



TVP2 PERFORMANCE TEST TAG MANUAL

Identec Ltd
Mercantile Road
Rainton Bridge Industrial Estate
Houghton-Le-Spring
County Durham
England
DH4 5PH

Tel: +44 (0)191 584 4084

Fax: +44 (0)191 584 9077

www.identec.com

e-mail: **info@identec.com**

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Patents:

Patents in the UK and other countries protect Cryptag and CypherTag systems.

Registered Designs

Various aspects of the Reader design are registered.

WARNING NOTICE

This product uses radio frequency signals to identify tags, and is therefore subject to possible interference. Any application should bear this in mind, and in particular it should not be possible for personal safety to be jeopardised by a failure to read.

Cyphertag neither uses nor generates hazardous voltages. You should not connect any such voltage to the equipment.

The TVP2 Test Tag is used to monitor correct operation of a RV1 Loop Controller. It will only do so if it is properly installed in accordance with this manual. You should also consider the failure mode analysis of Appendix A.



See Appendix C

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1. Introduction

The CypherTag Performance Test Tag (TVP2) is used in those situations where the continued operation of a reader on a RV1 Loop Controller is essential and has to be monitored at all times. Its purpose is to raise an alarm should the RV1, for whatever reason, fail to operate. Its secondary purpose is to monitor the reading range and raise an alarm should the reading range be reduced significantly.

The TVP2 monitors the Reader's operation, but it must be understood that this does not provide a complete guarantee that every tag will be read on every occasion. When doing a safety analysis, customers should be aware that:

- *Tags may fail, although the normal failure rate is believed to be less than 0.1% per annum.*
- *Tags have a specified battery life (which varies dependent upon the type of tag used and the way it's used). CypherTag tags have a battery low indicator, which should be used to ensure tags don't die unexpectedly.*

For quick setup details see Appendix B.

Whereas the TVP1 Performance Test Tag is located within the radio field of the reader, and communicates with the reader using radio frequency communications, the TVP2 is wired into the aerial leads of the RV1. The TVP2 monitors the voltage and current in the aerial leads, and it also injects its own output into the aerial leads. The main advantage of the TVP2 is that installation is simpler, as the TVP2 can be placed anywhere in the aerial leads.

The RV1 periodically checks for the presence of the TVP2. Should the data exchange between RV1 and TVP2 fail, a relay on the TVP2 will operate. Some faults are detected by the RV1, which can operate its own relay, and show the state of TVP test tags on its display.

TVP2 can only be used with RV1 Loop Controllers and cannot be used with smaller readers such as REV1.

If you wish to monitor a RV1-DS1 type reader (with common transmit aerial) TVP1 must be used. Contact Identec for further information.

The TVP2 should not be used if the aerial's transmit range is turned to below a setting of 8, as the voltage and current detection circuits would become unreliable. If the range must be turned this low then use a TVP1.

One TVP2 (or TVP1) is required for each aerial on the system being monitored.

