400 Series

UNITED ELECTRIC CONTROLS

Type H400, H402, H403, J400, J402, J403 (Pressure Switch)
Type H400K, H402K, J400K, J402K (Differential Pressure Switch)

Installation and Operation Instructions

Please read all instructional literature carefully and thoroughly before starting.
Refer to the final page for the Warranty.

GENERAL

MISUSE OF THIS PRODUCT MAY CAUSE DAMAGE TO EQUIPMENT OR PERSONAL INJURY. THESE INSTRUCTIONS MUST BE THOROUGHLY READ AND UNDERSTOOD BEFORE DEVICE IS INSTALLED.

PRIOR TO INSTALLATION, CHECK THE WETTED PARTS MATERIAL FOR COMPATIBILITY TO THE PROCESS MEDIA.

Cert number	**E42272-19910115**
Applicable Area	North America
Markings	UL Listed (400 and 402 Series) UL Recognized (403 Series)
Applicable Standards	UL 508; CSA-C22.2 No. 14

Cert number	**DEMKO 11 ATEX 1105261X**
Applicable Area	Europe (EU)
Markings	II 1 G Ex ia IIC T6 Ga -50°C ≤ Ta ≤ +60°C
Applicable Standards	EN IEC 60079-0; EN 60079-11

Cert number	**IECEx UL 14.0075X**
Applicable Area	International
Markings	Ex ia IIC T6 Ga -50 °C ≤ Ta ≤ +60 °C
Applicable Standards	IEC 60079-0; IEC 60079-11

Cert number	**FM Project 3021135**
Applicable Area	United States of America
Markings	FM Approved
Applicable Standards	FM 3510

ATEX AND IEC SPECIFIC CONDITIONS OF USE: ENCLOSURE CONTAINS ALUMINUM. CARE MUST BE TAKEN TO AVOID IGNITION HAZARD DUE TO IMPACT OR FRICTION.

PROOF PRESSURE * LIMITS LISTED ON NAMEPLATE MUST NEVER BE EXCEEDED, EVEN BY SURGES IN THE SYSTEM. OCCASIONAL OPERATION OF UNIT UP TO PROOF PRESSURE IS ACCEPTABLE, E.G., START-UP AND TESTING. CONTINUOUS OPERATION SHOULD NOT EXCEED THE DESIGNATED OVER RANGE ** OR MAXIMUM WORKING PRESSURE * RANGE.**

* Proof Pressure - the maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage (e.g., start-up, testing). The unit may require re-gapping.
** Over Range Pressure - the maximum pressure to which a pressure sensor may be continuously subjected without causing damage and maintaining set point repeatability.
*** Working Pressure Range - the pressure range in which two opposing sensors can be safely operated and still maintain set point, provided the difference in pressure between the low and high sides does not exceed the designated adjustable range.

THIS PRODUCT DOES NOT HAVE ANY FIELD REPLACEABLE PARTS. ANY SUBSTITUTION OF COMPONENTS SHALL INVALIDATE AGENCY CERTIFICATION(S).

DEVICE MUST NOT BE ALTERED OR MODIFIED AFTER SHIPMENT. CONSULT UE IF MODIFICATION IS NECESSARY.

The 400 Series pressure and differential pressure switches are activated when a bellows, diaphragm or piston sensor responds to a pressure change. This response, at a pre-determined set point or set points, actuates one, two or three snap-acting switch(es), converting the pressure signal into an electrical signal. Device set point(s) may be varied by turning the internal calibrated dial and pointer (H types) or internal adjustment screw (J types) (See Part II - Adjustments). Please refer to the datasheet for product specifications. Date code format on nameplate is "YYWW" for year and week.

Part I - Installation

- Flathead screwdriver
- Hammer (for alternate wire knockouts)
- Adjustable wrench

Mounting

INSTALL DEVICE WHERE SHOCK, VIBRATION AND TEMPERATURE FLUCTUATIONS ARE MINIMAL. DO NOT INSTALL DEVICE IN AMBIENT TEMPERATURES THAT EXCEED PUBLISHED LIMITS ON THE NAMEPLATE.

DEVICE SHOULD BE MOUNTED TO PREVENT MOISTURE FROM ENTERING THE ENCLOSURE. VERTICAL MOUNTING IS RECOMMENDED.

CONSIDER THE USE OF A PRESSURE SNUBBER IF SEVERE PRESSURE SURGES ARE EXPECTED.

