# SWIPE READERS
## WITH RS-232 INTELLIHEAD
## TECHNICAL REFERENCE MANUAL

**Manual Part Number 99875293 Rev 4**

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MAGTEK®
**REGISTERED TO ISO 9001:2000**
1710 Apollo Court
Seal Beach, CA 90740
Phone: (562) 546-6400
FAX: (562) 546-6301
Technical Support: (651) 415-6800
*www.magtek.com*

## REVISIONS

| Rev Number | Date | Notes |
|---|---|---|
| 1 | 21 Dec 04 | Initial Release |
| 2 | 19 Jul 05 | Included additional models |
| 3 | 13 Oct 05 | Add new models: 21046005 and 21047014<br>Updated drawings for other models |
| 4 | 24 Feb 06 | Increased minimum DTR voltage requirement for RS-232 compatibility from +4.1V to +4.9V. Increased absolute maximum for DTR and TXD for Rev B and subsequent products. Added note about true compliance requiring +/-25V tolerance. Deleted Altitude section. Added note about “reflection” when in transmit mode. Added Section 4 for interactive functionality starting with Rev B firmware. Added note to explain “port-powered” current consumption. |

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This equipment has been tested and found to comply with the limits for Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

## FCC COMPLIANCE STATEMENT

This device complies with Part 15 Of The FCC Rules. Operation of this device is subject to the following two conditions: (1) This device may not cause harmful interference. And (2) This device must accept any interference received, including interference that may cause undesired operation.

## CANADIAN DOC STATEMENT

This digital apparatus does not exceed the Class B limits for radio noise for digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de las classe B prescrites dans le Réglement sur le brouillage radioélectrique édicté par les ministère des Communications du Canada.

## CE STANDARDS

Testing for compliance to CE and FCC requirements was performed by an independent laboratory. The unit under test was found compliant to Class B.

## UL/CSA

This product is recognized per Underwriter Laboratories and Canadian Underwriter Laboratories 1950.

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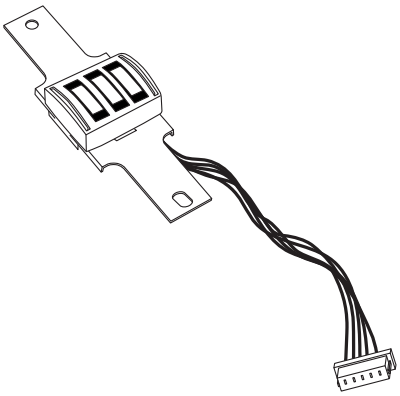
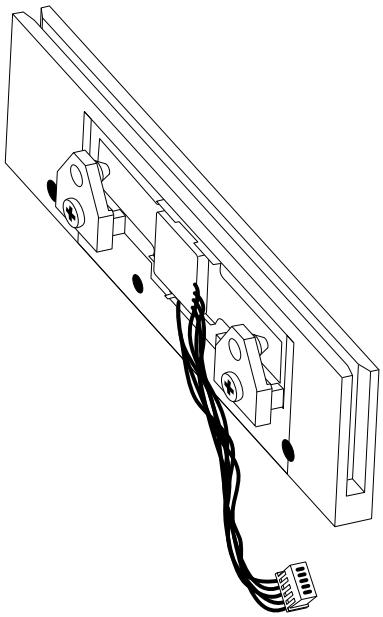
## FIGURES AND TABLES



**A. Head/Spring Assemblies**



**B. Slim Profile**

**Figure 1-1. RS-232 IntelliHead Spring Assembly and Slim Profile Reader**

# SECTION 1. FEATURES AND SPECIFICATIONS

The 3-Track, RS-232 IntelliHead, Port Powered Swipe Reader is a compact magnetic stripe card Reader that conforms to ISO/ANSI standards. The electronics are contained and potted inside the head to increase noise immunity and resistance to humidity. The Reader is compatible with most personal computers or almost any device with a serial RS-232 interface.

## MODELS

| Part Number | Description | Cable Length and Connector Type | Rail or Housing | Drawing In |
|---|---|---|---|---|
| 21030005 | RS-232 IntelliHead on spring | 125mm, 5 pin Molex | Butterfly Spring | Appendix A |
| 21040100 | RS-232 IntelliHead Swipe Reader | 6 ft, DE 9 | 100mm Black Body | Appendix B |
| 21040127 | RS-232 IntelliHead Swipe Reader | 6 in, DE 9 | 100mm Black Body | Appendix C |
| 21044009 | RS-232 IntelliHead 43mm rail | 125mm, 5 pin Molex | 43mm Black Body | Appendix D. |
| 21045085 | RS-232 IntelliHead open rail | 125mm, 5 pin Molex | 90mm Black rail | Appendix E |
| 21046005 | RS-232 IntelliHead 60mm slim rail | 125mm, 5 pin Molex | 60mm slim profile | Appendix F |
| 21047010 | RS-232 IntelliHead slim rail | 125mm, 5 pin Molex | 90mm slim profile | Appendix G. |
| 21047014 | RS-232 IntelliHead slim rail | 125mm, 5 pin Molex | 90mm slim profile (PAX) | Appendix H. |

## FEATURES

- **Low cost solution for triple track readers** –see Appendices for package options
- **EIA/TIA-232 compliant** - Simplex mode; see Specifications below for details
- **Transmit on and off switch (XON and XOFF)** – half-duplex communication
- **Ultra-compact design** – low-profile read head contains all needed circuits. Eliminates PCB for better noise immunity and humidity resistance
- **No external components** – reduces errors or failures resulting from additional connectors required in other readers
- **High noise immunity** – no more millivolt-level analog signals to route; no analog signals leave the shielded magnetic head. Withstands noisy PC monitors, cell phones, switching power supplies, etc.
- **High performance decoding** – new design reads badly damaged cards; compensates for poor head mounting
- **AGC (Automatic Gain Control)** – reads cards from 30% - 200% of ISO 7811 amplitude standard
- **Wide operational temperature range** – -40 °C to +70 °C
- **Low Power** – can be powered through an RS-232 port; no external power supply required
- **Bi-directional reading** – Accurately reads in forward or reverse directions
- **Reads all types of standard cards** – reads encoded data that meets ANSI/ISO/AAMVA standards, reads High Coercivity (HiCo) or Low Coercivity (LoCo) and various amplitude levels

## SPECIFICATIONS

**Table 1-2. Specifications**

| | |
|---|---|
| **OPERATING** | |
| Card Data Formats | ISO/ANSI/AAMVA* |
| Data Transmission | EIT/TIA-232 and V.28/V.24 compatible or compliant (see below) for TXD line |
| Recording Method | Two-frequency coherent phase (F2F) |
| Message Format | ASCII |
| Card Speed | 3 to 60 in/s (7.6 to 152.4 cm/s) |
| **ELECTRICAL** | |
| Power Input† | From RS-232 interface port (Host-referenced DTR and TXD signals) |
| DTR (Host-referenced) or external positive supply | +4.9 VDC at 5 mA** to +16.0 VDC recommended operating range for EIT/TIA-232 and V.28/V.24 *compatibility*<br>+5.1 VDC at 5 mA** to +16.0 VDC recommended operating range for full EIT/TIA-232 and V.28/V.24 compliance with the exception of the absolute maximum ratings*** |
| TXD (Host-referenced) or external negative supply | -4.1 VDC at 1.9 mA to -16.0 VDC recommended operating range for EIT/TIA-232 and V.28/V.24 *compatibility*<br>-5.1 VDC at 2.2 mA to -16.0 VDC recommended operating range for full EIT/TIA-232 and V.28/V.24 compliance with the exception of the absolute maximum ratings*** |
| RS-232 Communication | 9600 bps, 8 data bits, no parity, 1 stop bit |
| **MECHANICAL (STANDARD PRODUCT)** | |
| Dimensions | See related appendix |
| Cable Length | See related appendix |
| Connector | See related appendix |
| Life | 1,000,000 passes |
| **ENVIRONMENTAL** | |
| Temperature | |
| Operating: | -40 °C to +70 °C (-40 °F to +158 °F) |
| Storage: | -40 °C to +70 °C (-40 °F to +158 °F) |
| Humidity | |
| Operating: | 10% to 90% noncondensing |
| Storage: | 10% to 90% noncondensing |

