



SPD-1001D

SYSTEM PROTECTION DEVICE



INSTALLATION INSTRUCTIONS

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The Muncie SPD-1001D offers protection of the equipment's hydraulic system but in particular, to clutch shiftable PTOs and pumps.

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

- The SPD-1001D can limit the maximum high speed engagement of PTOs and pumps for the protection of the clutches.
- The SPD-1001D can limit the highest operating speed of equipment to protect system components such PTOs, Pumps, Cylinders, etc. or to establish the systems maximum hydraulic flow.
- The SPD-1001D can input the truck speedometer signal and automatically disengage a clutch-pump or PTO if the vehicle exceeds a MPH limit.
- The SPD-1001D incorporates a unique design for operating PTO and pump solenoid valves that lets them run significantly cooler and thereby minimizes the principal cause of coil failure.
- The SPD-1001D 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-1001D 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 set-points. 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-1001D

The SPD-1001D serves to protect power equipment; especially clutch-shiftable PTOs and pumps, by reacting to either RPM or MPH inputs. Additionally, there is a choice for RPM operation, that allows the output control of the SPD-1001D to be automatically returned or to be locked out when it interrupts the output at the "disengage set-point". Safety interlocks can be added to one of the SPD-1001D's inputs to add further restrictions to the safe operation of the power equipment.

It is important to decide first how the SPD-1001D will be used, as it will effect the installation, programming and operation. Read further to fully understand the various options.

RPM OPTION

The SPD-1001D provides input for 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 “set-points” 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-1001D 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 set point” of the SPD-1001D.
2. Latched operation mode: This selection “latches” the “disengaged” state of the SPD-1001D 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-1001D provides input for truck speedometer signals. This input can be connected to the appropriate ECU terminal or to transmission sensors. The SPD-1001D 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 PTO’s or pumps from being inadvertently left activated when the truck drives off the job.

INTERLOCK OPTION

The SPD-1001D provides 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-1001D and then to an electrical ground. If any connected switch closes its contacts to complete a path to ground, the SPD-1001D will react by “disengaging” the PTO or pump.

The SPD-1001D will remain in the “disengaged” state until the closed switch contacts open. AND THE CONDITIONS FOR THE MPH OR RPM SAFE OPERATION IS SATISFIED.

INSTALLATION WIRING

The SPD-1001D comes with a six-wire connector harness that includes the power, RPM and MPH inputs and the two outputs (one for the PTO or pump and the other for a status indicator light).

There are also three additional flying lead wires exiting the SPD-1001D module. These are for setting the operating mode, setting the “engage” and “disengage” points and for connecting safety interlock switches.

CONNECTOR WIRE HARNESS

<p>RED WIRE (Power)</p>	<p>This is the power wire and should be connected to the “activation switch” for the PTO or pump. The SPD-1001D 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 A SPD-1001D IN THE CIRCUIT.</p>
<p>BLACK WIRE (Ground)</p>	<p>This the negative power for the SPD-1001D. Connect to a secure electrical ground (battery ground).</p>
<p>ORANGE WIRE (RPM)</p>	<p>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 or PTO sensor or an ECU. If you have chosen MPH as the reactive input then do not connect this wire. Note: If the MPH input is a “low side driver”, this wire must be grounded.</p>
<p>GREEN WIRE (MPH)</p>	<p>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. Note: If the RPM input is a “low side driver”, this wire must be grounded.</p>
<p>BLUE WIRE (Output to coil)</p>	<p>This is the SPD-1001D 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.</p>
<p>WHITE WIRE (Indicator lamp)</p>	<p>This wire can be connected to an indicator light or alarm to show the status of the SPD-1001D. This output is current limited to 0.5 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.</p>

