Emerson™ Smart Wireless Field Link
Quick Start Guide

NOTICE
This guide provides basic guidelines for the Smart Wireless Field Link. It does not provide instructions for diagnostics, maintenance, service, or troubleshooting. This guide is also available electronically on www.emersonprocess.com.

WARNING
Failure to follow these installation guidelines could result in death or serious injury.

- Make sure only qualified personnel perform the installation.

Explosions could result in death or serious injury.

- Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Review the Product Certifications section for any restrictions associated with a safe installation.

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals. High voltage may be present on leads can cause electrical shock.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.
- This device must be installed to ensure a minimum antenna separation distance of 8-in. (20 cm) from all persons.

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1.0 Wireless considerations

1.1 Power up sequence
The Smart Wireless Field Link and wireless I/O should be installed and functioning properly before the power modules are installed in any wireless field devices. Wireless field devices should also be powered up in order of proximity from the Field Link beginning with the closest. This will result in a simpler and faster network installation.

1.2 Mounting location
The Field Link should be mounted in a location that allows convenient access to the host system network (wireless I/O) as well as the wireless field device network.

Find a location where the Field Link has optimal wireless performance. Ideally this will be 15 to 25 ft. (4.6 to 7.6 m) above the ground or 6 ft. (2 m) above obstructions or major infrastructure.

Figure 1. Mounting Location

A. Control room
B. Ground
C. Field link
D. Mast or pipe
E. Infrastructure
1.3 Antenna position

The antenna should be positioned vertically, either straight up or straight down, and should be approximately 3 ft. (1 m) from any large structure, building, or conductive surface to allow for clear communication to other devices.

Figure 2. Antenna Position

1.4 Conduit plug

The temporary orange plugs should be replaced with the included conduit plugs using approved thread sealant.

Figure 3. Conduit Plugs
1.5 Intended use

The Field Link must be used in conjunction with a network manager or network Gateway. The Field Link then functions as a translator between the wired network and a wireless field network.

Figure 4. Example System Architecture

A. Host system  D. Field link
B. Control network  E. Wireless field network
C. Network manager  F. Wireless field devices

2.0 Physical installation

2.1 Pipe mounting

1. Insert larger U-bolt around 2 in. pipe/mast, through the saddle, through the L-shaped bracket, and through the washer plate.
2. Use a ½-in. socket-head wrench to fasten the nuts to the U-bolt.
3. Insert smaller U-bolt around base the Field Link and through the L-shaped bracket.
4. Use a ½-in. socket-head wrench to fasten the nuts to the U-bolt.

Figure 5. Mounting
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2.2 Power and data wiring

1. Remove housing cover labeled “Field Terminals.”
2. Connect the positive power lead to the “+” power terminal and the negative power lead to the “−” terminal.
3. Connect the Data + lead to the “A (+)” terminal and the Data − lead to the “B (−)” terminal.
4. Plug and seal any unused conduit connections.
5. Replace the housing cover.

Figure 6. Smart Wireless Field Link Terminal Diagram

2.3 Grounding

The Field Link enclosure should always be grounded in accordance with national and local electrical codes. The most effective grounding method is a direct connection to earth ground with minimal impedance. Ground the Field Link by connecting the external ground lug to earth ground. The connection should be 1 Ω or less.

3.0 Verify operation

3.1 Power-up sequence

Upon applying power to the Field Link, the LCD display meter will activate and display a series of startup screens. The following screens are displayed during startup.

1. Startup Screen 1 – All segments on
2. Startup Screen 2 – Device Identification
3. Startup Screen 3 – Tag
4. Startup Screen 4 – Status
3.2 Normal operation

After the initial startup screens the Field Link will cycle through several periodic screens.
1. Electronics Temperature Screen
2. Percent Range Screen
3. Wired Interface Usage
4. Radio Interface Usage

The Field Link will continue to rotate through each periodic screen through the course of normal operation. If any diagnostic or fault condition occurs, a corresponding diagnostics screen will appear.

