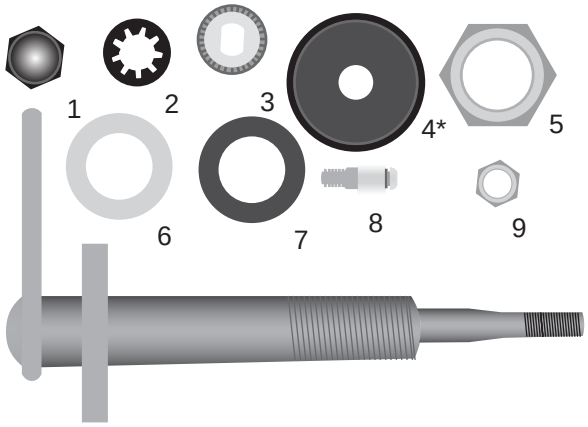
230 Series Pin-Type Pivot Shafts

amequipment.com

- 5/8” (17.3 mm) shaft body diameter fits into 3/4” (19 mm) bulkhead hole
- Length determined by “A” reference dimension of shaft body
- Three pin slots for different sweep angles (A, B, and C)
- Stainless steel shaft and components for corrosive environments

*All hardware numbered below is included in your shaft assembly order and is available individually





1. 407-1010 black cap nut
2. 407-1023 lockwasher
3. 407-1002 knurl
4. 407-1017 rubber cap*
5. 407-1007 nut
6. 407-1015 metal washer
7. 407-1012 rubber washer
8. 407-1005 pin
9. 414-1124 locknut

*Optional 1” (25.4) inside height rubber cap: #407-1072

Complete shaft assemblies:

304-1200 5/8” (16 mm)

304-1201 1” (25 mm)

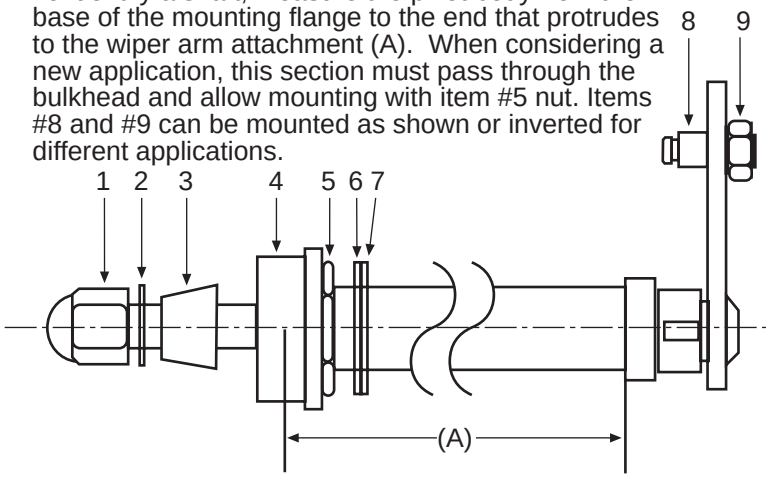
304-1202 1 1/4” (32 mm)

304-1203 2” (51 mm)

304-1204 2 1/2” (64 mm)

304-1205 3” (76 mm)

To identify a shaft, measure the pivot body from the base of the mounting flange to the end that protrudes to the wiper arm attachment (A). When considering a new application, this section must pass through the bulkhead and allow mounting with item #5 nut. Items #8 and #9 can be mounted as shown or inverted for different applications.



FAQ

Q. How do I determine what shaft length I need?

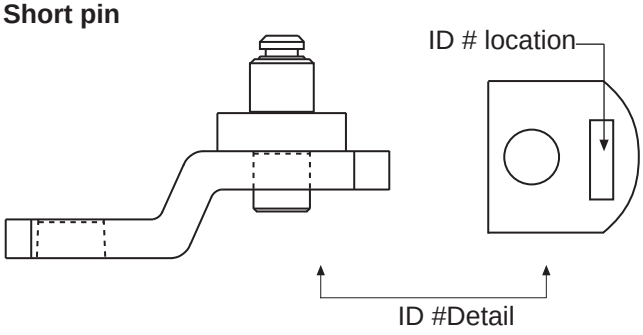
*A. Measure the thickness of material the shaft must pass through on the vehicle. Add on 3/8” (10mm) for the outside holding nut and washers. If pantograph arms are used, add another 3/8” (10 mm). Add the measurements and use the next longer shaft. **Example: 1/2” (12mm) steel plate vehicle bulkhead + 3/8” (10mm) nut and washers + 3/8” (10mm) pantograph = 1 1/2” (32mm), means you would need the 2” (50mm) shaft. The called shaft length is never the overall length, rather it refers to the portion of the shaft that passes through the vehicle (dimension A).*

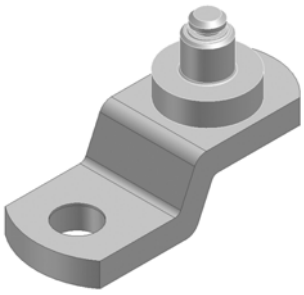
230 Series Pin Type Drive Arms

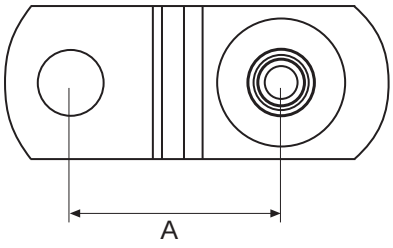
- Available in a variety of sizes for several sweep angles
- Short pin for single link systems, long pin for double link systems

amequipment.com

Short pin

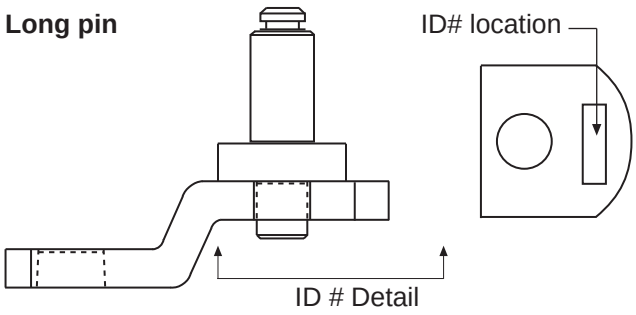


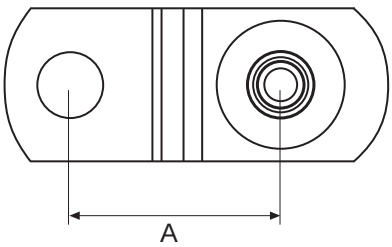




Part #	Dimension A	ID # (mm)
308-1048	1.185”	30.1
308-1049	1.303”	33.1
308-1050	1.335”	33.9
308-1051	1.057”	26.8
308-1052	1.380”	35.1
308-1053	.950”	24.2
308-1054	.875”	22.2
308-1055	1.460”	37.1

Long pin

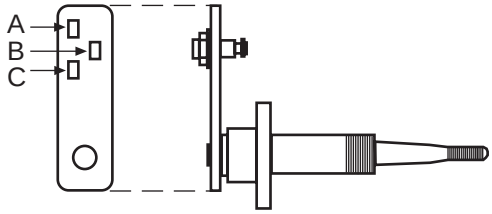




Part #	Dimension A	ID # (mm)
308-1056	1.312”	33.3
308-1057	1.230”	31.2
308-1058	1.135”	28.8
308-1059	1.185”	30.1
308-1060	1.303”	33.1
308-1061	1.335”	33.9
308-1062	1.057”	26.8
308-1063	1.380”	35.1
308-1064	.950”	24.2
308-1065	.875”	22.2
308-1066	1.460”	37.1

230 Series Adjustable Drive Arm Kit

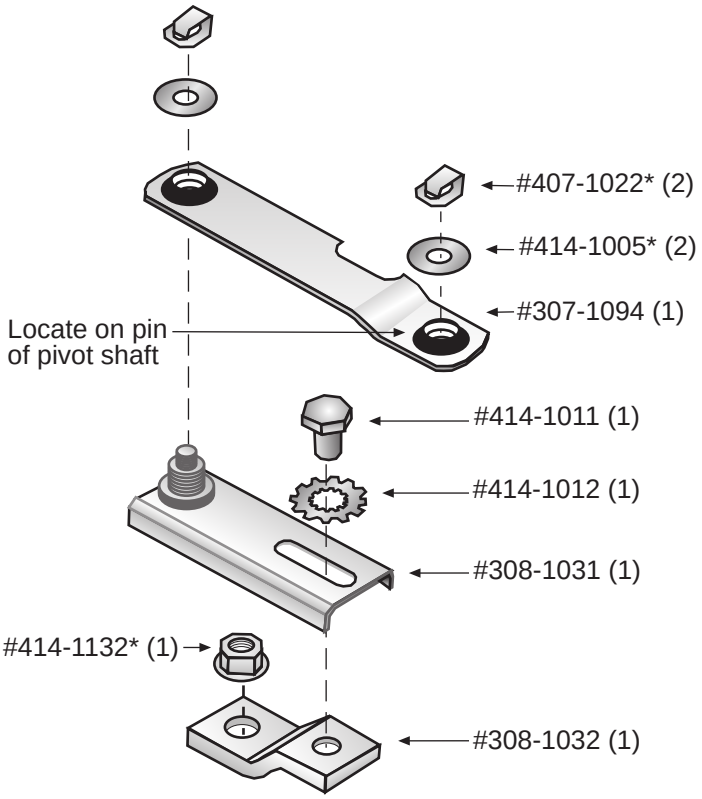
"A" pin position: 28-58°
"B" pin position: 35-70°
"C" pin position: not recommended for use with adjustable drive arm



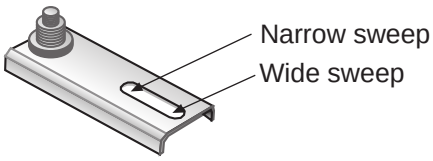
Installation Instructions:

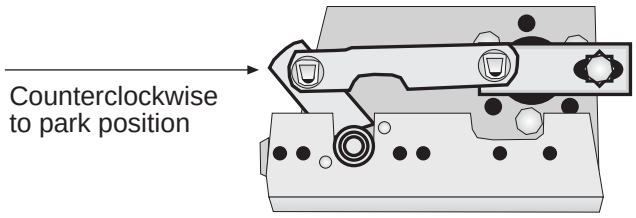
1. Assemble the wiper motor and pivot shaft onto the unitized wiper motor bracket and make sure the pin in the pivot shaft is in the "A" or "B" position. (See illustration)
2. Using a 12V power supply, apply power to the motor terminals to operate low (L), high (H), and park (P).
3. After parking the motor, install drive arm item #308-1032 onto the motor shaft, align the park position (clockwise or counterclockwise to park) as shown in the illustration. Set #308-1031 and #307-1094 on #308-1032 while aligning. Retain #308-1032 with a 12" (30cm) adjustable wrench and tighten nut #414-1004 to 17 foot pounds (23Nm) for 230 and 238 motors.
4. Install the slide #308-1031 onto the drive arm with lockwasher #414-1011 and bolt #414-1012. Tighten the bolt at an arbitrary position on the slide (the final adjustment of the slide will be made later).
5. Grease the pins on the slide and pivot shaft with standard automotive grease. Place link #307-1094 over the pins and install washer #414-1005 and spring clip #407-1022 on both pins to secure the link.
6. Install the wiper motor assembly onto the vehicle. Attach the wiper blade to the wiper arm and then the wiper arm to the pivot shaft. Tighten the wiper arm nut (not shown) to 10 foot pounds (14Nm).
7. Operate the wiper motor in low and high speeds. Using a garden hose, spray water on the windshield to simulate wet conditions. Make sure the wiper blade does not come into contact with the windshield moulding. Adjust the wiper arm sweep angle by loosening #414-1011 and sliding #308-1031 (see illustration). An adjustment of the wiper arm may also be necessary. Retighten the bolt to 10 foot pounds and run the system again, repeat step 7 until the desired sweep pattern is achieved.

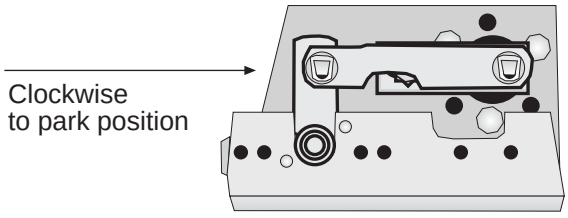
Adjustable drive arm kit #308-1005 (replaces LE60000)



* not included in #308-1005, order separately







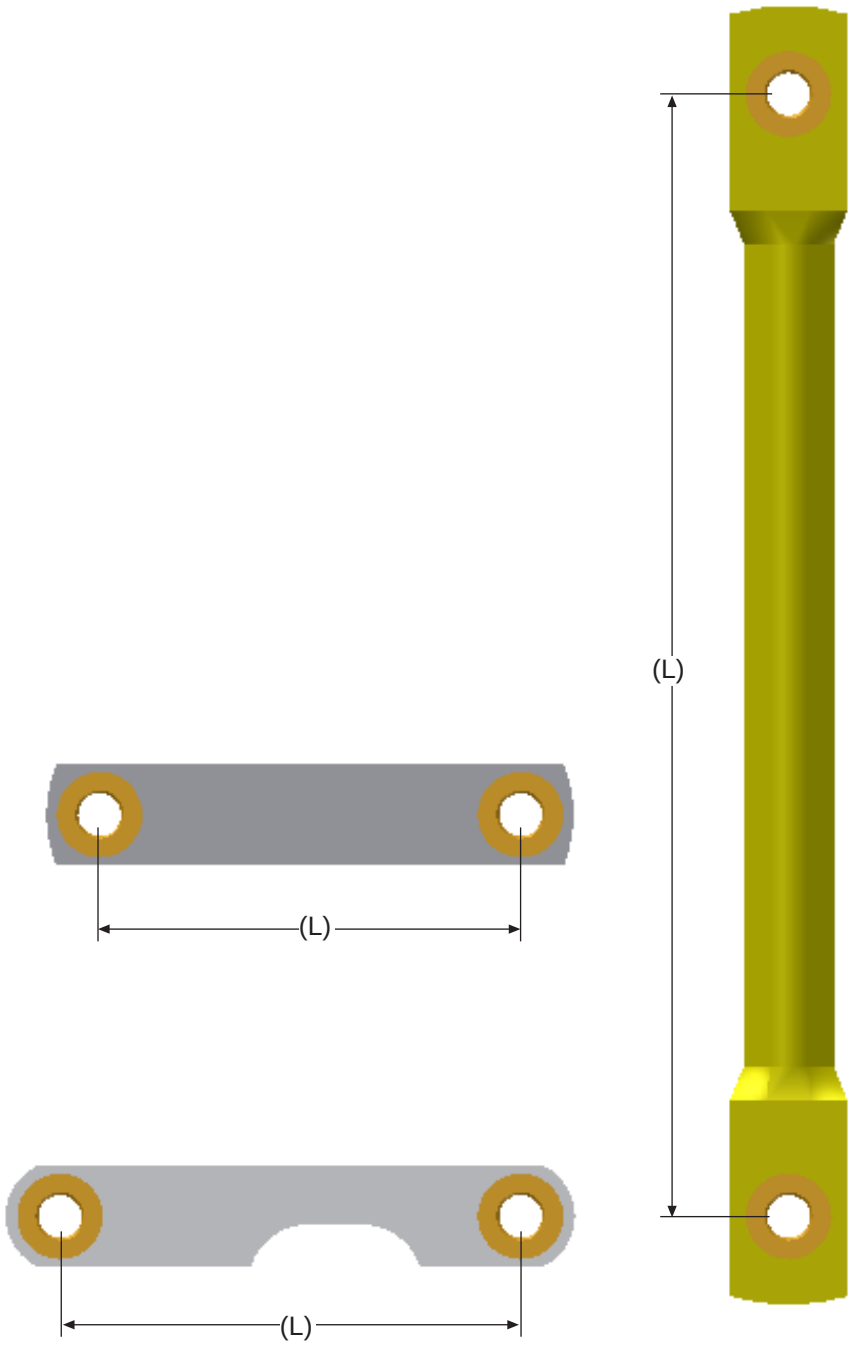
Phone: (541) 327-1546 FAX: (541) 327-3480

230 Series Pin-Type Links

amequipment.com

- Standard link for unitized and multiple pivot wiper systems
- Standard bronze bushings
- Standard and custom lengths available
- All bushings have a .31” (7.9 mm) inside diameter
- Typical styles shown below for identification
  *When ordering, please list the (L) reference dimension

Center to center length L	Part #
2.36” (60.0)	307-1113
2.97” (75.4)	307-1037
3.0” (76.2)	307-1027
3.09” (78.5)	307-1072
3.38” (85.9)	307-1022
3.75” (94.0)	307-1091
3.84” (97.5)	307-1095
3.95” (100.3)	307-1092
4.15” (105.4)	307-1093
5.3” (134.6)	307-1111
5.75” (146.1)	307-1080
6.4” (162.6)	307-1086
8.25” (209.6)	307-1105
8.5” (215.9)	307-1106
8.85” (224.8)	307-1074
9.38” (238.3)	307-1112
9.63” (244.5)	307-1162
10.25” (260.4)	307-1098
12.8” (325.1)	307-1076
13.0” (330.2)	307-1107
14.64” (371.9)	307-1073
16.1” (408.9)	307-1104
19” (482.6)	307-1079
19.89” (505.2)	307-1075
20.5” (520.7)	307-1100
21” (533.4)	307-1078
21.95” (557.5)	307-1103
22.5” (571.5)	307-1082
23.4” (594.4)	307-1087
23.75” (603.3)	307-1099
25.0” (635.0)	307-1108
27.5” (698.5)	307-1081
30.0” (762.0)	307-1101
32.0” (812.8)	307-1085
32.25” (819.2)	307-1077



230 Series Unitized Motor Assembly
Left Hand and Right Hand

amequipment.com

Link and drive arm

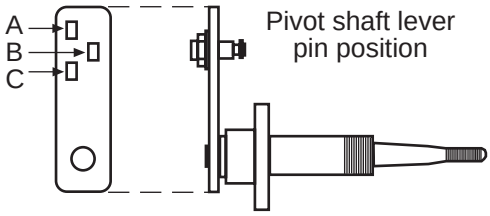
Pantograph

Wipe angle range*	Shaft lever pin position	Connecting link**	Drive arm**
below 60	B	307-1005	308-1005
60-62	A	307-1072	308-1053
62-65	A	307-1022	308-1053
68-72	A	307-1022	308-1051
70-74	B	307-1037	308-1054
75-79	B	307-1072	308-1053
80-85	A	307-1022	308-1048
85-91	B	307-1022	308-1051
93-99	A	307-1022	308-1050
97-103	A	307-1022	308-1052
100-105	A	307-1072	308-1055

Radial

Wipe angle range*	Shaft lever pin position	Connecting link**	Drive arm**
90-94	A	307-1022	308-1050
95-99	A	307-1022	308-1052
101-104	A	307-1072	308-1055
112-118	C	307-1022	308-1051

* Wipe angle varies with arm and blade combination and low or high speed (pantograph range determined with 22" arm/20" blade, 26" arm/24" blade, and 28" arm/28" blade combinations; radial range determined with 18" arm/18" blade, 22" arm/ 20" blade and 26" arm/ 24" blade combinations).
**See 230 drive arms and connecting links pages



230 Series Unitized Motor Assembly Instructions:

Caution: Disconnect power from the motor when assembling.

1. Determine which motor is needed from the 230 motor series page.
2. Determine which drive arm and link is needed for the desired sweep angle (refer to the chart above).
3. Determine which pivot shaft to use from the 230 series pivot shaft page.
4. Mount the pivot shaft to the motor bracket using two 10-32 screws. Torque to 3 foot pounds.
5. Mount the 230 motor with three M6 machine screws. Torque to 80 inch pounds.
6. Energize the "L" (low) speed terminal on the back plate of the motor and allow it to run for several seconds. Remove the power source from "L" (low) and energize the "P" (park) terminal. The motor will continue to run until it reaches its internal park position and stops.
7. Attach the pivot shaft lever pin in its appropriate position (see chart on next page). The pin should face outward, away from the motor. Torque the nut to 5 foot pounds.

Caution: During the next steps, do not rotate the motor output shaft out of the park position until the drive arm is installed as this will cause the motor assembly to park incorrectly. If the output shaft is rotated before the drive arm is installed, energize the park circuit to return the output shaft to the park position before continuing.

