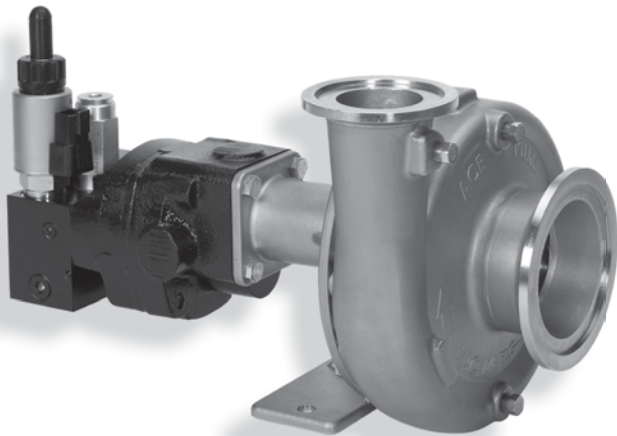




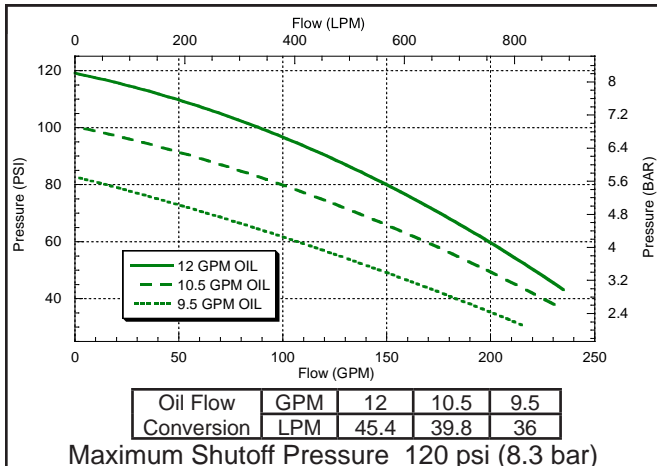
Hydraulic Driven Pump with Integrated PWM Control Valve



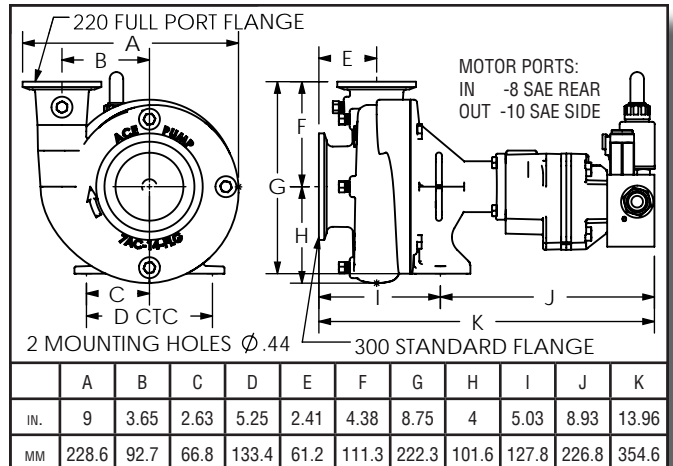
FMCS-205F-HYD-304-PWM FMCS-205FS-HYD-304-PWM

- 300 x 220 Series Flange
- -F Model - Cast Iron
-FS Model - 316 Stainless Steel wet end
- Integrated Proportional 12V Control Valve for Precision Ag applications using Pulse Width Modulated (PWM) control signals
- Integrated Pressure Relief Valve prevents overspeeding
- For the following hydraulic systems:
 - ✓ Pressure Compensated Closed Center
 - ✓ Load Sensing or Pressure and Flow Compensated Closed Center
- Severe Duty Silicon Carbide Mechanical Seal with O-ring Seat for Improved Survivability
- Chemical Resistant Thermoplastic Impeller and optional Cast Iron or 316 Stainless Steel (FS models) available