* ISO (International Standards Organization), ANSI (American National Standards Institute), and AAMVA (American Association of Motor Vehicle Administrators)

** 8 mA for units manufactured prior to May 2006.

*** Absolute maximum ratings are ±20 VDC for the DTR line, and +20, -25 VDC for the TXD line. Full EIT/TIA-232 and V.28/V.24 compliance requires that these lines withstand ±25 VDC. Absolute maximum ratings for units manufactured prior to May 2006 are ±16 VDC for the DTR line, and +16, -25 VDC for the TXD line.

**Comment [MSOffice1]:**

† A note about “port-powered” readers –These readers operate off some combination of otherwise unused RS-232 lines, DTR and TXD in this case. Per the RS-232 specification, these lines are

† only required to drive a 3kΩ load at 5V. This is a current of merely 5V/3kΩ=1.67mA per line. All "port-powered" readers fundamentally require more current than 1.67mA (consider that at least 1.67mA must be supplied to a 3kΩ load, and some extra current is needed for the circuit that does so). Thus these readers are not technically guaranteed to work unless multiple unused lines are used for power and/or some duty cycle limit is imposed on transmitting while employing an energy storage device (typically a capacitor). In practice, however most ports can supply 8 mA at ±5V on a single line. Some may not, and this is the reason for including a current consumption specification for a "port-powered" device. Also note that any capacitance on the RXD (host-referred) line will increase power consumption over the figures given here, in accordance with the baud rate. The current drive capability of an RS-232 port is not typically specified, so experimentation may be required in a particular application. If more current is needed for the positive supply, RTS may be paralleled with DTR (both host-referenced) in the cabling to the unit. If this is done, the host must of course take care to avoid contention between RTS and DTR.

# SECTION 2. INSTALLATION

## ELECTRICAL CONNECTIONS

The hardware installation consists of plugging the cable into the PC or device. See related appendix for cable connections.

## ACCESSORIES

| Part Number | Description |
|---|---|
| 21051533 | DE-9 Test Cable for RS-232 IntelliHead |

## POWER UP

When power is applied, the RS-232 IntelliHead, hereafter referred to as the "Reader", transmits a sign-on ID message consisting of 11 ASCII characters and ending with <CR>(0x0D). About 90 milliseconds after power is applied, the Reader sends the message that indicates the firmware part number and revision, e.g., 21088830Xnn<CR>. The "Xnn" will be replaced with the firmware revision (e.g., B01). The <CR> indicates carriage return. See Section 3, Operation, for sign-on ID messages.

## TESTING

1. Confirm that the Reader is connected to the RS-232 COM Port of the PC or device. (The optional test cable shown in "Accessories" above may be useful for testing purposes.)

2. Open a communications program such as the MagTek Encoder/Reader Demonstration Program, which can be obtained from the Internet at www.magtek.com. Navigate to the Demo Programs and select Encoder/Reader Demo.

3. Using the program, select the COM Port the reader is connected to.

4. Select the baud rate (9600).

5. Select 8 data bits, no parity, 1 stop bit.

6. Swipe a card. The data on the screen will show Track 1 beginning with "%" and ending with "?". Track 2 will begin with ";" and ends with "?". Track 3 begins with "+" and ends with "?". The following is an example:

**%B123^Smith/Joann^9812101000?;11222233333444444444?<0x0D>**

For Rev A firmware, if any ‘one’ bit is found, but the track contains an error, an “E” will appear in place of the track data, otherwise, there will be no transmission for that track. Starting with Rev B firmware, an “E” will be transmitted for a track that contains an error only if the start sentinel is found or at least 5 good characters are detected; otherwise, there will be no transmission for that track. For example, if track 2 has an error and tracks 1 and 3 are good, the display will look something like this:

**%1111111111111111111?;E?+3333333333333333333?<0x0D>**

If track 1 is blank, but track 2 is good and track 3 has errors, the display will be similar to the following:

**;2222222222222222222?+E?<0x0D>**

If the data on the screen is not numeric or alphanumeric like the data above, check the communication rate. If the alphanumeric characters are similar to those shown above, then the unit is ready for use.

# SECTION 3. OPERATION

Included in this section are brief descriptions of Card Read, Reader to Host Message Format, and Timing of sign-on ID.

## CARD READ

A card may be swiped through the Reader slot in either direction, as long as the magnetic stripe is down and facing the head in the unit.

## READER TO HOST MESSAGE FORMAT

Track data is sent in the following order: SS, Card Data, ES, CR

SS – Start Sentinel Character (%, ; or +)
Card Data – The data on the card or "E" in the event of a read error
ES – End Sentinel Character (?)
CR – Carriage Return (0x0D)

The Start and End Sentinel symbols for each track are as follows:

**Table 3-1. Track Number and Symbols for Start and Stop Sentinel**

| Track Number | Start Sentinel | End Sentinel |
|---|---|---|
| 1 | % | ? |
| 2 | ; | ? |
| 3 | + | ? |

After the DTR goes high, there is a delay of about 90 milliseconds, and then the Reader sends a sign-on message, e.g., 21088830A03<CR>. The timing is shown in Figure 3-1.

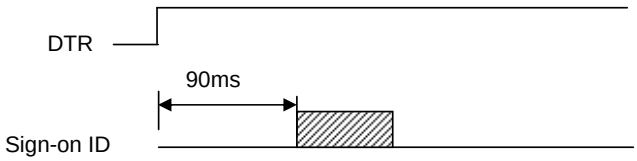



**Figure 3-1. Timing for ID Sign-on**

## HALF-DUPLEX MODE

When operating in simplex mode (transmit only), the Reader is EIT/TIA-232 and V.28/V.24 compliant given the recommended operating conditions are met (see Specification table). While simplex communication is sufficient for many applications, the Reader also has a limited capability to receive transmissions from the host via the Reader's RXD line. The Reader may be disabled or enabled as outlined in the two sections below.

The Reader's RXD line normally supplies the negative supply rail for the Reader's transmit output. Thus the Reader is half-duplex; it cannot transmit and receive signals simultaneously. The RXD (Reader-referenced) line is only RS-232 compatible (not compliant) when used as an input to the Reader. This is due to the high impedance of the line, 100 kΩ instead of the required 3 kΩ to 5 kΩ.

Also, the output of the Reader will reflect any signal received at its input. This "reflection" will occur simultaneously with the transitions on the Reader's input. The host must be expecting this "reflection" and refrain from transmitting commands while the Reader is transmitting, otherwise the data received by the host may be corrupted.

