ARO®

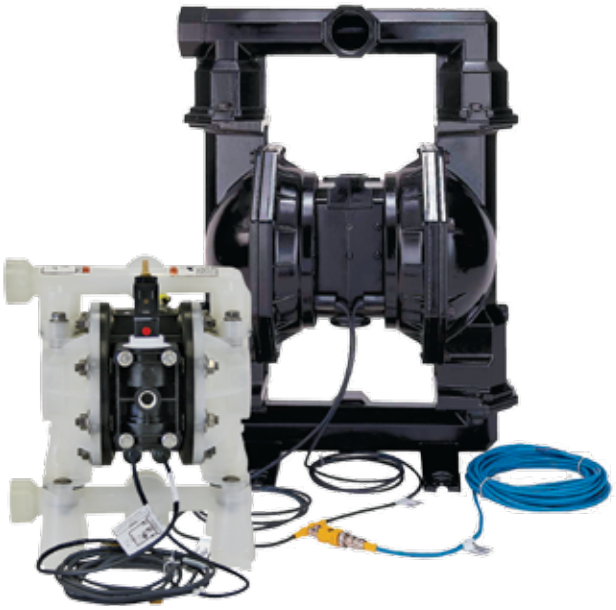
AUTOMATE YOUR PROCESSES

ARO® CONTROLLER / EXP SERIES ELECTRONIC INTERFACE PUMPS

Ingersoll Rand

ARO®

Ready to automate? Consider the EXP Series Electronic Interface pump and ARO® Controller



EXP is Automation Ready

All EXP Series pumps are enhanced with electronic interface capability, providing accurate, electronically controlled dosing. Combine our pump with the ARO® Controller and switch from inaccurate, inefficient manual processes to intelligent fluid management.

Additionally, you can operate the pump in the following hazardous locations:

NEC/CEC: Class I & II, Div 1 & 2, Group A-D

ATEX: Zone 1 & 2, 21 & 22

ARO® Electronic Interface Pumps

- Pumps seamlessly integrate with the ARO® Controller or almost any automation system.
- Pumps are now available for hazardous duty environments (ATEX, NEC, and CEC certifications).
- Leak detection option, suitable for use in ATEX/ and NEC/CEC locations, detects diaphragm failure to help reduce costly production downtime.
- Internal cycle sensor tracks end-of-stroke feedback and pump data.
- Preassembled components ensure hassle-free and error-proof installation.

Markets and Applications

- The ARO® controller and electronic interface pumps are ideal for a wide array of applications such as batching and filling containers and tanks in numerous markets.

Chemical Processing · *Commercial Laundry* · *Paint Formulation* · *Ink Formulation* · *Car Wash Dispensing* · *Electronic (Miccro chip)* · *Coatings/ Surface Finishing* · *Water/ Waste Water*

The ARO® Controller - Fluid Intelligence at Work

Get touch-and-walk-away automation that ensures accuracy and reduces waste.

Seamless integration between the ARO® Controller and the EXP Series Electronic Interface pumps

Real Time System Alerts

- Remote alerts send operating data
- Triggers can perform auto shut-down
- Notifications can be programmed for maintenance tasks

Flow Meter Integration

- A Flow meter signal provides accurate input for precise volume control
- The controller closes an outlet valve to quickly stop flow when the desired volume is reached
- Integrates with ease and eliminates the need for PLC wiring and programming

Multi-Pump Control

- Control 2 pumps for accurate two part batching processes
- Pre-program up to 5 batches per pump
- Alarm notifies on batch completion

Touch-and-Walk Away

- Accurate, electronically controlled dosing
- Includes pre-programmed and user-directed fuctions
- Closed loop system achieves dispensing repeatability within +/- 1%