PERFORMANCE CHART

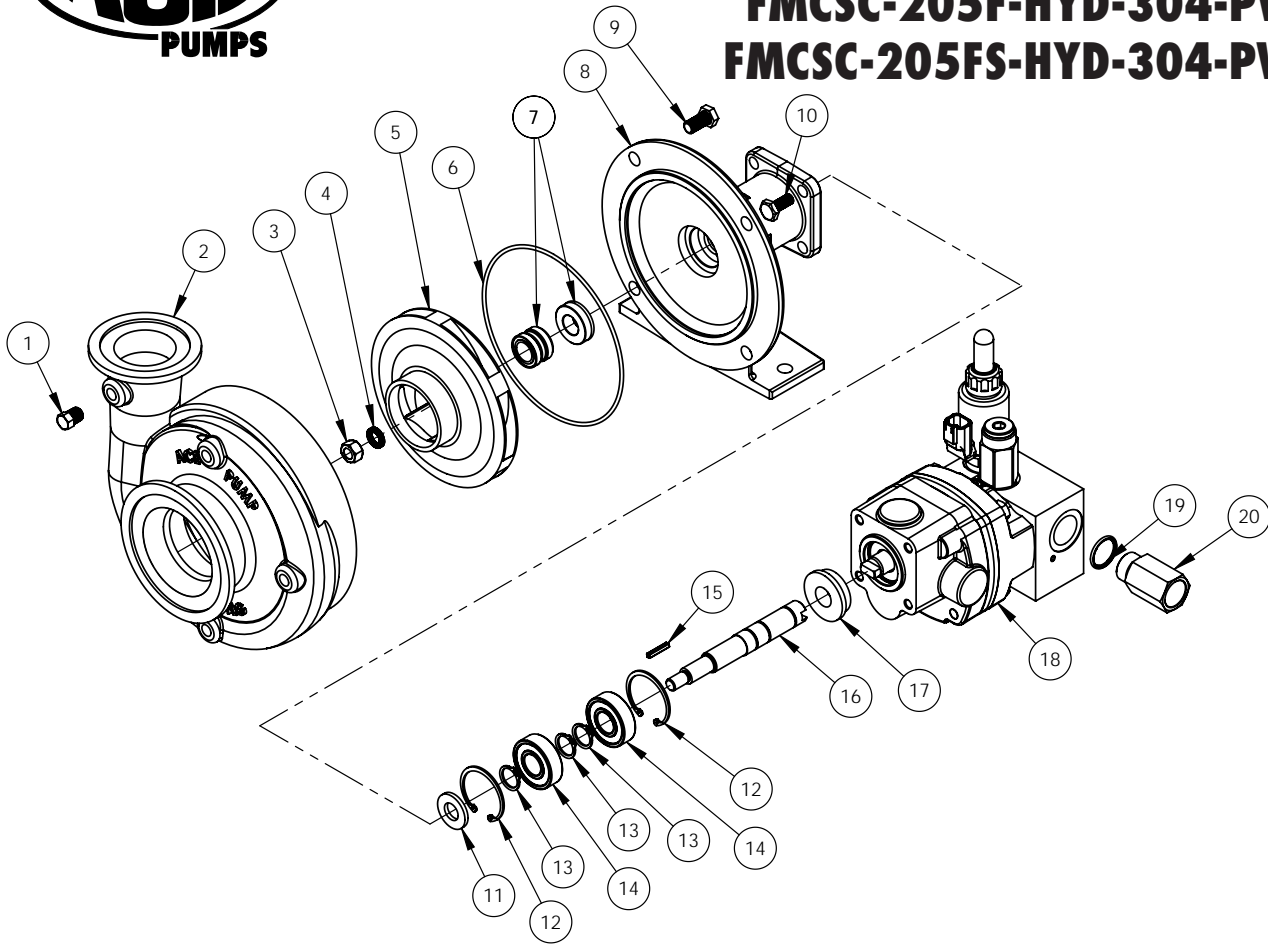


DIMENSIONS





FM CSC-205F-HYD-304-PWM FM CSC-205FS-HYD-304-PWM



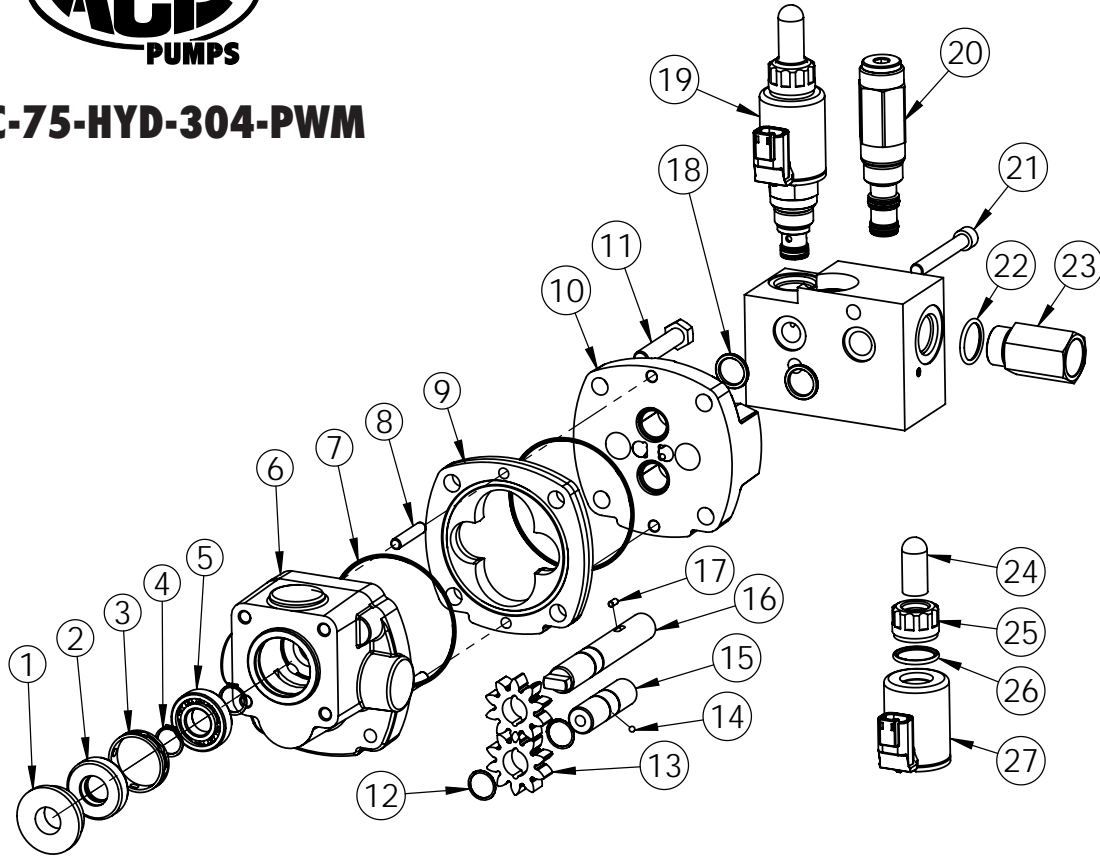
REF. #	PART NUMBER	EDP #	DESCRIPTION	REQ.
1	BAC-53	41110	Pipe plug	4
1	41120	41120	Pipe plug, stainless steel (-FS model) (optional)	4
2	7AC-14-FLG	41530	Volute, 300 standard flange x 220 full port flange, cast iron	1
2	7AC-14-FLG-SS	41532	Volute, 300 flange x 220 flange, 316 stainless steel (-FS model)	1
3	BAC-23-B-SS	40393	Nut, 3/8" NF, stainless steel	1
4	BAC-24-B-SS	42702	Washer, 3/8", stainless steel, self-locking	1
5	BAC-26-200-P	40434	Impeller, thermoplastic	1
5	BAC-26-200-CI	40433	Impeller, cast iron (optional)	1
5	BAC-26-200-SS	40436	Impeller, 316 stainless steel (-FS model) (optional)	1
6⓪	BAC-4A	40005	O-ring, body seal	1
7⓪	BAC-7SC-205V	40149	Seal, silicon carbide	1
8	BAC-14-205-HYD	40338	Mounting frame for 205 pump	1
8	BAC-14-205-HYD-SS	40346	Mounting frame for 205 pump, 316 stainless steel (-FS model)	1