## XON/XOFF

After a power-on, the Reader defaults to the XON state. In this state the Reader will transmit card data immediately after a card swipe. When XOFF is received in the middle of transmitting card data, the Reader will not halt transmission; the entire card data string will still be sent. After completing the transmission if XOFF has been received, the Reader will capture the next card swipe into its buffer; any subsequent swipes will now be ignored. When XON is received, the Reader will transmit any captured data from its buffer. Note that it is possible that the captured data may have one or more card data tracks containing errors. When in XOFF state, any command will be ignored except for XON.

## BAUD RATE

The communication rate is 9600 bps, 8-bit, no parity.

## COMMAND SET (REV A FIRMWARE ONLY)

The Commands Set is as follows:

| Command Character | Hex | Comment |
|---|---|---|
| V | 0x56 | Retrieve Firmware Version, Reader will send the power-up string. |
| XON | 0x11 | see XON/XOFF description |
| XOFF | 0x13 | see XON/XOFF description |

# SECTION 4. PROPERTIES AND COMMANDS

A full set of properties and commands have been incorporated into the RS-232 IntelliHead Port Powered Swipe Reader starting with Rev B firmware. This section describes the function and operation of each of these properties, and shows how to implement the commands.

## SENDING COMMANDS

The Reader will operate from 2400 to 115,200 bps but each command sent to the Reader must match the communication parameters of the Reader. The default communication parameters are 9600 bps with 8 bits, no parity and 1 stop bit (8N1). If the Reader fails to respond after a command has been transmitted, the application should modify the transmission parameters until a response is received.

Commands, as described below, must be preceded by an Escape (<ESC> – 0x1B) character and be terminated by a Carriage Return (<CR> – 0x0D). All commands are case sensitive—that is, they must all use upper case characters.

After a valid command has been received, the Reader will respond with an Acknowledge (<ACK> – 0x06) within one character time. If a message is started but not completed within 2 seconds, a No-acknowledge (<NAK> – 0x15) will be transmitted; also, if the baud rate or other communication settings are incorrect, the Reader will transmit a NAK using its current communication parameters. An unrecognized command will also return a NAK.

## XON/XOFF

The Reader can be placed into a “silent” mode so that it will not transmit or receive anything until requested to do so. This may be useful with interrupt-driven applications where the Reader should be disabled. The default for the Reader after a reset is XON. In the XON state, the Reader will transmit card data immediately after a card swipe.

Once XOFF has been received, after completing any transmission that may be in progress, the Reader will respond with an ACK and will capture the next card swipe into its buffer, any subsequent swipes will now be ignored.

When XON is received, the Reader will transmit any captured data from its buffer. Note that it is possible that the captured data may have one or more card data tracks containing errors. When in XOFF state, any command will be ignored except for XON.

## RESET DEVICE

The Reader will always be reset when power (DTR) is applied (hardware reset). It can also be reset programmatically with a Reset (RS) command. This command can be used after changing the setting to activate the new values:

<ESC>RS<CR>

After sending the <ACK>, the Reader will perform a soft reset and, if the function is enabled (SA-6), will transmit the sign-on ID message:

<ACK>21088830B03<CR>

Note that the carriage return (CR) will be included in this response only if the function is enabled (SB-0).

## VERSION REQUEST

In order to determine which device is connected, the application can send a Version Request (VR) command to the Reader:

<ESC>VR<CR>

The Reader will respond with an ACK and then will transmit the firmware part number and the corresponding version in a format like this:

<ACK>21088830B03<CR>

Note that the carriage return (CR) will be included in this response only if the function is enabled (SB-0).

## UPLOAD COMMAND

The Upload (UP) command is used to move any modified properties from temporary storage into the flash memory. This only needs to be done once after all changes have been made.

This method of updating the programmable settings allows all parameters to be modified in anticipation of the next reset. Thus, a series of switch commands (including the sentinel values described below) can be sent to the Reader without affecting any operation. The set of configuration commands should be followed by an Upload (UP) command to transfer all settings into flash. Finally, the Reset (RS) command can be sent to validate that all changes have taken place. After the RS command, any changes to communication parameters will become effective.

## CONFIGURATION COMMANDS

The configuration properties are stored in three separate bytes (referred to as switches). The switch settings are modified with three separate commands, one for each switch. The switch names, bits and corresponding properties are shown in the tables below.

The command to interrogate or modify a switch is of the form:

<ESC>Sn<CR>

where “n” is “A”, “B” or “C”.

For example, to interrogate the values of switch B, send the command:

<ESC>SB<CR>

The response will look like this:

<ACK><ESC>SB00000001<CR>

In order to change any switch settings, send a command like this:

<ESC>SA11100010<CR>

which will set switch A to the default value. The Reader will respond with an ACK if the command is formatted properly. The change in settings will NOT take place until after the Upload and Reset commands have been sent:

<ESC>UP<CR>
<ESC>RS<CR>

The Upload (UP) command moves the new setting(s) into flash memory. The new setting(s), however, will not be used until the device has been reset—either with a power reset or with the soft Reset (RS) command.

## Switch A

Switch A, Table 4-1, is primarily used to define the communication settings. The default for Switch A is:

111000109600, no parity, 8 bits, send ID at power on, transmit SS & ES

**Table 4-1. Switch A**

| Command position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
|---|---|---|---|---|---|---|---|---|---|
| **Byte Position** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **0** | **Description** |
| | | | | | | 0 | 0 | 0 | Baud rate 2400 |
| | | | | | | 0 | 0 | 1 | Baud rate 4800 |
| | | | | | | 0 | 1 | 0 | Baud rate 9600 |
| | | | | | | 0 | 1 | 1 | Baud rate 14400 |
| | | | | | | 1 | 0 | 0 | Baud rate 19200 |
| | | | | | | 1 | 0 | 1 | Baud rate 38400 |
| | | | | | | 1 | 1 | 0 | Baud rate 57600 |
| | | | | | | 1 | 1 | 1 | Baud rate 115200 |
| | | | | 0 | 0 | | | | No parity |
| | | | | 0 | 1 | | | | Even parity |
| | | | | 1 | 0 | | | | Odd parity |
| | | | | 1 | 1 | | | | Mark (Parity = 1 all the time) |
| | | | 0 | | | | | | 7 bits data length |
| | | | 1 | | | | | | 8 bits data length |
| | 0 | | | | | | | | Send ID at power on: No |
| | 1 | | | | | | | | Send ID at power on: Yes |
| 0 | | | | | | | | | Transmit SS and ES: No |
| 1 | | | | | | | | | Transmit SS and ES: Yes |

## Switch B

Switch B, Table 4-2, is used to define the bracketing characters that are used in the messages. The default for Switch B is:

00000001 Send CR after messages but don't send STX, ETX, ESC, LRC

**Table 4-2. Switch B**

| Command position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
|---|---|---|---|---|---|---|---|---|---|
| **Byte Position** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **0** | **Description** |
| | | | | | | | | 0 | Send CR after messages: No |
| | | | | | | | | 1 | Send CR after messages : Yes |
| | | | | | | | 0 | | Send STX before data: No |
| | | | | | | | 1 | | Send STX before data: Yes |
| | | | | | | 0 | | | Send ETX before data: No |
| | | | | | | 1 | | | Send ETX before data: Yes |
| | | | | | 0 | | | | Send ESC before data: No |
| | | | | | 1 | | | | Send ESC before data: Yes |
| | | | | 0 | | | | | Send LRC with track data: No |
| | | | | 1 | | | | | Send LRC with track data: Yes |
| | | | X | | | | | | Reserved |
| | | X | | | | | | | Reserved |
| | X | | | | | | | | Reserved |

## Switch C

Switch C, Table 4-3, is used to define the way a card is read. The default for Switch C is:
01010101Enable (but don't require) tracks 1, 2 & 3; decode all types of tracks

**Table 4-3. Switch C**

| Command position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
|---|---|---|---|---|---|---|---|---|---|
| **Byte Position** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **0** | **Description** |
| | | | | | | | 0 | 0 | Track 1 Disabled |
| | | | | | | | 0 | 1 | Track 1 Enabled |
| | | | | | | | 1 | 1 | Track 1 is required* |
| | | | | | 0 | 0 | | | Track 2 Disabled |
| | | | | | 0 | 1 | | | Track 2 Enabled |
| | | | | | 1 | 1 | | | Track 2 is required* |
| | | | 0 | 0 | | | | | Track 3 Disabled |
| | | | 0 | 1 | | | | | Track 3 Enabled |
| | | | 1 | 1 | | | | | Track 3 is required* |
| | | 0 | | | | | | | Decode ISO/ABA tracks only |
| | | 1 | | | | | | | Decode ISO/ABA & custom tracks |
| | X | | | | | | | | Reserved |

* If a track is required but does not exist, the Reader will indicate an error for that track.