FOR PRESSURE MODELS, MOUNT VIA PRESSURE CONNECTION. ALWAYS USE A WRENCH ON PRESSURE CONNECTION HEX. DO NOT TIGHTEN BY TURNING THE ENCLOSURE AS THIS WILL DAMAGE THE SENSOR AND WEAKEN WELDED JOINTS.

FOR DIFFERENTIAL PRESSURE MODELS, MOUNT USING A WRENCH ON LOW AND HIGH SIDE PRESSURE CONNECTION HEX OR MOUNT AGAINST A RIGID SUPPORT THEN CONNECT LOW AND HIGH PRESSURE PORTS.

Mount the unit via the (2) 1/4" screw clearance holes on the enclosure or directly to a rigid pipe via the NPT pressure connection.

ON MODELS SUPPLIED WITH AN EXTERNAL MANUAL RESET BUTTON, BE SURE TO LEAVE SUFFICIENT FINGER SPACE OVER THE RESET BUTTON FOR THE OPERATOR TO RESET THE CONTROL.

Wiring

DISCONNECT ALL SUPPLY CIRCUITS BEFORE WIRING DEVICE. WIRE DEVICE IN ACCORDANCE WITH LOCAL AND NATIONAL ELECTRICAL CODES. MAXIMUM RECOMMENDED WIRE SIZE IS 14 AWG AND RECOMMENDED TIGHTENING TORQUE FOR FIELD WIRING TERMINALS IS 7 TO 17 IN-LBS.

DO NOT EXCEED ELECTRICAL RATINGS LISTED ON NAMEPLATE. OVERLOAD ON A SWITCH CAN CAUSE FAILURE, EVEN ON THE FIRST CYCLE.

ENSURE ELECTRICAL CONDUIT ENTRIES ARE PROPERLY SEALED TO PREVENT MOISTURE ENTRY.

1. Remove the two screws retaining the cover and cover gasket.
2. A 3/4" NPT conduit connection is provided on the right side of the enclosure. Two cast-in 7/8" diameter knockouts are located on the left side and rear of the enclosure. These can easily be knocked out by placing the blade of a screwdriver in the groove and tapping sharply with a hammer.
3. Connect conduit to the enclosure and wire directly to the switch terminals according to local and national electrical codes. The three switch terminals are clearly labeled "common", "normally open" and "normally closed". Bring the wires up to terminals from the rear of the case (See Figure 1).

A grounding screw and clamp (cast in symbol) is provided which meets a 35 lb. pull test. On optional adjustable deadband switches (option 1520), ensure wiring does not interfere with the adjustment wheel.

If lead wires are supplied, color coding is as follows:

Manual Reset (Option 1530)			
	400 & 400K	402 & 402K	
	Switch 3	Switch 1	Switch 2
Common	Violet	Violet	Yellow
Normally Open (NO)	Blue	Blue	Orange
Normally Closed (NC)	Black	Black	Red

DPDT Option 1010 (for 400 & 400K)		
	Circuit 1	CIrcuit 2
Common	Yellow	Violet
Normally Open (NO)	Orange	Blue
Normally Closed (NC)	Red	Black

DPDT Option 1010 (for 402 & 402K)				
	Switch 1		Switch 2	
	Circuit 1	Circuit 2	Circuit 1	Circuit 2
Common	White	Violet	Yellow	Blue
Normally Open (NO)	Black	Red	Orange	Brown
Normally Closed (NC)	**	**	**	**

** On dual switch units (402 & 402K), the DPDT option is factory wired common and normally open per the color coding above. If normally closed wiring is desired, simply move the supplied wires from the normally open terminals to the normally closed terminals.

ALLOW ENOUGH SLACK (SEE FIGURE 1) SO AS TO NOT AFFECT SWITCH MOVEMENT WHEN MAKING SETTING ADJUSTMENTS. ENSURE THAT THE WIRES ARE NOT TOUCHING THE COVER WHEN INSTALLED.

NOTE: For larger wire gauges, a one-time shift may be experienced due to space limitations within the enclosure. Verify set point after installation.