4.0 Reference information

Figure 7. Smart Wireless Field Link Terminal Diagram

A. Data A (+)   C. +10.5 to 30 VDC
B. Data B (−)   D. Return

Note
The Smart Wireless Field Link requires separate twisted shield pairs (four wires) for power and data.
Figure 8. Smart Wireless Field Link Dimensional Drawing

A. 2× Conduit plug
B. Possible antenna rotation shown
C. Extended range antenna
D. WirelessHART® antenna

Table 1. Smart Wireless Field Link Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power</td>
<td>10.5 – 30 VDC</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>–40 to 185 °F (~40 to 85 °C)</td>
</tr>
<tr>
<td>Wiring (Power)</td>
<td>24 AWG - 14 AWG twisted shielded pair(1)</td>
</tr>
<tr>
<td>Wiring (RS-485 Communications)</td>
<td>24 AWG - 14 AWG twisted shielded pair(1)</td>
</tr>
<tr>
<td></td>
<td>Less than 15 pF/ft capacitance.</td>
</tr>
<tr>
<td>Wiring Distance</td>
<td>656 ft. (200 m)</td>
</tr>
<tr>
<td>Wireless Protocol</td>
<td>WirelessHART, 2.4 – 2.5 GHz DSSS</td>
</tr>
<tr>
<td>Wireless Output Power, EIRP</td>
<td>10 dBm with WK antenna and 12.5 dBm with WM antenna</td>
</tr>
<tr>
<td>Mounting</td>
<td>All SST, 2-in. pipe and panel mount bracket</td>
</tr>
<tr>
<td>Humidity</td>
<td>0 – 90% relative humidity</td>
</tr>
</tbody>
</table>

1. Ambient temperatures above 60 °C require wiring rated to at least 5 °C above max ambient temperature.
## 5.0 Ordering information

### Table 2. Smart Wireless Field Link

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

<table>
<thead>
<tr>
<th>Model</th>
<th>Product description</th>
</tr>
</thead>
<tbody>
<tr>
<td>781</td>
<td>Smart Wireless Field Link</td>
</tr>
</tbody>
</table>

**Physical connection**

<table>
<thead>
<tr>
<th>Model</th>
<th>Product description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>RS485</td>
</tr>
</tbody>
</table>

**Housing**

<table>
<thead>
<tr>
<th>Model</th>
<th>Product description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Dual compartment housing - Aluminum</td>
</tr>
<tr>
<td>E</td>
<td>Dual compartment housing - Stainless Steel</td>
</tr>
</tbody>
</table>

**Conduit threads**

<table>
<thead>
<tr>
<th>Model</th>
<th>Product description</th>
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<tbody>
<tr>
<td>1</td>
<td>1/2 – 14 NPT</td>
</tr>
<tr>
<td>2</td>
<td>M20</td>
</tr>
</tbody>
</table>

**Product certifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>Product description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I5</td>
<td>FM Intrinsically Safe, Non-incendive</td>
</tr>
<tr>
<td>I6</td>
<td>CSA Intrinsically Safe</td>
</tr>
<tr>
<td>I1</td>
<td>ATEX Intrinsically Safe</td>
</tr>
<tr>
<td>I7</td>
<td>IECEx Intrinsic Safety</td>
</tr>
<tr>
<td>KL</td>
<td>FM &amp; CSA Class 1 Division 1, ATEX Zone 0 Intrinsic Safe</td>
</tr>
<tr>
<td>NA</td>
<td>No Approvals</td>
</tr>
</tbody>
</table>

**Wireless update rate, operating frequency and protocol**

<table>
<thead>
<tr>
<th>Model</th>
<th>Product description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WA3</td>
<td>User configurable update rate, 2.4 GHz DSSS, WirelessHART</td>
</tr>
</tbody>
</table>

**Omnidirectional wireless antenna and SmartPower™**

<table>
<thead>
<tr>
<th>Model</th>
<th>Product description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WK3</td>
<td>External antenna, line power 10 – 30 VDC</td>
</tr>
<tr>
<td>WM3</td>
<td>Extended range, external antenna, line power 10 – 30 VDC</td>
</tr>
</tbody>
</table>

**Options** (Include with selected model number)

**Meter**

<table>
<thead>
<tr>
<th>Model</th>
<th>Product description</th>
</tr>
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<tbody>
<tr>
<td>M5</td>
<td>LCD display</td>
</tr>
</tbody>
</table>

**Gland and connector options**

<table>
<thead>
<tr>
<th>Model</th>
<th>Product description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G2</td>
<td>Cable gland (7,5 mm – 11,9 mm)</td>
</tr>
<tr>
<td>G4</td>
<td>Thin wire cable gland (3 mm – 8 mm)</td>
</tr>
</tbody>
</table>

Typical model number: 781 A1 D 1 KL WA3 WK3 M5
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6.0 Product Certifications

6.1 European Directive Information

A copy of the EC Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EC Declaration of Conformity can be found at www.rosemount.com.