## Sentinel Definitions

The start and end sentinels values can individually be specified by commands. The default settings are shown in the Table 4-4.

***Note***

*Changing the value of any of the sentinels does not actually change the encoded value on the magnetic track; it merely represents the sentinel in a unique way to help distinguish differently formatted tracks.*

**Table 4-4. Start and End Sentinels**

| Value Name | Default (hex) | Default (ASCII) | Definition |
|---|---|---|---|
| S1 | 25 | % | Start Sentinel ISO/ABA Track 1 |
| S2 | 3B | ; | Start Sentinel ISO/ABA Track 2 |
| S3 | 2B | + | Start Sentinel ISO/ABA Track 3 |
| S4 | 40 | @ | SS Non-standard (7bits) Track 2 |
| S5 | 26 | & | SS Non-standard (7bits) Track 3 |
| S6 | 23 | # | SS AAMVA track 3 |
| SE | 3F | ? | End Sentinel for all tracks all type |

As with the switch settings, the sentinel parameters can be discovered by sending the corresponding command for that value immediately followed by a CR. For instance, in order to determine the present setting of the 7-bit track 3 start sentinel, send the following command:

<ESC>S5<CR>

The Reader will respond with the value, in nibbles:

<ACK><ESC>S526<CR>

Any ASCII character from 0x00 to 0x7F can be used as a sentinel. To change the value of the 7-bit track 3 start sentinel to "!" (0x21), send the following command:

<ESC>S521<CR>

Again, as with the switch commands described above, send the Upload (UP) command followed by the Reset (RS) command to complete the transaction.

# APPENDIX A. RS-232 INTELLIHEAD, BUTTERFLY SPRING ASSEMBLY, 125MM, 5-PIN MOLEX

## Drawings

The following drawing is provided in this section:

| Part Number | Title |
|---|---|
| 21030005 | RS-232 IntelliHead, 3-Track, Butterfly Spring Assembly, 125mm Cable, 5-pin connector |

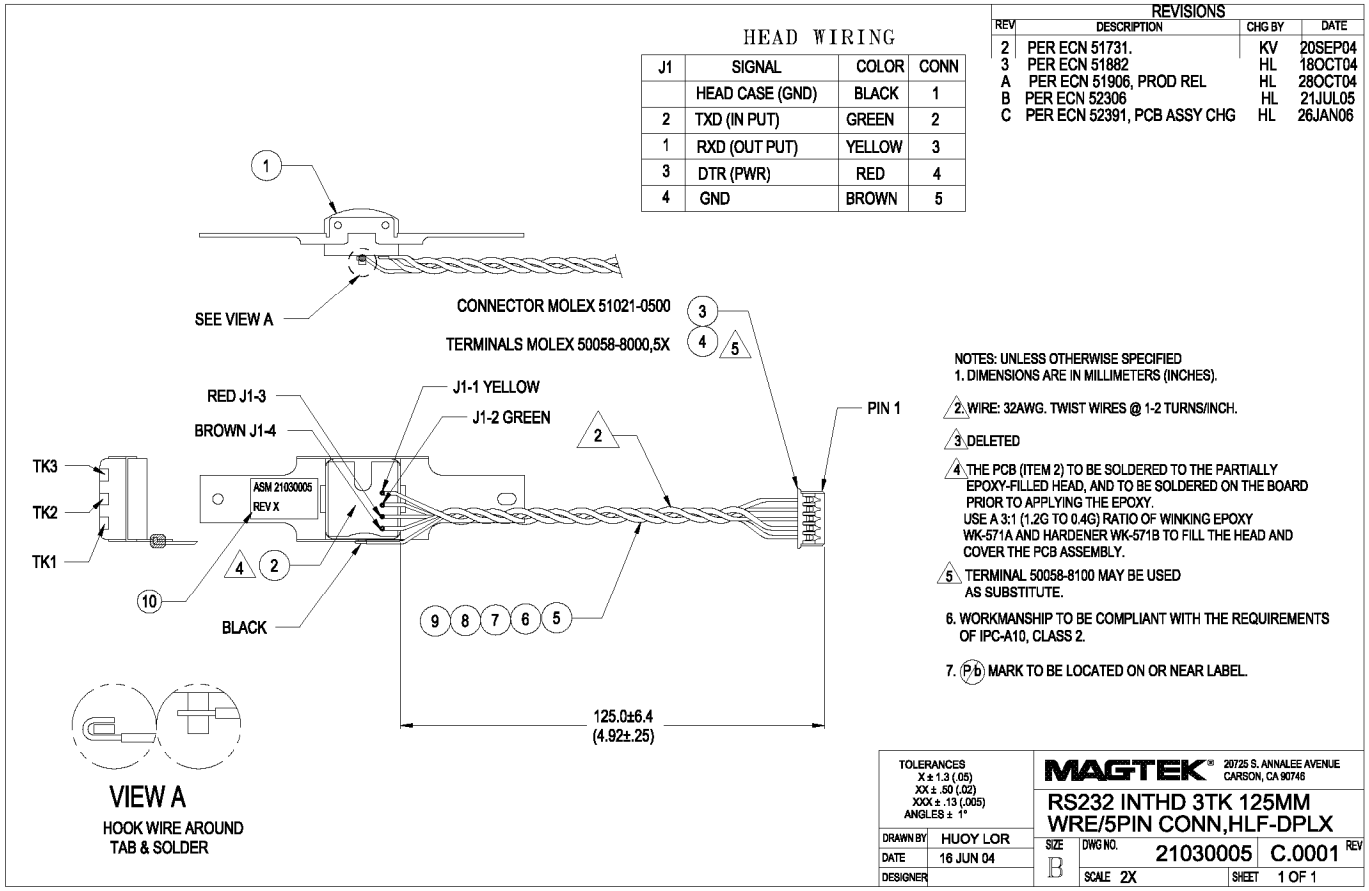



**Figure A-1. RS-232 IntelliHead, Spring Assembly, 125mm wire/5-pin connector**

# APPENDIX B. RS-232 INTELLIHEAD, 100MM BLACK BODY, 6 FT. DE9

## Drawings

The following drawing is provided in this section:

| Part Number | Title |
|---|---|
| 21040100 | RS-232 IntelliHead, 3-Track, 6 Foot Cable, 9 Pin Connector, 100mm Black Body |

