



Contact Ramco for technical support on D4RF amplifiers

6. Menu List

In case "English" is selected in "Language".<sup>1)</sup>

Initial menu	Setting value	Default value
1/3 Language	English, 日本語, 簡体中文, Español, 한국어	English
2/3 I/O polarity	NPN, Push-pull, PNP	PNP
3/3 Display	Std. display, Hold display	Std. display

Main menu	Sub menu	Setting value / description	Default value
S1 Output mode (N.O. / N.C.) <sup>3)</sup>		Light on, Dark on, (N.O. / N.C.)	Light on
S3 Response time		Main unit with stand-alone use: 16 $\mu$ s, 70 $\mu$ s, 250 $\mu$ s, 500 $\mu$ s, 1 ms, 2 ms, 8 ms Main and expansion units connected: 22 $\mu$ s, 70 $\mu$ s, 250 $\mu$ s, 500 $\mu$ s, 1 ms, 2 ms, 8 ms	250 $\mu$ s
S4 Timer		Not used, On delay, Off delay, On/off delay, Pulse output, On delay pulse, 1 to 30,000 ms	Not used
S6 Display	P1 Display mode	Value, Percentage, Bar graph, Counter <sup>4)</sup> , Edge <sup>5)</sup>	Value
	P2 Hold display	Off, Peak/bottom, Peak, Bottom, Time, On <sup>6)</sup>	Off
	P3 Brightness	10 to 100 % (10% increments)	100 %
	P4 Rotate display	Off, On	Off
	P5 Invert display	Off, On	Off
	P6 Alarm display	Off, On	Off
	P7 Zeroing	Not used, Execute	Not used
	P8 Eco mode	Off, On	Off
	P9 Stretch mode <sup>7)</sup>	Off, On - x10, On - x50	Off
	PA Language	English, 日本語, 簡体中文, Español, 한국어	English
	PB To main menu		
S7 Detection	D1 Hysteresis	1 to 90 %	5 %
	D2 Threshold mode	Standard, Edge height, Not used	Standard
	D3 APC	On, Off	On
	D4 ASC	Off, On - standard, On - fast, On - max	Off
	D5 Emitter power	Max, Mid, Min, Auto	Max
	D6 Counter	Off, On	Off
	D7 Set count <sup>8)</sup>	1 to 16383	10
	D8 Edge direction <sup>9)</sup>	Both, Positive, Negative	Both
	D9 Edge offset <sup>9)</sup>	16 $\mu$ s : 16 $\mu$ s to 4080 $\mu$ s (Main unit with stand-alone use), 22 $\mu$ s : 22 $\mu$ s to 5610 $\mu$ s (Inter-connection units with inter-connection use), 70 $\mu$ s : 70 $\mu$ s to 17850 $\mu$ s, 250 $\mu$ s : 250 $\mu$ s to 63750 $\mu$ s, 500 $\mu$ s : 0.5 ms to 127.5 ms 1 ms : 1 ms to 255 ms, 2 ms : 2 ms to 510 ms, 8 ms : 8 ms to 2040 ms	2500 $\mu$ s
	DA Edge hys. <sup>10)</sup>	1 to 9999	5
	DB To main menu		
S8 I/O	O1 I/O polarity <sup>2)</sup>	NPN, Push-pull, PNP	PNP
	O2 Pin 2 setting <sup>2*)</sup>	Output 2, Alarm output, Teach input, Emitter off, Counter reset <sup>1*)</sup> , Not used	Output 2
	O3 Pin 5 setting <sup>2*)</sup>	Output 2, Alarm output, Input ack., Not used	Output 2
	O4 Pin 2 setting <sup>2*)</sup>	Teach input, Emitter off, Counter reset <sup>1*)</sup> , Load preset, Not used	Teach input
	O5 Lock mode <sup>2)</sup>	Lock all, Lock keys	Lock all
	O6 Preset setting	Preset 1 to Preset 5	-
	O7 Load preset	Preset 1 to Preset 5	-
	O8 To main menu		
S9 Information	I1 Serial number	Manufacturing time.	
	I2 Firmware ver.	Firmware version.	
	I3 Hardware ver.	Hardware version.	
	I4 Temperature	Internal temperature in Celsius.	
	I5 Operation time	Operating time after reset.	
	I6 Total time	Total operating time.	
	I7 Counter value <sup>14)</sup>	Counter value in Counter mode.	
	I8 Received light	Value of the light received level diagnosis.	
	I9 No. of devices <sup>15)</sup>	Total number of connected units including the main unit.	
	IA Device number	Order number of the amplifier from the main unit.	
	IB Edge peak <sup>16)</sup>	Displays the edge peak value in Edge peak mode.	
	IC To main menu		
SA All devices	A1 Copy to all	No, Copy to all	No
	A2 Zeroing all	No, Zeroing all	No
	A3 Zero reset all	No, Zero reset all	No
	A4 Set reset all	No, Set reset all	No
	A5 Fct. reset all	No, Fct. reset all	No
	A6 All teach	No, All teach	No
	A7 To main menu		
SC Reset	S8 No		
	S8 Setting reset		
	S8 Factory reset		
SD To run mode			

