

EXPLOSION - PROOF HART® PRESSURE TRANSMITTER



FEATURES

- 4-20 mA, HART® 7 communication protocol
- 0.25% accuracy
- Compact, 316 stainless steel, hermetically sealed enclosure
- cULus & ATEX certified for Class I, Div. 1, Zone 1
- Pressure ranges:
0 to 15 psi to 0 to 25,000 psi
(0 to 1 bar to 0 to 1723,7 bar)



OVERVIEW

United Electric's TX200H is a HART® Smart pressure transmitter designed for panel or direct process mounting. The TX200H provides simplified field adjustment while reliably communicating asset management data utilizing the latest HART 7 specification.

A flexible 10:1 turndown allow users to range the transmitter as application requirements change while reducing inventory levels through model reduction. Real-time diagnostics also reduce maintenance costs by reporting device health status and process performance, alerting users to potential problems to troubleshoot before escalation occurs.

Integrating the TX200H into most process systems is simple. Since HART communication is superimposed over the 4-20 mA signal, the TX200H can use existing wiring as an upgraded, drop-in replacement for a standard analog 4-20 mA transmitter. A user may easily communicate with the TX200H utilizing a handheld device or a PC equipped with commercially available software.

FEATURES

- 10:1 pressure range turndown
- 3-year warranty
- Welded stainless steel wetted material
- Enclosure type 4X/IP66
- Submersible to 100 feet (when used with appropriate watertight conduit connection)
- Wide variety of pressure connections
- Certification of calibration accompanies every unit

TECHNOLOGY

The TX200H utilizes the latest HART communication protocol specification – HART 7. HART is an acronym for Highway Addressable Remote Transducer and is a bi-directional communication protocol that allows a Smart field device like the TX200H to provide data to a host system. Since the digital HART signal is superimposed over the 4-20 mA analog signal, the Smart TX200H transmitter can replace a simple 4-20 mA pressure transmitter using existing wiring. Utilizing the HART communication protocol, an end-user can easily calibrate and span the TX200H, write to or read information from the TX200H, detect device or process problems, amongst a host of additional diagnostic and configuration functions. The TX200H uses either a piezo-resistive or bonded foil strain gauge sensor for durable and reliable pressure sensing performance. A proprietary calibration process insures optimum temperature compensation limiting thermal effects on the sensor output.



HART® is a registered trademark of the HART Communication Foundation.

APPLICATIONS

TX200H Smart pressure transmitters may be used to safely monitor and control a variety of process applications, but are ideally suited for upstream oil & gas applications. cULus approval and ATEX/CE compliance assure that most worldwide hazardous requirements are met.



Control Panels



- Offshore rigs & pumping platforms
- Safety shutdown & control panels
- SCADA systems
- Tubing & casing pressures
- Wellhead monitoring



- Gas flow monitoring
- Pipeline compressor stations
- Pump monitoring & protection
- Metering runs
- Pipeline integrity



- Process monitoring & control
- Equipment monitoring & safety shutdown for pump, compressor & turbine skid packages
- Provides reliable asset management data

SPECIFICATIONS

PERFORMANCE

Full Scale Pressure Range (FSPR):	0 to 15 (0 to 1,0 bar) through 0 to 25,000 psi (0 to 1723,7 bar)
Non-linearity (L):	0 to 15 (0 to 1,0 bar) typical 0.3%, 0 to 30 psi through 0 to 250 psi (0 to 17,2 bar) typical @ 0.2% FSO 0 to 500 (0 to 34,5 bar) through 0 to 25,000 psi (0 to 1723,7 bar) typical @ 0.1% FSO
Hysteresis (H) and Repeatability (R):	±0.1% FSO
Accuracy (L, H, R):	0.25% (0.5% for 15 psi range)
Full Scale Output (FSO):	16 mA (4 - 20 mA)
Output Signal:	4-20 mA; HART digital process signal superimposed on 4-20 mA signal
Span adjustment:	Rangeable down 10:1 FSPR
Resolution:	22-bit A/D input resolution 0.0004 mA output resolution
Zero Balance:	± 0.5% (FSO)
Response Time:	Programmable time constant between 0.20 and 32 seconds.
Temperature Effect on Zero:	±0.5% per 100°F (55°C)
Temperature Effect on Span:	±0.5% per 100°F (55°C)
Compensated Temperature Range:	0°F to + 176°F (-18°C to 80°C)
Media Temperature:	-40°F to 257°F (-40°C to 125°C)
Operating Temperature:	-40°F to 185°F (-40°C to 85°C) per UL, cUL -40°F to 176°F (-40°C to 80°C) per ATEX
Storage Temperature Range:	-67°F to + 221°F (-55°C to 105°C)

