

SPD-2000 SERIES SYSTEM PROTECTION DEVICE



INSTALLATION INSTRUCTIONS

Muncie Power Products, Inc.

SPD-2000 Series

SYSTEM PROTECTION DEVICE

The Muncie Power SPD-2000 offers protection of the equipment's hydraulic system, but in particular, to clutch shift PTOs and pumps.

The SPD-2000 incorporates features that offer protection from premature failure causes of power equipment including:

- The SPD-2000 can limit the maximum high speed engagement of PTOs and pumps for the protection of the clutches.
- The SPD-2000 can limit the highest operating speed of equipment to protect system components such as PTOs, pumps, cylinders, etc., or to establish the systems maximum hydraulic flow.
- The SPD-2000 can input the truck speedometer signal and automatically disengage a clutch pump or PTO if the vehicle exceeds a MPH limit.
- The SPD-2000 incorporates OBD II functionality; it can read RPM and MPH readings from the OBD II port for an easier plug and play installation.
- The SPD-2000 can also react to safety interlock devices in order to interrupt power operation of a PTO or pump. These might include cylinder limit switches, door switches, air brake switches, neutral transmission switches, pump inlet vacuum switches, or hydraulic pressure switches.

The SPD-2000 incorporates a microcontroller that makes its installation and adjustment a breeze and its reliability rock-solid. All of the programming is accomplished by simple wire connections to an electrical ground. This includes establishing its setpoints. No tedious mechanical adjustments and no drifting of the settings. No factory or dealer required programming, no special readers, calibration tools, or extensive training required. It is truly a set-it-and-forget-it product.

HOW TO UTILIZE THE SPD-2000

The SPD-2000 serves to protect power equipment—especially clutch shift PTOs and pumps—by reacting to either RPM or MPH inputs. Additionally, within the RPM operation, there is a choice that allows the output control of the SPD-2000 to be automatically returned or to be locked out when it interrupts the output at the disengage setpoint. Safety interlocks can be added to one of the SPD-2000's inputs to add further restrictions to the safe operation of the power equipment.

It is important to decide first how the SPD-2000 will be used, as it will effect the installation, programming, and operation. Read further to fully understand the various options.

RPM OPTION

The SPD-2000 reads input from tachometer signals. This input can be connected to the appropriate ECU terminal, an alternator stator output, or to a sensor at a transmission or PTO. Two setpoints will be programmed. One will set a level for which the RPM must be below for the initial engagement operation. The second establishes the maximum RPM allowable for continued operation or disengage setting.

The RPM option allows for selecting how the SPD-2000 will respond after it disengages a PTO or pump.

- 1. Standard operation mode: The reactivation of the PTO or pump will be automatically returned when the RPM falls below the engage setpoint of the SPD-2000.
- Latched operation mode: This selection latches the disengaged state of the SPD-2000 until the PTO or pump activation switch is cycled off-to-on again. NOTE: THE RPM MUST BE BELOW THE LEVEL OF THE ENGAGE SETPOINT BEFORE RE-ENGAGEMENT.

The RPM option is the traditional overspeed protection used to protect clutches from failure by slippage by high-speed engagement and maximum operating speed limits to protect against hydraulic flows in excess of design limits for cylinders, motors, reliefs, etc.

MPH OPTION (LATCHED MODE)

The SPD-2000 reads input from truck speedometer signals. This input can be connected to the appropriate ECU terminal or to transmission sensors. The SPD-2000 can be programmed to interrupt its energizing output to a PTO or pump at any given MPH value. Once the interruption of the energizing output occurs, it can only be returned by cycling the activation switch for the PTO or pump. **NOTE: THE MPH OF THE TRUCK MUST BE BELOW THE DISENGAGE SETPOINT BEFORE RE-ENGAGEMENT.**

The use of the MPH option will protect PTOs or pumps from being inadvertently left activated when the truck drives off the job.

