



ID Innovations

Advanced Digital Reader Technology

-----Better by Design

ID-22 Data sheet
Low Power
Industrial RFID Probe Reader



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1. Overview

The ID-22 is a 9v – 27v low power industrial probe reader for popular EM4001 format 125KHz tags and is encapsulated for environmental protection. Read ranges of up to 18cm are possible with ID-Innovations long range cards and up to 28mm with 13mm glass tags. The ID-22 features ASCII, Wiegand26, and Magnetic ABA Track2 output formats. The ID-22 provides solutions for industrial control and logistics.

2. Features

- Low Power
- Oil and water resistant
- Wide Voltage range
- Long Read Range

3 Device Operational Characteristics

Parameter	ID-22
Frequency	125 kHz nominal
Card Format	EM 4001 or compatible
Read Range	13mm glass tag = 28mm, Clamshell card = 18cm
Interfaces	ASCII (9600, n, 8, 1), Wiegand26 and Magnetic ABA Track(ii)
Read Indication	Beeper logic output only
Encoding	Manchester 64-bit, modulus 64
Power Requirement	28-19mA nominal from 12v thru 27v (Uses switching regulator)
Dimensions	128mm x 35mm - not including locking nuts or cable
Cable	Chemical resistant and heat resistant cable (optional)

4 Data Output Formats

Output Data Structure – ASCII

STX (02h)	DATA (10 ASCII)	CHECK SUM (2 ASCII)	CR	LF	ETX (03h)
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[The 1byte (2 ASCII characters) Check sum is the “Exclusive OR” of the 5 hex bytes (10 ASCII) Data characters.]

Output Data Structure – Wiegand26

Even parity (E)												Odd parity (O)											

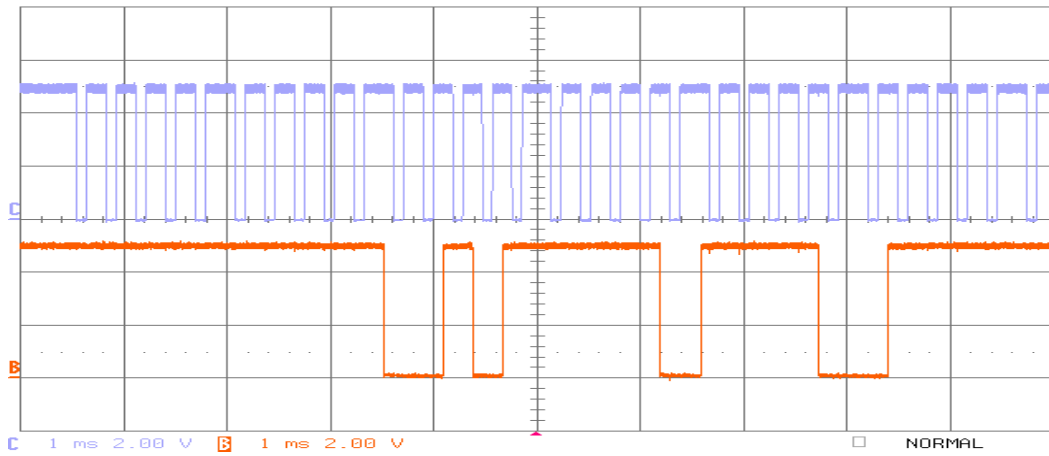
P = Parity start bit and stop bit

Data Output Magnetic ABA Track II

10 Leading Zeros	SS	Data	ES	LCR	10 Ending
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[SS is the Start Character of 11010, ES is the end character of 11111, LRC is the Longitudinal Redundancy Check.]

5. Magnetic Emulation Waveforms



Blue = Clock, Brown = Data

Fig. 3

Start and End Sequences for Magnetic Timing

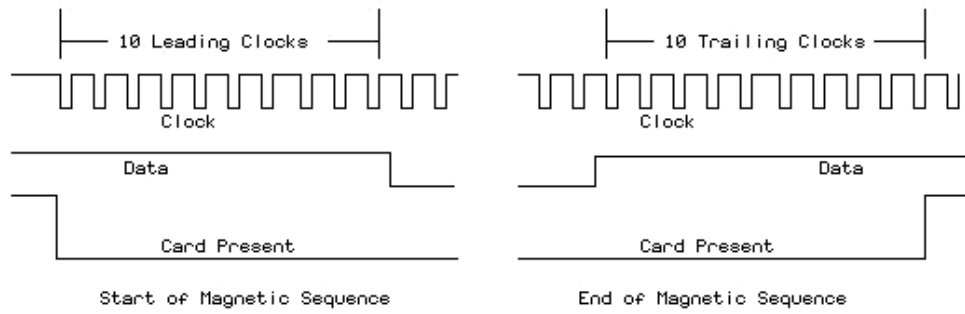


Fig. 4

Data Timings for Magnetic Emulation

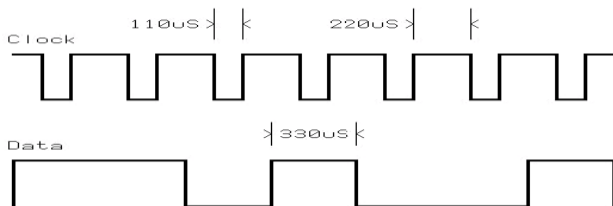


Fig. 5

The magnetic Emulation Sequence starts with the Card Present Line going active (down). There next follows 10 clocks with Zero '0' data. At the end of the 10 leading clocks the start character (11010) is sent and this is followed by the data. At the end of the data the end character is sent followed by the LCR. Finally 10 trailing clocks are sent and the card present line is raised.

