



**MODEL
3741
HORSEPOWER METER**

INSTRUCTION MANUAL



3700
Instrument Series

WARNING

Death, serious injury, or fire hazard could result from improper connection of this instrument. Read and understand this manual before connecting this instrument. Follow all installation and operating instructions while using this instrument.

Connection of this instrument must be performed in compliance with the National Electrical Code (ANSI/NFPA 70-2014) of USA and any additional safety requirements applicable to your installation.

Installation, operation, and maintenance of this instrument must be performed by qualified personnel only. The National Electrical Code defines a qualified person as "one who has demonstrated the skills and knowledge related to the construction and operation of the electrical equipment and installations, and who has received safety training on the hazards involved."

Qualified personnel who work on or near exposed energized electrical conductors must follow applicable safety related work practices and procedures including appropriate personal protective equipment in compliance with the Standard for Electrical Safety Requirements for Employee Workplaces (ANSI/NFPA 70E-2012) of USA and any additional workplace safety requirements applicable to your installation.

ADVERTENCIA

Una conexión incorrecta de este instrumento puede producir la muerte, lesiones graves y riesgo de incendio. Lea y entienda este manual antes de conectar. Observe todas las instrucciones de instalación y operación durante el uso de este instrumento.

La conexión de este instrumento a un sistema eléctrico se debe realizar en conformidad con el Código Eléctrico Nacional (ANSI/NFPA 70-2014) de los E.E.U.U., además de cualquier otra norma de seguridad correspondiente a su establecimiento.

La instalación, operación y mantenimiento de este instrumento debe ser realizada por personal calificado solamente. El Código Eléctrico Nacional define a una persona calificada como "una que esté familiarizada con la construcción y operación del equipo y con los riesgos involucrados."

El personal cualificado que trabaja encendido o cerca a los conductores eléctricos energizados expuestos debe seguir prácticas y procedimientos relacionados seguridad aplicable del trabajo incluyendo el equipo protector personal apropiado en conformidad con el estándar para los requisitos de seguridad eléctricos para los lugares de trabajo del empleado (ANSI/NFPA 70E-2012) de los E.E.U.U. y cualquier requisito de seguridad adicional del lugar de trabajo aplicable a su instalación.

AVERTISSEMENT

Si l'instrument est mal connecté, la mort, des blessures graves, ou un danger d'incendie peuvent s'en suivre. Lisez attentivement ce manuel avant de connecter l'instrument. Lorsque vous utilisez l'instrument, suivez toutes les instructions d'installation et de service.

Cet instrument doit être connecté conformément au National Electrical Code (ANSI/NFPA 70-2014) des Etats-Unis et à toutes les exigences de sécurité applicables à votre installation.

Cet instrument doit être installé, utilisé et entretenu uniquement par un personnel qualifié. Selon le National Electrical Code, une personne est qualifiée si "elle connaît bien la construction et l'utilisation de l'équipement, ainsi que les dangers que cela implique".

Le personnel qualifié qui travaillent dessus ou s'approchent des conducteurs électriques activés exposés doit suivre des pratiques en matière et des procédures reliées par sûreté applicable de travail comprenant le matériel de protection personnel approprié conformément à la norme pour des conditions de sûreté électriques pour les lieux de travail des employés (ANSI/NFPA 70E-2012) des Etats-Unis et toutes les conditions de sûreté additionnelles de lieu de travail applicables à votre installation.

WARNUNG

Der falsche Anschluß dieses Gerätes kann Tod, schwere Verletzungen oder Feuer verursachen. Bevor Sie dieses Instrument anschließen, müssen Sie die Anleitung lesen und verstanden haben. Bei der Verwendung dieses Instruments müssen alle Installation- und Betriebsanweisungen beachtet werden.

Der Anschluß dieses Instruments muß in Übereinstimmung mit den nationalen Bestimmungen für Elektrizität (ANSI/NFPA 70- 2014) der Vereinigten Staaten, sowie allen weiteren, in Ihrem Fall anwendbaren Sicherheitsbestimmungen, vorgenommen werden.

Installation, Betrieb und Wartung dieses Instruments dürfen nur von Fachpersonal durchgeführt werden. In dem nationalen Bestimmungen für Elektrizität wird ein Fachmann als eine Person bezeichnet, welche "mit der Bauweise und dem Betrieb des Gerätes sowie den dazugehörigen Gefahren vertraut ist."

Qualifiziertes Personal, das an bearbeiten oder herausgestellte angezogene elektrische Leiter sich nähern, muß anwendbare Sicherheit bezogener Arbeit Praxis und Verfahren einschließlich passende persönliche schützende Ausrüstung gemäß dem Standard für elektrische Sicherheitsauflagen für Angestellt-Arbeitsplätze (ANSI/NFPA 70E-2012) der Vereinigten Staaten und alle zusätzlichen Arbeitsplatzsicherheitsauflagen folgen, die auf Ihre Installation anwendbar sind.

Safety Precautions

The following safety precautions must be followed whenever any type of voltage or current connection is being made to the instrument.

- Before connecting to electric circuits or pulse initiating equipment, open their related breakers or disconnects. It is recommended NOT TO install any connection of the instrument on live power lines. Only Qualified Service personnel that have demonstrated the abilities and received the proper safety training are capable of connecting to live circuits.
- Connections must be made to the instrument first, then connect to the circuit to be monitored.
- Wear proper personal protective equipment, including safety glasses and insulated gloves when making connections to power circuits.
- Hands, shoes and floor must be dry when making any connection to a power line.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.
- If the equipment is used in a manner not specified in this user's guide, the protection provided by the equipment may be impaired.

Medidas de seguridad

Las medidas de seguridad siguientes deberán observarse cuando se realice cualquier tipo de conexión al instrumento.

- o Cuando se haga conexiones a circuitos eléctricos o a equipo de activación por pulso, deberá abrirse sus respectivas cajas de seguridad. NO deberá hacerse ninguna conexión del instrumento en líneas eléctricas bajo tensión.
- o Las conexiones deberán hacerse primero al instrumento y, luego, al circuito a ser monitorizado.
- o Al hacer conexiones a circuitos eléctricos, deberá utilizar anteojos y guantes protectores.
- o Sus manos, zapatos y el piso deberán estar secos en todo momento en que se haga una conexión a un cable eléctrico.
- o Verifique que la unidad esté DESACTIVADA antes de conectar sondas en el panel posterior.
- o Previo a cada uso, deberá verificarse que los cables no estén rotos y que el material aislante no tenga rajaduras. Reemplace de inmediato cualquier parte defectuosa.

Mesures de Sécurité

Les mesures de sécurité suivantes doivent être prises chaque fois qu'un type de connexion quelconque est effectué sur l'instrument.

