MWave Adjustments

February 16, 2022

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4. Application: Dual Relay
5. Application: Tune-in Chart for Technicians
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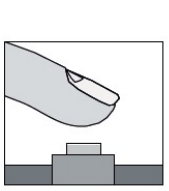
Installation Notes

1. Point the sensor in a minimum of 30 degrees in most installations. MWave sees objects coming towards it. If it's pointed too vertically, you're moving across the field, not towards it.
2. Adjust one parameter at a time, and record results. Changing one can affect another, so you may need to go back-and-forth between 2 or more for optimal results.

1. Remote Overview

The Miller Edge remote and the BEA remotes both work on the MWave.

This chart is in the Mwave insert.



ADJUSTABLE PARAMETERS

Check the settings by walk-testing the sensor. For more information on settings, see the **Troubleshooting** section.

DESCRIPTION (FUNCTION)	**ADJUSTMENT RANGE** (VALUE)	**FACTORY SETTING**	**MANUAL SETTING** Device Face [Function] ● Red	[Value] ● Green	**KEY** MWave Remote	**KEY** Generic Remote
Start parameterization mode—unlock			Hold 2 seconds		🔒	🔒
Exit parameterization mode exit—lock			Hold 2 seconds		🔒 + 🔒	🔒 + 🔒
FUNCTION 1 Field size	0 = minimum sensitivity … 9 = maximum sensitivity	6	Red LED 1x	[Value] 0-9	SENS + 0-9	📶 + 0-9
FUNCTION 2 Vehicle detection	1 = low sensitivity 2 = medium sensitivity 3 = high sensitivity	2	Red LED 2x	1, 2, 3	CAR + 1, 2, 3	A + 1, 2, 3
FUNCTION 3 Human-presence detection	1 = minimum sensitivity … 7 = maximum sensitivity	1	Red LED 3x	1-7	PER + 1-7	B + 1-7
DETECTION FILTER (Rejection Mode)						

1. Remote Overview

DESCRIPTION (FUNCTION)	ADJUSTMENT RANGE (VALUE)	FACTORY SETTING	MANUAL SETTING Device Face		KEY MWave Remote	KEY Generic Remote
FUNCTION 4 Vehicle-presence relay (Relay 1)	4 = Vehicle forward 5 = Vehicle backward 6 = Vehicle forward/backward 7 = Person/vehicle forward 8 = Person/vehicle backward 9 = Person/vehicle forward/backward	7	Red LED 4x	4-9	OCAR + 4-9	C + 4-9
FUNCTION 5 Human-presence relay (Relay 2)	1 = Person forward 2 = Person backward 3 = Person forward/backward 4 = Vehicle forward 5 = Vehicle backward 6 = Vehicle forward/backward	1	Red LED 5x	1-6	OPER + 1-6	D + 1-6
FUNCTION 6 Hold time	0 = 0.5 s 1 = 1.0 s 2 = 2.0 s 3 = 3.0 s 4 = 5.0 s 5 = 10 s 6 = 20 s 7 = 30 s 8 = 60 s 9 = 300 s	1	Red LED 6x	0 = 0.5 s 1 = 1.0 s 2 = 2.0 s 3 = 3.0 s 4 = 5.0 s 5 = 10 s 6 = 20 s 7 = 30 s 8 = 60 s 9 = 300 s	TIME + 0-9	(clock) + 0-9
FUNCTION 7 Switching output	1 = Relay N.O. 2 = Relay N.C.	1	Red LED 7x	1, 2	OUT + 1, 2	(arrows) + 1, 2
FUNCTION 8 Responsiveness	1 = Fast 2 = Normal 3 = Slow	2	Red LED 8x	1, 2, 3	STEP + 1, 2, 3	
Factory reset after pressing the key 9	9		Push both buttons at the same time for 5 seconds		SET + 9	(wrench) + 9
Sensor operation (permanent relay circuit to support commissioning)	1 = Automatic 2 = Vehicle and passenger relay permanently detected 3 = Vehicle relay detected, person relay not detected 4 = Vehicle relay not detected, person relay detected 5 = Vehicle and person relay permanently not detected	1			F2 + 1-5	F2 + 1-5
Function value keys					0-9, + , -	0-9, + , -
Query the value of the previously pressed key					?	?
SW revision query	Red LED flashes as per main version Green LED flashes as per sub-version				F1	F1

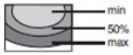
2. Set Up & Functions Explained

Where to start?