6.2 Ordinary Location Certification

As standard, the transmitter has been examined and tested to determine the design meets the basic electrical, mechanical, and fire protection requirements by a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

6.3 Installing in North America

The US National Electrical Code (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

USA

I5 USA Intrinsically Safe (IS), Nonincendive (NI) and Dust-ignitionproof Certificate: FM 3040398


Markings: IS CL I, DIV 1, GP A, B, C, D; CL II, DIV 1, GP E, F, G; Class III T4;
Class 1, Zone 0 AEx ia IIC T4;
NI CL I, DIV 2, GP A, B, C, D T4;
DIP CL II, DIV 1, GP E, F, G; CL III T4;
when installed per drawing 00781-1010
T4(-40 °C ≤ T_a ≤ +70 °C)

<table>
<thead>
<tr>
<th>Input parameters (power terminals)</th>
<th>Input parameters (sensor terminals)</th>
<th>Output parameters (sensor terminals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{\text{MAX}/U_i} = 30,V$</td>
<td>$V_{\text{MAX}/U_i} = 11,V$</td>
<td>$V_{\text{oc}/U_o} = 7.14,V$</td>
</tr>
<tr>
<td>$I_{\text{MAX}/I_i} = 200,mA$</td>
<td>$I_{\text{MAX}/I_i} = 300,mA$</td>
<td>$I_{\text{oc}/I_o} = 112,mA$</td>
</tr>
<tr>
<td>$P_{\text{MAX}/P_i} = 1,W$</td>
<td>$P_{\text{MAX}/P_i} = 1,W$</td>
<td>$P_{\text{MAX}/P_o} = 640,mW$</td>
</tr>
<tr>
<td>$C_i = 10,nF$</td>
<td>$C_i = 5,nF$</td>
<td>$C_{\text{g}/C_{\text{a}}} = 10,nF$</td>
</tr>
<tr>
<td>$L_i = 3.3,\mu H$</td>
<td>$L_i = 2.2,\mu H$</td>
<td>$L_{\text{g}/L_{\text{a}}} = 3.3,\mu H$</td>
</tr>
</tbody>
</table>

Special Conditions for Safe Use (X):

1. The Model 781 transmitter housing contains aluminum and is considered a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.
2. The surface resistivity of the unit is greater than 1 gigaohm. To avoid electrostatic charge buildup, it must not be rubbed or cleaned with solvents or a dry cloth.
3. The Model 781 transmitter will not pass the 500 Vrms electric strength test and this must be taken into account during installation.
Canada

16 Canada Intrinsically Safe
Certificate: CSA 2330424
Markings: Intrinsically Safe Class I, Division 1, Groups A, B, C, and D T3C (T_a ≤ +60 °C)
Type 4X; IP 66/67; when installed per 00781-1011

Europe

11 ATEX Intrinsic Safety
Certificate: Baseefa11ATEX0059X
Markings: II 1 G Ex ia IIC T4 Ga, T4(–40 °C ≤ T_a ≤ +70 °C)

Special Conditions for Safe Use (X):
1. The plastic antenna may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.
2. The Model 781 enclosure is made of aluminum alloy and given a protective paint finish; however, care should be taken to protect it from impact or abrasion if located in a zone 0 environment.
3. The apparatus is not capable of withstanding the 500 V isolation test required by EN 60079-11:2007 Clause 6.3.12. This must be taken into account when installing the apparatus.

International

17 IECEx Intrinsic Safety
Certificate: IECEx BAS 11.0026X
Markings: Ex ia IIC T4 Ga, T4(–40 °C ≤ T_a ≤ +70 °C)

### Input parameters (power terminals)
- U_i = 30 V
- I_i = 200 mA
- P_i = 1 W
- C_i = 0 μF
- L_i = 0 mH

### Input parameters (RS485)
- U_i = 11 V
- I_i = 300 mA
- P_i = 1 W
- C_i = 5.1 nF
- L_i = 0 mH

### Output parameters (RS485)
- U_o = 7.14 V
- I_o = 112 mA
- P_o = 1 W
- C_o = 13.9 μF
- L_o = 1000 μH
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**Special Conditions for Safe Use (X):**
1. The plastic antenna may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.
2. The Model 781 enclosure is made of aluminum alloy and given a protective paint finish; however, care should be taken to protect it from impact or abrasion if located in a zone 0 environment.
3. The apparatus is not capable of withstanding the 500 V isolation test required by EN 60079-11:2007 Clause 6.3.12. This must be taken into account when installing the apparatus.

