



## Step 1 Wiring and setting up an iQpump1000 Duplex System

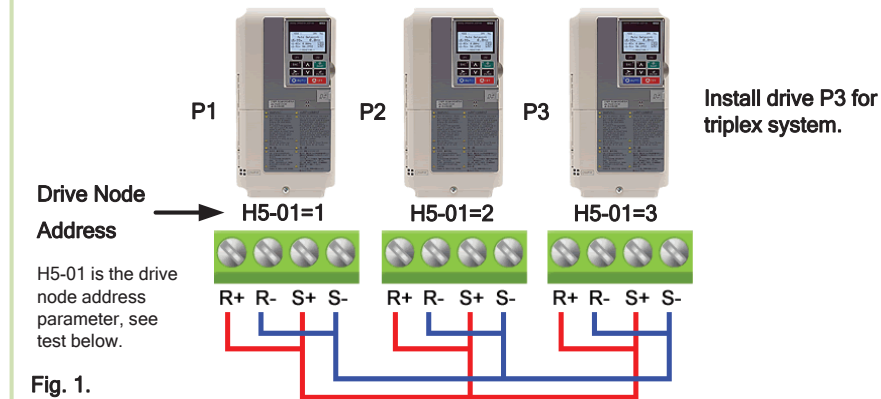
### APPLICATION DESCRIPTION

This step shows how to connect and wire an iQpump1000 Duplex or Triplex System using a transducer for each iQpump1000 drive.

Before making any connections **MAKE SURE POWER TO THE iQpump1000 IS TURNED OFF!** Next remove the terminal cover to gain access to the control terminals. (Step 1.)

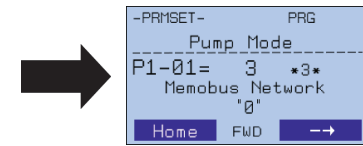
### NETWORK WIRING

1. Jumper terminals (R+ to S+) and jumper terminals (R- to S-) terminals on each individual iQpump1000 drive according to Fig. 1.
2. Use shielded communication cable to connect the iQpump1000 drives in a daisy chain the (R+ to S+, R- to S-) terminals between each iQpump1000 drive.

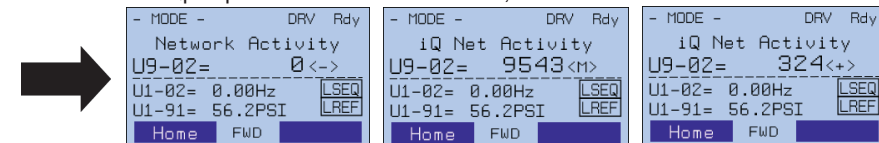


### MULTIPLEX NETWORK PROGRAMMING

3. Power-up the iQpump1000 Drives.
4. Set drive node address parameter H5-01 (see figure 1.) for each iQpump1000 drive.
5. Program each iQpump1000 parameter P9-25 (Highest Node Address) to 2 for a duplex system and 3 for a triplex system.
6. Program each iQpump1000 parameter P1-01 set to 3 (Pump Mode) to:



7. **! Cycle power to ALL iQpump1000 drives on the network.**
8. Check U9-02 and verify that :
  - No iQpump1000 drives have a value of "0" <->.
  - All iQpump1000 drives receive valid data and U9-02 changes regularly.
  - At least one iQpump1000 drive has the unit <M>, while the rest have the unit <+>.



9. If there is an iQpump1000 drive with "U9-02 = 0 <->" as shown above:
  - Check communication wiring as shown on first page of this report
  - Verify the serial communication address (H5-01) as shown on first page of this report
  - Confirm P9-25 and P9-27 settings on all drives. P9-25 should be set to the highest H5-01 address and at least one iQpump1000 drive should have P9-27 = 0.
  - Cycle power to all iQpump1000 drives.

The following procedure is a supplement to documentation supplied with this equipment and will guide the user in wiring multiple iQpump1000 drives for a multiplex pump application.

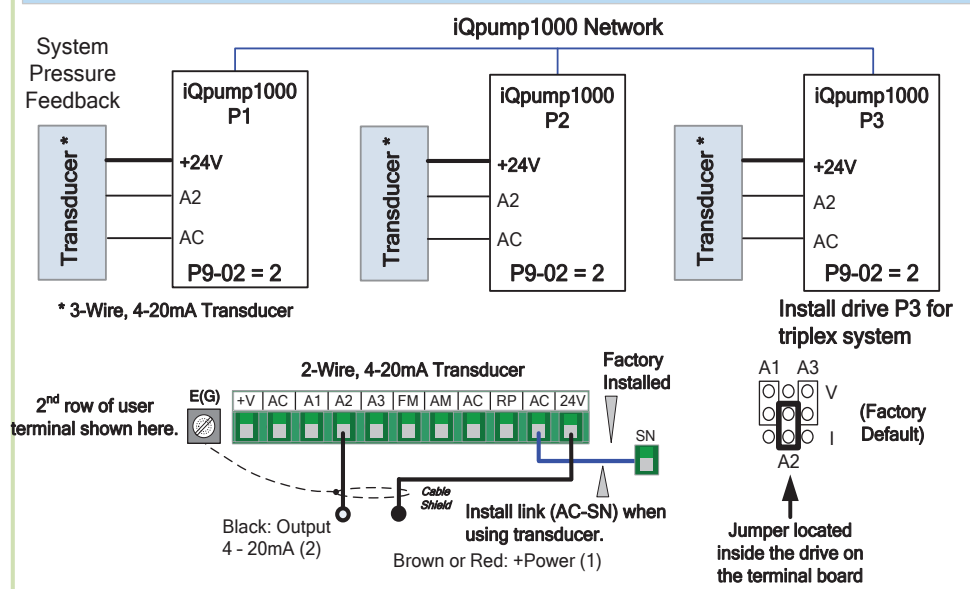
**DANGER!**  
*Improper wiring can and will cause bodily harm as well as damage to the equipment.*

