

## ProTechTPS

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### Overview

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On January 30, 2018, Woodward will be releasing new “preferred” ProTechTPS models and a new Field Software Conversion kit. The new ProTechTPS models include the same functionality as the older ProTechTPS models but include many product improvements and enhancements requested by product line users throughout the past years. After January 30, 2018, Woodward recommends that customers who are purchasing ProTechTPS units for use in new applications order part numbers from the “preferred” part number list only.

This ProTechTPS software update provides enhanced math/computational functionality and adds over 100 logic blocks for use when programming this safety logic solver for a specific application.

The new Field Software Conversion kit can be purchased and used to upgrade/convert older ProTechTPS models in the field to the new “preferred” ProTechTPS models by simply uploading/installing the latest software program. Refer to below description of changes for a list of the improvements and enhancements available. Refer to product manuals 35059v1 & 35059v2 for detailed product information on these new “preferred” ProTechTPS models.

### Description of Changes

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The new ProTechTPS software program is based on the older ProTechTPS software program and includes the below listed improvements/enhancements.

#### **New features**

The following new computational blocks were added:

1. MULTIPLY block. Provides the product of all configured inputs. Up to five inputs per block. Quantity 5.
2. DIVIDE block. Performs a divide function on the two inputs. Quantity 5.
3. ADD block. Provides the sum of all configured inputs. Up to five inputs per block. Quantity 5.
4. NEGATE block. Supports subtraction functionality by providing the negative value of the input. Quantity 10.

#### **Added the following new support blocks:**

1. CURVE block (polygon): A 2-dimensional lookup based on a single, configured analog input. Up to six breakpoints (coordinate pairs) can be defined. Values between breakpoints are interpolated. Values beyond table-defined min or max are limited - equal to first or last point, respectively; Quantity 2.
2. SWITCH block: Outputs one of two analog input values based on the status of the control input. Example usage: selecting a default value for a calculation if an analog input is failed; Quantity 10.
3. CONSTANT block: Allows definition of a fixed analog value to be used in conjunction with the math/analog blocks; Quantity 40.
4. ANALOG UNIT DELAY block: Loop breaking block for analog signals, to define execution order. Asserts a unit delay; Quantity 10.
5. COUNTER block: Provides a count indication as well as a comparison output which indicates when a count threshold is exceeded; Quantity 10.
6. PEAK HOLD block: Captures and holds both maximum and minimum signal values; Quantity 10.
7. PULSE DETECT block: Monitors an analog signal and is used to detect a sudden rise in value followed by a drop. The output indicates a pulse was detected; Quantity 5.
8. EVENT FILTER block: Provides an indication that an excessive number of events have occurred within the defined window of time. Typically used in conjunction with the PULSE DETECT; Quantity 5.

**Changes to existing logic blocks:**

- Speed Loss (sudden speed loss): made the failure threshold configurable and expanded the action selection to include 'not used'.
- Analog Output: Changes the source for the analog output to be configurable, allowing it to be connected to analog logic blocks.
- Analog Redundancy Manager: Added a difference detection to the Analog Redundancy Manager blocks, providing a difference comparison between the three inputs. The difference indication is provided if the threshold is exceeded for the configured time delay.
- Difference Detect: Modified the block inputs to allow connection to any of the internal analog logic signals (previously allowed connection to shared input signals only).
- Analog Inputs: Increased the allowed range of the analog inputs to +/- 999999.
- LAG blocks: Added a derivative (rate of change) output value to the LAG block for use in the configurable logic. The lag time constant data type was changed from a fixed-selection enumerated list to a numerical value from 0.004 to 10.
- Resettable Trip: Modified the function input to allow connection to any of the internal Boolean logic signals (previously allowed connection to discrete input 1-10 only).
- Auto Sequence Test: Added the test result displayed on the front-panel for the entire sequence, not just the local module. Removed the Continue Input selection, allowing the Start Input to provide both functions. Added inter-module halt option.
- The analog comparator ON and OFF inputs were modified to allow connection to any of the internal analog logic signals (previously these were constant values).
- Change the User Defined Test set input to edge triggered so the test does not repeat if set is left true.
- Logic execution rate changes: The discrete inputs are scanned at 1 ms (previously 4ms) and the configurable logic runs at 8ms (previously 4ms).

**Note:** all speed, acceleration, trip, and output functions are unchanged.

**Other Improvements and Additions:**

- Chinese language support added as a configuration setting.
- Increased allowable ranges for speed settings from 32000 to 80000 rpm to facilitate turbo-expander applications. The maximum speed frequency remains at 32kHz.
- A configurable low-pass filter was added to the acceleration signal.
- Front Panel Display changes:
  - Speed display: The precision of the speed value on the front panel provides one decimal precision when below 100 rpm. Configurable filtering added to the displayed speed value.
  - Improved front panel performance was improved, providing faster response to a key press.
  - Analog Input display: Expanded the front panel display of the analog input to show the level setpoints (e.g. Hi, Lo) as well as all the level status indications.
  - Trip button (front panel): Toggles display between the Trip Log and the Trip Latch.
  - Alarm button (front panel): Toggles display between the Alarm Log and the Alarm Latch.
  - Added Shared Reset, Shared Start, and Shared Speed Fail Override display screens.
  - Trip Latch inputs were rearranged to display more practical faults first (e.g. overspeed).
  - Modbus: A) Included the outputs of all analog logic blocks as Modbus analog/register reads. B) The address numbering (Boolean and register) changed to be consecutive, removing huge gaps in numbering. C) Added Spare Boolean read registers to prevent errors experienced by devices that queried in increments of 16. D) Added 20 scalable analog reads, allowing the user to select the source and set the signal scaling (for very large or very small analog signals).
- Expanded the configurable logic Boolean connections to include both the local and shared signals for start, reset, and speed fail override.
- New logic connections added:
  - Local and Shared Start
  - Local and Shared Reset
  - Local and Shared Speed Fail Override
  - ARM block Difference Detected
  - Outputs from the new analog blocks

