About AI-Tek® Tachometers

Not all tachometers are the same, and this is certainly true of the **AI-Tek** Instruments tachometry line. Designed with severe industrial environments in mind, these units will provide reliable around-the-clock operation for years under adverse conditions.

AI-Tek Instruments is a leader in manufacturing this type of instrument.

Our prices reflect the design, quality, ruggedness and engineering of the equipment. What you really get with **AI-Tek** Instruments is a superb price performance ratio. It may not initially be the least expensive equipment available; but, in the long run, the value of this equipment is that it will outperform and outlast others.

Introduction of the New Generation Tachometer Line

The new generation **TACHPAK** and **TACHTROL** series tachometers have been designed with all of the functions and durability embodied in the previous tachometer series as well as improvements to extend performance, accuracy and function. With the exception of the **Tachtrol 20,** both **TACHPAK** and **TACHTROL** now share a common processing platform. This commonality allows both to perform identical tachometry functions, streamlines programming and minimizes the learning curve. The main physical difference between the two is the characteristic integrated display function found in all **TACHTROL** series tachometers.

Common Specifications:

Temperature -10°C to +55°C operating; -40°C to +80°C storage
Thermal Cycle   50 cycles: -40°C to +80°C; 200 cycles: -10°C to +55°C

Humidity   90% RH non-condensing per IEC 654-1, IEC 68-2-3

Vibration   MIL-STD-810C Environmental Test Methods, method 514.2, procedure VIII, figure 514.2-6, curve V; 1.5g's 10-2000 Hz, 5.5 hrs./axis, 3 axis
IEC 60068-2-6, 10-150Hz, 2g, 10 sweep cycles / axis, 3 axis

Shock   MIL-STD-810C Environmental Test Methods, method 516.2, procedure I and figures 516.2-2, for ground equipment; 30g's half sine, 11ms. 3 axis, 18 total
IEC 60068-2-27; 50g half sine, 11ms, 3 axis, 18 total

EMC   CE Compliant
EN 61326:1997 Class A radiated and conducted emissions with amendments A1-A3
EN 61326:1997 with amendments A1-A3, Immunity
EN 61000-4-2: 1998 Electrostatic Discharge: ±4kV contact, ±8kV air
EN 61000-4-3: 1998 Radiated Immunity: 10V/m
EN 61000-4-4: 1995 Electrical Fast Transients/Burst: ±2kV AC, ±1kV I/O > 3m
EN 61000-4-5: 1995 Surges: ±1kV differential mode, ±2kV common mode, ±1kV line to ground I/O > 30m
EN 61000-4-6: 1996 Conducted Immunity: 3V
EN 61000-4-11: 1994 Supply Dips and VAriations: 100%, 0.5 cycles each polarity

RoHS   RoHS compliant per European Directive 2002/95/EC

Support Documents On Website Include: TACHLINK, Manual, Tach Training Video

Tach Package Contents: **TACHPAK 10 & 30** and **TACHTROL 10 & 30** are shipped in a single carton containing one instrument, **TACHLINK**, a manual on CD ROM, and a USB cable. **TACHTROL plus** is shipped in a single carton containing one instrument and a display cable with RJ-11 terminations. **TACHTROL 10 & 30** and **TACHTROL plus Explosion Proof and NEMA 4X** are shipped in a single carton containing one instrument and accessories as described above, one infrared remote and one DIN rail mounting kit. **TACHPAK 10 & 30 Explosion Proof and NEMA 4X** are shipped in a single carton containing one rated enclosure and one instrument and accessories as described above.

It is the customer's responsibility to determine whether the product is proper for customer's use and application.

The information contained herein is subject to change without notice. Refer to the factory for verification of any details.

Specifications (Continued):

Electrical
All measurements taken at 25°C unless otherwise specified.

Input Power

Power consumption
3.5 watts, typical for tachometer only
Add 0.5 watts per remote display
Add 2.0 watts for 12V out
9.5 watts max.

DC Voltage
12-30 volts. Reverse polarity protected. Available on terminal blocks and din rail in parallel (TACHPAK only).

AC Voltage
80-264 Vac 50-60 Hz

Power Sharing
If DC input and AC input are both supplied, DC will be loaded above approximately 15 volts. Below 15Vdc input, AC will be loaded.

