



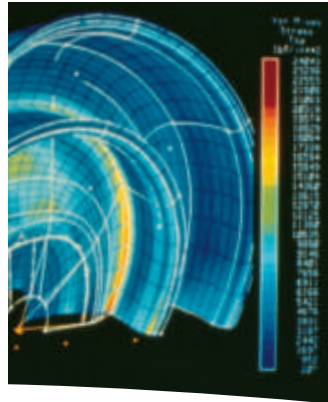
# ***IPS Tempo™***

## ***Pre-engineered Pump System Optimization, Control and Protection***

Part of the Intelligent Pump Solutions Family



***Experience In Motion***



## **Pump Supplier To The World**

*Flowserve is the driving force in the global industrial pump marketplace. No other pump company in the world has the depth or breadth of expertise in the successful application of pre-engineered, engineered and special purpose pumps and systems.*

### **Pumping Solutions**

Flowserve is providing pumping solutions which permit customers to continuously improve productivity, profitability and pumping system reliability.

### **Market Focused Customer Support**

Product and industry specialists develop effective proposals and solutions directed toward market and customer preferences. They offer technical advice and assistance throughout each stage of the product life cycle, beginning with the inquiry.



### **Dynamic Technologies**

Flowserve is without peer in the development and application of pump technology, including:

- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

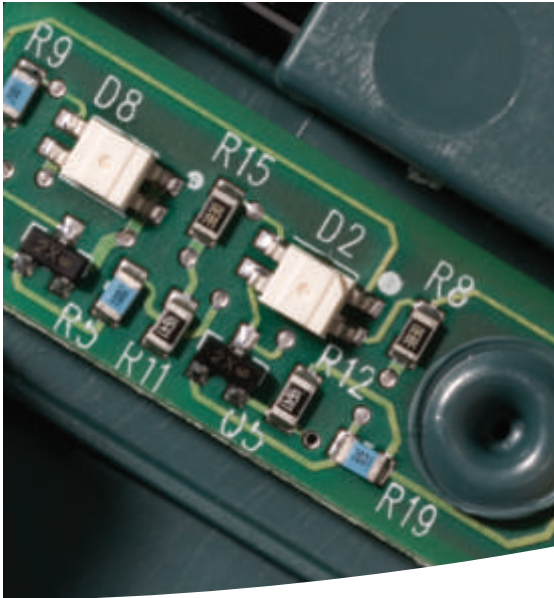
### **Broad Product Lines**

Flowserve offers a wide range of complementary pump types, from pre-engineered process pumps, to highly engineered and special purpose pumps and systems. Pumps are built to recognized global standards and customer specifications.

Pump designs include:

- Single stage process
- Between bearing single stage
- Between bearing multistage
- Vertical
- Submersible motor
- Rotary
- Reciprocating
- Nuclear
- Specialty

**IPS Tempo™**  
Pre-engineered Pump  
System Optimization,  
Control and Protection  
Powered by Reliance  
Electric



## **An Intelligent Pumping System That is Easy to Use**

*The Flowserve IPS Tempo is pre-engineered specifically for pumps, making the benefits of variable frequency drive (VFD) technology more accessible to pump users. By incorporating pump-specific system optimization software, an industrial grade AC drive and intuitive menu-driven user interface, IPS Tempo offers protection, reliability and ease of use not possible with other variable frequency drives. Most importantly, IPS Tempo enables end users to lower their total cost of pump ownership.*

### **Pump Optimization and Protection in a Fraction of the Time**

With immensely complex manuals and hundreds of different programmable parameters, the set-up and configuration of a typical variable frequency drive is a daunting task. Even experienced users require considerable time to set up a standard AC drive.

That's not the case with IPS Tempo. With the most common pump-specific parameters (capacity, head, etc.) built in and its pump-specific Quick-Start set-up wizard, a typical user can configure IPS Tempo in less than 30 minutes – a fraction of the time it would take to set up a typical VFD. That means easier, faster and more reliable implementation.

