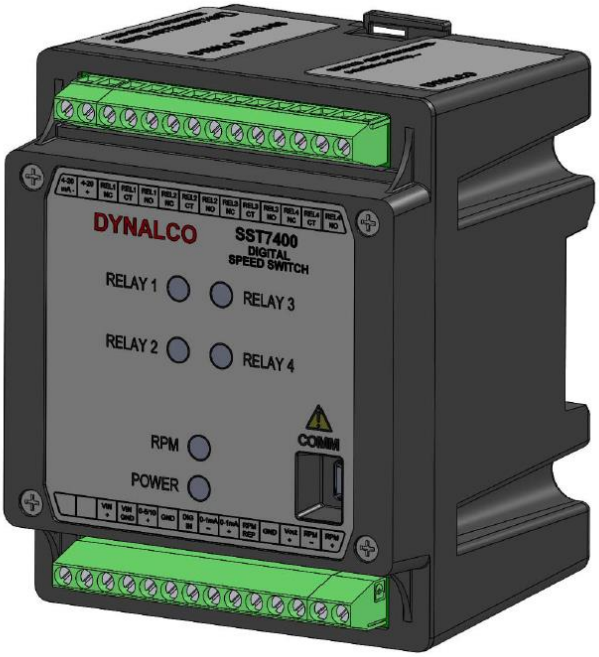
DYNALCO

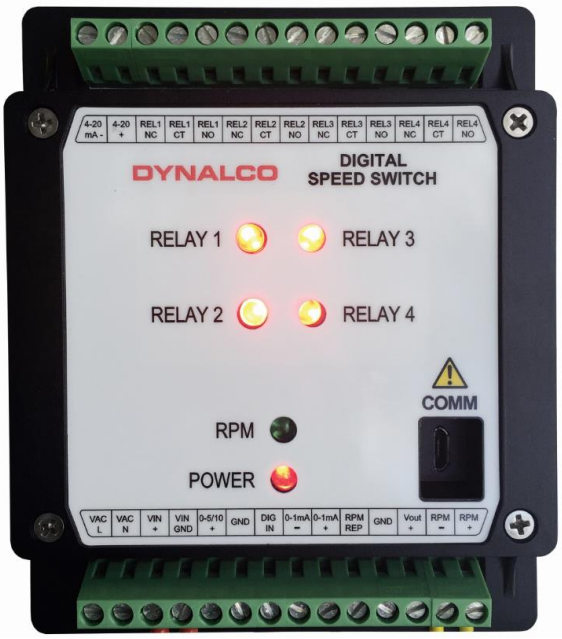
3211 Fruitland Ave
Los Angeles, CA 90058

SST7200
SST7400

Speed Switch / Transmitter

Installation and Operation Manual





Rev. A

P/N145F-13146

PCO – 00009461

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IMPORTANT - PLEASE READ BEFORE PROCEEDING!

The Dynalco SST7200 / SST7400 speed switches are designed for reliable and rugged operation. Performance of this product is directly related to the quality of the installation and knowledge of the user in operating and maintaining the instrument. To ensure continued operation to the design specifications, personnel should read this manual thoroughly before proceeding with installation, operation and maintenance of this instrument. If this product is used in a manner not specified by Dynalco, the protection provided by it against hazards may be impaired.

WARNING

- **Failure to follow proper instructions may cause any one of the following situations to occur: Loss of life; personal injury; property damage; damage to this instrument; and warranty invalidation.**

- **For clarification of instructions in this manual or assistance with your application, contact Dynalco at (800) 368-6666 or (954) 739-4300, send email to customerservice@dynalco.com or by mail:**

  Dynalco, Division of Barksdale
  5450 NW 33rd Ave
  Suite 104
  Fort Lauderdale, FL 33309

- **Additional manuals are available at www.dynalco.com**

- **Follow all warnings, cautions, and instructions marked on and supplied with the product.**

- **Use only qualified personnel to install, operate, program and maintain the product.**

- **Educate your personnel in the proper installation, operation, and maintenance of the product.**

- **Install equipment as specified in the installation section of this manual. Follow appropriate local and national codes. Only connect the product to power sources and end devices specified in this manual.**

- **Any repair is only to be performed by Dynalco using factory documented components. Tampering or unauthorized substitution of parts and procedures can affect the performance and cause unsafe operation of your process.**

- **All equipment doors must be closed and protective covers must be in place unless qualified personnel are performing maintenance.**
- **Shutdown / alarms should be tested monthly for proper operation (see page 16)**

This manual covers both models SST7200 and SST7400:

SST7200 **Speed Switch / Transmitter w/ 4 – 20 mA Output & 2 Relay Trips**

SST7400 **Speed Switch / Transmitter w/ 4 – 20 mA Output & 4 Relay Trips**

System Overview

The SST7200 / SST7400 speed switches are DIN rail mountable products designed to convert rotational speed (RPM) to an industry standard 4 – 20 mA analog output.

Both models will accept a pulsed input from either a 2 or 3-wire speed sensor.

Programming:

The host software allows programming of the SST7200 & SST7400 via a USB connection to a PC.

Additional Features

- Repeater Output
- 0 – 1 mA local meter output
- 0 – 5 VDC / 0 – 10 VDC selectable proportional output
- Isolated 4 – 20 mA proportional output

How to order

Specify part number as follows:

2 setpoints

SST-7200	Standard
SST-7200-I	Isolated RPM Input

4 setpoints

SST-7400	Standard
SST-7400-I	Isolated RPM Input

Specifications

1) INPUT SUPPLY VOLTAGE: 10 - 36 VDC, maximum 5 W

2) FREQUENCY INPUT:

- **a. Input Signal Frequency Range:** 0 - 0.1 Hz to 0 – 50 KHz
- **b. Waveforms:** Accepts sinusoidal or square wave (positive or zero-crossing)
- **c. Input Signal Sensitivity:** 25 mV to 1.0 VRMS (selectable), Maximum allowed is 50 VRMS
- **d. Input Impedance:** 10 K (minimum)
- **e. –I suffix on the part number:** Isolated RPM input from the power supply ground by more than 300V peak

3) DIGITAL INPUT (1): Dry contact closure for resetting latched relay

4) OUTPUTS:

- **a. Meter Output:** 0 – 1 mA meter output for loads up to 750 ohms
- **b. Proportional Output:** Proportional to input frequency range, configurable as:
  - **i.** 4 – 20 mA into maximum 1K load

    And one of either:
  - **ii.** 0 – 5 VDC into 20K load or higher or
  - **iii.** 0 – 10VDC into 20K load or higher

  Note that the 4 – 20 mA output is isolated but the 0 – 5 VDC & 0 – 10 VDC outputs are referenced to input supply ground.
- **c. Supply Output:** Regulated +12 VDC ±5%; 40 mA for active pickup power.
- **d. Repeater Output:** Square wave 12 V peak-to-peak, 10 mA max load, Zero based, positive going.
- **e. Response Time:** 50 milliseconds, 10% to 90% rise (standard)
  Full-scale frequency ranges below 80 Hz are proportionally slower
- **f. Linearity:** 0.1% of full-scale (0.05%, typical) all outputs
- **g. Stability:** Less than 0.05% of full-scale change with a 10% change in supply voltage. Temperature coefficient ±0.01% per °F (±0.018% per °C)

5) RELAY OUTPUTS:

- **a. Type:** SPDT relay contacts (isolated dry contacts)
- **b. Contact Rating:** 6.0 Amps @ 28 VDC or 300 VAC
  1/8 HP @ 120 / 240 VAC (100,000 cycles)
  1.5 / 0.8 Amps @ 120 / 240 VAC, Pilot Duty (100,000 cycles)
  3.8 / 1.9 Amps @ 120 / 240 VAC general Use (100,000 cycles)
- **c. Hysteresis:** Selectable (1% of full-scale frequency default)
- **d. Setpoints:** Programmable for:
  - **i.** Overspeed / under speed trip
  - **ii.** Energize or de-energize when setpoint reached
  - **iii.** Latching or non-latching (auto reset)
  - **iv.** Underspeed setpoints are Class C Logic (active once normal)
  - **v.** Latched relays are reset via digital input
- **e. Stability:** Less than 0.05% of setpoint change with a 10% change in supply voltage. Temperature coefficient ±0.01% per °F (±0.018% per °C)

6) ALARM INDICATION:

- **a. Open Pickup Alarm:** LED indication if open pickup sensed
  Option to trip relay
- **b. Trip Indication:** LED indication if a relay tripped condition

7) MEMORY: All configuration parameters retained if power lost

8) CONNECTORS: Terminal Blocks

9) MECHANICAL: DIN rail mount package

10) ENVIRONMENTAL:

- **a. Operating Temperature Range:** -40 to +70 DegC
- **b. Storage temperature:** -40 to +80 DegC
- **c. Vibration:** Per modified Mils STD 810-E

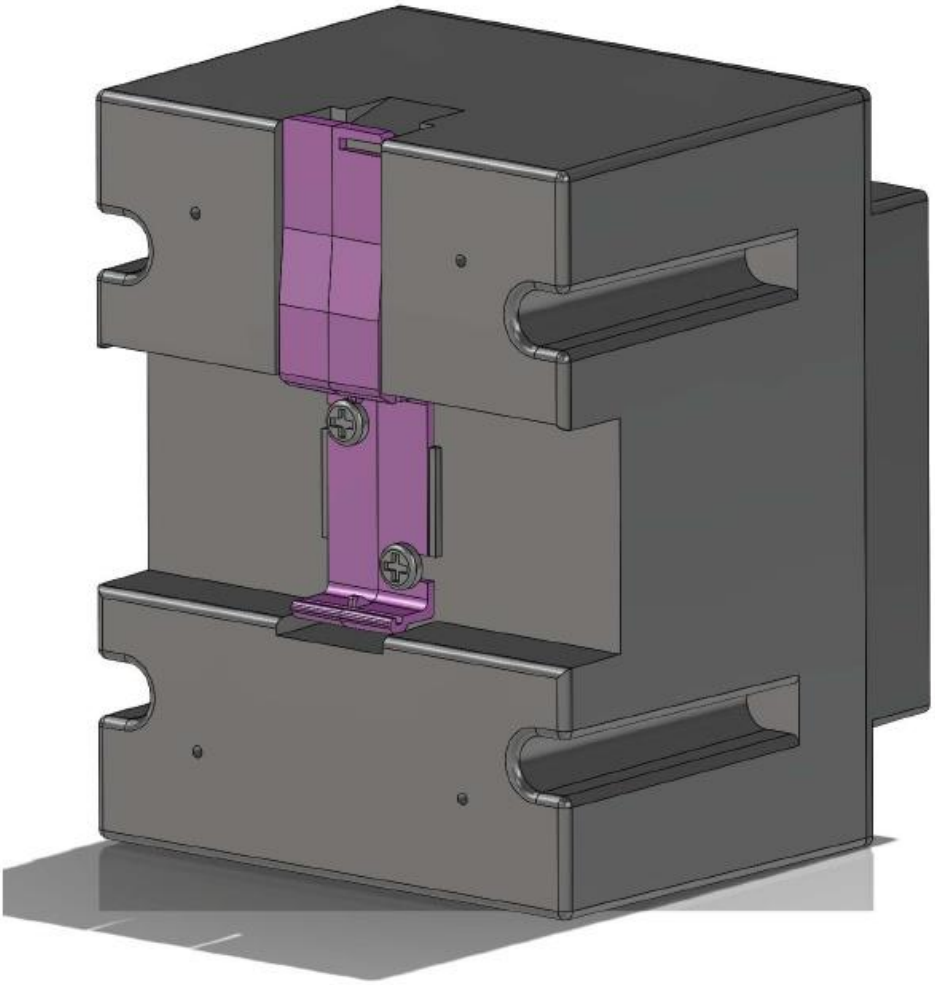
11) PROGRAMMING

- **a. PC / Windows based:** Windows XP, Vista & Windows 7 & 8 compatible
  USB port for programming, uploading & downloading

Installation:

The SST7200 & SST7400 have an integral latch on the rear of the device for installation on a standard 35 mm DIN rail.