Output Power
Regulated to 12 volts @ 150mA when input voltage is 13.6 volts and above. Below 13.6 volts, output voltage ≈ input voltage –1.5V.

Input Signal Characteristics

Channel A & B

Frequency
Upper Limit: 50 kHz absolute maximum
          (20µsec period); 40kHz typical
Lower Limit: 0.005 Hz absolute minimum
          (200 sec. period); .05 Hz typical
Minimum Pulse Width: 0.5 µsec.
Wave shape: Square or Sinusoidal

Input Impedance
12 kΩ typical

Input Sensitivity
Upper and Lower Limit: +/-30 volts max. (AC or DC). Logic 0 and Logic 1 thresholds are user adjustable from 200mV to +28 volts in approx. 20mV steps +/-3%. 200mV peak absolute min. imput sensitivity.

Common Mode Rejection Ratio
>40 db @1kHz typical

Electrical Isolation
Channel A, B and Direction share common ground
Channel A, B or Direction to output: 500 Vrms
Channel A, B or Direction to ground: 500 Vrms

Verify and Reset

Frequency
Essentially DC, Minimum Pulse Width: 250 µsec.

Input Impedance
10mA current regulated

Input Sensitivity
3.5 volts min. pulse to ground

Common Mode Rejection Ratio
>40 db @ DC typical

Electrical Isolation
Signal to signal 500 Vrms
Signal to ground 500 Vrms

Direction

Frequency
Essentially DC
Minimum Pulse Width: 0.5 µsec.

Input Impedance
12 kΩ typical

Input Sensitivity
Upper and Lower Limit: +/-30 volts max. (AC or DC). Logic 0 and Logic 1 thresholds are user adjustable from 0 to 28 volts in approx. 20mV steps +/-3%.

Common Mode Rejection Ratio
>40 db @1kHz typical

Electrical Isolation
Channel A, B and Direction share common ground
Direction to output: 500 Vrms
Direction to ground: 500 Vrms

Output Characteristics

Relays (Mechanical)

Physical
Form C

Contact Rating
10A @125/250 Vac, 6A @ 277 Vac, 5A @ 30Vdc, 0.5A @ 100Vdc
2500 VA

Response Time (operate and release)
Input to output 16.5 msec max.
(10 msec relay only)

Electrical Isolation
1500 Vrms, 1 minute coil to contacts

Switchpoint Accuracy
Internal instrument accuracy to alarm setpoint: ±.005%

Relays (Solid State)

Physical
Form A

Contact Rating
400mA @ 60V (AC or DC)
On resistance: 2Ω max

Response Time (operate and release)
Operate: 2 ms max, 0.8 ms typical
Release: 0.5 ms max, 0.1 ms typical

Electrical Isolation
500 Vrms, 1 minute

Switchpoint Accuracy
Internal instrument accuracy to alarm
setpoint: ±.005%

Analog Output

Ranges
0 to 20mA, 4 to 20mA, -20 to 0 to +20mA;
user selectable

Accuracy
Internal instrument accuracy: ±.005%; plus ±.05% of
full scale range at room temp with 400 ohm load;
±0.1% over temp range and load range. Unit is factory
calibrated. Can be re-calibrated using TACHLINK.

Resolution
Step size: 610 nanoamps per lsb. 16 bit D/A

Linearity
±0.02% typical

Loop Impedance
100-1000 Ω

Response Time
Input to output 6.55 msec+ 1 msec settle at 1kΩ (worst
case) to .1% of final value

Electrical Isolation
500 Vrms continuous

Display (applies to TT & TTplus)

Resolution
Black and White graphics display. 64x128 Pixels.

Accuracy
±.05% of full scale

Communication Protocol
RS485: 19.2kbaud, 8-n-1 protocol, Half duplex,
Tachometer is bus master

Network
- Multiplex up to seven displays plus one integrated display. Displays are addressable.

- With all seven displays at the end of one RJ11 6-4 cable, max length would be 125 ft (38m), limited by voltage drop in cable. Cable must be 1:1 type (not flipped), described as RJ11 6-4 reversed cable. For longer distances the RJ type cable should not be used. With #18 wire max run to a single display is 1000 ft (305m).