Follow good wiring practices and applicable codes when installing the system. Ensure that the mounting of the various components are secure and that the environment, such as extreme dampness, poor ventilation etc. will not cause system degradation.

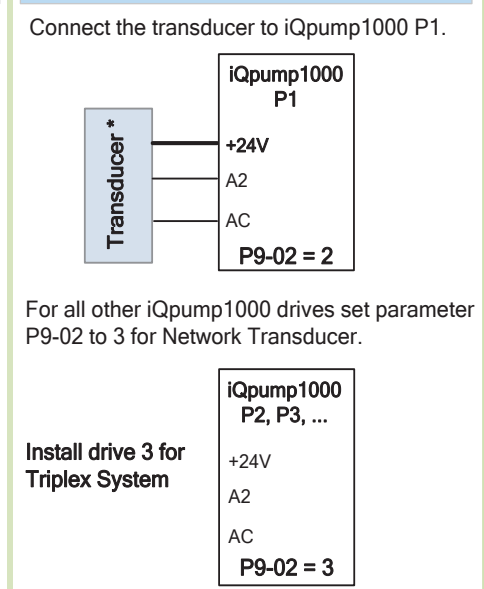
*Read this Quick Start Procedure and other documentation provided with the iQpump1000 thoroughly before attempting installation.*

## Step 2 Transducer Wiring

### ONE TRANSDUCER PER iQpump1000 DRIVE



### USE SINGLE NETWORK TRANSDUCER



## Step 3 Pump Rotation Check / Change Motor Direction / Real Time Clock Setup

### CHECK PUMP ROTATION

Push **HAND** on the Digital Operator; the display should read

```

- MODE -   DRV   Rdy
Hand Reference 1
U1-01= 40.00Hz
U1-02= 40.00Hz
U1-91= 34.2PSI
<-MONITOR->
    
```

and the **HAND** LED should be **ON**.

The motor should now be operating in the correct direction of pump.

Push **OFF** on the Digital Operator;

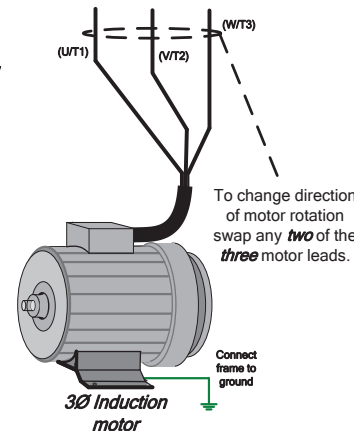
Press **ENTER** to access Hand Speed. Use **▲** **▼** **RESET** to change hand Speed value. Press **ENTER** to save value.

*If the direction is not correct, then power down the iQpump1000 and follow instructions below.*

**DANGER!**

*After the power has been turned OFF, wait at least five minutes until the charge indicator extinguishes completely before touching any wiring, circuit boards or components.*

*Next swap any two of the three motor leads.*



### REAL-TIME CLOCK SETUP

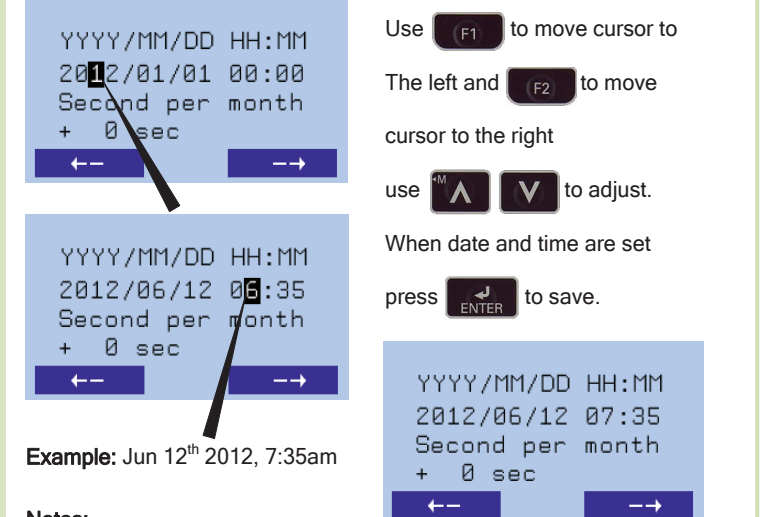
This step shows how to setup the iQpump1000 real-time clock for first use.

**Note:** If clock is not set the drive can still be programmed and operated, but ALM light will flash every 30s and showing **Clock Not Set** message.

Power up the drive and set the real-time Clock. The real-time Clock setup screen will appear at first power up.

Press **F2** to set the clock.

