

KEYBOX J1939UM_REV1.2

blink
MARINE



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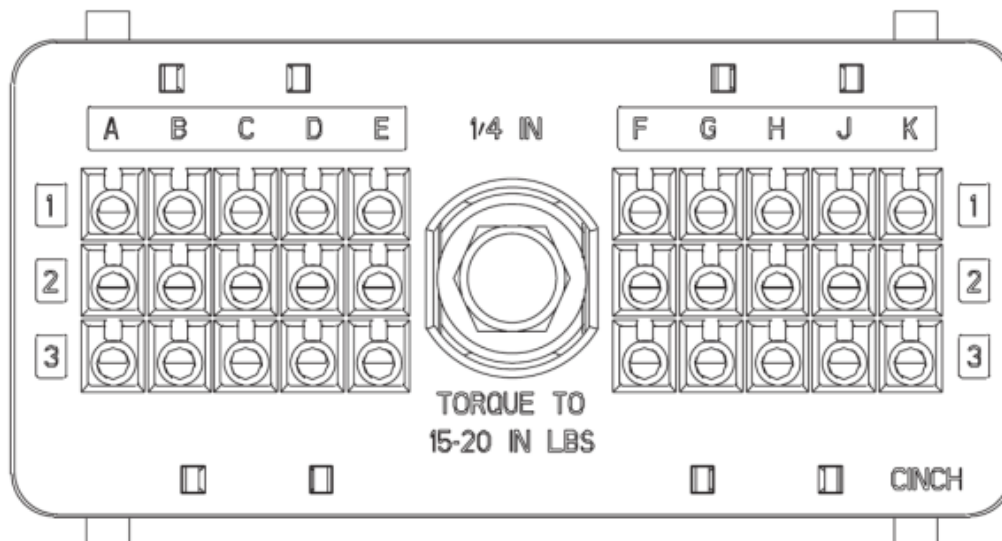
Table of contents

1.	Cinch Connector 30 pin:.....	3
2.	Message header description	4
3.	General Data Format.....	4
4.	Default Settings	5
5.	Single contact command (01h)	5
6.	Multiple contact command (02h).....	6
7.	Get software revision (2Ah)	6
8.	Baud rate setting (6Fh).....	7
9.	Set Source address (70h).....	7
10.	Contact status acknowledgment (73h).....	8
11.	Heartbeat TX (75h)	9
12.	Heartbeat RX (76h).....	10
13.	Set CAN protocol	11
14.	Revision history	11

1. Cinch Connector 30 pin:

Output	Pin
Battery Positive	E1
Battery Ground	F3
RS485 bus	D2
RS485 bus	E2
Contact1	C1, D1
Contact2	C2, C3
Contact3	H1, H2
Contact4	G2, H3
Contact5	D3, E3
Contact6	J1, K1
Contact7	J2, K2
Contact8	J3, K3
Contact9	A1, B1
Contact10	A2, B2
Contact11	A3, B3
Contact12	F2, G3
CAN H	F1
CAN L	G1

Pin Out – Harness Connector CINCH 5810130029:



2. Message header description

The 29-bit CAN identifier used in J1939 is structured in the following way.

Priority	Reserved	Data Page	PDU Format	PDU Specific	Source Address
3 bits	1 bit	1 bit	8 bits	8 bits	8 bits

The proprietary format used by keybox is defined as follows:

Priority = 6.

Reserved = 0.

Data page = 0.

PDU Format = EFh (the message is addressable).

PDU Specific = Destination Address.

Parameter Group Number (PGN) = 61184 (EF00h).

An example of CAN identifier of messages sent to the keybox is 18EF2100h where:

21h is the destination address (keybox)

00h is the source address.

An example of CAN identifier of messages sent by the keybox is 18EFFF21h where:

FFh refers to broadcast messages (no specific destination address)

21h is the source address (keybox).

3. General Data Format

The proprietary protocol has defined a general format for the data fields in the PGN 61184. The format consists of:

1 header field (2 bytes)

1 command byte

8 bytes (the remaining field) are defined specifically for each command.

The data length is 8 bytes, unused bits and bytes are set to all 1's (0xFF).

Byte 0	04h
Byte 1	1Bh
Byte 2	Command
Byte 3-7	Data required for each specific command

4. Default Settings

Setting	Default status or level	How to change
Baud rate	250kbit/s	Command 6Fh
Source address	21h	Command 70h
Keybox identifier	21h	Command 70h
Heartbeat TX	Disable	Command 75h
Heartbeat RX	Disable	Command 76h
Contact acknowledgment	Disable	Command 73h

5. Single contact command (01h)

This message is sent to the keybox to set the status of each output pin.

