Cincinnati Process Technologies
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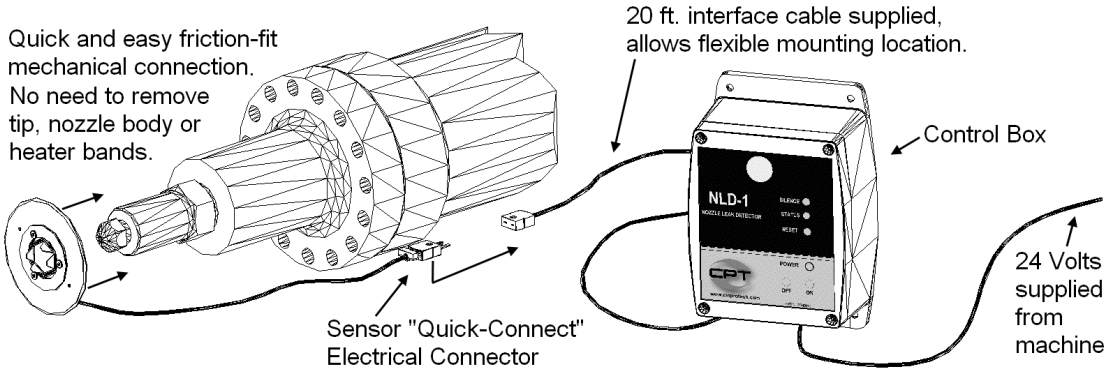
Nozzle Leakage Detector

User's Guide

Overview

The Nozzle Leakage Detector control box is designed to be directly mounted on the injection molding machine with the interface cable permanently attached in a manner similar to thermocouple wiring. The leakage detector disk was designed for easy replacement and has a friction-fit to hold the disk in place and a quick-connect electrical connection.



Nozzle leakage is detected when leaking plastic contacts the sensor disk. Upon detection the control box emits an audible alarm as well as activates a relay. In addition a “Status” LED reflects the current state (Red = Alarm, Green = OK). The audible alarm can be silenced by pressing the “Silence” button.

The NLD-1 system can be used independently or it can be directly interfaced to your injection molding machine. Typically machine interfacing is done by interrupting the purge guard signal through the relay contacts inside the control box.

The Nozzle Leakage Detector consists of three major parts: control box, wiring and the nozzle disk.

Installation

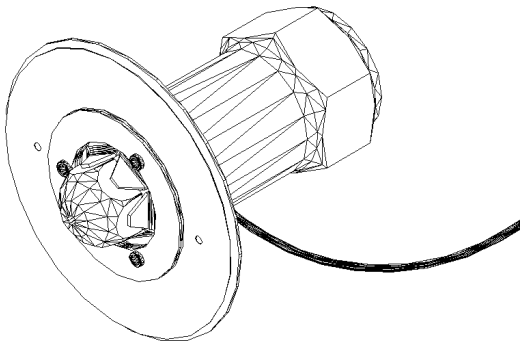
Appropriate precautions should be taken when working around high temperature and high voltage. To avoid risk of shock, machine power should be turned off before installing the NLD-1 system. Heater bands are hot and powered with high voltage, avoid making contact with them.

Leakage Disk Installation

1) To install, simply push the sensor disk onto the nozzle tip until seated. Make sure that the ‘points’ are facing towards the mold and the flat side is facing the nozzle body (as shown, right). In this position, the brass flex-plate will make contact with the leaking plastic.

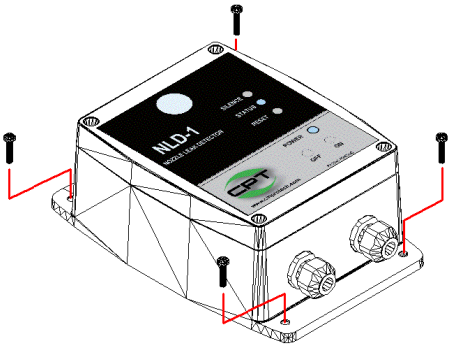
2) Inspect to make sure that the disk, when seated, does not interfere with the nozzle radius. This ensures that the when the sled is forward, and the nozzle is against the mold no damage occurs.

3) Without putting excess strain on the disk’s cable, route the cable back towards the barrel. Use a few cable ties to secure the wire to existing thermocouple or heater band wiring, leaving the connector free enough to insert into the other cable. Remember this is a consumable part, so do not attach cable ties in excess.



