

Automated production control
and data management for the
hog industry—OMNI-4000
overview

Table of contents

Automated production control and data management for the hog industry	1
The OMNI-4000 Production Management and Control System	2
OMNI-4000 benefits	3
OMNI-4000 modules.....	4
OMNI-Ventilation	4
OMNI-Feed	8
More than just feed usage	9
OMNI-Feed benefits	13
OMNI-Water.....	14
OMNI-Manure.....	15
OMNI-Alert.....	16
OMNI-Site Watcher.....	17
OMNI-Weather.....	18

If you have questions about OMNI-4000, contact us. We will be happy to answer your questions and provide the solution that is right for you.

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Automated production control and data management for the hog industry

Knowledge is power, or is it? Real power is the ability to collect and manipulate data into useful information. What you can do with that information may be just as powerful.

In today's fast-paced market, organizations that effectively manage their information get ahead, those who do not, fall behind.

“Today and in the future, companies that succeed will be those that know how to manage knowledge faster than their competitors. It isn't a question of getting new information. It's the ability to extract information from your existing business, to see trends and insights faster than your competition.”

Louis V. Gerstner Jr., Chairman and CEO of IBM¹

This quotation is just as true for the hog industry as it is for other industries. The problem for the hog industry is that there has not been an effective way to collect and analyze information from multiple remote production sites. This is where information management comes in.

This overview shows how OMNI-4000 collects and helps you manage your production information. This overview is not meant as an exhaustive review of all of the products discussed herein, but is intended to give the reader an understanding of Phason's approach to addressing the needs of the livestock industry.

Phason is an industry leader in the design and manufacture of automated production control systems for the production of livestock in confinement. Phason's experience is in the hog production area, but the concepts presented here apply to other information areas of the organization as well.

¹ at the Securities Industry Association's annual convention in Boca Raton, FL, October 1997

The OMNI-4000 Production Management and Control System

The OMNI-4000 Production Management and Control System is Phason's 'flagship' product line in the pursuit of providing producers with high-quality, reliable control and monitoring systems.

The OMNI-4000 system has been developed over several years to provide producers with the most comprehensive automated monitoring and control system available in the hog industry.

The OMNI-4000 suite of modules is a personal computer-based system of hardware components (controls and monitoring devices) and software programs. The image below shows the typical resources that can be applied to any hog production site, regardless of the production methods used or number of buildings at the site.



OMNI-4000 does much more than control the ventilation and air quality in barns. With OMNI-4000, producers can monitor and control virtually every element affecting the production of livestock in confinement.

OMNI-4000 automatically collects data about the barn environment and stores it in an ODBC database, the backbone of the OMNI-4000 system.

The OMNI-4000 system monitors and controls many aspects of your operation, including:

- ◆ Environmental conditions (ventilation)
- ◆ Feed levels, ingredients, nutrients, costs, and vendors
- ◆ Water usage
- ◆ Animal populations, weights, and IDs
- ◆ Manure levels
- ◆ Weather conditions
- ◆ Alarm conditions

OMNI-4000 is an ‘enabling platform’. It does not dictate specific methods of production; it assists you in managing and controlling your operation according to *your* strategy.

OMNI-4000 operates using existing personnel skill levels; in effect being ‘transparent’ to the user, and can operate without user input for extended periods. When OMNI-4000 requires attention, such as when alarm condition occurs, information about the situation displays in the main window.

OMNI-4000 benefits

The OMNI-4000 system has been designed to automatically collect information and help you:

- ◆ Develop and maintain a production records system.
- ◆ Significantly reduce the human intervention and error involved in manual data collection.
- ◆ Streamline and lower the cost of maintaining records.
- ◆ Provide assurance that animals are being raised under conditions that meet or exceed code of practice guidelines and environmental codes.
- ◆ Depending on the animal ID procedure (individual animal or lot), provide traceability through the production cycle to the processor.
- ◆ Record most variable inputs (feed, water, etc.) and relate them to animal groups as they move through the phases of production.
- ◆ Reduce production costs by optimizing production facilities and improving operating efficiency
- ◆ Reduce capital and variable costs
- ◆ Identify profit improvement opportunities
- ◆ Integrate business tools

OMNI-4000 modules

Phason continually develops new modules and adds new features to existing modules, all in an effort to provide you, the hog producer, with the most advanced and powerful system available.

OMNI-4000 is an open and modular system and can be customized to suit a specific need. You can easily add modules that are important to your operation. This section is an overview of each of the OMNI-4000 modules.

OMNI-Ventilation

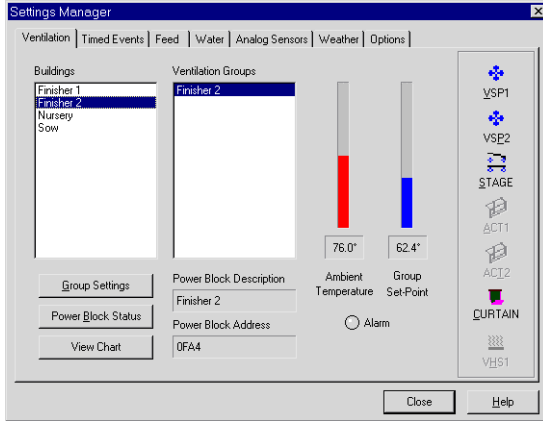
The OMNI-4000 Ventilation module has the flexibility to satisfy almost every barn type and ventilation strategy. OMNI-Ventilation, as with all other OMNI-4000 modules, is completely user configurable. The system fits the site instead of forcing the site to fit the system.