2. Installation

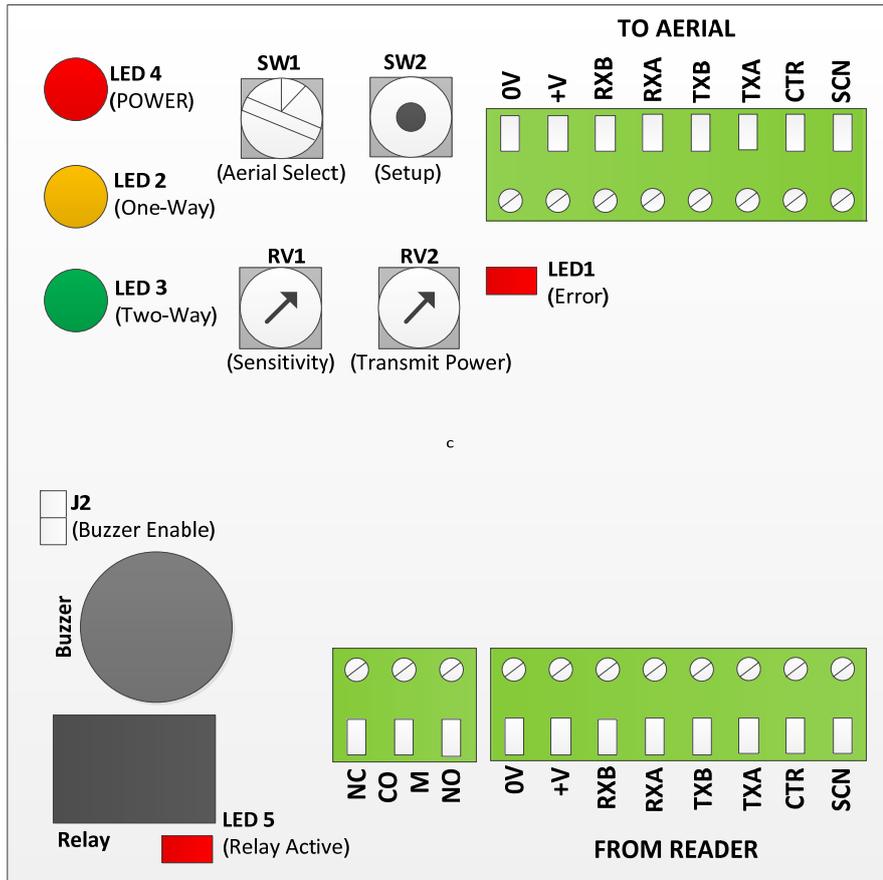


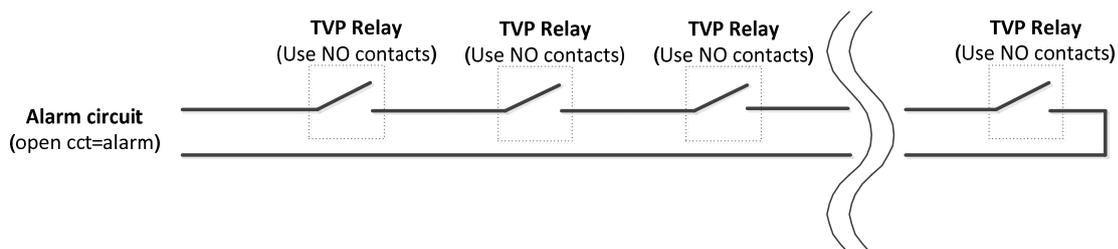
Figure 1 – TVP2 PCB

Each aerial requires its own TVP2, which should be connected between the RV1 reader and the aerial. As the communication is through the aerial leads there is no need to maintain physical separation between TVP2 units.

Connect the Reader and Aerial terminal blocks in line between the RV1 and the Head Amplifier. Make sure the correct terminal blocks are used for each.

TVP2 takes its power from the RV1 and does not need a separate power supply.

Failures may be detected by either the TVP2 or by the RV1, each operating a relay contact. As TVP2 takes its power from the RV1 it is essential that the Normally Open contact is used. The contacts should therefore be wired in series.



Series connected, using normally open contacts that close in correct operation

3. Commissioning

3.1 Initial Condition

On each TVP2 ensure that the SENSITIVITY pot is fully clockwise, and the TRANSMIT pot is fully clockwise.

The Aerial Select switch on the TVP1 should be set to the Number of the Aerial being monitored.

| Aerial | Switch setting as Aerial Number |
|--------|------------------------------------|
| 1-9 | |
| 10 | A |
| 11 | B |
| 12 | C |
| 13 | D |
| 14 | E |
| 15 | F |
| 16 | 0 |

3.2 RV1 Set-up

Make sure that all aerials are correctly assigned, they are tuned, and their transmit and receive ranges are set to the desired values.

Configure the RV1 to check for the presence of TVP test tags. This is in the “TVP Test Tag” option in the Installer menu. Select “On” for each physical aerial that has a TVP tag.

3.3 TVP2 Sample

Press the SETUP button on the TVP2 so that it knows the “normal” voltage and current for this aerial.

Now the green (Two-Way) LED on the TVP will flash (perhaps after a period of the amber LED flashing).