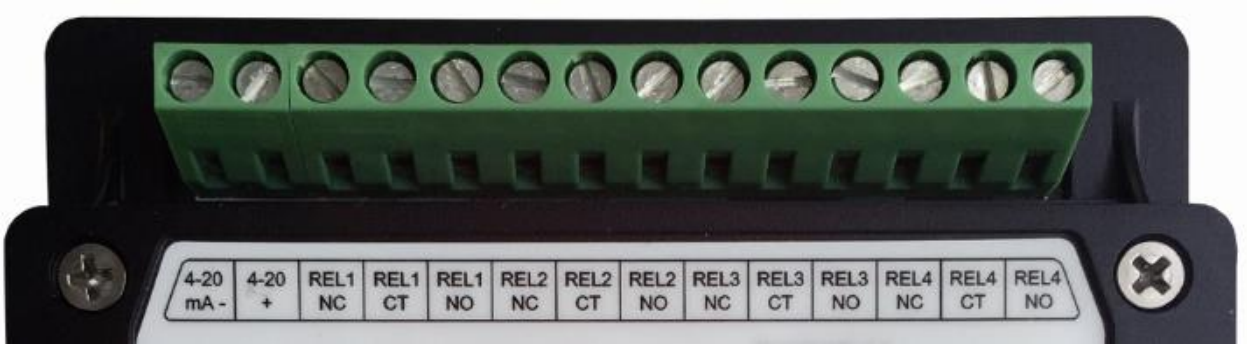
This device is OPEN type equipment that must be used within a suitable end-use system enclosure, the interior of which is accessible only through the use of a tool. The suitability of the enclosure is subject to investigation by the local Authority Having Jurisdiction at the time of installation.



Terminal Connections

All connections are made via the terminal blocks on the front of the unit.

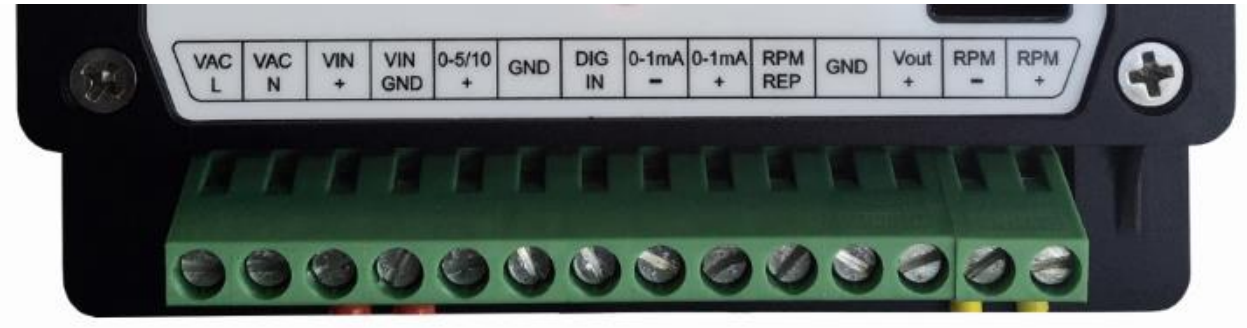
Top Terminal Block Connections



PIN	Description
4-20 (-)	4-20 mA Proportional Output (-)
4-20 (+)	4-20 mA Proportional Output (+)
REL1 NC	Normally-Closed Relay Contact
REL1 CT	Relay Common
REL1 NO	Normally-Open Relay Contact
REL2 NC	Normally-Closed Relay Contact
REL2 CT	Relay Common
REL2 NO	Normally-Open Relay Contact
REL3 NC	Normally-Closed Relay Contact
REL3 CT	Relay Common
REL3 NO	Normally-Open Relay Contact
REL4 NC	Normally-Closed Relay Contact
REL4 CT	Relay Common
REL4 NO	Normally-Open Relay Contact