You can configure OMNI-Ventilation for either natural or forced ventilation in strategies from tunnel ventilation, side-wall forced ventilation, curtain ventilation, or chimney ventilation systems. OMNI-Ventilation automatically controls the barn environment, regardless of the ventilation strategy.

The OMNI-4000 Power Blocks monitor temperatures and control equipment such as variable speed fans, heaters, inlet actuators, misters, lights, curtain machines, and more. There are six different configurations of Power Blocks.

Power Block	Variable stages	Power relays
PB-1	1	3
PB-2	2	9
PB-3	0	3
PB-4	0	9
PB-5	0	5
PB-6	1	0

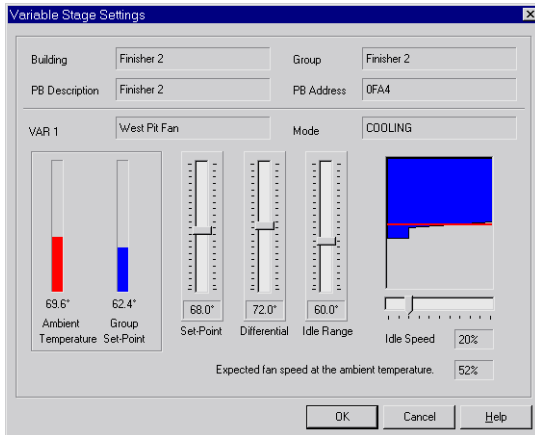
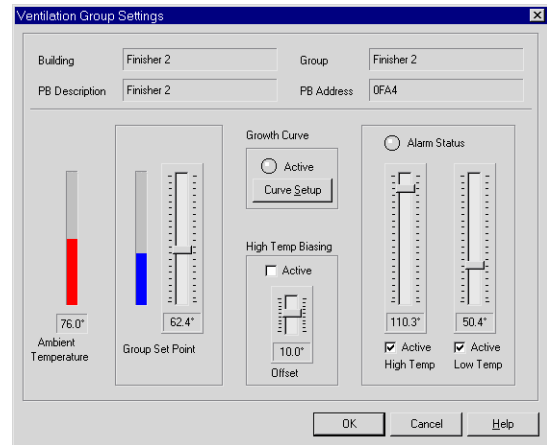
All Power Blocks come with an alarm relay that you can connect to an external alarm system.



OMNI-Ventilation has intuitive, easy-to-use setup windows.

The window on the left allows you to select a building and group (zone) within that building. From there, you have access to all the settings for variable speed fans, single speed fans, inlet actuators, relays, or curtains.

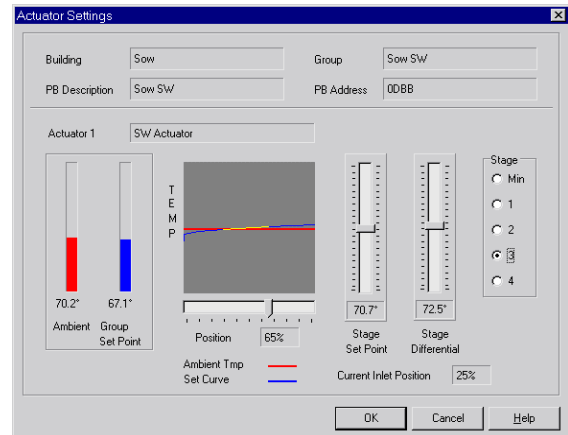
The window on the right allows you to set temperature set points for the group, high and low temperature alarms, and growth curves that automatically change temperature set points according to your settings.

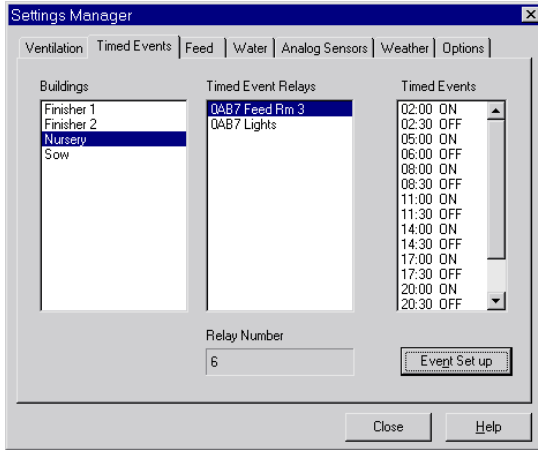


Whether you are using fans, curtains, or actuators, OMNI-4000 has an easy-to-use window to help you set up your equipment.

Each type of equipment has its own setup window. These windows allow you to implement particular ventilation strategies.