Byte 0	04h	Header bytes
Byte 1	1Bh	
Byte 2	01h	Single contact output message
Byte 3	XXh	XX: Contact number 01h: contact 1 02h: contact 2 03h: contact 3 04h: contact 4 05h: contact 5 06h: contact 6 07h: contact 7 08h: contact 8 09h: contact 9 0Ah: contact 10 0Bh: contact 11 0Ch: contact 12
Byte 4	YYh	Contact status 00h: OFF 01h: ON
Byte 5,6,7	FFh	Not used

Examples:

Direction	Identifier	Format	Message	Data
To Keybox	18EF2100h	Ext	04 1B 01 01 01 FF FF FF	Contact 1 ON
To Keybox	18EF2100h	Ext	04 1B 01 01 00 FF FF FF	Contact 1 OFF
To Keybox	18EF2100h	Ext	04 1B 01 06 01 FF FF FF	Contact 6 ON
To Keybox	18EF2100h	Ext	04 1B 01 06 00 FF FF FF	Contact 6 OFF
To Keybox	18EF2100h	Ext	04 1B 01 0A 01 FF FF FF	Contact 10 ON
To Keybox	18EF2100h	Ext	04 1B 01 0C 00 FF FF FF	Contact 12 OFF

6. Multiple contact command (02h)

This message is sent to the keybox to set the status of one or more output pins at the same time.

Byte 0	04h	Header bytes
Byte 1	1Bh	
Byte 2	02h	Multiple contact output message
Byte 3	K8 K7 K6 K5 K4 K3 K2 K1	'1'= set ON; '0'= set OFF
Byte 4	0 0 0 0 K12 K11 K10 K9	'1'= set ON; '0'= set OFF
Byte 5,6,7	00h	Not used

Example

Direction	Identifier	Format	Message	Data
To Keybox	18EF2100h	Ext	04 1B 02 01 00 00 00 00	Set contact 1 ON. All the other outputs OFF
To Keybox	18EF2100h	Ext	04 1B 02 C0 03 00 00 00	Set contacts 10, 9, 8, and 7 ON. All the other outputs OFF
To Keybox	18EF2100h	Ext	04 1B 02 3F 00 00 00 00	Set contacts 1, 2, 3, 4, 5, 6 ON. All the other outputs OFF

7. Get software revision (2Ah)

Byte 0	04h	Header bytes
Byte 1	1Bh	
Byte 2	2Ah	Get software revision
Byte 3,7	FFh	Not used

Answer:

Byte 0	04h	Header bytes
Byte 1	1Bh	
Byte 2	2Ah	Get software revision
Byte 3,6	XXh XXh XXh XXh	SW revision ASCII
Byte 7	00h	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keybox	18EF2100h	Ext	04 1B 2A FF FF FF FF FF	Get software revision
From Keybox	18EFFF21h	Ext	04 1B 2A 56 36 2E 30 00	V6.0

8. Baud rate setting (6Fh)

This message is used to change the baud rate of the CAN bus. Connecting only one keybox to the bus when changing the baud rate is recommended. If an invalid value is chosen, then no change is done to the stored value.

Byte 0	04h	Header bytes
Byte 1	1Bh	
Byte 2	6Fh	Set baud rate message
Byte 3	02h	500kbit/s
	03h	250kbit/s
Byte 4,7	FFh	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keybox	18EF2100h	Ext	04 1B 6F 02 FF FF FF FF	Set baud rate = 500kbit/s

9. Set Source address (70h)

This message is used to change the keybox CAN source Address and/or the keybox identifier. Either or both the Source Address or keybox identifier may be changed independently. Connecting only one keybox to the bus during the address change is recommended. If an invalid value is chosen, then no change is done to the stored value.

Byte 0	04h	Header bytes
Byte 1	1Bh	
Byte 2	70h	Set address message
Byte 3	XXh	XX: CAN source address
		From 01h to FEh FFh: no change
Byte 4	YYh	YY: keybox identifier
		From 00h to FEh FFh no change
Byte 5,7	FFh	Not used

Example

Direction	Identifier	Format	Message	Data
To Keybox	18EF2100h	Ext	04 1B 70 05 21 FF FF FF	Set source address = 05h Set keybox identifier = 21h

10. Contact status acknowledgment (73h)

This message enables or disables the transmission of the contact acknowledgment message. When this feature is enabled the keybox transmits an acknowledgment message each time a contact command is received.

Note: available only for the single contact command (01h)

Byte 0	04h	Header bytes
Byte 1	1Bh	
Byte 2	73h	Contact acknowledgment
Byte 3	XXh	XX: 00h OFF (default) 01h ON
Byte 4,7	FFh	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keybox	18EF2100h	Ext	04 1B 73 01 FF FF FF FF	Enable contact acknowledgement
To Keybox	18EF2100h	Ext	04 1B 01 0A 01 00 00 00	Single contact command (01h)
From Keybox	18EFFF21h	Ext	00 01 0A FF FF 21 FF FF	contact Ack message (contact 10 active)

Contact acknowledgment message:

Byte 0	00h	
Byte 1	XXh	XX: Contact status
Byte 2	YYh	YY: Contact number
Byte 5	ZZh	Keybox identifier
Byte 3,4,6,7	FFh	Not used

11. Heartbeat TX (75h)

This message enables or disables the transmission of Heartbeat message. This message is designed to indicate to other devices on the bus that this unit continues to work.

