702M12-W Industrial Wireless Radio
N-Tron Networking Series

red lion®

▶▶▶ Industrial Wireless Radio

The N-TRON® 702M12-W Industrial Wireless Radio offers outstanding performance and ease of use. It is ideally suited for connecting wireless devices to a wired network or for connecting two wired networks in an IP67 environment, where it is not possible, impractical, or too expensive to install cable.

For these situations, including related mobile applications, the wireless 702M12-W industrial radio is the perfect solution—a rugged, high performance network connection that can be quickly and easily deployed.

Product Features
- Full IEEE 802.11a,b,g,n Compliance
- IP67 Rated, Industrial Hardened Enclosure
- One 10/100BaseTX M12 Port
- Three Antennas for 3x3 MIMO Operations
- Four user definable LED's for display of signal quality
- Radio Enable, Link/Activity, and power LEDs
- Station roaming
- 802.3af PoE Powered Device
- Extended Environmental Specifications
- Autosensing 10/100BaseTX, Duplex, and MDIX
- Redundant Power Inputs (10-49 VDC)
- Web Browser Management

Wireless Compliance:
- IEEE 802.11a/b/g/n Compliant

Security:
- 802.11i with AES-CCM & TKIP Encryption
- 802.1x, 64/128 bit WEP

Data Rates:
- Legacy 802.11a/b/g (1-54Mbps)
- 802.11n (up to 300Mbps)

Range Performance:
- Indoor (Antenna Dependent) greater than 300m
- Outdoor (Antenna Dependent) greater than 60km

Overview
The 702M12-W radio features a combination of powerful technologies that enable fast setup and optimized operation. Power over Ethernet (PoE) capability allows the 702M12-W to receive both power and data over a Cat5e cable from a PoE device*, eliminating the need for additional cables or power supplies. For convenience, autosensing capabilities intuitively detect network speed and operation. The unit includes three antennas for Multiple-In, Multiple-Out (MIMO) performance, a smart antenna technology that maximizes throughput.

The N-Tron 105TX-POE switch is an excellent device for this application.

N-Tron 702M12-W with its three dual band antennas

Industrial Packaging and Specifications
The 702M12-W is specifically designed to operate in harsh industrial environments. With it's rugged IP67-rated enclosure and industrial specifications, such as expanded tolerances to dust, wash down, vibration, temperature and EMI, plus redundant power inputs, the 702M12-W easily meets and exceeds the operating parameters of connected network equipment.

Multiple Wireless Modes
The 702M12-W can be configured to suit specific application requirements.

Station: In **Station** configuration the 702M12-W is used to connect a single device (MAC Address) to a wireless access point.

Station, WDS (Wireless Distribution System): In **Station, WDS** mode the 702M12-W can be connected to a remote wired switch and will allow multiple devices (MAC Address forwarding) to be connected to the wireless access point with WDS activated.

Access Point: The **Access Point** configuration allows the 702M12-W to serve as a wireless switch for the attached wireless stations. Wireless access points are commonly used to create one wireless local area network (WLAN) that spans an area around the Access Point. Each access point typically supports up to 253 stations.

Access Point, WDS (Wireless Distribution System): The 702M12-W in **Access Point, WDS** mode allows wireless connection of a number of access points to extend the coverage of the wireless network. The main base Access Point in WDS mode is extended using a series of relay Access Points in WDS mode (Extended Service Set) and can in turn form a WLAN consisting of thousands of stations. All stations should be configured in **Station WDS** mode. Correctly configured switches will create a single network, providing station mobility throughout the wireless network.

Multiple Network Modes
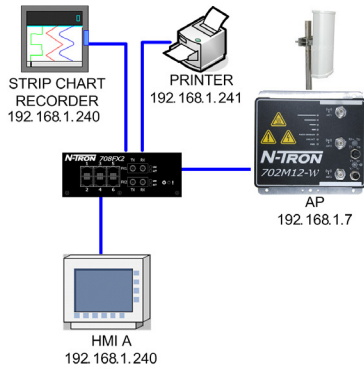Bridge: The 702M12-W will operate in Layer 2 without network segmentation.