Use the chart to setup the unit based on the application.

Valid detection of the target results from a combination of the vehicle and human detection, responsiveness and sensitivity settings.

The settings Responsiveness, Vehicle Detection and Human Presence detection are filter algorithms. Adjusting one will affect the others so only change one setting at a time when tuning in the sensor.

Parameter	Settings		Information
Sensitivity	1 ... 10	Smallest detection field Largest detection field	 Suggested value based on angle and mounting height

	15°	30°	45°	>45°
7 m	8	4	2	1
5 m	6	6	3	1
3.5 m	6	5	4	1
2.5 m	4	4	4	1

Vehicle detection	1 2 3	Low Medium High	Suggested value based on angle and mounting height

	15°	30°	45°	>45°
7 m	1	2	2	1
5 m	1	2	2	2
3.5 m	1	2	2	3
2.5 m	1	2	2	3

Human-presence detection	1 ... 7	Min. Max.	Suggested value based on angle and mounting height Detection without cross-traffic suppression

	15°	30°	45°	>45°
7 m	1	1	1	1
5 m	1	1	1	1
3.5 m	1	1	1	1
2.5 m	1	1	1	1

Detection with cross-traffic suppression

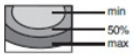
	15°	30°	45°	>45°
7 m	4-7	2-7	2-7	2-7
5 m	4-7	4-7	4-7	4-7
3.5 m	4-7	4-7	6-7	6-7
2.5 m	4-7	6-7	6-7	6-7

2. Set Up & Functions Explained

Sensitivity

Detection field size or Sensitivity is adjusted by setting the threshold of the return single for valid detection. The sensor does not change the size of the field but ignores weaker signals.

This can be useful when unwanted large trucks in the far background are causing nuisance trips. The trucks are large but because of their distance show up as weak signals.

Parameter	Settings		Information
Sensitivity	1 ... 10	Smallest detection field Largest detection field	 Suggested value based on angle and mounting height

	15°	30°	45°	>45°
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5 m	6	6	3	1
3.5 m	6	5	4	1
2.5 m	4	4	4	1

Parameter	Settings		Information
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5 m	1	2	2	2
3.5 m	1	2	2	3
2.5 m	1	2	2	3

Parameter	Settings		Information
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7 m	1	1	1	1
5 m	1	1	1	1
3.5 m	1	1	1	1
2.5 m	1	1	1	1

Detection with cross-traffic suppression

	15°	30°	45°	>45°
7 m	4-7	2-7	2-7	2-7
5 m	4-7	4-7	4-7	4-7
3.5 m	4-7	4-7	6-7	6-7
2.5 m	4-7	6-7	6-7	6-7

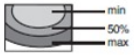
2. Set Up & Functions Explained

Vehicle Detection

a. If the echo wave is constant over multiple pulse lengths, this homogenous signal leads to a stable movement and therefore identified as a vehicle.

b. Increasing this parameter will lead to a higher tolerance threshold so a more accurate evaluation is necessary to identify a vehicle **Setting 3: detection of a vehicle is <u>more difficult</u>. Setting 1: detection of vehicle is <u>easier</u>**.

c. This helps when vehicles are approaching from an angle and not straight at the door, set lower. If you are detecting people as vehicles, set higher.

Parameter	Settings		Information
Sensitivity	1 ... 10	Smallest detection field Largest detection field	 Suggested value based on angle and mounting height

	15°	30°	45°	>45°
7 m	8	4	2	1
5 m	6	6	3	1
3.5 m	6	5	4	1
2.5 m	4	4	4	1

Parameter	Settings		Information
Vehicle detection	1 2 3	Low Medium High	Suggested value based on angle and mounting height

	15°	30°	45°	>45°
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5 m	1	2	2	2
3.5 m	1	2	2	3
2.5 m	1	2	2	3

Parameter	Settings		Information
Human-presence detection	1 ... 7	Min. Max.	Suggested value based on angle and mounting height Detection without cross-traffic suppression