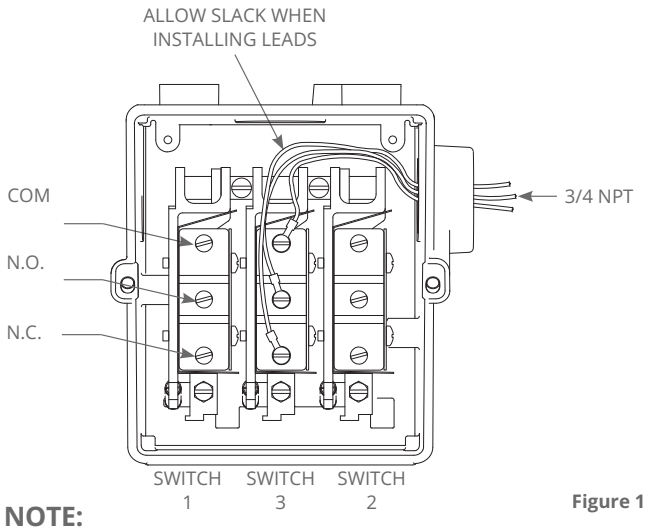


Figure 1

NOTE:
400/400K models use the middle switch position 3.
402/402K models use the two outer switch positions 1-2
403 models use all switch positions 1-3.

Part II - Adjustments

- Flathead screwdriver

FOR SET POINT ADJUSTMENTS AND RE-CALIBRATION, CONNECT DEVICE TO A CALIBRATED PRESSURE SOURCE.

Type "J" controls have an internal screw adjustment and type "H" have internal calibrated dial and pointer (see Figure 2).

Types J400 & J400K

1. Remove cover.
2. Adjust set point by turning adjustment screw clockwise to raise set point, or counterclockwise to lower set point (see Figure 2). When making adjustments, do not exceed the proof pressure rating on nameplate as this may cause a shift in set point.

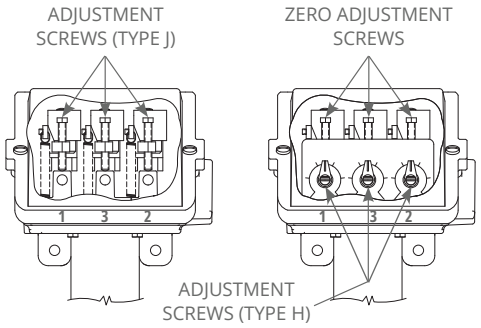


Figure 2

Types J402, J403 & J402K

1. Remove cover.
2. Adjust set points by turning adjustment screw clockwise to raise set points, or counterclockwise to lower set points (see Figure 2). When making adjustments, do not exceed the proof pressure rating on nameplate as this may cause a shift in set points.
NOTE: On J402 & J402K models, either switch #1 or #2 may be set high (except for models 520-535 – see special instructions). On J403 models, the middle switch - switch #3 – must always be set to the highest set point.
3. Switches may be set together or apart, up to 100% of range (except for models 520-535 and 570-572). See Table 1 for separation values.

Model	Range	Switch Separation (% of Range Span)
520, 530	300 "wc Vac to 0	30%
521, 531	10 "wc Vac to 10"wc	50%
522, 532	50 "wc Vac to 50'wc	50%
523, 533	0.5 to 5 "wc	50%
524, 534	2.5 to 50 "wc	50%
525, 535	10 to 250 "wc	30%
570	0 to 20 psi	30%
571	0 to 50 psi	30%
572	0 to 100 psi	30%

Table 1

Special Instructions for Models 520-535

1. Switch #2 should be set first, and to the highest set point. Using a a flathead screwdriver, adjust switch #2 by turning the slotted adjustment screw (see Figure 3) clockwise to raise set point or counterclockwise to lower set point.
2. Adjust switch #1 set point to an equal or lower set point than switch #2 by turning switch #1 adjustment screw (see Figure 3) clockwise to raise the set point or counterclockwise to lower the set point. Maximum switch separation between switch #1 and #2 is defined in Table 1.
Both switches are now set.
3. If further set point adjustment is required but switch separation is acceptable, make further adjustment by turning the slotted adjustment screw as indicated in step 1. This will maintain switch separation while raising or lowering set point of both switches simultaneously.

Types H400, H402, H403, H400K & H402K

1. Remove cover
2. Adjust each set point by turning adjustment screw and pointer to desired value on scale (see Figure 2). Scale division for models are noted in product datasheet.
NOTE: The device is factory calibrated for maximum accuracy at the dial midpoint.
NOTE: On H402 & H402K models, either switch #1 or #2 may be set high. On H403 models, the middle switch - switch #3 - must always be set to the highest set point.
3. Switches may be set together or apart, up to 100% of range.
4. If recalibration is required, connect device to a calibrated pressure gauge. Follow instructions in step 2 until switch(es) transfer. If the set point(s) chosen on the dial(s) does not match the pressure gauge, turn each zero adjustment screw (see Figure 2) clockwise to raise the pressure or counterclockwise to lower the pressure until the dial(s) and gauge match.

