Capacitor Controls

Communications-Ready | VAR Management
HDE Value Proposition

HDE designs, manufactures, and supports state-of-the-art capacitor controls which provide continuous monitoring of electrical and environmental system parameters to manage switching operations on capacitor banks. The HDE product line is one of the most comprehensive and complete capacitor control offerings available in the marketplace today. As capacitor controls are HDE’s primary product focus in its Controls & System Monitoring product line, significant engineering and design resources assure that these controls are the best and most complete capacitor controls available today. In addition they are backed by HDE’s 10-year warranty.

Two Product Lines are Available:

**VarCom®** – featuring ComFlex® Flexible Communications Technology, HDE’s solution for adaptive communications, provides full DNP 3.0 communications compatibility without compromising the users access to full front panel functionality for easy field interface.

**NoMax®** – field friendly with full front panel access and programmability, this product line allows users to program and manage capacitor bank operations on a local level.

Capacitor Control Software:

**VarWare®** manages, programs, and interfaces with VarCom capacitor controls. VarWare provides the user with powerful tools for programming controls with customized switching protocols while providing an easy platform for changing settings and extracting data profiles held in the logging function of enabled controls.

VarCom Features and Options:

**ComFlex®** – offers users an uncompromised selection of many different communications vendors. ComFlex design provides the user with ‘plug and play’ capability assuring you that everything required for supporting various communications devices is already installed and ready to use. From built in power supplies, to a flexible DNP Points List, your control is never obsolete even if installed initially without communications.

**R-Comm®** – VarCom controls can be equipped with remote Bluetooth® communications allowing the user the ease and safety of communicating with every control on an individual basis from the convenience of up to 200 feet away.

**DNPFlex®** – HDE’s ability to provide customizable DNP points to facilitate maximizing the users varying needs by adapting to individual user requirements. HDE’s DNPFlex solution strikes at the heart of successfully integrating smart capacitor controls into advanced Smart Grid systems.
VAR Management and Smart Grid

With our unique combination of capacitor controls designed for Local VAR Support as well as Smart Grid use, HDE controllers can be deployed in stand-alone voltage or VAR mode without communications or as controllers with DNP communications ready for integration into a Smart Grid environment. HDE VarCom controls are always ready to integrate into new or existing centralized VAR Managements Systems or into Advanced Distribution Management Systems (ADMS).

VAR Management

HDE believes that VAR Management is at the core of operational power system efficiency and HDE capacitor controls provide front-line value which maximizes a power company’s return on investment. By optimizing VAR management through the use of switched capacitor banks and HDE capacitor controls, a power company will improve power factor, reduce losses, and gain efficiencies. When HDE controllers are operated in conjunction with a VAR Management System (VMS), or, as stand-alone controllers operating in local environments, the investment in both controls and switched capacitor banks provides a compelling economic case and return on investment.

Smart Grid

HDE’s vision of Smart Grid includes end-to-end connectivity between all elements of the electric power system by using an advanced communications network. This vision increases the power of the network by adding new monitoring and control points which improve asset performance and reduce outages while strengthening system reliability and energy productivity. With the various elements of the Smart Grid working together, grid performance data is available to advanced distribution management systems which seamlessly provide real time data for the power company to act on. HDE adds to the power of the network with products focused on interoperability and data sharing.
VarCom®
Capacitor Controls with Communications Options

Communications equipped VarCom capacitor controls add new capabilities for monitoring and controlling capacitor banks. Using ComFlex® flexible communications technology, communications can be added to any of the VarCom controls. ComFlex adds remote command and control functions while maintaining all of the features and capabilities of the VarCom control.

Simple One-Way or Two-Way Control
Communications technologies available include paging, cellular, licensed and unlicensed radio options. The communications function is modular for retrofits or changes in communications technologies.

- Cost effective
- Add or remove local VARs to meet overall system demands
- Available on all VarCom local controls
- Full local control functions and capabilities

Control, Monitoring and Full Integration with VAR Management Systems (VMS)
Options include Sensus™-Telemetric Radio, Silver Spring® eBridge Radio, Landis+Gyr® Integrated Wangate Radio, Wide Area Network, Advanced Metering Infrastructure (AMI) networks or any DNP 3.0 communications interface. Two-way communications provides near real time control and monitoring of capacitor banks and the distribution systems they are connected to.