**Note:** After the real-time clock is set the real-time clock setup screen will not show again unless parameter o4-17 is set to "Set".



**Example:** Jun 12<sup>th</sup> 2012, 7:35am

**Notes:**

- Clock is set in 24hr mode.
- Do **NOT** adjust sec per month.



**Step 4** Generic parameter setup for system with two or three pumps as boosters with or without pressure tank. Pumps will be lead & lag with 24hrs alternation. Start / Stop from the keypad. Each drive has it's own transducer.

Parameter	iQpump P1 Setting		iQpump P2 or higher		Description	Comments
b5-02	Pressure Tank	No Pressure Tank	Pressure Tank	No Pressure Tank	Proportional Gain Setting (P)	Increase proportional gain to make iQpump1000 more responsive. Caution: can cause instability if value is too high.
	2.0	4.0	2.0	4.0		
b5-03	Pressure Tank	No Pressure Tank	Pressure Tank	No Pressure Tank	PI Integral Time (I)	Decrease integral time to make iQpump1000 more responsive. Caution: can cause instability if value is too low.
	3.0 sec.	2.0 sec.	3.0 sec.	2.0 sec.		
C1-01	9.0 sec.		9.0 sec.		Acceleration Time 1	Time it takes to accelerate the pump motor from zero to maximum speed.
C1-02	5.0 sec.		5.0 sec.		Deceleration Time 1	Time it takes to decelerate the pump motor from maximum speed to zero.
C6-02	Centrifugal Pump	Submersible Pump	Centrifugal Pump	Submersible Pump	Carrier Frequency	Note: Please refer to the iQPump1000 manual for drive full load amp de-ratings if setting C6-02 carrier frequency selection other than 6 or 7 for drives above 40HP.
	2	7	2	7		
E2-01	Motor Nameplate Amps		Motor Nameplate Amps		Motor Rated Current	Set to the motor nameplate full load amps.
H5-01	1		P2 = 2, P3 = 3		Drive Node Address	
P1-01	3		3		Pump Mode	Set drive software up for Memobus Multiplexing.
P1-03	XX PSI		XX PSI		Feedback Scaling	This should be the maximum range of the transducer output based on 4-20ma. If transducer is 300P SI that this is what should be programmed in P1-03.
P1-04	-5 PSI		-5 PSI		Start-Draw down Level	Note: Make sure to see the "-" negative sign on display
P1-06	Centrifugal Pump	Submersible Pump	Centrifugal Pump	Submersible Pump	Minimum Pump speed	This should always be set based on where the pump curve starts working to overcome the head and system losses.
	35.0 Hz	40.0 Hz	35.0 Hz	40.0 Hz		
P1-08	XX PSI		XX PSI		Low Feedback Level	Low pressure fault should be set based on system. This is customer settings.
P1-09	25 sec.		25 sec.		Low Feedback Level Delay Time	
P1-11	XX PSI		XX PSI		High Feedback Level	High Pressure fault should be set on average 20 PSI over the system set point.
P1-12	6 sec.		6 sec.		High Feedback Level Delay Time	
P4-10	1		1		AUTO Mode Operator Run Power Down Storage	This allows drive to recover and automatically run after a loss of Utility Power if run (Auto) command is via keypad. <b>Warning:</b> System will automatically restart.
P4-12	Centrifugal Pump	Submersible Pump	Centrifugal Pump	Submersible Pump	Trust Bearing Frequency	Thrust bearing frequency should not be disabled when using a submersible pump motor.
	0.0 Hz	30.0 Hz	0.0 Hz	30.0 Hz		
P9-02	2		2		Feedback Source	System programmed for redundant transducer feedback. Each drive has its own transducer wired to A2.
P9-06	59.5 Hz		59.5 Hz		Lag Drive Fixed Speed	
P9-08	2		2		Add Pump Mode	Sets the conditions for the lead pump drive so that the output speed must rise above P9-09 and the pressure to fall below P9-10 before adding an additional pump to the system.
P9-09	59.5 Hz		59.5 Hz		Add Freq Level	Sets the system to stage on lag pump when lead pump is above P9-09 level and the system is 5PSI below Auto Set point.
P9-10	5.0 PSI		5.0 PSI		Add Delta Level	Sets the system to stage on lag pump when lead pump is above P9-09 level and the system is 5PSI below Auto Set point.
P9-11	14 sec.		14 sec.		Add Delay Time	Sets the time when the lag pump will stage on.. Adjust as needed for system operation.
P9-13	45.0 Hz		45.0 Hz		Remove Frequency Level	Sets the lag pump output frequency when it de-stages and goes back to a single lead pump. May have to adjust based on pump system curve.
P9-15	5 sec		5 sec		Remove Delay Time	Sets the time when the lag pump will de-stage when speed falls below P9-13.
P9-18	98.0%		98.0%		High Feedback Quick De-stage	Allows program to this value when using High Pressure as Fault.
P9-25	2 for Duplex, 3 for Triplex		2 for Duplex, 3 for Triplex		Sets the maximum number of pumps in the multiplex system.	Sets the number of pumps in the multiplex system.
Q1-01	XX PSI		XX PSI		System Setpoint	Note: Program this value last on the main keypad screen using Q1-01. U1-01 auto set point is the same as Q1-01.