- Configuration Checking enhancements implemented:
  - Power-up trip (trip relay must be set for de-energize for trip)
  - configuration mismatch (function must be enabled)
  - Speed fail alarm (function must be enabled and local speed must enabled)
  - Speed Fail Trip and Speed Fail Timer (function must be enabled and speed must be enabled)

### **GAP Programming Environment Updated**

Updated the ProTechTPS GAP/simulation tool to include the firmware updates in this release. This tool allows users to program the ProTechTPS using graphical function block code. 9927-2151 Revision B or newer is required. Refer to manual 26712 for details on this tool.

This tool provides the following:

- Graphical view of entire application
- Completeness check to ensure the program will be accepted by the device
- Documented feedback of the ProTech CRC codes to ensure program 'fingerprint' verifying laptop GAP program & installed ProTech settings
- GAP Block help clarifying the function and input/output fields of each block
- Built-in simulation on the user PC to allow testing/debugging of logic
- Simulation that allows manual entry (control) of Input signals

### **Compatibility Notes and Table**

- Field Software Conversion kit **8929-037** is compatible with and can be used to convert most older ProTechTPS models to the newer models listed below. See table below for compatibility information.

<b>Description</b>	<b>Part Numbers that Can Be Converted</b>
ProTechTPS – Bulkhead Mount, HV/LV, Ind. Relays	8237-1248 Rev D or Newer or 8237-1602
ProTechTPS – Bulkhead Mount, HV/HV, Ind. Relays	8237-1249 Rev D or Newer or 8237-1603
ProTechTPS – Bulkhead Mount, HV/LV, Voted Relays	8237-1250 Rev D or Newer or 8237-1604
ProTechTPS – Bulkhead Mount, HV/HV, Voted Relays	8237-1251 Rev D or Newer or 8237-1605
ProTechTPS – Panel Mount, HV/LV, Ind. Relays	8237-1371 Rev D or Newer or 8237-1606
ProTechTPS – Panel Mount, HV/HV, Ind. Relays	8237-1372 Rev D or Newer or 8237-1607
ProTechTPS – Panel Mount, HV/LV, Voted Relays	8237-1373 Rev D or Newer or 8237-1608
ProTechTPS – Panel Mount, HV/HV, Voted Relays	8237-1374 Rev D or Newer or 8237-1609
ProTechTPS – Field Software Conversion Kit	8929-037

- Only ProTechTPS Service Tool (9927-1684 Rev. F or newer) is compatible with both new and old ProTechTPS models. Note that the latest revision of this service tool can be obtained/ downloaded from Woodward's website
- Configuration files from older ProTechTPS models can be loaded into new ProTechTPS models using the ProTechTPS service tool. However, configuration files from new ProTechTPS models cannot be loaded into older ProTechTPS models.

## Preferred Model Numbers

The following table shows the new/improved “preferred” ProTechTPS part numbers:

Description	Non-Preferred Part Number	Preferred Part Number
ProTechTPS – Bulkhead Mount, HV/LV, Ind. Relays	8237-1602	8237-2602
ProTechTPS – Bulkhead Mount, HV/HV, Ind. Relays	8237-1603	8237-2603
ProTechTPS – Bulkhead Mount, HV/LV, Voted Relays	8237-1604	8237-2604
ProTechTPS – Bulkhead Mount, HV/HV, Voted Relays	8237-1605	8237-2605
ProTechTPS – Panel Mount, HV/LV, Ind. Relays	8237-1606	8237-2606
ProTechTPS – Panel Mount, HV/HV, Ind. Relays	8237-1607	8237-2607
ProTechTPS – Panel Mount, HV/LV, Voted Relays	8237-1608	8237-2608
ProTechTPS – Panel Mount, HV/HV, Voted Relays	8237-1609	8237-2609

## Customer Action

1. Customers who are currently using any ProTechTPS model and do not require any of the above listed changes/improvements should take no action. Woodward is committed to supporting the listed “non-preferred” models for a period of 20 years after inactivation. Refer to the related product support plan for these models.
2. After January 30, 2018, Woodward recommends that customers who are purchasing ProTechTPS units for use in new applications order part numbers from the “preferred” part number list only.
3. After January 30, 2018, customers who currently own an older ProTechTPS model and wish to have/utilize one or more of the above listed changes/improvements can send their old ProTechTPS model into Woodward Colorado, USA for a conversion to a new model. Optionally, they can purchase Field Software Conversion Kit 8929-037 and schedule a field conversion by an authorized Woodward field service engineer. Please contact your Woodward representative to schedule model conversions.

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