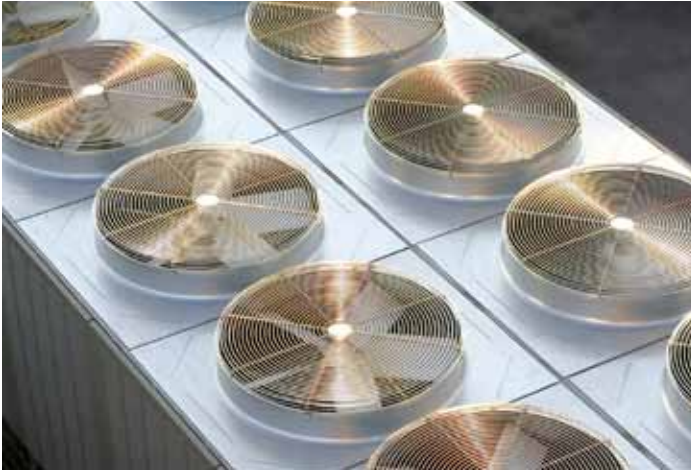


## PRESSURE, VACUUM & DIFFERENTIAL PRESSURE



### FEATURES

- Brass & Polysulfone (FDA compliant) Pressure Connections
- Compact Size
- Complies with Enclosure Type 4 with watertight conduit fitting
- Terminal block wiring
- Optional red status light
- Adjustable Ranges:

Pressure: 30" Hg Vac to 90 psi  
(-1 to 6,2 bar)

Differential Pressure: 1 to 45 psid  
(68,9 mbar to 3,1 bar)

### OVERVIEW

The cost-effective 24 Series Delta-Pro™ pressure, vacuum, and differential pressure switches offer a unique blend of compact size, excellent performance, and environmental protection. Available with brass or polysulfone pressure connections the Delta-Pro is ideal for applications involving hot or cool air, water, gas or oil. The precision snap-acting switch and sensitive diaphragms combine to provide a narrow deadband and repeatability of approximately  $\pm 1\%$  of full scale range. A convenient, externally accessible adjustment screw is multi-turn to provide easy set point adjustability. The force-balanced design gives the Delta-Pro excellent vibration resistance.

### FEATURES

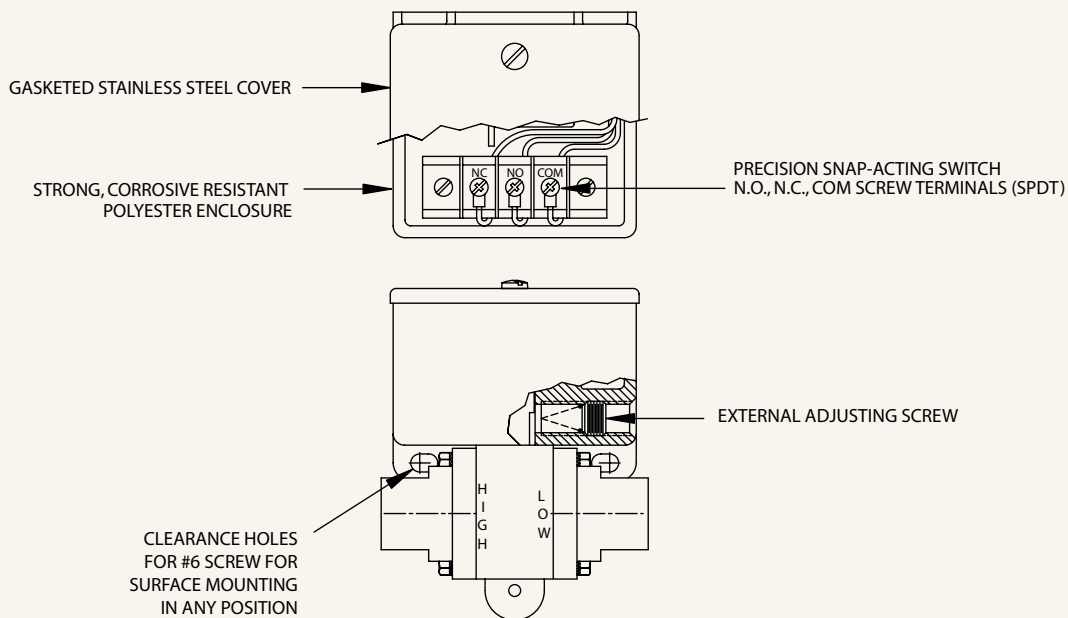
- UL listed and cUL certified. CE compliant to low voltage directive and pressure equipment directive
- Vacuum, Pressure or Differential pressure measurement
- 5 A @ 125/250 VAC SPDT snap-acting switch
- External stainless steel multi-turn adjusting screw
- OEM capabilities include external adjustment knob with or without reference scale



## APPLICATIONS

Typical applications include filter monitoring and proof-of-flow. The 24 Series is used within the water & wastewater, bioprocessing, food & beverage, HVAC and gas processing industries.

