

NEW

NEW TECHNOLOGY METERS™

**NTM™
SERIES**

March 20, 2017

MASTER CATALOG

(-N)

() = Model Number



(0.6" Digits)

- CURRENT LOOP POWERED
- A. C. & D.C. SIGNAL POWERED
- EXTERNALLY POWERED
- BAR-METERS
- CONTROLLERS
- TRANSMITTERS

Features:

- *Input Fail Alarm
- *Isolated Serial I/O & Flash Memory
- *1-4 Channels
- *>30 Input Signals
- *Only <100mW/Channel
- *20 Housings
- *Mil-Spec, Industrial Grades
- *22 Models for F.F.&F Replacement and new DCS/SCADA applications



(-9)

(0.3" Digits)

Watch 1 minute video: [YouTube](http://youtu.be/WXi970VXIzM)
<http://youtu.be/WXi970VXIzM>

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SCAN HERE FOR THE NTM CONFIGURATOR

NOW 10CFR50 APP. B & 10CFR21

- *Buy Direct From OTEK
- *Eliminate Reseller & Save ~50%
- *Talk Directly to our Engineers and Sales
- *Get our Lifetime Warranty!

NEED TRANSMITTERS?
 See the new NT Series.

SCAN HERE FOR OTEK'S HOME PAGE



(-L)

(0.25" Digits)



NEED COUNTERS/TIMERS?

See our UPM (Universal Panel Meter)

<http://www.otekcorp.com/content/universal-panel-meter>

520-748-7900
 FAX: 520-790-2808
 E-MAIL: sales@otekcorp.com
<http://www.otekcorp.com>



SINCE 1974

Catalog of 3/20/17

4016 E. TENNESSEE ST.
TUCSON, AZ. 85714 U.S.A.

MADE IN USA



NEW TECHNOLOGY BAR-METERS (ONLY)

*Dimensions Shown are Bezels *All models () share the same award winning Firmware & Hardware

Note: See Page 6, Digit 6 (Grade) for housing finish options.

LOOP/SIGNAL & EXTERNALLY POWERED PATENTED (& PENDING) TECHNOLOGY

(-P) 6.6x1.4"

(-L) 2.9x1.5"

()=Model Number

(-S) 6 x1"



(0.25" Digits) -L



(0.25" Digits)

Current Loop

-L



BENEFITS:

Meters:

- *Replace Analog Meter Pin for Pin
- *No rewiring or power required
- *No Stuck Needle/Guessing
- *No Recalibration/Maintenance
- *No Shock/Vibration Sensitivity
- *Auto Tri-Color Bar & Digital Display
- *Signal Failure Detect & Alarm
- *Isolated Serial I/O
- *Remote Display for SCADA/DCS
- *Self Diagnostics
- *Math Functions-Polynomials, X-Y Tables
- *Lifetime Warranty

Controllers and Transmitters:

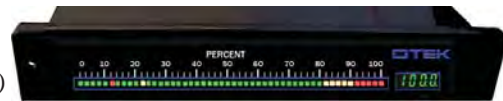
- *All of the above, plus:
- *Relays/Transistors Out
- *Analog Output (4-20mA, etc.)
- *Universal Power Input (DC & AC)
- *Ethernet-µSD Memory Card

DESCRIPTION:

Analog meters have been very useful and reliable in some undemanding applications since invented in 1893, but can not equal digital age technology where HMI (Human-Machine Interface) or MMI (Machine-Machine Interface) are indispensable.

Forty years after inventing the world's first loop powered meter, OTEK brings you its new space-age technology to help you remain competitive by lowering your maintenance costs and eliminating the uncertainty of the analog meters. This new technology avoids the operator's mistrust on stuck needles, which is to blame for countless accidents in nuclear, aircraft, shipboard and industrial tragedies. It allows the user to communicate directly from the process to the DCS/SCADA-whether it's across the street or across the world!

(-H) 1 x6"
(0.25" Digits)



(0.25" Digits)

How Does OTEK's New Technology Differ?

We use: ultra-efficient (approaching 0 LED) LEDs, nanotechnology ASIC, high efficiency power management techniques, state of the art software that has been Verified & Validated (SV&V), monolithic transformers for greater accuracy and isolation, our patented loop power technique, signal failure detection-alarming, patented A.C. signal powering technique, 16 bit ASIC DAC with galvanic isolation and opto-isolated relay drivers. We also offer OTEK's exclusive LIFETIME WARRANTY!

(-X) 4x4
Explosion
Proof



(0.35" Digits)



(-F)
Flat Pack
2x3x1/2"
No Panel
Cut-out

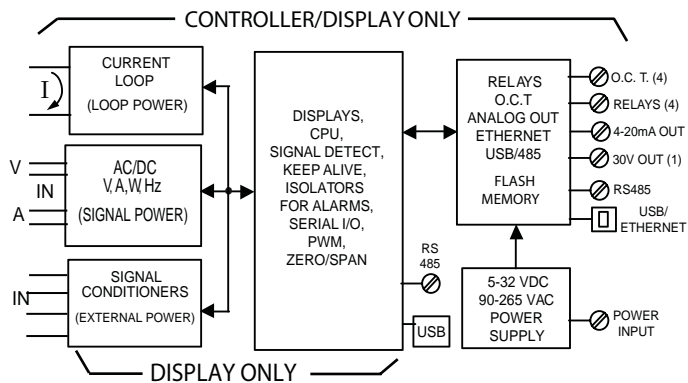
(0.3" Digits)

(-D)
3 1/2"
ANALOG METER
CASE



(0.35" Digits)

NEW TECHNOLOGY SERIES BLOCK DIAGRAM/CHANNEL



Two Wire Current loop

(0.3" Digits)

4-20mA
Transmitters
NTY or NTT



520-748-7900

FAX: 520-790-2808

E-MAIL: sales@otekcorp.com

http://www.otekcorp.com



SINCE 1974

Catalog of 3/20/17

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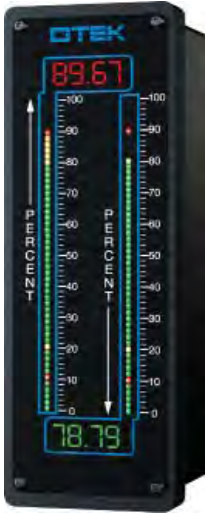
NTM™ NEW TECHNOLOGY CONTROLLERS & BAR-METERS

*Dimensions Shown are Bezels *All models share the same Firmware & Hardware

*()=Model Number

Note: See Page 6, Digit 6 (Grade) for housing finish options.

(-1)
1.9x5.7"
1 or 2
Channels



(-2)
2.84x5.7"
1 or 2
Channels



(-4)
11.3x1.4"
1 Channel



(-6)
7x1.4"
1 or 2
Channels



(-7): 7.2x2.8"
(-8): 6.3x2.8"
1, 2, 3 or 4
Channels



(-9)
6x1.74"
1 or 2
Channels



(-5)
3x6"
1, 2, 3 or 4
Channels



0.6" Digits

(-M)
4" Switchboard
1 Channel



(-0)
1/8 DIN 3.8x1.9"
1 Channel

(-3)
4" Switchboard
1, 2 or 3 Channels



0.3" & 0.25" Digits

(-A)
1/4 DIN: 3.8x3.8"
1, 2 or 3 Channels



(-V)
4.06x2.06"
1 Channel



(-B)
1/8 DIN
1.9x3.8"
1 Channel



All New Technology products share the same innovative electronic circuit design. The difference between the models is their mechanical features (see Block Diagram and mechanical drawings). Some are displays only, some are single or multi channel, some can have relays, DACs, ethernet and flash memory, and some require an external power source. But all products contain the New Technology, which consumes less than 1% of comparable digitals (20-100mW for loop/signal powered versions) and approaches the power consumption of analog meters.

WHAT CAN YOU DO WITH OTEK'S NEW TECHNOLOGY?

Note on Otek's Powerless™ Technology: If your signal cannot supply $\geq 15\text{mW}$ ($\sim 5\text{V}/3\text{mA}$), contact us or use external power models.

1. One Channel Models: -0, -4, -B, -D, -F, -H, -L, -M, -N, -P, -S, -V & -X: Implement any math function, X-Y table (25 point), polynomials (9th order), offset, tare, zero, scale, log & anti-logarithmic to affect the unit's display at will. Some examples are: change the display & data using any combination as commanded by your algorithm, such as $+/-/X/\div/\sqrt{\quad}$ or set a variable or linearize the display using X-Y tables or polynomials. This works well for odd shape containers. You can also change the reading from °F to °C or °K or compress/expand the display (and data out) using the log and antilog functions. In addition, you can change the factory default alarm pointers and colors or delete them. Zero & Span potentiometers **are included** for manual adjustment. **Note:** Models -D and -F have internal USB serial I/O that is not accessible to the customer. Contact Otek for access.

OTEK's New Technology series is only limited by your needs and imagination. Just give us a call at 520-748-7900 or email us at sales@otekcorp.com and give us the challenge to develop the best algorithm for your process.

2. Two Channel Models: -1, -2, -3 and -5 through -9 & -A: **Note:** Also available in models with 3 or 4 channels. Features include all those of the single channel models and each channel is 100% isolated from each other. In addition, you can add, subtract, multiply, divide, find the square root between channels. You can also use one channel to monitor/control the input signal and the second channel to indicate deviation, differential such as PID, alarm override or one channel setpoint can be used to control another channel function. You can also use one channel as a backup if the other channel becomes disabled or use them as volume & flow ($\sqrt{\quad}$) monitors/controllers. The **New Technology** two channel models are also perfect as REM/RAD indicators/controllers (also see our RPM series with log-antilog functions for radiation monitoring).

Contact OTEK for algorithms and formulas or any idea you wish to share with our audiences via our Youtube or Facebook page posts.

3. Three Channel Models: -3, -5, -7, -8 and -A: **Note:** Also available on 4 channel models -5, -7 & -8. Otek's New Technology three channel models perform all the functions outlined in #1 and #2. Further, one channel can indicate the input variable and the other two channels can be setpoint indicators/controllers (Hi, Hi-Hi, Low and Low-Low limits), or subject the input/output to any mathematical function or algorithm such as **PID** or display the input vs. output and derivative, or switch scales when the input reaches a limit/band such as for flow-volume-pressure or temperature. Monitor Volts, Amps and Watts AC or DC or any of 3 variables, including Hertz, lead/lag, power factor, peak/valley or for synchronizing of power lines with the bipolar (center zero) tricolor bargraph.

The **New Technology** series brings **Process Automation Control (PAC)** within your reach and affordability. These models are compatible with any DCS/SCADA system using their USB/RS485/Ethernet I/O options and allow for ease of interface with wireless systems.

4. Four Channel Models: -5, -7 and -8: The four channel models offer all of the functions outlined in #1, #2 and #3. However, with the additional channel available, the New Technology barmeters rival flatscreens with superior HMI/MMI functionality and ease of viewing/analysis of any combination of 4 variables. For example, Volts/Amps/Watts/Hertz or temperature/pressure/pH/humidity. The four channel models can also be used to monitor/control the product of the other 3 variables, making them ideal for the petrochemical industry.

Data Logging? Some models offer optional μSD memory to record 24/7 anything available via the serial I/O. Maximum capacity (and growing) is 32 GB!

REDUNDANT CONTROL:

Because all channels are 100% isolated from each other, you can use any multi-channels model as a redundant controller. If you need the "Democratic vote," algorithm, contact OTEK or see our Model **TRC** (Triple Redundant Controller).



Description, Notes & Order

(See Page 14 For Exclusion/Inclusion Charts)

DIGIT 5, SERIAL I/O & MEMORY:

Settings: 8N1N, 1200-19,200 Baud, ASCII.