- o Ouvrir les disjoncteurs correspondants lors d'une connexion à des circuits électriques ou à des équipement de génération d'impulsions. NE PAS effectuer de connexion d'instrument sur des lignes électriques sous tension.
- o Une fois toutes les connexions de l'instrument effectuées, connecter au circuit à contrôler.
- o Porter des lunettes de protection et des gants isolants pour effectuer des connexions aux circuits électriques.
- o S'assurer que les mains, les chaussures et le sol soient secs lors de connexions à une ligne électrique.
- o S'assurer que l'unité est ÉTEINTE avant de connecter les sondes au panneau arrière.
- o Inspecter tous les câbles, avant chaque utilisation, pour s'assurer que les isolants ne sont pas coupés ou fendus. Remplacer immédiatement tous les équipements défectueux.

Sicherheitsvorkehrungen

Die folgenden Sicherheitsvorkehrungen sind immer dann zu befolgen, wenn eine Verbindung zum Instrument hergestellt wird.

- o Öffnen Sie beim Anschluß an elektrische Stromkreise oder Impulsauslösungseinrichtungen die entsprechenden Unterbrecher. Es dürfen KEINE Anschlüsse an das Instrument unter stromführenden Spannungsleitungen montiert werden.
- o Die Verbindungen müssen zuerst am Instrument und danach an der zu überwachenden Schaltung hergestellt werden.
- o Tragen Sie Schutzbrillen und Isolierhandschuhe, wenn Sie Anschlüsse an den Stromkreisen vornehmen.
- o Hände, Schuhe und Fußboden müssen trocken sein, wenn Sie Anschlüsse an den Stromkreisen durchführen.
- o Stellen Sie sicher, daß das Gerät AUSgeschaltet ist, bevor Sie an der rückwärtigen Konsole Meßfühler anschließen.
- o Prüfen Sie vor jedem Gebrauch alle Kabel auf Bruchstellen und Risse in der Isolierung. Wechseln Sie schadhafte Kabel sofort aus.

Standard Accessories

Standard accessories

The following table lists the 3700 standard accessories.

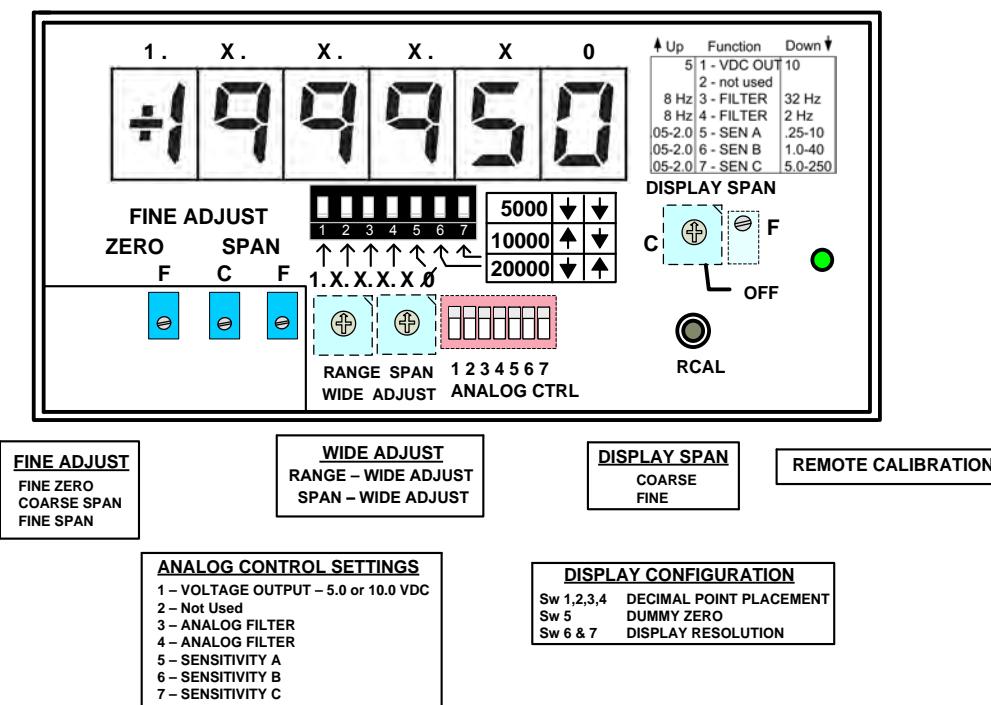
3741 Manual	92381.00
3741 Quick Reference Guide	92380.00
5 Pin connector, analog signals	25657-LF
8 Pin connector, transducer	25658-LF
10 Pin connector, logic	25606.00
*US Power Cord	USSTDCORD (900744)
*European Power Cord	EUROSTDCORD (115369-G1)
*United Kingdom Power Cord	UKSTDCORD (115368-G2)
*Australian Power Cord	AUSTDCORD (901347)
Desk top feet (4ea.)	35058.00
*User specified, one standard only.	

1 GENERAL DESCRIPTION AND SPECIFICATIONS

The Model 3741 is a single-channel panel instrument used to display and produce an analog output that represents Horsepower. The unit receives its inputs from the frequency source which is also connected to the Speed conditioner (typically the 3740 meter) and the amplified analog signal from the Torque conditioner (typically the 3770 or 3778 meter) for the Horsepower measurement. The 3741 unit is based on the 3740 conditioning and specifications. Proper Horsepower calculation and readout are provided using the Wide Range Span controls to maximize the analog output signal and the Display controls for proper engineering readout of the torque / speed equation.

The Model 3741 is calibrated by using the "two-point" process involving known zero & span standards. The first step is to calibrate the speed and the torque conditioners independently and then utilizing the "RCAL" feature - when using the 3740 and 3770/8 meters or using known input standards which in turn will be used to calibrate the 3741 for proper Horsepower engineering units.

FRONT PANEL VIEW OF 3741 CONTROLS (Front Display Cover Removed)



3741 SPECIFICATIONS

Selected Measurement Ranges: Adjustable 250 Hz to 128 kHz; nominal full-scale for RPM input

Input Types: An AC or Unipolar pulse signal, grounded or floating and \pm 5 or 10 Vdc Torque Signal Input

Excitation: \pm 12 VDC @ 50 mA; + 12 V only @ 100mA

Power Supply: Voltage 90 - 250 VAC, 47 -63 Hz; Optional 9-36 VDC (Model 3741DC)

Consumption 10 Watts

Physical Parameters: 5. 68" W x 2. 84" H x 7. 06" D; weight - 3. 25 Lbs.