Router: The 702M12-W offers Layer 3 routing to allow network segmentation.

industrial
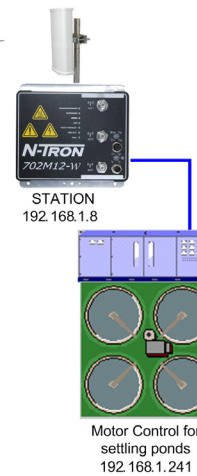networking

Scenario 1 – Basic Bridge

Access Point:

The **Access Point** mode allows the 702M12-W to serve as a wireless switch for the wireless stations attached to it.
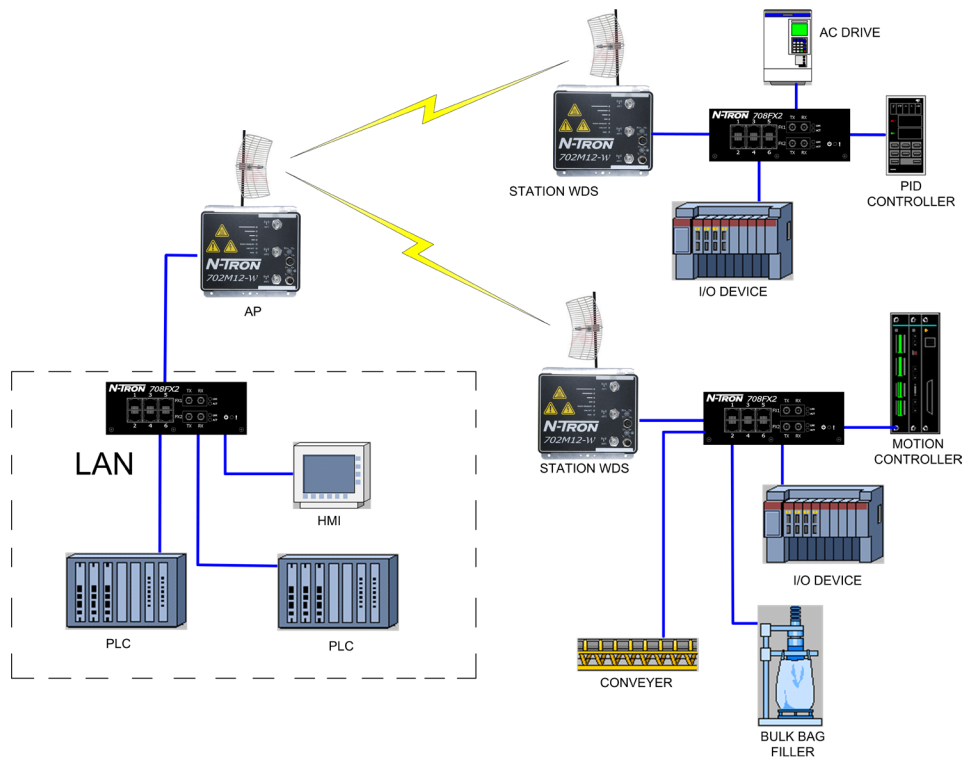
Station:

In **Station** configuration the 702M12-W is used to connect a single device (MAC Address) to a wireless access point.

STRIP CHART
RECORDER
192.168.1.240

PRINTER
192.168.1.241

AP
192.168.1.7

STATION
192.168.1.8

HMI A
192.168.1.240

Motor Control for
settling ponds
192.168.1.241

For added security, the 702M12-W supports WEP, WPA™, and WPA2™. WPA and WPA2, TKIP (Temporal Key Integrity Protocol) and CCMP (Counter Mode with Cipher Block Chaining Message Authentication Code Protocol) are available.