## Step 5 Low City Pressure

This function is used with low suction inlet pressure switches on pressure booster systems for buildings that get their main water supply from a municipality.

This pressure switch enables and disables the pump system when the inlet supply is at a low suction pressure and when running the pump system in this condition will cause damage.

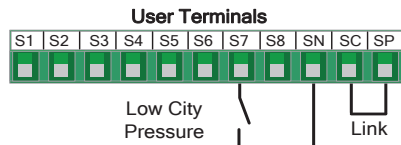
An inlet pressure switch is wired directly into the drive using one of the digital input terminals. If the pressure switch is active and sufficient pressure is available, the drive system will operate normally.

If the pressure switch indicates that incoming pressure is too low, the drive will take the following actions:

- The drive will be forced into a sleep-like state (coast to stop).
- Any drives staged in multiplex mode will immediately coast to stop.
- The selected alarm "Low City Pressure", "Low Suction Pressure", or "Low Water In Tank" will be displayed (determined by P4-24).

### Setup Procedure

1. Set all other parameters required for the application such as PI control loop, sleep, motor, and I/O parameters.
2. Set one digital input for the low suction inlet pressure switch (H1-xx = 73). Wire the switch to this terminal.
3. Configure the terminal for a normally open / closed switch type using parameter P4-21.
4. Configure the delay times for activating and removing the alarm in parameters P4-23 and P4-24. This can be used to stop the drive from cycling too frequently if the pressure varies a lot.
5. Select the alarm message that will be displayed when a Low City condition is detected using parameter P4-24. Options include "Low City Pressure", "Low Suction Pres", and "Low Water In Tank".



**Wiring Diagram: Low City Pressure**  
Example: Terminal S7: H1-07 = 73

Parameter	Value	Description	Reference
P4-21	0	Low City Input Select	Selects the type of pressure switch connected to the "Low City Press" digital input S7 (H1-07 = 73). 0: Normally Open 1: Normally Closed
P4-22	5 sec.	Low City On-Delay Time	Sets the amount of time a "Low City Pressure" condition needs to be present before the drives will stop.
P4-23	15 sec.	Low City Off-Delay Time	Sets the amount of time a "Low City Pressure" condition needs to be absent before the drives will restart.
P4-24	0	Low City Alarm Text	Selects the alarm message that will be displayed when a LowCity condition is detected. 0: Low City Pressure 1: Low Suction Pres 2: Low Water In Tank

## Step 6 Low and High PSI Levels

This function allows the user to set low and high system pressure levels measured off the feedback transducer.

The low (P1-08) and high (P1-11) feedback levels are set as an absolute value in the system units selected by P1-02.

### Low Feedback Detection, enabled when:

- Parameter P1-08 is set greater than zero

When the low feedback detection is enabled and the feedback signal falls below the low feedback detection level (P1-08) the iQpump1000 will annunciate the low feedback condition based on the Low Feedback Selection (P1-10).

Parameter	Value	Description	Reference
L5-40	0	Low Feedback Fault Retry Selection	Determines whether the LFB-Low Feedback fault can be auto- restarted. 0: No retry 1: Retry
P1-08	0.0 PSI	Low Feedback Level	Sets the lower detection level for the PID feedback. Range: 0 ~ 6000.0 (system units P1-02)
P1-09	10 sec	Low Feedback Level Fault Delay Time	Sets the amount of delay time from when the low feedback is detected until the drive faults out on a "LFB-Low Feedback" fault. (effective only when P1-10 = 0) Range 0 ~ 3600 sec
P1-10	0	Low Feedback Selection	Selects how the drive will respond during the "Low Feedback" condition. 0: Fault (and Digital Out) 1: Alarm (and Digital Out) 2: Digital Out Only (H2-0x = 97)

### High Feedback Detection, enabled when:

- Parameter P1-11 is set greater than zero

When the high feedback detection is enabled and the feedback signal rises above the high feedback detection level (P1-11) the iQpump1000 will annunciate the high feedback condition based on the High Feedback Selection (P1-13).

Parameter	Value	Description	Reference
L5-41	0	High Feedback Fault Retry Selection	Determines whether the HFB-Low Feedback fault can be auto- restarted. 0: No retry 1: Retry
P1-11	155.0 PSI	High Feedback Level	Sets the upper detection level for the PID feedback. Range: 0 ~ 6000.0 (system units P1-02)
P1-12	10 sec	High Feedback Level Fault Delay Time	Sets the amount of delay time from when the high feedback is detected until the drive faults out on a "HFB-High Feedback" fault. (effective only when P1-13 = 0) Range 0 ~ 3600 sec
P1-13	0	High Feedback Selection	Selects how the drive will respond during the "High Feedback" condition. 0: Fault (and Digital Out) 1: Alarm (and Digital Out) 2: Digital Out Only (H2-0x = 96 )