3.4 TX Potentiometer

Turn the TX potentiometer fully anti-clockwise. The green LED will probably stop flashing and the amber LED will flash. Now turn the TX potentiometer slowly clockwise until the green LED is flashing, and doesn't cut out occasionally. Now turn another eighth of a turn clockwise.

3.5 Sensitivity

The Sensitivity potentiometer should normally be turned fully clockwise. It can be used to de-sensitise the TVP2 to cover the situation where vehicles or doors (or other metal objects) might detune the aerial loop. Turn the Sensitivity potentiometer anti-clockwise if the TVP2 trips during conditions that might be expected in normal operation.

3.6 TVP2 Relay

When the green LED is flashing the Relay LED should also be lit, and the relay will operate. Remove the +5V connection from the RV1 and verify that the Relay LED goes out and the relay is no longer on.

3.7 RV1 Reader Relay

The RV1 relays can be set to operate if the TVP2 is functioning. Relays on the RV1 operate by reader, so you must select a relay on that reader's output board. Select TVP as a relay event for that relay, and set the flag for that relay to “Mult Clicks Off” on the RV1 menu.

3.8 **Buzzer Link**

Buzzer operation can be prevented by removing the buzzer jumper link.

3.9 **Checking operation**

Deliberately introduce faults to verify that the TVP2 detects them. These tests should be carried out on a regular basis to avoid the possibility of dormant faults. (Dormant Faults are those that are not detected, but would prevent the detection of faults that affect functionality.)

3.9.1 Disconnect the RX connections on the reader connector. The green LED will cease flashing, and the amber LED will start to flash. The relay will go out, and the buzzer will sound (if J2 fitted). Restore the connections.

3.9.2 Disconnect one of the TX connections between RV1 and TVP2. The green LED and the relay LED will go out and the buzzer will sound (if J2 fitted). The amber LED may flash or it may be on continuously. (The TVP2 may still detect the transmissions to the aerial so the amber LED may flash.) The Error LED will flash with a 50% duty cycle. Restore the connection.

3.9.3 Disconnect one of the TX connections between TVP2 and the aerial. The green LED and the relay LED will go out and the amber LED will flash. The Error LED will flash with a 25% duty cycle.

3.9.4 Restore all connections

The system is now correctly set up and functioning

3.10 Refit the cover.

4. LED indications

Main LEDs (visible from outside)

- Red (POWER) Power on
Should always be on
- Amber (FAIL) Flashes when TVP2 is getting communications from the reader, but goes out once two way communication is established.
- Stays on if the TVP2 is communicating with the RV1 but either the voltage or current has fallen too low. Check the Error LED indication.
- If both green and amber LEDs are off (and power is on) the TVP2 is not getting transmission signals from the reader. Check the connections.
- Green (SCAN) Flashes when two way communications are established

Internal LEDs and sounders

- Red (ERROR) Normally off.
Comes on when the aerial voltage/current shows an error.
- | Mark/space ratio | Cause |
|------------------|--|
| 1:3 (25%) | Current low (disconnected coil/aerial) |
| 1:1 (50%) | Voltage low (detuned or range turned down), or No signal from reader (wires not connected or shorted) |
| always on | Supply voltage low |
- NB:
It might be possible for the ERROR LED to be off when neither the Amber or Green LEDs is flashing, if the reader aerial connections are not made or are shorted.
- Red (RELAY) on when relay is on (TVP2 operating normally)
- Buzzer Comes on when the relay is off. This may not occur at exactly the same time as the green LED starts flashing. The buzzer can be disabled to avoid a nuisance.

5. Fault Finding

| Symptom | Cause | Action/Investigate |
|-----------------------------------|--|--|
| Power LED off | No Power | Check connections from RV1 Reader |
| ERROR LED on (see Chapter 4) | Supply voltage low Current Low Voltage Low | Check 0V/5V connections Check aerial TX connections Check aerial loop Check TX connections from reader Check aerial tuning |
| Neither Amber/Green | No valid input | Is TVP enabled for this aerial? Is correct aerial selected on switch? Does RV1 Reader read normal tags? Is RV1 Reader TX Range too low? |
| Amber but not Green | Reply failing | Is TX pot too low? Is RV1 Reader RX range too low? |
| TVP2 cuts out (amber flashing) | Intermittent noise | Turn up TX pot Identify noise source Increase TVP timeout (see below) |

The normal settings on the RV1 are for the TVP to be polled every 2 seconds, and the TVP timeout to be 8 seconds, which means it needs 4 (occasionally 3) failed reads of the TVP to give an error. Nuisance faults can be reduced by increasing the timeout. However this might hide problems such as a loss of range when a certain piece of equipment operates.