- Response time: 1 second update to all displays, PC and RS485

Electrical Isolation
500Vrms to ground continuous

Utility RS485
Full access to TACHLINK, single drop only

Communication Protocol
RS485: 19.2kbaud, 8-n-1 protocol, Half duplex,
Tachometer is bus master

Maximum Transmission Distance
8000 ft (2400m)

Electrical Isolation
500Vrms to ground continuous

USB
Full access to TACHLINK,
Version 1.1 / 2.0 compatible

Processing Platform
PIC18F series micro controller

Clock Speed
10MHz, ±50 ppm at room temp

Acquisition Time
Basic instrument acquisition time / period 6.55 ms

Accuracy
Basic instrument accuracy ±.005% (50 ppm)

Resolution
Basic instrument resolution: ±.025% or better

TACHLINK

- TACHLINK is a Windows-based program developed to simplify programming, communication and monitoring with the new generation of AI-TEK tachometers via USB2.0 or RS485.

- Programming is much faster and simpler with **TACHLINK.**

- Tachometer configuration databases can be stored, backed up and retrieved easily. A stored database can be used to program multiple tachometers and can be e-mailed to remote locations.

- The **TACHLINK** graphical user interface allows any PC to be used as a remote display.

- Analong output calibration is available only through **TACHLINK** and allows the customer to perform and verify calibration status.

- Plotting function is available only through **TACHLINK** and allows the customer to monitor a process over time while montioring speed and relay status. Output is available to be viewed real-time or can be captured and imported into a spreadsheet format for future analysis.

AI-Tek Instruments, Cheshire, CT USA

TACHTROL® 10 & 30
Dual Input
Digital Tachometer
Part Number Series
T77610 &T77630

CE
RoHS

TACHTROL 30 Key Features (T77630):

- Wide range of **AC or DC** power (12-30 Vdc, 80-264Vac 50-60Hz)
- Greatly improved instrument accuracy, processing speed and response time.
- Frequency, period or counter modes.
- User-defined inputs for logic level, averaging, alarm set points and hysteresis,
- Signal normalization and math functions allow mathematical manipulation of input signals. Results can be displayed along with user-defined units.
- Accepts sinusoidal and square wave inputs as found in variable reluctance and digital output speed sensors.
- Accepts bi-directional sensor inputs and will decode quadrature or direction signal logic
- 2 solid state relays (fast response time) and 2 mechanical relays (high power)
- Analog output: 0-20mA, 4-20mA, -20-0-(+) 20mA (can be used with bi-directional sensor)
- Two programming methods: Front panel on display or USB2.0 connectivity to PC / Windows-based **TACHLINK**.
- Utility **RS485** communication allows full **TACHLINK** function over longer distances (up to 8000 ft)
- Drives up to 7 remote displays (**TACHTROL plus**). A single display can be up to 1000 ft away with a simple **RJ11** (phone jack) connection. Longer runs, cable type and number of displays will affect distance.
- Security mode protects unauthorized access for programming or alarm resets (through display or **TACHLINK**)
- Environmentally hardened for temperature, vibration and shock. **EMC / CE** compliant to current BS / EN directives.
- Has integrated display and will mount in same panel opening as **TACHTROL 3**
- Display capabilities include two independent output channels for speed, count period or equation results, Alarm status / security, Mode, User defined units for each channel, 128x64 LCD graphics display with backlight.
- Designed and manufactured compliant with RoHS.

TACHTROL 10 Key Features (T77610):

- Same as **TACHTROL 30** but excludes solid state relays, analog output and utility **RS485**

It is the customer's responsibility to determine whether the product is proper for customer's use and application.