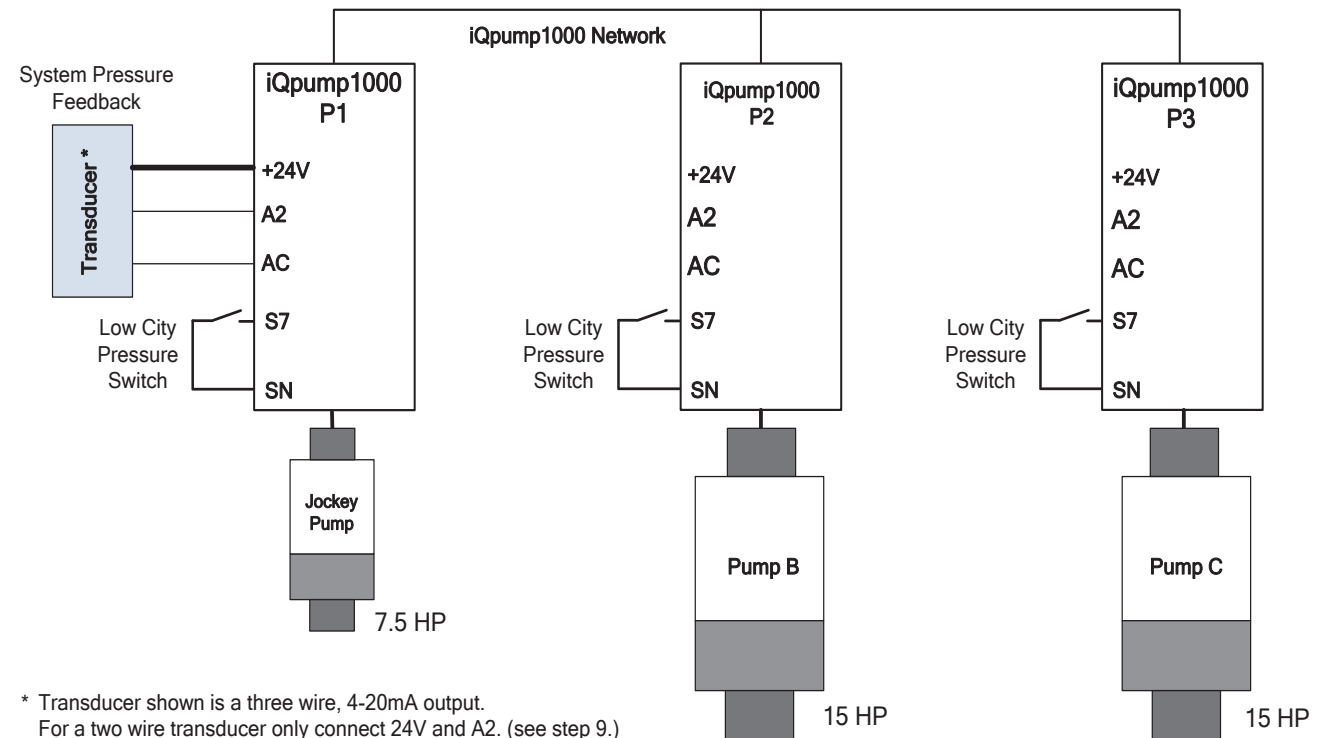
## Step 7 Adding a Jockey Pump to an iQpump1000 Duplex System

This step shows examples of how to setup an iQpump1000 Multiplex Systems using a jockey pump.

### Duplex System with Jockey Pump Example - Single Transducer

Example shows pump system with the following requirements:

- One small pump (the Jockey pump) 7.5 HP will run the system during off-peak times.
- Two larger pumps (15 HP) will run the system when the demand is higher.
- The Jockey pump should not run when the two larger pumps are running.
- Larger pumps lead-lag will alternate every run cycle
- The feedback scale is 200 PSI.
- System setpoint is 120 PSI.
- Low city pressure switch installed on input S7.
- There is only one feedback transducer in the system.



\* Transducer shown is a three wire, 4-20mA output. For a two wire transducer only connect 24V and A2. (see step 9.)





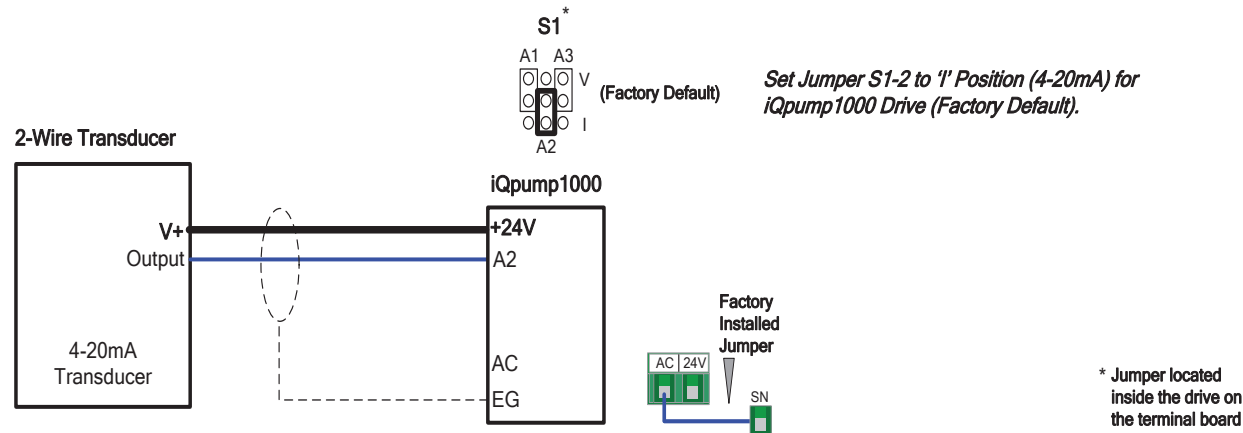
**Step 8** Parameter setup for triplex system with jockey pump and two pumps as boosters with or without pressure tank.  
Transducers used with a range of 200 PSI and System setpoint set for 120 PSI. Booster pumps will lead-lag with 24hrs alternation.