Scenario 2 – Control Network

AC DRIVE

STATION WDS

PID
CONTROLLER

I/O DEVICE

AP

LAN

HMI

STATION WDS

MOTION
CONTROLLER

PLC

PLC

I/O DEVICE

CONVEYER

BULK BAG
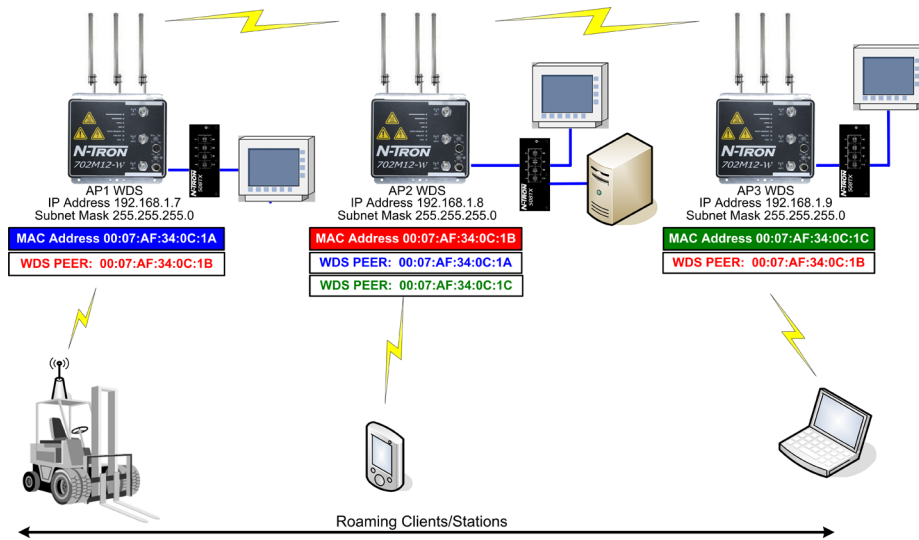FILLER

In **Station WDS** mode the 702M12-W can be connected to a remote wired Ethernet switch with multiple devices connected to the switch.
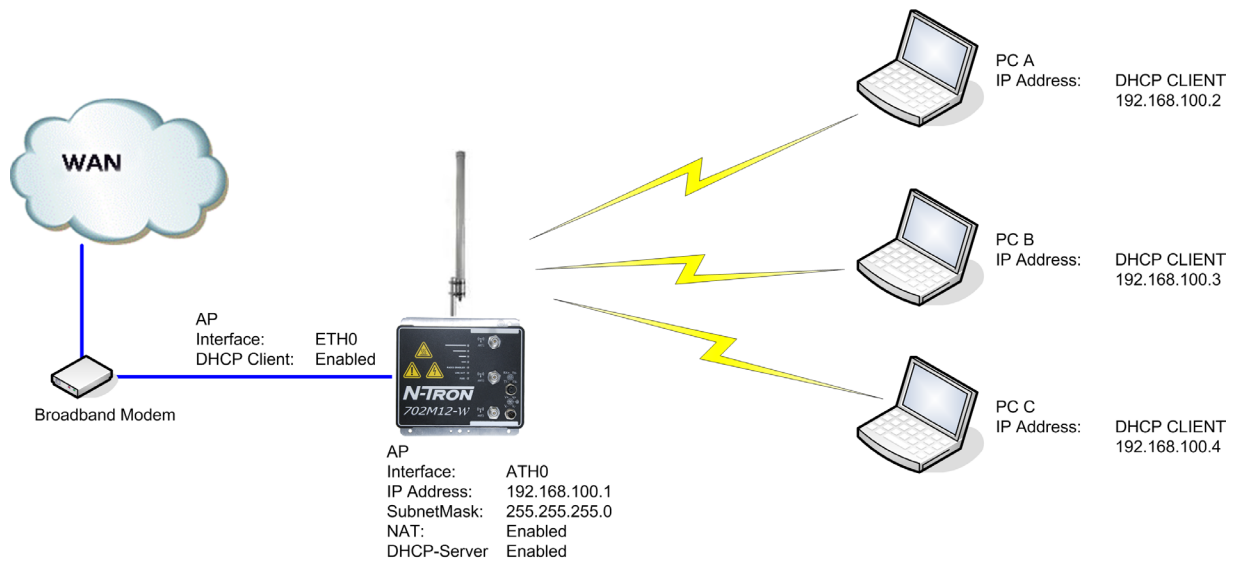
Scenario 3 – WDS Peering

AP1 WDS
IP Address 192.168.1.7
Subnet Mask 255.255.255.0

MAC Address 00:07:AF:34:0C:1A

WDS PEER: 00:07:AF:34:0C:1B

AP2 WDS
IP Address 192.168.1.8
Subnet Mask 255.255.255.0

MAC Address 00:07:AF:34:0C:1B

WDS PEER: 00:07:AF:34:0C:1A

WDS PEER: 00:07:AF:34:0C:1C

AP3 WDS
IP Address 192.168.1.9
Subnet Mask 255.255.255.0

MAC Address 00:07:AF:34:0C:1C

WDS PEER: 00:07:AF:34:0C:1B

Roaming Clients/Stations

In this scenairio, each 702M12-W has been configured as a peer of selected other 702M12-W(s) by using the MAC Addresses of the select unit(s). This allows forklifts, or other mobile wireless devices, to maintain communication seamlessly as they move from the area covered by one 702M12-W into the area covered by the next 702M12-W.