Programming Features

Programming has been greatly simplified and can be accomplished by 2 different methods. Many configurable attributes have been added to improve flexibility and function.
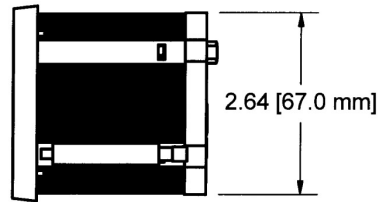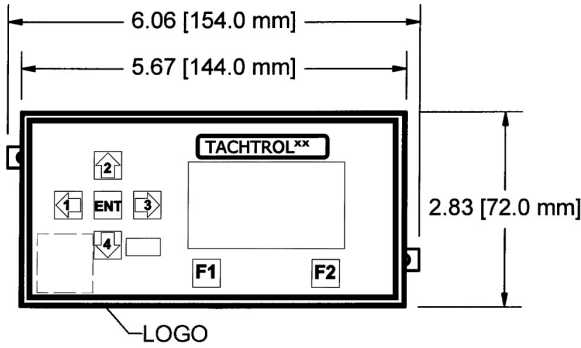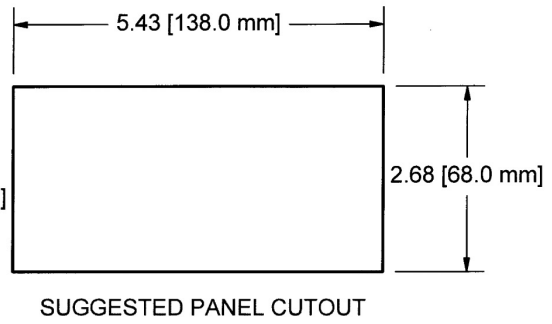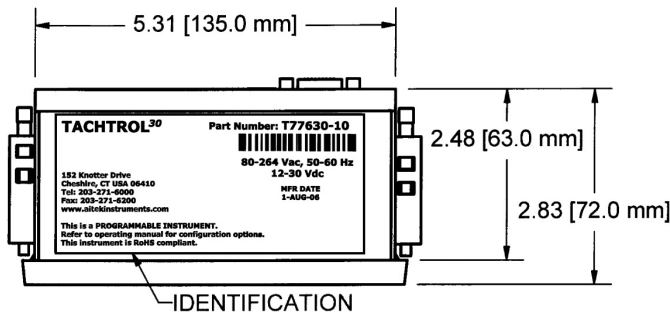
- Display front panel: **TACHTROL 10 and 30** can be programmed through the integrated display/membrane panel. Programming is accomplished by navigating through a series of nested menus. In the case of tachometer instruments embedded in explosion proof or NEMA 4X enclosures, remote access solves the problem of programming by making use of an IR link to allow full front panel control via a hand-held remote.

- PC / Windows-based **TACHLINK**: Custom software allows the user to program all configurable attributes of **TACHTROL by PC** via a **USB2.0** or **RS485** connection. In addition, the **PC** can be used to display data, perform security functions, diagnostics, analog output calibration and real-time data logging; all available through the **TACHLINK**.
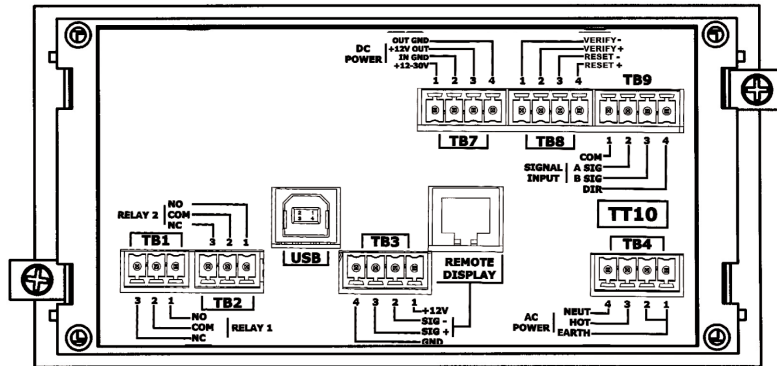
Applications:

- Fast response overspeed shutdown
- 2 Channel Speed/Draw Monior
- Bi-directional Tachometer
- Reverse Rotation Alarm
- Low Speed Tachometer
- Clutch Slip Alarm
- Winder Control
- Ahead/Astern Marine Tachometer
- Expanded analog Scale Speed Transmitter

- Flow Rate Monitor
- Process Time Monitor
- Time per Event Monitor
- Autoranging Tachometer
- Computer Signal Conditioner
- Averaging Tachometer
- Line Frequency Monitor 60.00 Hz/400.0 Hz
- RS485 Speed Transmitter

