



# H2FLOW CONTROLS



SMART SOLUTIONS

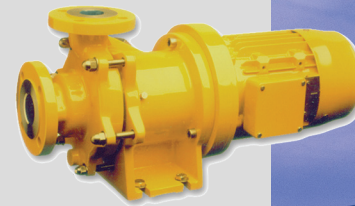


## TSA-PLUS

Advanced Motor Control & Pump Protection  
for Mag-Drive Pumps



## PROTECTED RIGHT FROM THE START



The benefits of Sealless, Mag Drive pumps are well-known and respected. However, the reality is that system upsets occur and pumps are run dry. Whereas a conventional pump can tolerate this, most Mag Drive pumps cannot. Failure to protect the pump will almost certainly result in significant repair or replacement costs.

After more than 25 years of protecting Mag Drive pumps from run dry conditions, our renowned M20 Shaft Power Monitor now has a 'Big Brother'. With far greater functionality, our TSA-Plus not only incorporates the benefits of the M20, but also introduces an array of additional, unique features that are not available from any other product. Features such as complete motor control with soft starting and supply monitoring will greatly reduce the life cycle costs of these types of pumps.

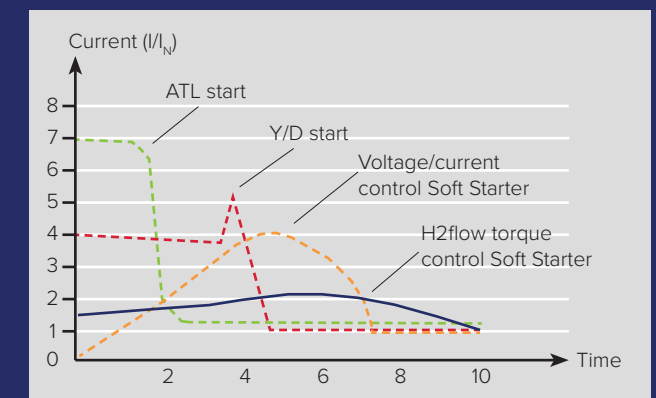
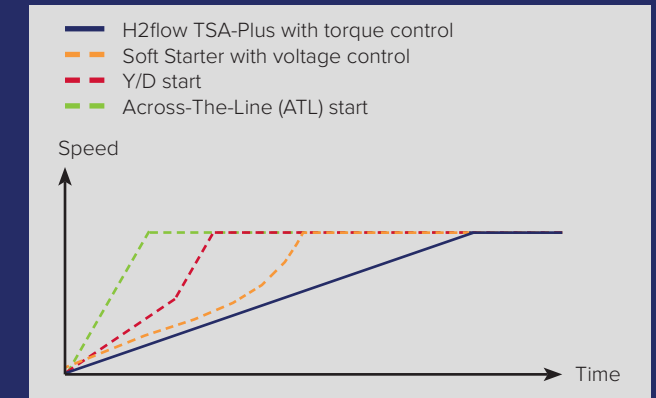
The TSA-Plus is a fully assembled solution with so many standard features that it's hard to imagine how so much could cost so little!

## SMOOTH STARTS REDUCE MECHANICAL STRESS

Adjusting the motor torque is best done by controlling the current in all three phases. This method offers symmetrical and balanced currents without the drawbacks of additional energy loss, noise, and vibration normally experienced with 2-phase Soft Starters.

The H2flow TSA-Plus incorporates 3-phase control together with sophisticated algorithms for torque control. Conventional Soft Starters use a pre-defined voltage ramp to control the start. With the H2flow TSA-Plus, the actual motor torque is continuously calculated and controlled according to application requirements. This torque control ensures an ultra-smooth start with constant acceleration and a further 30% reduction in starting current. The smooth starts also lead to less mechanical stress, improved process control, and reduced maintenance costs.

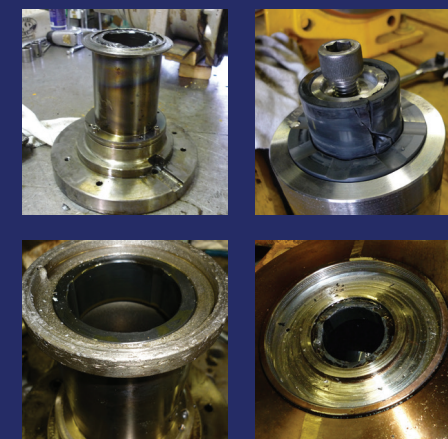
Soft Starting a Mag Drive Pump also greatly reduces the risk of magnetic decoupling due to high starting torques and rapid acceleration. Pump OEM's may even consider the possibility of reducing the size / density of the magnets.



## ELIMINATE DRY RUN FAILURE

Replacing bearings, magnets and containment shells can be very expensive. The damage can often be so severe that a complete replacement pump may be required. In addition to these repair or replacement costs, consideration must also be given to the loss of productivity due to equipment downtime.

A feature of the TSA-Plus is its patented Shaft Power Monitoring capability. The pump's working load is constantly monitored and compared to protection parameters. An abnormal condition, such as dry-running, will cause a drop in shaft power and the TSA-Plus will automatically shut the pump down - before damage occurs. This unique feature eliminates the damage caused by dry-running - and at a fraction of the cost of a new or repaired pump.



**Above:** Damaged magnets and containment shells are typically seen when a pump continues to operate in a dry-running condition. The H2flow TSA-Plus works as a safe-guard against such failures.