Scenario 4 – Broadband Modem Wireless Router (W/ DHCP)

WAN

Broadband Modem

AP
Interface: ETH0
DHCP Client: Enabled

AP
Interface: ATH0
IP Address: 192.168.100.1
SubnetMask: 255.255.255.0
NAT: Enabled
DHCP-Server   Enabled

PC A
IP Address: DHCP CLIENT
                192.168.100.2

PC B
IP Address: DHCP CLIENT
                192.168.100.3

PC C
IP Address: DHCP CLIENT
                192.168.100.4

When configured as a router,the N-TRON 702M12-W can act as a DHCP server. It supports Network Address Translation (Masquerade), a feature widely used by Access Points. This automates the assigning of IP addresses to devices as they connect. NAT will act as a firewall between LAN and WLAN networks. Additional firewall settings can be configured for Layer 3 packet filtering and access control in Router mode.

Specifications

Case Dimensions
Height: (w/o antennas) 6.7" (17.2 cm)
Width: 6.7" (17.2 cm)
Depth: 1.8" (4.6 cm)
Weight (max): 3.5 lbs (1.6 kg)

Environmental
Operating Temperature: -40ºC to 80ºC
Storage Temperature: -40ºC to 85ºC
Operating Humidity: 5% to 100% (non condensing)
Operating Altitude: 0 to 10,000 ft.
N-TRON Power Supply: NTPS-24-1.3

Electrical
Redundant Input Voltage: 10-49 VDC (regulated)
Input Current (max): 200mA max @ 24 VDC
702M12-W Max Power: 4.8 watts max
Input Ripple: Less than 100mV

Reliability
MTBF: >1 million hours

Network Media
10BaseT: ≥Cat3 cable
100BaseTX: ≥Cat5 cable
802.11abgn: Air

Connectors
10/100BaseTX: One (1) M12 copper port
　　　　　　　 PoE-powered device support
802.11abgn: (3) RP-TNC connectors

Recommended Wiring Clearance (Antenna Dependent)
Front: 4" (10.16 cm)
Side: 4" (10.16 cm)
Top: 6" (15.24 cm)

Regulatory Approvals
Safety:
• UL 508
• ANSI/ISA-12.12.01-2013, Class I and II, Division 2 and Class III, Divisions 1 and 2 Groups A, B, C and D Hazardous Locations
• C22.2 No. 14
• C22.2 No. 213-M1987 Class I, Division 2 Hazardous Locations
• Temperature code T4A

EMI/EMC
• FCC/CE
• ANSI C63.4-2003
• CFR 47, Part 15, Subpart B
• Industry Canada ICES-003 Issue 3

Radio Output Power
Up to 250mW US

802.11a　　5GHz

DataRate	Avg TX ±2dB
1-24Mbps	24 dBm
36Mbps	22 dBm
48Mbps	20 dBm
54Mbps	19 dBm

802.11b/g　2.4GHz

DataRate	Avg TX ±2dB
1-24Mbps	24 dBm
36Mbps	22 dBm
48Mbps	20 dBm
54Mbps	19 dBm

802.11n　2.4GHz　　5GHz

DataRate	Avg TX ±2dB	
MCS0	24dBm	24dBm
MCS1	24dBm	24dBm
MCS2	24dBm	24dBm
MCS3	22dBm	22dBm
MCS4	22dBm	22dBm
MCS5	22dBm	22dBm
MCS6	18dBm	18dBm
MCS7	15dBm	15dBm
MCS8	24dBm	24dBm
MCS9	24dBm	24dBm
MCS10	22dBm	22dBm
MCS11	20dBm	20dBm
MCS12	20dBm	20dBm
MCS13	17dBm	17dBm
MCS14	17dBm	17dBm
MCS15	15dBm	15dBm