9	40950	40950	Cap screw, 3/8" NC x 3/4" hex head	4
9	40930	40930	Cap screw, 3/8" NC x 3/4" hex head, stainless steel (-FS model)	4
10	41330	41330	Cap screw, 5/16" NC x 3/4" hex head, motor to pump	4
11	BAC-54	41130	Slinger	1
12	BACH-33	40820	Snap ring, internal, BAC-14-205 mounting frame	2
13	BACH-32-HD	40385	Snap ring, external, BAC-6-205 shaft	3
14	40880	40880	Ball bearing, sealed, BAC-6-205 shaft	2
15	BAC-25	40425	Key, 1/8" x 1/8" x 13/16", extended keyway	1
16	BAC-6-205-HYD-SS	40068	Shaft, extended keyway, tang, stainless steel	1
17	S305	40163	Seal support spacer for 205 series pump	1
18	BAC-75-HYD-304-PWM	41348	Hydraulic motor, 11 GPM, PWM	1
19	41445	41445	O-ring, #10 SAE fitting	1
20	BAC-78-10X10SAE	41467	Reverse check assembly, #10 SAE x #10 SAE	1
⓪	RK-FM CSC-205	52705	Repair kit for FMC-205 pump with silicon carbide shaft seal	-
#	RK-BAC-75-HYD-300-L	41362	Repair kit for 300 Series hydraulic motor	-