### **Benefits of IPS Tempo**

- Unique pump-specific user interface
- Quick-start set-up and configuration
- Pre-engineered pump protection features
- Industrial grade VFD
- Soft-start and soft-stop capability

### **Benefits of VFD Technology**

- Optimally Sized Pump Systems
  - Improved performance
  - Lower initial pump cost
  - Reduced power consumption with energy savings of 30 to 50 percent (Source: Europump and Hydraulic Institute)
- Increased Mean Time Between Repair (MTBR)
  - Reduced maintenance costs
  - Reduced equipment wear
  - Reduced inventory

### **Applications and Markets**

IPS Tempo is ideal for critical pump applications as well as ones with varying system parameters such as tank car unloading and multi-service pumps.

Applicable markets include:

- Chemical
- Petrochemical
- Refining
- Water
- General industry
- Mining

## IPS Tempo™



### **Intelligent Control and Protection Technology for Pumping Systems**

Embedded with *intelligence* derived from the extensive pumping system expertise of Flowserve Corporation, the IPS Tempo has been developed specifically for pump applications. Powered by industrial drive technology from Reliance Electric, IPS Tempo provides monitoring and protection features beyond the capability of typical VFDs.

Incorporating pump logic functionality, users can program IPS Tempo to respond to process and condition variables to protect pump equipment against adverse operating conditions.

IPS Tempo's customized pump terminology, built-in pump-specific parameters and simple menu-driven interface make installation and use intuitive for pump users. Making the benefits of variable frequency drive technology more accessible to pump users, IPS Tempo enables lower total cost of pump ownership.

**Two Analog Inputs** monitor process variables for speed control and pump protection logic

**Two Analog Outputs** are used to provide analog control signals to other equipment or for remote monitoring of selected VFD parameters

**Three Digital Outputs** are used to activate external devices such as starting auxiliary equipment or annunciating an alarm

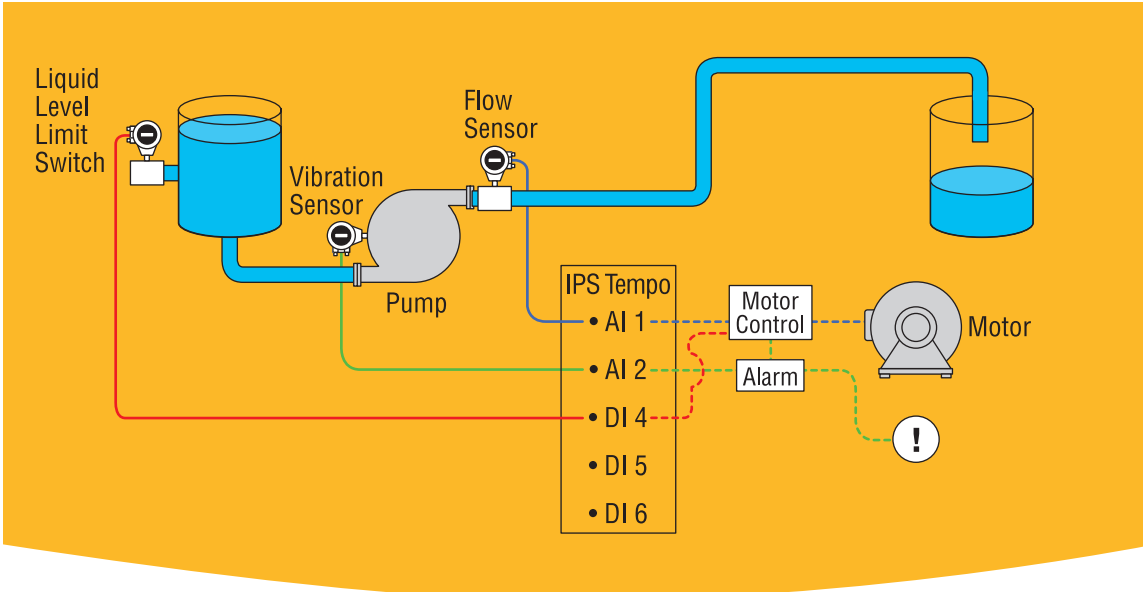
**Six Digital Inputs** are standard with IPS Tempo. Three are dedicated to drive operation. Three are available to use with limit switches for condition monitoring and protection