Parameter	Jockey iQPump1000 P1 Setting		Booster iQPump1000 P2 and P3 Setting		Description	Comments
b5-02	Pressure Tank	No Pressure Tank	Pressure Tank	No Pressure Tank	Proportional Gain Setting (P)	Increase proportional gain to make iQpump1000 more responsive. Caution: can cause instability if value is too high.
	2.0	4.0	2.0	4.0		
b5-03	Pressure Tank	No Pressure Tank	Pressure Tank	No Pressure Tank	PI Integral Time (I)	Decrease integral time to make iQpump1000 more responsive. Caution: can cause instability if value is too low.
	3.0 sec.	2.0 sec.	3.0 sec.	2.0 sec.		
C1-01	9.0 sec.		9.0 sec.		Acceleration Time 1	Time it takes to accelerate the pump motor from zero to maximum speed.
C1-02	5.0 sec.		5.0 sec.		Deceleration Time 1	Time it takes to decelerate the pump motor from maximum speed to zero.
C6-02	Centrifugal Pump	Submersible Pump	Centrifugal Pump	Submersible Pump	Carrier Frequency	Note: Please refer to the iQPump1000 manual for drive full load amp de-ratings if setting C6-02 carrier frequency selection other than 6 or 7 for drives above 40HP.
	2	7	2	7		
E2-01	11		P2 = Mtr FLA, P3 = Mtr FLA		Motor Rated Current	Set to the motor nameplate full load amps.
H1-07	73		73		Terminal S7 Input - Low City Pressure	Make sure Low City Switch is wired into S7-SN of all drives.
H5-01	1		P2 = 2, P3 = 3		Drive Node Address	
P1-01	3		3		Pump Mode	Set drive software up for Memobus Multiplexing.
P1-03	XX PSI		XX PSI		Feedback Scaling	This should be the maximum range of the transducer output based on 4-20ma. If transducer is 200 PSI that this is what should be programmed in P1-03.
P1-04	-5 PSI		-5 PSI		Start-Draw down Level	Note: Make sure to see the "-" negative sign on display.
P1-06	Centrifugal Pump	Submersible Pump	Centrifugal Pump	Submersible Pump	Minimum Pump speed	This should always be set based on where the pump curve starts working to overcome the head and system losses.
	35.0 Hz	40.0 Hz	35.0 Hz	40.0 Hz		
P1-11	XX PSI		XX PSI		High Feedback Level	High Pressure fault should be set on average 20 PSI over the system set point.
P1-12	4 sec.		4 sec.		High Feedback Level Delay Time	
P4-10	1		1		AUTO Mode Operator Run Power Down Storage	This allows drive to recover and automatically run after a loss of Utility Power if run (Auto) command is via keypad. <b>Warning:</b> System will automatically restart.
P4-12	Centrifugal Pump	Submersible Pump	Centrifugal Pump	Submersible Pump	Trust Bearing Frequency	Thrust bearing frequency shout not be disabled when using a submersible pump motor.
	0.0 Hz	30.0 Hz	0.0 Hz	30.0 Hz		
P4-21	1		1		Low City Input Select	Note: input is based on Normally Closed. (Open switch indicates low city pressure, and system will shut down)
P4-21	5 sec.		5 sec.		Low City On-Delay Time	
P9-01	1		2		Lead Drive Select	Booster pumps will alternate every run cycle. Jokey pump does not alternate.
P9-02	2		2		Feedback Source	System programmed for redundant transducer feedback. Each drive has its own transducer.
P9-03	0 Hr.		0 Hr.		Alternation Time	Alternation disabled as the Jockey pump will always be the lead pump to start and the larger booster pumps will alternate every run cycle.
P9-05	2		0		Lag Fixed Mode	When the Jockey pump cannot keep up with the system demand a booster pump will stage on and the Jockey pump will turn off.
P9-06	59.5 Hz		59.5 Hz		Lag Fixed Speed	
P9-08	2		2		Add Pump Mode	Sets the conditions for the lead pump drive so that the output speed must rise above P9-09 and the pressure to fall below P9-10 before adding an additional pump to the system.
P9-09	59.5 Hz		59.5 Hz		Add Freq Level	Sets the system to stage on lag pump when lead pump is above P9-09 level and the system is 5PSI below Auto Set point.
P9-10	5.0 PSI		5.0 PSI		Add Delta Level	Sets the system to stage on lag pump when lead pump is above P9-09 level and the system is 5PSI below Auto Set point.
P9-11	14 sec.		14 sec.		Add Delay Time	Sets the time when the lag pump will stage on. Adjust as needed for system operation.
P9-12	0		0		Remove Pump Mode	
P9-13	45.0 Hz		45.0 Hz		Remove Frequency Level	Sets the lag pump output frequency when it de-stages and goes back to a single lead pump. May have to adjust based on pump system curve.
P9-15	5 sec		5 sec		Remove Delay Time	Sets the time when the lag pump will de-stage when speed falls below P9-13.
P9-18	98.0%		98.0%		High Feedback Quick De-stage	Allows program to this value when using High Pressure as Fault.
P9-20	2		0		Allow Network Run	Jockey Pump will be the first to run at all times until a booster pump is staged on.
P9-21	7		8		Run Priority	
P9-24	0		5 sec		Lead swap at speed	When the booster pumps shuts down or goes into sleep mode for 5 seconds the lead is handed back to the Jockey pump .
P9-25	2 for Duplex, 3 for Triplex		2 for Duplex, 3 for Triplex		Max Number of Running Pumps	Program network for 2 or 3 pumps on the system.
Q1-01	120 PSI		120 PSI		System Setpoint	Note: Program this value last on the main keypad screen using Q1-01. U1-01 auto set point is the same as Q1-01.