Analog Output: selectable; \pm 5, \pm 10 VDC, 4 -20 mA or 4 -12 -20 mA (20 % over -range on voltage outputs only)

Operating Temperature: 0 to +55 Degrees C, 5 to 95% relative humidity, non-condensing

Altitude: 2000m (6560 ft) maximum

Installation Category: Installation Category II, Pollution Degree 2

Amplifier:

Normal-Mode Range: 250 Vrms operating; 290 V without instrument damage

Common - Mode Range: \pm 125 V

Input Impedance: Greater than 200 kOhms on all ranges

Offset: vs. Temperature: \pm 30 ppm/ $^{\circ}$ C; vs. Time: \pm 10 ppm/month

Gain Accuracy: \pm 0.02% full scale, typical, limited only by calibration accuracy

Gain Stability: vs. Temperature: \pm 30 ppm/ $^{\circ}$ C; vs. Time: \pm 10 ppm/month

Linearity: better than \pm 0.03% of full scale

Filter: 9-pole modified Butterworth; 3 dB down at 2 Hz, 8 Hz or 32 Hz; selectable

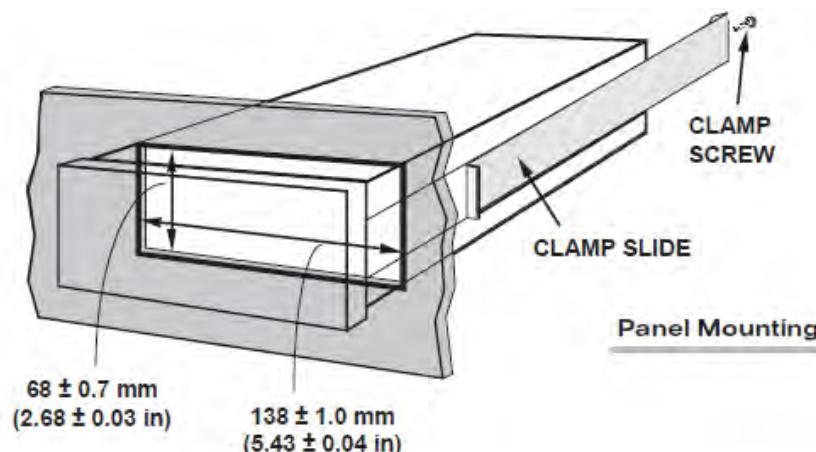
Fast output always enabled, 125Hz response (J3 Pin 3).

Step-Response Settling Times for the 3741 (in milliseconds)

	<u>3db Frequency</u>	<u>To within 1%</u>	<u>within .1%</u>	<u>within .02%</u>
Fast Output	125 Hz	4	8	10
Selectable Output	32 Hz	23	31	35
	8 Hz	93	125	140
	2 Hz	370	500	560

1.a PANEL MOUNTING

You can easily mount the instrument in your own precut panel. Cutout dimensions for a *panel-mounted* unit are standard **DIN**; panel thickness should not exceed 6 mm (0.24 in). Simply unscrew the two rear-panel CLAMP SCREWS and slide the CLAMP SLIDES rearwards out of their grooves (THE FRONT BEZEL NEED NOT BE REMOVED). Insert the unit through the panel cutout, *from the front of the panel* (if the unit has rubber feet, these will have to be removed). Then reinstall the CLAMP SLIDES, and tighten the CLAMP SCREWS until the instrument is securely mounted.



The Model 3741 I/O CONNECTIONS are via removable screw terminals which will accept wire sizes from AWG 12 to 26. **NOTE:** The recommended transducer cabling would be individually shielded, twisted pair or Coax cable - wired as indicated (Fig. 6) Table 1 denotes screw terminal assignments.

Rear Panel Connection

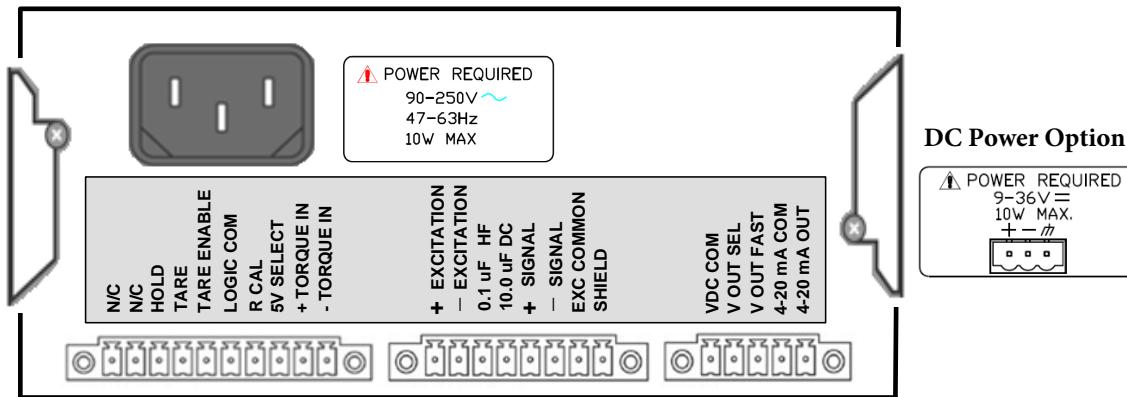
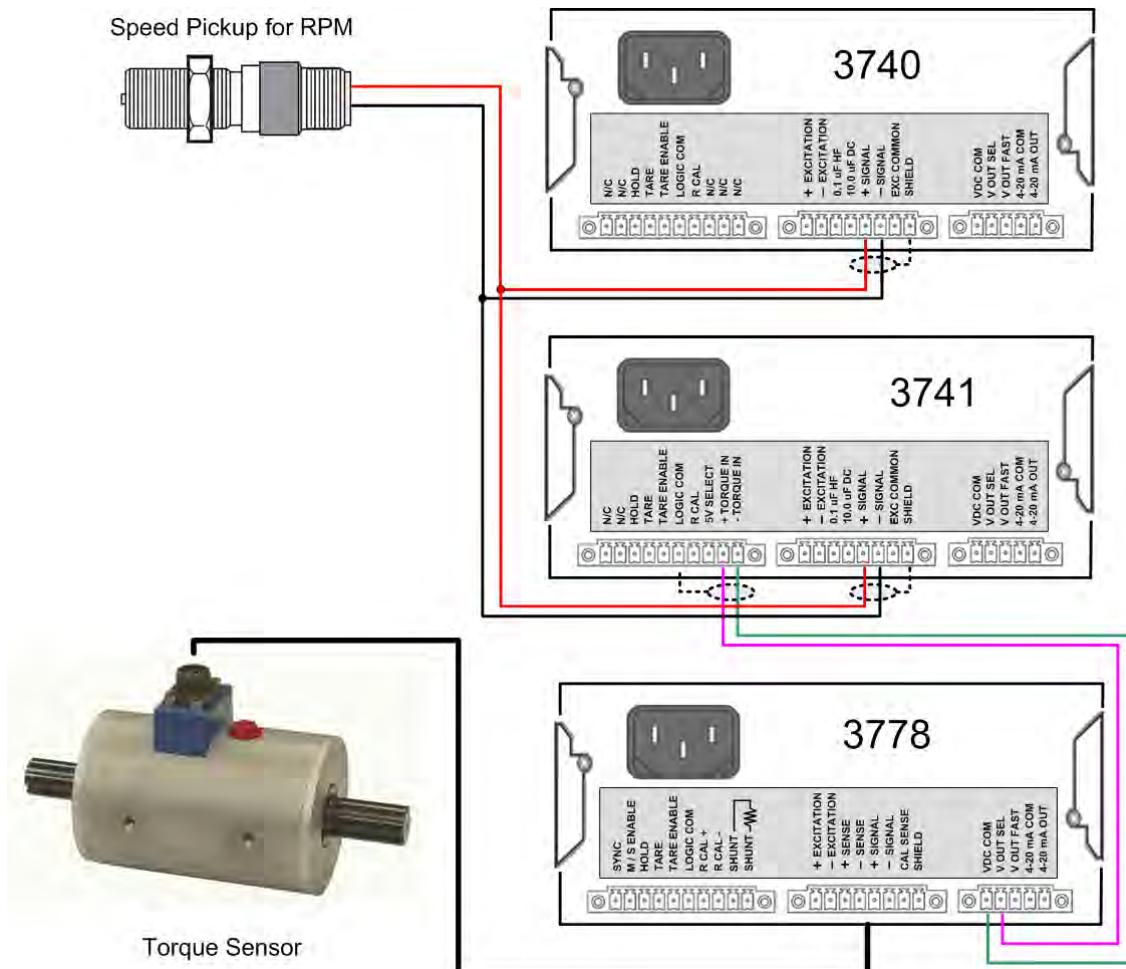