8. Determine your desired park position. Facing the window from the outside, decide if the arm and blade need to travel clockwise or counterclockwise to park.
9. Place the drive arm and M8 shouldered nut over the motor output shaft and barely tighten the nut. For counterclockwise (CCW) applications, the pin on the drive arm should point towards the pivot shaft. For clockwise (CW) applications, the pin on the drive arm should point away from the pivot shaft.
10. Place the connecting link over the pin on the pivot shaft lever and the pin on the drive arm.
11. Align the pivot shaft pin, the motor drive arm pin, and the center of the motor output shaft in the desired park position.
12. Remove the link from the assembly. Support the drive arm with a crescent wrench while torquing the shouldered nut on the motor output shaft to 17 foot pounds.

Caution: Do not allow the motor to run backwards, either by energizing the motor with a reversed polarity or by mechanically turning the output shaft of the motor clockwise when tightening the shouldered nut. This will damage the internal park circuit.

Phone: (541) 327-1546 FAX: (541) 327-3480

801-1035 Rev. 2 07/08

13. Apply a drop of light oil on the pivot shaft lever pin and the drive arm pin. Place the connecting link over the pins. When using a link with a cutout in one side, the cutout should face the pivot shaft body.
14. Install a flat thin washer and a retaining spring clip on the pivot shaft pin and drive arm pin to secure the connecting link.

Caution: Take care to keep hands and clothing away from the linkage.

15. Test run the motor. Energize the "L" (low) speed terminal for several seconds. Observe all mechanical functions to confirm proper assembly. Remove the power from "L" (low), then energize the "P" (park) terminal. The motor will run to its park position, then stop. Observe that the drive arm and the connecting link are close to parallel.

**Note: If you tighten the drive arm in the wrong orientation, you can remove and reset it. After removing the connecting link and drive arm nut, pry the outer end of the drive arm up with a large screwdriver or wrench handle between it and the motor bracket (or motor-mounting tower). This will loosen the drive arm from the motor output shaft. Do not reset the drive arm on the taper more than three times. Each reset enlarges the tapered hole and could cause system failure.

230 Series Unitized Motor Assembly Installation Instructions:

1. Drill a 3/4" (19mm) hole in the cowling or bulkhead at the pivot shaft location.
2. Fit the 230 series unitized motor assembly in the cowling or bulkhead with the pivot shaft protruding through the drilled hole.
3. Connect the vehicle wiring harness to the motor wiring harness.
4. For assemblies with pantograph sweep patterns:
   a. Fit the pantograph adapter over the pivot shaft, then finger tighten the 11/16"-24 jam nut to hold it in place.
   b. Use the pantograph adapter as a template to locate the mounting holes (the pantograph adapter should be parallel to the edge of the glass).
   c. Mark the hole locations with an awl.
   d. Remove the jam nut and pantograph adapter, then drill two 17/64" (7mm) holes at the marks.
   e. Use two 1/4"-28 machine screws (not included) that are long enough to engage the threaded holes in the 230 series bracket. If the screws interfere with the operation of the linkage, cut the ends off. **Note: stainless steel button-head machine screws work well.
5. Install the rubber or fiber washer on the pivot shaft first, then the steel washer. For assemblies with radial sweep patterns, fasten the 230 series unitized with the 11/16"-24 jam nut. We recommend adding a second point of attachment by using the pre-threaded holes in the motor bracket.

Caution: An improperly anchored system may cause physical injury and/or damage to the vehicle.

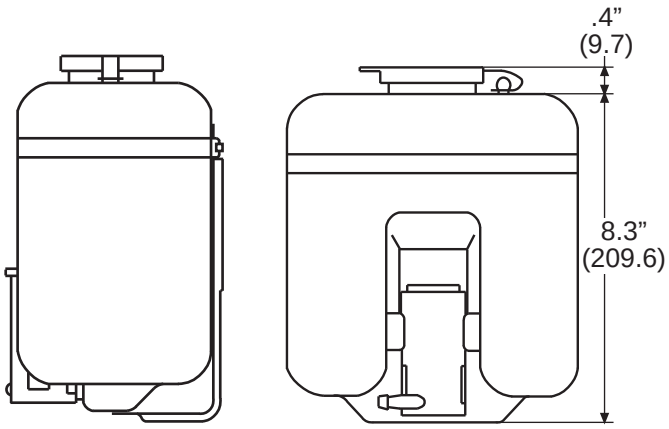
6. Attach a negative ground wire to the 230 series motor assembly bracket (or to the gear head of the motor).
7. Cover the jam nut with the rubber boot.
8. Tighten the 1/4"-28 machine screws in the pantograph adapter or bracket brace.
9. Install the blade to the wiper arm and install the wiper arm to the pivot shaft (torque the pivot shaft acorn nut to 10 ft. lbs.).

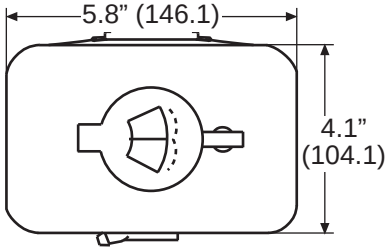
Phone: (541) 327-1546 FAX: (541) 327-3480

801-1035 Rev. 2 07/08

2 Liter Washer Bottle

- Available in 12V or 24V
- Metal spade bracket mount on backside of bottle
- Snap on lid
- Uses 3/16” (4 mm) inside diameter hose
- .25” (6.35 mm) terminals in “T” connector
- Packaged individually
- Conforms to SAE J942B testing
  *For 12V use part # 312-1038
  **For 24V use part # 312-1039



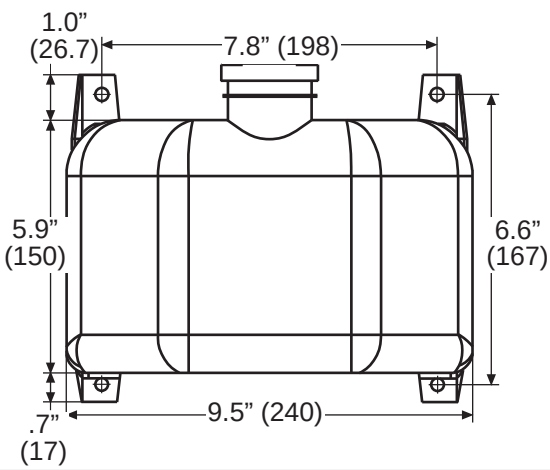


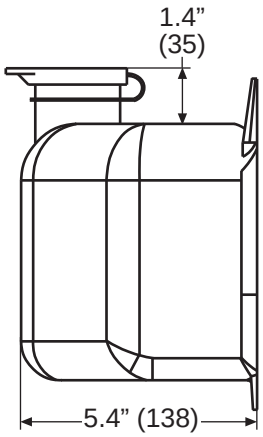
Pump amp draw:
Open line - 4.1 amps
Blocked line - 2.8 amps

Recommended pump circuit protection:
12V - 5 amps
24V - 3 amps

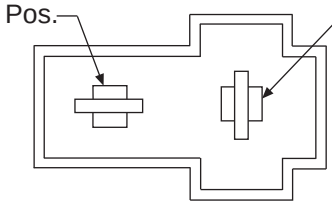
4 Liter Washer Bottle

- Available in 12V or 24V
- 4-point surface mount
- Snap on lid
- Uses 3/16” (4 mm) inside dia. hose
- .25” (6.35 mm) terminals in “T” connector
- Heavy wall construction
- Pressure leak tested
- Packaged individually
- Conforms to SAE J942B testing
- *For 12V use part # 312-1035
  **For 24V use part # 312-1036





Mating parts for 2 and 4 liter bottles:



Mate terminal housing: 317-1056
Mate terminal: 317-1055

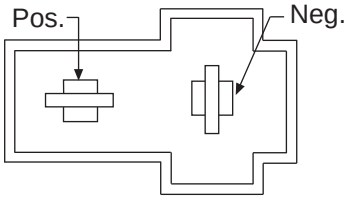
Pump only, 12V: 406-1010
Pump only, 24V: 406-1011
Grommet: 408-10 08

Phone: (541) 327-1546 FAX: (541) 327-3480

10 Liter Washer Bottle

amequipment.com

- Available in 12V or 24V
- Configurable for 1, 2, or 3 pumps
- Multiple point surface mounting holes
- Snap on lid
- Uses 3/16” (4 mm) inside diameter hose
- .25” (6.35) terminals in “T” connector
- Pressure leak tested
- Packaged individually



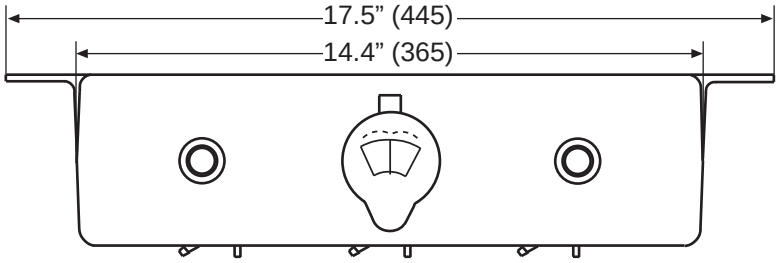
Mate terminal housing: 317-1056
Mate terminal: 317-1055

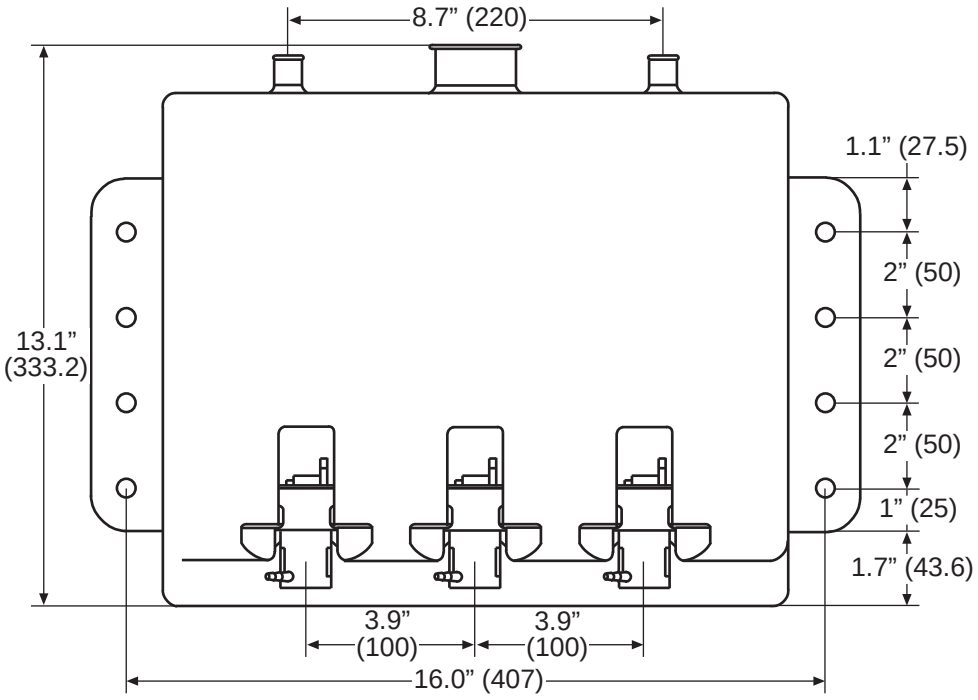
Pump amp draw:
Open line - 4.1 amps
Blocked line - 2.8 amps