- Add or remove local VARs to meet overall system demands
- Can be used as a capacitor bank control and distribution system monitor
- Control status reporting including trouble indicated by high neutral current
- Full local control and override functions and capabilities
- Monitoring and control of other system parameters including voltage and power factor

### VARCOM COMPARISON CHART

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<th>VarCom 2600</th>
<th>VarCom 1600</th>
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<td>Temperature</td>
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<td>4 Local Schedules</td>
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<td>Bluetooth Communications</td>
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VarCom® Capacitor Controls
Featuring ComFlex® Flexible Communications Technology

VarCom Capacitor Control Features

- Easy to use, field friendly control panel
- Based on existing, field-proven design
- Multi-schedule local functionality – Time / Voltage / Temp / Current / kVAR
- Neutral current sensing
- Local control default mode switches capacitor bank – even when communications or Volt/VAR applications are off-line
- Bluetooth® local wireless communications option
- Ethernet, multi-session capability
- ComFlex design – select the communications of your choice

- Field upgradeable at a later date with communications – radio, pager, etc.
- VHF/UHF paging for basic one-way communications
- Cellular, licensed or unlicensed radio networks through DNP 3.0 interface
- Control provides 12VDC power to communications hardware
- USB and RS-232 equipped
- VarWare® software allows data logs/profiles to be downloaded
- Data logging
- Mounting options available – pole, socket

Any DNP 3.0 Communications Device
One-Way Radio/Paging
Mesh Radio Networks
Cellular Modem / Router
AMI Networks
Wide Area Networks
Fiber Optics
VarCom®
3600 Series Capacitor Controls

VarCom 3600 Series Capacitor Controls switch Smart Grid capacitor banks using commands from Volt/VAR management systems with backup control based on local parameters of time of day, ambient temperature, kVAR, current and system voltage.

3600 Series controls monitor three phase voltages and currents and provide the ability to switch banks on a single phase basis for applications requiring this capability. This optional single phase switching capability enables the new CapCheck HV feature, providing in situ testing of a banks capacitor units with test results data logged and provided by the communications network. The controls can be programmed from the front panel or by computer, where a quantity of controls can be programmed quickly and identically. Data can be collected and stored for up to 3 months which can be downloaded to analyze further. With field-ready upgradeable firmware capabilities, VarCom Capacitor Controls feature ComFlex® Flexible Communications Technology, allowing the user the option of deploying the control initially as a local control and later upgrading it with communications.

**FEATURES**

- Monitors three phase voltages and currents
- CapCheck HV in situ capacitor unit testing, optional
- Single phase switching, optional
- Cap switch status inputs, optional
- Based on existing, field-proven design
- Best-in-class VarWare® control software user interface
- Multi-schedule local functionality – Time / Voltage / Temperature / kVAR / Current
- Local control default mode switches capacitor bank even when communications or Volt/VAR applications are off-line
- Easy to use, field friendly control panel
- Faceplate test points for line voltages and phase currents, optional
- DNP3.0/IEEE 1815 protocol
- ComFlex design – select the communications of your choice or field upgradeable at a later date with communications
  - Cellular Modem/Router
  - Mesh Radio
  - AMI Networks
  - Wide Area Networks
  - Fiber Optics
  - WiMAX
- Control provides 12VDC power to communications hardware
- Built in 5 minute reclosing delay
- USB and RS-232 serial communication ports are standard
- Ethernet (multi-session capable), optional
- R-Comm® Bluetooth® short range wireless communications, optional
- Mounting – pole mount with Amphenol® connectors
- Neutral current sensor option available to detect switch failures, blown fuses and other malfunctions (Supports HD Electric, Fisher Pierce® and Lindsey™ sensors)
### SMART GRID READY

**FULL INTEGRATION WITH VAR MANAGEMENT SYSTEM (VMS) AND CONSERVATION VOLTAGE REDUCTION (CVR) CAPABLE**

VarCom controls with ComFlex technology support DNP3.0/IEEE 1815 protocol as a standard feature for integrating with SCADA Systems, Distribution Management Systems (DMS), VAR Management Systems (VMS), Volt/VAR Management Systems (VVMS) and Conservation Voltage Reduction (CVR) applications. HDE’s DNPFlex technology enables remapping as well as the addition and deletion of DNP points, allowing controls to work with a variety of substation or system-wide VAR management strategies. HDE’s DNPFlex solution strikes at the heart of successfully integrating smart capacitor controls into advanced Smart Grid systems.