**China**

I3 China Intrinsic Safety
Certificate: GYJ13.1444X
Standards: GB3836.1-2010, GB3836.4-2010, GB3836.20-2010
Markings: Ex ia IIC T4 Ga, –40 ~ + 70 °C

**Special Condition for Safe Use (X):**
1. See certificate for special conditions.

**EAC – Belarus, Kazakhstan, Russia**

IM Technical Regulation Customs Union (EAC) Intrinsic Safety
Certificate: RU C-US.Cb05.B.00643
Markings: Ex ia IIC T4 Ga X

<table>
<thead>
<tr>
<th>Input parameters (power terminals)</th>
<th>Input parameters (RS485)</th>
<th>Output parameters (RS485)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U_i = 30 B</td>
<td>U_i = 11 B</td>
<td>U_o = 7.14 B</td>
</tr>
<tr>
<td>I_i = 200 mA</td>
<td>I_i = 300 mA</td>
<td>I_o = 112 mA</td>
</tr>
<tr>
<td>P_i = 1 BT</td>
<td>P_i = 1 BT</td>
<td>P_o = 1 BT</td>
</tr>
<tr>
<td>C_i = 0 mФ</td>
<td>C_i = 5.1 mФ</td>
<td>C_o = 13.9 mФ</td>
</tr>
<tr>
<td>L_i = 0 mГ</td>
<td>L_i = 0 mГ</td>
<td>L_o = 0 mГ</td>
</tr>
</tbody>
</table>

**Special Condition for Safe Use (X):**
1. See certificate for special conditions.

**Combinations**

KD Combination of I1, I5, and I6
KL Combination of I1, I5, I6, and I7
Figure 9. Rosemount 781 Declaration of Conformity

EMERSON
Process Management

EU Declaration of Conformity
No: RMD 1083 Rev. E

We,
Rosemount, Inc.
8200 Market Boulevard
Chanhassen, MN 55317-9685
USA

declare under our sole responsibility that the product,
Rosemount 781 Wireless Field Link

manufactured by,

Rosemount, Inc.
8200 Market Boulevard
Chanhassen, MN 55317-9685
USA

to which this declaration relates, is in conformity with the provisions of the European Union Directives, including the latest amendments, as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Union notified body certification, as shown in the attached schedule.

______________________________
(Vice President of Global Quality)

______________________________
(Signature)
Kelly Klein
(name)

______________________________
(date of issue)
19 Apr 2016

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EU Declaration of Conformity

No: RMD 1083 Rev. E

EMC Directive (2004/108/EC) This directive is valid until 19 April 2016
EMC Directive (2014/30/EU) This directive is valid from 20 April 2016

Harmonized Standards:
EN 61326-1:2013


Harmonized Standards:
EN 300 328: V1.9.1
EN 301 489-17: V2.2.1
EN 61010-1: 2010
EN 62479: 2010

ATEX Directive (94/9/EC) This directive is valid until 19 April 2016
ATEX Directive (2014/34/EU) This directive is valid from 20 April 2016

Baseefa11ATEX0659X – Intrinsic Safety Certificate
Equipment Group II, Category 1 G
Ex ia IIC T4 Ga

Standards Used:
EN 60079-0: 2009 (A review against EN60079-0:2012, which is harmonized, shows no significant changes relevant to this equipment so EN60079-0:2009 continues to represent “State of the Art”)
EN 60079-11: 2007 (A review against EN60079-11:2012, which is harmonized, shows no significant changes relevant to this equipment so EN60079-11:2007 continues to represent “State of the Art”)
EU Declaration of Conformity
No: RMD 1083 Rev. E

ATEX Notified Body
SGS Baseefa Limited [Notified Body Number: 1180]
Rockhead Business Park
Staden Lane
Buxton, Derbyshire
SK17 9RZ United Kingdom

ATEX Notified Body for Quality Assurance
SGS Baseefa Limited [Notified Body Number: 1180]
Rockhead Business Park
Staden Lane
Buxton, Derbyshire
SK17 9RZ United Kingdom
<table>
<thead>
<tr>
<th>Part Name</th>
<th>Hazardous Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pb</td>
</tr>
<tr>
<td>Electronics Assembly</td>
<td>X</td>
</tr>
<tr>
<td>Housing Assembly</td>
<td>X</td>
</tr>
</tbody>
</table>

This table is proposed in accordance with the provision of SJ/T11364.

O: Indicate that said hazardous substance in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X: Indicate that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.