Digit 5, Serial I/O: Option 0, USB: Complies 100% with V2.0 and if digit 10, option 1 is selected (USB powered) then digit 5 must be option 0. **Note:** On models -D and -F, USB is only for configuration and not available for communications (unless customized).

Note on USB Connectors: All models with Digit 5, Option 0 have μ USB connector behind the front filter and a standard type "B" on the back. **Only** connect either/or, not both! **M & E** grades might require "filter" connectors on back and must be specified. Use Digit 5, Option 9 and contact OTEK.

Digit 5, Option 1, RS485: Complies with industry standard and will require 5VDC@<3mA and a terminating 330 Ohm resistor at first and last unit in the BUS. Not available on -D or -F model. Connector: plug-in screw terminal on back.

Digit 5, Option 2 Ethernet: Complies with 1- Base-T/100Base-TX RJ45 up to 19,200 Baud. Maximum power consumption is <300mA@5V (1.5W). Only available in selected models. Connector: RJ45 on back.

Digit 5, Options 3 & 4: μ SD Flash Memory: Contact Otek for availability. Internal μ SD flash memory with up to 32 gigabytes capacity. You can store selected data at-will via serial command and download it as required. Connector: Same as options 0 or 1.

Digit 5, Options 5: IRDA: Note: Only available for housing style "X" (explosion proof). IRDA meets industry standards for infrared data reception. You can access all commands/functions without opening -X in hazardous areas. See our model IR/USB that plugs into your USB port (also see IR/232 for RS232 to IRDA). Connector: Internal μ USB.

Digit 5, Options 7: RS232: Note: Only available on models NTM-H, NTM-P and NTM-S. Conforms to the latest standard for RS232 and is only available with screw terminal connectors (no DB9). Same settings and Bauds as USB and RS485.

Case -P can be ordered for horizontal mount (instead of vertical). Use digit 14, option 9 and specify "horizontal."

DIGIT 6, GRADE:

Industrial Grade (Options 0 or I) is per these published specifications. Grades **M** and **E** per agreed specifications. Options **E & M** typically include an EMI/RFI shield all around and filtered connectors to meet EPRI-TR-102323-R3 (requiring ~2" deeper case). OTEK will build to certain nuclear or MIL-Standards but testing and confirmation of compliance, if required, will be quoted as a separate line item.

Option 0 is 94VO plastic, option "T" is an aluminium nickel plated case and cover; bezel face has black powder coat finish to Mil-Specs. The back cover is either black plastic or nickel plated aluminum. Typical Mil-Specs: 461, 462, 169, 901, 801, RTCA-160, I EEE344, etc. Contact Otek for custom colors.

NTM-X: Certified for Class I, Div. 1, Groups B-G; EX & IECex: IM2, Exd1.

DIGIT 7, (# CHANNELS) & DIGIT SIZE:

See photographs, Table A and "Ordering Information" for # of channels available, their location and exclusive conditions.

Case 0: 1 Channel (0.3")	Case B: One Channel (0.3")
Case 1: Up to 2 Channels (0.25")	Case D: One Channel (0.35")
Case 2: Up to 2 Channels (0.25")	Case F: One Channel (0.3")
Case 3: Up to 3 Channels (0.3")	Case H: One Channel (0.25")
Case 4: One Channel (0.3")	Case L: One Channel (0.25")
Case 5: Up to 4 Channels (0.3")	Case M: One Channel (0.6")
Case 6: Up to 2 Channels (0.3")	Case N: One Channel (0.6")
Case 7: Up to 4 Channels (0.3")	Case P: One Channel (0.25")
Case 8: Up to 4 Channels (0.3")	Case S: One Channel (0.25")
Case 9: Up to 2 Channels (0.3")	Case V: One Channel (0.3")
Case A: Up to 3 Channels (0.3")	Case X: One Channel (.35")

NTM-H



ABOUT OUR INPUT FAIL DETECTION

Only available on Powerless™ models (8th & 9th digits, options 00-14). While in normal operation, we store excess energy and use it to power the NTM if and when the signal fails (post mortem).

HAPE FAIR



Input & Display: See Below For Input Signals:

- *A/D: Accuracy, Linearity & Resolution: ± 0.1% of F.S. ±1 L.S.D. over entire temperature range of 0-60° C.; 12 Bits, Conversion Rate: 40/sec, Averaging: 0-255, zero, span, offset, tare, math functions and 25 point X-Y tables & polynomials.
- *Bargraph: 51 Automatic Tricolor (R/Y/G) Segments
- *Digits: Four Full Digits (9.9.9.9 & -1.9.9.9).
- *Typical Power Consumption of Display: 15-100mW@3.3V-5V(>3mA@3.3V); loop power version best at > 8mA.
- *Temperature Coefficient: +/-50PPM/°C
- *Operating Temperature: -10 to +60; Storage: -20 to +70°C
- *CCMR: >90dB@50-60Hz
- *Isolation: >500VDC to any other I/O & P.S.
- *Humidity: 5-95% RH non-condensing
- *Front Panel: NEMA 3. NEMA 4X on request.
- *Failed Signal Detect: ~ 20 seconds after > 1 minute "On" @50% of F.S. Only on loop & signal powered models.
- *Calibration Check: 2 years recommended.

Note 1: See page 15 for NTM replacement chart, including environmental specs vs. housing, bar length and digit size.

Note 2: E and M grades are the same as Industrial unless otherwise specified.

Yes! You can have the NTM powered by the input signal and have controlling outputs such as relays, O.C.T. & analog output!

How it works: Your input signal (Digit 8 & 9, options 00-14 only) powers the display, CPU, serial I/O and isolators. Your external power source powers the outputs.

Benefit: You have two independent and isolated sources (fail safe).

Requirement: Your signal must produce >10mW (current loop, VDC, VAC or AAC) and sustain <4V burden. If not, use external power (options 20-85 on Digits 8 & 9).

AC Signal Power & Outputs? Yes, you can have both input options 01-14 (digits 8 & 9) and relays (2 maximum) without external power!

Requirements: VAC input must be >90<140VAC, and AAC input must be >3<6 AAC via C.T. Ideal to monitor and control 120VAC mains! Contact OTEK for details.

Zero & Span: Since the NTM requires NO recalibration, the zero & span potentiometers are internal. If required, you can change them via the serial port or remove the unit from the housing and adjust.

INPUT SIGNAL SPECIFICATIONS (Digits 8 & 9)- See Pages 12 & 13

Note: All ±1 LSD and % full scale range unless noted.

Option 00 & 17 For Loop Power Only:

Option 00, 4-20mA Loop Powered: Burden: >3V@4mA, ≤5V@20mA; Range: 3-26mA; Accuracy & Linearity: ±0.05% of F.S.

Option 17: 10-50mA Loop Powered: Burden: >3V@10mA, ≤5V@50mA; Range: 3-50mA; Accuracy & Linearity: ±0.05% of F.S.

Options 01 Through 18, A. C. Signal Powered Only:

FUSE IT! Use external 1/2 ASB for Volts and 7 ASB for Amps.

Important Notes:

1) C.T. are sensitive and limited to the secondary (output) impedance. OTEK A.C. signal powered products present and input impedance of ~0.2 Ohms (~1V@5A). Make sure your C.T. can drive a >0.3 Ohm load without saturating or losing linearity. Contact Otek for assistance. Best C.T. to use: >100:5 ratio.

2) All inputs for 50-60 Hz lines. Contact Otek for 400 Hz lines.

Option 01, VAC (P.T.): Burden: 0.2 Ohm & <100mW; Range: 30-140V/40-100Hz; Accuracy & Linearity: ±0.2% of F.S. Best operating range: 90-140VAC to specifications.

Option 02, 5 AMP A.C. (C.T.): Burden: <100mW; Range: .5-5A; Accuracy & Linearity: ±0.2% of F.S. Best range: 2-4 Amps. Note: Not available in "-F" case.

Options 01 Through 18, A. C. Signal Powered Only: (Continued)

Option 03, Watts A.C. (C.T. & P.T.): Not available on case -F. Range: >100<600W/50-60Hz; Accuracy & Linearity: ±0.2% of F.S. at 90-140VAC & 1-4AAC. Best operating range: 100-500 Watts. For 400 Hz lines, use option 03 and specify (03=400 Hz line) after the complete part number.

Option 04, Hertz VAC: Not available on case -F. Range: >30V<140V & >30<100Hz; Accuracy & Linearity: ±0.2% of F.S. For 400 Hz lines, use option 04 and specify (04=400 Hz line) after the complete part number.

Option 05-14: Same as options 01 through 04.

PROPORTIONAL CONTROL? For proportional control, use a two (or more) channel model. Channel 1 is powered by your signal and the display signal (using a 4-20mA out) to drive the Channel 2 input. Channel 2's 4-20mA output allows you to control your generator. The result: Channel 1 display your AC signal and Channel 2 display it's 4-20mA output. Only Channel 2 needs power for its analog output and/or relays. Use part number NTM-(1, 2, 3, 5, 6, 7, 8, 9 or A)??-269-?21-99). Note: "?"= any available option on Digits 5, 6 & 10 and specify (9=Ch 1 signal power, Ch 2 external power). Also see the new model NTI.



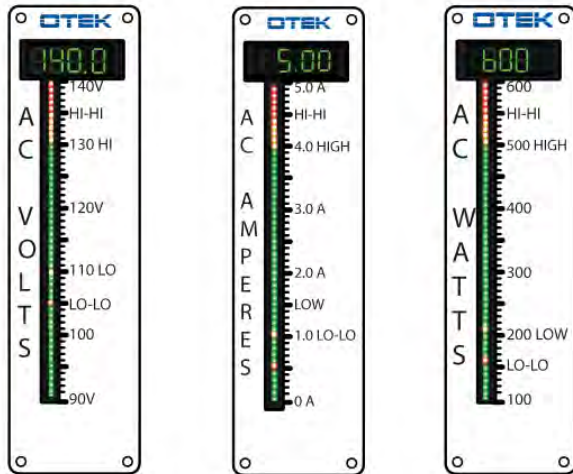
VAC/DC Signal Power Only:

Option 16, 7-140VAC/DC: Now you can monitor and control your AC line, UPS, battery bank or power supply from 7-140VDC/VAC, with only power from the signal. The NTM requires >10<80mW (~3mA-20mA). Imagine the possibilities! Almost like analog (only signal wires), but with 21st century digital technology ready for your PAC/DCS/SCADA system.

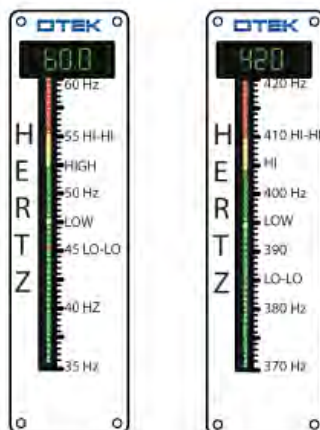
Scaling: 7-140VDC in =7.0-140.0 Digital Display & 5-100% bargraph with alarm pointers. See Digits 13 & 14 for custom calibration and scale.

Accuracy & Linearity: ±0.1% of full scale.

STANDARD NT SCALE (Option #01) 115-125 V Line STANDARD NT SCALE (Option #02) AMPS STANDARD NT SCALE (Option #03) WATTS



Standard NT Scale (Option #04 {09}) 50 HERTZ Standard NT Scale (Option #44 {09}) 400 HERTZ



Alarm Outputs (Signal Power): Open collector transistors (4) optional. See the ordering information on pages 10/11, digit 11, option 1. For relays, contact Otek (custom).

4-20mA Analog Output: Custom, contact Otek (requires >1 watt from input signal).

Option 17: 10-50mA Loop Power: See option 00 & 17 in the prior column.