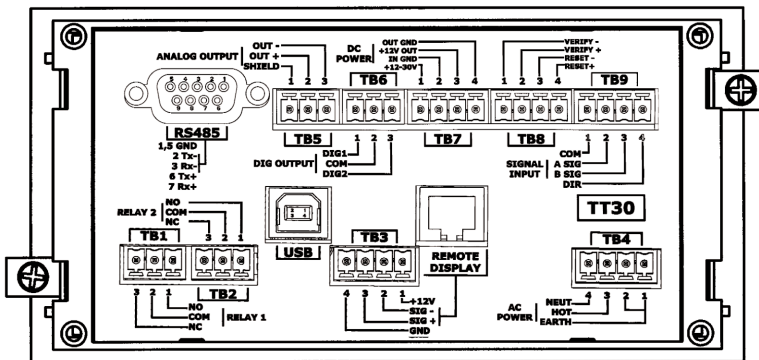| Ordering P/N	Input Power	Enclosure	Net Weight (lbs.)
T77610-10	80-264 Vac/12-30 Vdc	Std. Panel Mount	0.8
T77610-40	80-264 Vac/12-30 Vdc	NEMA 4X	3.9
T77610-70	80-264 Vac/12-30 Vdc	Explosion Proof	42.0
T77630-10	80-264 Vac/12-30 Vdc	Std. Panel Mount	0.9
T77630-40	80-264 Vac/12-30 Vdc	NEMA-4X	4.0
T77630-70	80-264 Vac/12-30 Vdc	Explosion Proof	42.0

PANEL MOUNT, STANDARD ENCLOSURE

5.31 [135.0 mm]
2.48 [63.0 mm]
2.83 [72.0 mm]

TACHTROL³⁰ Part Number: T77630-10

80-264 Vac, 50-60 Hz
12-30 Vdc

152 Knotter Drive
Cheshire, CT USA 06410
Tel: 203-271-6000
Fax: 203-271-6200
www.aitekinstruments.com

MFR DATE
1-AUG-06

This is a PROGRAMMABLE INSTRUMENT.
Refer to operating manual for configuration options.
This instrument is RoHS compliant.

IDENTIFICATION

5.43 [138.0 mm]
2.68 [68.0 mm]

SUGGESTED PANEL CUTOUT

6.06 [154.0 mm]
5.67 [144.0 mm]
2.83 [72.0 mm]

TACHTROL ˣˣ

ENT   F1   F2

LOGO

2.64 [67.0 mm]

REAR VIEW TACHTROL 10

DC POWER
OUT GND
+12V OUT
IN GND
+12-30V

VERIFY -
VERIFY +
RESET +
RESET +

TB9
TB7   TB8

SIGNAL INPUT
COM
A SIG
B SIG
DIR

RELAY 2
NO
COM
NC

TB1   TB2

USB   TB3   REMOTE DISPLAY

TT10

TB4

NO
COM
NC   RELAY 1

+12V
SIG -
SIG +
GND

AC POWER
NEUT-
HOT-
EARTH

REAR VIEW TACHTROL 30

ANALOG OUTPUT
OUT -
OUT +
SHIELD

DC POWER
OUT GND
+12V OUT
+12-30V

VERIFY -
VERIFY +
RESET -
RESET +

TB6   TB9
TB5   TB7   TB8

RS485
1,5 GND
2 Tx-
3 Rx-
6 Tx+
7 Rx+

DIG OUTPUT
DIG1
COM
DIG2

SIGNAL INPUT
COM
A SIG
B SIG
DIR

RELAY 2
NO
COM
NC

TB1   TB2

USB   TB3   REMOTE DISPLAY

TT30

TB4

NO
COM
NC   RELAY 1

+12V
SIG -
SIG +
GND

AC POWER
NEUT-
HOT-
EARTH

Table 2: Connection Information			
Terminal Block	**Pin #**	**TACHTROL 30**	**TACHTROL 10**
Remote Display		Use RJ11 type connector. See TB3 for individual breakout of pins.	
USB		Use USB "B" type connector. No individual breakout of pins.	
RS485 DB9	1,5	GND	Not Available
	2	Tx -	
	3	Rx -	
	6	Tx +	
	7	Rx +	
	4,8,9	Not Used	