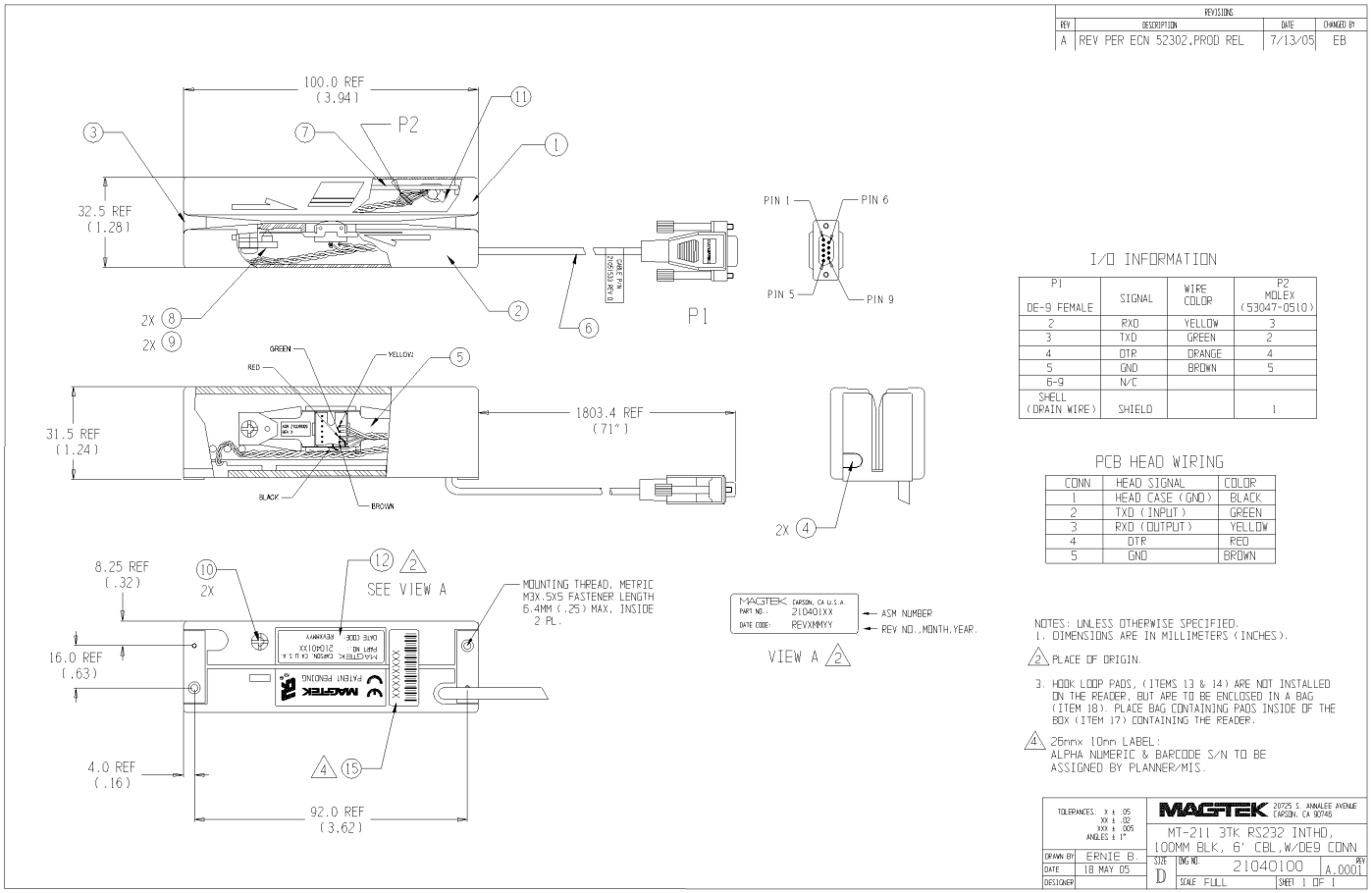



**Figure B-1. RS-232 IntelliHead, 100mm Black Body, Cable 6 Ft. DE9**

# APPENDIX C. RS-232 INTELLIHEAD, 100MM BLACK BODY, 6 IN. DE9

## Drawings

The following drawing is provided in this section:

| Part Number | Title |
|---|---|
| 21040127 | RS-232 IntelliHead, 3-Track, 100mm Black Body, Cable 6 Inch, 9 Pin |

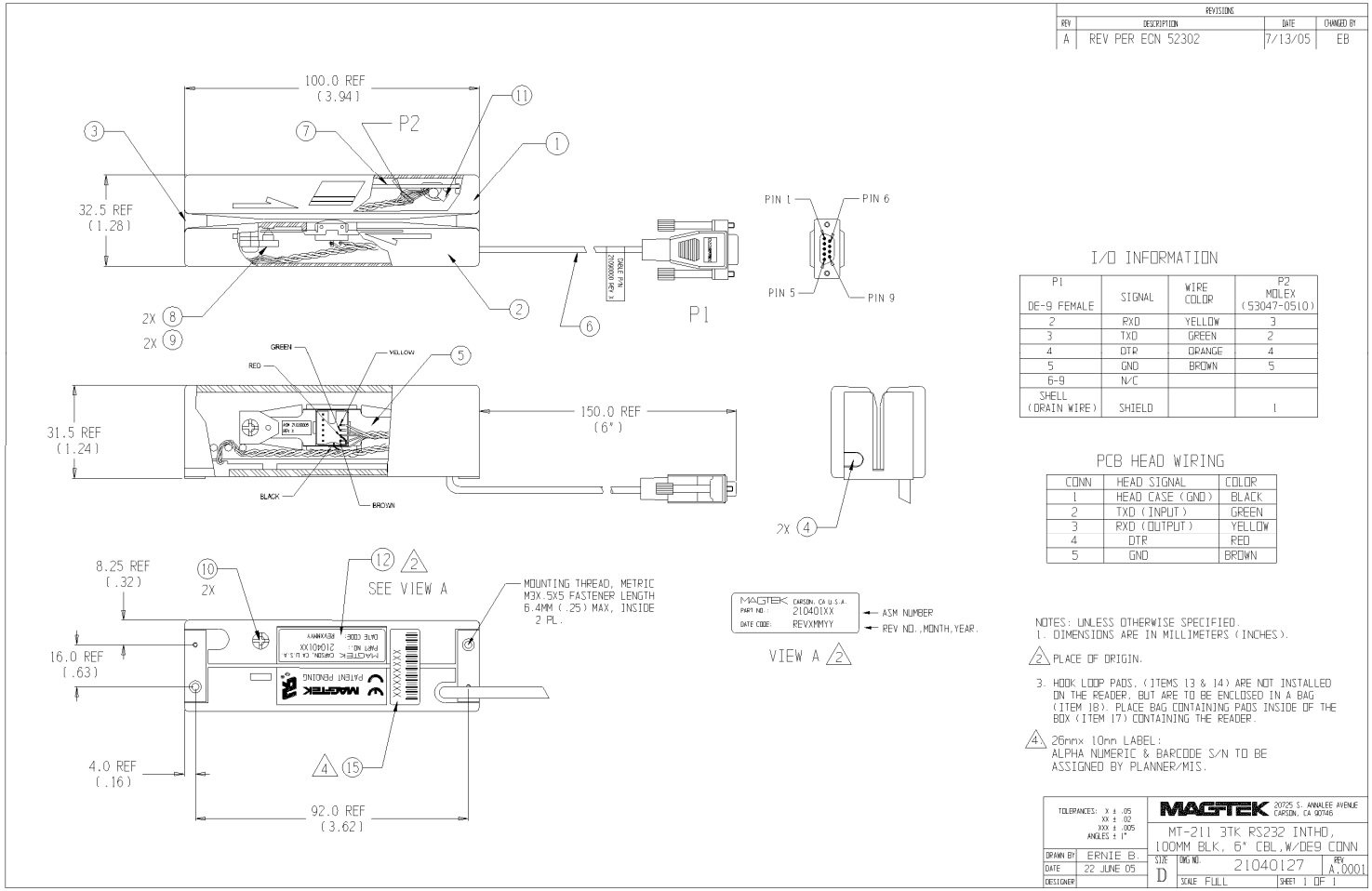



**Figure C-1. RS-232 IntelliHead, 6 inch Cable, 9 Pin, 100mm Black Body**

# APPENDIX D. RS-232 INTELLIHEAD 43MM RAIL 125 MM 5-PIN MOLEX

## Drawings

The following drawing is provided in this section:

| Part Number | Title |
|---|---|
| 21044009 | RS-232 IntelliHead, 3-Track, 43mm Black Body, 125mm 5-Pin Molex Connector |