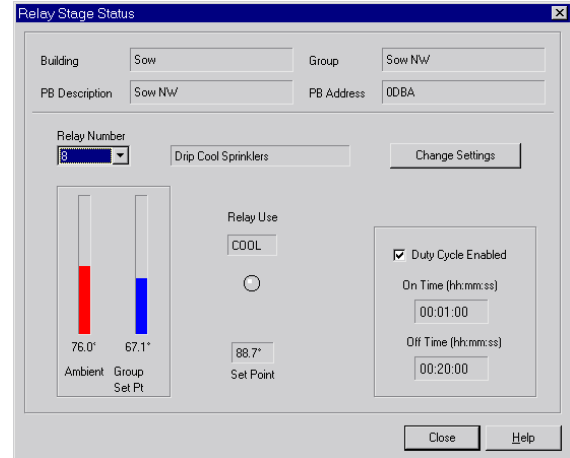
For variable speed fans, you can set minimum ventilation rate, set point, and differential. The image on the right-hand side of the window is a graphical representation of how your fan will operate according to your settings.



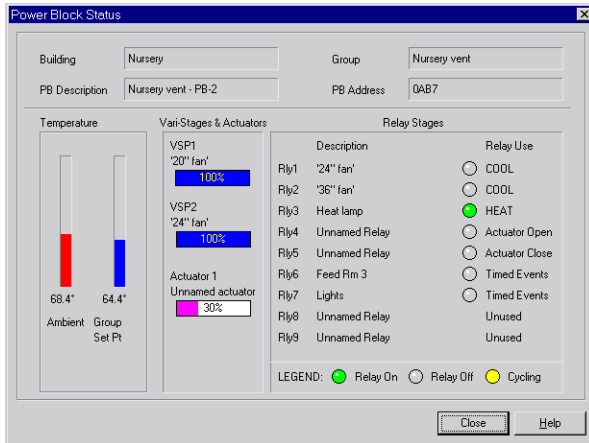


Power Block relays can be used for; heating, cooling, timed events for lighting, duty cycles for misting or feed auger control.

The relays can control any function at your site that needs to turn ON or OFF based on temperature, time, or duration.



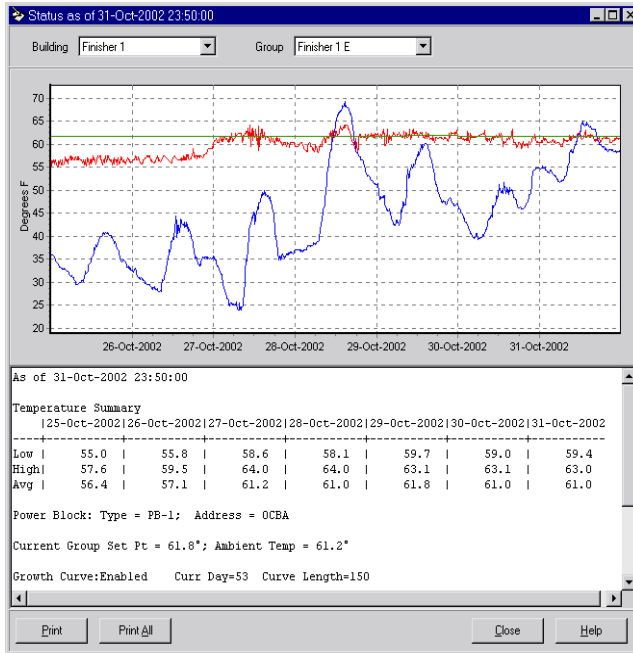
One of the great features of all OMNI-4000 modules, including OMNI-Ventilation, is automatic data collection. OMNI-Ventilation constantly collects information about your barn's environment.



OMNI-Ventilation has several charts, reports and viewers that allow you to view information about your barn and help you troubleshoot any irregularities.

You can view the status of any Power Block or create charts and reports for any ventilation group (zone) at your site.

Status reports, show below, provide information about every aspect of a ventilation group: current settings, settings history, ambient temperature history, and outdoor temperature history.

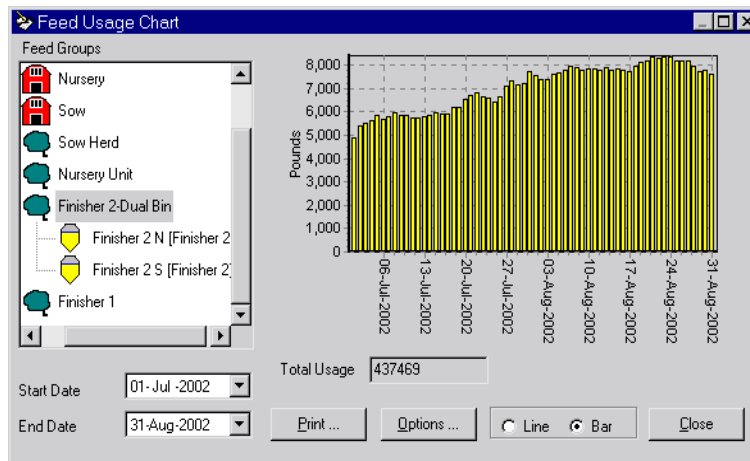


Status reports are an excellent tool for diagnosing ventilation problems.

OMNI-Feed

OMNI-Feed is a cost-effective solution for on-farm feed management. OMNI-Feed works with the Feed Level Sensors to measure the feed level in feed bins. The Feed Level Sensors use ultrasonic technology to accurately measure the feed levels.