Table 1

Connector Number	Screw Terminal	Label	Function
J1	1	N/C	No connection
J1	2	N/C	No connection
J1	3	HOLD	Input Analog Hold command
J1	4	TARE	Input Analog TARE command
J1	5	TARE ENABLE	External TARE Enable
J1	6	LOGIC COM	Logic Common
J1	7	R CAL	Remote Calibration command
J1	8	5V SELECT	5V enable for Torque Input signal
J1	9	+ TORQUE IN	+ Torque Signal from conditioner
J1	10	- TORQUE IN	- Torque Signal (Analog Common)
J2	1	+ EXC	+ Excitation Power
J2	2	- EXC	- Excitation Power
J2	3	0.1 uf	High Frequency Noise suppression capacitor
J2	4	10.0 uf	DC Offset capacitor
J2	5	+ SIGNAL	Positive signal input from sensor
J2	6	- SIGNAL	Negative signal input from sensor
J2	7	EXC COMMON	Excitation Common reference
J2	8	SHIELD	Case Shield for cable termination
J3	1	VDC COM	- Signal Output Voltage Common
J3	2	V OUT SEL	+ Signal Output Voltage – Filter Select
J3	3	V OUT FAST	+ Signal Output Voltage – 125 Hz
J3	4	4-20 mA COM	Filter Current Output Common
J3	5	4-20 mA OUT	Current Output Signal

2 CONNECTIONS

Horsepower Connections. When utilizing the Model 3741, the frequency sensor source will be the same as the "Speed" conditioner source that is connected to the RPM meter, typically the Model 3740. Connect the frequency input to the 3740 and 3741 meters as shown in the frequency connections later in this manual depending on the type of sensor that is being utilized. The "Torque" input source for the Horsepower measurement will originate from the Torque conditioner, typically the Model 3770 or 3778 DC & AC Strain Gage meters. The conditioned analog signal from the Torque meter will be connected to J1-9 & J1-10 of the Model 3741 unit as shown in the overview diagram below. When connecting signals between meters it is recommended to used twisted pair, shielded cable with the "shield" connection (or J1- Pin 6 terminal).



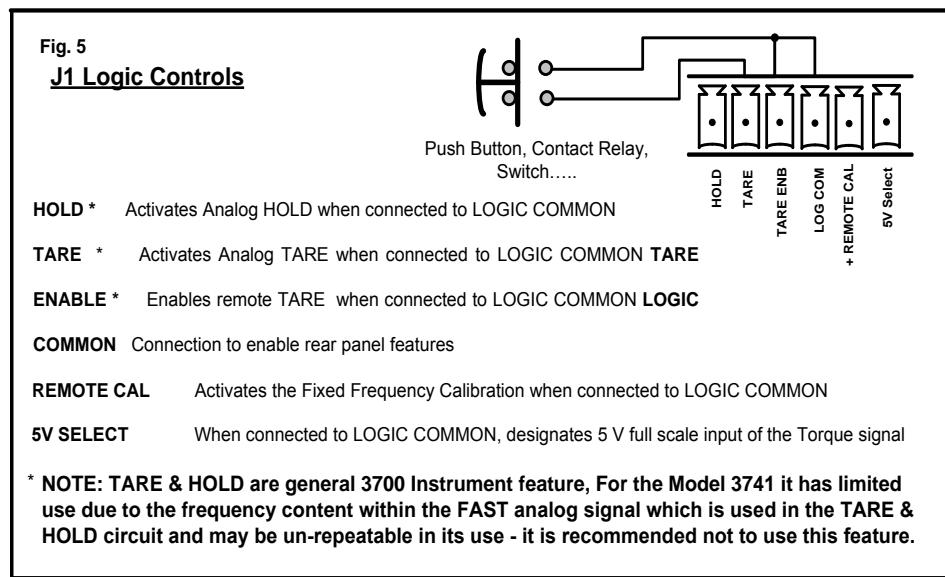
Note: For the torque meter connections, refer to the Model 3770 or 3778 manual.

WARNING

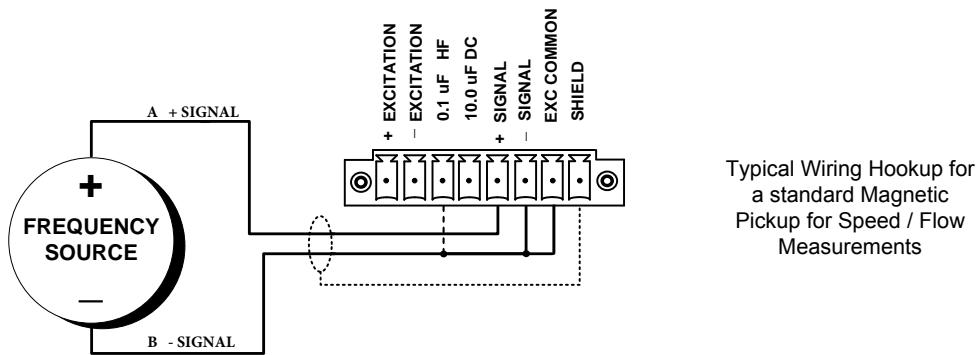
Qualified personnel who work on or near exposed energized electrical conductors must follow applicable safety related work practices and procedures including appropriate personal protective equipment in compliance with the Standard for Electrical Safety Requirements for Employee Workplaces (ANSI/NFPA 70E-2012) of USA and any additional workplace safety requirements applicable to your installation.