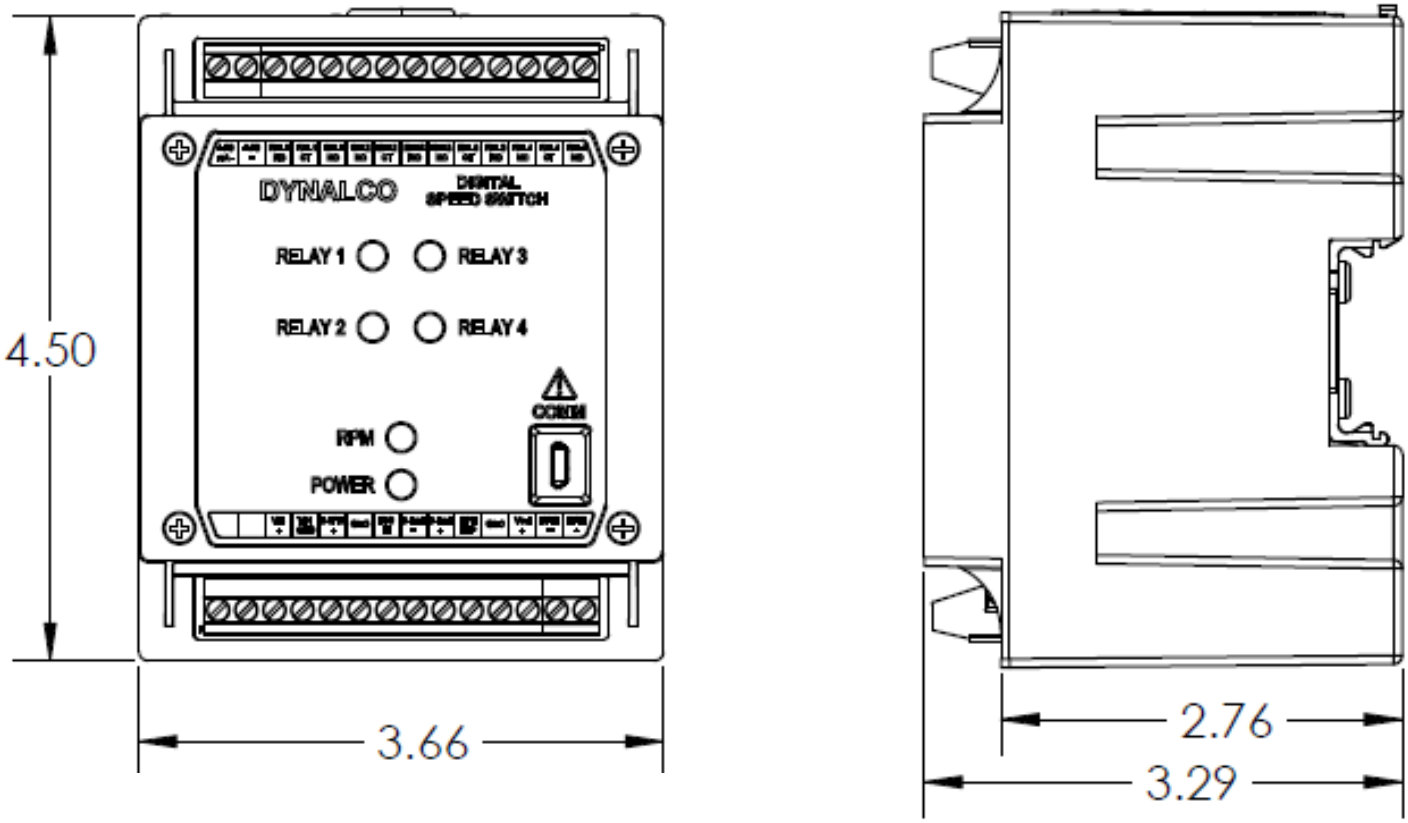
Bottom Terminal Block Connections

PIN	Description
VAC L	120 VAC (Hot)
VAC N	120 VAC (Neutral)
VIN (+)	10 - 36 VDC Supply (+)
VIN GND	Supply Ground (-)
0-5/10 (+)	0-5 or 0-10 VDC Proportional Output (+)
0-5/10 GND	0-5 or 0-10 VDC Proportional Output (-)
DIG IN	Digital Input for resetting latched relay
0-1mA (-)	0-1 mA local meter output (-)
0-1mA (+)	0-1 mA local meter output (+)
RPM REP	Repeater Output (+) (pulsed square wave)
12V GND	Ground for 3-wire pickups
12V (+)	Power source for 3-wire pickups
RPM (-)	Signal Input (-) from speed sensor
RPM (+)	Signal Input (+) from speed sensor



Terminal screws to be tightened to 4 inch-pounds torque.

Outline Dimensions



Dynalco SST7200 & SST7400 Software

The Dynalco host software provides serial communication between a PC or laptop and the SST7200 & SST7400. The software is compatible with Windows XP, Vista and Windows 7 operating systems. The SST7200 & SST7400 must be connected via Dynalco p/n 270A-XXXXX serial communication cable. This cable is sold separately.

The Dynalco host software is available as a free download from our website:

www.dynalco.com/downloads

Following installation, a shortcut will be installed on your PC desktop. This application software allows access to various screens for configuration of input signal sensitivity, proportional output and relay logic / setpoints. Once the configuration parameters are set, they can be programmed into the SST7200 & SST7400 and a spec file can be saved to the PC. This saved spec file can then be loaded into another SST7200 & SST7400 if desired. Additionally, there is an import function allowing uploading of the spec file from an SST7200 & SST7400 to the PC.

Configuration consists of the steps described in the following pages:

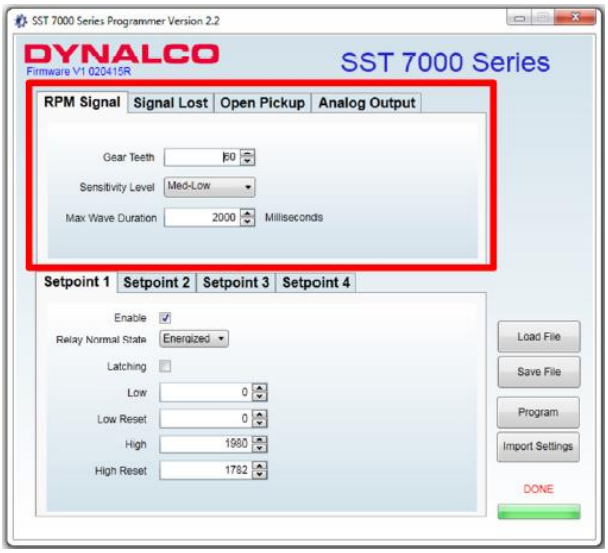
RPM Signal

The RPM Signal needs to be programmed prior to all other settings.

The SST7200 & SST7400 are capable of accepting input signals from 2-wire (also known as variable reluctance) magnetic pickups as well as 3-wire (powered, TTL or hall-effect) type sensors. The output from 2-wire pickups is an AC signal where the 3-wire type will normally have a positive-going (non zero-crossing) square wave output.

- Gear Teeth
  - Required to convert RPM to Hz for proper calibration

- Sensitivity Level
  - Set for Med-High for most applications
  - Higher level will allow greater sensitivity if needed for low speed applications
  - Lower level will be less sensitive to noise



- Max Wave Duration
  - The Max Wave Duration is defined as the maximum time allowed between input signal pulses before a sensor fault is declared. For example, a shaft with 2 keyways turning at 0 – 10 RPM would have an extremely low frequency range, calibrated below:

    Frequency = RPM X # teeth / 60
    = 10 X 2 / 60 = 0.333 Hz

    Then, the period (time in seconds between pulses) is calculated as:

    Period = 1 / Frequency
    = 1 / 0.333 = 3 seconds

    In this example, the pulses would be received in time intervals of once every 3 seconds or longer. The Max Wave Duration can be configured to a maximum value of 10,000 milliseconds (10 seconds) to allow for this low speed range. Any pulse not received within 10 seconds would be considered a sensor fault.

  - Note that the default value of 1000 Milliseconds (1 second) is correct for most applications.

