



The Data Structure

Transmitter data

- The transmitter is continually active while a functioning battery is installed and will emit data stream at intervals of approximately 15 seconds. The data stream comprises:
 1. A 16 bit ADDRESS which is unique to that installation, programmed on manufacture
 2. An 8 bit STATUS notice. The least significant bit (lsb) of this segment is set at bit level 0 for SEAL CLOSED and bit level 1 for SEAL OPEN.
 3. A 16 bit COUNTER. This increments each time the seal is opened or closed.
 4. A 16 bit ERROR value for the cyclic redundancy check (CRC) error detection system.

The data is transmitted at 9600 baud, taking around 15 milliseconds and normally once per cycle. Seal state change will, however, cause immediate transmission of a message, repeated continuously for approximately 1.5 seconds, irrespective of the position in the transmission cycle.

Operation

Opening the seal

- At the left side of the seal casing, a rectangular section release slide protrudes, terminating in a round knob. Using the knob to withdraw the slide to the left releases the cable plunger out from the bottom of the seal casing. This allows the free stop-end to be pulled from the plunger keyway.
- Withdrawal of the slide also spins the security number display wheels to scrambled positions and closes the microswitch.

Closing the seal

- With the free end of the cable passed through or around the appropriate door catch mechanism, the stop-end is inserted into the plunger keyway.
- The plunger is pushed firmly up into the seal casing, locking the cable end and allowing the release slide back to the closed position.
- The closing action spins the security number display wheels to a new, random, 5 digit number and locks them in place, it also opens the microswitch.



fail safe security/mechatronics system
 event-unique random security number
 sequential covert security number
 tamper evident design

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The Receiver

- The Receiver is housed in a case moulded from impact-resistant polystyrene. Access to the case is via the base plate secured by four screws.
- The receiver antenna is contained within the case, of the in-cab unit. The unit should therefore be positioned in the cab for maximum practical signal capture. Ground-based receivers may use an external antenna.
- The receiver is secured by four mounting brackets. When secured, access to the unit via the base plate is not possible.
- The unit is powered from the tractor electrical system and is intended to operate on 24V dc. A 12V dc power input option is available. The unit is intended for operation on Negative Earth systems. A positive earth option is available.

VERSION 3

The Receiver VERSION 3

The receiver will operate on 433.93Mhz and provide a serial RS232 interface for connection into a VMS or PC. It will provide a single relay contact that will emulate the seal status.

Connections to receiver are via a 15 pin D connector.

Connections as below:

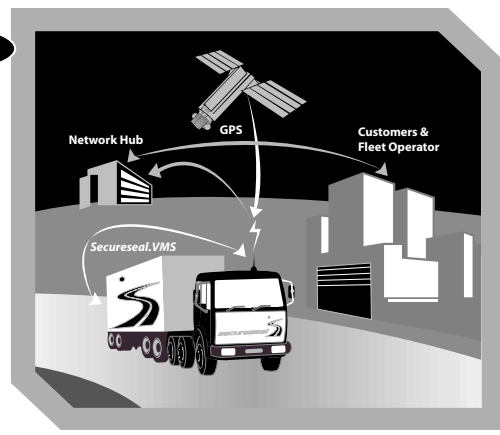
No.	Pin	Description
2	Rx.	RS232 Receive Data from Host
3	Tx.	RS232 Transmit Data to Host
5	RLY- C	Relay Common Output
6	Rx-	RS232/485 B Input
7	Rx+	RS232/485 A Input
8	RLY_NC	Relay Normally Closed Output
9	GND	Power Ground
10	GND	RS422/485 Z Output
11	Tx-	RS232/3=485 Z Output
12	Tx+	RS232/485 Y Output
14	RLY_NO	Power Input +24 V dc (or +12V dc)
15	PWR	17-30V dc Input – typical 40mA (max 60mA with relay energised)

An 8 way switch on the base card will allow settings as shown below:

SW1-6 : Set Receiver address. The receiver will pass all messages received over RF to the communications port. However, the relay will only be controlled when a message from a matching transmitter is received.

SW7-8 : Set communications baudrate as shown below:

8	7	Baudrate
OFF	OFF	4800,N,8,1
OFF	ON	9600,N,8,1
ON	ON	19200,N,8,1
ON	OFF	38400,N,8,1



It will always be active and listening out for messages from any transmitter (RF). Once a message is validated, it will be transmitted on the communications channel at the selected baudrate in the following format:

STX	Rx_Add	Add_HO	Add_LO	Status	Count_LO	Count_HO	ETX
\$F2							\$F3

The most significant bit (msb) of the Rx_Add byte will clear (0) to indicate message is directly from a receiver. It will be set if the message has come through a repeater.

There are 3 leds' on the receiver which operate as follows:

- Green:** Power/System in Receive Mode
- Yellow:** Signal Detected. This may stay lit for approx. 4 seconds following signal validation. This indicates that if exactly the same message is received again (which happens when the seal state changes) the receiver will not pass it onto the host.
- Red:** Valid Signal Received (CRC Pass)