**Removable Numerical and Graphical LCD Keypad** is backlit to aid readability. Its TAB menu is intuitive and easy to navigate with minimal keystrokes

**Modern Modular Construction** incorporates both regulator and I/O electronics into a removable cassette, resulting in easy installation, repair and upgrade capability

**Compact Bookshelf Design** requires minimal space

**More than just a VFD, IPS Tempo™ incorporates pump-specific functionality to monitor and protect against adverse operating conditions. These options are pre-programmed directly into the IPS Tempo and do not require an external controller.**



**IPS Tempo Protections Extend Pump Life**

**Process Control**

Users can utilize the process control function to adjust motor speed to maintain a user-established set point. In doing so, IPS Tempo can optimize plant output and pump availability. Process control parameters include:

- Flow
- Pressure
- Temperature
- Fluid level

**Process Variable Monitoring**

This feature monitors whether the user-established process variable can be maintained within the designated min/max operating speed range for the VFD. In the event the process variable cannot be maintained, IPS Tempo can perform numerous actions, including:

- Send message
- Stop pump
- Retry
- Speed override (go to preset fixed speed)
- Process override (go to alternate process set point)
- Activate discrete digital output (relay)

**Condition Monitoring and Control**

IPS Tempo also can monitor four additional condition variables for advanced system control. An analog input can monitor one additional external sensor against a signal level set point (e.g., vibration threshold point[s]) or against a signal range set point (e.g., min/max temperature range). Additionally, IPS Tempo can monitor up to three limit switches via three digital inputs. IPS Tempo can vary pump speed as specified by the user and alert operators of the condition.

**Pump Power Monitoring**

In addition to its process and condition monitoring controls, IPS Tempo monitors actual pump power for over- and under-power conditions without an external sensor. Set points are automatically adjusted based on required pump speed. Upon detection of an over or under load condition, the monitor will initiate the appropriate selected action.

The pump power monitor helps to eliminate costly downtime and expensive pump repairs caused by:

- Dry running
- Blocked lines
- Pump overloads
- Closed suction or discharge valves
- Cavitation
- Excessive wear or rubbing

| Pre-Engineered Monitors           | Description  | Example   |
|-----------------------------------|--|---|
| Process Variable Monitor          | Used while operating in process control (PI) mode to detect a process no longer controllable within the set operating limits   | Change in process fluid or system characteristics, loss of adequate suction, equipment failure or wear                            |
| Pump Power Monitor                | Used in process or speed control mode to detect pump operation at power levels above or below pre-determined normal levels. Min/max allowable power levels are entered for selected speed. IPS Tempo is pre-engineered to vary acceptable power level as drive speed changes by utilizing pump system affinity laws    | Dry running, low flow, change in fluid characteristic, blocked lines, closed valves, overload conditions, excessive wear, rubbing |
| Pump Condition Monitor            | Used to detect abnormal pump or process conditions by monitoring a sensor signal on analog input channels and initiating an appropriate selected action from a list of available responses   | Excessive vibration, temperature, high or low pressure, flow or poor lubrication health   |
| Digital Input Monitor             | Used in process (PI) or speed control modes to detect and respond to conditions or events indicated by discrete (on-off) switching devices   | Limit, level, pressure, temperature, flow, and relay switches   |
| Auto Set Point Adjustment Monitor | Enables process control or speed set point to be automatically adjusted in response to a signal from an analog sensor connected to an analog input. The sensor signal is acted upon by a programmable multi-point scaling operation that determines the effect of the signal on the process control or speed set point | Loadout application optimization, batch process applications, automated cavitation protection                                     |

**Note:** IPS Tempo inherently monitors pump speed, motor power, energy costs and total runtime without the addition of external sensors.