2 CONNECTIONS

J1 – HOLD, TARE, RCAL & 5V SELECT Connections. These Logic connections are used when external control of these features are enabled or controlled by an external switch, PLC or relay. The input Command signals are activated when connected to LOGIC COMMON and will affect the display and analog output signals present on J3.



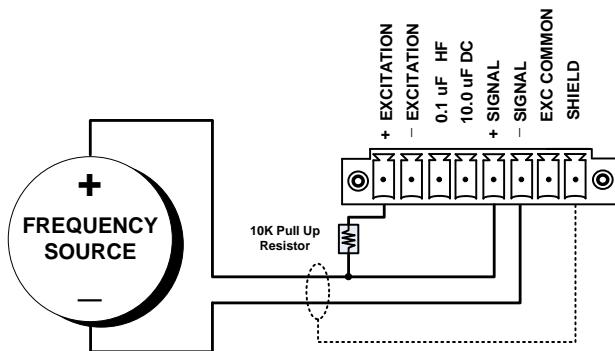
Model 3741 Transducer Cabling – Typical Magnetic Pickup



SUPPRESSION OF HIGH-FREQUENCY NOISE IN LOW-FREQUENCY INPUT (0.1- μ F)

False triggering can sometimes occur, especially at the *low-frequency input range*, because of stray pickup of frequencies outside the common-mode range. Capacitive coupling of the frequency input to ground can in such cases serve to suppress unwanted signal noise. *This noise suppression is always recommended when using a two wire MAGNETIC PICKUP as the frequency source.* Thus, if you find your frequency reading to be unacceptably unstable or "noisy," it is recommended to tie the 0.1- μ F pin to EXC COM & -SIGNAL; maintaining the normal +SIGNAL connection.

2 CONNECTIONS



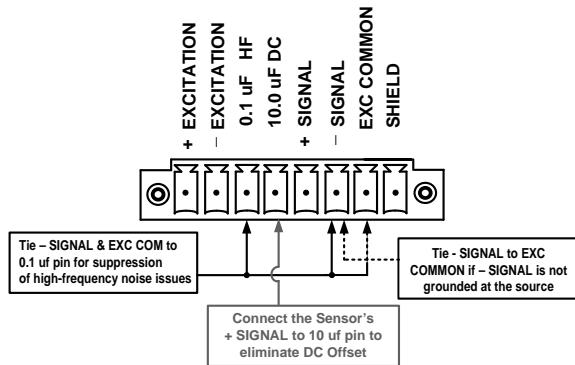
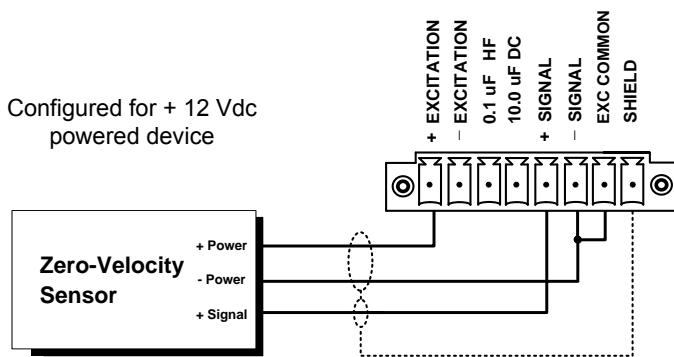
Ungrounded Frequency Source

PULL-UP RESISTOR

When used with an *open-collector* type sensor, the 3741 requires a pull-up resistor (typically $10\text{ k}\Omega$) between the +SIGNAL and the +EXCITATION terminals.

Zero-Velocity Sensor

Configured for + 12 Vdc powered device



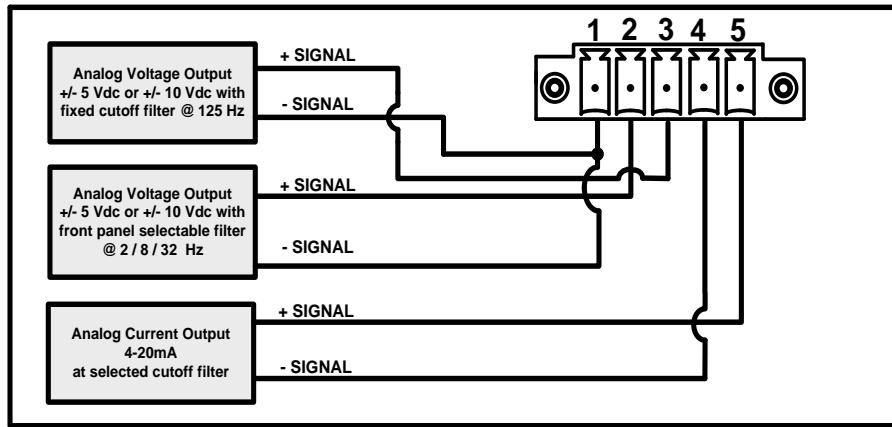
Wiring Options for
DC Offset and
High Frequency
Noise issues

ELIMINATION OF DC OFFSET (10- μ F)

The 3741 is supplied with two *capacitive-coupled terminal inputs*, 0.1- and 10-microFarad capacitance. These special inputs would not normally be used with zero-velocity sensors requiring 10-12 Vdc excitation. The larger (10- μ F) capacitive coupling can be used to eliminate any positive or negative DC offset that exists for a 3741 input frequency signal. Simply connect the +SIGNAL line from the frequency source to the 10- μ F terminal instead of to the normal +SIGNAL terminal. The capacitor is then in series with the +SIGNAL input and allows only AC to pass. **Note: Only for configurations of 10V logic levels or less.**

2 CONNECTIONS

J3 - Analog Connections. Connections are used to provide analog outputs from the meter's signal conditioning area in the form of +/- 5VDC or +/- 10 VDC (selectable via the front panel controls) and 4-20 mA.



Analog Output Connections

VDC COM - Pin 1 Voltage Common (- Signal out); Negative reference for Pin 2 and Pin 3 Voltage Output.

V OUT SEL - Pin 2 Voltage Output Selected (+Signal out) reference to Pin 1. The Full Scale Voltage is determined by the position of switch **1-VDC** on the Conditioner Controls. Voltage Filter output response of this signal is determined by the position of switch **3-FIL** and **4-FIL** on the Analog Controls.