The Feed Level Sensor uses an ultrasonic transducer to sense (measure) the feed level in a bin. The sensor emits ultrasonic pulses that are reflected by the feed. The sensor measures the time the pulses take to reflect back to the sensor and then sends the data to the OMNI-Feed software. OMNI-Feed analyzes the data and converts it to reliable measurements of the feed level, which it can display in height, volume, or weight.

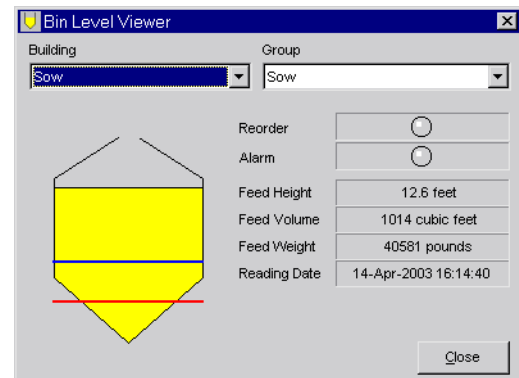


OMNI-Feed determines the amount of feed disappearing over time (usage) by measuring the feed levels at different times and then calculating the difference at midnight each day.

OMNI-Feed and the Feed Level Sensor have been designed to measure the feed level within two percent of the full bin amount.

When a feed delivery occurs, the sensor detects the bin lid opening (auger delivery system) or an increase in pressure (pneumatic delivery system). If the sensor detects an increase in the feed level after the lid has been closed or the pressure returns to normal, then the system recognizes this as a 'fill event'.

Easy-to-read windows display feed bin levels, feed forecasts, and low feed level alarms. The charting and reporting tools allow you to review and print information for any previous period.



More than just feed usage

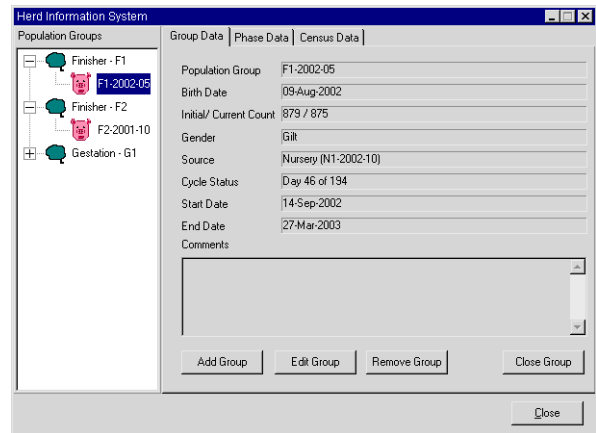
OMNI-Feed not only monitors feed usage, it also helps you to set up and monitor feed strategies for groups of animals, develop feed growth curves, and develop diet budgeting to influence productivity.

OMNI-Feed includes four subsystems: the Herd Information System, the Feed Mill System, the Feed Forecaster, and the Feed Ticket Entry System.

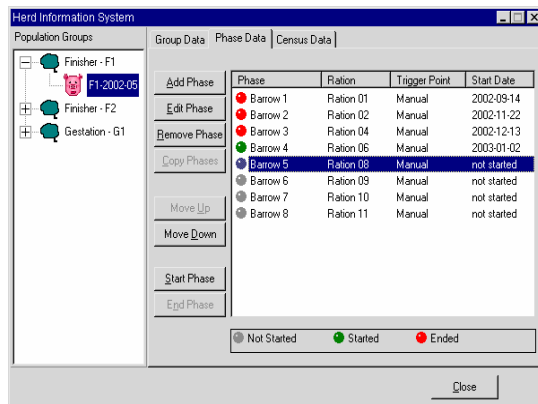
The Herd Information System is a valuable animal management tool that gives you more control over the animal populations at your site. The Herd Information System collects and stores information about the groups of animals (population groups) as they move through their life cycles.

The system provides an overview of the status of the population groups at any point in time, not only after the animals have left your site.

You can look at trends that might be emerging and adjust them as they develop. This allows you to enhance factors that benefit your site, and try to prevent or reduce harmful ones before they cause problems.



Phase feeding is an important tool for providing good nutrient management to help your animals achieve optimum growth. Different stages or physiological states in an animal's life cycle require different nutrients and rations. Phase feeding allows you to plan the nutrients and rations for each stage of your animals' life cycles.



OMNI-Feed can automate the transition from one phase to the next (ration changes) using triggers. Triggers allow you to select how OMNI-Feed advances to the next phase.

Once you select the trigger type for a population group, OMNI-Feed monitors the system and makes sure the correct ration is being used at the correct time. This allows you to focus on what is happening, not how or when it is happening.

The Herd Information System has six detailed reports:

- ◆ Animal Census Report
- ◆ Population Status Report
- ◆ Animal Shipment Report
- ◆ Population History Report
- ◆ Feed Mills Report
- ◆ Feed Bin Inventory Report

Each report provides valuable information to help you analyze your past and present population groups.