Appendix A Failure modes and detection

TVP2 monitors the aerial leads to ensure that the reader is operating correctly. This is less visible than TVP1 which communicates using magnetic fields. This Appendix is provided to explain how TVP2 operates and how it detects faults.

TVP2 looks at the voltage across the aerial coil when the reader is transmitting to tags. This voltage is sampled during installation and stored in non-volatile memory. If the voltage drops below a certain percentage of the sampled voltage, the TVP2 will trigger an alarm. The threshold is set at about 85% of voltage for the SENSITIVITY pot fully clockwise. With the SENSITIVITY potentiometer fully anti-clockwise the threshold is set to zero and no alarm will be raised for reduced voltage. (85% typically corresponds to about 5% loss of range from the reader to the tag.)

The TVP2 also monitors the current in the coil, and will give an alarm if the current drops below 50% of the sampled value. This is not affected by the SENSITIVITY potentiometer.

TVP2 transmits to the reader by injecting a voltage into the aerial lead. As the other tests have ensured the aerial coil's integrity, this signal is equivalent to what a tag would produce.

The power supply to the TVP2 is monitored and an error occurs if the internal 5V supply drops below about 4V, as this would mean that the measurements could also be in error.

TVP2 detects the following types of fault

- Reader failure
- Broken transmit loop
- Broken transmit leads to the aerial (either side of TVP2)
- Excessive noise corresponding to a significant loss in reading range.

TVP2 will not detect some faults, which would be detected by TVP1

- Damage to receive circuits in the Head Amplifier
- Wiring of receive signals between Head Amplifier and TVP2

There are some types of fault that neither TVP1 nor TVP2 will detect.

- TVP2 will not necessarily react to intermittent noise as they only communicate occasionally with the reader. The first symptom of such noise would be occasional alarms on the TVP.
- The TVP2 will not detect a faulty tag.
- TVP2 will not detect noise that will cause a small loss of range.

As mentioned previously, the TVP2 should itself be tested occasionally to ensure that it is operating properly. It is theoretically possible for a TVP to fail with the relay permanently on, which is a dormant fault that will mean that it would not detect a failure of the RV1 Reader. If this failure is of concern there are other mechanisms, such as heart beat messages which can be generated by the RV1 reader which are available.

Appendix B Quick setup procedure

1. Connect the aerial cables (8 way) from the RV1 to the TVP2 and from the TVP2 to the aerial.
2. Set RV1 (TX Adjust) pot fully anticlockwise and RV2 (SENSITIVITY) fully clockwise.
3. Power up reader
4. After 10 seconds, press the “Set-Up” button for 3 seconds and release.
5. The amber LED should now be flashing
6. Turn the TX Adjust pot (RV1) slowly clockwise until the Amber light first goes out and the Green LED comes on.
7. Continue turning pot RV1 a further 1/8 turn (threshold)
8. The Green LED should be blinking. The RELAY LED should be on. The buzzer should have stopped sounding.
9. Connect relays as stated in Installation section.

Appendix C Regulatory

European Union and other ETSI countries



This product is in conformity with the requirements of 2004/108/EC covering EMC.

Low Voltage Directive

CypherTag Loop Controllers and accessories have been designed and manufactured in accordance with EN60950, following the provisions of the Low Voltage Directive.

Waste from Electrical and Electronic Equipment (WEEE) Directive

We encourage the recycling of Identec products at the end of their life. Equipment can be returned to Identec Ltd for safe disposal. However we recommend any metal cases be recycled locally. For further information contact Identec Ltd.

United States of America

FCC Approval pending.

Operation is subject to the following two conditions:

- (1) this device must not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

ISO 9001

Identec's Quality System conforms to ISO 9001:2008. (Certificate Number - FM36029)