<sup>1)</sup> D4RF-MC4/-S are not equipped with OLED display, so all menus cannot be displayed.  
<sup>2)</sup> D4RF-TM-0/-TS-0/-MC4/-S are not equipped with output/input wires, so all menus related to output/input cannot be displayed.  
<sup>3)</sup> "N.O./N.C." is displayed when "Edge" is selected in "D2 Threshold mode" or when "1-point Zone" or "2-point Zone" is selected during teaching.  
<sup>4)</sup> Displayed when "On" is selected in "D6 Counter".  
<sup>5)</sup> Displayed when "Edge height" is selected in "D2 Threshold mode".  
<sup>6)</sup> Only "Off" or "On" can be selected when "Edge height" is selected in "D2 Threshold mode".  
<sup>7)</sup> Displayed when "Standard" or "Not used" is selected in "D2 Threshold mode".  
<sup>8)</sup> Displayed on 1-output and 1-switchable-output/input models.  
<sup>9)</sup> Displayed on 2-output and 1-input models.  
<sup>10)</sup> Displayed on all main units except D4RF-MC4.

Contact Ramco for picking the best fiber cable for your application

7. Specifications

Type		Standard inter-connection		Inter-connection for communication unit				
		With display and keys		With display and keys		Without display and keys		
		Main unit	Expansion unit	Main unit	Expansion unit	Main unit	Expansion unit	
Model	1 output and 1 switchable output/input	Cable type	D4RF-TM	D4RF-TS	-	-	-	-
		Connector type	D4RF-TMC4	D4RF-TSC4	-	-	-	-
	2 outputs and 1 input	Cable type	D4RF-TDM	D4RF-TDS	-	-	-	-
	2 outputs and 1 input, short-range/high accuracy	Cable type	D4RF-TDM-Y	D4RF-TDS-Y	-	-	-	-
	Without output/input wires	Connector type	-	-	-	-	D4RF-MC4	-
Cable-less type		-	-	D4RF-TM-0	D4RF-TS-0	-	D4RF-S	
Light source		4-element Red LED (Wavelength: 660nm)						
Response time	Stand-alone use	16 $\mu$ s, 70 $\mu$ s, 250 $\mu$ s, 500 $\mu$ s, 1 ms, 2 ms, 8 ms	-	22 $\mu$ s, 70 $\mu$ s, 250 $\mu$ s, 500 $\mu$ s, 1 ms, 2 ms, 8 ms	-	-	-	
	Inter-connection use	-	-	-	-	-	-	
Teach Mode		1 point, 2 points, Auto, Through, 1-point Zone, 2-point Zone, Manual						
Display	Digital display	OLED display 128 x 22 pixel				-		
	Indicators	Menu languages : English, Japanese, Korean, Simplified Chinese, Spanish 2 x Output indicator (orange) Power indicator (green): Lights up when power is on				-		
Interface	Control output <sup>1)</sup>	NPN/PNP open collector or Push-pull selectable by setting 1 output : Max. 100mA, 2 outputs : Max. 50mA Inter/30 VDC residual voltage 1.8V or less						
	External input	Teach, Counter-reset, Emitter off or Preset loading <sup>2)</sup>						
Number of units with cross talk prevention		Response time 22 $\mu$ s: 2 units, 70 $\mu$ s: 3 units, 250 $\mu$ s: 4 units, 500 $\mu$ s: 9 units, 1 ms: 9 units, 2ms: 12 units, 8 ms: 14 units (including main unit)						
Timer function		On delay, Off delay, On/off delay, Pulse output, On delay pulse Adjustable 1 to 30,000 ms						
Output mode		Light ON/Dark ON, selectable by setting						
Number of connectable units		Max. 16 units (including main unit)						
Connection type		Cable type: 2m, Minimum bending radius: 4 x Cable diameter 5 wires with 2-outputs and 1-input main models, 4 wires with 1-output and 1-switchable-output/input main models, 3 wires with 2-outputs and 1-input expansion models, 2 wires with 1-output and 1-switchable output/input expansion models, Connector type: M8 4-pin plug connector				Without cable or connector Connector type: M8 4-pin connector (For supplying power) Without cable or connector		
Insulation resistance		20 Megohm or more (with 500 VDC)						