LOOSE WIRES

YELLOW WIRE (Interlock input)	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 can be connected in this way to monitor a number of safety considerations.
GRAY WIRE (Programming)	Grounding this wire puts the SPD-1001D into its "program mode" for establishing the "engage and disengage" setpoints. Disconnecting this wire from ground sets the SPD-1001D for normal operation.
BROWN WIRE (Programming / Latched output)	This wire serves two functions. A. When the SPD-1001D 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. B. In the normal operating mode of the SPD-1001D permanently grounding this wire causes the SPD-1001D 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-1001D 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 1/3 second duration flashes indicate the SPD-1001D accepted an "engage" set point.
DISENGAGE SETPOINT	Six 1/3 second duration flashes indicate the SPD-1001D 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.
DISENGAGED	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-1001D.
MAX. AMP. EXCEEDED	LED = - - - - - Continuous 1/3 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 over-current condition is corrected.

VALIDITY CHECK

To confirm the validity of the RPM or MPH input on the SPD, first ground the Gray wire (Programming wire), with the RPM or MPH source operating and 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 SET-POINTS

1. Temporarily Ground the GRAY WIRE to put the SPD-1001D into the “program mode”.
2. For a RPM input the SPD-1001D will have two set-points. One for the maximum “engagement” speed and a second for the maximum operating speed or “disengagement”.
3. Advance the engine RPM's 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-1001D'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 RPM's 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-1001D powered up it will begin over with a new first setting.

- 4) For a MPH input there will only be one set-point 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-1001D 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.