## TECHNOLOGY



The 24 Series (Delta Pro™) was designed to be a compact, cost-effective differential pressure switch for applications such as proof-of-flow, filter monitoring, etc. It depends upon two opposing diaphragms to sense pressure on the "High" and "Low" pressure outputs of a system. The resulting pressure differential is transmitted through a linkage to a snap-action electrical switch, providing an output when a pre-set difference is exceeded. This set point can be easily modified while under pressure via an external adjusting screw. This adjustment "pre-loads" the actuation mechanism, which results in excellent vibration-resistance. Straight pressure and vacuum versions, with a single diaphragm, are also available.



# 24 Series

24 Series

## SPECIFICATIONS

<b>STORAGE TEMPERATURE</b>	-20° to 180°F (-29° to 82°C)
<b>AMBIENT TEMPERATURE</b>	30° to 160°F (-1° to 71°C). Set point typically shifts less than ±0.6% of range for a 50°F (28°C) ambient temperature change; consult factory for special ratings
<b>MAX MEDIA TEMPERATURE</b>	200°F (93°C) at 100 psi working pressure
<b>SHOCK</b>	Set point repeats after 15G, 10 millisecond duration
<b>VIBRATION</b>	Set point repeats after 2.5G, 5-500 Hz
<b>ENCLOSURE CLASSIFICATION</b>	Complies with enclosure type 4 requirements with optional water tight conduit connector. Reinforced polyester body, stainless steel cover with gasket.
<b>SET POINT REPEATABILITY</b>	Typically ± 1% of full scale range.
<b>SWITCH OUTPUT</b>	One SPDT precision snap-acting micro-switch with mechanical contact life of 10 million cycles. Actual life depends on electrical load and cycle frequency
<b>ELECTRICAL RATING</b>	Rated to 5 A resistive and 5 A inductive (75% PF) at 125 VAC and 250 VAC, 1/4 HP; 5 A resistive and 3 A inductive at 30 VDC and 0.5 A resistive and 0.25 inductive at 125 VDC. Gold flash over silver contacts for minimum loads of 5 mA at 6 VDC, 2 mA at 12 VDC and 1 mA at 24 VDC
<b>WEIGHT</b>	6.5 oz.
<b>ELECTRICAL CONNECTION</b>	7/8" hole for optional 1/2" NPT conduit connector. Terminal block with screw terminals. Max wire size 16 AWG
<b>PRESSURE CONNECTION</b>	Models 013-014, 019-022: 1/4" NPT (female) brass; models 011-012, 015-018: 1/4" NPS (female) FDA compliant* Udel® polysulfone, non-tapered to minimize connection stress with 1/4" NPT (male) fittings - max torque is 2-ft.lbs.
<b>MOUNTING &amp; INSTALLATION</b>	Surface mount with two screws through clearance holes, or mount by pressure connections

Udel® is a registered trademark of Solvay Advanced Polymers

\* The U.S. Food & Drug Administration (FDA) has approved polysulfone resins as compliant with the specifications of the FDA 21CFR177.1655 for repeated use and selected single use in contact with food under conditions of use as specified in the citation.