Item not shown.



HYDRAULIC MOTOR PARTS LIST

BAC-75-HYD-304-PWM



REF #	PART #	EDP #	DESCRIPTION	REQ.
1	S305	40163	Seal support spacer, S305 for 205 Series pumps	1
2 ^o	BAC-75-300-TLS	40154	Seal cartridge, BAC-75-300-TLS	1
3	43056	43056	Spacer seal/bearing, perforated, 300 series motor	1
4	43205	43205	Retaining ring, bearing	2
5	43225	43225	Ball bearing	1
6	43016	43016	Drive plate	1
7 ^o	43130	43130	O-ring, housing seal	2
8	43085	43085	Dowel pin, housing	2
9	43005	43005	Gear housing	1
10	43023	43023	End plate, 300-PWM series motor	1
11	43185	43185	Cap screw, 3/8" N.C. hex head	4
12	43240	43240	Retaining ring, gear	2
13	43035	43035	Gear	2
14	43250	43250	Ball, idler shaft	1
15	43235	43235	Idler shaft	1
16	43046	43046	Drive shaft	1
17	43195	43195	Dowel pin, drive shaft	1
18	74205	74205	O-ring, port sealing, manifold to motor	2
19	PWM-18-PRO-11	74220	Valve assembly, 12V proportional	1
20	PWM-18-PRV-11	74210	Valve assembly, pressure reducing	1
21	41251	41251	Cap screw, 5/16" N.C. x 2.25" socket head	2
22	41445	41445	O-ring, #10 SAE fitting	1
23	BAC-78-10X10SAE	41467	Reverse check assembly, #10 SAE x #10 SAE	1
24	74235	74235	Protector, manual override, PWM-18-PRO	1
25	74230	74230	Nut, coil retainer for PWM-18-PRO	1
26	41445	41445	O-ring, coil nut	1
27	74225	74225	Coil, 12V for PWM-18-PRO	1
28	BAC-75-HYD-304P	41328	Motor, BAC-75-HYD-304-PWM, less manifold	-
#	PWM-1	74200	Manifold assembly, 304-PWM, includes 18 - 23	-
Ⓢ	RK-BAC-75-HYD-300-L	41362	Motor repair kit, includes item 2 & 7	-

Item not shown.