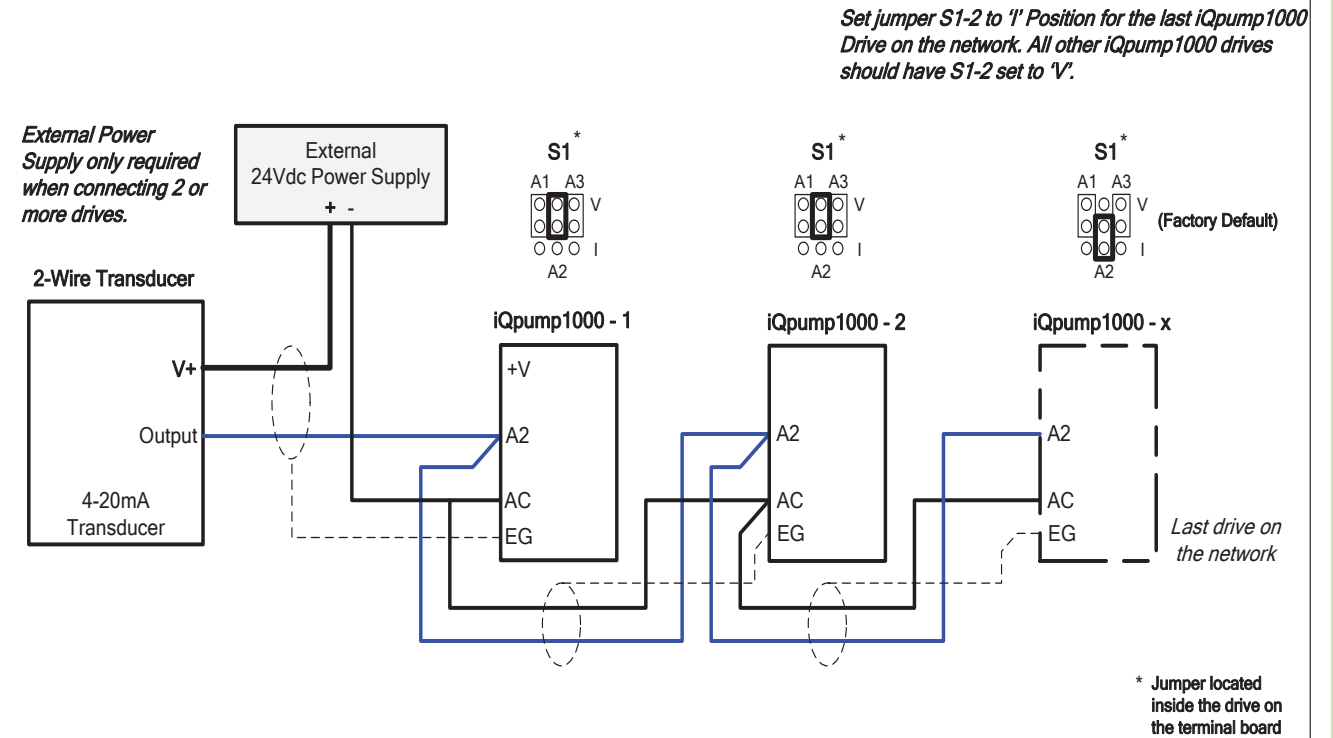


**Step 9 Transducer Connections**

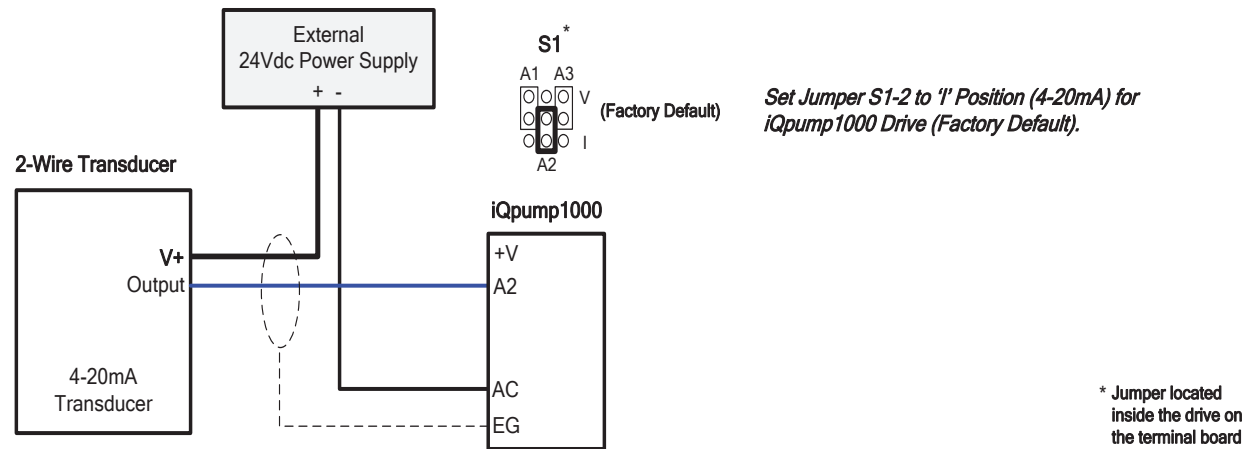
**Simplex System - Single Transducer Connection using Analog Input A2**



