# M12 Tubular Metal Photoelectric Sensors FDM Series

## M12 (12mm) Tubular Metal - DC FDM Series

### Overview

The AchieVe FDM series M12 tubular photoelectric sensors offers DC Digital sensitivity adjustment by teach-in button or remote cable, and multifunction LED status indicator. This series offers diffuse reflection, polarized retroreflective, and through-beam models. Housings have an IP67 enclosure rating with complete protection against electrical damage.

### Features

- Diffuse reflection, polarized retroreflective, and through-beam models available
- M12 quick-disconnect (purchase cable separately) or pigtail models
- Multifunction LED status indicator
- Red and infrared models
- Complete protection against electrical damages
- IP67 protection degree
- 3-year warranty


FDM3-0N-1A

FDM3-0N-1H

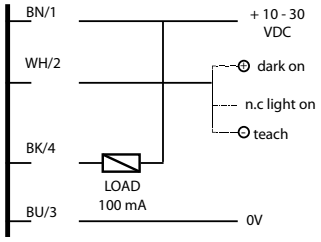
| M12 (12mm)Tubular Metal -DC FDM Series | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ***Part Number*** | ***Price*** | ***Sensing Distance*** | ***Switching Frequency*** | ***Light Emission*** | ***Logic*** | ***Output Function*** | ***Connection Type **** | ***Wiring*** | ***Drawing Link*** |
| ***Diffuse Reflection with Sensitivity Adjustment*** | | | | | | | | | |
| ***FDM3-0N-1A*** | $6azg: | 100mm [3.9 in] | 1 kHz | Infrared LED (880nm) | NPN | Selectable Light-on/Dark-on | 4-wire, 2m [6.5 ft] pigtail | Diagram 1 | PDF |
| ***FDM3-0N-1H*** | $6azh: | | | | NPN | | 4-pin M12 quick-disconnect | Diagram 1 | PDF |
| ***FDM3-0P-1A*** | $-6azi: | | | | PNP | | 4-wire, 2m [6.5 ft] pigtail | Diagram 2 | PDF |
| ***FDM3-0P-1H*** | $-6azj: | | | | PNP | | 4-pin M12 quick-disconnect | Diagram 2 | PDF |
| ***FDM7-0N-1A*** | $6azk: | 300mm [11.8 in] | | | NPN | | 4-wire, 2m [6.5 ft] pigtail | Diagram 1 | PDF |
| ***FDM7-0N-1H*** | $6azo: | | | | NPN | | , 4-pin M12 quick-disconnect | Diagram 1 | PDF |
| ***FDM7-0P-1A*** | $6azp: | | | | PNP | | 4-wire, 2m [6.5 ft] pigtail | Diagram 2 | PDF |
| ***FDM7-0P-1H*** | $6azq: | | | | PNP | | , 4-pin M12 quick-disconnect | Diagram 2 | PDF |
| ***Polarized Retroreflective Teach-in ***** | | | | | | | | | |
| ***FDMP-0N-1A*** | $-6azl: | 2m [6.5 ft] | 1 kHz | Visible red LED (660nm) | NPN | Selectable Light-on/Dark-on | 4-wire, 2m [6.5 ft] pigtail | Diagram 3 | PDF |
| ***FDMP-0N-1H*** | $6azn: | | | | NPN | | 4-pin M12 quick-disconnect | Diagram 3 | PDF |
| ***FDMP-0P-1A*** | $6azv: | | | | PNP | | 4-wire, 2m [6.5 ft] pigtail | Diagram 4 | PDF |
| ***FDMP-0P-1H*** | $6azx: | | | | PNP | | 4-pin M12 quick-disconnect | Diagram 4 | PDF |
| ***Through-beam Receiver ****** | | | | | | | | | |
| ***FDMR-0N-1A*** | $6azu: | 4m [13.1 ft] | 250 Hz | — | NPN | Selectable Light-on/Dark-on | 4-wire, 2m [6.5 ft] pigtail | Diagram 5 | PDF |
| ***FDMR-0N-1H*** | $6azy: | | | — | NPN | | 4-pin M12 quick-disconnect | Diagram 5 | PDF |
| ***FDMR-0P-1A*** | $6azz: | | | — | PNP | | 4-wire, 2m [6.5 ft] pigtail | Diagram 6 | PDF |
| ***FDMR-0P-1H*** | $;6az]: | | | — | PNP | | 4-pin M12 quick-disconnect | Diagram 6 | PDF |
| ***Through-beam Emitter - Potentiometer ****** | | | | | | | | | |
| ***FDME-00-1A*** | $6azs: | 4m [13.1 ft] | — | Infrared LED (880nm) | — | — | 4-wire, 2m [6.5 ft] pigtail | Diagram 7 | PDF |
| ***FDME-00-1H*** | $;6azt: | | — | | — | — | 4-pin M12 quick-disconnect | Diagram 7 | PDF |