Rating	Supply voltage	Supplied directly or from communication unit <sup>1)</sup> 12 to 24 VDC $\pm$ 10 % including 10 % ripple (p-p)	Supplied from main unit or communication unit <sup>1)</sup> 12 to 24 VDC $\pm$ 10 % including 10 % ripple (p-p)	Supplied from communication unit <sup>1)</sup> 12 to 24 VDC $\pm$ 10 % including 10 % ripple (p-p)	Supplied from communication unit <sup>1)</sup> 12 to 24 VDC $\pm$ 10 % including 10 % ripple (p-p)	Supplied directly or from communication unit <sup>1)</sup> 12 to 24 VDC $\pm$ 10 % including 10 % ripple (p-p)	Supplied from communication unit <sup>1)</sup> 12 to 24 VDC $\pm$ 10 % including 10 % ripple (p-p)	
	Current consumption	Eco mode: Off 792 mW max. (33 mA or less at 24 VDC, 52 mA or less at 12 VDC)	Eco mode: On 696 mW max. (29 mA or less at 24 VDC 43mA or less at 12 VDC)	624 mW max. (26 mA or less at 24 VDC 41 mA or less at 12 VDC)	300 ms	624 mW max. (24 mA or less at 24 VDC, 41 mA or less at 12 VDC)	300 ms	
Warm-up time		300 ms						
Applicable regulations		EMC	EU EMC directive (2014/30/EU) UK directive EMC (The Electromagnetic Compatibility Regulations 2016)					
		Environment	EU RoHS directive (2011/65/EU) China RoHS (The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012) China RoHS (MIIT Order No.32)					
Applicable standards		EN 60947-5-2						
NRTL certification		UL Listed or Recognized Components Proximity Switch Certified for US and Canada.						
Company standards		Noise resistance Fellen Level 4 cleared						
Protection circuit		Reverse connection protection, Overcurrent protection						
Environmental resistance	Ambient temperature <sup>17)</sup> /humidity	-25 to 55 $^{\circ}$ C/35 to 85 % RH (no freezing or condensation)						
	Ambient illuminance	Sunlight: 10000 lx or less, Incandescent light: 3000 lx or less						
	Vibration resistance	10 to 55 Hz, Double amplitude 1.5 mm; 2 hours in each of the X,Y and Z directions						
	Shock resistance	Approx. 50 G (500 m/s <sup>2</sup> ) 3 times in each of the X,Y and Z directions						
Degree of protection		IP54						
Material		Housing, cover: PC						
Weight		Cable model: approx. 71 g (including cable), Connector model: approx. 25 g				Approx. 23 g		
Included items		Mounting bracket, Instruction manual						

<sup>1)</sup> The load current and operating temperature are limited by the number of connected units (including inter-connection main unit) as shown in the table below.

Number of connected units	1 unit		2 units		3 to 5 units		6 to 16 units <sup>4)</sup>	
Max. input current of main unit	152 mA		144 mA		360 mA		1152 mA	
No. of control output per unit	1	2	1	2	1	2	1	2
Max. load current per output	100 mA	50 mA	20 mA	10 mA	20 mA	10 mA	20 mA	10 mA
Upper limit of ambient temperature	55 $^{\circ}$ C		55 $^{\circ}$ C		50 $^{\circ}$ C		45 $^{\circ}$ C	

<sup>2)</sup> Preset loading selectable only on 2-output and 1-output models.  
<sup>3)</sup> For details on supplying power from the communication unit, refer to the instruction manual of the respective communication unit.  
<sup>4)</sup> When 6 or more units connected and used as UL certified product, use the product under the conditions shown in the table below.

Number of connected units	6 to 8 units		9 to 16 units	
Max. input current of main unit	576 mA		1152 mA	
No. of control output per unit	1	2	1	2
Max. load current per output	20 mA	10 mA	20 mA	10 mA
Upper limit of ambient temperature	45 $^{\circ}$ C		40 $^{\circ}$ C	

This device complies with part 15 of the FCC Rules.  
Operation 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.

\*This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

- Support for the China RoHS directive

 For details on the support for the China RoHS (the Administrative Measure on the Control of Pollution Caused by Electronic Information Products), see the following website:  
[https://www.optex-fa.com/rohs\\_cn/](https://www.optex-fa.com/rohs_cn/)

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