Radio Receiver Sensitivity

802.11a　5GHz

DataRate	Sens. ±3dB
1-24Mbps	-96 dBm
36Mbps	-95 dBm
48Mbps	-94 dBm
54Mbps	-91 dBm

802.11b/g 2.4GHz

DataRate	Sens. ±3dB
1-24Mbps	-97 dBm
36Mbps	-90 dBm
48Mbps	-86 dBm
54Mbps	-84 dBm

802.11n　2.4GHz　　5GHz

DataRate	Sens. ±3dB	
MCS0	-97dBm	-96dBm
MCS1	-96dBm	-95dBm
MCS2	-93dBm	-92dBm
MCS3	-91dBm	-90dBm
MCS4	-87dBm	-86dBm
MCS5	-84dBm	-83dBm
MCS6	-78dBm	-77dBm
MCS7	-75dBm	-74dBm
MCS8	-96dBm	-95dBm
MCS9	-94dBm	-93dBm
MCS10	-91dBm	-90dBm
MCS11	-88dBm	-87dBm
MCS12	-85dBm	-84dBm
MCS13	-80dBm	-79dBm
MCS14	-79dBm	-78dBm
MCS15	-76dBm	-75dBm

• R&TTE directive 99/5/EC
• EN 301 489-3 V1.4.1 with respect to EN 301 489-1 V1.6.1
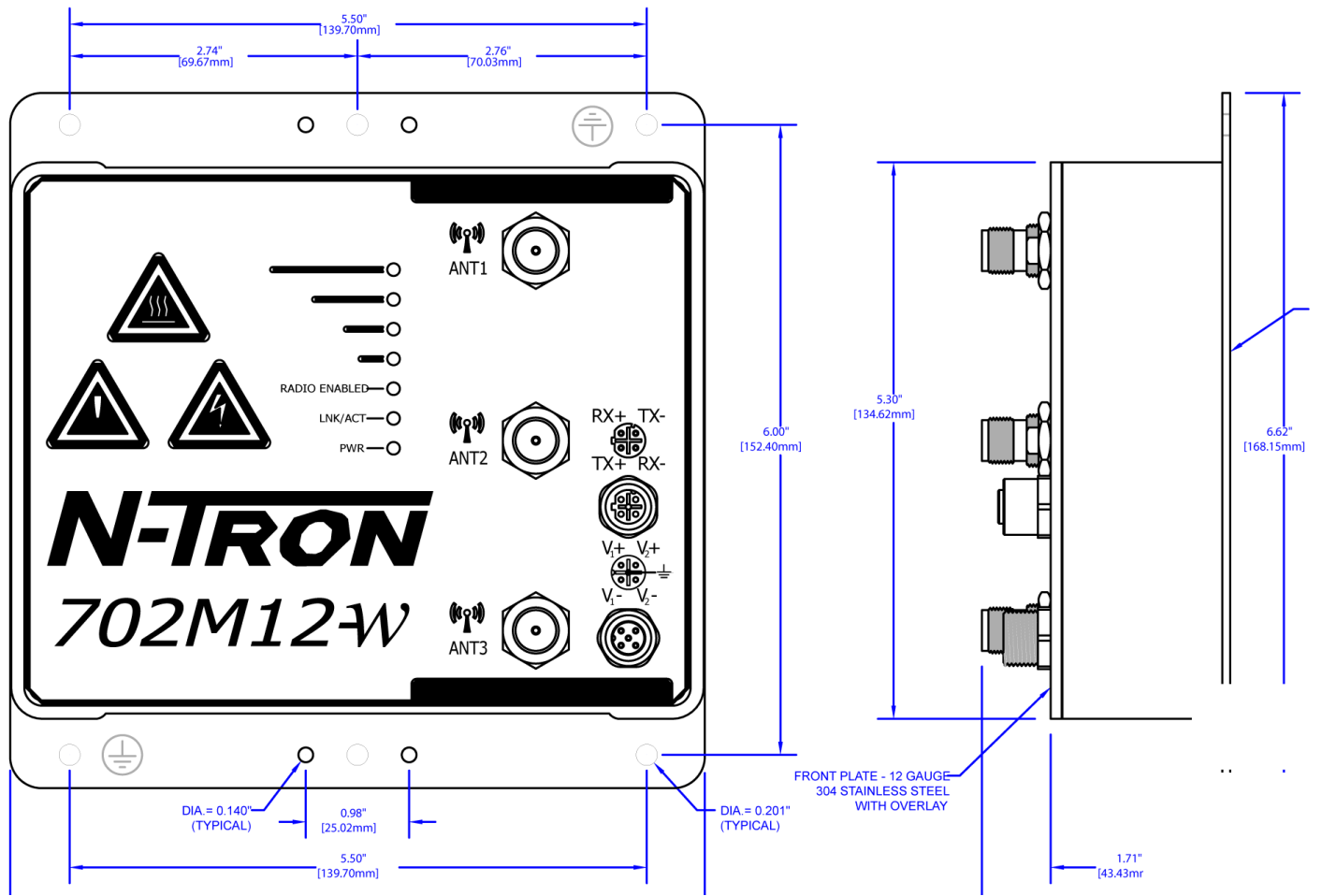• IEC 61000-4-2
• IEC 61000-4-3

