

## CAN frame definition: measurement header

### General parameters for the message

CAN bitrate [Hz]	any
CAN FD bitrate [Hz]	n/a
CAN frame format	SFF
CAN ID	0x147
Mode	broadcast
Broadcast rate [Hz]	any
Poll message	n/a

See the documentation of the FP\_B-MEASUREMENTS message for the general concept, and the values for timestamp type, location and type.

### Header frame

CAN payload bytes	0	1	2	3	4	5	6	7
<i>Intel bit numbering</i>	7 6 5 4 3 2 1 0	15 14 13 12 11 10 9 8	23 22 21 20 19 18 17 16	31 30 29 28 27 26 25 24	39 38 37 36 35 34 33 32	47 46 45 44 43 42 41 40	55 54 53 52 51 50 49 48	63 62 61 60 59 58 57 56
<i>Motorola bit numbering (sane)</i>	63 62 61 60 59 58 57 56	55 54 53 52 51 50 49 48	47 46 45 44 43 42 41 40	39 38 37 36 35 34 33 32	31 30 29 28 27 26 25 24	23 22 21 20 19 18 17 16	15 14 13 12 11 10 9 8	7 6 5 4 3 2 1 0
<i>Motorola LSB bit numbering (weird)</i>	7 6 5 4 3 2 1 0	15 14 13 12 11 10 9 8	23 22 21 20 19 18 17 16	31 30 29 28 27 26 25 24	39 38 37 36 35 34 33 32	47 46 45 44 43 42 41 40	55 54 53 52 51 50 49 48	63 62 61 60 59 58 57 56
<i>Bit in byte</i>	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0

# of measurements	uint8_t (unsigned, little-endian)	7 6 5 4 3 2 1 0
Timestamp type	uint8_t (unsigned, little-endian)	7 6 5 4 3 2 1 0
GPS week number	uint16_t (unsigned, little-endian)	7 6 5 4 3 2 1 0 15 14 13 12 11 10 9 8
GPS tow	uint32_t (unsigned, little-endian), [ms] / [-]	7 6 5 4 3 2 1 0 15 14 13 12 11 10 9 8 23 22 21 20 19 18 17 16 31 30 29 28 27 26 25 24

### Notes

- the max number of measurements (wheels) is 4
- number of measurement = number of 0x148 frames to follow
- timestamp type and GPS time is like in FP\_B-MEASUREMENT
- see FP\_B-MEASUREMENTS documentation for details on some of the fields

### Example

1 measurement  
 Timestamp type = time of arrival = 1  
 GPS Week number = 2304 = 0x0900 (unused for TOA)  
 GPS tow = 1234567890 = 0x499602d2 (unused for TOA)

0 0 0 0 0 0 0 1	0 0 0 0 0 0 0 1						
		0 0 0 0 0 0 0 0	0 0 0 0 1 0 0 1				
				1 1 0 1 0 0 1 0	0 0 0 0 0 0 1 0	1 0 0 1 0 1 1 0	0 0 1 0 0 1 0 0 1

CAN frame payload

0x01	0x01	0x00	0x09	0xd2	0x02	0x96	0x49
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## CAN frame definition: measurement data

### General parameters for the message

CAN bitrate [Hz]	any
CAN FD bitrate [Hz]	n/a
CAN frame format	SFF
CAN ID	0x148
Mode	broadcast
Broadcast rate [Hz]	any
Poll message	n/a

See the documentation of the FP\_B-MEASUREMENTS message for the general concept, and the values for timestamp type, location and type.