Option 18: 10-500mADC Signal Power: Calibration: 10-500mADC=10-500 & 5-100%. For other calibrations, use digit 14 and specify.

Options 20 through 58 (or multi-channel equivalent): For Externally Powered Only:

Option 20, 4-20mA: Burden: <25 Ohm (0.5V); Range: 3-26mA; Accuracy & Linearity: ±0.05% of F.S. ±1 Digit.

Options 21 through 24, VDC: Input impedance 1M Ω; Range: Per Option; Accuracy & Linearity: ±0.05% of F.S. ±1 Digit.

Options 25 & 26, mADC: Input impedance Option 25: 50Ω; Option 26: 5Ω; Accuracy & Linearity: ±0.05% of F.S. ±1 Digit.

Option 27, Watts DC (1Vx1A DC): VZin: 1M Ω/AZin: 1.0Ω, 5W; Range: 1W; Accuracy & Linearity: ±0.1% of F.S. ±1 Digit.

Option 28, Watts DC (1Vx1V): VZin: 1M for both inputs; Range: 0-1V; Accuracy & Linearity: ±0.1% of F.S. ±1 Digit.

NOTE: Always use P.T. or C.T. with H.V. Lines (Options 30-34)
Options 30 through 34: VRMS: Zin: 1MΩ; Range; per options; Accuracy & Linearity: ±0.1% of F.S. ±1 Digit.

Options 35-37, Amps RMS: Zin: Option 35 (0.1A): 2Ω; Option 36 (1 A): 0.2Ω; Option 37 (5A): 0.04Ω; Range: Per option; Accuracy & Linearity: ±0.1% of F. S. ±1 Digit.

Option 38: Watts RMS (1Vx1V AC/DC): Zin: 1MΩ for both inputs; Range: 1V RMS; Accuracy & Linearity: ±0.2% of F.S. ±1 Digit.

Note: Always use P.T. & C.T. for options 33, 34, 40, 42, 43 & 44.

Options 20 through 58 (or multi-channel equivalent): For Externally Powered Only: (Continued)

Option 40, Watts RMS (120VAC P.T. x5AAC C.T.): Zin: 1M for V & 0.04Ω for I; Range: 0-750W; Accuracy & Linearity: ±0.2% of F.S. ±1 Digit Note: Shunt resistor (0.04Ω) supplied.

Option 41, Hertz (10KHz/5V Logic): Zin: 1M; Range: 30-10KHz; Accuracy & Linearity: ±0.1% of F.S. ±1 Digit

Option 42, Hertz (120V, 40-100Hz): Zin: 1M; Range: 50-150V/30-100Hz; Accuracy & Linearity: ±0.1% of F.S. ±1 Digit

Option 43, Hertz (240V, 30-100Hz): Zin 1 M; Range: 100-260V/30-100Hz; Accuracy & Linearity: ±0.1% of F.S. ±1 Digit

Option 44, Hertz (120V, 500 Hz): Zin: 1 M; Range: 50-150V/300-500Hz; Accuracy & Linearity: ±0.2% of F.S. ±1 Digit.

Note on Strain Gage: Specify S-G, sensitivity, range (cal. resistor value) and calibration. Example: 350 Ohms, 2mV/V, 20mV=0-100%.

Options 45, Strain Gage (≥300K<4K Ohm) : Excitation: 4.096V, 50 PPM/°C Range: ±300-4K Ω; Accuracy & Linearity: ±0.1% of F.S. ±1 Digit.

Option 47 & 48, RTD: 47: 100 Ω (PT100); **48:** 1K Ω (PT1000); Range: same as RTD; Accuracy & Linearity: ±0.5% of F.S. ±1 Digit; 2, 3 or 4 wire RTD.

Option 47 & 48, RTD (Continued): For 3 wire, connect -E to -S. For 2 wire, also connect +E to +S. Warning: Max distance to sensor: ~ 300 Feet (100M) or use our NTY or NTT transmitters.

Note: Model NTM-D only accepts 2 wire.

Note for Options 47-52: You can switch from °F to °C via serial port or use option 29 and specify. Default: °F.

Option 50, Type “J” TC: Range: -210 to 760°C; Colors: red and white; CJC: Included; Accuracy & Linearity: ±2°C of F.S.

Option 51, Type “K” TC: Range: -270 to 1370°C; Colors: Yellow and red; CJC: Included; Accuracy & Linearity: ±2°C of F.S.

Option 52, Type “T” TC: Range: -270 to 400°C; Colors: blue and red; CJC: Included; Accuracy & Linearity: ±2°C of F.S.

Note for Thermocouples (TC): Shorting out the +/-TC terminals will display the ambient temperature of the C.J.C. at the terminals.

Option 53, pH: Range: 0-14.00; Zin: >10¹⁵Ω; Temperature compensation: None; Accuracy & Linearity: ±0.05% of F.S. ±1 Digit.

Option 54, ORP: Range: 0-2000mV; Zin:>10⁹ Ω; Accuracy & Linearity: ±0.05% of F.S. ±1 Digit

Option 55, % RH: Range: Per sensor; Input Type: 2-3 pF/% Capacitors; Accuracy & Linearity: ±0.05% of F.S. ±1 Digit. State sensor’s specifications.

Option 56, Resistance Range: 0-10K Ω=0-100%=0-100.0; Accuracy & Linearity: ±0.1% of F.S. ±1 Digit. Ideal for linear transducers.

Option 57, 10-50mA Range: 10 Ohms input resistance Accuracy & Linearity: ±0.1% of F.S. ±1 Digit.

Option 58, None: Serial input only as per Digit 5 for remote/display & controller.

Options 60-89:

For multichannel mixed signals. Same specifications as per options 20 through 56.

Build Your Own Part
Number/User’s Manual
or Receive a Quote at:

[http://www.otekcorp.com/
configurator/nts/](http://www.otekcorp.com/configurator/nts/)



DIGITS 8 & 9 (INPUT SIGNAL):

See Input Signal Conditioners section (Page 6 & 7) for description and specifications.

Digit 10 (Power Input):

Digit 10, Option 0, Powerless™, No Power Required: The **Input Fail** detect/Alarm (patented) flashes the display “INPT FAIL” (input FAIL) and transmits this serial message for ~20 seconds, after which it will cease. This feature is available in all Powerless™ models. If desired on powered models, use option **9** on Digit **14** and specify “input fail detection.” Signal Fail Requirement: Unit must be “On” for at least 1 minute at >50% of full scale for it to operate. You can change the message via commands.

Digit 10, Option 1, USB Powered: Back up Power for signal powered models: Some applications might require “keep alive” power in case the input signal fails in Powerless™ models (signal/loop powered). If you select option **0** on Digit **10** and have a **USB** connection, the NTM will transmit the distress message “INPT FAIL” until the signal is restored or the **USB** is disconnected.

If you don't use **USB** and need “keep alive” power, select options **1-4** or **9** on digit **10**. The NTM “keep alive” power requirement is <3mA@5VDC.

Digit 10, Option 2, Isolated 5VDC: 5VDC is used to drive the relays (<50mA/relay) and/or the DAC via internal isolated 5-30VDC-DC (<200mA). If you order relays and analog out, you will need ~300mA/channel. This option is also isolated from the input signal.

Digit 10, Option 3, Isolated 7-32VDC: Same as option **2** but with wide input range of 7-32VDC. Efficiency: >75%.

Digit 10, Option 4, Isolated 90-265VAC: This option accepts 50-60Hz. For 100-300VDC or 400 Hz, use Digit **10**, option **9** and specify. Efficiency: >70%.

Digit 10, Option 5, Non-Isolated 5VDC: Same as option **2**, but non-isolated power. Model NTM-F only.

Digit 10, Option 3, Isolated 7-32VDC: Same as option **3** but non-isolated power. Model NTM-F only.

Flat Pack Conditions:

See page 6 for additional restrictions.

If Digit **4** = **F**, then Digit **10** must be Options **0, 5, 6** or **9** (**NOT** isolated power)

No control or analog output. Part #: NTM-F-00-1??0/2/3 or 9-00??. (??=any option).

Digit 5 (Serial) must be option 8 (None) or option 9 (custom) and is not available for external use (for factory configuration only). Contact Otek for unsealed case. For access to the Serial I/O, contact Otek to request an unsealed case.

DIGIT 11 (CONTROL OUTPUTS & BARGRAPH COLORS):

Digit 11, Control Outputs: Options 1, 3, 5 or 7: Open Collector Transistors (O.C.T.): They are **NOT** isolated from each other (common emitter) but are **isolated** between channels and can sink a maximum of 30 mA and sustain a maximum of 30V_{CE}. The O.C.T. are normally used to drive S.S.R. When you order relays (Digit 11, options 2, 4, 6 or 8) we use the O.C.T. to drive the relays. Power required: none.

Digit 11, Options 2, 4, 6 or 8: Relays: are S.P.D.T. (1C) and can switch maximum resistive loads of 1 Amp @ 120 VAC or 30 VDC. They include 300V varistors at their contacts. Inductive loads must be attenuated by user. Power required: 150mW@5VDC/relay.

AUTOMATIC BAR COLORS:

Limits/Colors Factory default (% of Full Scale): Also see digit 14.

Low-Low Limit (<10%): Red Bar, OCT4/K4 “ON”

Low Limit (<20%): Yellow Bar, OCT3/K3 “ON”

High Limit (>80%): Yellow Bar, OCT2/K2 “ON”

Hi-Hi Limit (>90%): Red Bar, OCT1/K1 “ON”

Note: You can switch limits/relays via command.



DIGIT 11 (CONTROL OUTPUTS & BARGRAPH COLORS): {Continued}

Safe Area (>20<80%): Green bar will follow signal input and if outside the limits, it will change its color to the limit's color (yellow or red).

Bargraph or Pointer? Bargraph is by default. You can change it to pointer (one bar) via command or use option 9 on Digit 14 and specify "Pointer." See commands in the user's manual to customize your bargraph colors.

For other configurations, use option 9 on Digit 14 (field configurable). Max power consumption per relay: 50mA@5VDC (0.25W). See Digit 14.

External Control: You can control the O.C.T./Relays via the serial port with simple commands. They don't have to be assigned to the bar colors/set points, but are by default.

Notes:

1. Digit 11 is governed by Digit 7 (# of Channels) & Digit 4 (Housing).

DIGIT 12 (ANALOG /POWER OUTPUT):

Digit 12, Analog Output, Options 1, 3, 5 or 7: This isolated output is factory set to follow the input (0-F.S. in=4-20 out) but can also be set for other outputs such as external 10K Ohm potentiometer (2-22mA out) or 0-0.1VDC=4-20mA out; or it can be serially controlled by simple commands via the serial port. For other outputs, use option 9 and specify, including reverse scale (4-20=20-4), bipolar and PID. Power consumption: 200mA@5VDC (1W). Accuracy & linearity: $\pm 0.5\%$ of full scale.

Analog Output External Control (Use Option 9 and specify): A) 0-100mVDC in=4-20mA out; B) 0-10K Ohm in=4-20mA out; C) Use options 58, 68, 78 or 88 and control it via serial port.
by Digit 4 (Housings).

DIGIT 12 (ANALOG /POWER OUTPUT): (Continued)

Digit 12, 30 VDC Out, Options 2, 4, 6 or 8: Use this option to power your 4-20mA transmitter or other transducer. Maximum current is 25mADC. It's isolated and is the same power source we use for options 1, 3, 5 and 7. Power consumption: 200mA@5VDC (1W)/channel.