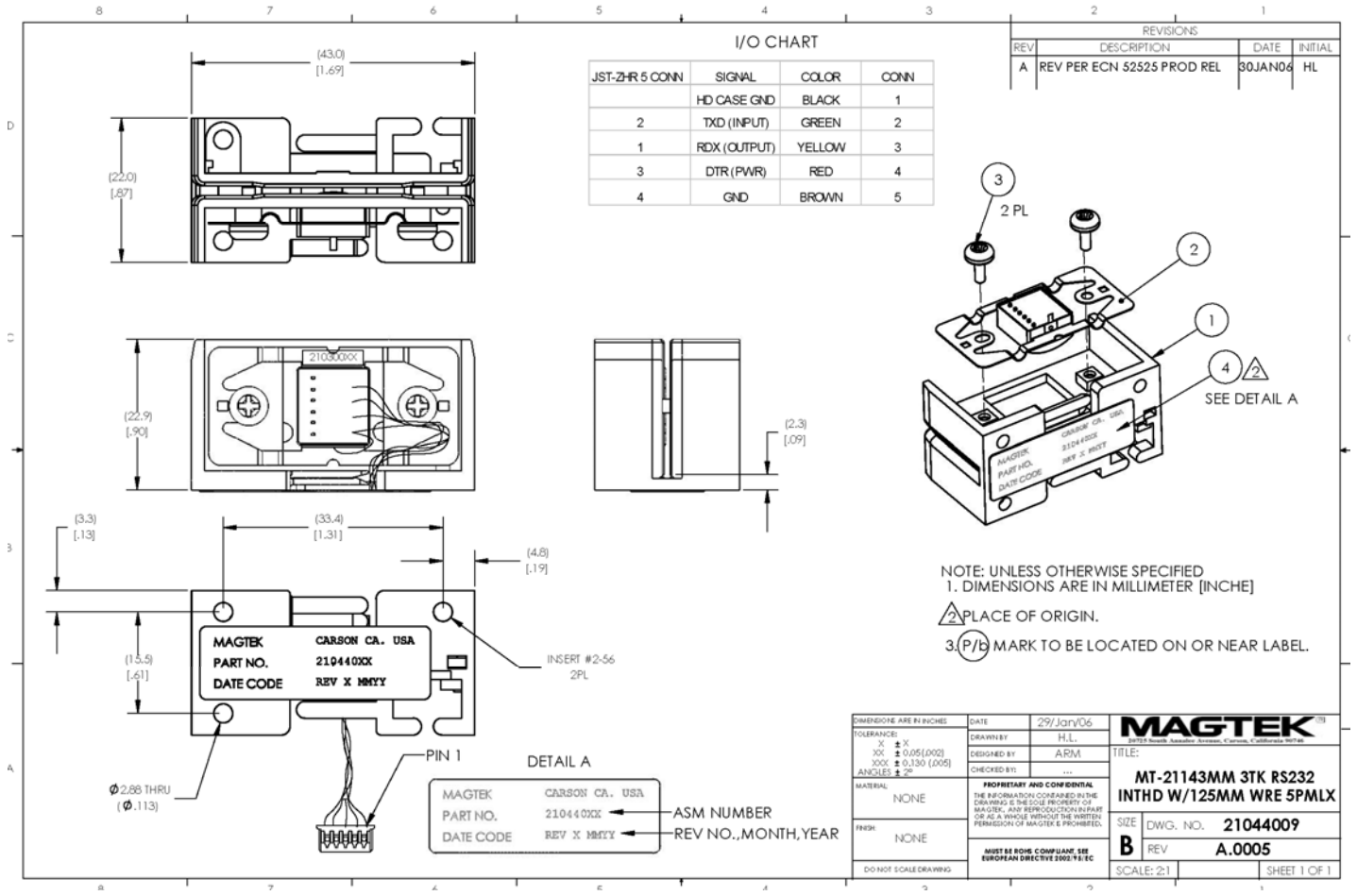



**Figure D-1. RS-232 IntelliHead, 43mm Black Body, 125mm 5-Pin Molex Connector**

# APPENDIX E. RS-232 INTELLIHEAD, 90MM BLACK RAIL, 125MM 5-PIN MOLEX

## Drawings

The following drawing is provided in this section:

| Part Number | Title |
|---|---|
| 21045085 | RS-232 IntelliHead, 3-Track, 90mm Black Rail, Cable 125mm, 5-Pin Molex |