Control Box Installation and Wiring

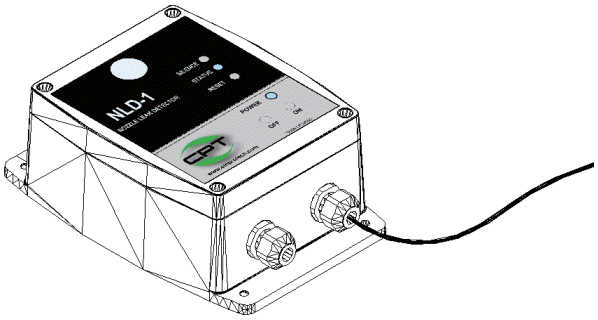
1) Begin by connecting the 20-foot interface cable to the installed leakage disk. This cable is a permanent installation, so it is ok to use more cable ties on this wire.



2) Use cable ties to secure the wire to existing thermocouple or heater band wiring. Leave a little extra cable to account for minor variations in the nozzle disk cable length.

3) Route the existing cable as desired; be sure to take the sled (carriage) travel into consideration. This will help to avoid a situation where the cable is over-tightened when the sled is fully forward or retracted.

4) Use the four mounting holes on the lip of the control box to bolt it to a panel in an appropriate place. If the supplied cable length is not long enough, it is acceptable to extend the wire either through a terminal block or by using wire nuts. The cable extension does not need to be thermocouple wire.



5) Open the control box by unscrewing the captive screws in the lid. Feed the end of the interface cable through the cable gland at the bottom of the control box and cut the cable to length leaving enough excess to attach the cable to the circuit board on the lid (approximately 8-10" inside the box).

6) To connect the end of the wire to the circuit board the cable end needs to be stripped. Use a razor-knife and very carefully cut through the outer (brown) jacket back (about 1" long). To avoid cutting the insulation lay the wire flat against a cutting surface and slice the insulation between the wires where the jacket is tightly stretched.

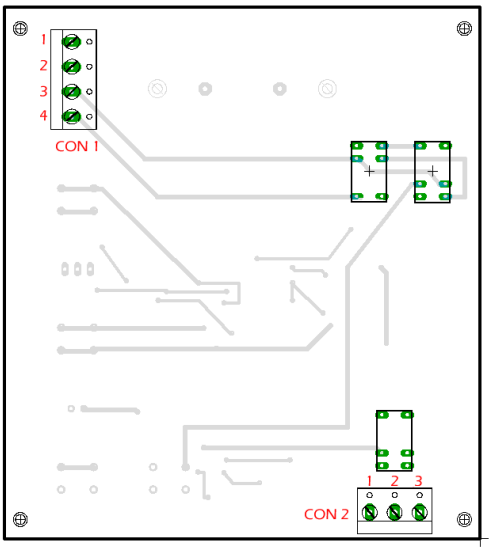
7) Remove the sliced portion of the brown jacket by peeling it back and cutting it off with the razor-knife.

8) Strip back the insulation ¼" on both the white and red wires. Trim any remaining insulation strands to ensure that the wire (not the insulation) will make electrical contact with the connector.

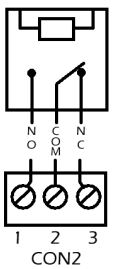
9) Screw the **RED** wire to Pin 1 on CON 1 (Shown Right).

10) Screw the **WHITE** wire to Pin 2 on CON 1 (Shown Right)

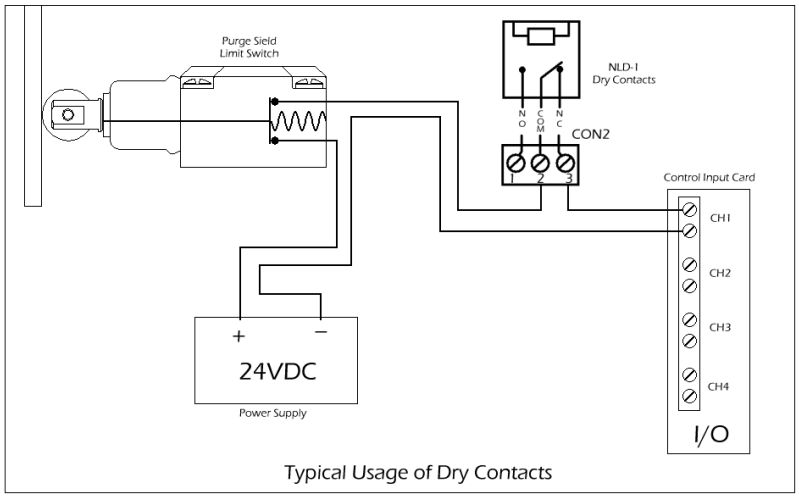
11) A power supply cable (customer supplied) must also be run from the 24VDC power supply to pins 3 & 4 of CON 1 (shown, right). CON1, pin 3 is common (ground) and CON1, pin 4 is +24V DC. Run this wire through the other cable gland on the bottom of the control box.