*** Purchase cable separately for the M12 quick-disconnect models.**
**** Purchase reflector separately.**
**** Purchase one receiver and one emitter for a complete set.**

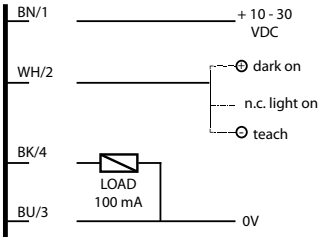
# M12 Tubular Metal Photoelectric Sensors FDM Series

## Wiring Diagrams

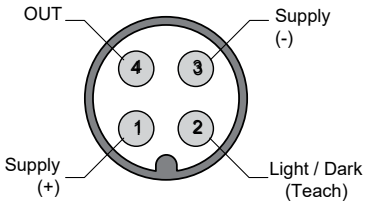
### Diagram 1
**4-Wire NPN Output**
**DM3/DM7**



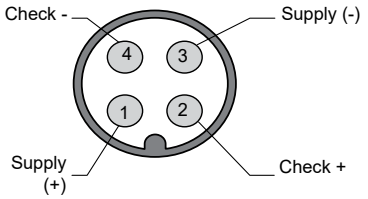

### Diagram 2
**4-Wire PNP Output**
**DM3/DM7**



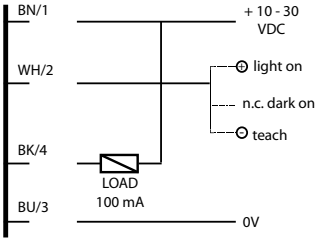

### M12 Connector
**Diffuse reflection polarized receiver**



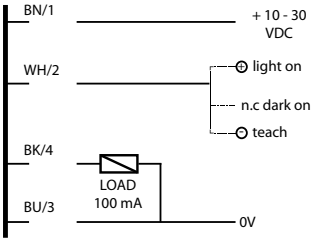

**Emitter**



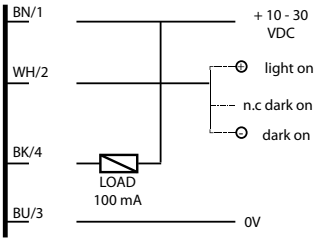

### Diagram 3
**4-Wire NPN Output**
**DMP**



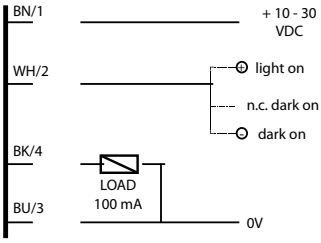

### Diagram 4
**4-Wire PNP Output**
**DMP**



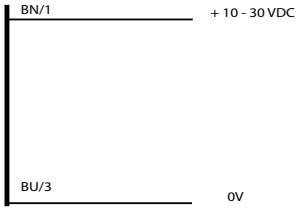

### Diagram 5
**4-Wire NPN Output**
**DMR**




### Diagram 6
**4-Wire PNP Output**
**DMR**




### Diagram 7
**Emitter**
**DME**



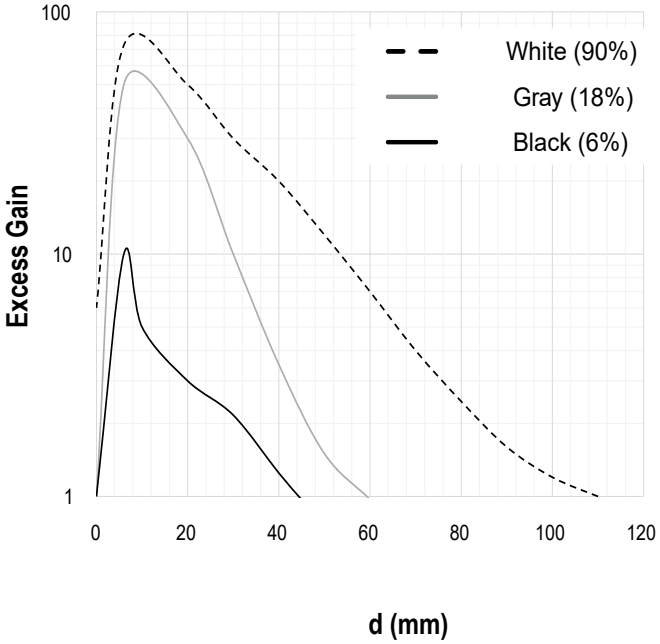
# M12 Tubular Metal Photoelectric Sensors FDM Series

| M12 (12mm)Tubular Metal -DC FDM Series Specifications | | | |
|---|---|---|---|
| ***Sensor Type*** | ***Diffuse Reflection*** | ***Polarized Retroreflective Teach-in*** | ***Through-beam*** |
| ***Sensing Distance*** | FDM3:100mm [3.9 in]<br>FDM7: 300mm [11.8 in] | 2.5m [8ft] | 4m [13.1 ft] |
| ***Thermal Drift*** | ≤ 10% Sr | | |
| ***Repeatability*** | ≤ 5% | | |
| ***Response Time Maximum*** | 500µs | 500µs | 2ms (Receiver only) |
| ***Output Types*** | NPN, PNP | NPN, PNP | NPN, PNP (Receiver only) |