Automate Your Process

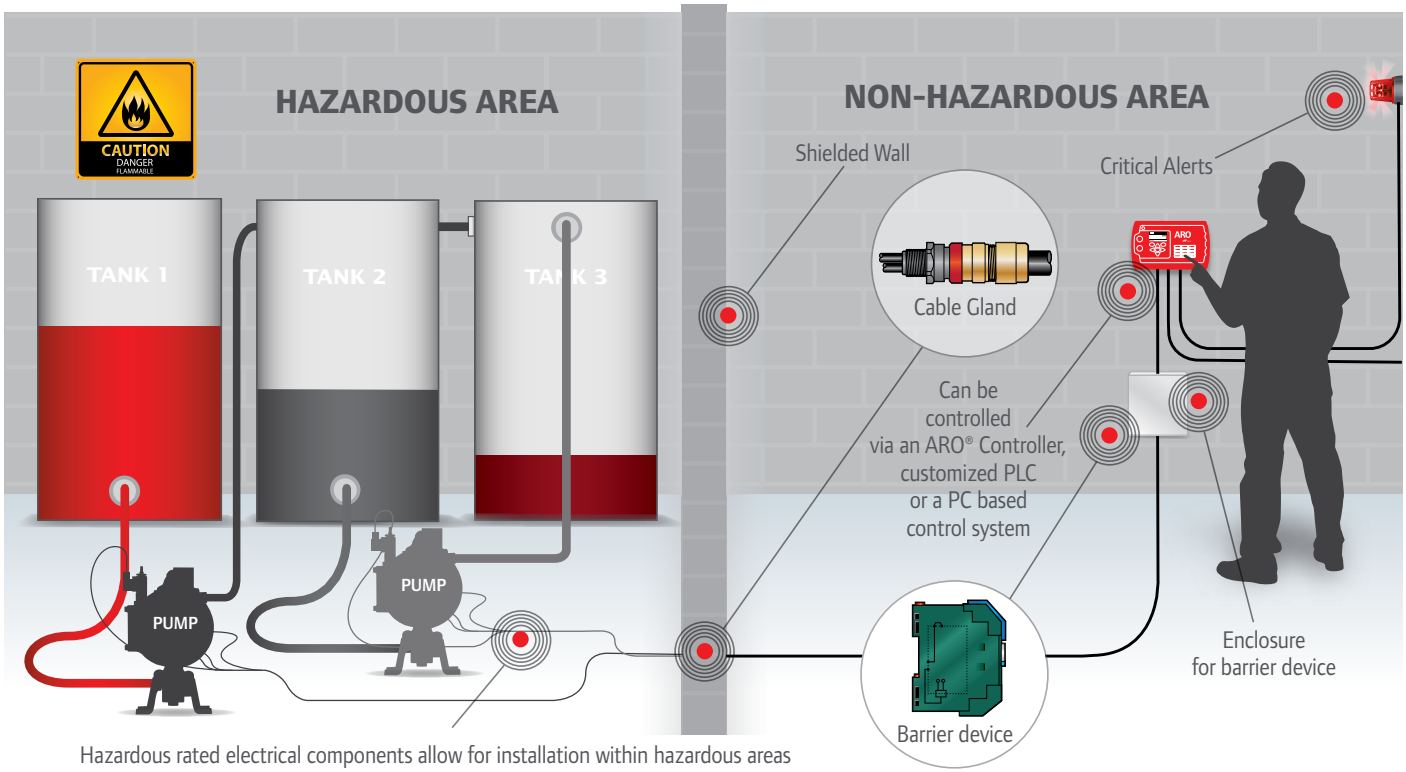
- Eliminate manual processes and mistakes
- Achieve safer control and monitoring via remote operation
- Accepts leak detection, liquid level sensing and proportional control

Simul-Start Pumping

- Synchronize your pumps
- Controller can signal 2 pumps to start simultaneously in applications requiring consistent volumetric ratios

ARO® provides safer control and monitoring

ARO® Electronic Interface pumps are suitable for use in gas and dust environments, including ATEX and North American applications. Connect the pump to the ARO® Controller outside the hazardous zone and provide safer control and monitoring of your processes.