Rail
• EN 50155, EN 50121 and EN 61373
• GOST-R certified, RoHS compliant

Designed to comply with:
IEEE 1613 for Electric Utility Substations
NEMA TS1/TS2 for Traffic Control

ANT1

ANT2

RX+ TX-
TX+ RX-

V₁+ V₂+
V₁- V₂-

ANT3

RADIO ENABLED
LNK/ACT
PWR

N-TRON
702M12-W

5.50"
[139.70mm]

2.74"
[69.67mm]

2.76"
[70.03mm]

6.00"
[152.40mm]

DIA.= 0.140"
(TYPICAL)

0.98"
[25.02mm]

DIA.= 0.201"
(TYPICAL)

5.50"
[139.70mm]

5.30"
[134.62mm]

6.62"
[168.15mm]

FRONT PLATE - 12 GAUGE
304 STAINLESS STEEL
WITH OVERLAY

1.71"
[43.43mr

702M12-W shown without antennas

PART NUMBER	DESCRIPTION
702M12-W	IP67-rated 1-port (10/100BaseTX w/M12 D-coded female connectors) Industrial Wireless Radio with three MIMO antennas, bulkhead mountable
702M12-PK	Pole Mount Kit for 702M12-W Radio
ANT-CAB-400-N-RPTNC-X	Low Loss Coaxial Antenna Cable (1 RP-TNC and 1 N-male connector)
ANT-MD24-12	2.4GHz 12dBi Mini Directional Antenna
ANT-PAD24-14	2.4GHz 14dBi Directional Antenna
ANT-PAD58-20	5.8GHz 20dBi Directional Antenna
ANT-PD58-32	5.8 GHz Parabolic Dish 32dBi Directional Antenna
ANT-LA6-NFF	2-6GHz quarter wave lightning arrestor. N-female to N-female, less than 0.2dB insertion loss, IP65, -40 to 85°C
ANT-CAB-400-N-X	Low loss CA-400 coaxial cable with (2) N-male connectors for use with ANT-LA6-NFF lightning arrestor
M12DRC-ISO	DIN-Rail Kit, two isolated plastic clips
M12DRC-MTL	DIN-Rail Kit, two metal clips
NTPS-24-1.3	DIN-Rail Power Supply 24V@1.3 Amp

Cables with M12 connectors

CAT5E-M12-M12-X	Straight M12 to straight M12, shielded
CAT5E-M12-RJ45-X	Straight M12 to RJ-45, shielded
CAT5E-M12-X	Straight M12 to bare-end, shielded
CAT5E-RM12-M12-X	90º M12 to straight M12, shielded
CAT5E-RM12-RM12-X	90º M12 to 90º M12, shielded
CAT5E-RM12-RJ45-X	90º M12 to RJ-45, shielded
CAT5E-RM12-X	90º M12 to bare-end, shielded
PWR-M12-A-X	Power Cable, M12 A-coded, straight female to bare-end, shielded
PWR-RM12-A-X	Power Cable, M12 A-coded, 90º female to bare-end, shielded

Where: X = length of cable, fill in desired amount in feet. Example: CAT5E-RM12-10 (-10=10 ft cable)

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