| ***Operating Voltage*** | 10-30 VDC | | |
| ***Maximum Residual Ripple*** | 10% | | |
| ***Leakage Current*** | ≤ 130µA | ≤ 130µA | ≤ 130µA (Receiver only) |
| ***No Load Supply Current*** | 30mA | | |
| ***Maximum DC Output Voltage Drop*** | 2V @ IL - 100mA | 2V @ IL - 100mA | 2V @ IL - 100mA (Receiver only) |
| ***Operating (Load) Current*** | 100mA | 100mA | 100mA (Receiver only) |
| ***Short-circuit Protection*** | Yes | | |
| ***Reverse Polarity Protection*** | Yes | | |
| ***Impulsive Overvoltage Protection*** | Yes | | |
| ***Delay to Availability*** | ≤ 150ms | | |
| ***Operating Temperature*** | -25 to 70°C [-13 to 158°F] | | |
| ***Protection Degree*** | IP67 | | |
| ***LED Indicators*** | Yellow (output status) | | Emitter: Yellow (power on)<br>Receiver: Yellow (output status) |
| ***Housing Material*** | Nickel plated brass / PBT cable exit | | |
| ***Lens Material*** | PMMA - Poly (methyl methacrylate) | | |
| ***Optical Location*** | Axial | | |
| ***Shock/Vibration*** | Shock IEC 60068-2-27 / Vibration IEC 60068-2-6 | | |
| ***Ambient Light Immunity*** | 15000 lux (incandescent lamp),<br>< 1000 lux (fluorescent lamp) | | 5000 lux (incandescent lamp)<br>>3000 lux fluorescent lamp<br>(Receiver only) |
| ***Tightening Torque*** | 10 N•m [7.37 lb•ft] (mounted) | | |
| ***Weight*** | 52g [1.83 oz] Connector version / 16g [0.56 oz] Cable version | | |
| ***IO-Link*** | N/A | | |
| ***Connectors*** | PVC, 2m [6.5 ft] 3-wire or 4-wire, 26AWG M12 4-pin connector | | |
| ***Agency Approvals*** | cULus File E328811, CE, UKCA | | |