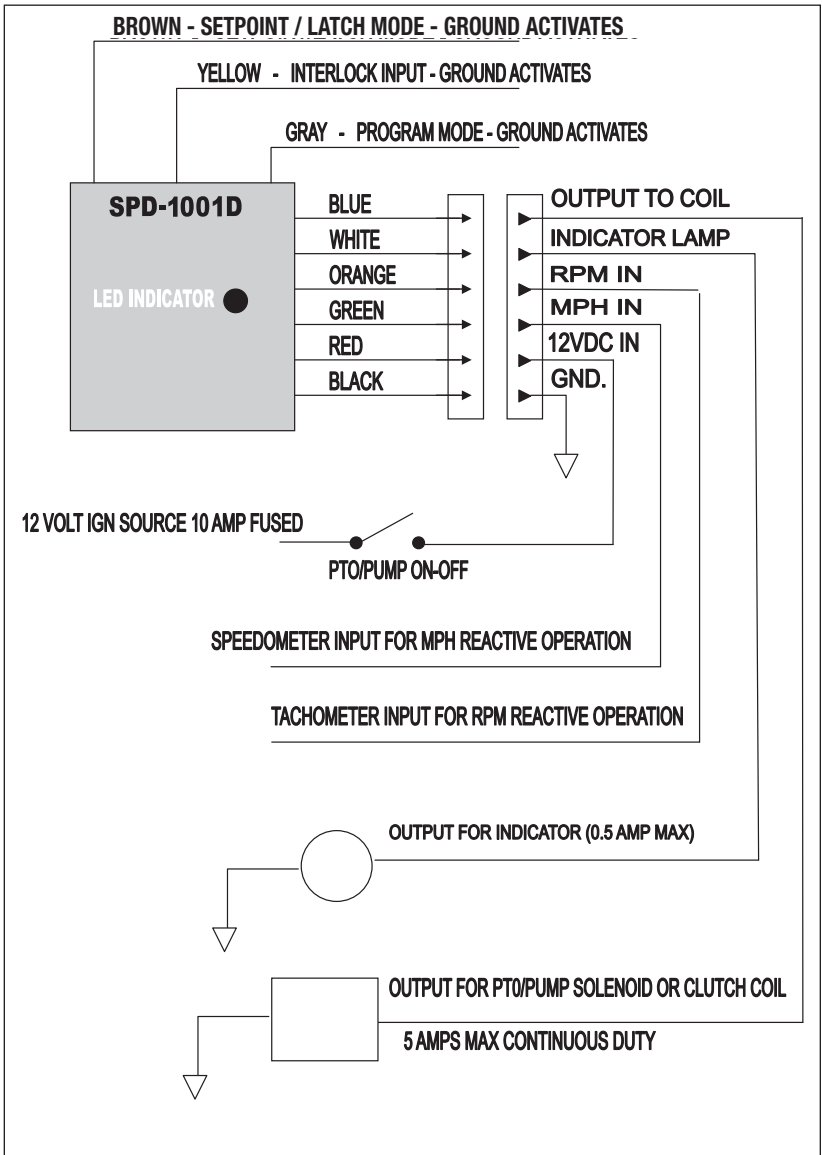
MOUNTING

After programming unit, mount it within the cab or engine compartment and away from any heat source or road spray. The flying leads, which are not connected after programming, can be cut short and taped off to prevent them from grounding. The kit is supplied with a decal which is to be mounted nearest the indicator light for “disengage” indication (if installed) or placed near SPD if no indicator light is used.

SPD-1001D COMPONENTS:

- SPD-1001DX - Base Unit
- 34T40871 - Upfitter Wire Harness
- 36T40878 - Dash Label

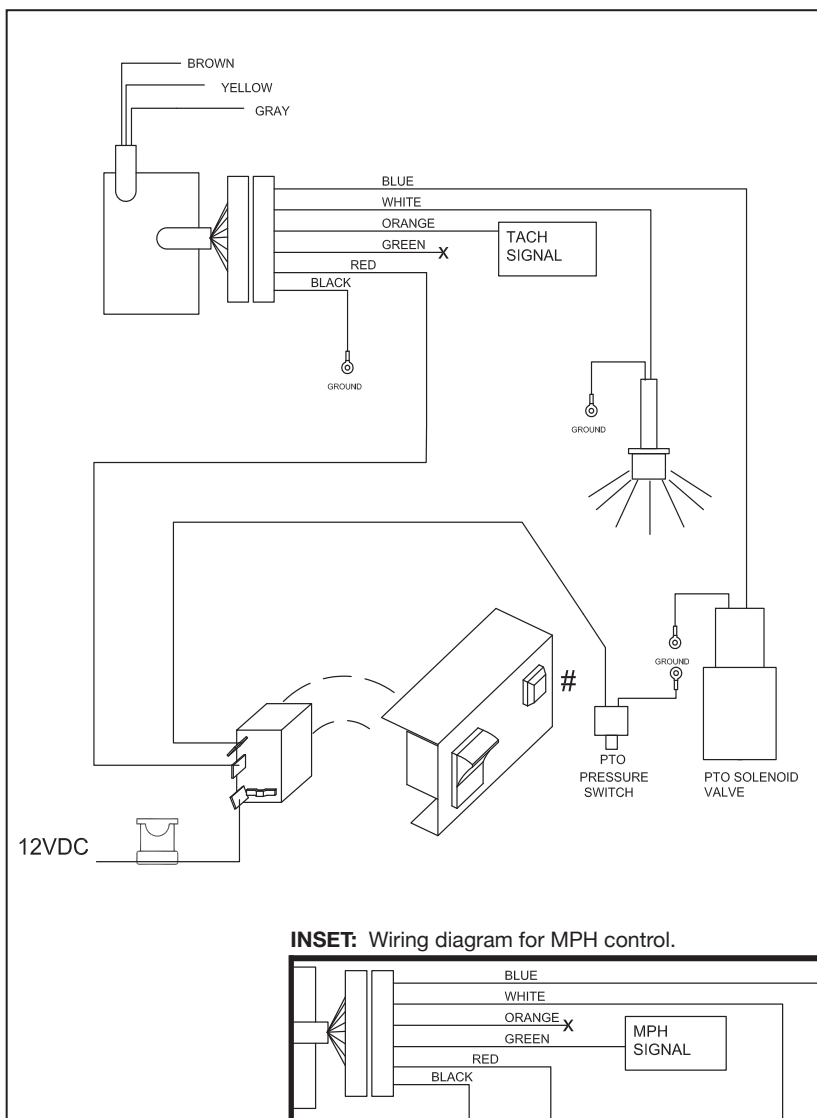
SPD-1001D WIRING DIAGRAM



SPECIFICATIONS:

- Max output low current .500 amp (white wire)
- Max output high current 5 amp (blue wire)
- Operating temperature range -40° C to 70° C (-40° F - 160° F)
- Operating voltage range 9-28 Vdc
- Accept RPM or MPH sinusoidal or square wave type signals from 200 mV pp, with a frequency range within 10Hz to 5kHz.