INTERLOCK OPTION

The SPD-2000 reads input for all manners of extraneous safety switches. These can include transmission neutral switches, brake switches, door switches, pressure switches, pump inlet vacuum switches, etc. A single or multiple switches can be used.

When this option is used each switch will be connected to the interlock input of the SPD-2000 and then to an electrical ground. If any connected switch closes its contacts to complete a path to ground, the SPD-2000 will react by disengaging the PTO or pump.

The SPD-2000 will remain in the disengaged state until the closed switch contacts open and the conditions for the MPH or RPM safe operation is satisfied.

OBD II (OPTIONAL)

The SPD-2000 has the capability to interface with vehicles that have an OBD II port. By adding an additional harness, the SPD-2000 can read RPM or MPH from the chassis without having to hook up the wires directly to the applicable locations. The OBD II feature will need to be programed using a PC Programming Cable and a computer application that is available online. Once programmed, use the OBD II harness by plugging it into the OBD II port located under the dash and inserting the two-pin connector into the SPD-2000.

PC PROGRAMMING

The SPD-2000 can be programmed with a computer application that can be downloaded from Muncie Power's website. This allows all standard programming (programming that can be done with the tap to perform feature) as well as the OBD II interface.

INSTALLATION WIRING

The SPD-2000 comes with a six-wire connector harness (34T44007) that includes the power, ground, RPM and MPH inputs, and the two outputs (one for the PTO or pump and the other for a status indicator light).

The SPD-2000 also comes with a three-wire harness (34T44008) that has flying leads. These wires are for setting the operating mode, setting the engage and disengage points, and for connecting safety interlock switches.

HIGH AMP OPTION (CLUTCH PUMPS)

For electrical loads higher than 5 amps, the following relay harness and adapter can be sourced separately (P/N: 34T41001 + 34T44006). This relay kit adapter allows the module to drive electrical loads up to 20 amps continuous duty. (See page 13.)

FORD 2020+ MODEL YEARS

For Ford model years 2020+, you will need the specific Ford adapter harness 34T67228 for the SPD-2000. If you have already purchased the standard SPD-2000 kit for new installations, AND, have a Ford 2020+ model year, you will need to source the 34T67228 wire harness separately. If not, you will need to purchase SPD-2004A Ford Kit, which will come with everything needed for new SPD-2000 installation, including the Ford adapter harness 34T67228. (See page 14.)

CONNECTOR WIRE HARNESS

RED WIRE (Power)	This is the power wire and should be connected to the activation switch for the PTO or pump. The SPD-2000 will in turn be the sole source of power to the PTO or pump solenoid or clutch coil. DO NOT MAKE A CONNECTION FROM THE ACTIVATION SWITCH TO THE PTO OR PUMP AS WOULD BE DONE WITHOUT AN SPD-2000 IN THE CIRCUIT.				
BLACK WIRE (Ground)	This is the negative power for the SPD-2000. Connect to a secure electrical ground (battery ground).				
ORANGE WIRE (RPM)	If you have chosen RPM as the reactive input, then connect this wire to a tachometer signal. This could be an alternator stator, a transmission, a PTO sensor, or an ECU. If you have chosen MPH as the reactive input, then do not connect this wire.				
GREEN WIRE (MPH)	If you have chosen MPH as the reactive input, then connect this wire to a speedometer signal. This could be at a transmission sensor, speedometer display head, transmission interface module, or an ECU. If you have chosen RPM as the reactive input do not connect this wire.				
BLUE WIRE (Output to coil)	This is the SPD-2000 control output. This wire is to be connected to a PTO or pump solenoid valve, or clutch pump coil. This output is rated for 5 amps continuous maximum. The output will automatically turn itself off if this limit is exceeded.				
WHITE WIRE (Indicator lamp)	This wire can be connected to an indicator light or alarm to show the status of the SPD-2000. This output is currently limited to 1 amps. A connected device cannot exceed 6 watts. The output will automatically turn itself off in the event of a current demand in excess of its rating.				