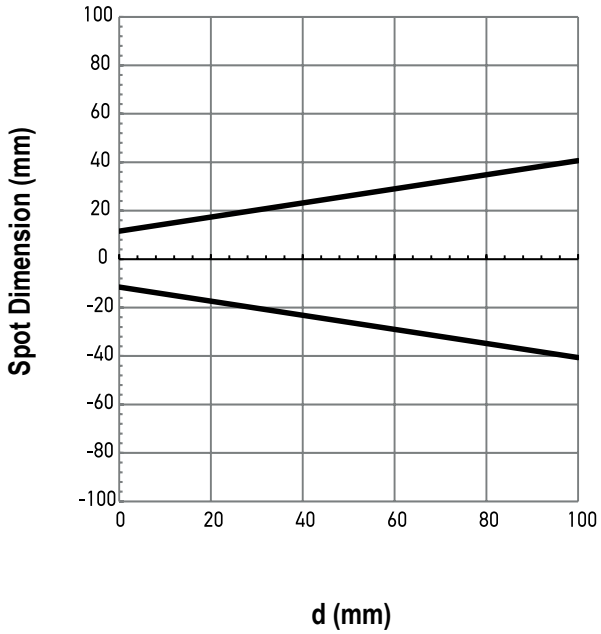
# M12 Tubular Metal Photoelectric Sensors FDM Series

## Characteristic Curves FDM3 Models
## Diffuse Reflection

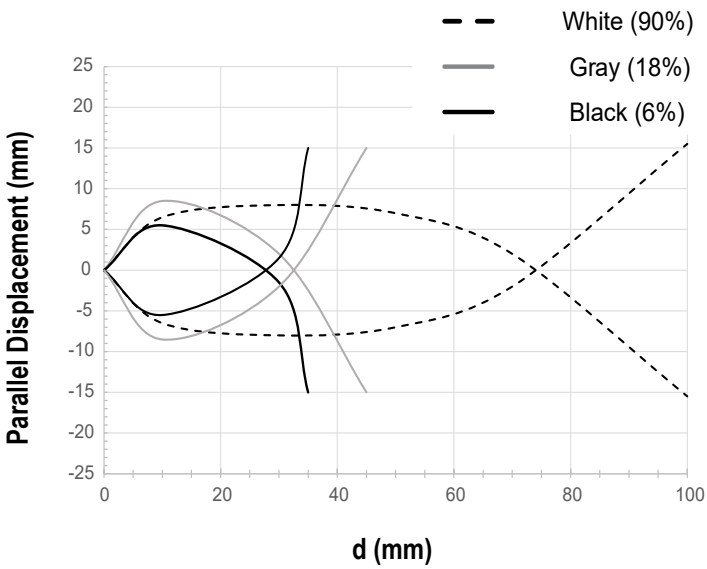
**Excess Gain**




**Spot Dimension**



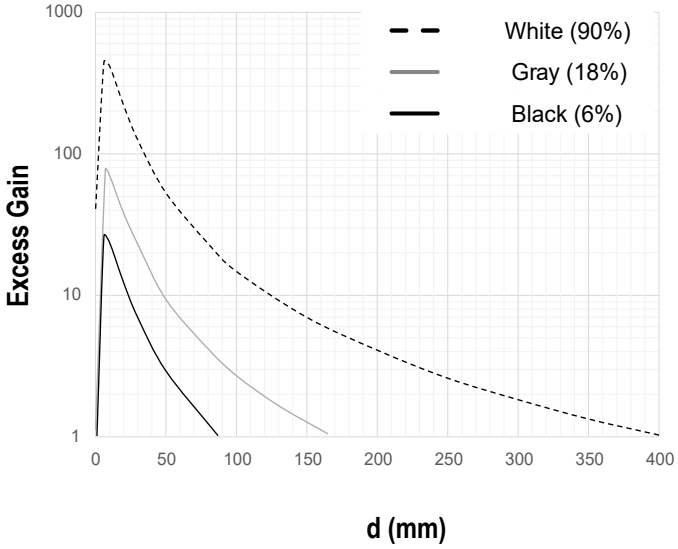

**Parallel Displacement**



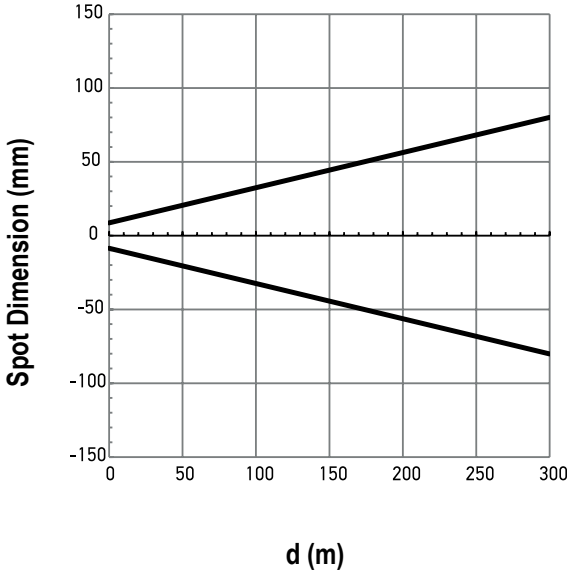
# M12 Tubular Metal Photoelectric Sensors FDM Series