Hazardous rated electrical components allow for installation within hazardous areas

Installation Overview for Hazardous Areas

- Operate the pump in the following hazardous locations: NEC/CEC: Class I&II, Div 1&2, Group A-D ATEX: Zone 1&2, 21&22
- Hazardous rated electrical components allow for installation within hazardous areas
- Wire the provided sensors and barrier devices per your local code requirements
- Install controller and barrier devices in a suitable hazardous enclosure or outside the hazardous area

Ex ATEX

The ARO® Controller, paired with one or more compatible EXP Electronic Interface pumps, completes the system to provide enhanced control.

Note: the controller is not required. Pumps can be operated using your existing control system (such as PLC)

Controller Specifications

External Power	
V in	90 - 264 VAC
V out	24 VDC (± 5%)
I out	3A

Controller I/O	Rating	QTY
Digital inputs	24 VDC	13
Digital outputs	24 VDC	6
Analog inputs	4 - 20mA	2
Analog outputs	4 - 20mA	2

Environmental	
Operating temperature range	-20°C to 70°C
Storage temperature range	-30°C to 80°C
Maximum relative humidity	90% non-condensing

Electronic Interface Pump Specifications

	1/4″	3/8″	1/2″	3/4″	1″	1-1/2″	2″	3″
Maximum GPM (l/min)	4.2 (15.8)	8.68 (32.8)	11.52 (43.6)	11.84 (44.8)	40.94 (154.9)	98.4 (372.4)	147.2 (557.2)	-
			9.6 (36.3)	*10.88 (41.1)*	*36.56 (138.3)*	*98.4 (372.4)*	*149.05 (564.2)*	*205.57 (778.1)*
Displacement per cycle	.019 (.072)	.0338 (.127)	0.039 (0.15)	0.032 (0.12)	0.296 (1.12)	0.617 (2.34)	1.4 (5.3)	-
			0.039 (0.15)	*0.030 (0.11)*	*0.2789 (1.05)*	*0.617 (2.34)*	*1.6269 (6.15)*	*3.4247 (12.9)*
Air Inlet (Female):	1/4" NPT	1/4" NPT	1/4" NPT	1/4" NPT	1/4" NPT	1/2" NPT	3/4" NPT	-
			1/4" NPT	*1/4" NPT*	*1/4"*	*1/2" NPT*	*3/4" NPT*	*3/4" NPT*
Fluid Connection	NPT/BSP	NPT, BSP	NPT, BSP	NPT, BSP	NPT, BSP A.N.S.I./DIN	A.N.S.I./DIN	A.N.S.I./DIN	-
			NPT, BSP	*NPT, BSP*	*NPT, BSP*	*NPT, BSP, A.N.S.I./DIN*	*NPT, BSP, A.N.S.I./DIN*	*NPT, BSP, A.N.S.I./DIN*
Max. Op.Pressure PSI (bar):	125 (8.6)	100 (6.9)	100 (6.9)	100 (6.9)	120 (8.3)	120 (8.3)	120 (8.3)	-
			100 (6.9)	*100 (6.9)*	*120 (8.3)*	*120 (8.3)*	*120 (8.3)*	*120 (8.3)*

Metallic Models

Preassembled, Yet Custom-Designed

UPGRADE
PUMP FOR REMOTE ACTUATION CAPABILITY

Choose a Controller

Model Options	
Base Controller	651763-XX-0
Interface with 1 Pump	651763-XX-1
Interface with 2 Pumps	651763-XX-2

XX = AM (Americas), EM (Europe, Middle East, India and Africa), AP (Asia/Pacific)

PD pumps are now upgradeable:

ARO® PD pumps are manufactured such that solenoid operation, end-of-stoke feedback and leak detection functionality can be added at a later date.
Once upgraded, the pumps can also be integrated with the ARO® controller giving you attainable, affordable automation.

Visit AROzone.com to learn more.