Population History Report						Phason Farms
Production Environment:		Finisher 2-Dual Bin				
Population Group:		Fin-AR51				
Source:		Nursery 2				
Initial Count:		1000				
Birth Date:		01-Mar-2002				
Start Date:		15-May-2002				
End Date:		28-Sep-2002				
Gender:		Mixed				
Consumption						
Ration	Start Date	End Date	Census	Weight (lb)	Cost	
Ration 03	15-May-2002	29-May-2002	2000	36,693	375	
Ration 04	30-May-2002	12-Jun-2002	2000	51,937	483	
Ration 05	13-Jun-2002	30-Jun-2002	2000	82,035	801	
Ration 06	01-Jul-2002	27-Jul-2002	1997	163,296	1,426	
Ration 07	28-Jul-2002	17-Aug-2002	1989	160,889	1,450	
Ration 08	18-Aug-2002	07-Sep-2002	1984	166,516	1,542	
Ration 09	08-Sep-2002	28-Sep-2002	992	141,461	1,276	
Totals				802,826	\$7,352	
Shipments						
Time	Count	Comments				
05-Oct-2002 4:30 PM	710	Shipped Animals				
06-Oct-2002 4:30 PM	276	Shipped Animals				
		986				
Deads / Culls						
Date	Count					
16-Jul-2002	3					
03-Aug-2002	1					
08-Aug-2002	1					
09-Aug-2002	3					
16-Sep-2002	1					
19-Sep-2002	2					
23-Sep-2002	1					
30-Sep-2002	2					
		14				
Weight History						
Date	Weight (lb)	Comment				
01-Jun-2002 16:30:00	45	Scheduled Weigh				
15-Jun-2002 16:30:00	67	Scheduled Weigh				
29-Jun-2002 16:30:00	79	Scheduled Weigh				
12-Jul-2002 16:30:00	93	Scheduled Weigh				
26-Jul-2002 16:30:00	109	Scheduled Weigh				
10-Aug-2002 16:30:00	115	Scheduled Weigh				
24-Sep-2002 16:30:00	123	Scheduled Weigh				

The Feed Mill Information System helps you manage feed rations and vendors that supply them to your site. The system allows you to keep track of all your feed information and provides at-a-glance and detailed information about feed vendors, rations, ingredients, nutrients, and costs.

Feed rations are one of the largest expenses of any livestock operation and are critical to the growth and health of the animals. Monitoring the many aspects of feed rations is very important.

Determining the requirements of ingredients and nutrients such as lysine is an important part of managing your animals. The Feed Mill Information System helps you track these and then evaluate different combinations to help develop the best feed strategy.

Feed Mill Information	
Vendors Ingredients Nutrients Rations Options	
Nutrient	Unit of Measure
Calcium	%
Copper	kcal/lb
DE Swine	kcal/lb
Lysine	%
ME Swine	kcal/lb
NE Swine	kcal/lb
Protein	%
TPhosphorous	%
Vit A	%

Buttons: Add Nutrient, Edit Nutrient, Remove Nutrient, Close

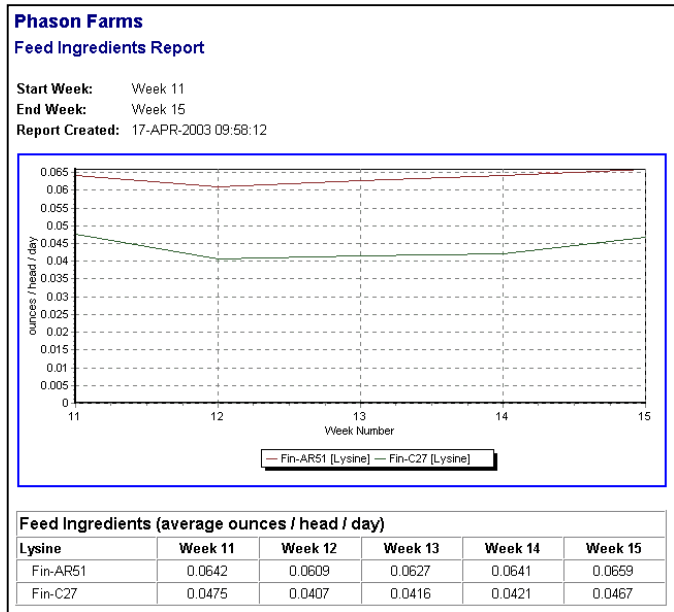
You can create detailed feed ingredients reports and feed nutrients reports that compare the consumption for different animal populations.

Tracking nutrient consumption allows you to ensure that your animals are consuming the desired amount of nutrients. This allows you to monitor nutrient levels and make adjustments on a week by week basis instead of doing a post mortem after the animals have left the barn.

Tracking nutrients and making any necessary adjustments will help you get better-performing animals.

Tracking nutrients can also help you monitor nutrients when ingredients change in a ration.

For example, if one ingredient becomes too expensive and is replaced by a similar, less-expensive ingredient, you can track nutrient consumption and then compare it to animal performance from the previous ingredient.



Ration Information

Ration: Ration 06 Description:

Comment: Barrow feed

Vendor: Joe's Feed Lead-time (days): 3

Nutrient	Units	Value
Lysine	%	1.15
Protein	%	19.7
ME Swine	kcal/lb	1573.2
Calcium	%	0.63
TPhosphorous	%	0.57
Vit A	IU/lb	2200

Lysine / Energy Ratio: 3.3158

Add Nutrient Edit Nutrient Remove Nutrient Set L/E Ratio

OK Cancel

The Feed Information System can calculate the lysine/energy ratio for a feed ration. Lysine is an essential amino acid required by the body for optimum growth.