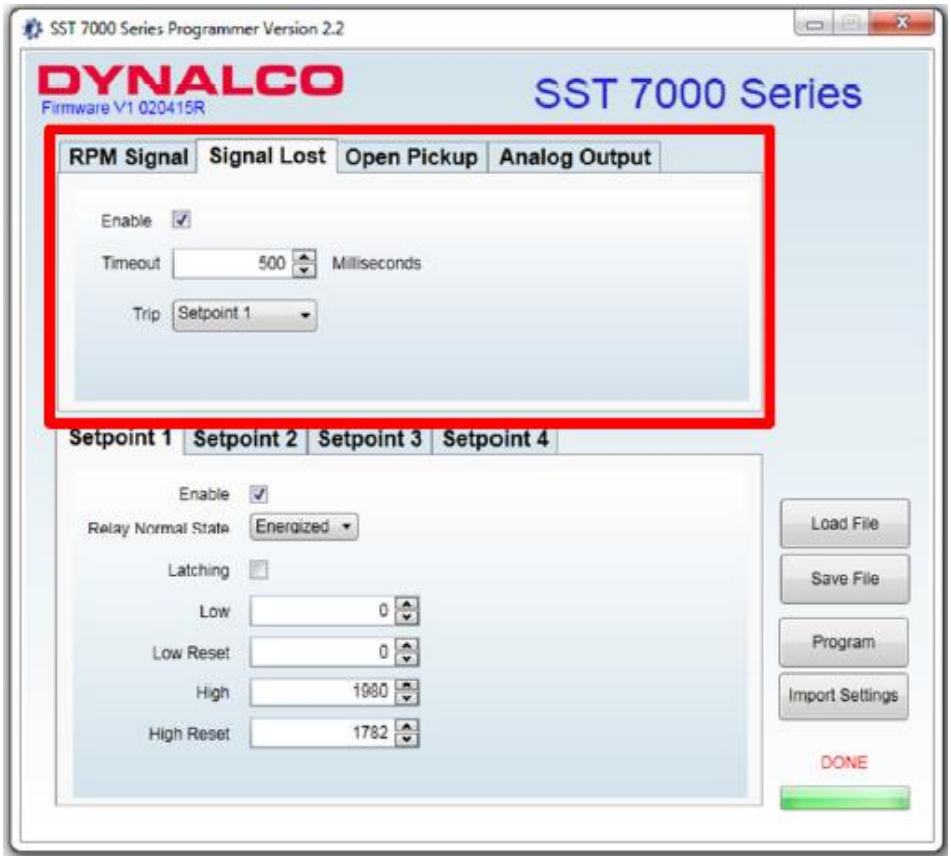
Signal Lost

The Signal Lost function is defined as the absolute maximum allowable period (time between input pulses in milliseconds) before an under speed relay is tripped. Similar to the Max Wave Duration described in the previous step, the Signal Lost setting is necessary for low speed applications where there is a programmed under speed trip. This setting should be set longer than the period (in milliseconds) of the under speed setpoint.

- Enable
  - Check this box to enable Signal Lost
  - If there is no under speed setpoint, leave un-checked

- Timeout
  - This is the maximum time (in milliseconds) allowed before an under speed trip is initiated.

- Trip
  - Select either Setpoint 1 or 2 for the SST7200
  - Select either Setpoint 1, 2 ,3 or 4 for the SST7400

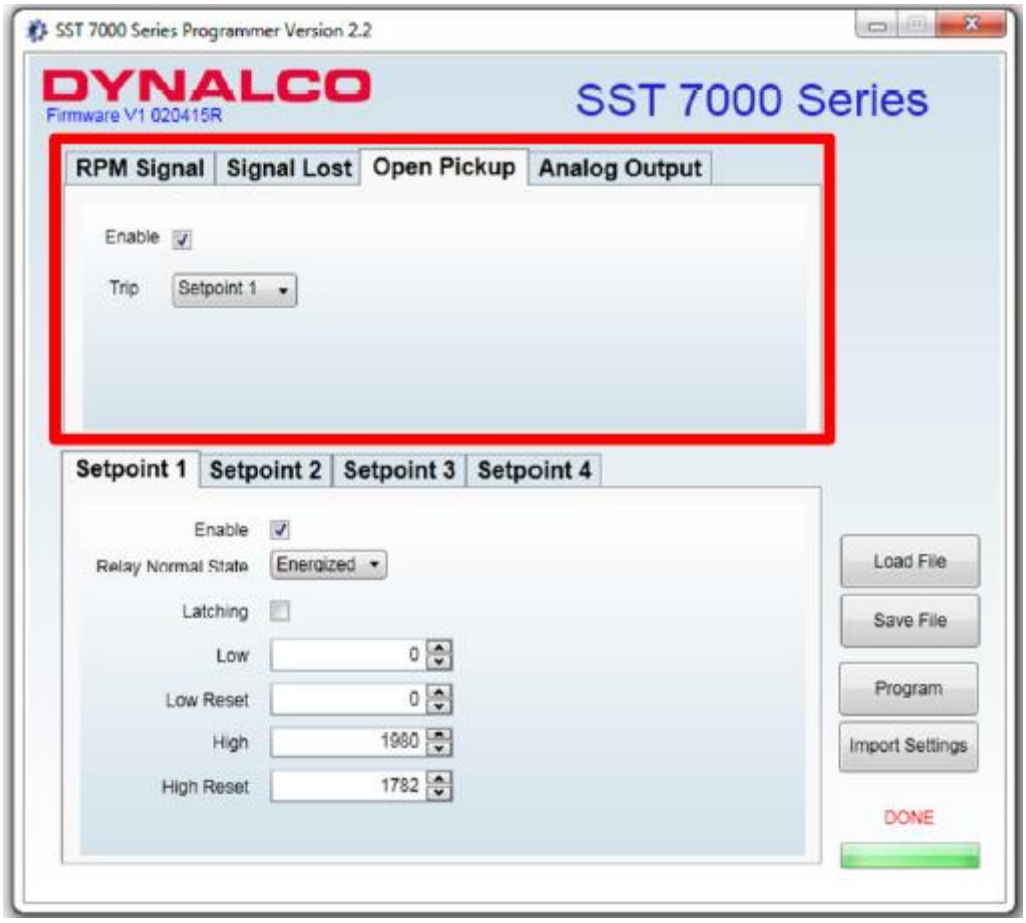


Open Pickup

The Open Pickup tab allows the user to select which relay (if any) will activate if an open pickup is sensed.