Types with Manual Reset (Option 1530)

These models incorporate a snap switch that, when actuated on rising pressure, remains activated until the reset button (located on top of the device) is manually depressed to reset the switch.

Types with Adjustable Deadband Switch (Option 1520)

Models with option code 1520 incorporate a snap switch with integral adjustment wheel. Turning this wheel raises or lowers the pressure rise set point and sets the deadband between rise and fall settings. The fall set point remains constant.

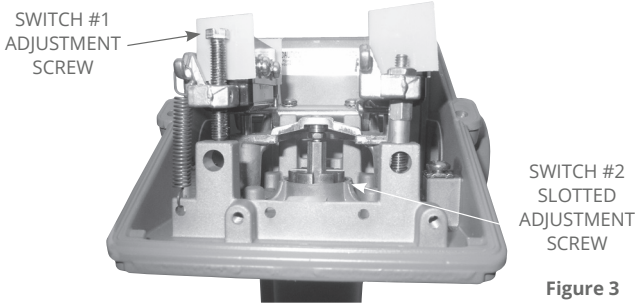


Figure 3

Setting the adjustable deadband switch:

1. Determine rise or fall set point or set points and deadband.
2. Adjust each **fall** set point by turning the adjustment screw clockwise to raise each set point or counterclockwise to lower each set point (see Figure 2). The **fall** setting is constant.
3. Adjust each **rise** set point (and deadband) by turning the adjustment wheel on the snap switch counterclockwise to raise each set point (and widen deadband) or clockwise to lower each set point (and narrow deadband).

Consult UE for additional information.

Types J400K & J402K with Option M210

To adjust for maximum accuracy at any desired set point, follow steps 1 - 4:

1. Remove front window and gasket (four screws) to gain access to span adjustment.
2. Connect control to calibrated pressure source and set to required differential pressure.
3. Using a screwdriver, carefully turn span adjustment. (See Figure 4) to obtain required indication.
4. Reattach front gasket and window.

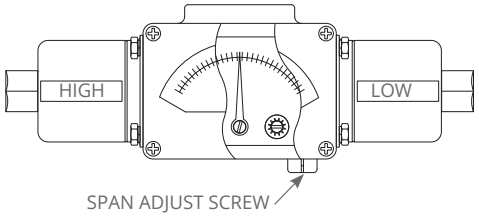


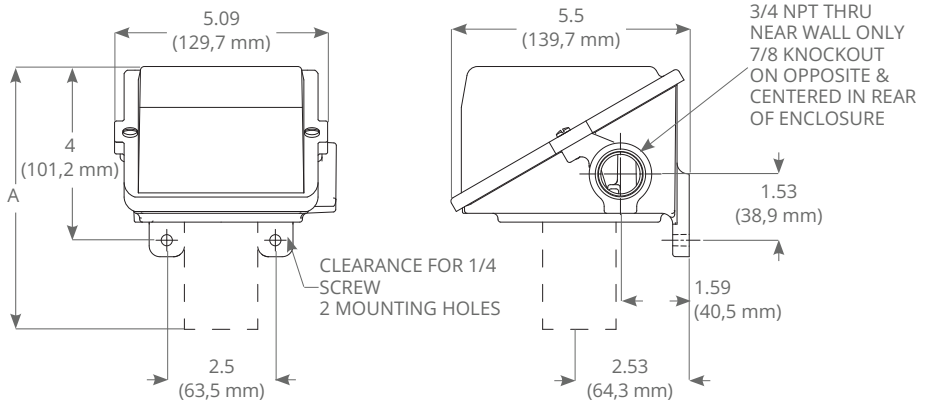
Figure 4: Option M210 - DIfferential Pressure Indication

Recommended Practices

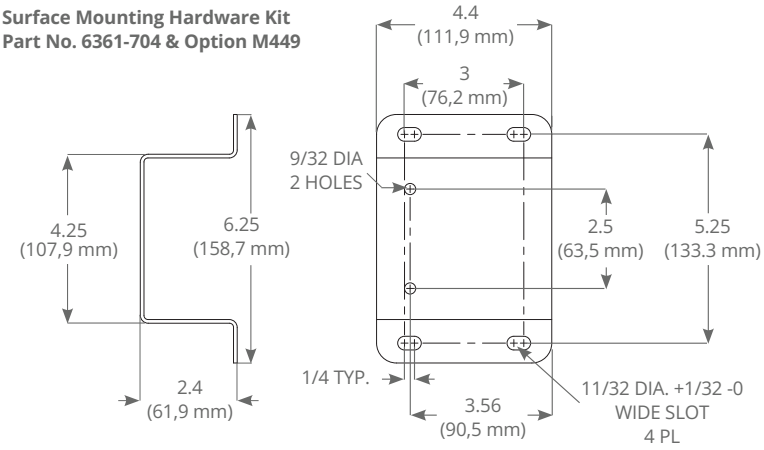
- A redundant device is necessary for applications where damage to the primary device could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- Monitor operation to observe warning signs of possible damage to device, such as drift in set point or faulty display. Check device immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.