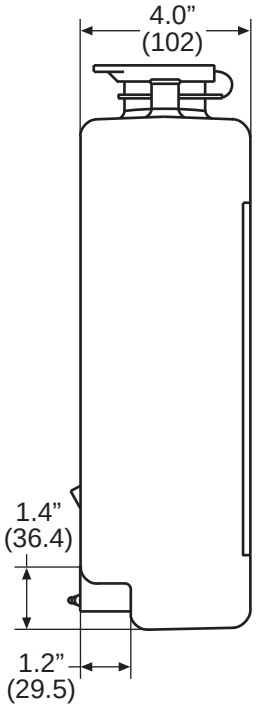
Recommended pump circuit protection:
12V - 5 amps
24V - 3 amps

Part #	Volts	# of pumps
312-1201	12	1
312-1202	12	2
312-1203	12	3
312-2401	24	1
312-2402	24	2
312-2403	24	3

Pump only, 12V: 406-1010
Pump only, 24V: 406-1011
Grommet: 408-1008





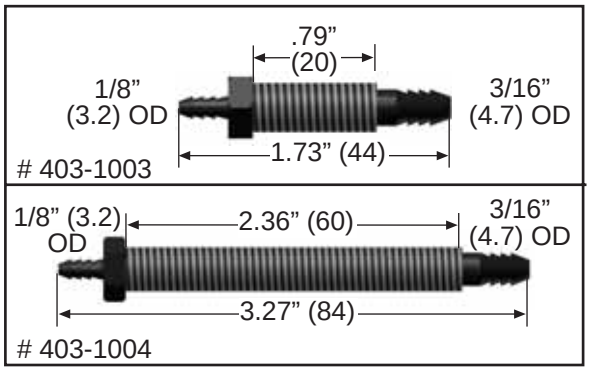


Phone: (541) 327-1546 FAX: (541) 327-3480

Bulkhead Fittings And Hose Connectors

- Two brass fittings available to pass washer fluid through various bulkhead thickness

amequipment.com



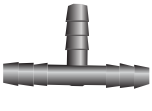
# 414-1136	Brass nut
# 404-1015	Rubber washer
# 414-1137	Stainless washer

Kit:	Includes:	Kit:	Includes:
# 313-1012	1 #404-1001 2 #403-1003 2 #414-1136 2 #404-1015 2 #414-1137	# 313-1015	1 #404-1001 2 #403-1004 2 #414-1136 2 #404-1015 2 #414-1137
# 313-1013	1 #404-1005 3 #403-1003 3 #414-1136 3 #404-1015 3 #414-1137	# 313-1016	1 #404-1005 3 #403-1004 3 #414-1136 3 #404-1015 3 #414-1137
# 313-1014	1 #403-1003 1 #414-1136 1 #404-1015 1 #414-1137	# 313-1017	1 #403-1004 1 #414-1136 1 #404-1015 1 #414-1137

313-1025 90° Bulkhead fitting, 20mm

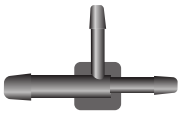
313-1027 Kit, Includes 2 # 313-1025 and 1 # 404-1001

406-1014 Check valve
For use 3/8” ID hose

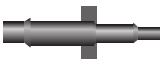


404-1001 Hose T
3/16” x 3/16” x 3/16”
(4.7 x 4.7 x 4.7)

404-1017 Hose Y
3/16” x 3/16” x 3/16”
(4.7 x 4.7 x 4.7)



404-1002 Hose T
3/16” x 1/8” x 1/8”
(3.2 x 3.2 x 3.2)



404-1003 Adapter
1/8” x 3/16” (3.2 x 4.7)

404-1005 4-way adapter
3/16” x 3/16” 3/16” x 3/16”
(4.7 x 4.7 x 4.7 x 4.7)

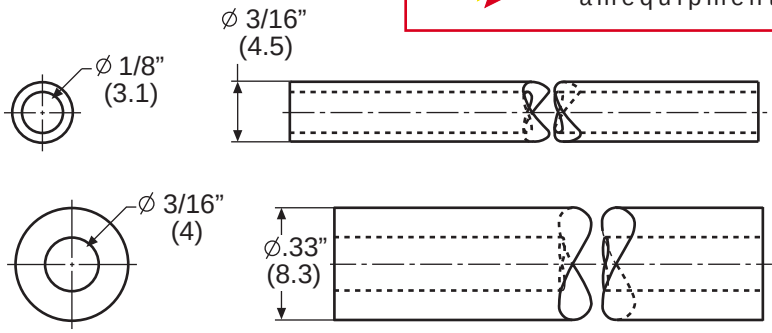
Phone: (541) 327-1546 FAX: (541) 327-3480

801-1053 Rev. 5 04/09

Washer Hose

- Use 3/16” (4.7) hose from washer bottle to bulkhead fitting
- Use 1/8” (3.2) hose from bulkhead fitting to nozzle
- Bulk lengths cut to order

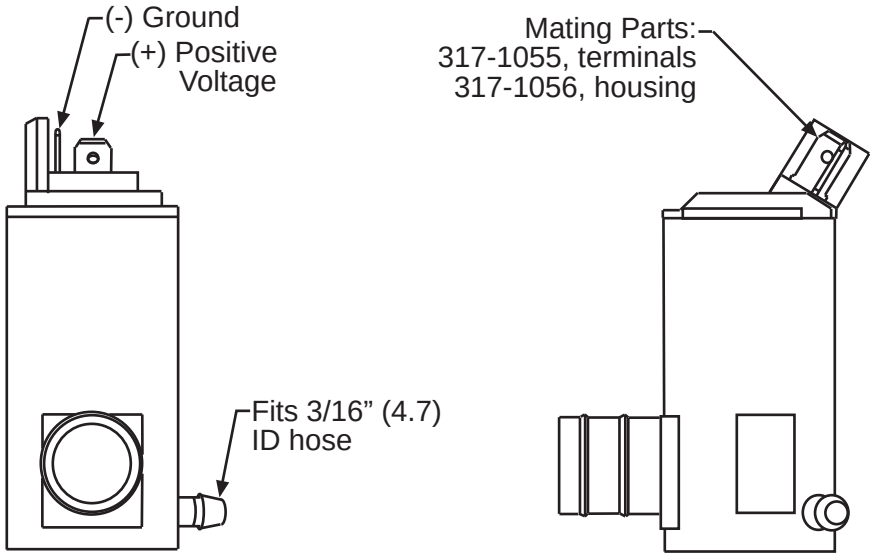
Part #	Inside diameter	Length
314-1007	3/16” (4.7)	12.5’ (3.8m)
314-1008	3/16” (4.7)	18’ (5.5m)
314-1009	3/16” (4.7)	50’ (15.24m)
314-1013	1/8” (3.2)	10’ (3m)
314-1014	3/16” (4.7)	10’ (3m)
314-1015	1/8” (3.2)	20’ (6m)
314-1016	1/8” (3.2)	50’ (15.24m)
405-1001	3/16” (4.7)	800’ (244m) bulk
405-1002	1/8” (3.2)	1600’ (488m) bulk



Pumps

- Available in 12V and 24V
- Delivery volume (with free flow rate): 135 mL displaced during 3 seconds of actuation
- Delivery pressure of 30 psi (2.11 kgf/cm²)

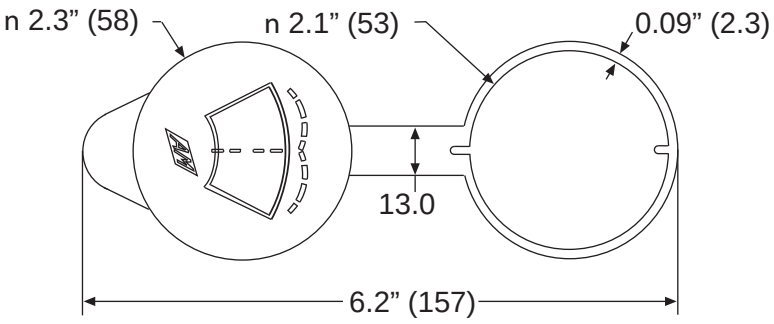
406-1010 12V Pump
406-1011 24V Pump



Lid

- Made of plastic

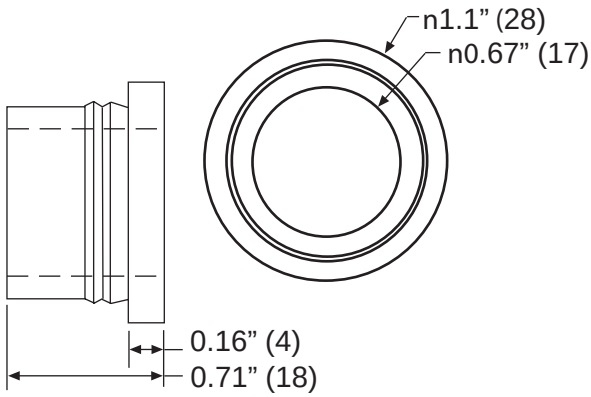
406-1009 Washer bottle lid



Grommet

- Made of EPDM

406-1008 Washer bottle grommet



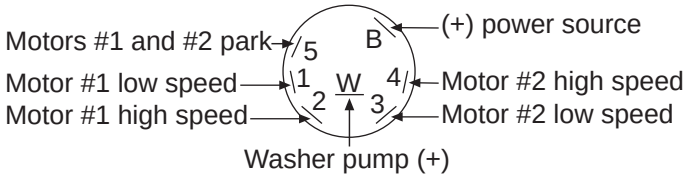
Phone: (541) 327-1546 FAX: (541) 327-3480