## Characteristic Curves FDM7 Models
## Diffuse Reflection

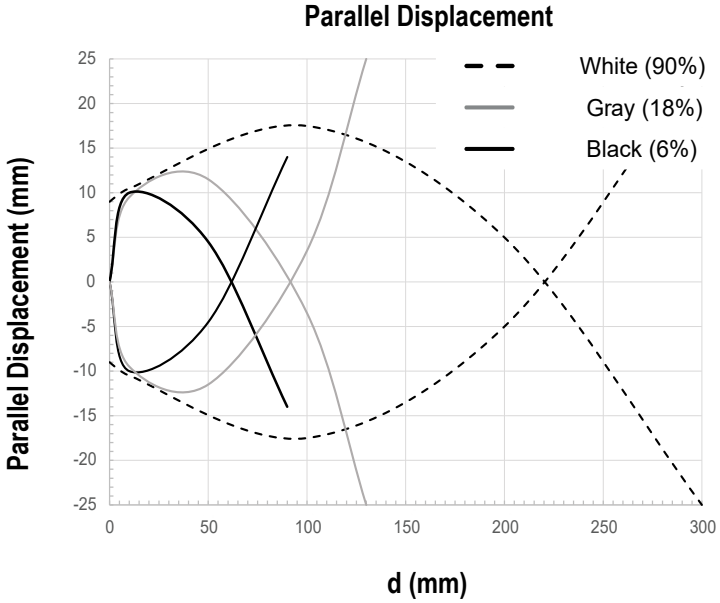
### Excess Gain




### Spot Dimension



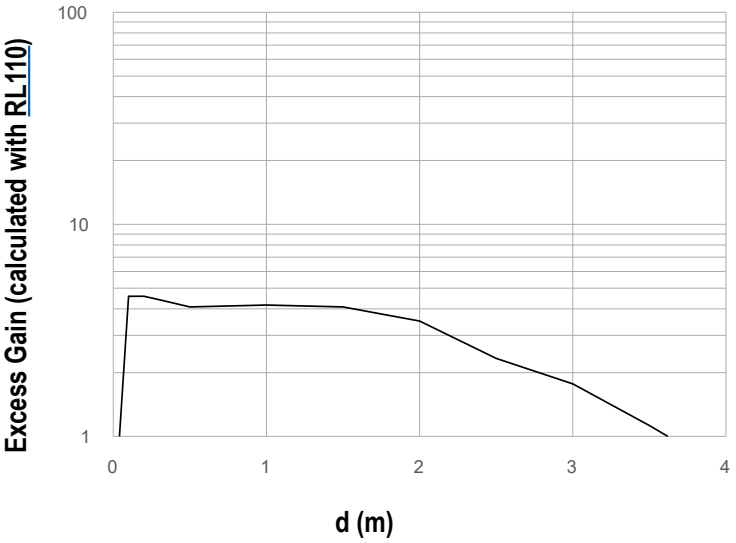

### Parallel Displacement



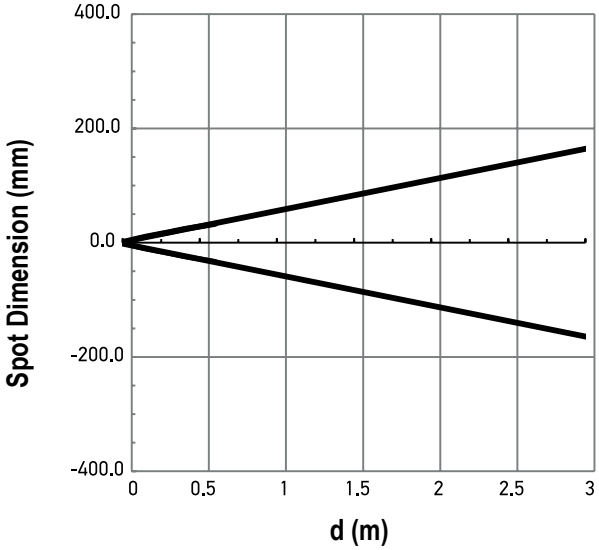
# M12 Tubular Metal Photoelectric Sensors FDM Series