Notes:

1. This digit 12 is governed by digits 4 (Housing) & 7 (# of Channels). Reason: Digit 12 cannot have more outputs than input channels (Digit 7), which is governed

Important Note on A.C. Powerless

The NTM, UPM & NT Series can extract energy from your A.C. signal to power itself and opto isolated serial, optional O.C.T. (Digit 11, options 1, 3, 5 or 7), and to power the optional 4-20mA output (Not 20-4mA out) from a wide input range (see specifications on page 6). External power is required to power the optional relays (Digit 11, options 2, 4, 6 & 8) (200mW each). If you need relays, either use the external powered options on Digits 8 & 9 (33, 37, 40 or 42) and the Digit 10 power input options (1-4) or use Powerless™ options 01-04 on Digits 8 & 9 and Power Input option 09 (custom) on Digit 10 and specify (09=Power for relays and DAC). Result: The signal will power the instrument and will include our patented **Signal Fail Detection & Alarm**. The relays and analog output are powered by the external power option (all 100% isolated).

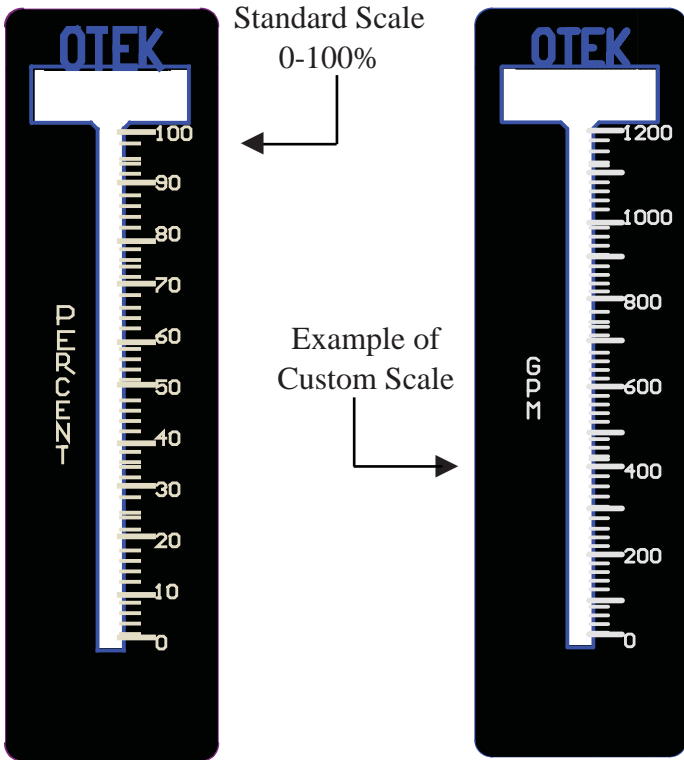
For User-Software or drivers,
visit:

[otekcorp.com/content/
support-downloads](http://otekcorp.com/content/support-downloads)



DIGIT 13 (SCALE PLATE):

Digit 13, Scale Plate: Option **0** is a standard scale plate that reads 0-100%. Use option **9** for custom printing and contact Otek. You must send us your custom scale plate drawings when ordering and we will send you our custom scale drawing for your approval.



OTHER IMPORTANT DATA:

Math Functions: +, -, x, ÷, √, Polynomials to 9th order, 25 Point X-Y table, zero, offset, span and tare. You can add, subtract, multiply, divide (etc.) one channel to/from another channel and display the result in the other channel (i.e. $V(Ch.1) \times A(Ch.2) = W(Ch.3)$).

Signal Failure Alarm: Requires approximately 1 minute of normal (mid-scale) operation for it to alarm the display and output the serial data after the signal (Powerless™) has ceased (post-mortem).

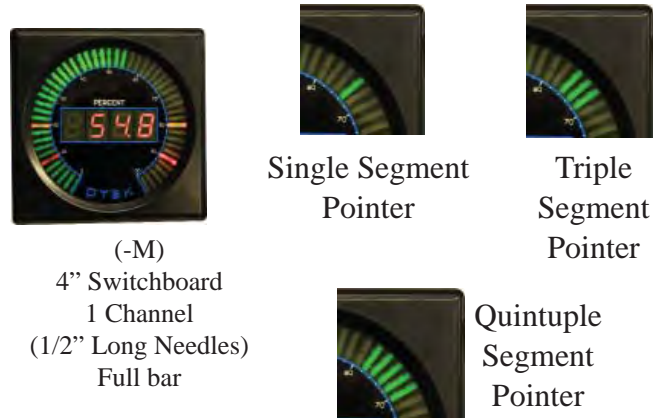
Serial I/O: Setting: 8N1N, 1200-19,200 BAUD, 8 Character Address

PID: Programmable (best with >dual channel models) automatic or manual with external 10K Ohm potentiometer (option **56**). See models **NTY** & **NTT** for dedicated 4-20mA transmitters (same technology).

High Quality: No matter their size or number of channels all use the same (SV & V) firmware, hardware and commands. No matter their grade (Industrial, Mil-Spec, Nuclear) they all carry a **lifetime warranty**.

DIGIT 14 (RANGE/CALIBRATION):

0=Factory Default: 0-Full Scale Input=0-100% bar and 0-100.0 digits. Colors: <10>90%: Red; <20>80%: Yellow; >20<80%: Green. Use Option **9** (custom) and contact Otek. Also see Control Outputs (Digit 11). **Bargraph Default:** 0-Full scale=0-100%. You can program it for **single** pointer, or **three** or **five** bars via the serial port.



(-M)
4" Switchboard
1 Channel
(1/2" Long Needles)
Full bar

Single Segment
Pointer

Triple
Segment
Pointer

Quintuple
Segment
Pointer

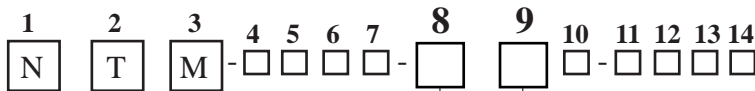


- NOTES:** 1. For multichannel mixed signal of any signal listed or not listed, use option 09, 29, 59, 69, 79 or 89 and specify for quotation by OTEK.
 2. Part number is governed by inter-digit exclusivity ("Must" & "Exclusivity") tables on page 12 or use our configurator at: <http://www.otekcorp.com/configurator/nts/>.
 3. Please refer to option descriptions/conditions on pages 5-10 before selecting.

*See additional notes on page 12.

<p>HOUSING (BEZEL DIMENSION & MATERIAL) (4, 9)</p> <p>0.....1 Ch...3.8x1.9"....1/8 DIN Horizontal Plastic or Metal 1.....1 or 2 Ch.....5.7x1.9" Metal 2.....1 or 2 Ch.....5.7x2.8" Metal 3.....1, 2 or 3 Ch.....4" ANSI Swbd, Plastic or Metal 4.....1 Ch.....1.4x11" Plastic or Metal 5.....1, 2, 3 or 4 Ch.....3x6" Plastic or Metal 6.....1 or 2 Ch.....7x1.4" Metal 7.....1, 2, 3 or 4 Ch.....7.2x2.8" Metal 8.....1, 2, 3 or 4 Ch.....6.3x2.8" Metal 9.....1 or 2 Ch.....6x1.74" Plastic or Metal A.....1, 2 or 3 Ch.....3.8x3.8" 1/4 DIN Plastic or Metal B.....1 Ch...1.9x3.8".....1/8 DIN Vertical Plastic or Metal D.....1 Ch.....3 1/2" Barrel Analog Meter Plastic F.....1 Ch.....(See Note 4).....2x3" Flat Pack Plastic H.....1 Ch.....1x6" Plastic L.....1 Ch.....2.9x1.5" Plastic or Metal M.....1 Ch.....4" ANSI Swbd, Solid Bar, Plastic or Metal N.....1 Ch.....4" ANSI Swbd, Dotted Bar, Plastic or Metal P.....1 Ch.....(See Note 9).....6.6x1.4" Plastic S.....1 Ch.....6x1" Plastic V.....1 Ch.....4.06"x2.06" Metal X.....1 Ch.....4x4" Explosion Proof Metal</p>	<p>RANGE/CALIBRATION</p> <p>0.....Standard DIGIT 14 9.....Custom (Contact OTEK)</p> <p>SCALE PLATE</p> <p>0.....Standard (0-100%) DIGIT 13 9.....Custom (Contact OTEK)</p> <p>ANALOG/POWER OUTPUT</p> <p>0.....None 1...CH. 1.....4-20mA Out 2...CH. 1.....30V Out 3...CH. 1 & 2.....4-20mA Out 4...CH. 1 & 2.....30V Out DIGIT 12 5...CH. 1, 2 & 3.....4-20mA Out 6...CH. 1, 2 & 3.....30V Out 7...CH. 1, 2, 3 & 4.....4-20mA Out 8...CH. 1, 2, 3 & 4.....30V Out 9.....Custom (Contact OTEK)</p> <p>CONTROL OUTPUTS</p> <p>0.....None 1...CH. 1.....O.C.T. (4) 2...CH. 1.....Relays (4) 3...CH. 1 & 2.....O.C.T. (8) 4...CH. 1 & 2.....Relays (8) DIGIT 11 5...CH. 1, 2 & 3.....O.C.T. (12) 6...CH. 1, 2 & 3.....Relays (12) 7...CH. 1, 2, 3 & 4.....O.C.T. (16) 8...CH. 1, 2, 3 & 4.....Relays (16) 9.....Custom (Contact OTEK)</p> <p>POWER INPUT (4)</p> <p>0.....Powerless™ (No Power) 1.....Non-Isolated USB DIGIT 10 2.....Isolated 5VDC 3.....Isolated 7-32VDC 4.....Isolated 90-265VAC 5.....Non-Isolated 5VDC (-F Only) 6.....Non-Isolated 7-32VDC (-F Only) 9.....Custom (Contact OTEK)</p> <p>INPUT SIGNAL DIGIT 8 & 9</p> <p>See Page 13 and enter option number for Digits 8 & 9.</p>	<p>SERIAL I/O</p> <p>0.....USB DIGIT 5 1.....RS485 2.....Ethernet 3.....USB & μSD Memory (Pending) 4.....RS485 & μSD Memory (Pending) 5.....IRDA (-X Only) 7.....RS232 (-H, -P & -S Only) 8.....None (-D & -F Only) 9.....Custom (Contact OTEK)</p> <p>GRADE</p> <p>0.....Industrial & Plastic DIGIT 6 I.....Industrial & Metal M...To Mil-Spec & Metal (Contact OTEK) E.....To EPRI-Nuclear & Metal (Contact OTEK) 9.....Custom (Contact OTEK)</p> <p># OF CHANNELS (1)</p> <p>1.....One DIGIT 7 2.....Two 3.....Three 4.....Four 9.....Custom (Contact OTEK)</p>	<p>Example of Good Part Number: NTM-500-480-488-00</p> <p>Example of Bad Part Number: NTM-300-480-488-00*</p> <p>*Red Numbers are conflicting options)</p>
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INPUT SIGNAL



FOR LOOP/SIGNAL POWERED ONLY (1, 4, 5, 6, 7, 8)

- 00.....4-20mA, All Channels=Input, Loop Power
- 01.....Volts A.C., All Channels, Signal Power
- 02.....(See Note 4).....5 Amps A.C., All Channels, Signal Power
- 03.....(See Note 4).....Watts A.C., All Channels, Signal Power
- 04.....(See Note 4).....Hertz A.C.V., All Channels, Signal Power
- 05.....Mixed 2 Channel.....Ch. 1: VAC; Ch. 2: AAC, Signal Power
- 06.....Mixed 2 Channel.....Ch. 1: VAC; Ch. 2 WAC, Signal Power
- 07.....Mixed 2 Channel.....Ch. 1: VAC; Ch. 2: Hz, Signal Power
- 08.....Mixed 2 Channel.....Ch. 1: AAC; Ch. 2: WAC, Signal Power
- 09.....Custom (Contact OTEK)
- 10.....Mixed 3 Channel.....Ch. 1: V; Ch. 2: A; Ch. 3: W, Signal Power
- 11.....Mixed 3 Channel.....Ch. 1:V; Ch. 2: A; Ch. 3: Hz, Signal Power
- 12.....Mixed 3 Channel.....Ch. 1: V; Ch. 2: W; Ch. 3: Hz, Signal Power
- 13.....Mixed 3 Channel.....Ch. 1: A; Ch. 2: W; Ch. 3: Hz, Signal Power
- 14.....Mixed 4 Channel.....Ch. 1: V; Ch. 2: A; Ch. 3: W; Ch. 4: Hz, Signal Power
- 16.....7-140 Volts A.C./D.C., All Channels, Signal Power
- 17.....10-50mA, All Channels=Input, Loop Power
- 18.....10-500mADC, All Channels=Input, Signal Power

FOR EXTERNAL POWER ONLY (1-4 Ch.)