### COMMUNICATIONS READY

**VarCom controls feature a best-in-class user interface, while allowing for the addition of remote communications.** VarCom controls are also available with communications hardware factory installed and ready to use out of the box. Should the choice of communications technology change after deployment, VarCom controls easily accommodate the upgrade, maintaining the value of the asset.
VarCom®
2600 Series Capacitor Controls

The VarCom 2600 Series Capacitor Controls monitor and control capacitor banks using time of day, ambient temperature, system voltage, line current and line kVAR with overrides.

They can be programmed from the front panel or by computer, where a quantity of controls can be programmed quickly and identically. Data can be collected and stored for up to 3 months, which can be downloaded to analyze further. With field-ready upgradeable firmware capabilities, VarCom Capacitor Controls feature ComFlex® Flexible Communications Technology, allowing the user the options of purchasing the controls with communications hardware factory installed and ready to use or deploying the control initially as a local control and later upgrading it with communications.

FEATURES

- Easy to use, field friendly control panel
- Based on existing, field-proven design
- Best-in-class user interface
- Multi-schedule local functionality – Time / Voltage / Temperature / Current / kVAR
- Neutral current sensing
- Local control default mode switches capacitor bank, even when communications or Volt/VAR applications are off-line
- Field upgradeable firmware
- Secure mode prevents front panel changes
- ComFlex design – select the communications of your choice
- Field upgradeable at a later date with communications – radio, modem, router, etc.
- Cellular, licensed and unlicensed radio networks through DNP 3.0 interface
- Control provides 12VDC power to communications hardware
- Built in 5 minute reclosing delay
- USB and RS-232 equipped
- PC software allows data logs/profiles to be downloaded
- Data logging
- Mounting options available – pole, socket, etc.
- Voltage and current test points
- Ethernet, multi-session capable, optional
- Wireless communications capable
- Bluetooth® short range wireless communications from PC to control for programming, monitoring and downloading, optional
The VarCom series of controls with ComFlex are DNP communications ready. These controls can be deployed with factory installed communications or as local controls with the ability to add communications later, allowing them to work with a variety of system-wide VAR management strategies.

VarCom controls feature a best-in-class user interface, while allowing for the addition of remote communications. VarCom controls are also available with communications hardware factory installed and ready to use out of the box. Should the choice of communications technology change after deployment, VarCom controls easily accommodate the upgrade, maintaining the value of the asset.
VarCom®
1600 Series Capacitor Controls

The VarCom 1600 Series Capacitor Controls monitor and control capacitor banks using time of day, ambient temperature, system voltage.

They can be programmed from the front panel or by computer, where a quantity of controls can be programmed quickly and identically. Data can be collected and stored for up to 3 months, which can be downloaded to analyze further. With field-ready upgradeable firmware capabilities, VarCom Capacitor Controls feature ComFlex® Communications Technology, allowing the user the option of deploying the control initially as a local control and later upgrading it with communications.

FEATURES
- Easy to use, field friendly control panel
- Based on existing, field-proven design
- Best-in-class user interface
- Multi-schedule local functionality – Time / Voltage / Temperature
- Neutral current sensing
- Local control default mode switches capacitor bank – even when communications or Volt/VAR applications are off-line
- Field upgradeable firmware
- Secure mode prevents front panel changes
- ComFlex design – select the communications of your choice
- Field upgradeable at a later date with communications – radio, modem, router, etc.
- Cellular, licensed and unlicensed radio networks through DNP 3.0 interface
- Control provides 12VDC power to communications hardware
- Built in 5 minute reclosing delay
- USB and RS-232 equipped
- PC software allows profiles to be uploaded
- Data logging
- Mounting options available – pole, socket, etc.
- Voltage test points
- Ethernet, multi-session capable, optional
- Wireless communications capable
- Bluetooth® short range wireless communications from PC to control for programming, monitoring and downloading, optional
The VarCom series of controls with ComFlex® are DNP communications ready. These controls can be deployed with factory installed communications or as local controls with the ability to add communications later, allowing them to work with a variety of system-wide VAR management strategies.