CLUTCHSHIFT PTO RPM/MPH CONTROLLED



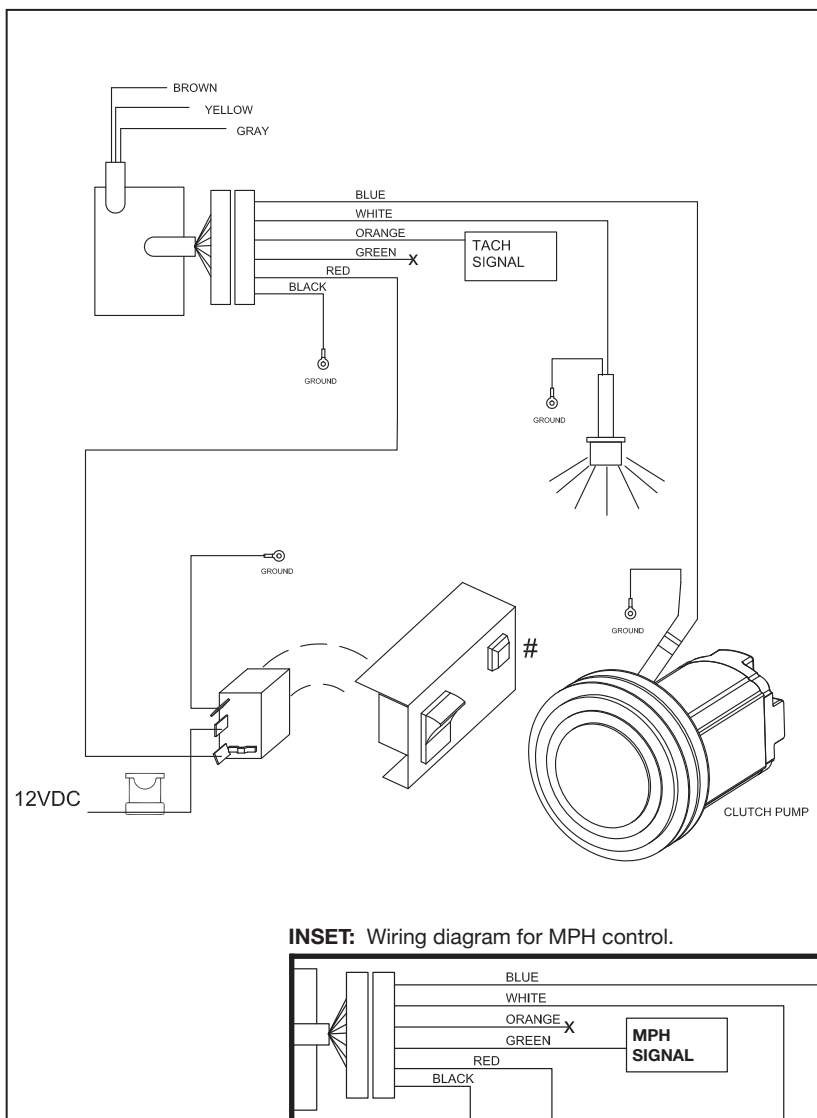
INSET: Wiring diagram for MPH control.

