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.

T77510

T77530

TACHPAK® 10 & 30
Digital Process Tachometer

Part Number Series
T77510 & T77530

CE
RoHS

TACHPAK 30 Key Features (T77530):

- 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 8 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**)
- Mounts to DIN rail. Power can be applied through special DIN bus when used with **AI-TEK** power supply.
- Environmentally hardened for temperature, vibration and shock. EMC / CE compliant to current BS/ EN directives.
- Designed and manufactured compliant with RoHS.

TACHPAK 10 Key Features (T77510):

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

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.

- **TACHPAK** 10 and 30 can be programmed with the addition of a **TACHTROL plus** remote display. Programming is accomplished by navigating through a series of nested menus. In the

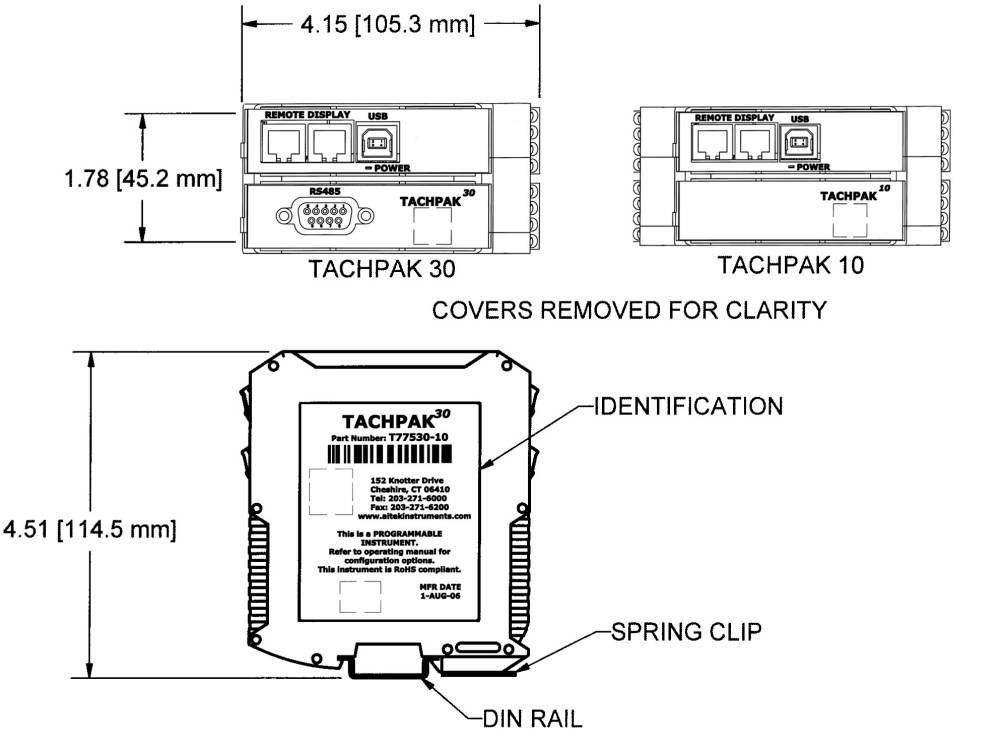
Programming Features (continued):

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.

- **TACHLINK®:** PC / Windows-based custom software allows the user to program all configurable attributes of **TACHPAK** 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
- Petrochemical production applications
- Pump or generator alarm
- Low speed switching
- Start-up, over/under speed switching
- Textile production applications
- Machine control
- Paper & pulp production
- Turbine speed control
- Food processing
- Conveyor alarms
- Printing industry
- Metal production
- Mining applications
- Test labs
- Generator set
- Broken or slipping belt drives



Ordering P/N	Input Power	Enclosure	Net Weight (lbs.)
T77510-10	80-264 Vac/12-30 Vdc	Standard	0.6
T77510-40	80-264 Vac/12-30 Vdc	NEMA 4X	3.4
T77510-70	80-264 Vac/12-30 Vdc	Explosion Proof	24.0
T77530-10	80-264 Vac/12-30 Vdc	Standard	0.7
T77530-40	80-264 Vac/12-30 Vdc	NEMA-4X	3.5
T77530-70	80-264 Vac/12-30 Vdc	Explosion Proof	24.0