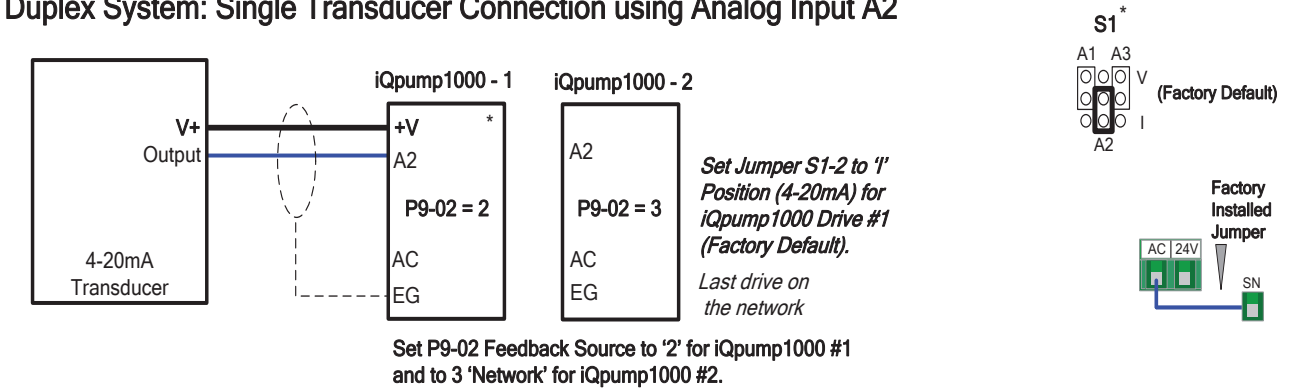
**Triplex System: Single Transducer Connection using Analog Input A2 (External Power Supply)**



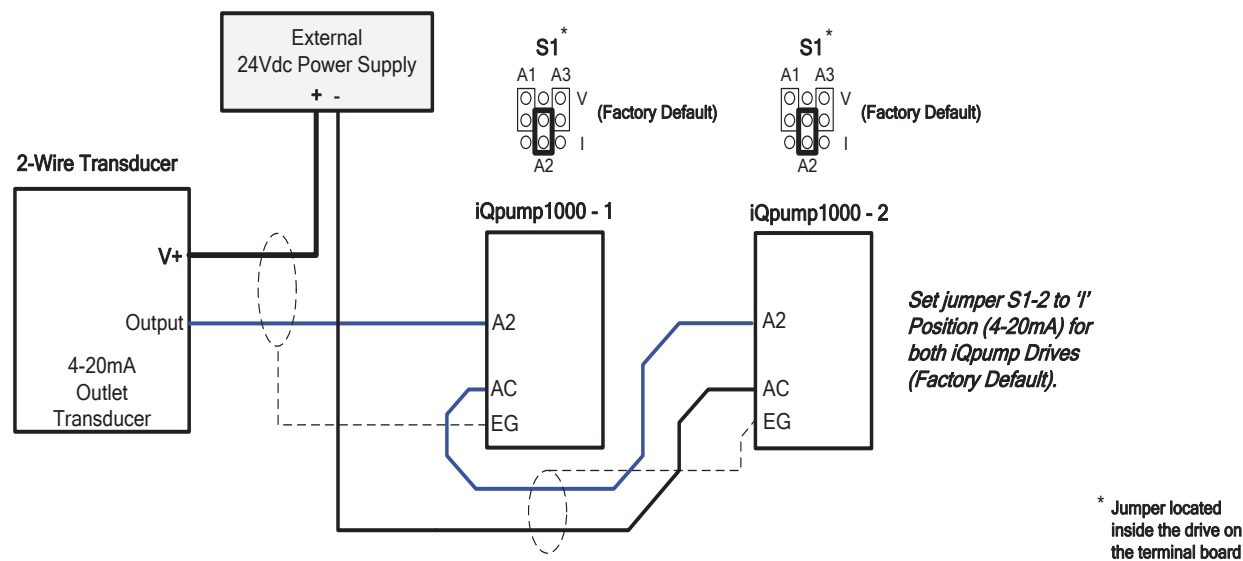
**Simplex System - Single Transducer Connection using Analog Input A2 (External Power Supply)**



**Duplex System: Single Transducer Connection using Analog Input A2**



**Duplex System: Single Transducer Connection using Analog Input A2 (External Power Supply)**



**Triplex System: Single Transducer Connection using Analog Input A2**