All channels same input. (1, 4, 5, 6, 7, 8)

- 20.....4-20mA F.S.
- 21.....100mV DCF.S.
- 22.....1V DCF.S.
- 23.....10V DCF.S.
- 24.....100V DCF.S.
- 25.....10mADC F.S.
- 26.....100mADC F.S.
- 27.....Watts DC (1Vx1A) F.S.
- 28.....Watts DC (1Vx1V) F.S.
- 29.....Custom (Contact OTEK)
- 30.....0.1V RMS F.S.
- 31.....1V RMS F.S.
- 32.....10V RMS F.S.
- 33.....150V RMS F.S.
- 34.....250 V RMS F.S.
- 35.....0.1A RMS F.S.
- 36.....1A RMS F.S.
- 37.....5ARMS F.S.
- 38.....W RMS (1Vx1VAC) F.S.
- 40.....W RMS (120Vx5A AC) F.S.
- 41.....Hertz (10KHz/5V Logic) F.S.
- 42.....Hertz (120VAC/40-100 Hz) F.S.
- 43.....Hertz (240VAC/30-100 Hz) F.S.
- 44.....Hertz (120VAC/500 Hz) F.S.
- 45.....Strain-Gage (≥300-4K Ohm)
- 47.....RTD (PT100)
- 48.....RTD (PT1000)
- 50.....TC (Type J)
- 51.....TC (Type K)
- 52.....TC (Type T)
- 53.....pH (0-14.00)
- 54.....ORP (0-2000mVDC)
- 55.....% RH (Specify Sensor)
- 56.....Resistance (0-10KΩ)
- 57.....10-50mA F.S.
- 58.....None (Serial Input Remote Meter)

MIXED INPUT SIGNALS (2 CHANNELS) {5}

- 60.....Ch.1: 1V; Ch.2 1A (.2Ω) RMS
- 61.....Ch.1: 10V; Ch.2: 1A (.2Ω) RMS
- 62.....Ch.1: 100V; Ch.2: 1A (.2Ω) RMS
- 63.....Ch.1: 100V; Ch.2: 50mV RMS
- 64.....Ch.1: 150V; Ch.2: 5A (.04Ω) RMS
- 65.....Ch.1: 250V; Ch.2: 5A (.04Ω) RMS
- 66.....Ch.1: 150V; Ch.2: 100Hz (120 V Line) RMS
- 67.....Ch.1: 250V; Ch.2: 100 Hz (240V Line) RMS
- 68.....None, Serial Input Only
- 69.....Custom (Contact OTEK)

MIXED INPUT SIGNALS (3 CHANNELS) {5}

- 70.....Ch.1: 1V; Ch.2: 1A (.2 Ω); Ch.3: W RMS
- 71.....Ch.1: 10V; Ch.2: 1A (.2 Ω); Ch.3: W RMS
- 72.....Ch.1: 100V; Ch.2: 1A (.2Ω); Ch.3: W RMS
- 73.....Ch.1: 100V; Ch.2: 50mV; Ch.3: W RMS
- 74.....Ch.1: 150V; Ch.2: 5A (.04 Ω); Ch.3: W RMS
- 75.....Ch.1: 250V; Ch.2: 5A (.04Ω); Ch.3: W RMS
- 76.....Ch.1: 150V; Ch. 2: 5A (.04Ω); Ch.3: 100Hz RMS
- 77.....Ch.1: 250V; Ch. 2: 5A (.04Ω); Ch.3: 100 Hz RMS
- 78.....None, Serial Input Only
- 79.....Custom (Contact OTEK)

MIXED INPUT SIGNALS (4 CHANNELS) {5}

- 80.....Ch.1: 150V; Ch. 2: 5A (.04 Ω); Ch.3: W; Ch.4: 100Hz RMS
- 81.....Ch.1: 250V; Ch. 2: 5A (.04Ω); Ch.3: W; Ch.4: 100 Hz RMS
- 82.....Ch.1: 120V; Ch. 2: 5A (.04Ω); Ch.3: W; Ch.4: 500 Hz RMS
- 83.....Ch.1: 250V; Ch. 2: 5A (.04Ω); Ch.3: W; Ch.4: 500 Hz RMS
- 88.....None, Serial Input Only
- 89.....Custom (Contact OTEK)

Don't See It?
Ask For It!



NOTES (Continued):

4. Options 02 through 14 on Digits 8 & 9 are not available on the NTM-F (Digit 4, option -F). Model NTM-F can only have options 0, 5 or 6 on Digit 10 (Power Input). See "Flat Pack," conditions on page 9.
5. # of input channels is governed by Digit 7 (Page 11).
6. Option 00 only for loop powered (Digit 10, option 0).
7. Options 20 thru 58 available for all models except NTM-D; options 60 thru 69 only for models with 2+ channels (digit 7, options 2-4); Options 70-79 only for models with 3+ channels (digit 7, options 3 or 4); options 80-89 only for digit 7, option 4.
8. Options 20-89 only for externally powered models (Digit 10, options 1-9).
9. On NTM-P for horizontal mount or edgecard connector use option 9 on Digit 7 and specify.



NOTE: If you use our award winning [Configurator](#), you can ignore this page!

EXCLUSIVITY RULES:

**Table A NTM™ METERS/CONTROLLER MODELS
OPTIONS THAT MUST BE SELECTED VS. CASE OPTION # (DIGIT 4)**

MODEL/ BEZEL SIZE (DIGIT 4)	SERIAL I/O (DIGIT 5)	GRADE (DIGIT 6)	# OF INPUT CHANNELS (DIGIT 7)	INPUT SIGNAL (DIGITS 8 & 9)	POWER INPUT (DIGIT 10)	CONTROL OUTPUTS (DIGIT 11)	ANALOG OUTPUT/ POWER (DIGIT 12)
-0	0 THRU 4	0, I, M, E	1	00 THRU 04 or 20 THRU 58	0 THRU 4	0 THRU 2	0 THRU 2
-1	0 THRU 4	I, M, E	1 OR 2	00 THRU 08 OR 20-68	0 THRU 4	0 THRU 4	0 THRU 4
-2	0 THRU 4	I, M, E	1 OR 2	00 THRU 08 OR 20-68	0 THRU 4	0 THRU 4	0 THRU 4
-3	0 THRU 4	0, I, M, E	1 THRU 3	00 THRU 13 OR 20-78	0 THRU 4	0 THRU 6	0 THRU 6
-4	0 THRU 4	0, I, M, E	1	00 THRU 04, 20 THRU 58	0 THRU 4	0 THRU 2	0 THRU 2
-5	0 THRU 4	0, I, M, E	1 THRU 4	00-88	0 THRU 4	0 THRU 8	0 THRU 8
-6	0 THRU 4	I, M, E	1, 2	00 THRU 08, 20 THRU 68	0 THRU 4	0 THRU 4	0 THRU 4
-7	0 THRU 4	I, M, E	1 THRU 4	00 THRU 88	0 THRU 4	0 THRU 8	0 THRU 8
-8	0 THRU 4	I, M, E	1 THRU 4	00 THRU 88	0 THRU 4	0 THRU 8	0 THRU 8
-9	0 THRU 4	0, I, M, E	1, 2,	00-08, 20 THRU 68	0 THRU 4	0 THRU 4	0 THRU 4
-A	0 THRU 4	0, I, M, E	1 THRU 3	00 THRU 13, 20 THRU 78	0 THRU 4	0 THRU 6	0 THRU 6
-B	0 THRU 4	0, I, M, E	1	00 THRU 04 or 20 THRU 58	0 THRU 4	0 THRU 2	0 THRU 2
-H	0, 1, 7	0	1	00 THRU -04, 20 THRU 58	0 THRU 4	0 THRU 2	0 THRU 2
-M	0 THRU 4	0, I, M, E	1	00 THRU 04, 20 THRU 58	0 THRU 4	0 THRU 2	0 THRU 2
-N	0 THRU 4	0, I, M, E	1	00 THRU 04, 20 THRU 58	0 THRU 4	0 THRU 2	0 THRU 2
-P	0, 1, 7	0	1	00 THRU 04, 20 THRU 58	0 THRU 4	0 THRU 2	0 THRU 2
-S	0, 1, 7	0	1	00 THRU -04, 20 THRU 58	0 THRU 4	0 THRU 2	0 THRU 2
-V	0 THRU 4	I, M, E	1	00 THRU 04, 20-58	0 THRU 4	0 THRU 2	0 THRU 2
-X	0, 1, 3 THRU 6	I, M, E	1	20 THRU 58	0 THRU 4	0 THRU 2	0 THRU 2

DIGIT 4 (HOUSING): If options 1, 2, 6, 7, 8 or X (metal), then digit 6 (Grade) must be I, M or E; if options D, F, H, P or S, then dig. 6 must be 0 (plastic); if option F, then dig 10 (Power) must be options 0-3, and digits 5, 6, 11 & 12 (Outputs) must be option 0.

DIGIT 5 (SERIAL I/O): If option 2, 3 or 4, then digit 4 (Case) must be 0-B, M or N; if options 5 or 6 (IRDA), then digit 4 (Case) must be X; if options 2, 3 or 4, then digit 10 (Power) must be 2, 3 or 4.

DIGIT 6 (GRADE): If option 0 (plastic), then digit 4 (Case) must be 0, 3, 4, 5, 9, A, B, D, F, H, L, M, N, P or S; if option I, then digit 4 must be options 0-9, A, M, N or X.

DIGIT 7 (# OF CHANNELS): Option 1: no exceptions; if option 2, then digit 4 (Case) must be options 1-3, or 5-A; if option 3, then digit 4 (Case) must be options 3, 5, 7, 8 or A; if option 4, then digit 4 (Case) must be options 5, 7 or 8.

DIGIT 8 & 9 (INPUT SIGNAL): If options 00-04 or 20-58 (1 Ch.), then digit 4 (Case) can be any option; if option 05-08 or 60-69 (2 Ch.), then digit 4 (Case) must be options 1-3, 5-A; if options 70-79 (3 Ch.), then digit 4 (Case) must be options 3, 5, 7, 8 or A; if options 80-89 (4 Ch.), then digit 4 (case) must be options 5, 7 or 8; if options 00-14, then digits 10, 11 & 12 (Power & Outputs) must be option 0; if options 20-89, then digit 10 (Power) must be options 1-4.

DIGIT 10 (POWER INPUT): If option 0 (Powerless™) then digit 5 (Serial) must be options 0 or 1 and digits 8 & 9 (Input Signal) must be options 00 through 14 (Powerless™); if option 1 (USB), then digit 5 (Serial) must be option 0; if option 4, then digit 4 (Case) cannot be option F (Flat Pack).

DIGIT 11 OR DIGIT 12 (CONTROL OR ANALOG/POWER OUT): If option 0, no restrictions; if options 1 or 2 (1 Ch.), then digit 4 (Case) must be options 0-B, M, N, P or X; if option 3 or 4 (2 Ch.), then digit 4 (Case) must be options 1, 2, 3 or 5-A; if options 5 or 6 (3 Ch.), then digit 4 (Case) must be options 3, 5, 7, 8 or A; if options 7 or 8 (4 Ch.), then digit 4 (Case) must be options 5, 7 or 8.