## Characteristic Curves FDMP Models
## Polarized Retroreflective

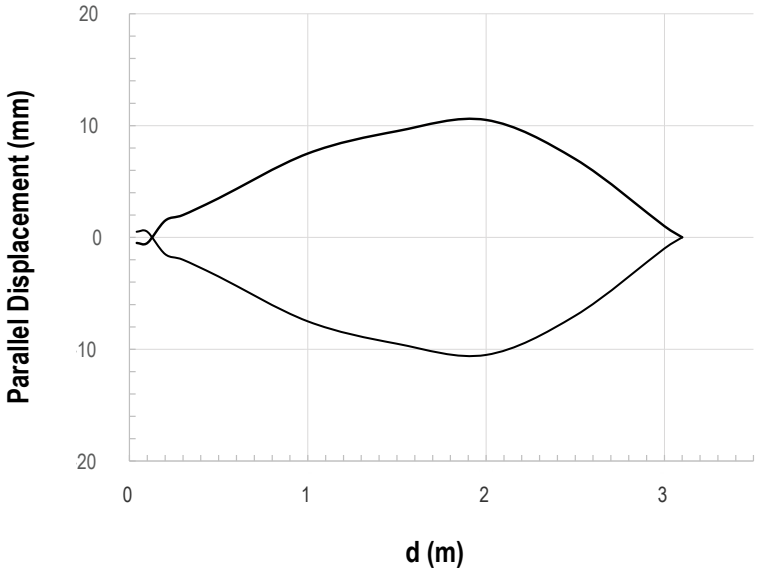
**Excess Gain (calculated with RL110)**




**Spot Dimension**



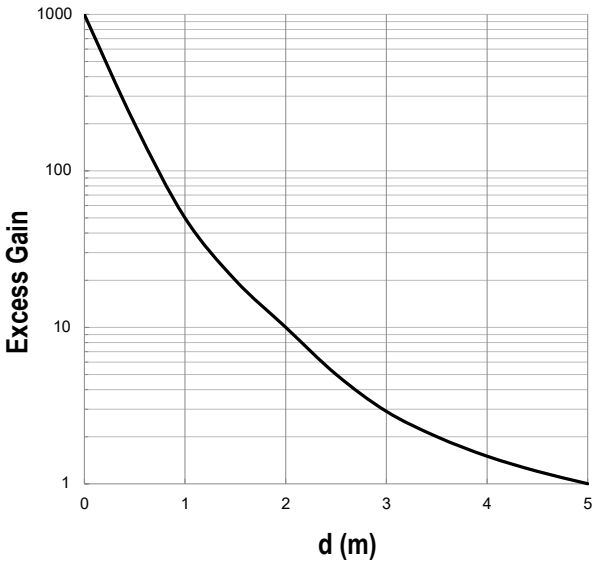

**Parallel Displacement (calculated with RL110)**



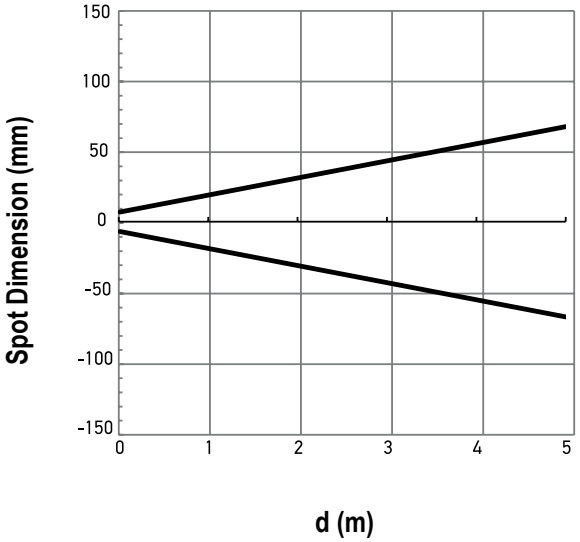
# M12 Tubular Metal Photoelectric Sensors FDM Series

## Characteristic Curves FDME Models
## Emitters and Receivers

**Excess Gain**




**Spot Dimension**




**Parallel Displacement**