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

36TK4971 KIT

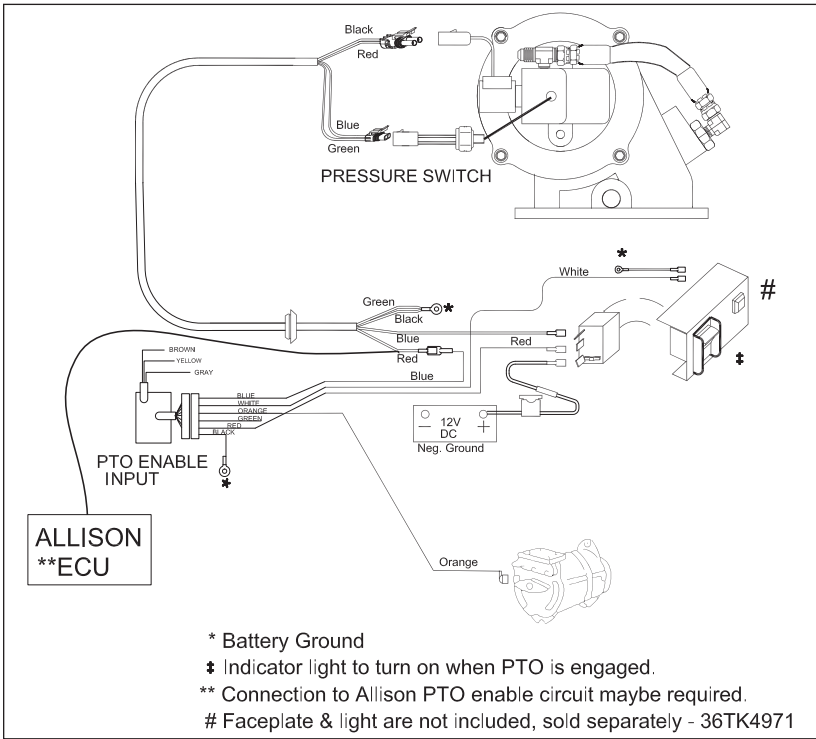
- 136M01006Faceplate
- 132MSR12VLight
- 234M18187Terminals

CLUTCHPUMP RPM/MPH CONTROLLED



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

TYPICAL PTO INSTALLATION

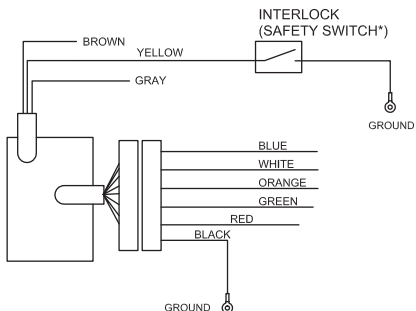


FLYING LEADS - STANDARD INSTALLATION

- 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.

SAFETY / INTERLOCK

- Requires switch to be opened and activation switch to be cycled off-on in order to re-engage unit.
- Close switch will dis-engage PTO.