- Enable
  - Check this box to enable Open Pickup option

- Trip
  - Select either Setpoint 1 or 2 for the SST7200
  - Select either Setpoint 1, 2 ,3 or 4 for the SST7400

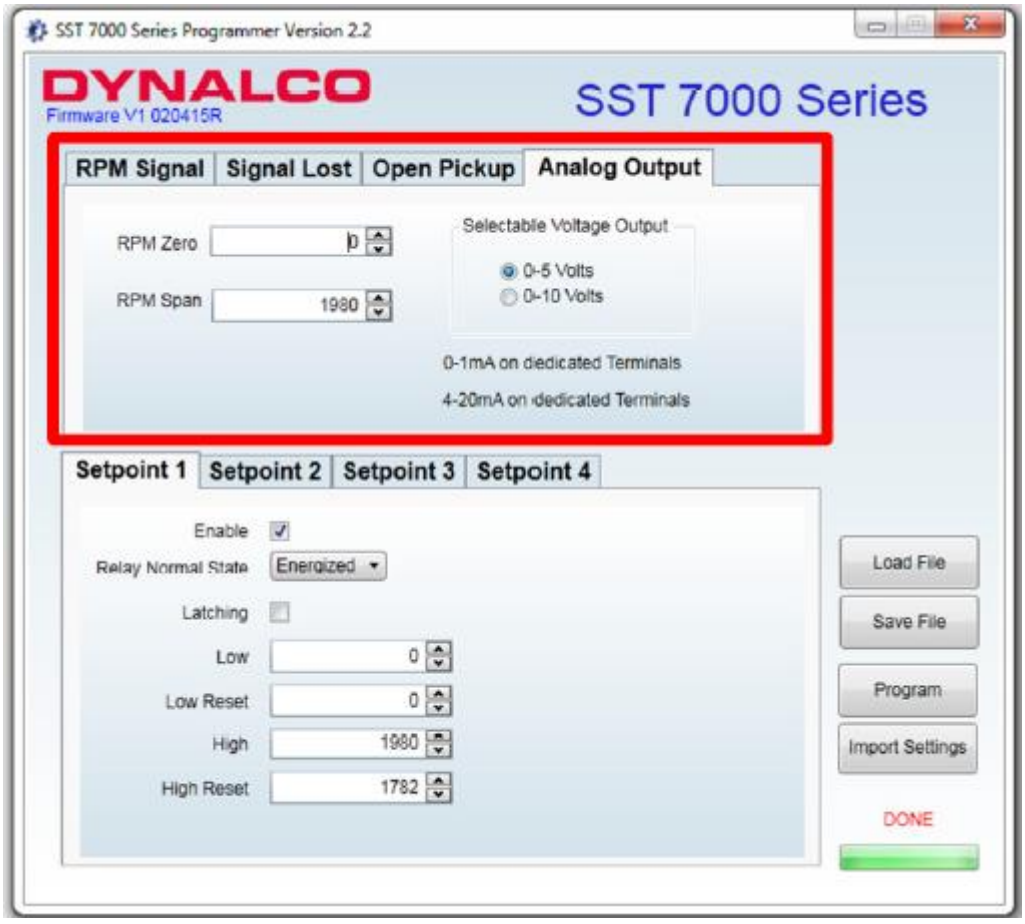


Analog Output

The analog output tab is used to define the RPM range of the proportional 4 – 20 mA output.

- RPM Zero
  - Set to the RPM value corresponding to 4 mA output.
  - Normally set to 0 RPM but can be set to any value as long as it is lower than the RPM span.

- RPM Span
  - Set to the RPM value corresponding to 20 mA output.



Setpoints 1 & 2 (plus 3 & 4 for SST7400)

The Setpoint tabs allow configuration of relay setpoints and relay logic.

- Enable
  - Check this box to enable each setpoint

- Relay Normal State
  - This is the normal relay state when not tripped
  - Either select normally Energized or normally De-Energized

WARNING:

For critical applications, it is highly recommended to configure the Relay Normal State as "normally Energized." This configuration will cause the contacts to switch in the event of a relay coil failure.

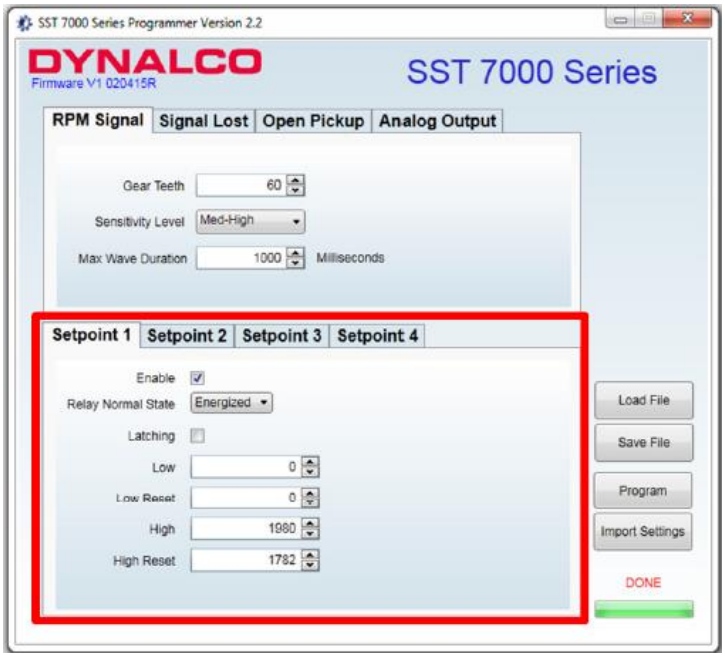
- Latching
  - Un-check this box to select non-latching relay (auto-reset following trip)
  - Check this box to select latching relay (must be manually reset following trip)
  - A momentary contact from DIG IN (digital input) to VIN GND (supply ground) will reset latching relay

- Low
  - Selects under speed setpoint
  - Set to 0 if no under speed setpoint required

- Low Reset
  - Defines the reset value following an under speed trip
  - Must be set at least 1% higher than Low RPM value to prevent relay chatter
  - Set to 0 if no under speed setpoint required

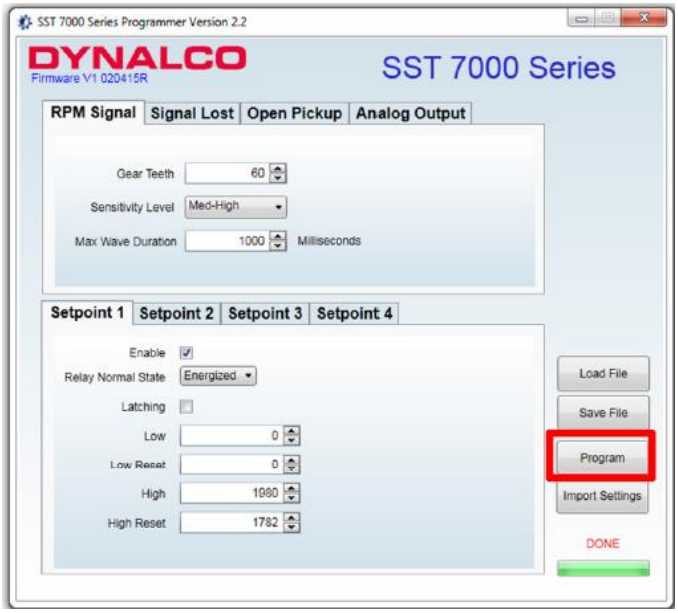
- High
  - Selects over speed setpoint

- High Reset
  - Defines the reset value following an over speed trip
  - Must be set at least 1% lower than High RPM value to prevent relay chatter