ELECTRICAL

Supply Voltage:	10 to 36 VDC for 4-20 mA output
Load Impedance:	Max. load impedance (ohms) = $(V_{supply} - 10) \times 41$ Min. load impedance (ohms) for communication = 250 ohms
Circuit Protection:	The TX200H input is protected against transient surges using both gas discharge tube and TVS transient voltage suppressor technology, and is reverse polarity protected.
Electrical Connection:	1/2" NPT or optional M20 metric (male), 72" 18 AWG, color coded leadwires
Wiring:	Red: +VDC Black: -VDC Green: Earth Ground

MECHANICAL

Wetted Materials:	Model 03-14, 17-20: 316, 15-5 stainless steel Model 15-16: 316 stainless steel; Hastelloy C and Monel available, please consult UE
Pressure Connections:	1/4" NPT, 1/2" NPT, 7/16-20 SAE, G-1/4, G-1/2, and medium pressure and high pressure autoclave (see pressure connection chart page 10), 316 stainless steel
Sensors	Model 03-08: 316 stainless steel welded diaphragm, micro-machined piezo-resistive strain gauge silicon element, 0.25 ml silicon oil fill Model 09-20: 15-5 stainless steel welded diaphragm, bonded foil strain gauge element
Proof Pressure:	≤10,000 psi (689,5 bar) 3 times FSPR; ≥15,000 psi (1034,2 bar) 2 times FSPR
Burst Pressure:	15 to 2000 psi (6,9 to 137,9 bar) 10 times FSPR; 2500 to 6000 psi (172,4 to 413,7 bar) 8 times FSPR or 30,000 psi, whichever is less; 7500 to 25,000 psi (517,1 to 1723,7 bar) 4 times FSPR or 90,000, whichever is less
Shock:	200 G's, one millisecond duration
Vibration:	Tested to MIL-STD-810F, modified to 2000 Hz at 15 G's peak
Enclosure:	316 stainless steel
Enclosure Classification:	Welded, hermetically sealed, enclosure type 4X. Certified to IP66 requirements
Weight:	TX200H: approx. 1.3 lbs (.59 kg)

APPROVALS



UNITED STATES AND CANADA

Class I, Division 1, Groups A, B, C & D

Class II, Division 1, Groups E, F & G

Class III

Class I, Zone 1, Group IIC

Enclosure Type 4X

UL Listed, **cUL** Certified

UL 698, 1203, 61010-1;

CSA No. 25, 30, 61010-1 - File # E226592



EUROPEAN UNION

ATEX Directive 94/9/ EC

II 2 G Ex d IIC T5

II 2 D Ex tD A21 IP66 T+90C

Tamb = -40C to +80C

EN 60079-0, 60079-1, 61241-0, 61241-1

UL International DEMKO A/S (N.B.# 0539)

Certificate # DEMKO 08 ATEX 0810742X



Pressure Equipment Directive (PED)

(97/23/EC)

Sound Engineering Practice (SEP)

Electromagnetic Compatibility Directive (EMC)

(89/336/EEC, 92/31/EEC & 93/68/EEC)