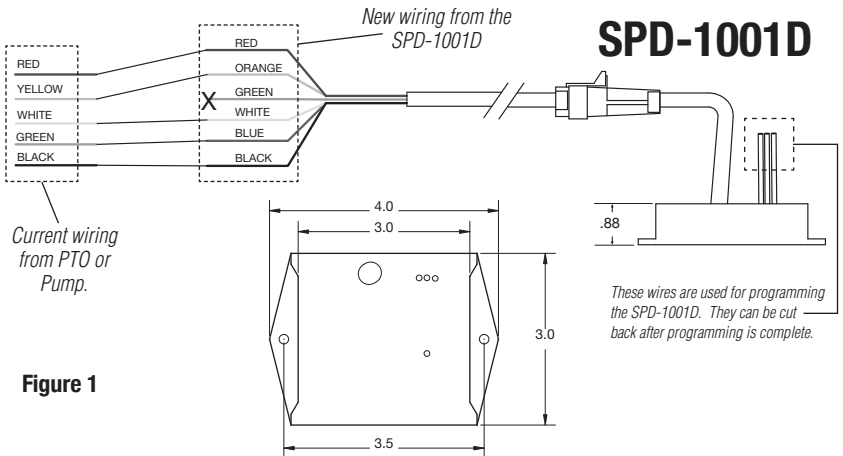
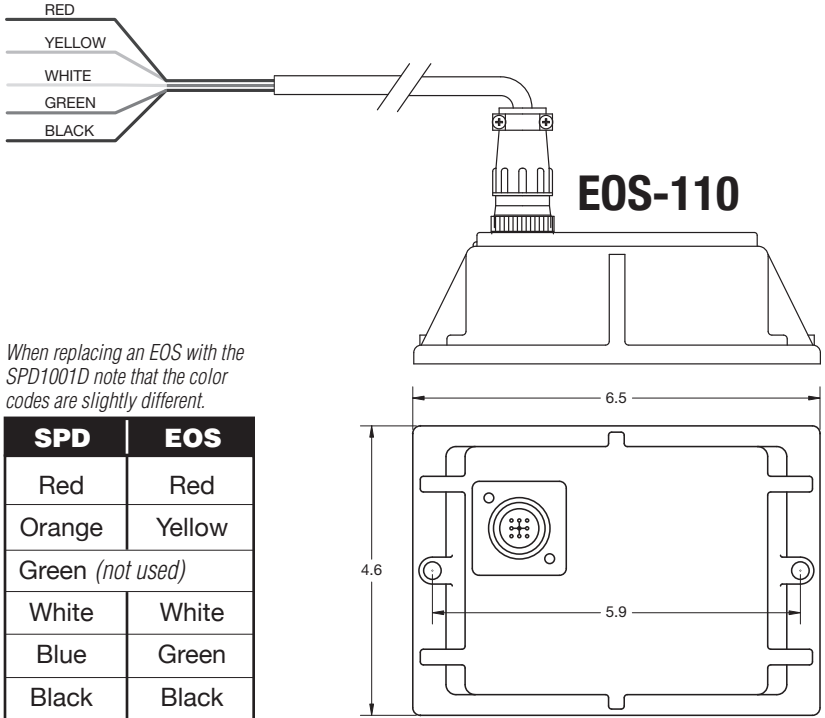


* Interlock switches/buttons can be multiple locations wired in parallel.

EOS REPLACEMENT

When replacing an EOS please note two different situations.

SITUATION ONE: When the EOS operates only the PTO or Pump and not other componets, it can be replaced by the SPD-1001D by wiring the SPD to the EOS wiring connections as described in (Figure 1.)



EOS REPLACEMENT *continued*

SITUATION TWO: When the EOS is operating equipment requiring higher than 5 Amp draw, then use the SPD-1001B which incorporates a 12Vdc relay to control the activation (Figure 2.)

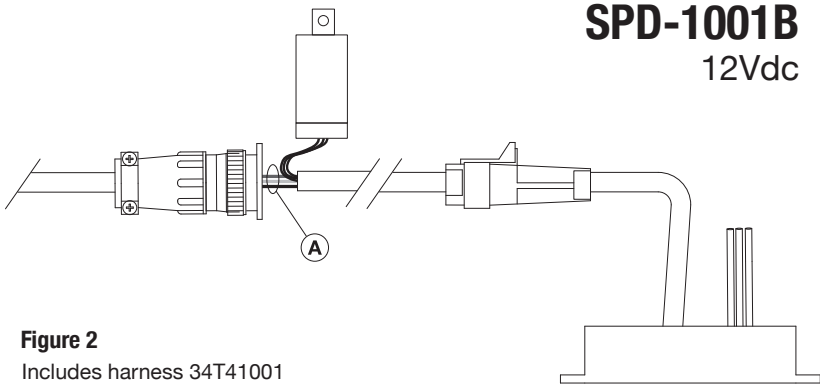


Figure 2

Includes harness 34T41001

A: For applications needing to control devices using 5A to 10A, use the SPD-1001B, but remove the EOS connector to make your SPD connections.