V OUT FAST - Pin 3 Voltage Output Fixed. (+ Signal out) reference to Pin 1. Full Scale Voltage is determined by the position of switch **1-VDC** of the Conditioner Controls. Filter response is fixed at the highest analog signal response of 125 Hz.

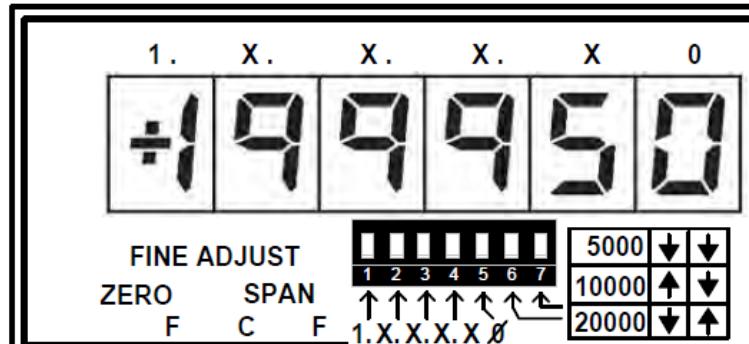
4-20mA COM - Pin 4 4 - 20 mA Current Output Common (- Signal) reference for Pin 5 Current output.

4-20mA OUT - Pin 5 4 - 20 mA Current Output (+Signal) reference to Pin 4 Current Output Common. Mode of the Current Output.

3 CONTROLS

Digital Display Range and Decimal Point Selection

Configures the Engineering Unit's Digital Display Range. Three selections are available to set the display operation for 1 count in 5000, 2 counts in 10000 or 5 counts in 20000. These full scale ranges correspond to the analog output full scale value of ± 5 VDC or ± 10 VDC as selected when the Display Span control is set to the "OFF" position (see below).



Switch 1 - selects decimal point for position **X.XXXXX**

Switch 2 - selects decimal point for position **XX.XXXX**

Switch 3 - selects decimal point for position **XXX.XXX**

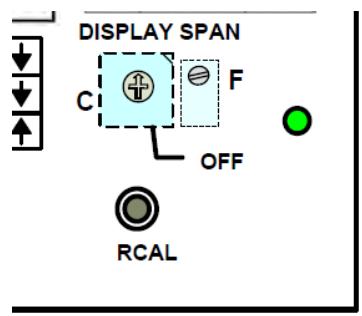
Switch 4 - selects decimal point for position **XXXX.XX**

Switch 5 - enables dummy zero display digit **XXXXX0**

Switch 6 & 7 - selects Display Full Scale Range.

Display Span Adjustments

Used to adjust the digital readout of the 3741 meter independently of the analog signal when not in the "OFF" position. After setting the analog FS output signal level, the user rotates the Display SPAN Coarse controls (F) and adjust the Display Fine (F)control for proper engineering units display. Example: adjust the analog output for maximum full scale analog output. Once achieved, rotate the Display "C" control from "OFF" (F position on the switch) to the desired Horsepower measurement on the display. Use the Display SPAN "F" control for fine adjustment of the readout. If needed, use the display's 5000, 10000 or 20000 unit's selection as shown above to achieve the proper reading.



Display Coarse Span - 16 position switch to adjust wide zero authority

Display Fine Span - 25 Turn potentiometer for fine span control of analog signal

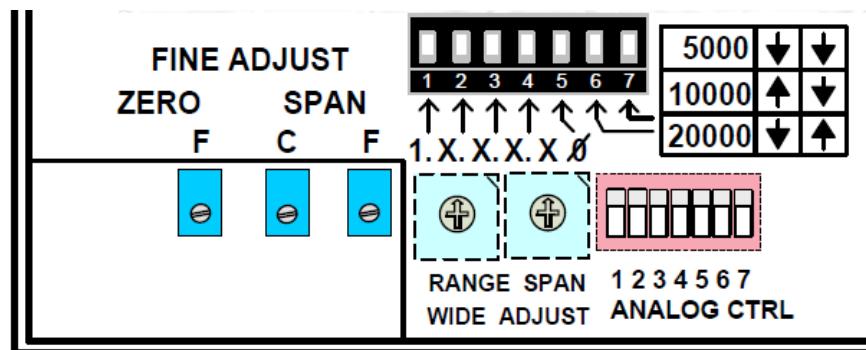
Display "OFF" – switch position "F" – "OFF" which disables the Display Span feature

3 CONTROLS (cont.)

Analog Control Settings

Analog Control - 7 position switch configures the main parameters of the AC Signal conditioner for required output voltage level, low pass filter characteristics and input signal sensitivity level.

For the initial setup of the 3741 Meter, the switch settings should be the same as the "calibrated" 3740 RPM meter settings, including Wide-Adjust Range - Span switch positions.



1 – 5 VDC Output - UP sets the analog output FS to 5 VDC, DOWN is 10 VDC

2 – Not Used

3 – 8/32 Hz - UP selects 8 Hz filter. DOWN selects 32 Hz filter

4 – 8/2 Hz - UP selects 8 Hz filter. DOWN selects 2 Hz filter

5 – SENSITIVITY A - UP selects 0.25 – 10.0 V, DOWN selects 0.05 – 2.0 V

6 – SENSITIVITY B - UP selects 0.25 – 10.0 V, DOWN selects 1.0 – 40.0 V

7 – SENSITIVITY C - UP selects 0.25 – 10.0 V, DOWN selects 5.0 – 250.0 V

With all of the switches in the up position, the unit will have the following settings:

- The full scale analog output will be 5.000 VDC
- The selected analog output - low pass filter will be set for 8 Hz
- Input voltage sensitivity detect (least positive value of wave shape) is 0.25 to 10 V.

Analog Control Settings for Conditioner Configuration

	Function	Down ↓
5	1 - VDC OUT	10
	2 - not used	
8 Hz	3 - FILTER	32 Hz
8 Hz	4 - FILTER	2 Hz
.25-10	5 - SEN A	.05-2.0
.25-10	6 - SEN B	1.0-40
.25-10	7 - SEN C	5.0-250

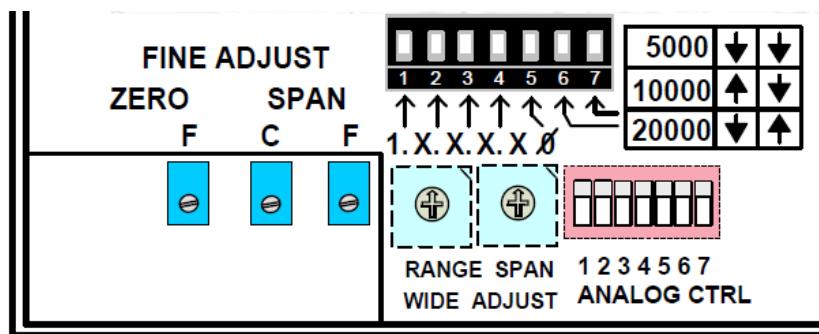
Analog Control Settings (red switch)

The 7 position front panel analog control switch will configure the signal conditioning section of the meter. The position of the switches will depend on the type of sensor, it's parameters and the expected analog output signal Full Scale level - along with the output signal's 3db roll-off response characteristics.