See the NT Series for dedicated 4-20mA transmitters.

NOTE: Our NTM-X is CE approved for explosive atmospheres (IECEx)!
(Class 1, Div 1)

**METERS (DISPLAY ONLY MODELS)
OPTIONS THAT MUST BE SELECTED VS. CASE OPTION # (DIGIT 4)**

MODEL/ BEZEL SIZE (DIGIT 4)	SERIAL I/O (DIGIT 5)	GRADE (DIGIT 6)	# OF INPUT CHANNELS (DIGIT 7)	INPUT SIGNAL (DIGITS 8 & 9)	POWER INPUT (DIGIT 10)	CONTROL OUTPUTS (DIGIT 11)	ANALOG OUTPUT/ POWER (DIGIT 12)
-D	0	0	1	00 THRU 04, 20 THRU 58	0 THRU 4	0	0
-F	0	0	1	00, 01 & 04, 20 THRU 58	0 THRU 3	0	0
-L	0, 1	0, I, M, E	1	00 THRU 04, 20 THRU 58	0 THRU 4	0	0



NTM-	METERS & CONTROLLERS Housing (Digit 4) () = Bezel Size	*All Models NEMA 3 NEMA 4X on Request BAR LENGTH/ DIGIT SIZE	REPLACES ANALOG OR DIGITALS
Option 0:	(3.8x1.9"), 1/8 DIN Plastic or Metal, Horizontal	2.5"/.4"	Any 1/8 DIN DPM Horizontal
Option 1:	(5.7x1.9"), Metal	4"/.4"	Sigma-VMI-Dixson, Otek's HIQ121
Option 2:	(5.7x2.84"), Metal	4"/.4"	Sigma-VMI-Dixson, Otek's HIQ122
Option 3:	(4" ANSI Switchboard), Plastic or Metal	6.5"/.3 & .25"	DB40, Weschler BF6400, Dixson, 4" ANSI Switchboard
Option 4:	(1.4"x11"), Plastic or Metal	8"/.3"	Chessel's 700, Any 8" Bargraph
Option 5:	(3x6"), Plastic or Metal	4"/.3"	Any 3x6" Meter
Option 6:	(7x1.4"), Metal	4"/.3"	Bailey RY, Dixson SH101
Option 7:	(7.2x2.8"), Metal	4"/.3"	Bailey 775, Foxboro 257, Otek HIQ117
Option 8:	(6.3x2.8"), Metal	4"/.3"	Bailey 775, Foxboro 257, Otek HIQ118
Option 9:	(6x1.74"), Plastic or Metal	4"/.3"	GE180, Yokogawa 180, Dixson, Weschler
Option A:	(3.8x3.8"), 1/4 DIN Plastic or Metal	2.5"/.4"	Any 1/4 DIN (96x96mm) Meter
Option B:	(3.8x1.9"), 1/8 DIN Plastic or Metal, Vertical	2.5"/.4"	Any 1/8 DIN (48x96mm) Meter, Vertical
Option D:	(3 1/2"), Barrel Analog Meter Plastic	3"/.4"	Any Analog Meter Case 3 1/2" Barrel
Option F:	(2x3"), Flat Pack Plastic	3"/.3"	Any Otek "Flat Pack" 516 through 528, 400-414 & FPM
Option H:	(1x6"), Plastic	2.5"/.25"	Otek's HIQSLIM 1, 2 or 3
Option L:	(2.9x1.5"), Plastic or Metal	2.5"/.25"	Otek's LPM, LPE, NPM, Velonex
Option M:	(ANSI Switchboard .4"), Plastic or Metal	6.5"/.6"	DB40, Weschler, Dixson, Otek's HIQTBS & HIQ123
Option N:	(ANSI Switchboard .4"), Plastic or Metal	6.5"/.6"	DB40, Weschler, Dixson, Otek's HIQ124 & HIQTBE
Option P:	(6.6x1.4"), Plastic	4"/.25"	Dixson BE 051/101, Sigma, VMI, Otek's HIQ101
Option S:	(6x1"), Plastic	2.5"/.25"	Otek's HIQSLIM 1, 2 or 3
Option V:	(4.06x2.06"), Metal, Vertical	2.5"/.4"	Scientech/Sigma/VMI/Versatile 9200 Series, Vertical
Option X:	(4x4"), Class I, Div. 1, E.P., Metal	3"/.3"	Any Explosion Proof Meter, Otek's LPX

MAX CONTROL OUTPUT LIMITATIONS

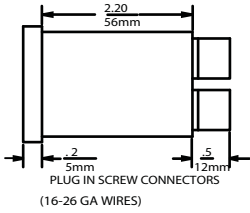
MULTICHANNEL MODELS			
MODEL	# OF CH.	RELAYS/O.C.T.	4-20mA/30
1	1-2	8/8	2/2
2	1-2	8/8	2/2
3	1-3	12/12	3/3
5	1-4	16/16	4/4
6	1-2	8/8	2/2
7	1-4	16/16	4/4
8	1-4	16/16	4/4
9	1-2	8/8	2/2
A	1-3	12/12	3/3

SINGLE CHANNEL MODELS		
MODEL	RELAYS/O.C.T.	4-20mA/30
0	4/4	1/1
4	4/4	1/1
B	4/4	1/1
D	NONE	NONE
F	NONE	NONE
H	2/4	1/1
L	NONE	NONE
M	4/4	1/1
N	4/4	1/1
P	2/4	1/1
S	2/4	1/1
V	4/4	1/1
X	2/4	1/1

NEED COUNTERS/TIMERS?
See our **UPM** (Universal Panel Meter)

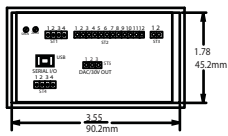
NEED TRANSMITTERS? See the new NT Series.

OPTION -0 1/8 DIN 3.8x1.9" Bezel Mechanical

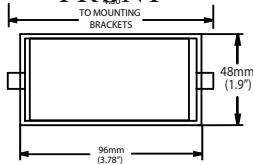


Panel Cutout: 46x92mm
(1.85x3.62")

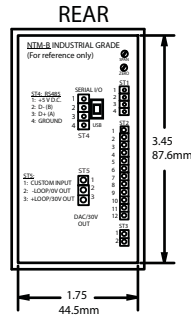
REAR



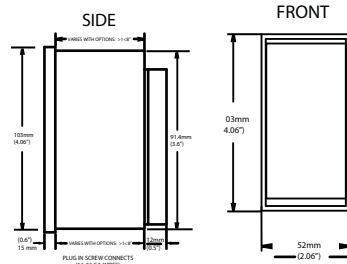
FRONT



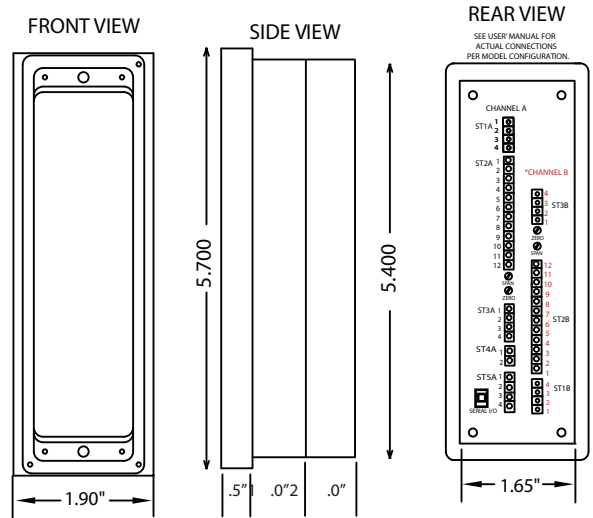
OPTION V 4.06x2.06" Bezel Mechanical



Panel Cutout:
>3.5" <4.0" H x >1.8" <2" W



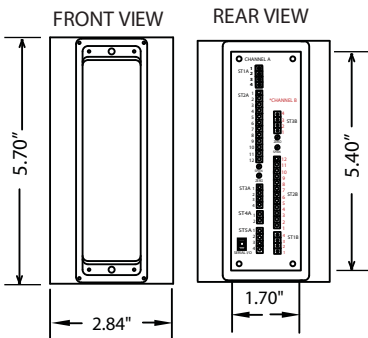
Option -1 5.7x1.9" Metal Bezel Mechanical



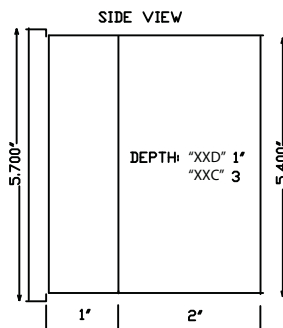
NOTE: CH. B HAS PINOUT NUMBERED FROM BOTTOM TO TOP.
INDUSTRIAL PANEL CUT-OUT: 1.67x5.42"
NOTE: INDUSTRIAL HAS EURO PLUG CONNECTORS
(MIL OR EPRI HAS FILTERED TERMINAL CONNECTORS)
DEPTH VARIES WITH OPTION. MAX: 3"

OPTION -2 2.84X5.7" Bezel Mechanical

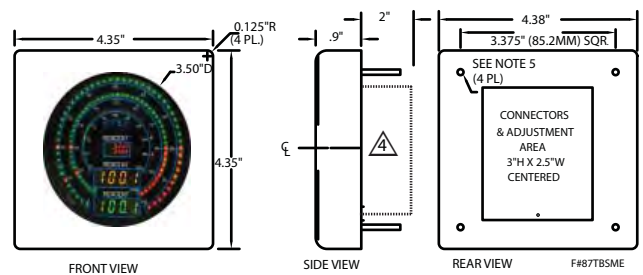
- Notes:
1. Ch. B has pinout numbered from bottom to top.
 2. Industrial grade has euro-plus connectors; MIL & EPRI have filtered terminal connectors.
 3. Depth varies with option. Max: 3"



Panel Cutout: 5.42x2.70"
Depth: 1" (Display Only)
3" (Controller)



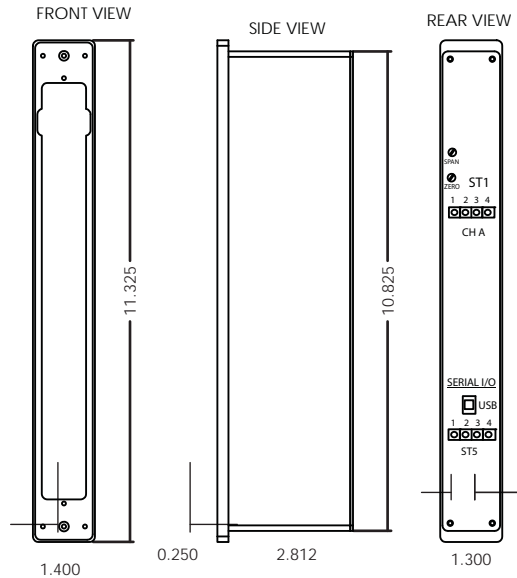
OPTION -3, -M, -N ANSI 4" Switchboard Mechanical



- NOTES:
1. ANSI 4" (3.375") CASE CAN ALSO BE MOUNTED IN 1/4 DIN PANEL CUTOUT.
 2. CONNECTORS AND 3.375" STUDS SPACING MEET ANSI39.1 STANDARD FOR SWITCHBOARD METERS. J1 FALLS WITHIN EXISTING "BARREL" CUTOUT.
 3. WIRE: 26-16GA
 4. SHIELDED VERSIONS WILL EXTEND ~2" BEHIND THE PANEL.
 5. METAL VERSION HAS #8-32 X 3/4" MOUNTING STUDS; PLASTIC HAS #4-40 X 1/2" MOUNTING STUDS.