## APPROVALS



### **UNITED STATES AND CANADA**

**UL** Listed, **cUL** Certified

Pressure: UL 508; CSA C22.2 No. 14, File #E42272



### **EUROPEAN UNION**

#### **Low Voltage Directive (LVD) 2006/95/EC**

UEC Compliant to LVD

Products rated lower than 50 VAC and 75 VDC are outside the scope of the LVD

The Low Voltage Directive does not apply to products for use in hazardous locations

#### **Pressure Equipment Directive (PED) 97/23/EC**

##### **Pressure models only**

Compliant to PED

Products rated below 7.5 psi are outside of the scope of the PED

## DIFFERENTIAL PRESSURE MODEL CHART

Model	Adjustable Range		Typical Deadband		***Max. Working Pressure		**Proof Pressure	
	Low end of range of fall	High end of range on rise	psid	mbar	psi	bar	psi	bar
Polyurethane (polyether) diaphragm and polysulfone® 1/4" NPS (female) (mechanical) pressure connection								
011	1 to 10	68,9 mbar to 0,7	0.75	51,7	0 to 150	0 to 10,3	150	10,3
012	4 to 45	0,3 to 3,1	1	68,9	0 to 150	0 to 10,3	150	10,3
Polyurethane (polyether) diaphragm and brass 1/4" NPT (female) pressure connection								
013	1 to 10	68,9 mbar to 0,7	0.75	51,7	0 to 150	0 to 10	150	10,3
014	4 to 45	0,3 to 3,1	1	68,9	0 to 150	0 to 10	150	10,3

## VACUUM AND PRESSURE MODEL CHART

Model	Adjustable Range		Typical Deadband		*Over Range Pressure		**Proof Pressure	
	psi (unless noted)	bar (unless noted)	psi (unless noted)	mbar (unless noted)	psi	bar	psi	bar
Polyurethane (polyether) diaphragm and polysulfone®, 1/4" NPS (female) (mechanical) pressure connection								
015	30" to 2" Hg VAC	-1 bar to -68,9 mbar	2.5" Hg	84,7	150	10,3	150	10,3
016	1 to 10	68,9 mbar to 0,7	0.75	51,7	150	10,3	150	10,3
017	4 to 45	0,3 to 3,1	1	68,9	150	10,3	150	10,3
018	10 to 90	0,7 to 6,2	3	0,2 bar	150	10,3	150	10,3
Polyurethane (polyether) diaphragm and brass 1/4" NPT (female) pressure connection								
019	30" to 2" Hg VAC	-1 bar to -68,9 mbar	2.5" Hg	84,7	150	10,3	150	10,3
020	1 to 10	68,9 mbar to 0,7	0.75	51,7	150	10,3	150	10,3
021	4 to 45	0,3 to 3,1	1	68,9	150	10,3	150	10,3
022	10 to 90	0,7 to 6,2	3	0,2 bar	150	10,3	150	10,3

**\*Over Range Pressure:** The maximum pressure that may be applied continuously without causing damage and maintaining set point repeatability.

**\*\*Proof Pressure:** The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g. start-up, testing).

**\*\*\*Working Pressure:** The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability.



## HOW TO ORDER

Build a part number by selecting a model and options. Choose the Sensor Type and the Range from the Model Chart. If options are required, add the code from the option list below. Example: 24-013 \* M900.

<b>24</b> Select a Type	<b>013</b> Select a Model	<b>M900</b> Select an Option
24	013	M900

**COMPONENTS  
CODE**

**DESCRIPTION**

**SERIES DESIGNATION**

24 Designation for 24 Series product line

**DIFFERENTIAL PRESSURE MODELS \***

011, 012 Polyurethane (polyether) diaphragm and 1/4" NPS (female) (mechanical) polysulfone pressure connection

013, 014 Polyurethane (polyether) diaphragm and 1/4" NPT (female) brass pressure connection

\*(See Model Chart for Differential Pressure Ranges)

**VACUUM AND PRESSURE MODELS \***

015, 016, 017, 018 Polyurethane (polyether) diaphragm and 1/4" NPS (female) (mechanical) polysulfone pressure connection

019, 020, 021, 022 Polyurethane (polyether) diaphragm and 1/4" NPT (female) brass pressure connection

\*(See Model Chart for Pressure Ranges)

