

Insight^{HP}

HazardPRO System Tester User Manual

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The Insight^{HP} tester is a sensor signal measurement and emulation tool for field testing HazardPRO systems. When connected between a HazardPRO sensor and node input, user-directed tests measure, display and copy the sensor signal, modifying and outputting it to the node for system warning and shutdown tests. TEMP and SPEED tests emulate bearing/rub-block heat-up and conveyor slow-down by ramping the output signal from the sensor input level to the set final level at the set rate. Signal ramps may be paused (signal holds constant), resumed and reversed. Paused output signals may also be manually stepped. CONTACT emulates a plugged chute by inverting the contact output relative to the input. TIMER emulates a stopped conveyor by outputting an abrupt zero speed signal, measuring time to alarm.

Operating instructions

The connect/select display (menu root)

- Set the switch to ON or ON-BL (ON with backlight).
After a 3s start-up display, the connect/select display appears, prompting the user to connect a sensor and node and to select a test (from the keypad Test keys):
CONNECT SENSOR/NODE
SELECT TEST ■■■■

Notes: The 4-segment (max) indicator shows battery charge.
In this document, ENT (enter) and ESC (escape) refer to the ENT/ESC key.
Tests (TEMP, SPEED, CONTACT, TIMER) and settings (SET) start from the connect/select display (menu root).
After selecting a test (pressing TEMP, SPEED, CONTACT or TIMER), whether in pre-test (▶ not yet pressed), test (▶ pressed, test running) or post-test (test done), pressing ESC returns to the connect/select display.

TEMP, SPEED and CONTACT tests

The tester powers the sensor and measures, displays and copies its signal, outputting the signal copy to the node. Then (when ▶ is pressed) the tester modifies the output signal to test system warnings, alarms and shutdown.

- Go to the connect/select display (described in 1).
Disconnect the sensor from the node and plug it into the tester Sensor cable.
Plug the tester Node cable into the node connector previously occupied by the sensor.
Press the test key (TEMP, SPEED or CONTACT) for the sensor type.
The tester outputs an unmodified sensor signal copy to the node while the pre-test display shows the test name, input/output signal value and prompts to press ▶ (begin test):
<test name> I/O <input/output signal value>
▶ <test description>
- When ready, press ▶ to begin the test.
The tester modifies the signal copy as follows, outputting it to the node
TEMP The output signal ramps up at the set rate from the sensor level to the set maximum.
SPEED The output signal ramps down at the set rate from the sensor level to the set minimum.
CONTACT The output contact inverts from the input contact state for 5s, then un-inverts (done).
 e.g. if the sensor contact is closed, the Node output will open for 5s, then close.
while the test display shows the test name, output signal value and prompts possible actions:
<test name> OUT <output signal value>
<key prompts for actions>
- When the test is done, the output signal holds at the final value (described in 3) while the post-test display shows the output signal final value and prompts possible actions:
<test name> OUT <output signal final value>
<key prompts for actions>
Press ESC to return to the connect/select display 1.

Additional TEMP and SPEED test controls

- || to pause the signal ramp (hold at the current signal value).
- || or ▶ to resume the signal ramp from pause.
- ◀ to ramp the signal back (toward the starting signal level) from pause.
- ▲, ▼ to step (up or down by the step setting) a paused ramp signal.

TIMER test (stopwatch for measuring the time from a stopped conveyor to alarm)

The tester powers a shaft speed sensor and copies its signal, outputting the signal copy to the node.

Then (when **▶** is pressed) it stops the output signal (abrupt zero speed) and starts a stopwatch timer.

5. Go to the connect/select display 1.

Disconnect the speed sensor from the node and plug it into the tester Sensor connector/cable.

Plug the tester Node cable into the node speed connector previously occupied by the sensor.

Press **TIMER**: The tester outputs a sensor signal copy while the pre-test display prompts to start the test:

SHAFT STOP RESP TIME

▶ TO START TEST

6. When ready, press **▶** to start the test.

The tester simultaneously stops the output signal and begins counting time in 0.1s increments.

ELAPSED TIME <. *S>**

■ WHEN ALARM

7. When the stopped shaft system alarm happens, press **■** to stop. The post-test display shows:

RESPONSE TIME <. *S>**

ESC EXIT

and the unmodified sensor signal copy again outputs to the node.

Press **ESC** to return to the connect/select display 1.

Settings (defaults are advised)

Setting	Minimum	Default	Maximum
Temp out ramp rate (°F/s)	1	2	5
Temp out maximum (°F)	150	250	300
Temp out user step (°F)	1	5	10
Speed out ramp rate (-%/s)	0.5	1.0	2.0
Speed out minimum (%)	60	70	90
Speed out user step (ramp Δ's)	1	1	3
Speed out preset RPM *	0	0	300

*This capability is not yet implemented

To change a setting, go to the connect/select display 1.

8. Press **SET**. The setting select display shows:

<last changed setting>

▲ ▼ sel setting, ENT

The up and down keys (**▲ ▼**) select the setting and the **ENT** key calls up the selected setting value.

Pressing **SET** again exits and returns to the connect/select display 1.

9. Select the desired setting then press **ENT**. The (selected) setting value change display shows:

<setting value>

◀ ▶ dig, ▲ ▼ chg, ENT

The left and right keys (**◀ ▶**) select a setting digit and the up and down keys (**▲ ▼**) change the selected (blinking) digit value. Pressing **ENT** saves the setting value and returns to the setting select display 8.

Charging

The connect/select display 1. shows the battery indicator. 4 segments (■ ■ ■ ■) indicate near-full to full charge.

Connect the charger (amber CHARGING LED turns on) when the indicator shows 2 segments (■ ■) or less.

Disconnect the charger when the green CHARGED LED is on.

Charger (USB-C)	Status	CHARGING (amber)	CHARGED (green)
Disconnected	--	OFF	OFF
Connected	Charging	ON	OFF
Connected	Fully Charged	OFF	ON

Cables

Tester cables (see cover page image) provide easy push/pull connect/disconnect to HazardPRO sensors and nodes. 2 and 5 m lengths are available.

Specifications

Sensor connector (input)	M12 female, 4-pin, A-code
Node connector (output)	M12 male, 4-pin, A-code
Display	LCD, 2-line, 20 char/line, backlight (BL)
Keypad	Membrane, 12 button switches
Switch	3 position (L to R): ON-BL/ON/OFF
Lanyard attachment screw	M4 (20mm max length)
Charger connector	USB-C receptacle
Battery (internal, not replaceable)	Li ion, < 10 Wh
On-time (from full charge, BL on, 20°C/68°F)	336 hr (14 days) continuous typ.
Measurement accuracy (Temp)	±1°F
Measurement accuracy (Speed)	±0.1 RPM
Operating temp	-20 → 70°C (-4 → 158°F)
Storage temp	-30 → 80°C (-22 → 176°F)