NOTE: When enabled if it is set a period value out of range, this parameter remains unchanged.

Byte 0	04h	Header bytes
Byte 1	1Bh	
Byte 2	75h	Heartbeat TX
Byte 3	XXh	XX: 00h Disabled (default) 01h Enabled
Byte 4	YYh	YY: Period in milliseconds ÷ 10 From 05h (50ms) to FEh (2.54 sec)
Byte 5,7	FFh	Not used

Example:

Direction	Identifier	Format	Message	Data
To Keybox	18EF2100h	Ext	04 1B 75 01 32 FF FF FF	Set heartbeat message transmission each 500 milliseconds

Heartbeat TX generated message:

Byte 0	04h	Header bytes
Byte 1	1Bh	
Byte 2	F9h	Heartbeat message
Byte 3	XXh	XX: Message counter, incremented each message sent
Byte 4	K8 K7 K6 K5 K4 K3 K2 K1	Contact state indicators Each bit represents a contact status
Byte 5	00 00 00 00 K12 K11 K10 K9	0: OFF 1: ON
Byte 6,7	FFh	Not used

Example:

Direction	Identifier	Format	Message	Data
From Keybox	18EFFF21h	Ext	04 1B F9 03 80 00 00 00	Heartbeat message with contact 8 active.
From Keybox	18EFFF21h	Ext	04 1B F9 03 00 08 00 00	Heartbeat message with contact 12 active

12. Heartbeat RX (76h)

This command is used to determine that CAN communication is active by monitoring at a predefined time interval the reception of the heartbeat message from the master device. If for whatever reason this periodic message is not transmitted anymore, the keybox goes into communication failure and all the outputs will be turned off. The following table details how to set the monitoring time and the CAN master identifier parameters (PRIORITY and PGN).

NOTE: the heartbeat RX time should be greater than the related transmission time coming from the producer.

NOTE 2: the command is arranged to receive heartbeat signals transmitted to a specific destination or to all devices connected on the bus (BROADCAST).

Byte 0	04h	Header bytes
Byte 1	1Bh	
Byte 2	76h	Heartbeat RX
Byte 3	RRh	RR: Priority used by the master device 00h-1Fh
Byte 4	SSh	SS: 00h-FFh (PGN value LSByte)
Byte 5	TTh	TT: 00h-FFh (PGN value MSByte)
Byte 6	YYh	YY: Heartbeat RX time in milliseconds LSByte
Byte 7	XXh	XX: Heartbeat RX time in milliseconds MSByte

Heartbeat time: XXYYh (from 000Ah to FEFh: from 10 to 65279 milliseconds).

When the period is set to 0000h, the feature is disabled.

NOTE 3: If it is set a time value out of range, this parameter remains unchanged.

Example 1:

If the master device priority = 0x18h; PGN = 0xEFFh; PDU SPECIFIC = 0x21h (addressed to the keybox 0x21h); heartbeat message transmitted each 400 milliseconds; then CAN identifier is 0x18EF21FFh and the command should be set as shown in the table below:

Direction	Identifier	Format	Message	Data
To Keybox	18EF2100h	Ext	04 1B 76 18 FF EF F4 01	Monitoring time set to 500 milliseconds
From Master	18EF21FFh	Ext	-	Message transmitted each 400 milliseconds

Example 2:

If the master device priority = 0x1Fh; PGN = 0xAB15h; PDU SPECIFIC = 0xFFh (addressed to all devices - BROADCAST); heartbeat message transmitted each 900 milliseconds; then CAN identifier is 0x1FABFF15h and the command should be set as shown in the table below:

Direction	Identifier	Format	Message	Data
To Keybox	18EF2100h	Ext	04 1B 76 1F 15 AB E8 03	Monitoring time set to 1s
From Master	1FABFF15h	Ext	-	Message transmitted each 900 milliseconds

13. Set CAN protocol

This set of messages are used to change to the desired CANbus protocol.

- Change from CANopen to J1939:

Direction	Identifier	Format	Message	Data
To Keybox	615h	Std	2F FF 20 00 01	Change to J1939

- Change from J1939 to CANopen:

Direction	Identifier	Format	Message	Data
To Keybox	18EF2100h	Ext	04 1B 80 00 FF FF FF FF	Change to CANopen

14. Revision history

Date	Manual Revision	Comment	Related SW version
06/03/2018	1.0	First release Keybox J1939	Sw x.x
05/02/2019	1.1	Second release: Deleted CANopen messages structure table	Sw x.x
21/02/2019	1.2	Third release: Added heartbeat RX command (76h)	Sw x.x