LOOSE WIRES

YELLOW WIRE	This is the connection for safety interlock switches. Connect one side of the switch to this wire and the other side to ground. Any number of switches
(Interlock input)	can be connected in this way to monitor a number of safety considerations.
GRAY WIRE	Grounding this wire puts the SPD-2000 into it program mode for
(Programming)	wire from ground sets the SPD-2000 for normal operation.
BROWN WIRE (Programming / Latched output)	 This wire serves two functions. When the SPD-2000 is in its program mode a momentary connection to ground on this wire establishes the engage and disengage setpoints in response to RPM or MPH levels. In the normal operating mode of the SPD-2000 permanently grounding this wire causes the SPD-2000 to operate in the latched output mode for RPM inputs as described above. If you are not using the latch mode then leave this wire unconnected after making the setpoint entries in the program mode.

STATUS DISPLAYS

The SPD-2000 has its own LED status indicator on the module itself. If an optional light or alarm has been connected to the WHITE WIRE output, it will follow the same patterns of displays as the LED.

PROGRAM MODE LED INDICATORS:

ENGAGE SETPOINT	Three $\ensuremath{^{/}\!$			
DISENGAGE SETPOINT	Six 1/3 second duration flashes indicate the SPD-2000 accepted a disengage setpoint.			

OPERATING MODE LED INDICATORS:

STEADY ON	LED =				
	Condition indicates the PTO or pump has been shut off because of an overspeed condition.				
STEADY OFF	NULL Condition indicates the PTO or pump is actively operating.				
CLOSE TO DISENGAGE	LED =				
	One second pulses ON followed by one second OFF indicates the RPM or MPH is very close to the disengage setting.				
DISENGAGE	LED =				
	Two second pulses ON followed by two seconds OFF indicates that a safety interlock switch is triggered and the PTO or pump has been disengaged by the SPD-2000.				
MAX. AMP. EXCEEDED	LED =				
	Continuous ½ second duration pulses indicates that the 5 amp maximum current has been exceeded on the BLUE WIRE output to the PTO or pump. Recycling the PTO or pump activation switch will clear this fault if the cause of the overcurrent condition is corrected.				

VALIDITY CHECK

To confirm the validity of the RPM or MPH input on the SPD-2000, first ground the GRAY WIRE (programming wire). With the RPM or MPH source operating, observe the LED indicator on the module. The LED will be lit (constant ON) if the input is acceptable. The LED will remain OFF or flicker if the input is not detectable or unstable.

PROGRAMMING THE SETPOINTS

- 1. Temporarily ground the GRAY WIRE to put the SPD-2000 into the program mode.
- 2. For an RPM input, the SPD-2000 will have two setpoints. One for the maximum engagement speed and a second for the maximum operating speed or disengagement.
- 3. Advance the engine's RPMs to the value of the first setting (engage limit) and while holding the speed touch the BROWN

WIRE to a ground and then lift wire from ground. The SPD-2000's LED status indicator will respond with three flashes if successful (if an indicator light has been connected to the WHITE WIRE it will also flash in the same manner). Next, advance the engine's RPMs to the second setting (disengage limit) and again touch the BROWN WIRE to a ground and then lift wire from ground. The LED status indicator will respond with six flashes if successful.

NOTE: If you were to touch the BROWN WIRE again with the SPD-2000 powered up it will begin over with a new first setting.

- 4. For a MPH input, there will only be one setpoint which is the disengage speed. Touch the BROWN WIRE to a ground with the truck speedometer showing the desired speed at which you desire the SPD-2000 to interrupt operation of the PTO or pump.
- 5. When finished remove the GRAY WIRE from ground. After removing GRAY WIRE from ground, shut unit OFF and then ON again to retain settings.
- 6. LATCHED OUTPUT ONLY: If you are using the RPM input and want the operation to be a latched-off control at the disengage setting, then you will need to ground the BROWN WIRE permanently after making the settings in the program mode. DO THIS ONLY AFTER DISCONNECTING THE GRAY WIRE TO END THE PROGRAM MODE.