Choose a Pump

Position	1	2	3		4	5	6		7	8	9		10	11	12
Example:	PE	05	P	-	A	P	S	-	P	A	A	-	B	D	E

1 - Base Model

PE	Electronic Interface

2 - Port Size

01	1/4" Port
03	3/8" Port
05	1/2″ Port
07	3/4″ Port
10	1″ Port
15	1.5″ Port
20	2″ Port
30	3″ Port

3 - Center Section Material

A	Aluminum
P	Polypropylene
S	Stainless Steel

4 - Connection

A	NPT Thread
B	BSP Thread
F	A.N.S.I Side
Y	A.N.S.I Center

5 - Wetted Parts

A	Aluminum*
D	Groundable Acetal (single port)*
E	Groundable Acetal (multiple port)*
K	PVDF (Kynar) (single port)
L	PVDF (Kynar) (multiple port)
P	Polypropylene (single port)
R	Polypropylene (multiple port)
S	Stainless Steel*

6 - Hardware

P	Plated Steel
S	Stainless Steel

7 - Seat Material

A	Santoprene®
C	Hytrel®
D	Acetal
E	Carbon Steel
F	Aluminum
G	Nitrile
H	440 Stainless Steel (Hard)
K	PVDF
L	Hastelloy
P	Polypropylene
S	Stainless Steel

8 - Ball Material

A	Santoprene®
C	Hytrel®
G	Nitrile
S	316 Stainless Steel
T	PTFE
U	Polyurethane
V	Viton

9 - Diaphragm Material

A	Santoprene®
C	Hytrel®
G	Nitrile
T	PTFE
V	Viton®

10 - Revision

A	First
B	Second
C	Third

11 - Specialty Code 1

A	Solenoid 120VAC, 110VAC + 60VDC
B	Solenoid 12VDC, 24VAC + 22VDC
C	Solenoid 240VAC, 220VAC + 120VDC
D	Solenoid 24VDC, 48VAC + 44VACA
E	Solenoid 12VDC NEC/CEC*
F	Solenoid 24VDC NEC/CEC*
G	Solenoid 12VDC ATEX/IECex*
H	Solenoid 24VDC ATEX/IECex*
J	Solenoid 120VDC NEC/CEC*
K	Solenoid 220VDC ATEX/IECex*
N	Solenoid with no coil
P	Ported Motor (No major valve
O	Standard Valve Block (No solenoid)

12 - Specialty Code 2

E	End-of-stroke feedback + leak detection
F	End-of-stroke feedback
G	End of Stroke ATEX/IECex*
H	End of Stroke feedback + Leak Detection ATEX / IECex*
L	Leak Detection
M	Leak Detection ATEX / IECex / NEC / CEC *
O	No Option
R	End of Stroke Feedback NEC/CEC*
T	End of Stroke Feedback + Leak Detection NEC/CEC*

* Acceptable for use in hazardous locations.
- NEC/CEC: Class I & II, Div 1 & 2, Group A-D
- ATEX: Zone 1&2, 21&22

Case Study:

Nation's largest silver-bearing film recycler finds better way to move and manage fluids in the recovery of silver with new ARO® Pump and closed-loop Controller.

ARO, a global leader in fluid management and a brand of Ingersoll Rand, has developed the only closed-loop controller with remote operating capabilities offering dispensing repeatability within 1 percent with less operator oversight. Keeping the recycling and refining process moving efficiently requires precise fluid dosing and pump reliability. Replacing its equipment with ARO solutions supported United DMS' focus on safety, and helped meet certain compliance requirements, while streamlining its process, lowering operational costs and achieving a solution designed to customize production lines.

United DMS Improves Process Reliability and Efficiency with ARO

When you recycle and refine more than twenty-five million pounds of silver-bearing material each year, you rely on the equipment used in the process to deliver the efficiency and reliability needed to keep things moving.

At United DMS, the efficiency of its chemical washing process was affected by the poor reliability of existing equipment. The company replaced its system with a new one-inch ARO® Electronic Interface Diaphragm Pump and Controller equipped with a flow meter to automatically meter fluids and prevent overfilling. According to United DMS, reliability issues and related downtime were eliminated and overall pump productivity jumped by more than 75 percent according to T. J. Harris, maintenance manager at DMS.