### ***Quick-Start Set-Up Wizard***

Configuring IPS Tempo is easy and intuitive. Its Quick-Start set-up wizard directs users through the initial set-up and configuration process. IPS Tempo prompts users via the large backlit screen on the keypad for the information it needs. Moreover, the prompts are in pump-specific terms and units. Users can select the units of measure they prefer.

### ***Optional Network Communications***

IPS Tempo can be programmed with network communication platforms that allow it to interface with customer-owned distributed control systems (DCS) or programmable logic controllers (PLC). Optional network communications platforms include:

- DeviceNet
- ControlNet
- Profibus
- InterBus
- EtherNet/IP

### ***Additional Features and Options***

- Text can be displayed in English, Spanish, Portuguese or French
- Zero-stacking bookshelf design allowing multiple drives to be cabinet mounted with zero spacing between drives

### ***Input/Output Specifications***

- Two analog inputs  $\pm 10$  V / 4-20 mA (11 bit + sign)
- Two analog outputs  $\pm 10$  V / 4-20 mA (11 bit + sign)
- Six programmable digital inputs available in 24 VDC or 115 VAC
- Three programmable digital outputs
- Additional feedback and drive reference input options available

### ***General Specifications***

- 0°C to 50°C (32°F to 122°F), 1000 m (3300 ft) altitude without derating
- 5 to 95 percent humidity, non-condensing
- Operating input voltage ranges: 200-240 / 380-480 / 575-600 VAC
- Input voltage supply tolerance:  $\pm 10$  percent of nominal
- Available power ranges:
  - ♦ 3.7 to 75 kW (5-100 hp) at 240 VAC
  - ♦ 3.7 to 150 kW (5-200 hp) at 480 VAC
  - ♦ 3.7 to 112 kW (5-150 hp) at 600 VAC
- Input voltage frequency range: 47 to 63 Hz
- Volts/Hertz or sensorless vector regulation
- Operation on single-phase power for 50 percent of the nominal current rating
- 97.5 percent efficiency, nominal line voltage and rated amps
- Standard enclosure: NEMA 1/IP20

### ***Agency Certifications Listings***

- UL
- cUL
- CE
- C-tick (Australian certification)

*Global Service  
and Technical  
Support*



***Service Dedication***

Flowserve Engineered Services focus on providing customers with uncompromising service and support, where and when needed. Dedicated to delivering the highest quality support, Engineered Services integrate pump and materials engineering knowledge with creative service solutions.

A worldwide network of service and repair centers staffed by highly skilled engineers and technicians is available around the clock, seven days a week to respond to customer queries, to evaluate and troubleshoot problems and to provide reliable solutions.

***Strength of Experience,  
Commitment to Excellence***

Flowserve has long served industries requiring superior equipment performance and service life.

- Oil and gas production
- Hydrocarbon processing
- Chemical processing
- Water resources
- Power generation
- Nuclear
- Mining and mineral processing
- Pulp and paper
- General industry

Flowserve is dedicated to maximizing equipment performance and providing reliability-centered maintenance programs for pumps and related equipment, regardless of manufacturer. Using the FlowStar.net™ asset management software, Flowserve engineers and technicians track performance and support improvement programs using a service life cycle cost business approach. The results are improved reliability and increased profitability.

***Business Partner***

Flowserve partners with customers to respond to the dynamic business conditions that affect them. Flowserve will work with customers to drive efficiency, maximize throughput and control process quality. Whether user needs involve on-site technical assistance or broader project planning with full turnkey responsibility, Flowserve Engineered Services will deliver professional, reliable results.





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