Part III - Dimensions

Dimensions are for reference only. Drawings for all models may be found at www.ueonline.com

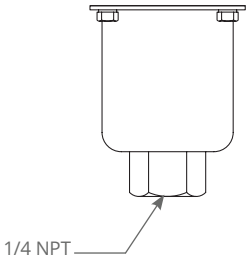


Surface Mounting Hardware Kit
Part No. 6361-704 & Option M449

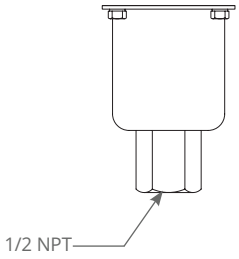


Dimension A			
Models	Inches (± 1/4)	mm (± 7)	NPT
Pressure			
126-164	5 7/8	149	1/4
S126B-S164B	6 1/4	159	1/2
270-376	5 1/2	140	1/4
440-443, 449, 451, 453, 454	4 3/8	111	1/4
448, 450, 452	5 1/8	130	1/4
520-525	8 1/4	210	1/2
530-535	8 1/8	206	1/2
551, 553-555	4 5/8	118	1/4
550, 552	5 1/8	130	1/4
570-572	4 5/8	118	1/4
610-614	6 3/8	162	1/4
Differential Pressure			
147-157	6 1/4	159	1/4
S147B-S157B	6 1/4	159	1/2
455-559	7	178	1/4
540-543	8	203	1/8
544-547	8 1/8	206	1/8