The lysine/energy ratio (grams of lysine per megacalorie of energy) compares the amount of lysine to the amount of energy for the ration. The lysine/energy ratio is an important figure to monitor when changing ingredients in rations.

The Feed Forecaster analyzes your feed usage, compares it with the feed bin levels, and then forecasts your upcoming feed ration needs. This helps you more efficiently schedule feed deliveries, and warns of potential feed shortages.

The Feed Forecaster makes forecasts based on weekly feed usage data and trends from the previous 30 days. You can select when and how often you want the forecaster to analyze the feed data.

Bin	Empty	3 Ton	6 Ton	9 Ton	12 Ton
Barn 1	No Change	Now	Now	Now	Now
Barn 2	Sep 26, 2002	Now	Now	Now	Now
Barn 3	No Change	Now	Now	Now	Now
Barn 4	Sep 28, 2002	Now	Now	Now	Sep 26, 2002
Barn 5	Sep 28, 2002	Now	Now	Now	Sep 26, 2002
Barn 6	Oct 04, 2002	Now	Now	Sep 27, 2002	Oct 01, 2002
Barn 7	Oct 01, 2002	Now	Now	Sep 28, 2002	Sep 29, 2002
Barn 8	Sep 28, 2002	Now	Now	Now	Sep 27, 2002

Next Forecast: Sep 26, 2002 4:30 PM

The *Empty* column shows the date when the bin will be empty. The *3 Ton*, *6 Ton*, *9 Ton*, and *12 Ton* columns show the dates on which you can safely order that amount of feed. You can use this information to more efficiently schedule feed deliveries.

The Feed Forecaster can also send faxes to preselected fax numbers. The faxes are sent once per day and show which ration is in each bin, when each bin will be empty, and suggest how much of each ration you should order.

Phason Farms
Feed Bin Forecast Report
 Fax Date: 2002-Aug-15

Bin	Ration	Bin Empty By	Suggested Order Amt/Type
Feed F1	Ration 07	2002-Aug-20	8000 pounds/Ration 08
Feed F2	Ration 03	2002-Aug-28	5000 pounds/Ration 04

The Feed Ticket Entry System allows you to reconcile your feed bin inventory with the feed delivery tickets.

The system corrects differences between the amount of feed measured (Feed Level Sensors) and the amount of feed delivered (feed ticket), and helps ensure the correct feed goes into the correct bin in the correct quantity.

Feed Groups	Date/Time	Sensed Weight *	Ticket Weight *	Feed Type
Barn A (Finisher)	15-Nov-2002 09:30:21	15554	15000	Ration 01
	17-Nov-2002 15:55:32	15482	15000	Ration 01
Barn B (Gestation)	19-Nov-2002 13:39:20	15539	15000	Ration 01
	21-Nov-2002 12:48:37	15437	15000	Ration 01
Barn C (Farrow)	23-Nov-2002 14:15:02	15548	15000	Ration 01
	25-Nov-2002 13:21:25	15532	15000	Ration 03

OMNI-Feed benefits

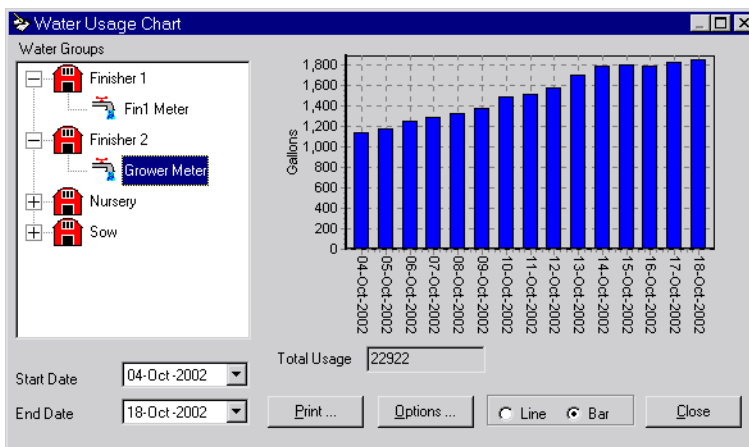
- ◆ Increases feed management capabilities
- ◆ Reduces feed inventory outages
- ◆ Helps control feed levels in all the feed bins at your site
- ◆ Helps make sure you receive the correct quantity of the correct feed in the correct bin at the correct time, all at the lowest possible cost
- ◆ Improves control of the feed management process from feed mill to feed bins
- ◆ Provides the data to help create an optimal feed manufacturing schedule
- ◆ Helps schedule the most efficient feed delivery assignments for all drivers and trucks
- ◆ Helps provide a competitive edge and increased profits
- ◆ Helps make your site more efficient and more profitable

OMNI-Water

OMNI-Water is a valuable tool for monitoring your animals' daily water consumption.

Changes from normal water consumption patterns can be an early indication of costly changes in the health of your animals. OMNI-Water automatically collects water usage data from water meter pulse counters and provides charts and reports for you to monitor and analyze water usage at your site.