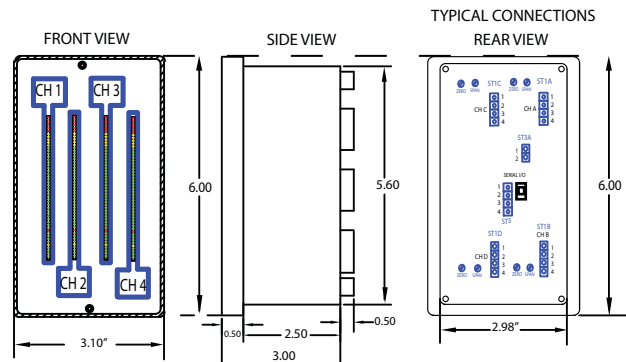


OPTION -4 11.3x1.4" Bezel Mechanical



PANEL CUT-OUT: 1.34x10.88"

OPTION -5 3x6" Bezel Mechanical



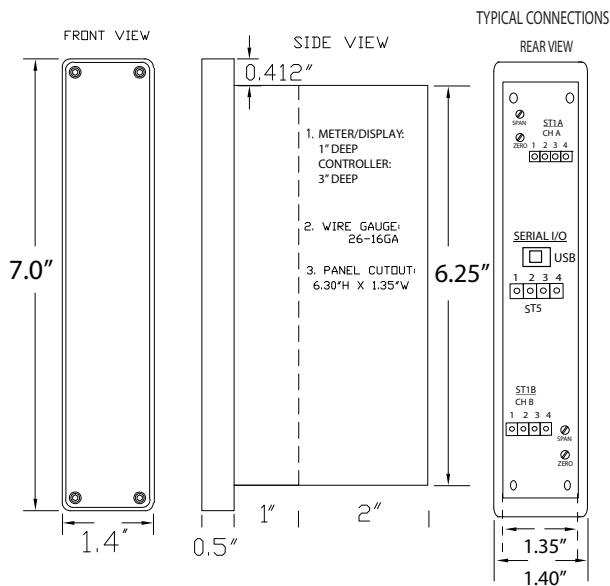
Mounting: 1. REMOVE FILTER

2. TWIST MOUNTING TABS (2) CLOCKWISE

3. REPLACE FILTER

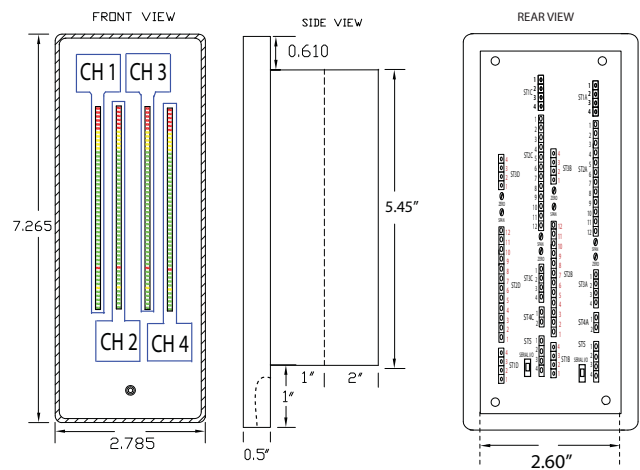
PANEL CUT-OUT: 3.05Wx5.6"H

OPTION -6 7x1.4" Bezel Mechanical



PANEL CUT-OUT: 1.35x6.30"
DEPTH: 1" (DISPLAY ONLY)
3" (CONTROLLER)

OPTION -7: 7.2x2.8" Bezel Mechanical

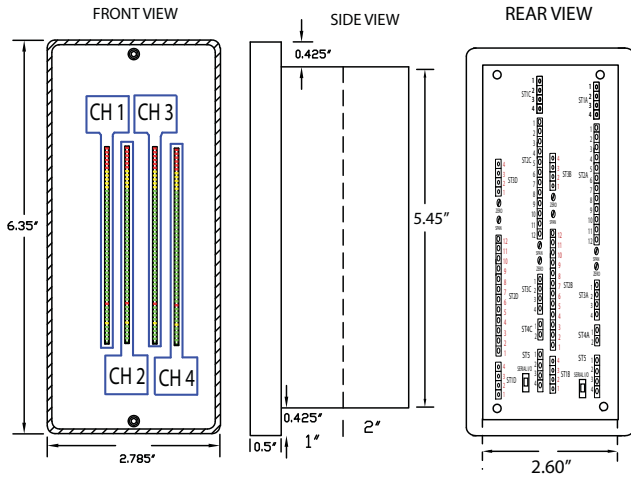


PANEL CUT-OUT: 2.65x5.50"
DEPTH: 1" (DISPLAY ONLY)
2" (CONTROLLER)



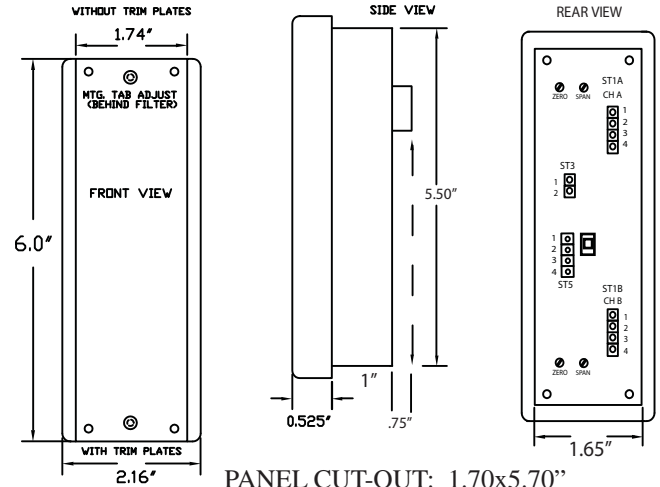
NEW TECHNOLOGY MECHANICAL & MOUNTING INFORMATION BY CASE STYLE (Digit 4 & Option #)

OPTION -8: 6.3x2.8" Bezel Mechanical

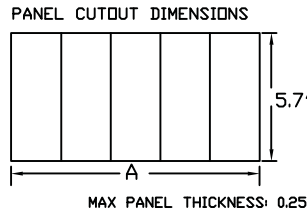


PANEL CUT-OUT: 2.65x5.50"
DEPTH: 1" (DISPLAY ONLY)
3" (CONTROLLER)

OPTION -9: (Industrial) 6x1.74" Bezel Mechanical



PANEL CUT-OUT: 1.70x5.70"
DEPTH VARIES W/OPTIONS. MAX: 3"

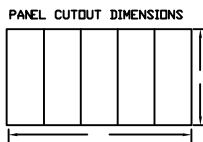
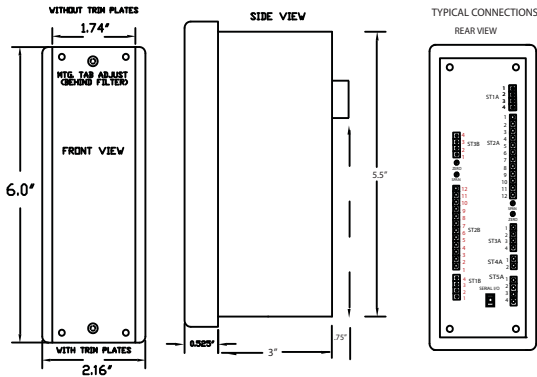


NOTE: DISPLAYS ARE 1" DEEP
CONTROLLERS ARE 2.3" DEEP

DIMENSION 'A'	+0.03 -0.00	+0.76 -0.00
# UNITS	INCHES	mm
1	1.77	44.96
2	3.52	89.41
3	5.26	133.60
4	6.99	177.55
5	8.73	221.74

OPTION -9 (EPRI) 6x1.74" Bezel Mechanical

NTM-9 MECHANICAL INFORMATION (EPRI)

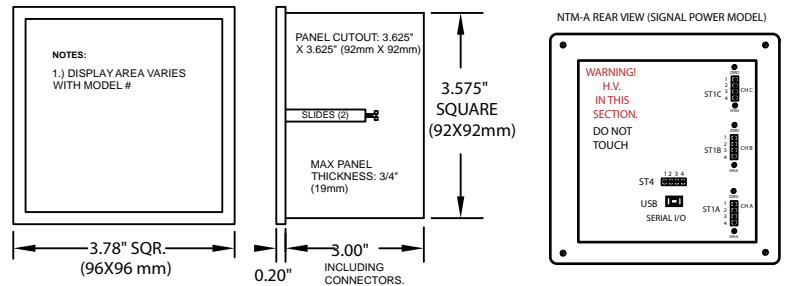


NOTE: DISPLAYS ARE 1" DEEP
CONTROLLERS ARE 2.3" DEEP

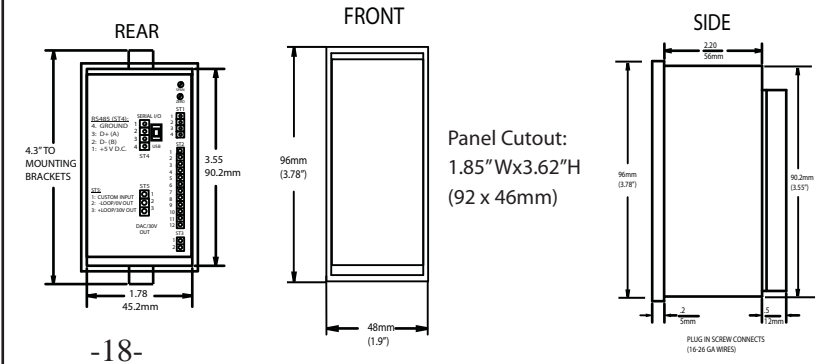
DIMENSION 'A'	+0.03 -0.00	+0.76 -0.00
# UNITS	INCHES	mm
1	1.77	44.96
2	3.52	89.41
3	5.26	133.60
4	6.99	177.55
5	8.73	221.74

PANEL CUT-OUT: 1.70x5.70"
DEPTH: 3"

OPTION -A 1/4 DIN: 3.8x3.8" Bezel Mechanical



OPTION -B 1/8 DIN VERTICAL 1.9x3.8" Bezel Mechanical

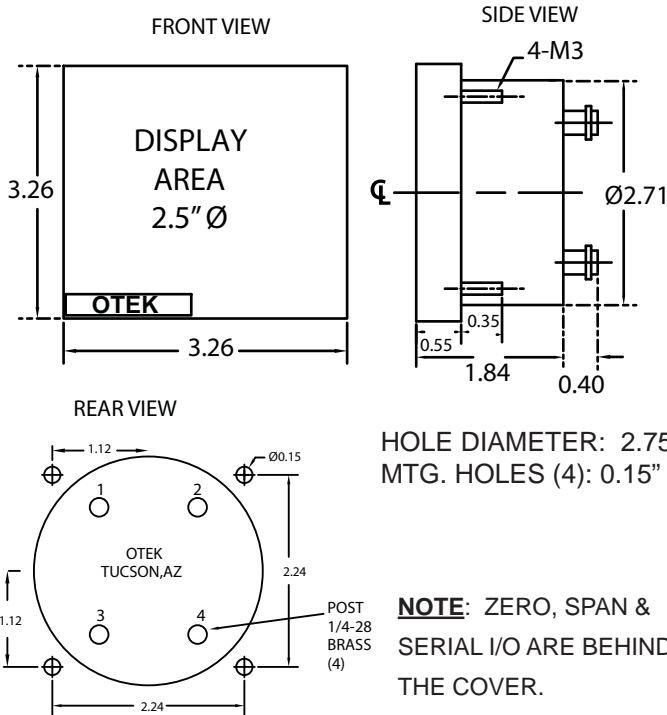


Panel Cutout:
1.85"Wx3.62"H
(92 x 46mm)



