

## YASKAWA VARIABLE FREQUENCY DRIVES

### Drive Overview

The iQpump was designed with the pump service operators and pumpsystem owners in mind. iQpump offers ease of setup and comprehensive pump and motor protection features. The integrated pump software and setup parameters allow the operator to set up specific control values for a wide range of applications. The iQpump will automatically adjust pump operating conditions, as the process variables change, while still maintaining optimum pump performance and protection. iQpump can also replace phase converters when converting from a single-phase to a three-phase pump motor.



The iQpump1000 drive was designed with the pump service operators and pump system owners in mind. iQpump1000 offers ease of setup and comprehensive pump and motor protection features.

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Most existing systems, which require constant pressure or flow control, are using bypass lines, pressure release valves, throttling valves, or impeller trim adjustments. The most efficient method is pump speed control. Pump speed control will reduce energy consumption, while maintaining system optimization.

The iQpump1000 drive can be configured for Simplex, Duplex, Triplex, or up to an eight-pump system. One iQpump1000 drive can be used as a master, which can also control one or two secondary pump motors. The secondary pump motors can be connected using mechanical motor starters, reduced voltage soft starters, or additional iQpump1000 drives. The software is structured in such a way that it only has a few basic pump parameters to be set up to run this application.

The iQpump1000 drive from Yaskawa is available from 3/4 to 500 horsepower. In addition to Irrigation Pumps in Commercial and Residential applications, the iQpump1000 drive is suitable for a variety of other pumping applications such as Pressure Booster Pumps, Submersible Deep Well Pumps, Storage Tank Level Control, and Metering Pumps.



## iQPump1000 FEATURES

### Drive Performance Features

- Ratings: 3/4-175 HP, 208 VAC 5-150 HP, 230 / 240 VAC 1-500 HP, 480 VAC, 1-250 HP, 600 VAC
- Overload capacity: nominal 120% for 60 sec. (150% peak)
- Starting torque: 100% at 3 Hz
- Motor preheat function
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range: 40:1
- Critical frequency rejection: 3 selectable, adjustable bands
- Torque-limiting: 30-180%
- Energy Saving control
- Torque boost: full range, auto
- Power loss ride-thru: 2 sec.
- Auto restart after power loss or fault reset, selectable, programmable
- Feedback signal loss detection
- Serial communications loss detection
- "Up/Down" floating point control capability (PI)
- Stationary motor auto-tuning
- Pump Sleep function
- Run-permissive input

### Protective Features

- Current-limited stall prevention
- Heat sink overtemperature, speed fold-back
- Bi-directional start into rotating motor
- Current-limiting DC bus fuse
- Optically-isolated controls
- Short circuit protection: Phase-phase and phase-neutral
- Ground fault protection
- Short circuit withstand rating: 100K RMS
- Electronic motor overload: UL
- Current limit
- Fault display: last 10 faults
- Fault circuit: OC, OV, OT
- Over torque and under torque protection

### Design Features

- LCD keypad display, 5 lines x 16 characters, backlit, 4 languages, copy function
- Multi-step speed settings: 5 available
- Setpoint (PI) control
- 32-bit microprocessor logic
- Non-volatile memory, program retention
- Displacement power factor: 0.98
- Output frequency: 0.1 to 400 Hz
- Frequency resolution: 0.06 Hz
- Frequency regulation: 0.1%
- Control Terminal Board: Quick disconnect
- Carrier frequency: selectable to 15 kHz
- 3% DC bus reactor: 30-150 HP, 208 VAC; 30-150 HP, 240 VAC; 40-500 HP, 480 VAC; optional on lower ratings
- 24 VDC control logic, PNP / NPN selectable
- Transmitter/Option power supply
- Input/output terminal status
- Timer function: Elapsed time, Delay on start, Delay on stop
- RS-422/485 port: Modbus protocol
- Volts/hertz ratio: Preset and programmable V/Hz patterns
- Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
- NEMA 1 or protected chassis
- UL, cUL listed and CE marked; IEC 146;
- MTBF: exceeds 28 years

### Service Conditions

- Ambient Temperature:
  - -10°C to 40°C (14°F to 104°F) NEMA 1,
  - -10°C to 50°C (14°F to 113°F) protected chassis
- Humidity: 95% RH, non-condensing
- Altitude: 3300 ft; higher by derate
- Input voltage: +10%/-15%
- Input frequency: 50/60 Hz ± 5%
- 3-phase, 3-wire, phase sequence insensitive