VarCom controls feature a best-in-class user interface, while allowing for the addition of remote communications. VarCom controls are also available with communications hardware factory installed and ready to use out of the box. Should the choice of communications technology change after deployment, VarCom controls easily accommodate the upgrade, maintaining the value of the asset.
VarCom®
950P Series Capacitor Controls

The VarCom 950P Series Capacitor Controls are an economical way to control capacitor banks using paging, time and/or voltage.

They are fully programmable from the front panel eliminating the need for a computer. The smaller, compact design allows for easy installation in any configuration. These compact controls are available with FLEX Paging receivers.

FEATURES

• Based on existing, field-proven design
• Best-in-class user interface
• Local control default mode switches capacitor bank – even when communications or Volt/VAR applications are off-line
• Easy to use, field friendly control panel
• VHF/UHF paging for basic one-way communications
• Control provides power to communications hardware
• Built in 5 minute reclosing delay
• Voltage test points
• Mounting options available – pole, socket, etc.

Auto Operation Mode
Allows operations based on local conditions or with override from SCADA

Control Settings
Easily selected from intuitive front panel
SMART GRID READY

The 950 controls are deployed with factory installed communications, allowing them to work with a variety of systemwide VAR management strategies.

COMMUNICATIONS READY

950P controls feature a best-in-class user interface, allowing rapid field installation and checkout.
DNP3 Configuration/Interoperability Software

DNPFlex solution provides the user with a feature rich standard DNP points list and a path to create a custom DNP interface to optimize compatibility with existing SCADA control systems or related hardware. This comprehensive points list along with HDE’s commitment to work with the user to modify or customize commands to align their VAR management and capacitor control switching scheme is at the core of providing customer satisfaction. In addition, HDE stands by our pledge to support the product continually by adapting it to maximize performance requirements.

DNP Interface

The DNP interface in the HDE VarCom® controls is a set of remotely accessible data points within the control allowing access for remote command, control, and monitoring. Through this DNP interface the VarCom control continually updates the SCADA system on capacitor bank status, control status and alarms for parameters such as high neutral current, under/over voltage, etc.

At the other end of the DNP interface is the SCADA master control system. This system sends commands to the VarCom control based on system VAR/voltage requirements and the control responds with the appropriate command to open or close the capacitor bank switches. At all times, the control is continuing to report to the SCADA master all local line parameters.

The SCADA VAR Management System monitors and controls all capacitor banks and the line parameters for each one. Using sophisticated control algorithms, this VMS optimizes power factor on an entire feeder based on data provided from each individual control.

HDE VarCom controls play well in this central control environment through the responsive DNP interface while providing a local control option as a backup for those times when communications or central control are unavailable.
Bluetooth® Local Wireless Communications

HDE’s R-Comm Bluetooth Local Wireless capability works with VarCom capacitor controls to access the control remotely. In many cases capacitor controls are mounted high on the pole and are not easily accessible from the ground. Instead of needing to connect directly to the computer with a cable, a USB dongle is used that allows the capacitor control to be accessed via Bluetooth communication from the comfort of a vehicle. The Bluetooth link simply replaces the USB cable that would otherwise connect your PC to the control. With the computer running the VarWare® capacitor control software, most of the VarWare functions can be completed through the Bluetooth wireless link.

The HDE supplied Bluetooth USB dongle bypasses the typical PC Bluetooth hardware and replaces it with secure encrypted data stream to the control.

Connect to the control via local wireless Bluetooth communication and command the control from up to 200 feet away.

**BENEFITS**

- Convenience
- Safety
- No longer having to go up the pole with a bucket or ladder to access the control
- Access to the control is now from the computer in the truck cab
- Controls can be programmed, downloaded, operated and interrogated all via the Bluetooth local wireless link

**TECHNICAL SPECIFICATIONS**

- Class 1 high power 100 meter range
- PC USB hardware self installs in any PC USB port
- LEDs indicate Bluetooth link status
- Encrypted secure communications
NoMax®
Local Capacitor Controls

NoMax Capacitor Controls provide best-in-class local VAR management and feature a user-friendly interface with local programming capability. The NoMax product line provides the industry with an economical solution for local capacitor controls and a proven performance history.