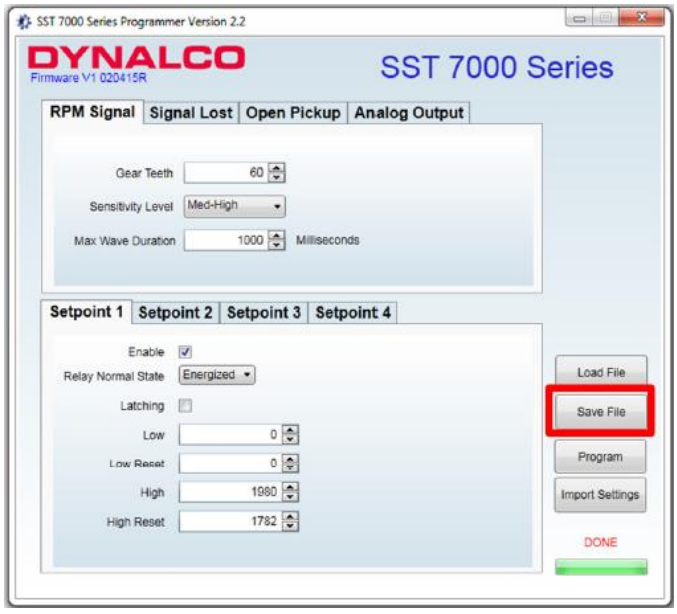
Program

Following initial configuration of the unit or any setting changes, you will need to select “Program” to program the new settings to the SST7200 / SST7400.



Save File

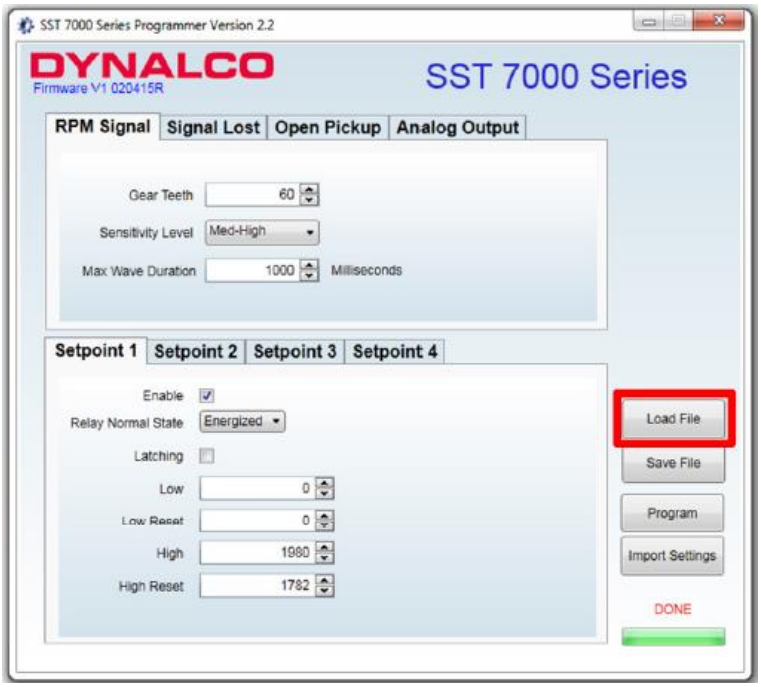
Selecting “Save File” allows the new settings to be saved to a file location on the PC.



Load File

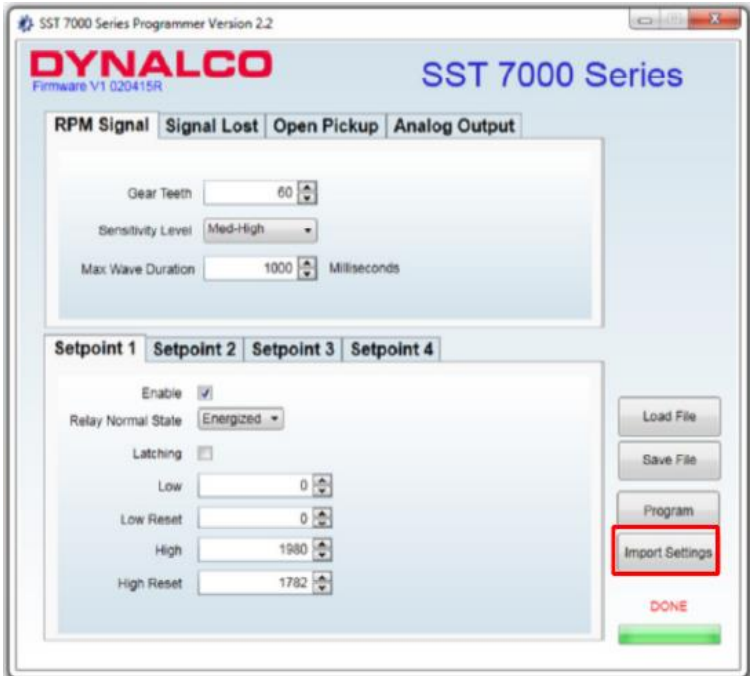
Any spec files that have been saved to the PC can be loaded to the SST7200 & SST7400 application by selecting “Load File.”

Following this, you will need to select “Program” to write the new configuration to the SST7200 & SST7400.



Import Settings

Selection of “Import Settings” will upload the current settings to be read by the SST7200 & SST7400 software.



WARNING:

The relay outputs on the SST7200/SST7400 should be tested monthly for proper operation, especially if being used for engine overspeed shutdown or other critical function.