### Pump Control Features

- Operator Keypad with intuitive pump language
- Hand-Off-Auto
- Programmable Pump Process Set Point
- Pump Start Level & Start Time
- Sleep Protection
- Simplex, Duplex, & Triplex Control
- Automatic System Restart
- No Flow Detection
- Low and High Feedback set points
- Pre-Charge Low Level Control
- Thrust Bearing Control
- Automatic System Stabilization
- Motor Condensation Pre-Heat Function

### Pump Protective Features

- Dry Well
- Air in System
- Blocked Impeller
- Pump Over Cycling
- No Flow Protection
- Loss of Prime
- Transducer Loss
- Over Torque

### Pump Alarms and Messages

- Low Feedback
- High Feedback
- Low Level
- Low Water
- Pump Over Cycling
- No Flow Detection
- Loss of Prime
- Pump Fault
- Motor Thermostat
- Pre-Charge Mode
- Thrust Bearing Active
- Start Mode Active
- Sleep Mode Active



## STANDARD DRIVES 200 - 240V

Rated Input Voltage	Rated Output Amps	Nominal HP <sup>(3)</sup>	Standard Enclosure <sup>(1,2)</sup> Model Number
<b>200-240V 3-Phase</b>	3.5	.75	<b>Y2/0004F</b>
	6.0	1	<b>Y2/0006F</b>
	8.0	2	<b>Y2/0008F</b>
	9.6	3	<b>Y2/0010F</b>
	12.0	3	<b>Y2/0012F</b>
	17.5	5	<b>Y2/0018F</b>
	21.0	7.5	<b>Y2/0021F</b>
	30.0	10	<b>Y2/0030F</b>
	40.0	15	<b>Y2/0040F</b>
	56.0	20	<b>Y2/0056F</b>
	69.0	25	<b>Y2/0069F</b>
	81.0	30	<b>Y2/0081F</b>
	110.0	40	<b>Y2/0110F</b>
	138.0	50	<b>Y2/0138F</b>
	169.0	60	<b>Y2/0169F</b>
	211.0	75	<b>Y2/0211F</b>
	250.0	100	<b>Y2/0250A</b>
	312.0	125	<b>Y2/0312A</b>
360.0	150	<b>Y2/0360A</b>	
415.0	175	<b>Y2/0415A</b>	

**(1)** Standard Enclosure can be conventionally mounted, or heatsink external (kit required for models Y2/0081F and smaller). Flange Enclosure includes special factory-installed gasketing and flange to provide NEMA 12 backside integrity when mounting heatsink external.

**(2)** Only models ending in FAA (Y2/0211F and smaller) come standard with NEMA 1 End Cap Kits. Separately sold kits are available for larger models.

**(3)** Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors. Also, listed power ratings assume three-phase input.

**Consult factory for single phase options.**

## STANDARD DRIVES 380 - 480V

Rated Input Voltage	Rated Output Amps	Nominal HP <sup>(3)</sup>	Standard Enclosure <sup>(1,2)</sup> Model Number
<b>380-480V 3-Phase</b>	2.1	1	<b>Y4/0002F</b>
	4.1	2	<b>Y4/0004F</b>
	5.4	3	<b>Y4/0005F</b>
	6.9	4	<b>Y4/0007F</b>
	8.8	5	<b>Y4/0009F</b>
	11.1	7.5	<b>Y4/0011F</b>
	17.5	10	<b>Y4/0018F</b>
	23.0	15	<b>Y4/0023F</b>
	31.0	20	<b>Y4/0031F</b>
	38.0	25	<b>Y4/0038F</b>
	44.0	30	<b>Y4/0044F</b>
	58.0	40	<b>Y4/0058F</b>
	72.0	50	<b>Y4/0072F</b>
	88.0	60	<b>Y4/0088F</b>
	103.0	75	<b>Y4/0103F</b>
	139.0	100	<b>Y4/0139F</b>
	165.0	125	<b>Y4/0165F</b>
208.0	150	<b>Y4/0208A</b>	
250.0	200	<b>Y4/0250A</b>	

**(1)** Standard Enclosure can be conventionally mounted, or heatsink external (kit required for models CIMR-PW4A0044FAA and smaller). Flange Enclosure includes special factory-installed gasketing and flange to provide NEMA 12 backside integrity when mounting heatsink external.

**(2)** Only models ending in FAA (CIMR-PW4A0165FAA and smaller) come standard with NEMA 1 End Cap Kits. Standard models CIMR-PW4A0362AAA and smaller are compatible with NEMA 1 End Cap Kits shown on page 29. NEMA 1 End Cap Kits for models CIMR-PW4A0414AAA and larger are also shown on page 29, but NEMA 1 Compatible special order numbers (UUX ...) must be used until further notice. UUX special order drives have a longer lead time than standard drives (consult Yaskawa inside sales). UUX special order number will not appear on drive nameplate.