12) The final 'relay dry contacts' cable is optional. One suggested use for the relay dry contacts is to cut the signal from the purge shield, allowing the injection molding machine to provide an audible alarm and stop the machine. The relay is only to be used to make or break signal level circuits (not to be used for driving high current devices).



13) The illustration below shows one possible method of wiring of the dry contacts.



Typical Usage of Dry Contacts

Operation

The NLD-1 control box has four buttons (ON, OFF, SILENCE and RESET) and two LEDs (POWER and STATUS). This portion of the guide describes the function of each component.

With power applied, and a disk installed, turn the unit on by pressing the ON button. The alarm may sound when the unit is initially turned on, this is normal, simply press the SILENCE button to stop the buzzer. The POWER LED will illuminate green when the unit is turned on.

The STATUS LED indicates the operating condition of the disk. If it is green then there is no obstruction (like plastic leakage) pressing against the disk, conversely, if it is red there is an obstruction.

The STATUS LED will turn red and the alarm will sound when an obstruction is pressing against the disk. This is an alarm condition. In addition the dry contact relay will actuate (the common pin will disconnect from the normally closed pin and will connect to the normally open pin).

When in an alarm condition, press the SILENCE button to mute the buzzer. This does not remove the alarm condition. In fact, if the obstruction is still present even pressing the RESET button will not remove the alarm condition (the STATUS LED will remain red). The only way to clear the alarm condition is by pressing RESET after the obstruction has been removed. When the alarm is cleared the STATUS LED will turn back to green.

When an alarm occurs, move the sled (carriage) back and check for nozzle leakage, clear the obstruction and determine if the disk can be re-used or if it needs to be replaced. The disk acts like a switch, the brass plate needs to be able to cleanly make contact with the rigid back-plate for the switch to function.

To test the disk:

1) Clear the obstruction.
2) Press the RESET button (At this point the STATUS LED should be green and the alarm should be silenced).
3) Lightly depress the brass plate with a non-conductive object (use common sense and safe procedures when working near high temperatures).
4) The alarm should sound and the STATUS LED should turn from green to red.
5) Stop pressing on the disk.
6) Press the RESET button.
7) The alarm should then be silenced and the STATUS LED should go from red back to green.

If the unit does not perform as described in the above procedure, replace the nozzle disk with a new one.

Additional Information

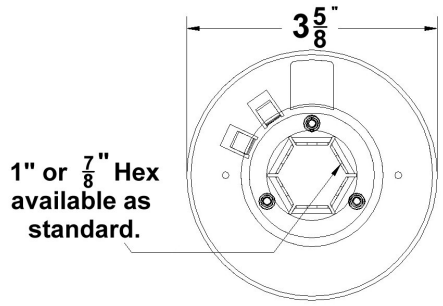
Part Numbers

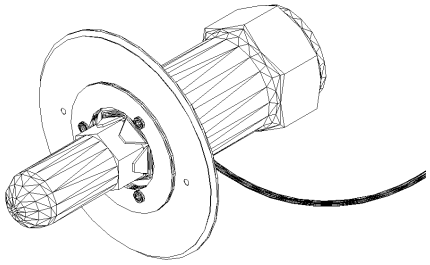
The sensor disks come is two standard sizes, 1” and 7/8” hex. Replacement disks can be ordered by using the part numbers shown in the table below. For non-standard sizes, please consult the factory at (513) 619-7415.

Nozzle Tip	Part #	Description
1" Hex	1015	(1) Control Box, (2) 1" Hex Sensor Disks, (1) Disk Wiring
7/8" Hex	1016	(1) Control Box, (2) 7/8" Hex Sensor Disks, (1) Disk Wiring
1" Hex	1019	(Box of 10) 1" Hex Replacement Sensor Disks
7/8" Hex	1020	(Box of 10) 7/8" Hex Replacement Sensor Disks
Other	Consult Factory for Additional Sizes (513) 619-7415	

Sensor Disk Dimensions

The sensor disks have an overall diameter of 3 $^{5}/_{8}$”, as shown below, for non-standard sizes, please consult the factory at (513) 619-7415.



Recessed Sprue Bushings / Extended Nozzle Tips

The nozzle disks can also be used with extended nozzle tips as in the case of recessed sprue bushings.