The data bit duration is approximately 330uS. The approximate clock duration is 110uS. Because of the symmetry data can be clocked off either the rising or falling edge of the clock.

6. Output Wire Description

Wire color		Description
Red	PWR	+12V DC input
Black	GND	Ground
Violet		Beeper Logic level output
Blue		Used to Select Magnetic
White		Card Present (Magnetic)
Green		Data1 (Wiegand). ASCII (9600, n, 8, 1). Clock (Magnetic)
Brown		Data 0 (Wiegand). Inverted ASCII (9600,n,8,1). Data (Magnetic)
Yellow		Program line (format selector)
Screen	GND	Earth Screen

7. Programming the Output Format

Output Format	Programming
ASCII	Connect PRGM (Yellow wire) to Black wire
Wiegand26	Connect PRGM (Yellow wire) to Red wire
Magnetic ABA Track(ii)	Connect PRGM (Yellow wire) to Blue

8. Connection direct to a computer

Direct connection to a computer RS232 can be made by connecting the green wire to a 1k series resistor and connecting the other end of the resistor to the computer RS232 input. The mode is called pseudo RS232. On a standard D9 socket, connect the green wire via the series 1k to pin2 of the D-type. Connect the ground to Pin5 on the D-type. Leave the TX pin3 open. See "Useful Information" below for free terminal download information.

More optional output connectors are available:

1. Output with RS485 connector
2. Output with RS232 connector
3. RS232-RS485 converter
4. RS232-USB converter
5. RS485-USB converter

Online purchase link:

<http://www.id-innovations.com/httpdocs/converting%20accembly.html>

9. Connection to a Processor UART

Direct connection to a UART is possible using the brown wire to the UART RX in pin.

10. Connecting a Read LED

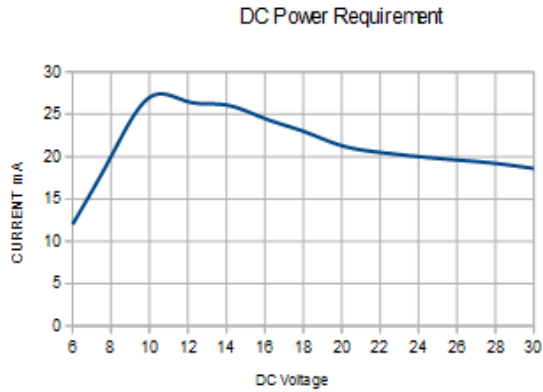
Sometimes the user may not want to drive a beeper but may still need to drive an LED. In this case a driver transistor may not be necessary because the Beeper Output Pin can supply 3mA continuously. Connect a 1k5 resistor to the violet wire. This will limit the current. Connect the other end of the resistor to the LED anode and connect the cathode to ground

11. Choice of Power Supply

The ID-22 has a very wide supply voltage range, 9v-27v, to cope with notoriously unstable industrial 24volt DC lines. The ID-22 has a carefully chosen internal switch mode supply to convert the DC input down a reasonable level where a low noise linear regulator takes over to give the required 5volt for the internal reader. This helps to maintain good read range and ensure low power consumption. The ID-22 is intended for 24volt connection but DC supplies in the range of 9 to 27volt may be used.

12. DC Current Characteristics

The graph below shows the current at various supply voltages. The reader probe uses both a switching regulator and a linear regulator in cascade to give good supply rejection. Above 10volts the current stabilizes and gets smaller as the voltage increases. This reduces internal power dissipation and heat.



13. Absolute Maximum Ratings

Maximum DC supply voltage	(Vcc)	Red Wire	30V
Maximum voltage applied to	Data 0	Brown	5.7v
Maximum voltage applied to	Data 1	Green	5.7v
Maximum voltage applied to	C.P (Magnetic)	white	5.7v
Maximum voltage applied to	Beeper logic	violet	5.7v
Minimum voltage applied to	All Connections		-0.7V
Maximum current sourced/sunk	Data 0	Brown	5mA
Maximum current sourced/sunk	Data 1	Green	5mA
Maximum current sourced/sunk	C.P (Magnetic)	White	5mA
Maximum current sourced/sunk	Beeper logic	violet	5mA
Maximum temperature	70 Deg C		
Minimum Temperature	-10 Deg C		
Minimum Temperature	-25 Deg C	(Low temperature version ID-22 only)	

Ground wire, Black is assumed to be at zero volts for all ratings.

These are maximum and minimum ratings, not working ratings. Long term operation at or near these limits will result in stress and reduce the life of the reader probe.

14. Useful information

For general testing we suggest the user downloads a terminal program free from the internet. Here is one particularly good one to consider:

<http://braypp.googlepages.com/terminal> - Truly an excellent piece of software, easily the best free terminal we have seen.

If you have any technical queries please contact your local distributor, they have all the technical resources to help you and support you. Where no local distributor exists, our technical helpline may be contacted by writing to help@ID-Innovations.com

15. Contact Information

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