Table 3: Connection Information			
Terminal Block	**Pin #**	**TACHTROL 30**	**TACHTROL 10**
TB1	1	Relay 1 N.O.	Relay 1 N.O.
	2	Relay 1 Com	Relay 1 Com
	3	Relay 1 N.C.	Relay 1 N.C.
TB2	1	Relay 2 N.O.	Relay 2 N.O.
	2	Relay 2 Com	Relay 2 Com
	3	Relay 2 N.C.	Relay 2 N.C.
TB3 Remote Display	1	+12vdc Out	+12vdc Out
	2	Sig -	Sig -
	3	Sig +	Sig +
	4	Gnd	Gnd
TB4	1	AC/Earth Gnd	AC/Earth Gnd
	2	AC/Earth Gnd	AC/Earth Gnd
	3	AC Hot	AC Hot
	4	AC Neutral	AC Neutral
TB5	1	Analog Shield	Not Available
	2	Analog Out +	
	3	Analog Out -	
TB6	1	Digital 1	Not Available
	2	Dig Com	
	3	Digital 2	
TB7	1	12-30 Volt In	12-30 Volt In
	2	In GND	In GND
	3	+12 Vdc Out	+12 Vdc Out
	4	Out GND	Out GND
TB8	1	Verify -	Verify -
	2	Verify +	Verify +
	3	Reset -	Reset -
	4	Reset +	Reset +
TB9	1	Input Com	Input Com
	2	A Sig	A Sig
	3	B Sig	B Sig
	4	Direction Input	Direction Input

TACHTROL Enclosure Options

T77610-40
T77630-40

10.94 [278.0 mm]

10.00 [254.0 mm]

IDENTIFICATION

7.40 [188.0 mm]

6.46 [164.0 mm]