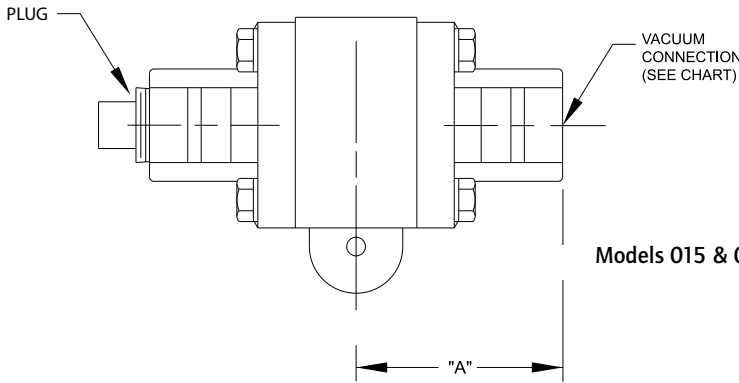
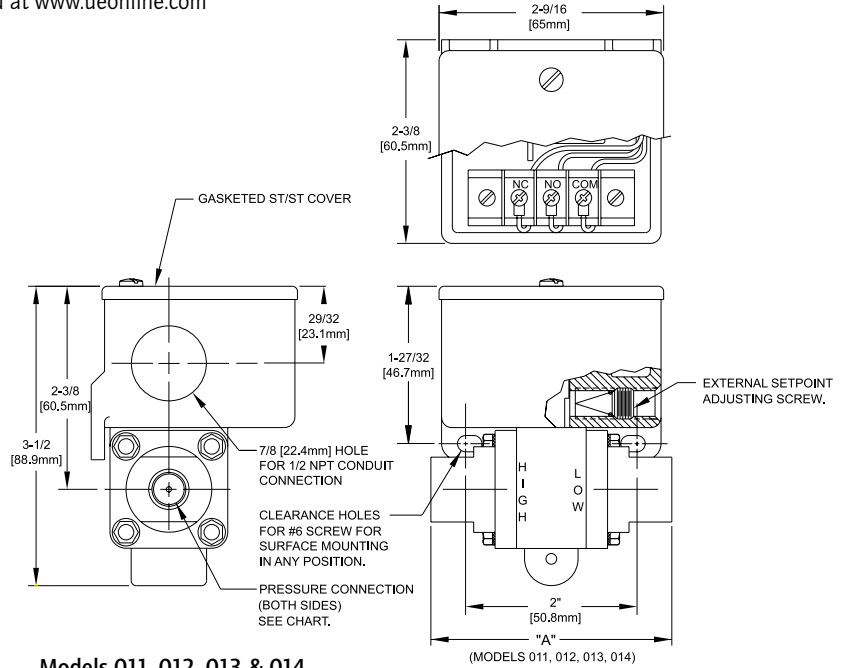
**OPTIONS**

- M020 Red status light, 115 VAC only. Specify whether light turns on or off with increasing or decreasing pressure
- M201 Factory set one switch; specify set point on increasing or decreasing pressure
- M260 Self-contained battery-operated audible alarm
- M262 Buna-N diaphragm
- M277 Range indicated on nameplate in kPa or MPa, factory selected
- M278 Range indicated on nameplate in Kg/cm<sup>2</sup>
- M540 Viton® construction (deadband and low end of range may increase slightly. Consult factory.) Wetted parts include Viton® diaphragm plus standard connection material.
- M900 Water tight conduit fitting; converts 7/8" hole to 1/2" NPT fitting; must specify for Enclosure Type 4 compliance

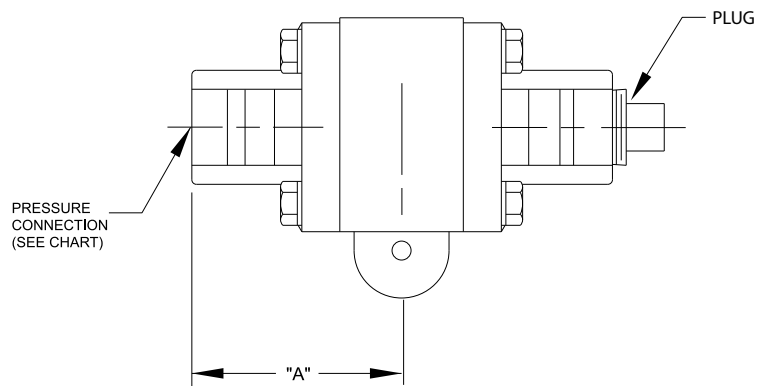
Viton® is a registered trademark of E.I. duPont de Nemours and Company.