**(3)** Horsepower rating is based on standard NEMA B 4-pole motor design as represented in NEC table 430.150 Full-Load Current, Three-Phase Alternating Current Motors. Also, listed power ratings assumes three-phase input.

**Consult factory for single phase options.**

## AC LINE / LOAD REACTORS, 5% 200 240V

Rated Input Voltage	Nominal HP	Drive Model	Nominal 5% Impedance			
			Reactor Rated Current (a)	Inductance	Enclosed Part Number	Weight (lb)
<b>200-240V 3-Phase</b>	.5	Y2/0004F	2	12000	05P00620-0015	11
	.75	Y2/0004F	4	6500	05P00620-0021	11
	1	Y2/0006F	4	6500	05P00620-0021	11
	1.5	Y2/0006F	8	3000	05P00620-0028	15
	2	Y2/0008F	8	3000	05P00620-0028	15
	3	Y2/0018F	12	2500	05P00620-0033	17
	5	Y2/0018F	18	1500	05P00620-0037	15
	7.5	Y2/0021F	25	1200	05P00620-0042	32
	10	Y2/0030F	35	800	05P00620-0047	34
	15	Y2/0040F	45	700	05P00620-0051	46
	20	Y2/0056F	55	500	05P00620-0055	45
	25	Y2/0069F	80	400	05P00620-0059	51
	30	Y2/0081F	80	400	05P00620-0059	51
	40	Y2/0110F <sup>(1)</sup>	100	150	URX000204	47
	50	Y2/0138F <sup>(1)</sup>	130	100	05P00620-0066	47
	60	Y2/0169F <sup>(1)</sup>	160	75	URX000206	59
	75	Y2/0211F <sup>(1)</sup>	250	45	URX000248	65
	100	Y2/0250A <sup>(1)</sup>	250	45	URX000248	65
	125	Y2/0312A <sup>(1)</sup>	320	40	URX000249	107
	150	Y2/0360A <sup>(1)</sup>	400	30	URX000250	111
175	Y2/0415A <sup>(1)</sup>	500	25	URX000251	111	

(1) "Large" iQpump1000 chassis have a built-in DC link reactor equivalent to 3% line reactance. 240 VAC ratings are shown with 3% added AC reactance for 6% total.

## AC LINE / LOAD REACTORS, 5% 380 - 480V

Rated Input Voltage	Nominal HP	Drive Model	Nominal 5% Impedance			
			Reactor Rated Current (a)	Inductance	Enclosed Part Number	Weight (lb)
<b>380-480V 3-Phase</b>	.5	Y4/0002F	1	36000	URX000241	11
	.75	Y4/0002F	2	20000	05P00620-0016	11
	1	Y4/0002F	2	20000	05P00620-0016	11
	1.5	Y4/0004F	4	12000	05P00620-0023	13
	2	Y4/0004F	4	12000	05P00620-0023	13
	3	Y4/0005F	8	7500	URX000226	20
	5	Y4/0009F	8	5000	05P00620-0029	18
	7.5	Y4/0011F	12	4200	05P00620-0034	25
	10	Y4/0018F	18	2500	05P00620-0038	34
	15	Y4/0023F	25	1800	05P00620-0043	38
	20	Y4/0031F	35	1200	05P00620-0048	48
	25	Y4/0038F	35	1200	05P00620-0048	48
	30	Y4/0044F	45	1200	05P00620-0052	57
	40	Y4/0058F <sup>(1)</sup>	55	500	05P00620-0055	45
	50	Y4/0072F <sup>(1)</sup>	80	400	05P00620-0059	51
	60	Y4/0088F <sup>(1)</sup>	80	400	05P00620-0059	51
	75	Y4/0103F <sup>(1)</sup>	100	300	05P00620-0062	55
	100	Y4/0139F <sup>(1)</sup>	130	200	05P00620-0067	61
	125	Y4/0165F <sup>(1)</sup>	160	150	05P00620-0073	68
	150	Y4/0208A <sup>(1)</sup>	200	110	05P00620-0078	72
200	Y4/0250A <sup>(1)</sup>	250	90	05P00620-0083	107	

(1) "Large" iQpump1000 chassis have a built-in DC link reactor equivalent to 3% line reactance. 480 VAC ratings are shown with 3% added AC reactance for 6% total.