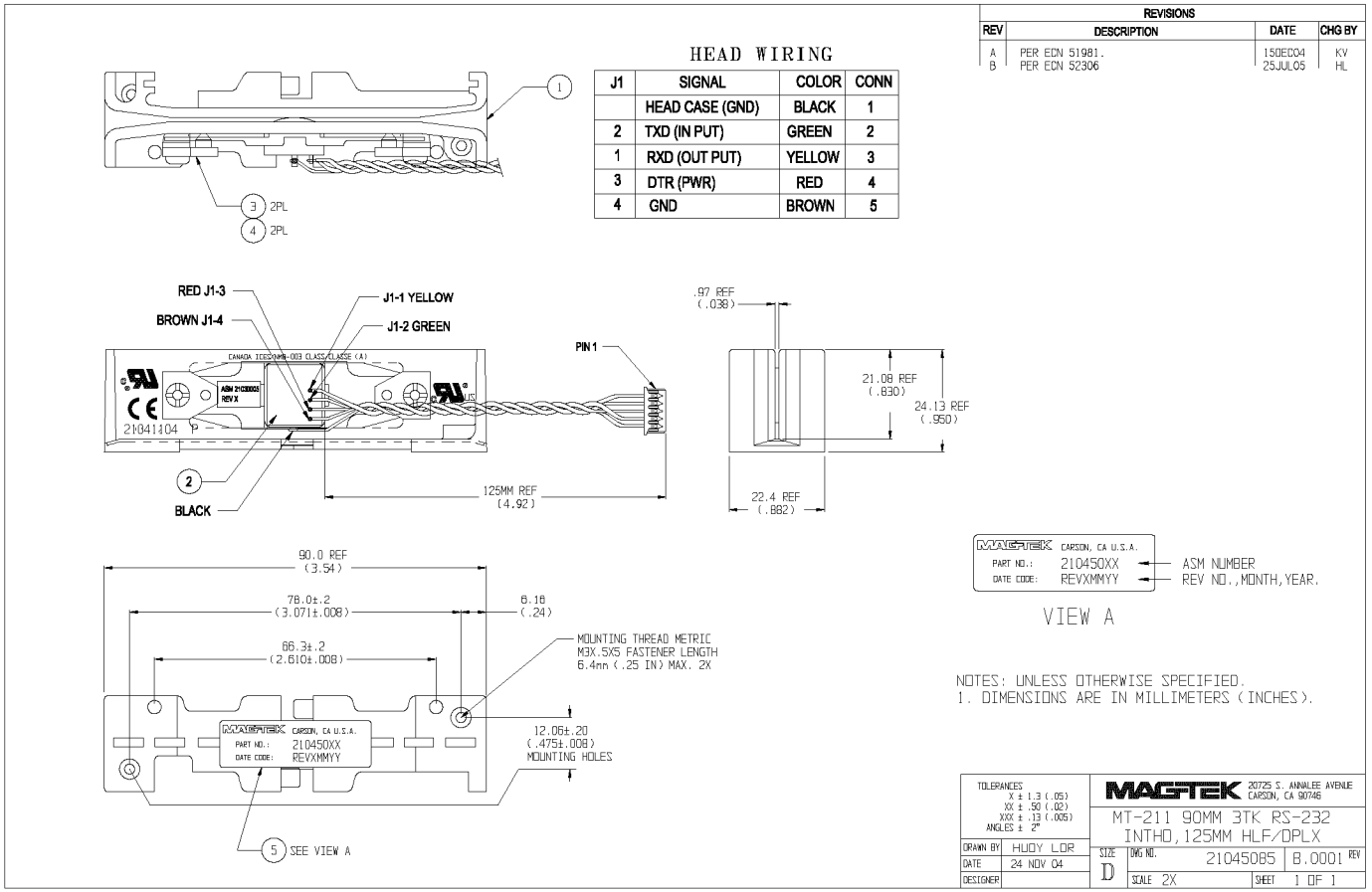



**Figure E-1. RS-232 IntelliHead, 90mm Black Rail, 125mm, 5-Pin Molex**

# APPENDIX F. RS-232 INTELLIHEAD 3 TRACKS, 60MM, SLIM PROFILE, 125MM 5 PIN MOLEX

## Drawings

The following drawing is provided in this section:

| Part Number | Title |
|---|---|
| 21046005 | RS-232 IntelliHead, 3-Track 60mm Slim Profile, Cable 125mm 5-Pin Molex |

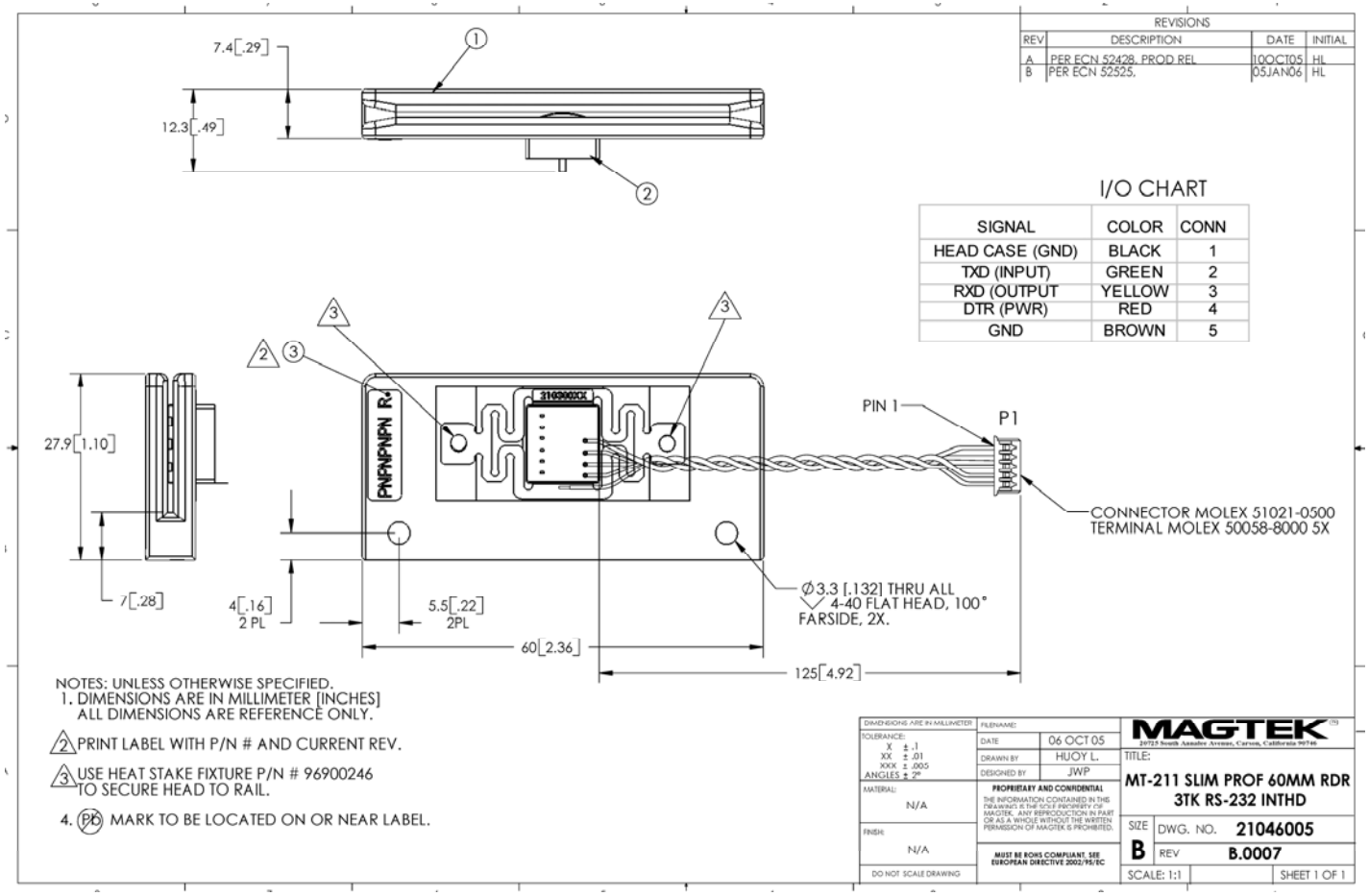



**Figure F-1. RS-232 IntelliHead 60mm, 3 Tracks, Cable 125mm, 5-Pin Molex**

# APPENDIX G. RS-232 INTELLIHEAD, SLIM PROFILE READER

### Drawings

The following drawing is provided in this section:

| Part Number | Title |
|---|---|
| 21047010 | RS-232 IntelliHead, 3-Track 90mm Black Slim Rail, Cable 125mm, 5-Pin Molex |