	15°	30°	45°	>45°
7 m	1	1	1	1
5 m	1	1	1	1
3.5 m	1	1	1	1
2.5 m	1	1	1	1

Detection with cross-traffic suppression

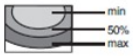
	15°	30°	45°	>45°
7 m	4-7	2-7	2-7	2-7
5 m	4-7	4-7	4-7	4-7
3.5 m	4-7	4-7	6-7	6-7
2.5 m	4-7	6-7	6-7	6-7

2. Set Up & Functions Explained

Human-Presence Detection

a. The Human Presence detection works by looking for phase shift (or different frequencies) of the returning echoes. A person has arms and legs that are approaching the sensor at different rates.

b. Max “7” means the sensor needs the greatest phase difference to trigger an output. Min “1” means the lowest phase difference to trigger an output. **Therefore, when set at “7” it is <u>more difficult</u> to tell people from a vehicle. Set to “1” it is <u>easier</u> to see people and differentiate from a vehicle.**

Parameter	Settings		Information
Sensitivity	1 ... 10	Smallest detection field Largest detection field	 Suggested value based on angle and mounting height

	15°	30°	45°	>45°
7 m	8	4	2	1
5 m	6	6	3	1
3.5 m	6	5	4	1
2.5 m	4	4	4	1

Vehicle detection	1 2 3	Low Medium High	Suggested value based on angle and mounting height

	15°	30°	45°	>45°
7 m	1	2	2	1
5 m	1	2	2	2
3.5 m	1	2	2	3
2.5 m	1	2	2	3

Human-presence detection	1 ... 7	Min. Max.	Suggested value based on angle and mounting height Detection without cross-traffic suppression

	15°	30°	45°	>45°
7 m	1	1	1	1
5 m	1	1	1	1
3.5 m	1	1	1	1
2.5 m	1	1	1	1

Detection with cross-traffic suppression

	15°	30°	45°	>45°
7 m	4-7	2-7	2-7	2-7
5 m	4-7	4-7	4-7	4-7
3.5 m	4-7	4-7	6-7	6-7
2.5 m	4-7	6-7	6-7	6-7

2. Set Up & Functions Explained

Responsiveness

a. Sets the quantity of valid wave periods used to evaluate the target.

b. Setting 3 Slow: evaluates more waves and has a is **slower response**.

c. Setting 1 Fast: evaluates fewer waves and has a **faster response**.

d. These settings will not be perceivable in reaction time of the MWave, but will help in determining people form vehicles and not detect other movement.

Responsiveness	1 2 3	Fast Normal Slow	**Behavior**	**Setting**
			More reliable detection of people	Fast (1)
			Factory setting/reliable vehicle detection	Normal (2)
			Reliable differentiation between vehicles and people	Slow (3)