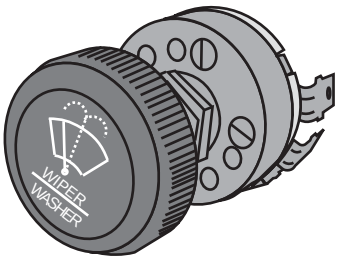
801-1053 Rev. 5 04/09

Wiper Switches

- 2 speed
- Twist knob

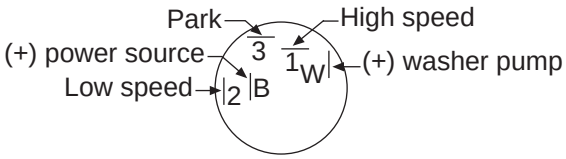
#311-1017
- To operate two coast to park motors
- Push-to-wash
- Without circuit breaker

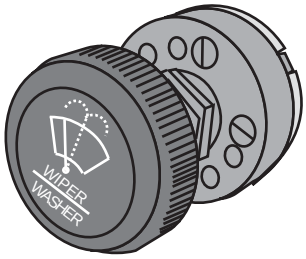




*Ground the motor and washer pump

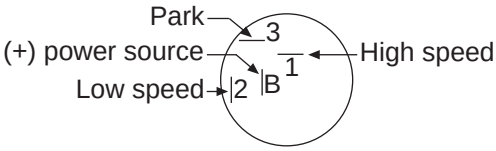
#311-1022
- To operate one coast to park motor
- Push-to-wash
- Internal circuit breaker

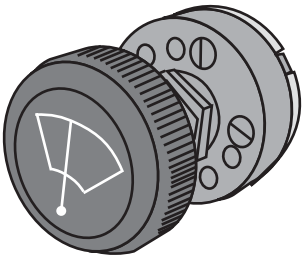




*Ground the motor and the washer pump

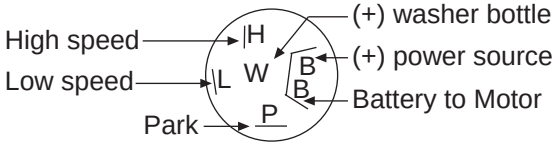
#311-1023
- To operate one coast to park motor
- Internal circuit breaker

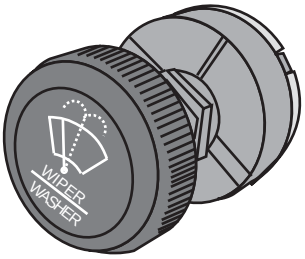




*Ground the motor

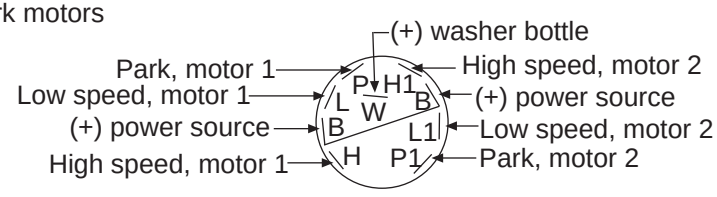
#311-1019
- To operate one dynamic park motor
- Push-to-wash
- Without circuit breaker

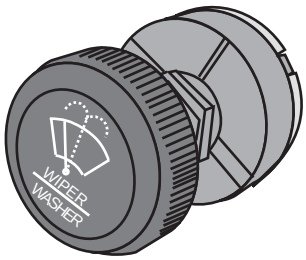




*Ground the motor and washer pump

#311-1030
- To operate two dynamic park motors
- Push-to-wash
- Without circuit breaker





*Ground the motors and washer pump

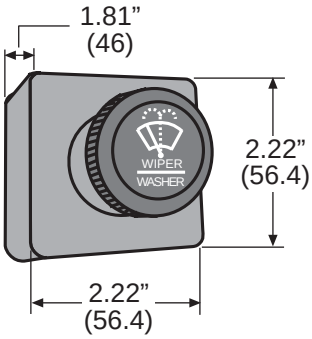
Note: Coast to park and dynamic park switches are not interchangable

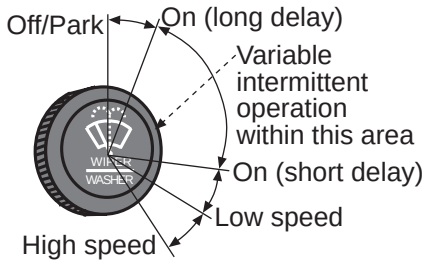
Phone: (541) 327-1546 FAX: (541) 327-3480

Delay Switches

- 2 speed, intermittent delay
- Twist knob
- Die-cast
- Push to wash feature--3 wipes after release of button

amequipment.com





#311-1006

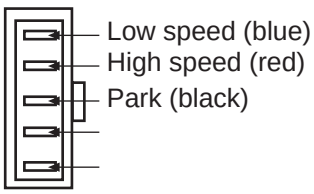
- Operates one 12V dynamic park or coast to park motor
- Operating range: 9VDC-16VDC
- Rotary switch and push switch actuation: 20K cycles min.
- Motor drive: 15A per motor continuous, washer circuit: 3A
- Short circuit proof
- Microprocessor controlled, solid state relay, current limit sense circuit, reverse polarity protected
- Conforms to SAE J1455

*Ground the motor and washer pump

Switch connector
Coast to park motors

Yellow wire - low speed
White wire - high speed
Blue wire - park
Black wire - case ground
Red wire - pos. power source
Brown wire - pos. washer pump

Coast to park motor connector



*Case ground

*Note: Coast to park and dynamic park switches are not interchangable

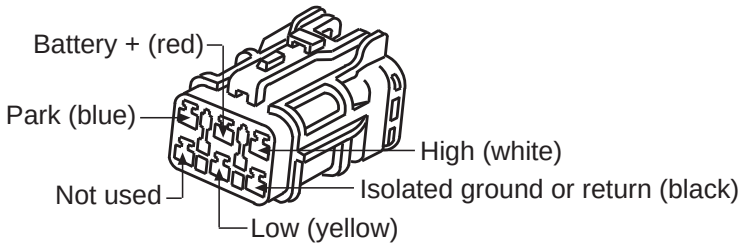
#311-1009

- Same as 311-1006, only operates one 24V motor
- Operating range: 18VDC-32VDC

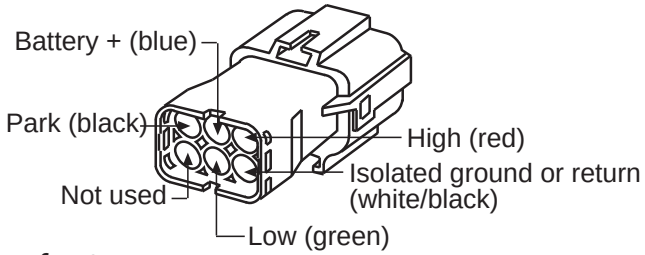
Switch connector
Dynamic park motors

Yellow wire - Low speed
White wire - High speed
Blue wire - Park
Black wire - Ground
Red wire - Pos. power source
Brown wire - Pos. washer pump

Dynamic park harness connector



Dynamic park motor connector

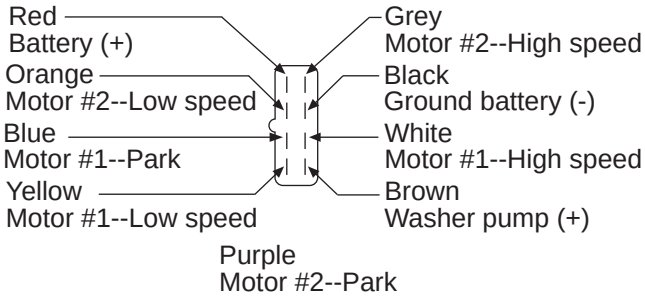


Phone: (541) 327-1546 FAX: (541) 327-3480

801-1055 Rev. 4 07/08

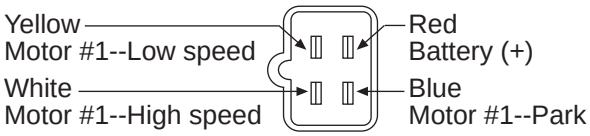
Two-Motor Delay Switches

#311-1026
- Operates two 12V coast to park motors
- Push to wash feature--3 wipes after release of button
- Operating range: 9VDC-16VDC
- Rotary switch and push switch actuation: 20K cycles min.
- Motor drive: 10A per motor continuous, washer circuit: 3A
- Microprocessor controlled, solid state relay, current limit sense circuit, reverse polarity protected
- Conforms to SAE J1455

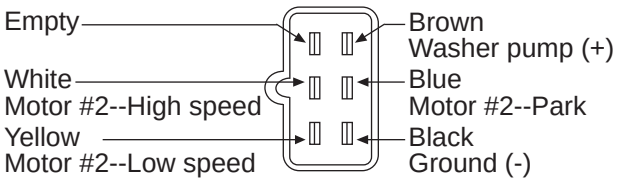


*Both motors must be grounded to battery negative
**Washer pump needs negative ground wire

#311-1027
- Operates two 12V dynamic park motors
- Push to wash feature--3 wipes after release of button
- Operating range: 9VDC-16VDC
- Rotary switch and push switch actuation: 20K cycles min.
- Motor drive: 10A per motor continuous, washer circuit: 3A
- Microprocessor controlled, solid state relay, current limit sense circuit, reverse polarity protected
- Conforms to SAE J1455



*Washer pump needs negative ground wire



#311-1028
- Same as 311-1027, except operates two 24V dynamic park motors

Rocker Switches

#311-1033
- DPDT 3 position rocker switch (ON-ON-ON)
- Operates one dynamic park motor
- Two-speed
- Internal seal
- Independent illumination
- SAE wiper symbol imprinted on lens

(See next page for wiring specifications)