UL International EMC Services

Certificate File # NC4525

EN 55011, 61000-6-4, 61000-6-2, 61326

PRESSURE MODEL CHART

Model	Pressure Range		Proof Pressure*		Burst Pressure**	
	psi	bar	psi	bar	psi	bar
Welded 316 stainless steel diaphragm and pressure connection (see page 9 for available connections)						
03	0 to 15	0 to 1	45	3,1	150	10,3
04	0 to 30	0 to 2,1	90	6,2	300	20,7
05	0 to 50	0 to 3,4	150	10,3	500	34,5
06	0 to 100	0 to 6,9	300	20,7	1000	68,9
07	0 to 250	0 to 17,2	750	51,7	2500	172,4
08	0 to 500	0 to 34,5	1500	103,4	5000	344,7
Welded 15-5 stainless steel diaphragm with 316 stainless steel pressure connection (see page 9 for available connections)						
09	0 to 1000	0 to 68,9	3000	206,8	10,000	689,5
17	0 to 1500	0 to 103,4	4500	310,3	15,000	1034,2
18	0 to 2000	0 to 137,9	6000	413,7	20,000	1379,0
10	0 to 2500	0 to 172,4	7500	517,1	20,000	1379,0
19	0 to 3000	0 to 206,8	9000	620,5	25,000	1723,7
11	0 to 5000	0 to 344,7	15,000	1034,2	25,000	1723,7
20	0 to 6000	0 to 413,7	18,000	1241,1	30,000	2068,4
12	0 to 7500	0 to 517,1	22,500	1551,3	30,000	2068,4
13	0 to 10,000	0 to 689,5	30,000	2068,4	40,000	2757,9
14	0 to 15,000	0 to 1034,2	30,000	2068,4	60,000	4136,9
1-piece, weld-free 316 stainless steel diaphragm and 1/4" (female) HF4 autoclave connection						
15	0 to 20,000	0 to 1379,0	40,000	2757,9	80,000	5515,8
16	0 to 25,000	0 to 1723,7	50,000	3447,4	90,000	6205,3

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

** **Burst Pressure:** Pressure which may cause failure of the pressure element, resulting in permanent damage.



HOW TO ORDER

Select letter or number codes to construct part number.

PART #	TX200	H	09	S	1	H	M446
	Type	Enclosure	Models, Range	Pressure Reference	Pressure Connection	Output Signal	Options
CODE	DESCRIPTION						
ENCLOSURE DESIGNATION							
H	HART Smart transmitter						
MODELS, PRESSURE RANGE							
03	0 to 15						
04	0 to 30						
05	0 to 50						
06	0 to 100						
07	0 to 250						
08	0 to 500						
09	0 to 1000						
17	0 to 1500						
18	0 to 2000						
10	0 to 2500						
19	0 to 3000						
11	0 to 5000						
20	0 to 6000						
12	0 to 7500						
13	0 to 10,000						
14	0 to 15,000						
15	0 to 20,000						
16	0 to 25,000						
PRESSURE REFERENCE							
S	psi (sealed gage)						

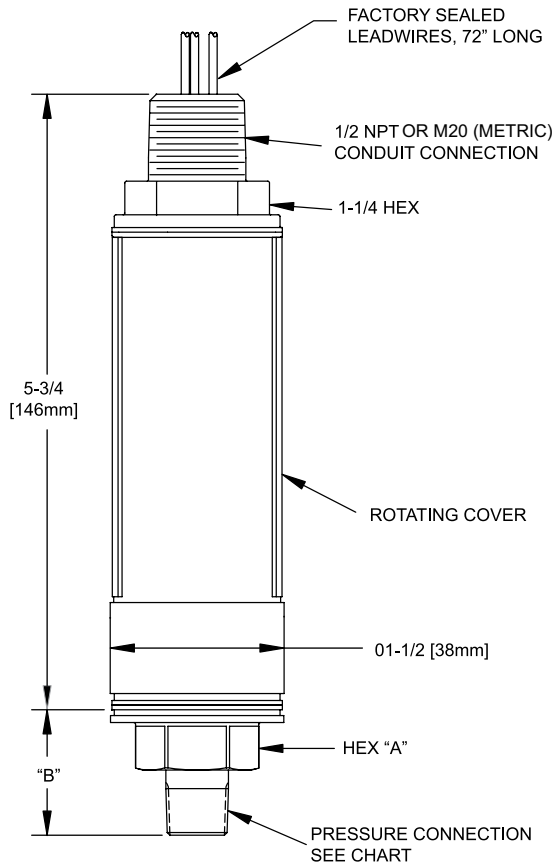
Continued on page 9

HOW TO ORDER (CONTINUED)