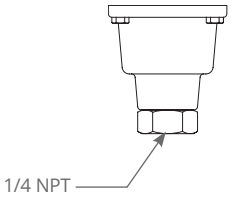
PRESSURE



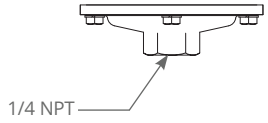
Models 126-164



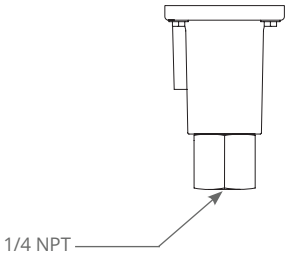
Models S126B-S164B



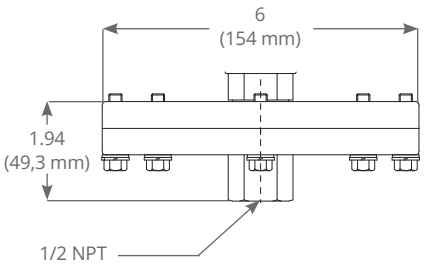
Models 270-376



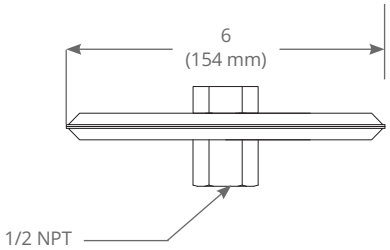
Models 440-454, 550-555, 570-572



Model 610-614

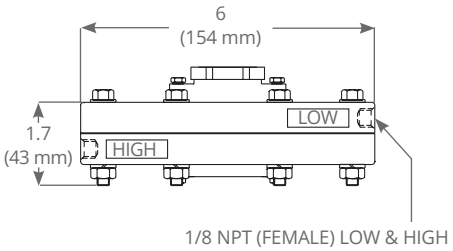


Models 520-525

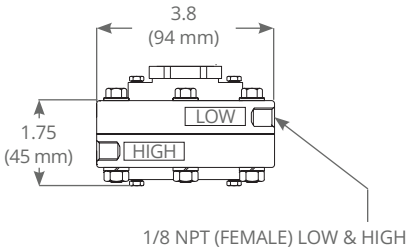


Models 530-535

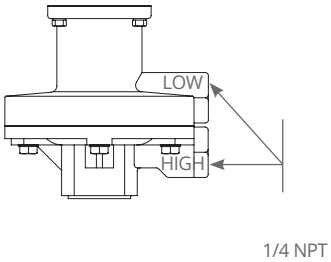
DIFFERENTIAL PRESSURE



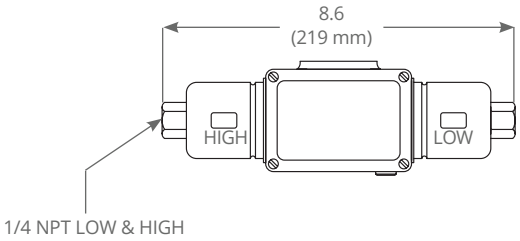
Models 540-543



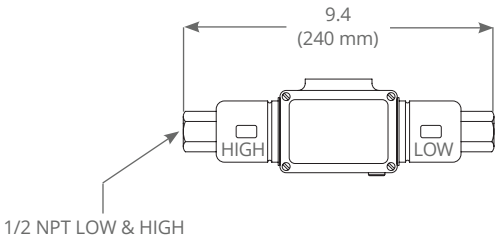
Models 544-547



Models 455-457, 559



Models 147 & 157



Models S147B & S157B

French Warnings Translations

Page	Warning Text	Texte d'Avertissement
1	MISUSE OF THIS PRODUCT MAY CAUSE DAMAGE TO EQUIPMENT OR PERSONAL INJURY. THESE INSTRUCTIONS MUST BE THOROUGHLY READ AND UNDERSTOOD BEFORE UNIT IS INSTALLED.	Une mauvaise utilisation de cet appareil peut endommager l'équipement ou provoquer des blessures corporelles. Ces consignes doivent être lues attentivement et bien comprises avant l'installation de l'appareil.
1	ATEX AND IEC SPECIFIC CONDITIONS OF USE: ENCLOSURE CONTAINS ALUMINUM. CARE MUST BE TAKEN TO AVOID IGNITION HAZARD DUE TO IMPACT OR FRICTION.	Conditions spécifiques d'utilisation ATEX et IEC: Le boîtier contient de l'aluminium. Des précautions doivent être prises pour éviter tout risque d'inflammation dû à un choc ou à un frottement.
1	THIS PRODUCT DOES NOT HAVE ANY FIELD REPLACEABLE PARTS. ANY SUBSTITUTION OF COMPONENTS SHALL INVALIDATE AGENCY CERTIFICATION(S).	Aucun composant ne peut être remplacé sur le terrain. Tout remplacement de composant invalidera toutes les approbations et certifications données par un tiers.
1	INSTALL DEVICE WHERE SHOCK, VIBRATION AND TEMPERATURE FLUCTUATIONS ARE MINIMAL. DO NOT MOUNT DEVICE IN AMBIENT TEMPERATURES THAT EXCEED THE LIMITS ON THE NAMEPLATE FOR THE APPROPRIATE AREA	Installer l'appareil dans un endroit où les chocs, les vibrations et les variations de température sont minimes. Ne pas installer l'appareil dans un lieu où les températures ambiantes dépassent les limites indiquées sur la plaque signalétique de l'appareil.
2	DISCONNECT ALL SUPPLY CIRCUITS BEFORE WIRING DEVICE. WIRE DEVICE IN ACCORDANCE WITH LOCAL AND NATIONAL ELECTRICAL CODES. MAXIMUM RECOMMENDED WIRE SIZE IS 14 AWG AND RECOMMENDED TIGHTENING TORQUE FOR FIELD WIRING TERMINALS IS 7 TO 17 IN-LBS	Avant le branchement de l'appareil, déconnecter l'installation sur laquelle l'appareil doit etre monté. Réaliser le branchement électrique selon les codes électriques nationaux et locaux. Le diamètre maximal recommandé pour les fils est de 14 AWG. Le couple de serrage pour la borne de raccordement est de 7 à 17 IN-LBS.
2	DO NOT EXCEED ELECTRICAL RATINGS LISTED ON NAMEPLATE. OVERLOAD ON A SWITCH CAN CAUSE FAILURE, EVEN ON THE FIRST CYCLE.	Les seuils électriques indiqués dans la documentation et sur les plaques signalétiques ne doivent jamais etre dépassés. La surtension peut causer une panne de l'appareil dès les premier cycle.

TERMS AND CONDITIONS OF SALE

UE specifications subject to change without notice.

UNITED ELECTRIC CONTROLS

180 Dexter Avenue
Watertown, MA 02472 - USA
Telephone: 617 926-1000 - Fax: 617 926-2568
www.ueonline.com

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