MOUNTING

After programming the unit, mount it within the cab or engine compartment and away from any heat source or road spray. The input harness can be removed and the dust cap can be put in place. If any loose wires are remaining, cut the wires short and tape off to prevent them from grounding. Place remaining dust caps on unused connectors.



COMPONENTS LIST:

- System Protection Device Module
- SPD2 Harness Adapter (SPD-1001)......34T44006
- SPD2 Upfitter Wire Harness......34T44007

- SPD2 PC Programming......34T44010



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Ground

SPD-2000 WIRING DIAGRAM



SPECIFICATIONS:

- Max Output: PTO or Clutch Coil 5 Amps
- Max Output: Indicator Light 1 Amp
- Operating Temperature Range: -40° C to 85° C (-40° F to 185° F)
- Operating Voltage Range: 7-30 V
- Accept RPM or MPH sinusoidal or square wave: 1 Hz to 10 Khz
- Overcurrent protection

NOTE: **20 Amp option available with P/N: 34T4101 _ 34T44006 (see pg. 13).

CLUTCH SHIFT PTO RPM/MPH CONTROLLED



Note:

- Faceplate and light are not included. Sold separately - 36TK4971

36TK4971 Kit							
1	36M01006	Faceplate					
2	32MSR12V	Light					
3	34M18187	Terminals					

CLUTCH PUMP RPM/MPH CONTROLLED



Note:

- Faceplate and light are not included. Sold separately - 36TK4971

TYPICAL PTO INSTALLATION



FLYING LEADS - STANDARD INSTALLATION

- BROWN WIRE Momentary connection. With GRAY WIRE grounded, touch BROWN WIRE to ground to set the engage and disengage speed settings. This wire is not connected after unit is programmed.
- YELLOW WIRE Not connected.
- GRAY WIRE Temporary connection for programming. Remove from ground after programming is completed.



- Requires switch to be opened and activation switch to be cycled OFF/ON in order to re-engage unit.
- Close switch will disengage PTO.



SPD-2000 REPLACEMENT

When replacing the SPD-1001 with SPD-2000, the retro fit harness and module are included in the SPD-2003A. Use the included harness, 34T44006, to convert from the SPD-1001 harness to the SPD-2000. Unplug the SPD-1001 and insert the SPD2 harness adapter, next connect the adapter harness to the SPD-2000.

DT06-6S Pin Assignment				12124107 Pin Assignment			
Pin Function	AWG	Wire Color		Pin	Function	AWG	Wire Color
1 +12 V	18	Red		A	Ground	18	Black
2 Ground	18	Black		В	+12 V	18	Red
3 SPD Output	18	Blue		С	RPM	18	Orange
4 Indicator Output	18	White		D	MPH	18	Green
5 RPM	18	Orange		E	SPD Output	18	Blue
6 MPH	18	Green		F	Indicator	18	White

HIGH AMP OPTION - 20 AMPS



FORD MODEL YEAR 2020+ ADAPTER HARNESS P/N 34T67228

DT06-6S Pin Assignment					DT04-6P Pin	Assig	Inment	
Pin	Function	AWG	Wire Color		Pin	Function	AWG	Wire Color
1	+12 V	18	Red		1	+12 Volt	18	Red
2	Ground	18	Black		2	Ground	18	Black
3	SPD Output	18	Blue		3	SPD Output	18	Blue
4	Indicator Output	18	White		4	Indicator	18	White
5	RPM	18	Orange		5	RPM	18	Orange
6	MPH	18	Green		6	MPH	18	Green
To SPD-2000 To Std. SPD-2000 Harness								

NOTES



A Member of the Interpump Group

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