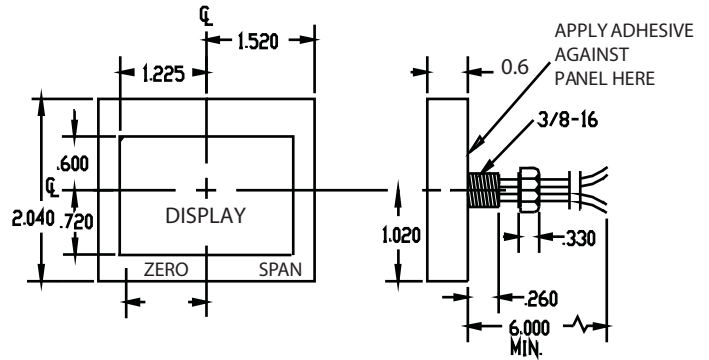
OPTION -D

3 1/2" Analog Meter Case Mechanical



OPTION -F

**Flat Pack 2x3" Mechanical
No Panel Cut Out Required!**



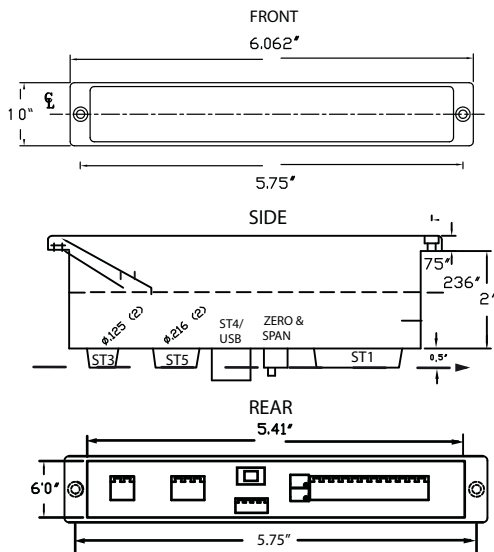
Mounting Instructions:

1. Drill a 3/8 - 1/2" diameter hole.
2. Attach supplied double sided tape to back of it.
3. Pass wires through hole.
4. Align and Press NTM-F on panel (that is all!)
5. Don't pull on wires (26 gauge!)

NO PANEL CUT-OUT!

OPTION -H:

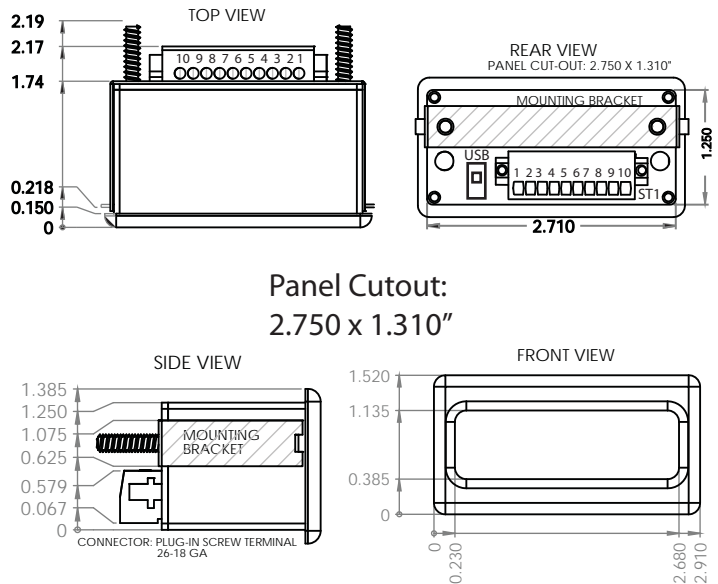
1x6" Bezel Mechanical



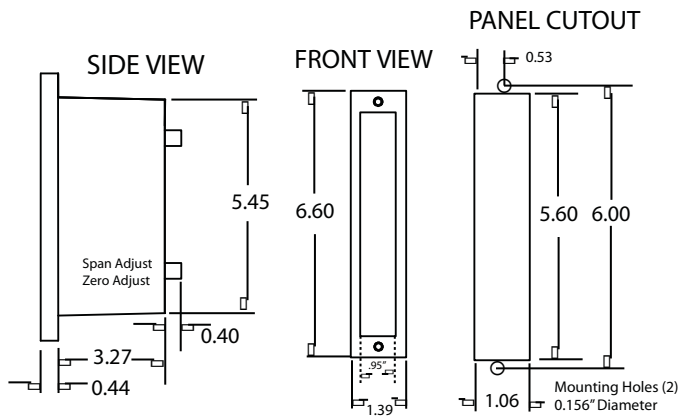
PANEL CUT-OUT: 5.45X.95"

OPTION -L:

2.9x1.5" Bezel Mechanical



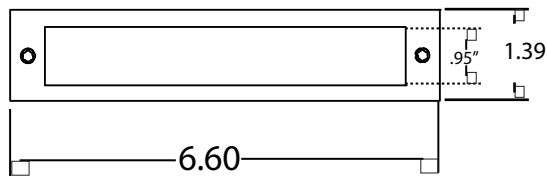
OPTION -P: 6.6x1.4" Bezel Mechanical



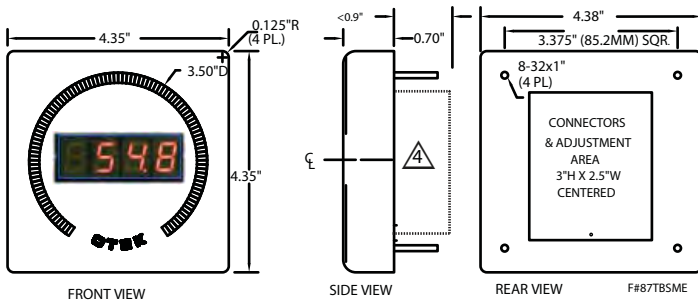
PANEL CUT-OUT: 1.06x5.60"

NTM-P can be mounted horizontally. Use digit 14, option 9 and specify "Horizontal (no digits)."

FRONT VIEW



OPTIONS -M & -N: ANSI 4" Switchboard Mechanical

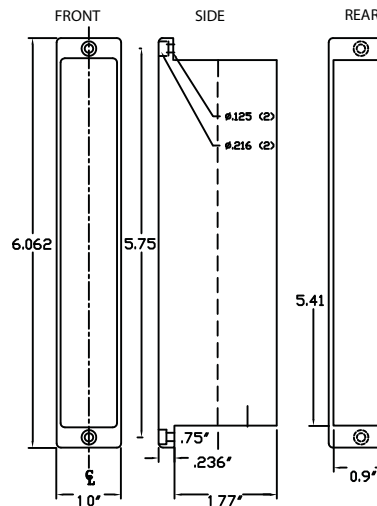


NOTES:

- ANSI 4" (3.375") CASE CAN ALSO BE MOUNTED IN 1/4 DIN PANEL CUTOUT.
- CONNECTORS AND 3.375" STUDS SPACING MEET ANSI39.1 STANDARD FOR SWITCHBOARD METERS. J1 FALLS WITHIN EXISTING "BARREL" CUTOUT.
- WIRE: 26-16GA
- SHIELDED VERSIONS WILL EXTEND ~2" BEHIND THE PANEL.

OPTION -S: 6 x1" Bezel Mechanical

NTM-S MECHANICAL



Notes:

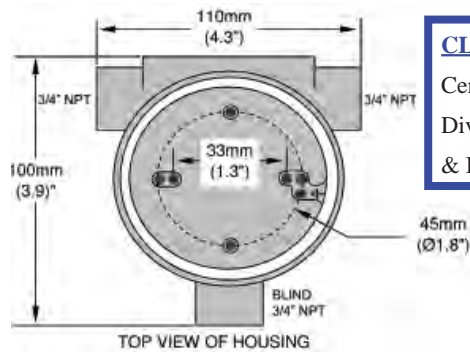
- Mounting holes (2) for #4 clearance hardware supplied.
- Wire size accepted: >24<16GA.
- All DIM +/- 0.010"
- For stacked applications, make mounting holes on 1.05" centers
- Meter/Display only: 0.75" deep; Controller" 1.77" deep

(For Vertical Mount, See NTM-S)

PANEL CUT-OUT: .95x5.45"

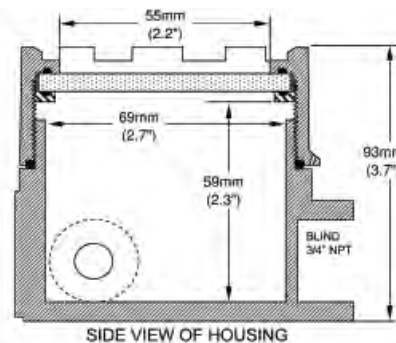
OPTION -X 4x4" Explosion Proof Mechanical

Explosion Proof Mechanical



CLASSIFICATIONS:

Certified for Class I, Div. 1, Groups B-G, EX & ICEx: IM2, Exd1



Contact OTEK for wall mount bracket.





Build Your Own Part
 Number/Receive a
 Quote at:
[http://www.otekcorp.com/
 configurator/nts/](http://www.otekcorp.com/configurator/nts/)





ABOUT THE NEW TECHNOLOGY METER (NTM) SERIES:

In 1974 Otek introduced the 1st loop powered LCD DPM. In 1985, the 1st LED loop powered DPM. In 1998, the 1st auto tricolor bargraph LCD loop powered bar-meter. In 2005, the 1st LED loop powered bar-meter. Now we bring you the culmination of 40 years dedicated to the POWER of the LOOP!

We are proud to introduce our new NTM Series of instruments! All models use the same patent pending technology along with our patented hardware and firmware to give you the highest reliability (lifetime warranty) at the lowest cost.

The NTM Series includes various features such as: automatic (programmable) tricolor bargraph, automatic signal fail detect (open or short), indication and serial transmission with run time stamp and unit's ID, isolated retransmission (4-20mA), and universal power input (5-32VDC and 90-265VAC). The NTM Series offers several math functions such as X-Y tables, polynomials and log-anti-log functions.

The NTM signal and external power series also feature isolated serial USB, RS485 or Ethernet μ SD memory card to 32GB, open collector transistors (4/channel) and SPDT relays (4/channel). You can tell us your custom needs and we'll make it (or might already have it)!

The new Otek NT product line offers a series of 4-20 mA transmitters suitable for most control applications. The NT Series is designed to replace the old thumbwheel-style controllers with a new device which combines transmitter and controller functions in a single, compact unit. Like the NTM series, NT transmitter/controllers offer: 4 digit, low-power, hi-intensity LED's, 4 digits per display, over 30 input signal conditioners standard, tricolor bar graph with programmable set points, and options for signal or external power. Control functions include: serial I/O, isolated analog retransmission, OCT or relay control outputs.

INSTANT PRICING: Our state-of-the-art **Configurator** allows you to build your specific part number, receive a price and create a customized user's manual. If you already have a complete part number, you can simply enter it to get instant pricing or create the custom user's manual. There is no waiting, no hassle and no RFQ.

Hard to believe? Watch our 1 minute video:



ABOUT OTEK:

OTEK Corporation was founded in 1974 by Dr. Otto Fest, whose enduring goal has been to provide the very best in process measurement and control instrumentation, coupled with unparalleled service. Otek designs, develops and manufactures their products right here in the U.S., deploying state-of-the-art technology and using only the highest quality materials and components. Key products include digital panel meters, bargraphs, controllers, batch counters, and process data loggers. The high quality of our products allows us to offer an unprecedented lifetime warranty.

OTEK also offers a 15 day evaluation program at no charge.

520-748-7900

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E-MAIL: sales@otekcorp.com

<http://www.otekcorp.com>

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