Headquartered in East Tennessee, United DMS is the nation's largest silver-bearing film recycler. Its 100,000 square-foot, three-facility operation covers more than 25 acres of film warehousing, sorting, grinding, washing and smelting services that help avoid discarding millions of pounds of plastic and precious metals into landfills across America and generate raw materials for use in new products.

Recycling silver-bearing film involves a number of steps ranging from the receipt, shredding and assessment of materials to specialized washing processes, and smelting which restores the silver to a purity of 99.9 percent. Plastic base films are also recycled as raw materials for new commercial plastics.

Stop gaps and workaround impact efficiency and operator safety

To facilitate the removal of silver from various films, base materials are treated and then separated from a silver emulsion mix that is pumped into 12,000 gallon settling tanks for further processing. Chemicals are added to maintain the ideal pH balance followed by the addition of polymers to precipitate the silver. This is a critical step in the process of turning the emulsion water into reusable silver and requires a highly reliable pump and controller system to accurately dispense and track the flow of chemical settling tanks.

While United DMS was processing up to 300,000 gallons of emulsion mix each week, the existing diaphragm pump and batch control system was limiting the company's full production potential. The reliability of the original pump under these demanding conditions resulted in downtime for pump disassembly, repair, reassembly and restart, while issues with the controller's circuit board often resulted in failure to signal the pump to cycle.

Ongoing equipment issues resulted in manual dispensing of the chemical solution taking the operator away from the settling tanks to a remote area where fluid media was added based on a counting formula. This workaround posed several negative impacts to material use, inventory management and worker safety, while also introducing unanticipated delays and costs in the form of rework to recalibrate the emulsion mix should an operator exceed the pH level.

"Compared to the original industrial pump United DMS was using, it was clear that the ARO Diaphragm Pump and Controller could offer the reliable dosing they needed and also verify how much media was dispensed for material tracking purposes," commented James Herbers, ARO Sales Manager.

The right pump for the job

By replacing the existing pump and controller, United DMS was able to minimize downtime, streamline process, save money and reduce its total cost of ownership. "Pump reliability is key for this phase of our operation," said Blake Brown, production supervisor at United DMS. "The new ARO system installed easily into our current layout, which meant we could address specific performance issues without having to reconfigure any of our existing piping."

With the addition of the ARO® Controller, United DMS has a fully automated, multi-pump system for batching and tank filling with plus or minus 1% repeatability. The easy-to-use remote operating capabilities free workers from "pump duty," allowing them to spend more time on the floor ensuring things are running smoothly.

The ARO® Controller is the first fully closed-loop controller for air-operated diaphragm pumps allowing operators to customize production lines and remote monitor fluid transfers without manual intervention for greater efficiency and accuracy in fluid delivery and less overall downtime. With touch-and-walk-away automation, users are assured dispensing repeatability within 1%.

> **"Reliability issues and related downtime were eliminated and overall pump productivity jumped by more than 75 percent"**
>
> - T. J. Harris
> Maintenance Mgr.
> DMS

"Not only has the new ARO® Pump and Controller improved our bulk transfer and mixing process, it also supports worker safety by eliminating the need for manual operator dispensing. All around, ARO has proven to be the best pump system we've got — which is why we ordered two more systems for our bulk caustic tank and caustic day tank transfer processing areas," said Gerry Fishbeck, president, United DMS.

A winning combination with bottom-line results

The new ARO® Pump and Controller were installed just over eight months ago with exceptional results. United DMS has consistently met its ideal pH balance for emulsion mix processing with no further liquid dispensing or mixing issues. After working through a number of failed alternatives, the company could not be more pleased with the simplicity and reliability of the ARO system. Additionally, United DMS reports an overall efficiency gain through the elimination of manual operator intervention and supports worker safety goals.

ARO® Electronic Interface pumps - customized control without the cost

The ARO® Electronic Interface Diaphragm Pump provides all the benefits of an air-operated pump with the controllability of an electric pump. All ARO® EXP Series Electronic Interface Pumps seamlessly integrate with the ARO® Automated Controller.

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www.AROzone.com arotechsupport@irco.com youtube.com/aropumps (800) 495-0276

ARO®

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