NoMax 900 Series
The NoMax 900 Series Capacitor Controls are smaller and easily field programmable from the front panel. There are three models of the NoMax 900 Series Capacitor Controls available to suit your needs:

- NoMax 900T offers time control only
- NoMax 950 offers time control with voltage override
- NoMax 900 offers time control with temperature and voltage override

All capacitor controls have an electronic clock with perpetual calendar for leap years, holidays and daylight savings time. A 10-year replaceable battery maintains the clock time through extended power outages. The LCD display confirms all settings and displays the non-resettable operations counter. Front panel lights confirm the proper operation of the control and display the capacitor switch status based on the last command.

### NOMAX COMPARISON CHART

<table>
<thead>
<tr>
<th>Feature</th>
<th>NoMax 950</th>
<th>NoMax 900</th>
<th>NoMax 900T</th>
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<tr>
<td>kVAR</td>
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<tr>
<td>Current</td>
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<td>Voltage</td>
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<td>Temperature</td>
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<td>4 Local Schedules</td>
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<td>DNP Communications</td>
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<td>Firmware Upgrades</td>
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<td>Optional Bluetooth Communications</td>
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</table>
NoMax®
900 Series Capacitor Controls

The NoMax 900 Series Capacitor Controls are an economical way to control capacitor banks using time of day, temperature or system voltage.

The smaller, compact size allows for easy installation in any configuration. An intuitive design eliminates the need for a computer or special codes, easing the task of field programming. The time control features a 365 day time clock with daily and/or seasonal schedules. Voltage override allows high or low voltages to override the time settings. The voltage settings can be programmed to be time independent or to allow different voltage set-points at different times of the day or year. This control provides maximum versatility for a variety of applications.

There are three NoMax 900 Series Capacitor Controls models available to suit your needs:
  • NoMax 900 offers time control with temperature and voltage override
  • NoMax 950 offers time control with voltage override
  • NoMax 900T offers time control only

**FEATURES**

- Based on existing, field-proven design
- Operations counter and adjustable daily limit on operations
- Field adjustable time delay for all operations
- Automatic control or manual close and open
- Easy field adjustment for vacuum or oil capacitor bank switches
- Surge protection on all inputs
**VarWare® Software**

HDE's VarWare control software manages, programs and interfaces with HDE’s VarCom capacitor control product lines. VarWare provides the user with a powerful tool for programming controls with customized switching protocols while providing an easy platform for changing settings and extracting data profiles held in the logging function of enabled controls. The DNP interface is controlled by the selection and settings of the DNP points.

Point and click to program a control. Build a library of program files. Retrieve a program from a control to verify operation.

Download, view and analyze stored data. The most recent data is available to view local line parameters. Data can be viewed graphically to get the big picture.

Connect to the control via local wireless Bluetooth communication and command the VarCom control from up to 200 feet away.

All VarCom controls can be field upgraded to change operating characteristics or add new functionality by downloading new firmware.
Optional Features and Options

External Neutral Indicator Light
This light, which is visible on the outside of the control, is illuminated when the neutral current exceeds the set threshold.

Neutral Current Sensor
Used with controls equipped with optional neutral current sensing, a neutral current sensor can indicate blown fuses, bad capacitors and bad capacitor bank switches. HDE controls also support Fisher Pierce and Lindsey neutral current sensors.

Line Post Current Sensors
All VAR controls are suitable for use with Lindsey™ CVMI or Lindsey™ Multicore, Piedmont Sensor or Fisher Pierce™ 1301 line current sensors.

Pole Mounting and Wiring Options

Terminal Strip
Amphenol® Connector
Pole Mounting Hardware

Various remote antenna mounting configurations are available. Please contact the factory for details.
HD ELECTRIC COMPANY

For over eighty years, HD Electric Company has provided products serving the diverse needs of the electric power industry and its related industries worldwide. Our continuous improvement and innovation in the areas of controlling, testing and measuring of electric power has resulted in the development of leading edge products designed to help you provide electric power to your customers safely and efficiently.

Acquired by Textron in 2013, HDE is headquartered in the Chicago metropolitan area and supports over 60 sales representatives worldwide; manages a field demonstration fleet; and maintains global support for its vast array of industry-proven products.

This brochure is printed on paper comprised of 10% post consumer waste.

All sales are subject to the terms and conditions of the Limitation of Warranty and Liability set forth in the product Instruction Manual and at www.HDElectricCompany.com. Users must read and agree to the Limitation terms, as stated, before using the product.

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