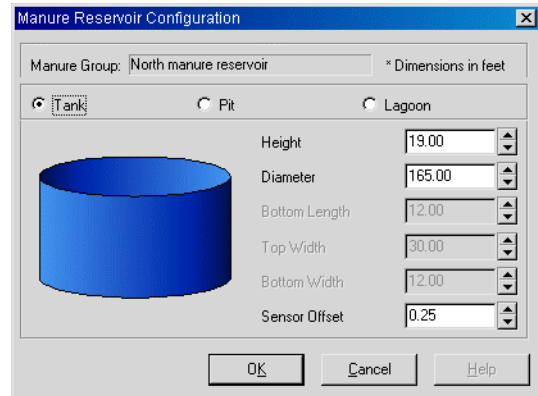
When combined with OMNI-Feed, OMNI-Water can be a valuable tool for the early diagnosis of potential health problems. For example, using the charts and reports, you can monitor water consumption after introducing a new type of feed.



OMNI-Manure

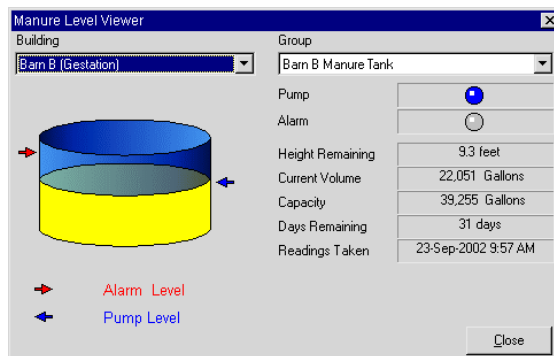
OMNI-Manure is an easy and effective solution for monitoring manure levels at your site. You can configure the to monitor aboveground tanks, under-slat pits, or earthen lagoons.

The Manure Level Sensor uses an ultrasonic transducer to sense (measure) manure levels. The sensor emits ultrasonic pulses that are reflected by the manure. The sensor measures the time the pulses take to reflect back to the sensor and then sends the data to the OMNI-Manure software.



OMNI-Manure analyzes the data it receives from the Manure Level Sensors and then converts it to reliable measurements of manure levels. OMNI-Manure determines the amount of manure accumulating over time by measuring the manure levels at different times of the day and then calculating the change.

OMNI-Manure has a chart, a report, and a viewer to display manure data, as well as configurable alarms.



The Manure Level Viewer shows the manure level in yellow with the freeboard in blue. The blue arrow shows the level at which pumping should start. The red arrow shows the alarm level.

OMNI-Manure calculates the days remaining using the capacity of the reservoir and historical data from the previous 30 days.

The alarms can provide warnings of high manure levels. This is a powerful environmental protection tool, particularly when combined with the OMNI-Alert notification system.

OMNI-Manure charts and reports can provide early warning of leaks or high manure-level conditions and proof of past manure levels. OMNI-Manure's information can also help you plan and schedule manure spreading.

OMNI-Alert

OMNI-Alert uses a voice modem and text-to-speech technology to convert OMNI-4000 alarm messages to speech over phone lines.

OMNI-Alert monitors all the OMNI-4000 modules at your site. If a module reports an alarm condition, OMNI-Alert calls your contacts and notifies them of the condition. The system provides a verbal message to the contact, advises them of the date and time of the condition, what the condition is, and requests a confirmation response.

If there is no response from a contact, the OMNI-Alert continues down the calling list, calling the remaining people on the list. If multiple contacts need to be notified, it continues calling until all calls are completed.

If a user-specified period elapses and the alarm condition has not been corrected, OMNI-Alert begins the calling process again, even if a previous call acknowledgment has been received.

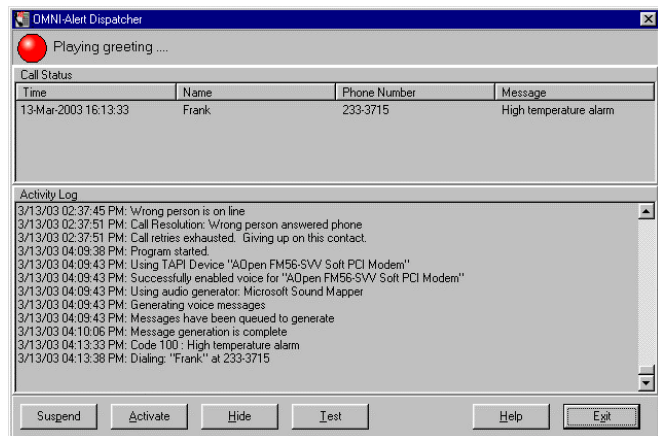
OMNI-Alert can detect if answering machine is responding to a call. If an answering machine responds to a call, OMNI-Alert calls the next contact on the calling list.

OMNI-Alert is easy to customize. Specific alarm conditions can be directed to specific individuals and you can create your own alarm classes and schedules. These and 11 other options allow you to customize OMNI-Alert for your site.

The OMNI-Alert Dispatcher displays information about OMNI-Alert, including status, recent activity, and calls to be processed.

OMNI-Alert comes with three reports that help you keep track of configuration, alarm conditions, and call results.