3 CONTROLS (cont.)

Input Frequency Range & Span Wide-Adjust Controls

Two rotary control switches are used to set the nominal input frequency range of the input signal. Ranges are 250 Hz to 128 KHz Full Scale which corresponds to the of the analog output signal of the 3741 meter. Note the 3741 meter, when used with the 3740 meter, should have the same Range and Span Wide adjust settings for intial setup.

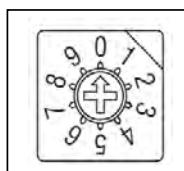


Range Wide-Adjust - 10 position switch to adjust input range full scale – 250 Hz 128 KHz

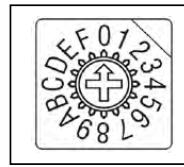
Span Wide-Adjust - 16 position switch to adjust range authority between the selected ranges

Due to multiple amplifier stages within the 3741 instrument, attention to the proper gain setting and understanding of the sensor inputs should be reviewed to produce a linear- amplified analog output signal and display reading.

The Range & Span Wide-Adjust– gain control (as shown in the front panel diagram) amplify the incoming conditioned signal by incremental steps. Each step is positioned so the front panel accessible Coarse and Fine Span potentiometer controls overlap each step to provide a continuous linear gain of the signal from 250 Hz to 128 KHz full scale.



Range Wide-Adjust – 10 Position switch for adjustment of the full scale frequency input range. Also sets the 80% value for the RCAL switch. X2 gain per step



Span Wide-Adjust – 16 Position switch for adjustment of the frequency input between the Range Wide-Adjust switch position. Approx. X 4.8% gain change per step.

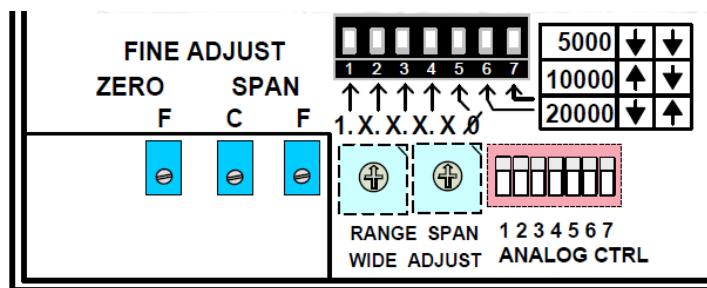
3741 Horsepower configuration of the Wide Adjust Controls should match the 3740 Frequency meter on initial setup. Further adjustment can be made once the Speed and Torque readings are established and calibrated.

The Horsepower "Span" adjustment should involve only minor correction from this reference point unless maximizing the analog output is required. If this is the case, reference the "Display Span Adjustment" control features as shown on page 8.

3 CONTROLS (cont.)

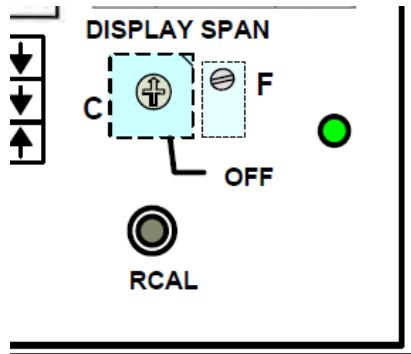
Fine Zero, Coarse Span and Fine Span Adjustments

Front panel potentiometer controls for the fine adjustment of the zero and gain setting of the analog output signal of the 3741 meter. The controls are present when the front panel is re-installed for user fine tuning adjustment as needed to maintain calibration of the measurement once the unit has been configured via the analog controls.



- Fine Zero -** 25 Turn potentiometer for fine balance control of analog signal
- Coarse Span -** 22 Turn potentiometer adjustment for analog control of gain
- Fine Span -** 25 Turn potentiometer adjustment for analog control of gain

Remote Calibration



- R CAL** **Remote / Reference Calibration** - Momentary switch - when depressed connects an internal clock reference to the SPAN circuit as a reference to set or check calibration of the 3741 unit. R CAL can also be activated via the rear panel connection when Remote CAL is connected to logic common. R CAL frequency is determined by the setting of the Wide Range control switch and will represent 80% of the setting of the RPM signal. Proper activation of the Torque input is required for RCAL to function properly.

4. CALIBRATION – 2 Point - with known inputs

This section contains the instructions for calibrating the 3741. Reference the description of the instrument front-panel and Analog Controls for initial setup. Prior to calibration of the 3741 Meter, the source inputs of RPM & Torque require calibration. Please refer to the separate 3740 and 3770/3778 manuals for these procedures. When these measurements are established, proceed as follows.

- (a) Connect Power, Sensor and Analog terminals as required. Apply power. The front-panel digital display should light indicating the application of the AC input power. Allow 10 minutes of warm up for stabilization of the instrument and sensor. Remove the front panel cover of the 3741 unit which is held in place by the two small Phillips screws.
- (b) Position the front panel switches to the same settings as the 3740 meter. Refer to Section 3 for details.
- (c) Center the Fine Zero and Span potentiometers as needed by rotating the potentiometers fully CW (Coarse is 22 turns, Fine is 25 turns), then reverse direction - CCW (Coarse 11 turns and Fine 13 turns) to obtain mid-authority of the controls. Typically this is done on initial calibration. When recalibrating for minor adjustments this may not be required.
- (d) With a known Zero (Zero Torque or Zero Speed or both) Adjust Fine Zero for the Zero position reading on the display or the desired analog output signal. Note: Display can be adjusted independently to the analog signal when the Coarse Display control is not in the "OFF" position.
- (e) Calculate your Horsepower "Span" point for the given calibration RPM & Torque values.
- (f) Apply the known frequency or sensor input to the 3741 meter, typically at full scale or nominal working range. Apply a torque input using Shunt Cal or known input to the torque meter within the nominal working range of the torque meter. With both inputs active, adjust the Wide Span controls and Fine Span controls for the proper Horsepower reading as calculated for the input value given. If greater control is needed, utilize the display 5000,10000 or 20000 settings.
- (g) Return the input signal to the Zero position in step (d) and re-adjust the Zero controls as needed to obtain the proper reading (or analog signal) for the application's zero position.
- (h) Re-Apply the known frequency and torque signals and re-Adjust the Coarse Span and Fine Span controls, as needed, for precise engineering units reading on the display as well as the analog output desired.
- (i) Repeat Steps (g) and (h) to obtain proper measurement readings since the Gain – Span controls will affect the Zero amplification of the input signal.
- (j) Re-install the front panel. Fine Span and Zero controls are accessible with front panel installed.