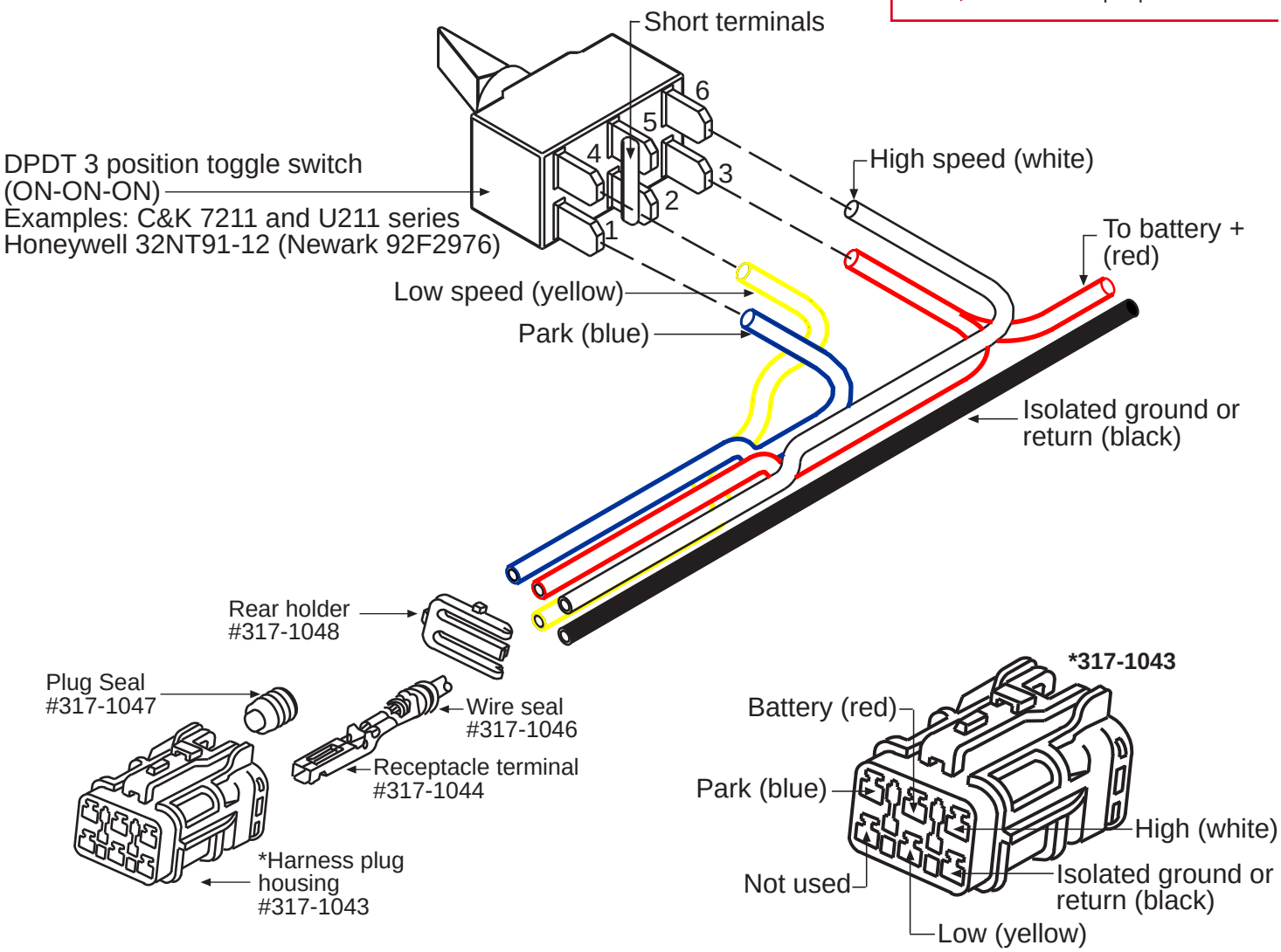
#311-1036
- Off-Mom On rocker switch
- Operates one washer pump
- Internal seal
- Independent illumination
- SAE washer symbol imprinted on lens

Phone: (541) 327-1546 FAX: (541) 327-3480

801-1055 Rev. 4 07/08

Two Speed Dynamic Park Toggle Switch Wiring

amequipment.com

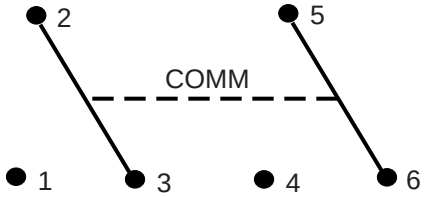


AME offers a DPDT 3 position rocker switch, ON-ON-ON (#311-1033). Wiring is the same as the diagram, with two aditional terminals for switch lamp:

Lamp - → 7 4 5 6

Lamp + → 8 1 2 3

Sample switch diagram
*Not typical of all switches

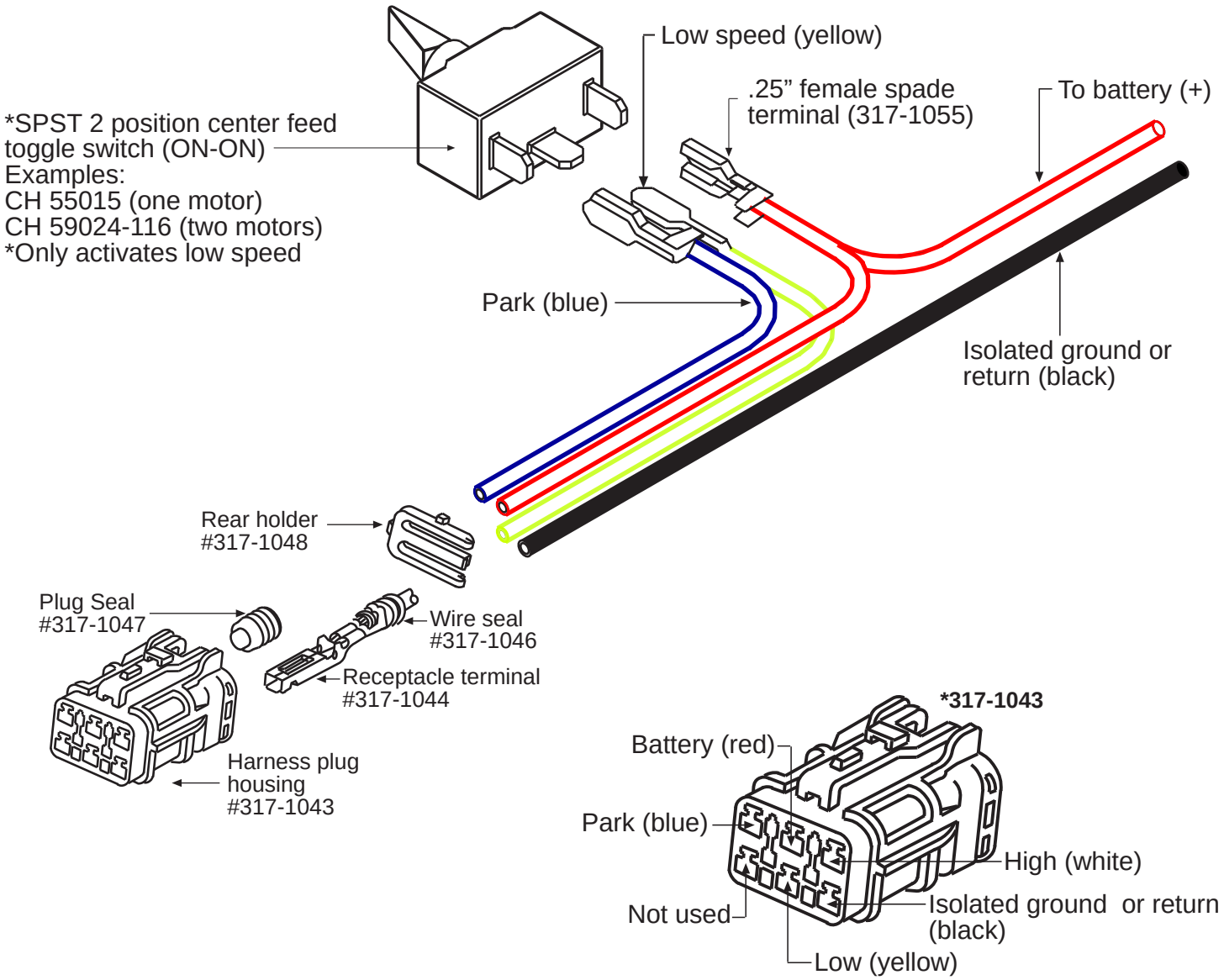


POS-1 (Park) - 2-1, 5-4
POS-2 (Low) - 2-3, 5-4
POS-3 (High) - 2-3, 5-6

Phone: (541) 327-1546 FAX: (541) 327-3480

801-1090 Rev.1 04/07

One Speed Dynamic Park Toggle Switch Wiring



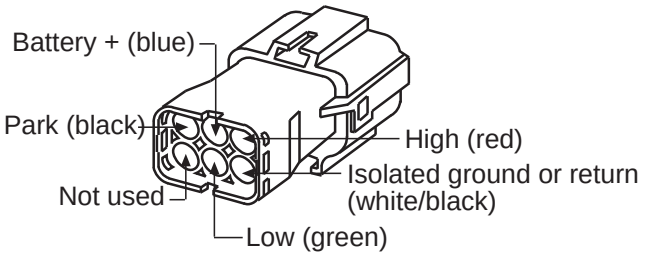
Phone: (541) 327-1546 FAX: (541) 327-3480