**DIMENSIONAL DRAWINGS**

Dimensional drawings for all models may be found at [www.ueonline.com](http://www.ueonline.com)  
 All dimensions stated in inches (millimeters)



**Models 016, 017, 018, 020, 021 & 022**



Model	DIMENSION A	Pressure Connection
011, 012	2.75" (69.9 mm)	1/4" NPS (F) Polysulfone
013, 014	3.13" (79.5 mm)	1/4" NPT (F) Brass
015, 016, 017, 018	1.44" (36.6 mm)	1/4" NPS (F) Polysulfone
019, 020, 021, 022	1.56" (39.6 mm)	1/4" NPT (F) Brass



## RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

## LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

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SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

*UE specifications subject to change without notice.*

## U.S. SALES OFFICES

United Electric Controls  
31 Old Stage Road  
Hampton Falls, NH 03844  
Phone: 617-899-1132  
email: [northeastsales@ueonline.com](mailto:northeastsales@ueonline.com)

United Electric Controls  
28 N. Wise Ave.  
Freeport, IL 61032  
Phone: 815-341-2588  
email: [midwestsales@ueonline.com](mailto:midwestsales@ueonline.com)

United Electric Controls  
1022 Vineyard Drive  
Conyers, GA 30013  
Phone: 770-335-9802  
email: [southeastsales@ueonline.com](mailto:southeastsales@ueonline.com)

United Electric Controls  
5829 Grazing Court  
Mason, OH 45040  
Phone: 513-535-5486  
email: [midatlanticsales@ueonline.com](mailto:midatlanticsales@ueonline.com)

United Electric Controls  
102 Salazar Court  
Clayton, CA 94517  
Phone: 925-408-5997  
email: [westcoastsales@ueonline.com](mailto:westcoastsales@ueonline.com)

United Electric Controls  
27 Summit Terrace  
Sparta, NJ 07871  
Phone: 973-271-2550  
email: [easternsales@ueonline.com](mailto:easternsales@ueonline.com)

United Electric Controls  
33018 Weatherby Court  
Fulshear, Texas 77441  
Phone: 832-457-6138  
email: [southwestsales@ueonline.com](mailto:southwestsales@ueonline.com)

## CANADA

EASTERN  
68 Mosley Crescent  
Brampton, Ontario  
Canada L6Y 5C8  
Phone: 905-455-5131  
FAX: 905-455-5131

## INTERNATIONAL OFFICES

CHINA  
United Electric Controls, *Shanghai Office*  
Room 1011, 10th Flr,  
Huai Hai Zhonghua Building  
No. 885, Renmin Road, Luwan District  
Shanghai 200010, P.R. China  
Phone: +8621-6255 8059  
email: [chinasales@ueonline.com](mailto:chinasales@ueonline.com)

United Electric Controls, *Beijing Office*  
Room 1006, Jainhao International Bldg.  
Block D, No. 116  
Zizhuyuanlu, Haidian District  
Beijing, China 100089  
Phone & Fax: +86-10-5893-0551  
email: [beijingsales@ueonline.com](mailto:beijingsales@ueonline.com)

## EUROPE

United Electric Controls  
05-806 Komorow  
Kujawska 5, Poland  
Phone: +48 22 499 4804  
email: [easterneuropesales@ueonline.com](mailto:easterneuropesales@ueonline.com)

## INDIA

United Electric  
#402, Aries Avenue - 1  
United Colony, Sama, Baroda  
Baroda (Gujarat), India  
Phone: +91 (-265) -2788654  
email: [indiasales@ueonline.com](mailto:indiasales@ueonline.com)

## ASIA-PACIFIC

United Electric Controls, Far East  
No. 1-2-2, 2nd Floor  
Jalan 4/101C  
Cheras Business Centre  
56100 Kuala Lumpur, Malaysia  
Phone: 603-9133-4122  
email: [asiapacific@ueonline.com](mailto:asiapacific@ueonline.com)

## MEXICO

United Electric Controls  
Privada Fernando San Pedro 305  
Col El Naranjal 89349  
Tampico, Tamaulipas Mexico  
Phone: +52 833-116-7637  
email: [latinamericasales@ueonline.com](mailto:latinamericasales@ueonline.com)

## RUSSIA & SCANDINAVIA

United Electric Controls, Moscow  
Elninskaya str., 15-140  
Moscow, 121552 Russia  
Phone: +7 (495) 792-88-06  
email: [russiansales@ueonline.com](mailto:russiansales@ueonline.com)



UNITED ELECTRIC  
CONTROLS

180 Dexter Avenue, P.O. Box 9143  
Watertown, MA 02471-9143 USA  
Telephone: 617 926-1000 Fax: 617 926-2568  
<http://www.ueonline.com>