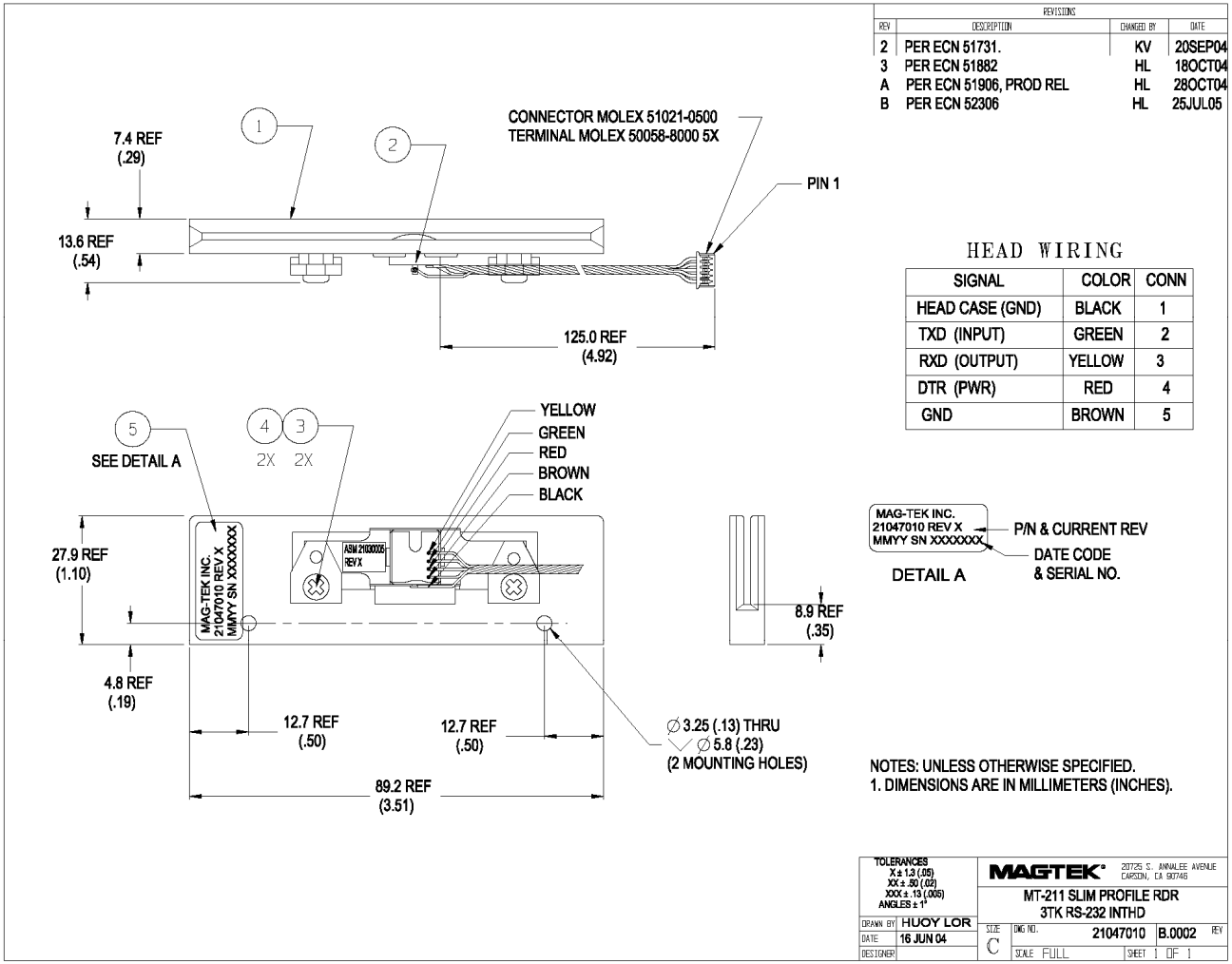



**Figure G-1. RS-232 IntelliHead, 90mm Slim Rail, 3 Tracks, 125mm, 5-Pin Molex Connector**

# APPENDIX H. RS-232 INTELLIHEAD, SLIM PROFILE (PAX) READER

### Drawings

The following drawing is provided in this section:

| Part Number | Title |
|---|---|
| 21047014 | RS-232 IntelliHead, 3-Tracks 90mm Slim Profile (PAX), Cable 125mm 5-Pin Molex |

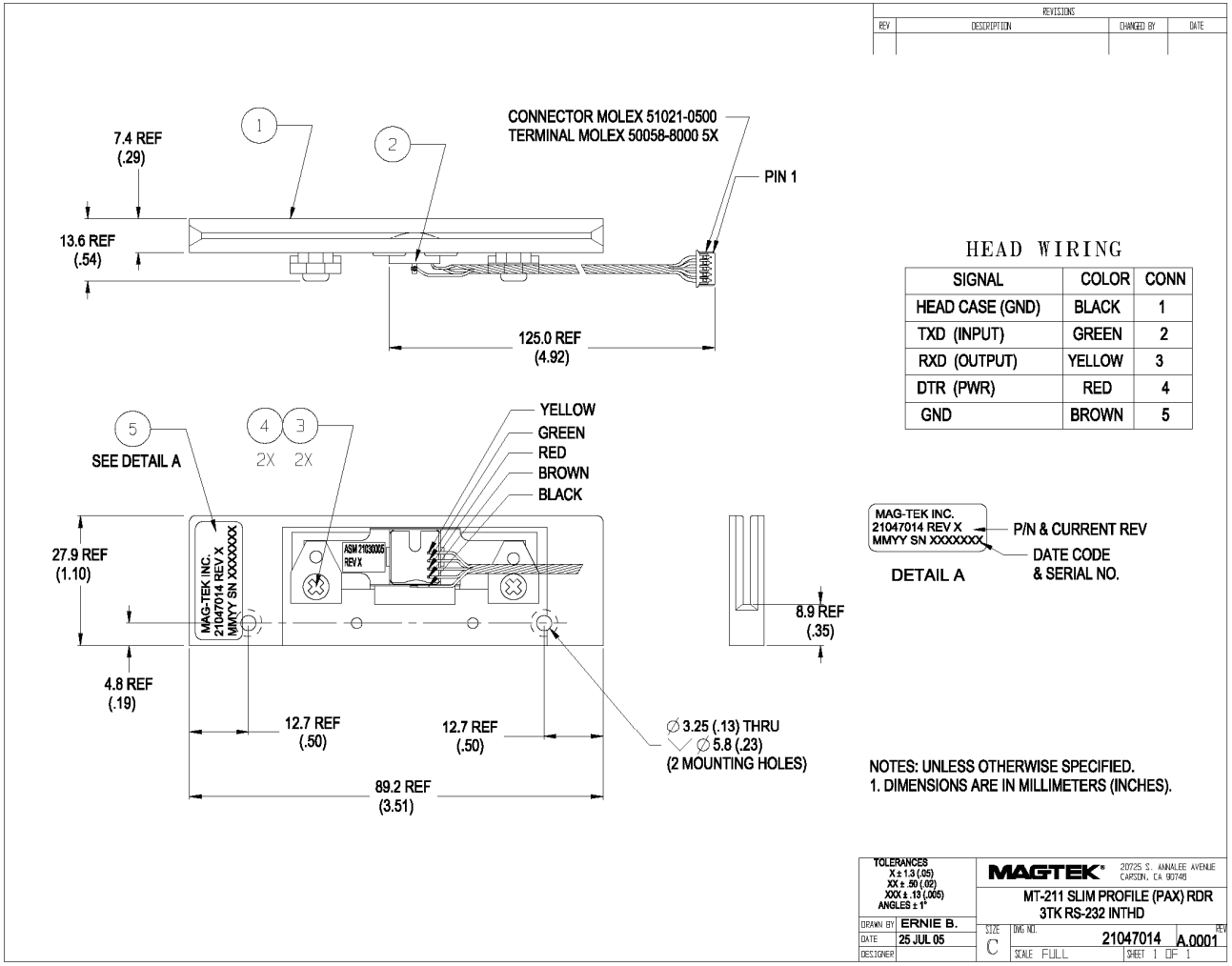



**Figure H-1. RS-232 IntelliHead, 90mm Slim Profile (PAX), 125mm, 5-Pin Molex Connector**