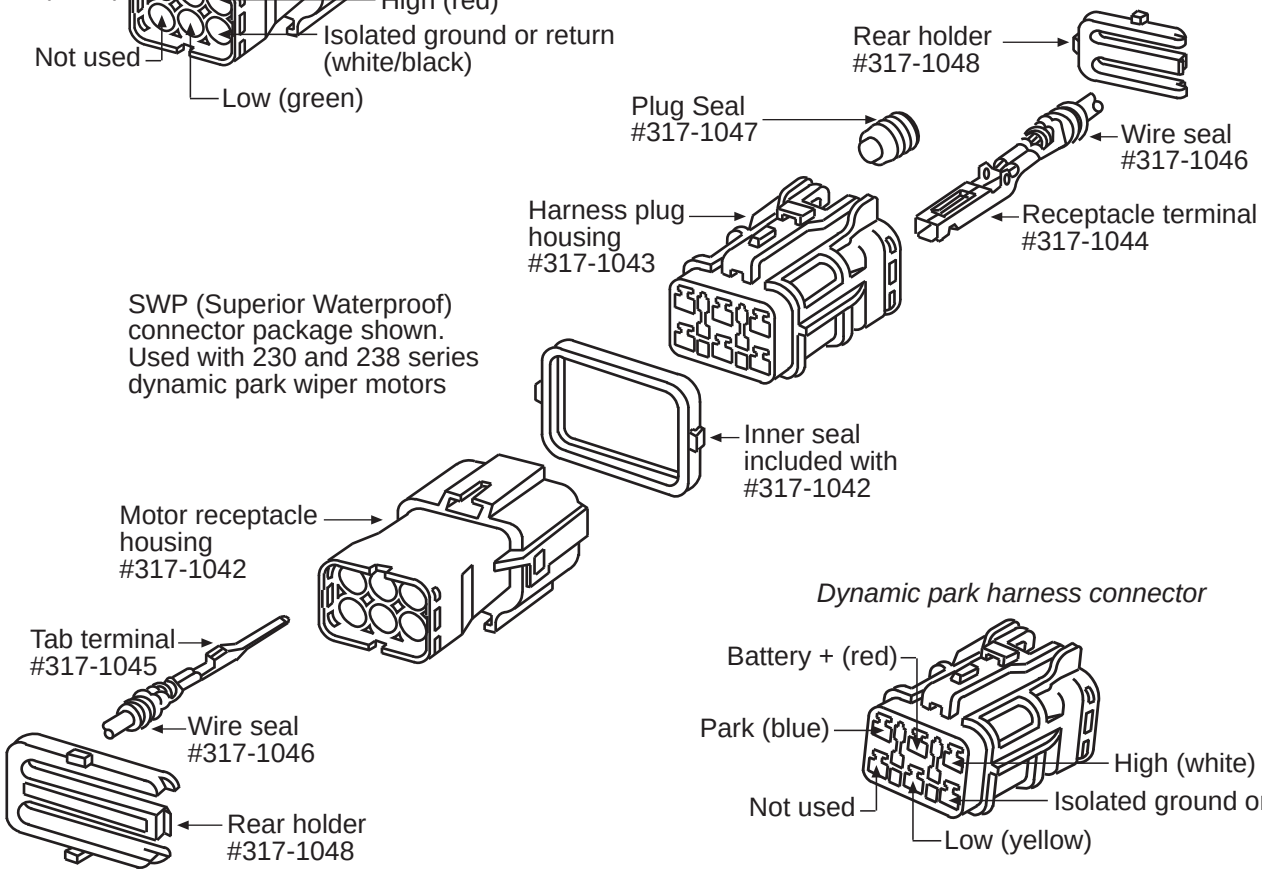
801-1090 Rev.1 04/07

230 and 238 Motor Connectors

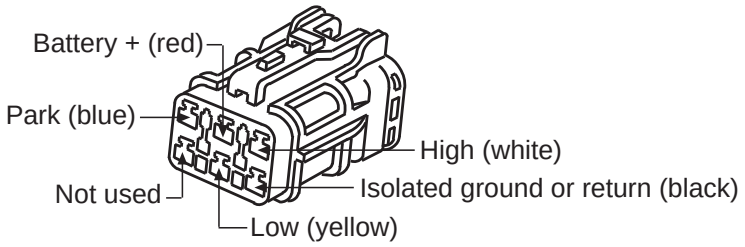
amequipment.com

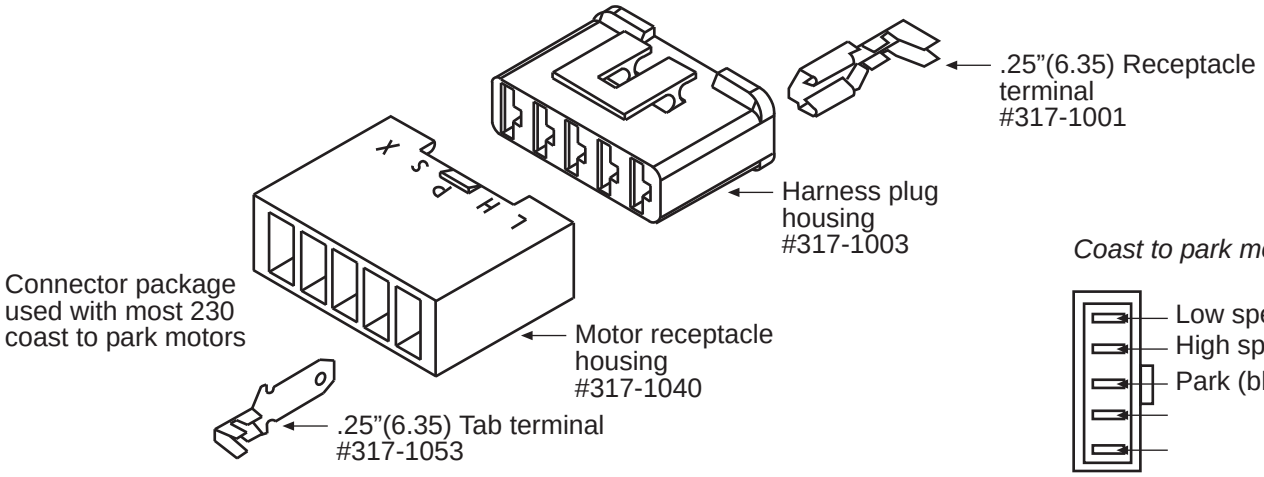
Dynamic park motor connector



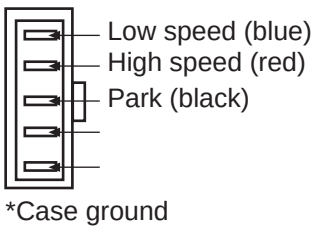


Dynamic park harness connector





Coast to park motor connector



Phone: (541) 327-1546 FAX: (541) 327-3480

Reference Information

amequipment.com

Arm Length
The distance from the center of the pivot shaft to the center of the wiper blade

Breakaway Curve
The place where the curve of the glass becomes too great to wipe

Bridge
The connector at the end of the pantograph arm which attaches the idler to the driver and mounts the blade

Bulkhead Fitting
A washer fluid fitting that provides passage through the bulkhead. The washer hose from the pump connects to the inside of the fitting. The washer hose to the nozzles connects to the outside of the fitting.

Coast to Park Motor (12V/24V)
A motor that needs a power source to park the terminal. When the park circuit is energized, the motor continues to run until it reaches its assigned park position. There, the power is disconnected on the motor's park-plate internally. The motor stops because the power is disconnected.

Connecting link
A link with two bearings that connects the motor drive arm to the pivot shaft.

Cord
The straight-line distance that the center of the blade travels in its sweep pattern measured in inches.

Daylight Opening (DLO)
The area of the windshield glass that you can see through from the inside edges of the moulding.

Drive Arm
A crank arm that bolts onto the output shaft of the motor and drives the connecting linkage.

Dynamic Park Motor (12V/24V)
A motor that is electrically locked in its park position. When the circuit is energized, the motor continues to run to its assigned park position. There, it stops very positively and will not move. This method of wiring is usually utilized where high winds or heavy snow carry the momentum of longer arms and blades past the normal coast to park circuitry.

Margin
The unswept area of the glass beyond the cord length.

Pantograph
A sweep pattern in which the blade stays parallel to the side of the glass.

Pantograph Adapter
A plate which supports the pivot post for the idler of a pantograph arm.

Pivot Shaft
A shaft with a lever to input power from the motor via the connecting link. The lever is attached to an inner shaft that oscillates. The wiper arm is attached to the inner shaft on the outside of the vehicle.

Radial
An arced sweep pattern. The arms are sometimes called "standard arc" or "pendulum" type.

Rise (or Rise and Fall)
The amount a wiper arm moves in and out as it follows the curvature of the glass.

Saddle
A channel at the end of the wiper arm where the center of the wiper blade attaches.

Sweep angle
The arc of the wiper arm measured in degrees.

Tip Pressure
The amount of force exerted on the blade by the spring tension of the wiper arm.

General conversion table for torque units

To obtain \ Multiply number of	Inch ounces	Inch pounds	Foot pounds	Centi-meter kilograms	Meter kilograms	Newton meters
Inch ounces	1	16	192	13.89	1389	141.6
Inch pounds	.0625[1]	1	12	.8680	86.80	8.851
Foot pounds	.005208	.08332[2]	1	.07233	7.233	.7376
Centimeter kilograms	.07201	1.152	13.83	1	100	10.20
Meter kilograms	.0007201	.01152	.1383	.01	1	.102
Newton meters	.007061	.1130	1.356	.09806	9.806	1

[1]or divide by 16
[2]or divide by 12

Phone: (541) 327-1546 FAX: (541) 327-3480

801-1057 Rev. 1 03/06

Frequently Asked Questions

amequipment.com

Q. What is the difference between radial and pantograph wiper systems?
A. Radial wiper systems are typical for most automotive applications. They use a single arm that sweeps the blade in an arc pattern. Pantograph wiper systems have a double arm. One arm is a drive arm that attaches to the pivot shaft. The other arm is an idler that pivots off of a post on the pantograph adapter and keeps the blade parallel to the side edge of the glass (or the center mall in a split windshield).

Q. Which sweep pattern is best for my application?
A. Generally, glass that is wider than it is tall is wiped better with a radial pattern. A pantograph pattern works better on tall, narrow glass. Usually, the pivot locations are close to the window for radial patterns and farther away for pantograph patterns.

Q. Which wiper motor should I use?
A. Wiper motors are rated by stall torque. This is usually expressed in Newton meters (Nm) (See the conversion table on the next page). A 38 Nm motor is recommended for arm and blade combinations of 28” (710mm) and longer and for multiple arms and blades driven by one motor. A 30Nm motor is suitable for arms and blades in the 20” to 28” (500mm to 710mm) range. A 12 Nm motor is appropriate for arms and blades in the 16” to 20” (400mm to 500mm) range. For small arm and blade combinations of 16” (400mm) and under, an 8Nm motor works well. Often motors of 20Nm or less have internal linkage to make the necessary oscillating motion.