OMNI-Alert Configuration report—lists the current configuration and settings for OMNI-Alert.



Alarm log—lists all alarm conditions that occurred during the selected date range.

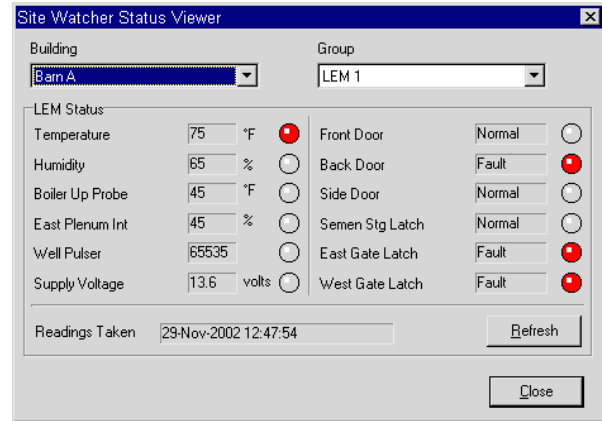
OMNI-Alert Activity log—lists all the text from the Activity Log area of the OMNI-Alert Dispatcher. The activity log is useful for determining the result of the alert calls and can help troubleshoot connection problems.

OMNI-Site Watcher

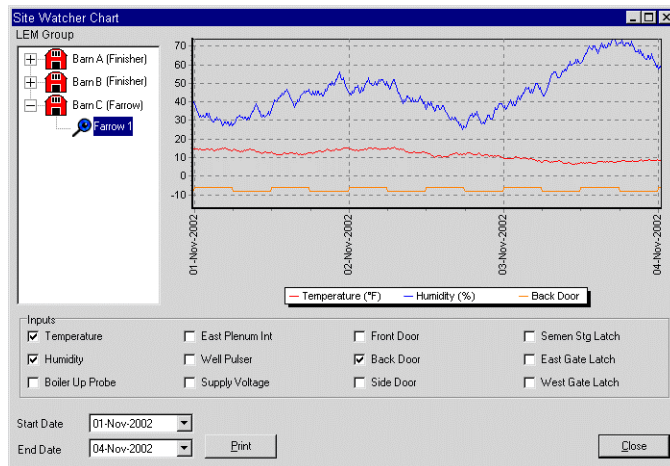
OMNI-Site Watcher works with the Local Environment Monitor to monitor critical conditions at your site. Using multiple Local Environment Monitors, you can monitor conditions in *every* room or zone at your site.

OMNI-Site Watcher's status viewer and easy-to-use charts and reports display information at a glance and allow you to 'keep an eye' on your site.

The Local Environment Monitor monitors the conditions and notifies OMNI-Site Watcher of alarm conditions. When there is an alarm condition, OMNI-Site Watcher sends a message to the Communications Center, the Site Watcher Status Viewer, and the Alarm log.



When combined with OMNI-Alert, OMNI-Site Watcher is the ideal monitoring system for your site; combining automatic and continuous monitoring of critical conditions, with notification of alarm conditions.



The Local Environment Monitor automatically monitors supply voltage (DC) and comes with a 30-foot temperature probe for monitoring outdoor or ambient temperatures. In addition to monitoring supply voltage and temperature, the Local Environment Monitor can also monitor humidity, pulse counts, auxiliary inputs (additional temperature or humidity), and digital inputs.

The pulse count input can be used for monitoring pulse counts, such as a water flow pulse counter. Very low or high pulse counts can indicate leaks or water supply problems.

The auxiliary inputs can be used for monitoring temperature, humidity, or third-party sensors such as gas or pressure sensors.

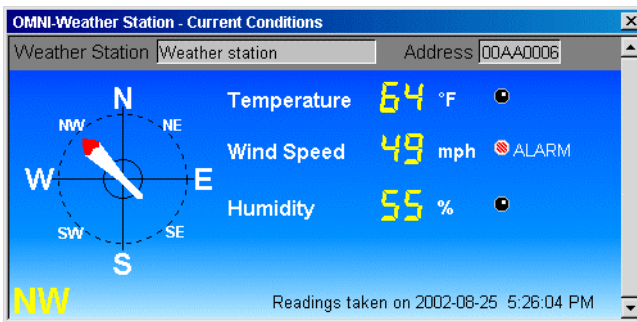
The digital inputs can be used for monitoring power failures, door contacts, pressure switches, smoke alarms with relay outputs, or any other inputs that have two-position switches.

OMNI-Weather

OMNI-Weather works with the OMNI-Weather Station to monitor and log environmental conditions at your site. This gives you accurate weather information instead of general conditions from a remote location such as an airport.

Monitoring conditions outside the barn can help you more efficiently control conditions inside the barn. You can analyze the affects of weather on conditions inside the barn or implement restrictions on manure handling during unfavorable wind and weather conditions.

The OMNI Weather Station monitors, outdoor temperature, relative humidity, wind speed, and wind direction. OMNI-Weather can even collect and display data from multiple OMNI Weather Stations.



The easy-to-read visual display shows you current conditions.

Programmable alarms include high and low temperature, high humidity, and high wind speed.

The charting and reporting tools allow you to review and print weather information for any previous period.