### Meas frame

CAN payload bytes	0	1	2	3	4	5	6	7
<i>Intel bit numbering</i>	7 6 5 4 3 2 1 0	15 14 13 12 11 10 9 8	23 22 21 20 19 18 17 16	31 30 29 28 27 26 25 24	39 38 37 36 35 34 33 32	47 46 45 44 43 42 41 40	55 54 53 52 51 50 49 48	63 62 61 60 59 58 57 56
<i>Motorola bit numbering (sane)</i>	63 62 61 60 59 58 57 56	55 54 53 52 51 50 49 48	47 46 45 44 43 42 41 40	39 38 37 36 35 34 33 32	31 30 29 28 27 26 25 24	23 22 21 20 19 18 17 16	15 14 13 12 11 10 9 8	7 6 5 4 3 2 1 0
<i>Motorola LSB bit numbering (weird)</i>	7 6 5 4 3 2 1 0	15 14 13 12 11 10 9 8	23 22 21 20 19 18 17 16	31 30 29 28 27 26 25 24	39 38 37 36 35 34 33 32	47 46 45 44 43 42 41 40	55 54 53 52 51 50 49 48	63 62 61 60 59 58 57 56
<i>Bit in byte</i>	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0	7 6 5 4 3 2 1 0

Meas x	int16_t (signed, little-endian) 0.001m/s, 0xffff = invalid	7 6 5 4 3 2 1 0 15 14 13 12 11 10 9 8
Meas y	int16_t (signed, little-endian) 0.001m/s, 0xffff = invalid	
Meas z	int16_t (signed, little-endian) 0.001m/s, 0xffff = invalid	7 6 5 4 3 2 1 0 15 14 13 12 11 10 9 8
Meas type	uint8_t (unsigned, little-endian)	
Meas loc	uint8_t (unsigned, little-endian)	7 6 5 4 3 2 1 0

### Example

Meas x = 1.234 m/s --> value = 1234 = 0x04d2  
 Meas y = 5.678 m/s --> value = 5678 = 0x162e  
 Meas z = 9.101 m/s --> value = 9101 = 0x238d  
 Meas type Speed = 1  
 Meas loc RC = 1

1 1 0 1 0 0 0 0	0 0 0 0 1 0 0 0	0 0 1 0 1 1 1 0	0 0 0 1 0 1 1 0				
				1 0 0 0 1 1 0 1	0 0 1 0 0 0 1 1		
						0 0 0 0 0 0 0 1	0 0 0 0 0 0 0 1

CAN frame payload

0xd2	0x04	0x2e	0x16	0x8d	0x23	0x01	0x01
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# CAN frame definition

## General parameters for the message

CAN bitrate [Hz]	any
CAN FD bitrate [Hz]	n/a
CAN frame format	SFF
CAN ID	0x146
Mode	broadcast
Broadcast rate [Hz]	50 Hz
Poll message	n/a

CAN payload bytes		0								1								2								3								4								5								6								7																							
Intel bit numbering		7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8	23	22	21	20	19	18	17	16	31	30	29	28	27	26	25	24	39	38	37	36	35	34	33	32	47	46	45	44	43	42	41	40	55	54	53	52	51	50	49	48	63	62	61	60	59	58	57	56																
Motorola bit numbering (sane)		63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0																
Motorola LSB bit numbering (weird)		7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8	23	22	21	20	19	18	17	16	31	30	29	28	27	26	25	24	39	38	37	36	35	34	33	32	47	46	45	44	43	42	41	40	55	54	53	52	51	50	49	48	63	62	61	60	59	58	57	56																
Bit in byte		7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0								
FR (or RC)	int16_t (signed, little-endian) 0.001m/s, 0xffff = invalid	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8																																																																
FL	int16_t (signed, little-endian) 0.001m/s, 0xffff = invalid									7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8																																																								
RR	int16_t (signed, little-endian) 0.001m/s, 0xffff = invalid																																	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8																																
RL	int16_t (signed, little-endian) 0.001m/s, 0xffff = invalid																																									7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8																								

## Example

FR = 1.234 m/s --> value = 1234 = 0x04d2  
 FL = -1.234 m/s --> value = -1234 = 0xfb2e  
 RR = n/a --> value = 0xffff  
 RL = n/a --> value = 0xffff

CAN frame payload

1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0xd2								0x04								0x2e								0xfb								0xff								0xff								0xff															

No longer supported