4X Ø.28 [7.1 mm]
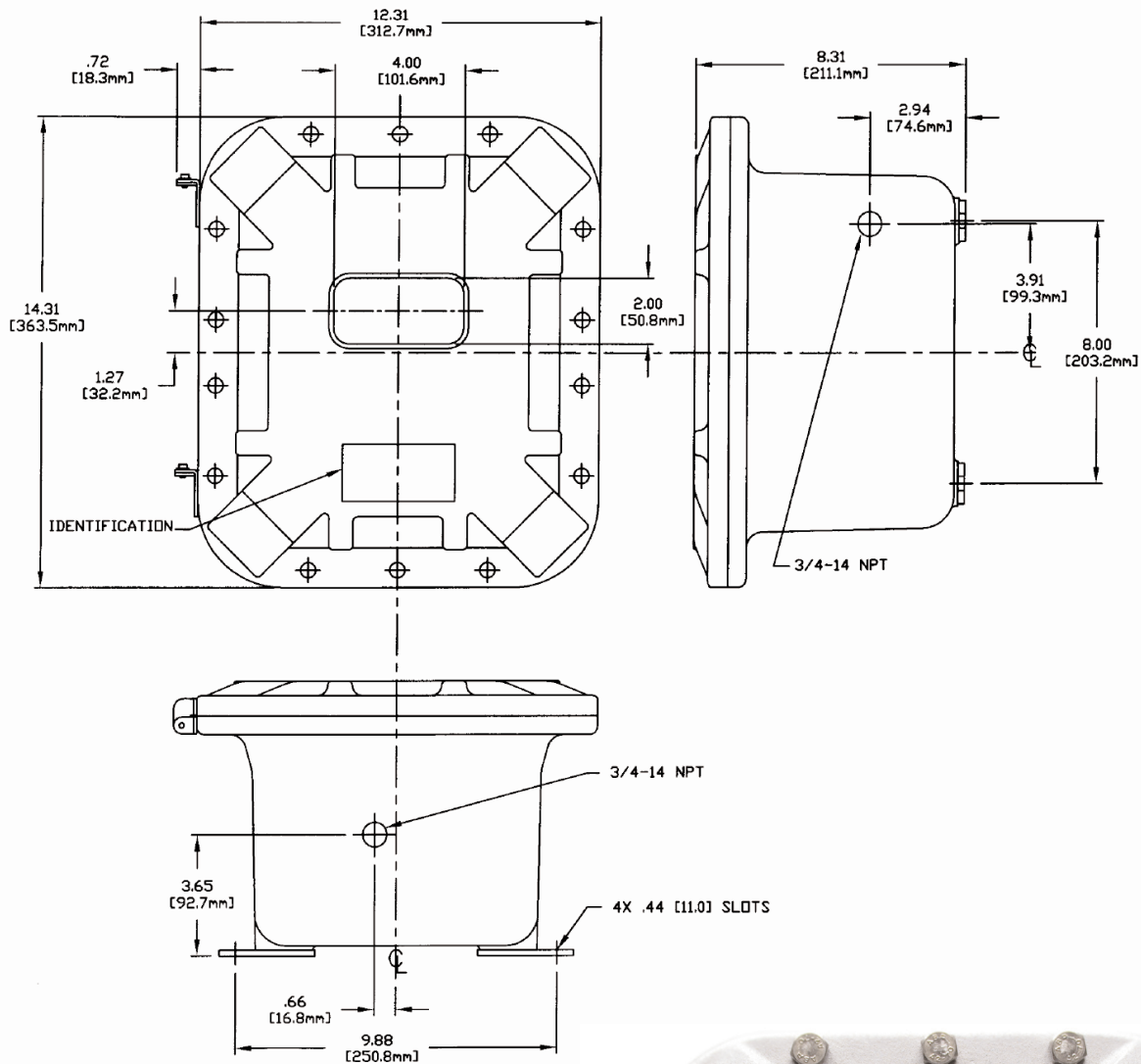ENCLOSURE MTG HOLES

7.09 [180.0 mm]

COVER OPENS 180°
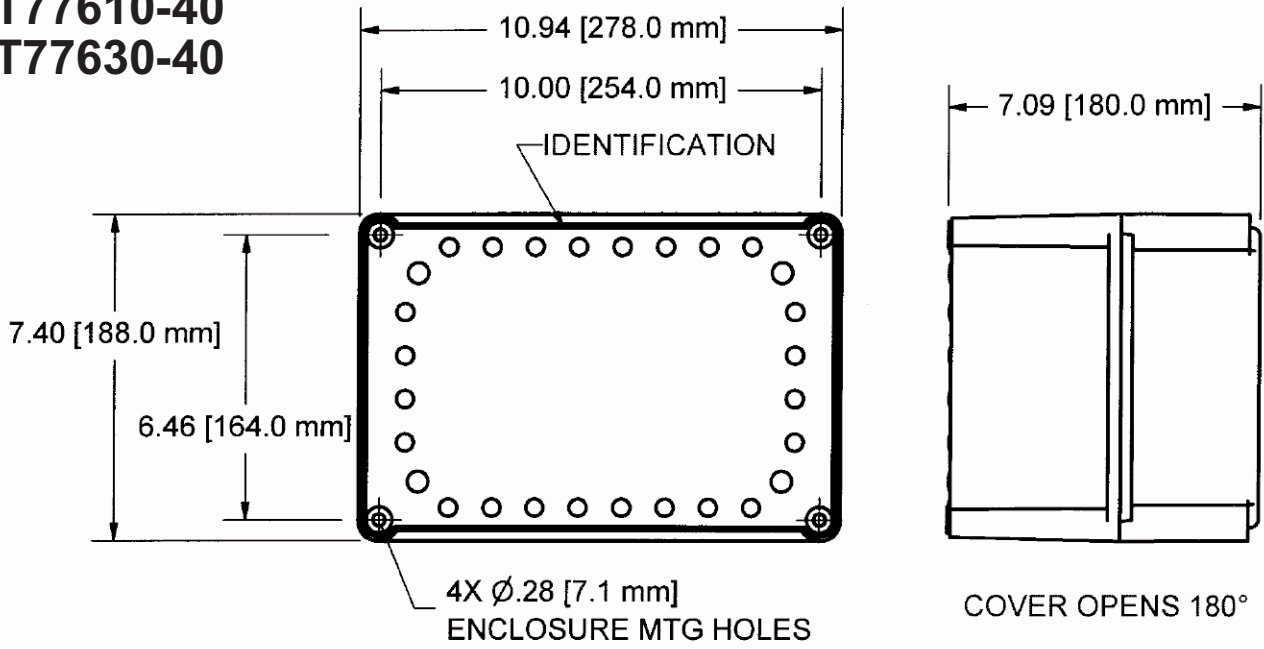
NEMA 4X

TACHTROL Enclosure Options

T77610-70 / T77630-70

EXPLOSION PROOF

UL/CSA for Hazardous Locations
Class I, Groups B, C & D
Class II, Groups E, F & G
Class III
Also Class I, Zone 1, Groups IIB + H$_2$, IIA

ATEX
0102 EX II 2 G
For use in Zone 1 Groups
IIA, IIB & IIB+H2 T6 or T5,
IP66 hazardous locations

Certifications Inside Enclosure
(Consult Factory for Latest Update)