3. Application: Auto Dealer

Backside

Door 2

Exterior

Interior

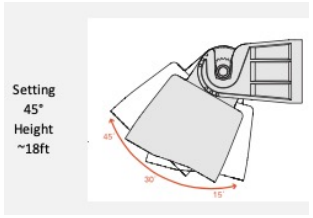
BAY

Interior

Exterior

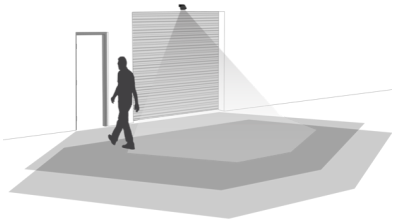
Door 1

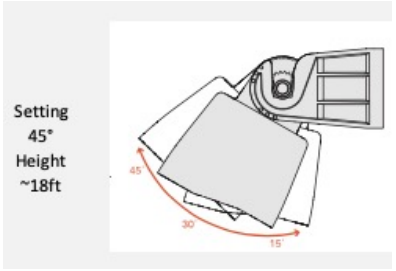
Front Customer Access



			Miller Remote	BEA Remote	Door 1 Interior	Door 1 Exterior	Door 2 Interior	Door 2 Exterior
FUNCTION 1	**SENS**	Factory Setting	**SENS**		6	5	6	4
Field Size	0 to 9	6						
FUNCTION 2	**CAR**	Factory Setting	**CAR**		1	2	1	2
Vehicle Detection	1 = low	2 = med						
	2 = med							
	3 = high							
FUNCTION 3	**PER**	Factory Setting	**PER**		7	7	7	7
Human Pres Detection	1 to 7	1						
FUNCTION 8	**STEP**	Factory Setting	**STEP**		2	2	2	2
Responsivness	1 = fast	2 = normal						
	2 = normal							
	3 = slow							
FUNCTION 4	**OCAR**	Factory Setting	**OCAR**		4	4	4	4
Vehicle Presence Relay	4=Vehicle forward	7						
Realy-1	5=Vehicle backward							
	6=Vehicle forward/backward							
	7=Person/Vehicle forward							
	8=Person/Vehicle backward							
	9=Person/Vehicle forw/backw							
FUNCTION 5	**OPER**	Factory Setting	**OPER**		4	4	4	4
Human Presence Relay	1=Person forward	1						
Realy-2	2=Person backward							
	3=Person forward/backward							
	4=Vehicle forward							
	5=Vehicle backward							
	6=Vehicle forw/backw							

4. Application: Dual Relay (Pedestrian + Vehicle)





			Miller Remote	BEA Remote	Door 1 Interior	Door 1 Exterior
FUNCTION 1	**SENS**	Factory Setting	**SENS**		6	6
Field Size	0 to 9	6				
FUNCTION 2	**CAR**	Factory Setting	**CAR**		2	2
Vehicle Detection	1 = low	2 = med				
	2 = med					
	3 = high					
FUNCTION 3	**PER**	Factory Setting	**PER**		1	1
Human Pres Detection	1 to 7	1				
FUNCTION 8	**STEP**	Factory Setting	**STEP**		2	2
Responsivness	1 = fast	2 = normal				
	2 = normal					
	3 = slow					
FUNCTION 4	**OCAR**	Factory Setting	**OCAR**		4	4
Vehicle Presence Relay	4=Vehicle forward	7				
Realy-1	5=Vehicle backward					
	6=Vehicle forward/backward					
	7=Person/Vehicle forward					
	8=Person/Vehicle backward					
	9=Person/Vehicle forw/backw					
FUNCTION 5	**OPER**	Factory Setting	**OPER**		1	1
Human Presence Relay	1=Person forward	1				
Realy-2	2=Person backward					
	3=Person forward/backward					
	4=Vehicle forward					
	5=Vehicle backward					
	6=Vehicle forw/backw					

5. Application: Tune-in Chart for Technicians

			Miller Remote	BEA Remote	Door 1		Door 2		Door 3		Door 4	
					Interior	Exterior	Interior	Exterior	Interior	Exterior	Interior	Exterior
FUNCTION 1	**SENS**	Factory Setting	**SENS**									
Field Size	0 to 9	6										
FUNCTION 2	**CAR**	Factory Setting	**CAR**									
Vehicle Detection	1 = low	2 = med										
	2 = med											
	3 = high											
FUNCTION 3	**PER**	Factory Setting	**PER**									
Human Pres Detection	1 to 7	1										
FUNCTION 8	**STEP**	Factory Setting	**STEP**									
Responsivness	1 = fast	2 = normal										
	2 = normal											
	3 = slow											
FUNCTION 4	**OCAR**	Factory Setting	**OCAR**									
Vehicle Presence Relay	4=Vehicle forward	7										
Realy-1	5=Vehicle backward											
	6=Vehicle forward/backward											
	7=Person/Vehicle forward											
	8=Person/Vehicle backward											
	9=Person/Vehicle forw/backw											
FUNCTION 5	**OPER**	Factory Setting	**OPER**									
Human Presence Relay	1=Person forward	1										
Realy-2	2=Person backward											
	3=Person forward/backward											
	4=Vehicle forward											
	5=Vehicle backward											
	6=Vehicle forw/backw											

6. How to Recover from a “Lost Situation“

a. Factory Default

Factory reset after pressing the key "9"	9		Push both buttons at the same time for 5 seconds		SET +9	+9

b. Start with Application Sample

c. Use Tune-in Chart and Log steps

d. Focus on <u>one</u> Sensor → Optimize and then move to the next sensor!