### STANDARD INPUTS/OUTPUTS INCLUDE:

4 Digital in, 1 Analog in, 3 Relay out, 2 Analog out and a motor PTC input.

### OPTIONS

One communication module and up to two option boards can be mounted.

### Communication Modules:

- Profinet 1 or 2 ports - Industrial Ethernet communication
- Modbus/TCP - Industrial Ethernet communication
- EtherCAT - Industrial Ethernet communication
- Profibus DP - Fieldbus communication
- DeviceNet - Fieldbus communication
- Serial communication via USB or RS485 with Modbus RTU. RS232 as standard

### Option Boards:

- Extended digital I/O (3 + 3 sets I/O)
- PTC/PT-100 Motor Protection (3 + 3 PT100)



## PUMP PROTECTION



TSA-Plus accurately measures the motor shaft power taken to operate the pump. In the event of a run dry, dead head, or even pump cavitation condition, the motor shaft power will drop and the TSA-Plus will shut the pump down before damage occurs. A summary of the protection provided is as follows:

- Underload monitoring that will automatically shut the pump down in the event of a run dry, dead head, etc.
- Overload monitoring that will automatically shut the pump down in the event of a blocked impeller, bad bearing, etc.
- Alarm history with a time and date stamp as well as a readout of the motor load when the problem occurred.
- Pump protection for up to four different processes performed by the same pump.

## MOTOR CONTROL



The TSA-Plus is a fully assembled motor control system that simply requires a motor supply voltage input and a motor connected to its output. The key features for motor control and protection are:

- Torque controlled soft starting and stopping. This feature not only eliminates the potential for water hammer for the end-user, but could also reduce the required strength of the magnets supplied by the pump manufacturer
- Motor thermal overload protection
- Integrated bypass contactor to run the motor Across-the-Line once ramped up to full speed
- Slow speed Jog Forward / Reverse - an ability to test for correct pump rotation during installation
- Locked rotor protection; TSA-Plus will immediately shut the motor down should it detect a jammed condition during start-up
- Accumulated pump run time readout
- Accumulated consumed energy (kWh)

## CLEVER & EASY TO USE



### USER-FRIENDLY INSTALLATION AND OPERATION

Since the TSA-Plus features Soft Starter capability, a Circuit Breaker with thru-the-door disconnect, and a rugged NEMA 4 enclosure, no additional equipment is required. All of the equipment typically required is included. A number of options let you customize the functionality of the Soft Starter.

### MULTILINGUAL CONTROL PANEL WITH SINGLE-FUNCTION KEYS AND COPY FUNCTION

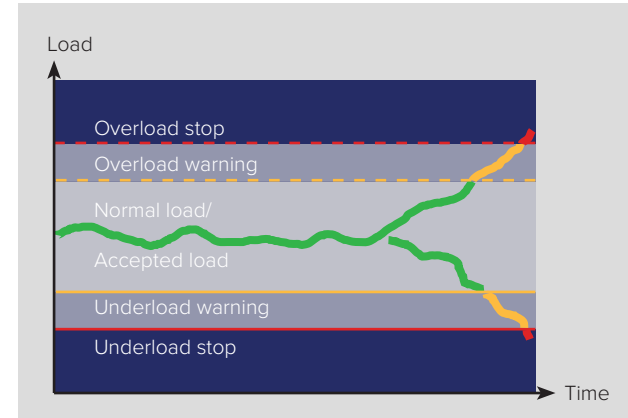
Designed for global application the H2flow TSA-Plus Soft Starter carries a multilingual display unit as standard. The control panel has a menu system with unique menu numbers and separate menu keys and start/stop keys.



## SUPPLY MONITORING

In addition to pump protection and motor control, the TSA-Plus provides an array of supply condition monitoring to ensure that the pump's motor is not damaged by an abnormal condition.

- Over Voltage monitoring and protection
- Under Voltage monitoring and protection
- Supply Phase loss monitoring and protection
- Supply Phase reversal monitoring and protection
- Readout of used motor thermal capacity
- Display of motor supply voltage
- Display of motor current



## ADDITIONAL FEATURES

- Multilingual display in English, Spanish, French, Italian, Swedish, Russian, Czech and Turkish
- Process readout in Torque, RPM, Frequency, GPH, etc.
- Analog output of motor Shaft Power, Torque, Electrical Power, Mains Supply, Current or Motor Used Thermal Capacity
- Remote pump start / stop control
- Modbus RTU communication (standard)
- Multiple communication options including RS485, Profibus, DeviceNet, Modbus/TCP, EtherCAT and EtherNet
- Programmable relay functions

## MODELS & RATINGS

The TSA-Plus is available in a compact, yet rugged NEMA 4 construction for three-phase, 230-Volt and 460-Volt applications.

MODEL (3 x 230V)	HP @230V	MODEL (3 x 460V)	HP @460V	DIMENSIONS (H x W x D)	WEIGHT (lbs.)
TSA-P-16-2	5	TSA-P-16-4	10	30" x 9" x 11"	43
TSA-P-22-2	7.5	TSA-P-22-4	15	30" x 9" x 11"	43
TSA-P-30-2	10	TSA-P-30-4	20	30" x 9" x 11"	43
TSA-P-36-2	N/A	TSA-P-36-4	25	30" x 9" x 11"	43
TSA-P-42-2	15	TSA-P-42-4	30	30" x 9" x 11"	43
TSA-P-56-2	20	TSA-P-56-4	40	30" x 9" x 11"	43



THE **ULTIMATE**  
**SOLUTION**



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