Q. What is the difference between coast to park and dynamic park motors?
A. A motor with an automatic park feature will continue to run after it is turned off by a switch until it reaches its predetermined park position. It will then shut itself off. A coast to park motor is internally disconnected when switched off. It coasts to a stop because the motor brushes are de-energized. When a dynamic park motor reaches its assigned park position, it electrically locks in the park position. The park position is always the same on dynamic park motor. The park position may vary several degrees each time with a coast to park motor. Dynamic park and coast to park require specific motors, switches, and wiring circuits.

Q. What circuit protection should I provide?
A. A 12V DC motor draw s about 5 amperes during normal use. With heavy snow or wind loads, this will increase. A 10 amp circuit breaker for one motor, or a 15 amp circuit breaker for a two-motor system is recommended. Use a 5 amp breaker for one 24V motor and a 7 amp breaker for two motors.

Q. Can I use a rocker or toggle switch for my self-parking wiper motor?
A. Yes, if you use a one-speed coast to park motor or only the low speed on a two-speed coast to park. Wire the park circuit hot directly through the ignition switch. Use a single-pole, single-throw switch to energize the low speed brush. Do not use the high speed on a two-speed motor with a toggle or rocker switch. Correctly circuited switches for two-speed and dynamic park motors are featured in the switch section of the catalog.

Q. What is right hand or left hand park?
A. These terms were replaced by *clockwise to park (CW)* or *counterclockwise to park (CCW)*. Looking at the windshield from outside of the vehicle, the wiper arm and blade must travel in a clockwise direction or counterclockwise direction to park.

Q. Why do wiper arms and shafts have so many interfaces (i.e. knurl drum, tapered knurl, DIN)?
A. Over the years, the mainstream manufacturers have each developed their own standards for wiper arms. Drum interfaces were popular in 1950s and 1960s automobiles. The tapered knurl is commonly found on many off road applications, as well as larger applications such as motorhomes and busses. The European DIN standard is the latest world wide adopted interface and can be found on all types of equipment.

Windshield Wiper System Questionnaire Form

amequipment.com

This form will allow our team of engineers to provide you with the best configuration of our systems for your application. Please fill out the form as detailed and accurately as possible, so that we may ensure the best results when using our products.

Company Name _____ Email _____

Contact Name _____ Address _____

Project Name _____ City, State _____

Phone _____ Zip Code _____

Fax _____ Country _____

What CAD system do you use? _____

*AME uses AutoDesk Inventor and can import/export files (please see attached document: 845-0018).

Please check all boxes that correspond to your application.

POWER SUPPLY

- ☐ 12 volt DC
- ☐ 24 volt DC
- ☐ Other _____

MOTOR LOCATION

- ☐ Above window
- ☐ Below window
- ☐ Driver's Side
- ☐ Passenger's Side

SWEEP PATTERN OPTIONS*

- ☐ Radial
- ☐ Pantograph

PARK OPTIONS

- ☐ Dynamic Park (Recommended)
- ☐ Coast to Park

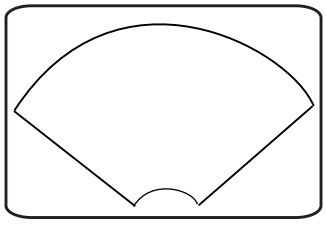
SWITCH OPTIONS

- ☐ One switch
- ☐ Two switches
- ☐ One Motor
- ☐ Two Motors
- ☐ Washer feature
- ☐ Delay feature
- ☐ Smart Wheel™/ Smart Stick™
- ☐ No switch required

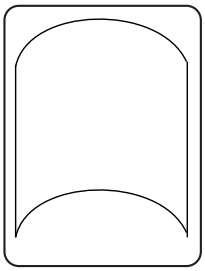
WASHER SYSTEM

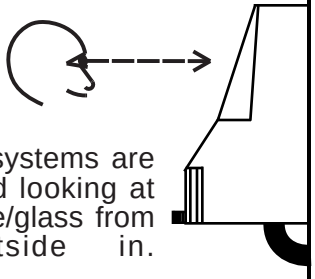
- ☐ Complete with reservoir
  - ☐ 2 Liter
  - ☐ 4 Liter
  - ☐ 10 Liter
- ☐ Without reservoir
- ☐ No system needed

*A radial sweep pattern is arced, uses one arm for each blade, and is more common on glass that is wider than it is tall.



*A pantograph sweep pattern is when the blade stays parallel to the side of the glass. This pattern is more common for glass that is taller and narrower and is achieved by using two linked arms attached to one blade.





All wiper systems are referenced looking at the vehicle/glass from the outside in.

Phone: (541) 327-1546 FAX: (541) 327-3480

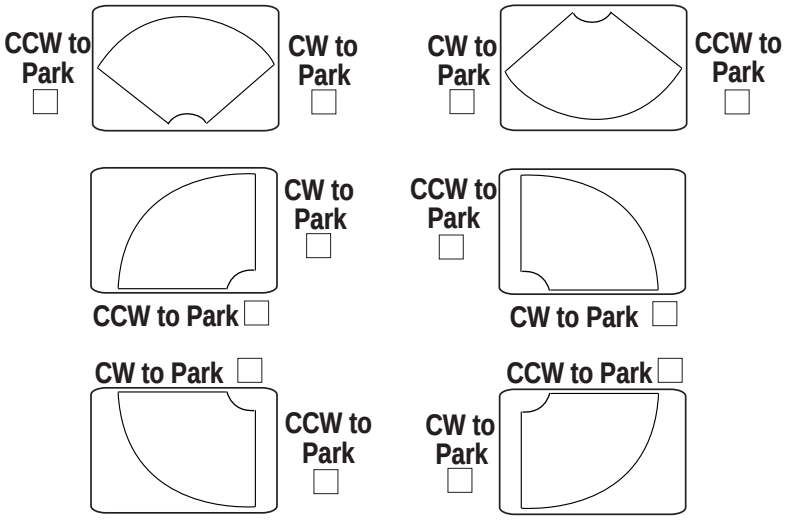
832-1008 Rev. 3 12/08

WINDOW INFORMATION

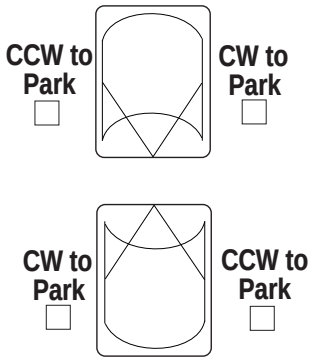
Select your desired park position from the choices below. All illustrations are looking from the outside in. “Clockwise to Park” (CW) means the wiper arm travels in a clockwise direction to reach its park position. “Counterclockwise to Park” (CCW) means the wiper arm travels in a counterclockwise direction to reach its park position.

amequipment.com

Select the park position for radial systems:



Select the park position for pantograph systems:



Please specify the dimensions of your glass according to the diagram below. Make all of the measurements looking from the outside in of the “daylight opening” (DLO), inside of the molding. The DLO is the area of glass that you can see after the windshield is installed and the molding is in place (the actual size of the glass before it is installed is bigger than the daylight opening dimensions of the glass and will affect the proper configuration of your wiper system).

Dimensions in: ☐ Inches ☐ Millimeters

Glass type: ☐ Curved* ☐ Flat

A - Top width _____

B - Bottom width _____

C - Height _____

D - Distance from horizontal edge of DLO

to center of pivot shaft _____

E - Distance from vertical edge of DLO

to center of pivot shaft _____

F - Bulkhead thickness _____

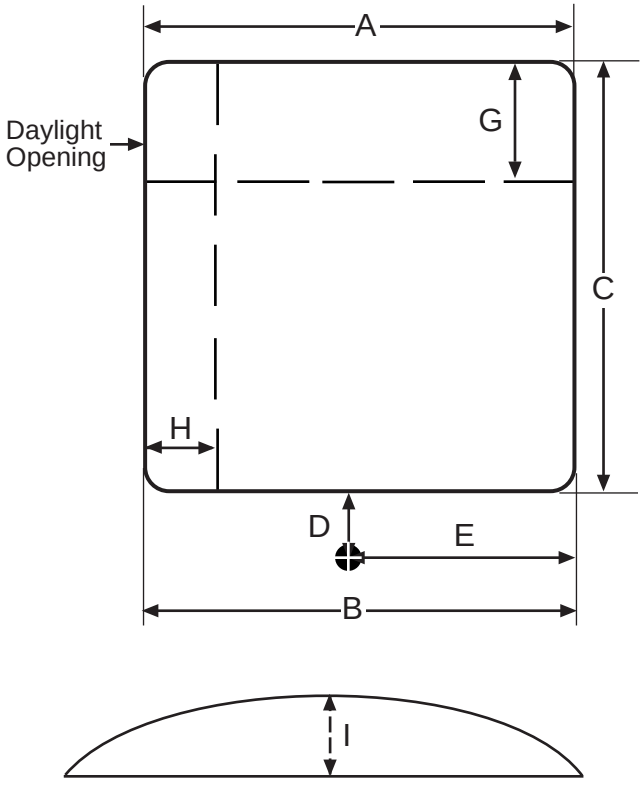
G - Eye-level of the operator _____

H - Breakaway curve from vertical DLO

_____

*For curved glass applications

I - Glass curve radius _____



Comments:

Phone: (541) 327-1546 FAX: (541) 327-3480

832-1008 Rev. 3 12/08

1. Place the cross intersection point directly over the center of your pivot shaft (cut a hole in the paper if necessary) and affix this sheet to the windshield with the bottom edge parallel to the bottom edge of the glass.

2. Measure in inches the distance from the cross intersection point straight up to the bottom edge of the top molding strip to get measurement **A**. Multiply measurement **A** by .6667 and round down to the nearest inch to get measurement **B**. Measurement **B** is the suggested arm and blade length (Note: the arm and blade length may be varied to achieve optimal coverage).

3. a) If the glass is taller than it is wide, you will most likely need a *pantograph* system. Use measurement **B** and align your tape measure to the next smallest sweep angle line while remaining at least one-inch within the side edge of the visible glass. This will give you the suggested sweep angle. Measurement **B** is the suggested arm and blade length.

b) If the glass is wider than it is tall, you will most likely need a *radial* system. Use measurement **A** and align your tape measure to the next smallest sweep angle line while remaining at least one-inch within the side edge of the visible glass. This will give you the suggested sweep angle. Measurement **B** is the suggested arm and blade length (Note: you may need to un-tape the paper and move it or rotate it one way or the other to establish a better sweep pattern).