REGULATING HYDRAULIC FLOW TO THE SPRAYER PUMP

There are three general types of hydraulic systems:

- 1) Load Sensing (LS), also known as Pressure-Flow Compensating (PFC) Closed Center
- 2) Pressure Compensating Closed Center (PC)
- 3) Open Center (OPEN)

This product is designed to operate on both Closed Center Hydraulic Systems. It should not be used with Open Center systems. Please consult the Tractor Hydraulic System Pump Selection Guide(HSG), Internet Hydraulic Selection Guide (IHSG) at www.AcePumps.com, or your tractor dealer to determine your tractor's hydraulic system.

The two valve design limits the maximum oil flow to the motor and prevents overspeeding. So the Restrictor Orifice and Flow Limiter are not needed with this product.

All PWM controllers are slightly different in the terminology used and setup procedures. Please consult your controller documentation or their technical service department for additional assistance with your specific application and implement in use.

Link to Ace Pump
IHSG

<http://www.acepumps.com/ihsg/>



Link to Ace Pump
PWM Technical File

http://www.acepumps.com/_Assets/Literature/PWM_Technical_File.pdf



The screenshot shows the ACE PUMPS logo and the IHSG title. Below the title, it says "Internet Hydraulic Selection Guide". There is a section for selecting a tractor make and model number. A grid of logos for various tractor brands is displayed, including AGCO, CASE, Challenger, John Deere, Kubota, Massey Ferguson, Versatile, McCormick, and White. At the bottom, it lists ACE PUMP CORPORATION with contact information: P.O. Box 13187 • 1650 Channel Avenue • Memphis, TN 38113. Phone: (901) 948-8514 • Fax: (901) 774-6147.

The screenshot shows the ACE PUMPS logo and the title "PWM Technical File". It is dated "Updated 12/2015". The document contains sections on "PWM Control Basics and Terminology", "Dither", "Stiction", "Hysteresis", "Valve Settings & Performance", and "Typical Valve Performance Graph".

PWM Control Basics and Terminology
 PWM (Pulse Width Modulated) control systems are being used widely in modern liquid applications. The use of this technology is driven by the need in agriculture for precision application of fertilizers and chemicals. The goal is to apply what is needed at the correct time while minimizing input cost, preventing runoff which may contaminate water supplies, and eliminate drift.

The PWM signal is an efficient technique to control current to a proportional electrical hydraulic valve. The PWM signal switches on and off to achieve the required control current (see Figure 1). The duty cycle "D" refers to the "on" portion of the cycle. The duty cycle can be anywhere from 0 (signal always off) to 1 (signal always on).

Dither is a rapid, small variation in the control signal designed to keep the valve spool in motion. This movement is intended to avoid stiction and average out hysteresis.

Stiction keeps the valve spool from moving when control signal changes are small. When the valve spool finally moves it can overshoot the correct position.

Hysteresis is the tendency for the spool movement to be different if the signal is increase or decreasing. This can happen even with the identical control signal.

Valve Settings & Performance

I-Min or Minimum PWM is the minimum control current induced into the control valve. This is typically set to the point where the control signal creates a response from the valve spool. For Ace Pumps, this is typically set to the point when our pump starts to turn or where a minimum application pressure is achieved. This eliminates the **Deadband** which is typical for all control valves (see Figure 2).

I-Max or Maximum PWM is the maximum control current supplied to the control valve. This is typically set to the point where the control signal results in maximum performance. For Ace Pumps, set this to achieve the maximum shut-off pressure recommended for the pump model.

Figure 1
 A graph showing three pulse width modulated signals. The first pulse is 50% on, the second is 25% on, and the third is 75% on. The period for each pulse is 1 Hz, and the frequency is 1 Hz = 1 Cycle per Second.

Figure 2
 A graph titled "Typical Valve Performance Graph" showing US GPM (l/min) on the y-axis (0 to 40) versus (I+V) (A) on the x-axis (0 to 1.8). Three lines represent different valve settings, showing an increase in flow rate as current increases.

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