CONNECTIONS FOR SST72XX/SST74XX WITH ISOLATION AND INPUT VAC FUNCTIONS

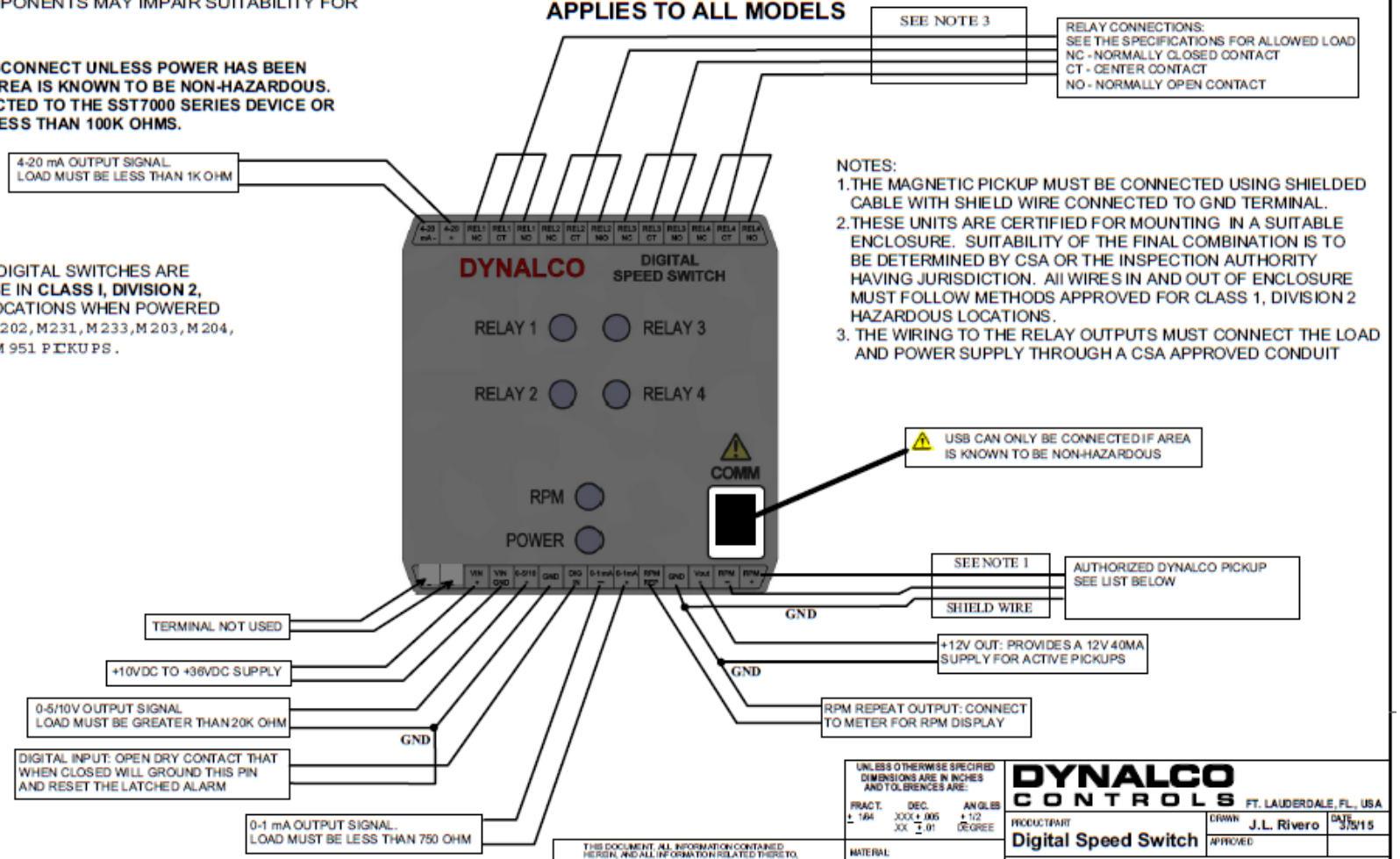
REVISIONS			
LTR	DESCRIPTION	DATE	APPD
A	PCO 9461, Initial Release	1/29/2015	JLR.

WARNING - EXPLOSION HAZARD :
SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.

WARNING:
DO NOT CONNECT OR DISCONNECT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS. PICKUP MUST BE CONNECTED TO THE SST7000 SERIES DEVICE OR TO A LOAD IMPEDANCE LESS THAN 100K OHMS.

ALL SST72XX/SST74XX DIGITAL SWITCHES ARE CSA CERTIFIED FOR USE IN **CLASS I, DIVISION 2, GROUPS A, B, C, & D** LOCATIONS WHEN POWERED BY A DYNALCO M201, M202, M231, M233, M203, M204, M205, M928, M928-24 & M951 PICKUPS.

WIRING DIAGRAM
APPLIES TO ALL MODELS



NOTES:
1. THE MAGNETIC PICKUP MUST BE CONNECTED USING SHIELDED CABLE WITH SHIELD WIRE CONNECTED TO GND TERMINAL.
2. THESE UNITS ARE CERTIFIED FOR MOUNTING IN A SUITABLE ENCLOSURE. SUITABILITY OF THE FINAL COMBINATION IS TO BE DETERMINED BY CSA OR THE INSPECTION AUTHORITY HAVING JURISDICTION. All WIRES IN AND OUT OF ENCLOSURE MUST FOLLOW METHODS APPROVED FOR CLASS 1, DIVISION 2 HAZARDOUS LOCATIONS.
3. THE WIRING TO THE RELAY OUTPUTS MUST CONNECT THE LOAD AND POWER SUPPLY THROUGH A CSA APPROVED CONDUIT

DO NOT SCALE THIS DRAWING

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DYNALCO CONFIDENTIAL

DO NOT SCALE THIS DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND TOLERENCES ARE:
FRACT. ± 1/64 | DEC. .XXX ± .005, .XX ± .01 | ANGLES ± 1/2 DEGREE

MATERIAL:

FINISH:

5

DYNALCO CONTROLS FT. LAUDERDALE, FL., USA

PRODUCT/PART	DRAWN	DATE
Digital Speed Switch	J.L. Rivero	3/5/15
	APPROVED	

TITLE: INTERCONNECTION DRAWING FOR CSA CERTIFIED UNITS

SCALE	SIZE	DRAWING NUMBER	PAGE	OF	REVISION
	B	800-13131	1	1	A