Note: RCAL on the 3741 unit simulates 80% of the full scale of the frequency signal only. An active "torque" or "shunt cal" input from the torque meter is required to produce a Horsepower reading for calibration reference.

Useful Horsepower calculations

Using ft.lbs $HP = \text{Torque (ft.lbs)} \times \text{RPM} / 5252$

Using in.lbs $HP = \text{Torque (in.lbs)} \times \text{RPM} / 63025$

Using Newtons $HP = \text{Torque (newton meters)} \times \text{RPM} / 7121$

Horsepower (metric) = Horsepower (english) x 1.014

Newton-meters = ft.lbs x 1.3558

Tech Tip for the Frequency Conditioner

The 3741 Frequency Panel meter and conditioner has selectable low pass filter settings which are configured via the Analog Control Switch located behind the front panel of the instrument. The proper filter setting will depend on the application and the dynamic response needed for the analog output signal. Use the following table as a guide in determining the most appropriate Range and Filter setting. The table is referenced by the expected stability / AC content “bleed through” from the input signal when at low frequency levels. Utilizing a 9 pole filter enhances the analog tracking of the incoming frequency signal to very low levels compared to traditional F/V converters. Note the FAST signal output is always present on J3-3.

Filter Setting effect per Input Range for low end stability of the analog output signal

Input Level - 50 mV P-P Sine Wave: Output - +/ 5 mV signal content level (0.1% FS) (x = unusable)

		Filter Setting			
		2 Hz	8 Hz	32 Hz	Fast
0	250	10	40	175	x
1	500	10	36	160	x
2	1000	10	34	150	x
3	2000	10	30	136	810
4	4000	10	26	125	680
5	8000	10	22	115	600
6	16000	10	22	100	530
7	32000	10	22	90	480
8	64000	10	22	175	950
9	128000	10	22	340	1900
Range Fullscale in Hertz		Low End Input in Hertz			

Typical Horsepower system with a 3703 Rack panel

3770 or 3778 Meter	DC or AC Strain Gage Conditioner for Torque
3740 Meter	Frequency Conditioner for Speed
3741 Meter	Horsepower Meter

5. FUSE REPLACEMENT

Should you suspect a blown fuse proceed as follows.

WARNING

Installation, operation and maintenance of this instrument must be performed by qualified personnel only. The National Electrical Code defines a qualified person as “one who has the skills and knowledge related to the construction and operation of the electrical equipment and installations, and who has received safety training on the hazards involved.”

- a) Disconnect all power sources and cables connected to the instrument before servicing the instrument.
- b) On the rear panel remove the (2) clamp slide retaining screws and remove the clamp slides from both sides of the instrument. Next remove the (4) corner screws that retain the rear panel to gain access to the instrument.
- c) Open the rear panel and replace the fuse(s) as required , replace only with same type T Slow Blow, 1A, 250V (Littelfuse 218001.HXP, 1 A). The fuseholder wire conductors are appropriately labeled “L” for Line and “N” for Neutral on both halves of each of the fuseholder wires. When reassembling the fuseholder(s) make sure “L” and “L” are connected together and “N” and “N” labeled wires are connected together properly.
- d) Mate the rear panel to the enclosure and replace the clamp slides back in position and secure the clamp slides with the (2) screws previously removed from the instrument. Next, replace the (4) corner screws to secure the rear panel and ensure that all screws have been adequately tightened.
- e) Power ON the instrument with the appropriate power cord and verify the instrument is functioning properly before reconnecting the instrument to your installation.

WARNING

For continued protection against risk of fire or shock replace only with the same type and rating of fuse.

ADVERTENCIA

Para la protección continua contra el peligro de incendio o descarga, cambie sólo por fusibles del mismo tipo y capacidad nominal.

AVERTISSEMENT

Pour assurer une protection continue contre les risques d'incendie ou de choc, ne remplacez que par un fusible du même type et de la même valeur nominale.

WARNUNG

Zum anhaltenden Schutz gegen Brand oder einen elektrischen Schlag nur gegen eine Sicherung desselben Typs und mit demselben Nennwert austauschen.

WARNING

Do not replace fuse again if failure is repeated. Repeated failure indicates a defective condition that will not clear with replacement of the fuse. Refer condition to a qualified technician.

ADVERTENCIA

No reemplace el fusible nuevamente si se repite la falla. La repetición de las fallas indica una condición defectuosa que no se subsanará con el cambio del fusible. Acuda a un técnico calificado para evaluar la condición.

AVERTISSEMENT

Ne remplacez pas le fusible une nouvelle fois si la défaillance se répète. Une défaillance répétée indique une condition défectueuse qui ne disparaîtra pas avec le remplacement du fusible. Consultez un technicien qualifié.

WARNUNG

Die Sicherung nicht erneut austauschen, wenn der Fehler noch einmal auftritt. Ein wiederholtes Auftreten des Fehlers weist auf einen Defekt hin, der sich nicht durch Austauschen der Sicherung beheben lässt. Den Defekt einem qualifizierten Techniker mitteilen.

Page is Blank

Page is Blank

3741 Horsepower Panel Meter

Product Warranty and Repair

Daytronic Corporation warrants its products to be free from defects in material and workmanship, under normal and proper use in accordance with our instructions, for the period of one year for date of shipment. Our liability under such warranty or in connection with any other claim relating to the products shall be limited to, at our option, the repair or replacement of any products or parts or components thereof which are returned to us freight prepaid and which are defective in material or workmanship or the refund of the purchase price to the Buyer.

ANY PRODUCT FOUND TO BE DAMAGED THROUGH CUSTOMER NEGLIGENCE OR MISUSE MAY BE EXCLUDED FROM ANY AND ALL POLICIES CONTAINED IN THIS DOCUMENT.

ALL EQUIPMENT TO BE REPAIRED OR REPLACED UNDER WARRANTY MUST BE RETURNED TO THE FACTORY. Before returning a product or products for any reason, the customer must call **Daytronic Customer Support Services** at **(937) 866-3300** to request a *RETURN MATERIAL AUTHORIZATION (RMA)*. Once the customer has provided the necessary information and has been assigned a specific RMA, the product(s) in question may be returned to Daytronic by shipping it

Daytronic Corp., 1000 New Durham Road, Edison, New Jersey 08818
Daytronic Customer Service: 1-800-668-4745 service@daytronic.com