PART #	TX200	H	09	S	1	H	M446
	Type	Enclosure	Models, Range	Pressure Reference	Pressure Connection	Output Signal	Options
PRESSURE CONNECTION							
1	1/4" NPT (female); NOT AVAILABLE MODELS 15-16						
2	1/2" NPT (female); NOT AVAILABLE MODELS 14-16						
3	1/2" NPT (male); NOT AVAILABLE MODELS 14-16						
4	HF4 high pressure autoclave 1/4" (female); NOT AVAILABLE MODELS 03-05						
5	HF6 high pressure autoclave 3/8" (female); NOT AVAILABLE MODELS 03-05						
6	LF4 medium pressure autoclave 1/4" (female); NOT AVAILABLE MODELS 03-05						
7	LF6 medium pressure autoclave 3/8" (female); NOT AVAILABLE MODELS 03-05						
8	1/4" NPT (male); NOT AVAILABLE MODELS 15-16						
9	7/16-20 SAE (female); NOT AVAILABLE MODELS 14-16						
A	G-1/4 (female); NOT AVAILABLE MODELS 14-16						
B	G-1/2 (female); NOT AVAILABLE MODELS 14-16						
C	7/16-20 SAE (male); NOT AVAILABLE MODELS 14-16						
D	HM4 high pressure autoclave 1/4" (male); NOT AVAILABLE MODELS 03-05						
E	HM6 high pressure autoclave 3/8" (male); NOT AVAILABLE MODELS 03-05						
F	LM4 medium pressure autoclave 1/4" (male); NOT AVAILABLE MODELS 03-05						
G	LM6 medium pressure autoclave 3/8" (male); NOT AVAILABLE MODELS 03-05						
H	G-1/4 (male); NOT AVAILABLE MODELS 14-16						
J	G-1/2 (male); NOT AVAILABLE MODELS 14-16						
OUTPUT							
H	4-20 mA, HART 7 communication protocol						
OPTIONS							
M276	Pressure range markings in bar						
M277	Pressure range markings in kPa						
M278	Pressure range markings in Kg/cm ²						
M423	ATEX flameproof compliant metallic junction box, pre-wired (not UL approved). NOT AVAILABLE ON M20 METRIC THREAD ELECTRICAL CONDUIT VERSION						
M441	M20 metric thread (male) electrical connection						
M444	Paper ID tag						
M446	Stainless steel ID tag and wire						
M460	External ground screw; required by ATEX for non-metallic conduit systems						
M513	UL approved junction box, pre-wired, meets enclosure type 4. NOT ATEX COMPLIANT						
M550	Oxygen service cleaning; alcohol cleaning to remove residue from the process connection						

DIMENSIONAL DRAWING

Dimensional drawings for all models may be found at www.ueonline.com



Pressure Connection Chart

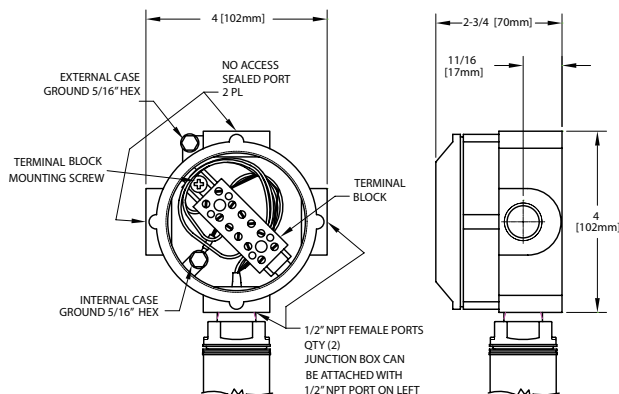
Code	Description	Hex "A" in	Length "B" in [mm]
1	1/4" NPT (female)	15/16	0.54 [13.7]
2	1/2" NPT (female)	1-3/8	1.01 [25.7]
3	1/2" NPT (male)	15/16	1.26 [32.0]
4	HF4 autoclave (female)	15/16	0.54 [13.7]
5	FH6 autoclave (female)	1-3/8	0.90 [22.9]
6	LF4 autoclave (female)	15/16	0.54 [13.7]
7	LF6 autoclave (female)	15/16	0.65 [16.5]
8	1/4" NPT (male)	15/16	0.97 [24.6]
9	7/16-20 SAE (female)	15/16	0.54 [13.7]
A	G-1/4 (female)	15/16	0.54 [13.7]
B	G-1/2 (female)	1-3/8	1.01 [25.7]
C	7/16-20 SAE (male)	15/16	0.77 [19.6]
D	HM4 autoclave (male)	15/16	1.10 [27.9]
E	HM6 autoclave (male)	15/16	1.29 [32.8]
F	LM4 autoclave (male)	15/16	1.18 [30.0]
G	LM6 autoclave (male)	15/16	1.32 [33.5]
H	G-1/4 (male)	15/16	1.03 [26.2]
J	G-1/2 (male)	1-3/8	1.78 [45.2]