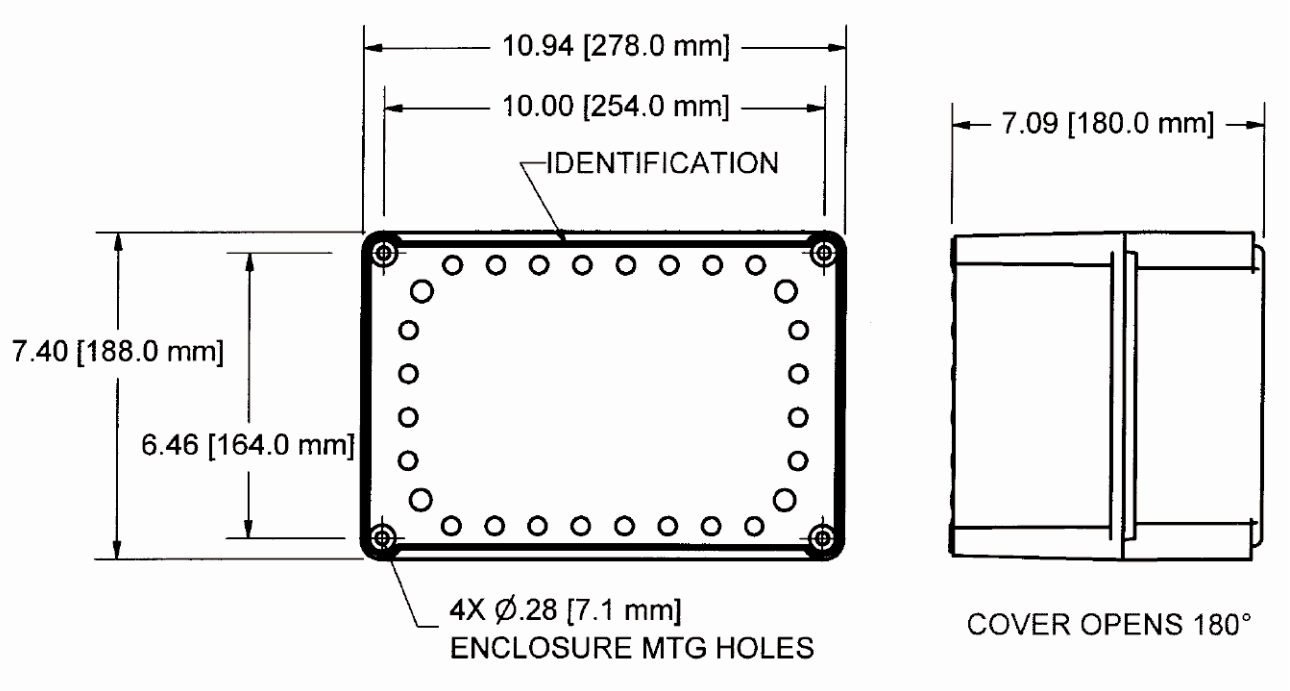
Table 2: Connection Information			
Terminal Block	**Pin #**	**TACHPAK 30**	**TACHPAK 10**
Remote Display	Use RJ11 type connector. No individual breakout of pins.		
USB	Use USB “B” type connector. No individual breakout of pins.		
RS485 DB9	1,5	GND	Not Available
	2	Tx -	
	3	Rx -	
	6	Tx +	
	7	Rx +	
	4,8,9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

Table 3: Connection Information			
Terminal Block	**Pin #**	**TACHPAK 30**	**TACHPAK 10**
TB1	1	Input Com	Input Com
	2	A Sig	A Sig
	3	B Sig	B Sig
	4	Direction Input	Direction Input
TB2	5	Verify -	Verify -
	6	Verify +	Verify +
	7	Reset -	Reset -
	8	Reset +	Reset +
TB4	9	Analog Out +	Not Available
	10	Analog Shield	
	11	Analog Out -	
	12	Not Used	
TB3	13	In GND	In GND
	14	12-30 Volt In	12-30 Volt In
	15	+12 Vdc Out	+12 Vdc Out
	16	Out GND	Out GND
TB5	17	Relay 1 Com	Relay 1 Com
	18	Relay 1 N.C.	Relay 1 N.C.
	19	Relay 1 N.O.	Relay 1 N.O.
	20	Not Used	Not Used
TB6	21	Relay 2 Com	Relay 2 Com
	22	Relay 2 N.C.	Relay 2 N.C.
	23	Relay 2 N.O.	Relay 2 N.O.
	24	Not Used	Not Used
TB8	25	AC/Earth Gnd	AC/Earth Gnd
	26	Not Used	Not Used
	27	AC Hot	AC Hot
	28	AC Neutral	AC Neutral
TB7	29	Digital 1 (no polarity)	Not Available
	30	Digital 1 (no polarity)	
	31	Digital 2 (no polarity)	
	32	Digital 2 (no polarity)	

Connection to 12-30 Volt In is also available on the bottom of **TACHPAK 10 & 30**. A special DIN rail power bus adapter is available as an accessory and works with the accessory power supply.