Wire Color Coding

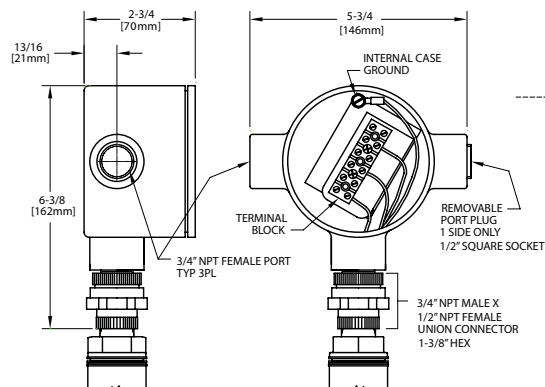
4-20 mA output

RED	+ VDC
BLACK	- VDC
GREEN	Earth Ground

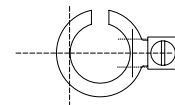
OPTION M423 ATEX FLAMEPROOF COMPLIANT JUNCTION BOX
(Not UL or cUL approved)



OPTION M513 UL/CSA APPROVED JUNCTION BOX
(Enclosure Type 4 requirements only. Not ATEX compliant)



OPTION M460 EXTERNAL GROUNDING SCREW



ALTERNATIVE PRODUCTS FROM UE

Stainless Steel 12 Series

- Compact, cylindrical 316 stainless steel design
- Hermetically sealed micro-switch
- Explosion Proof
- Snap-acting belleville spring mechanism for maximum vibration resistance and set point stability
- Pressure ranges 1 to 12,500 psi;
DP working pressure ranges 0 to 2500 psid;
temperature ranges -130 to 650°F
- Dual seal compliance to ANSI/ISA 12.27.01



120 Series

- Explosion-proof line of pressure, differential pressure, and temperature models with wide selection of ranges, sensors and pressure connections
- UL, cUL, ATEX certified for hazardous locations
- Single or dual switch outputs
- Welded stainless steel diaphragm pressure sensor
- Internal or external set point adjustment



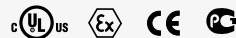
One Series for Division 1 (Zone 1)

- Electronic pressure and temperature switches with no moving parts
- Fully adjustable deadband and smart self diagnostics
- 4-20 mA output and digital process display
- Explosion-proof enclosure for Division 1 (Zone 1) hazardous areas
- 2-wire, 4-wire and loop powered models available
- Digital display and tamper-proof keypad adjustment of setpoint and deadband



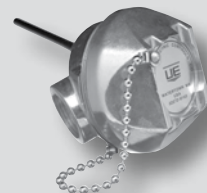
One Series for Division 2 (Zone 2)

- Electronic solid-state reliability
- Two-wire operation
- Digital display with keypad set-up
- 100% of range adjustable on-off deadband
- 4-20 mA output models
- Continuous diagnostic health check



Temperature Sensors

Rugged RTDs and thermocouples for process and energy applications, available with Nema 4X and explosion-proof heads to match heat-trace, turbine, combustion, and stack-emission applications



RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure transmitters. 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 (i.e., 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.
- 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. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Supply voltage stated in literature and on nameplate must not be exceeded. Overload on a transmitter 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 36 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.

LIMITATION OF SELLER'S LIABILITY

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

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

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

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

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

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

United Electric Controls
33018 Weatherby Court
Fulshear, Texas 77441
Phone: 832-457-6138
email: 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*
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

United Electric Controls, *Beijing*
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

EASTERN EUROPE & SCANDINAVIA
United Electric Controls
05-806 Komorow
Kujawska 5, Poland
Phone: +48 22 499 4804
email: easterneuropesales@ueonline.com

INDIA
United Electric Controls
#402, Aries Avenue - 1
United Colony, Sama, Baroda
Gujart, India 390 008
Phone: +91 (-265) -2788654
email: 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

MEXICO
United Electric Controls
Zacatecas # 206, Suite 20
Col Guadalupe CP 89120
Tampico, Tamaulipas Mexico
Phone: +52 833-217-5201
email: latinamericasales@ueonline.com

RUSSIA
United Electric Controls, Moscow
Elninskaya str., 15-140
Moscow, 121552 Russia
Phone: +7 (495) 792-88-06
email: 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>

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