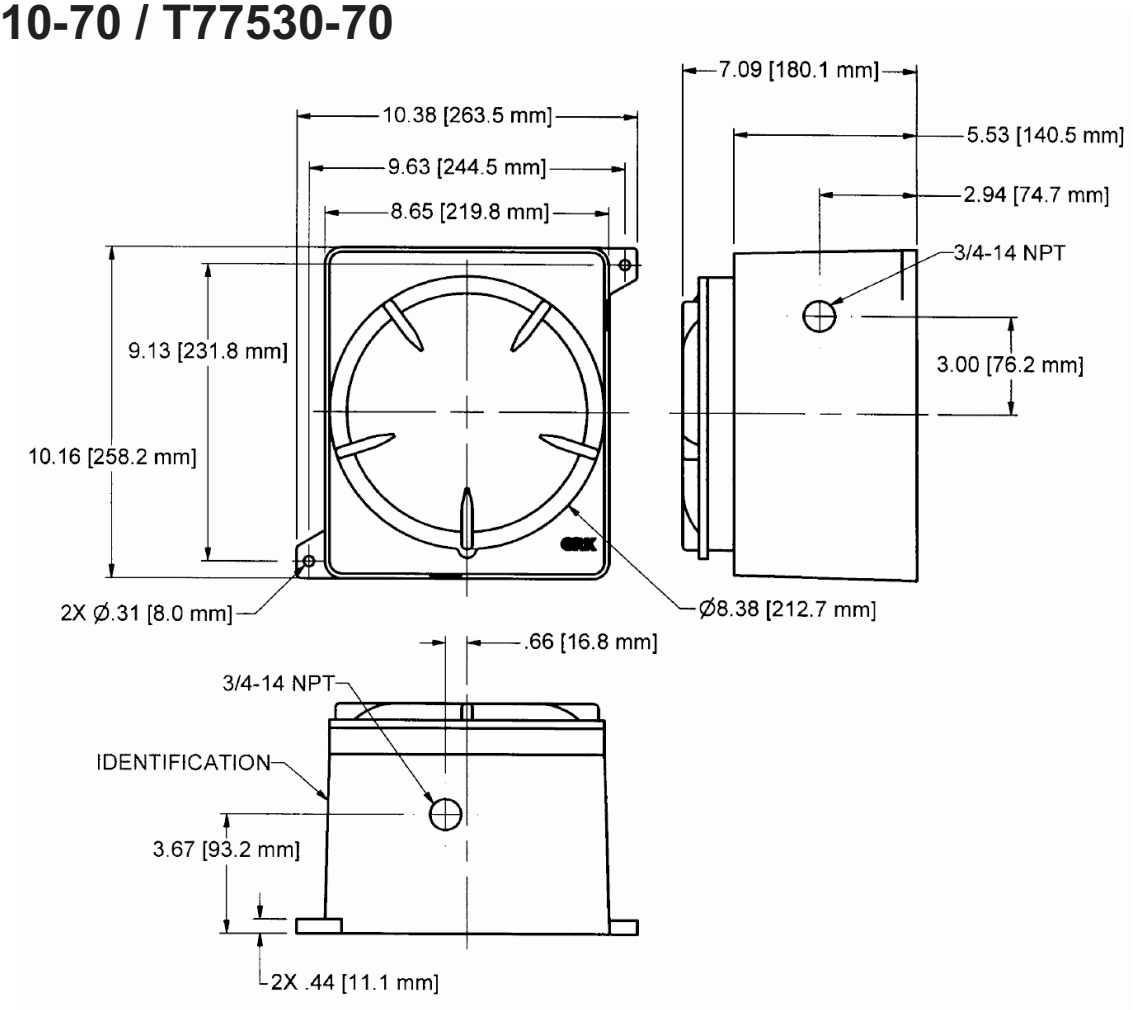
TACHPAK Enclosure Options

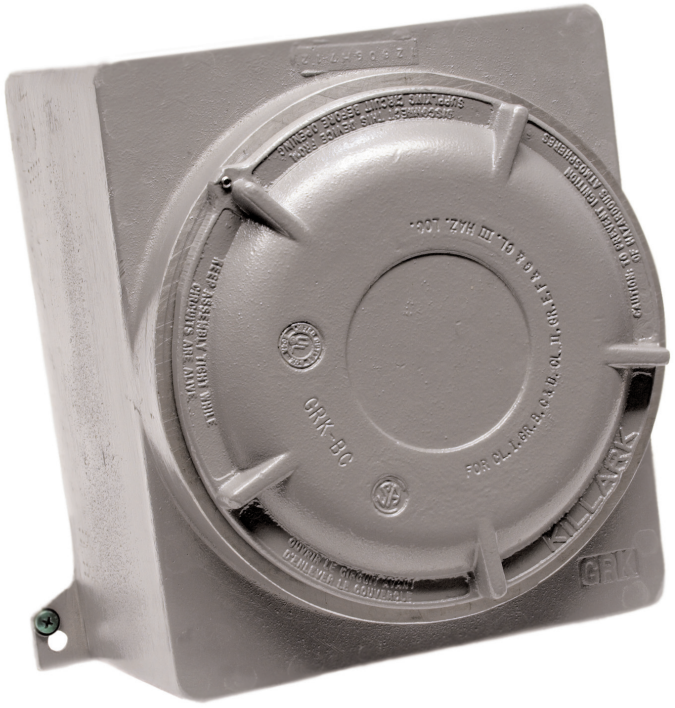
T77510-40 / T77530-40



TACHPAK Enclosure Options

T77510-70 / T77530-70





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 EEx d IIC
For use in Zone 1,
Group IIC, Category 2 G,
IP66 hazardous locations

Certifications Inside Enclosure
(Consult Factory for Latest Update)