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Installation, Operation and Maintenance Manual

SERIAL NUMBER_____

The specifications contained in this manual are subject to change without notice and any user of these specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications that have been changed and are no longer in effect.

Installation, Operation and Maintenance Manual

TM-61546 REV. M

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Virtually every major commercial, government, and scientific organization is making use of our products, expertise and extensive technical support. This is a culmination of years of refinement in our flowmeter and calibrator designs, which has resulted in the technological leadership in the flow measurement field that we enjoy.

We are proud of our quality products, our courteous service and welcome you, as a valued customer, to our growing family.

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TM-61546
REVISIONS

DATE	REVISION	ECO NUMBER	APPROVAL
7/17/06	L	18782	J. Blasius
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1 Introduction

1.1 Scope

The Linear Link™ redefines the state-of-art performance in flowmeter linearizers. Its process speed is clearly superior over traditional linearizer methods and offers an averaging technique that eliminates mechanical variances of the rotor blades. Speed, accuracy and compact size makes the Linear Link™ an attractive signal processing addition to any turbine flowmeter.

This manual provides information and guidance for installation, operation, and maintenance of the Linear Link™, manufactured by Flow Technology, Inc. Also covered in this manual is the use of the Link Series tools for testing, calibrating, and programming the Linear Link™. The Link Series tools consist of the Linear Link™ Visual Link™ Software and Smart Cable.

The Linear Link™ consists of two major components: linearizer hardware and Visual Link™ software. Separating the *everyday* working hardware of the Linear Link™ from the *periodically* used testing and re-programming hardware of the Smart Cable and PC (personal computer) has several advantages. Size, weight, power consumption, and cost are kept to a minimum. Ruggedness, simplicity, functionality, and protection from unauthorized tampering are kept to a maximum. To achieve a wide usable flow range from turbine flow meters, electronic compensation of nonlinear flow effects is a necessity. The Link System makes premium levels of performance affordable and easy.

Field re-programming and user scaling are easily achieved by direct connectivity with a Smart Cable, and the serial port of an IBM compatible notebook or personal computer. User friendly software utilizing pull down menus, graphical displays, and on line help, makes re-programming straightforward and easy for anyone familiar with a mouse and keyboard.

All Linear Links™ have the necessary hardware to accept the Smart Cable.

1.2 Linear Link™

The Linear Link™ is the heart of the Link System, replacing several components: Amplifier, linearizer and analog converter. When mated to a calibrated flowmeter, all Linear Links™ are shipped calibrated, tested and ready to use.

The Linear Link™ electronics consists of one circular PCB, or in the pickoff version, three interconnecting boards, with the following functions:

1) Wide voltage input switching power supply
2) Microcontroller
3) RF or MAG amplifier and pickoff

1.3 Smart Cable and Visual Link™ Software

The Smart Cable is used to connect the Linear Link™ to the PC's serial port and provide the RS-232 to TTL level conversions. The Visual Link™ software is a Windows®-based program used to program the Linear Link™, which requires Windows® 95/98/2000/XP or Windows NT® to program the Linear Link™. It is designed to provide a user-friendly interface for downloading and manipulating linearization curves and unit scaling into the Linear Link™. The program provides a GUI (Graphical User Interface) and a comprehensive Help file to assist the user in programming the Linear Link™.

Visual Link™ provides the ability to read back programmed data when a device has been programmed with Visual Link™ 3.0 or newer. This allows for verification of data actually last programmed to the Linear Link™.

1.4 PC Requirements for Linear Link™ Visual Link™ Software

486 or higher PC; VGA monitor; mouse; 1 meg of RAM; Windows® 95/98/2000/XP or Windows NT®; and a free RS-232 Serial Port.

2 Installation

2.1 Inspection

Your Linear Link™ has been tested and calibrated to linearize the output of its mated meter prior to shipment. The equipment is ready for immediate installation upon receipt. Please check the unit to assure that no damage has occurred during shipment.

- Visually inspect the unit for any signs of damage.
- Verify that the model number of the unit received matches what was ordered.

2.2 Mechanical Installation of the Linear Link™ to the Flowmeter

2.2.1 Pickoff Version

- Fully screw the locknut onto the base of the Linear Link™.
- Using ***hand pressure*** only, screw the Linear Link™ into the mating pickoff well (11/16-24 UNEF-2A typical thread size) until it comes to a positive stop against the bottom of the pickoff well. **Do not use a wrench to install the Linear Link™, excessive force could indent the wall of the flowmeter body, which separates the Linear Link™ from the process fluid.**

Note: As with any pickoff, it is critical to the operation of the Linear Link™, that the unit is fully

seated in the pickoff well. Failure to fully seat the Linear Link™ would increase the distance between the tip of the rotor blades in the flowmeter and the pickoff coil inside the base of the Linear Link™. This increased distance will decrease the signal strength and could result in failure of the passing rotor blade to be detected. The end result could be an erroneously output or zero output reading.

- Verify there is a gap (threads exposed) between the bottom of the locknut and the top of the flowmeter.
- Using a wrench, tighten the locknut against the top of the flowmeter body.

2.2.2 Condulet Installation or Positioning

The housing can be mounted on top of the flowmeter or on the end of the conduit. All connections are made to a terminal strip.

2.3 Mechanical Dimensions

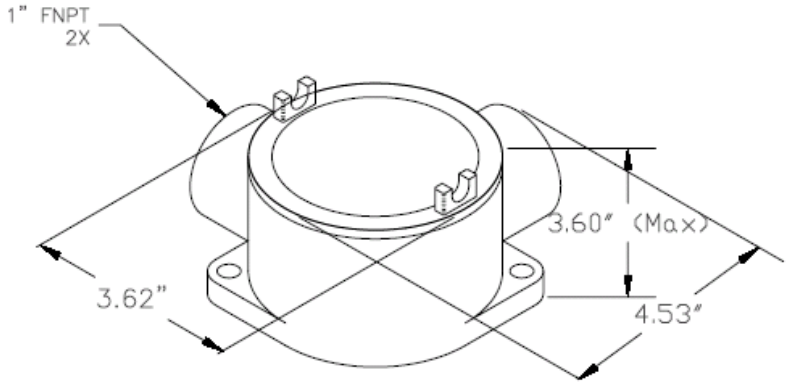


Figure 1: -9; Class 1, Div 1, Group A, B, C, & D

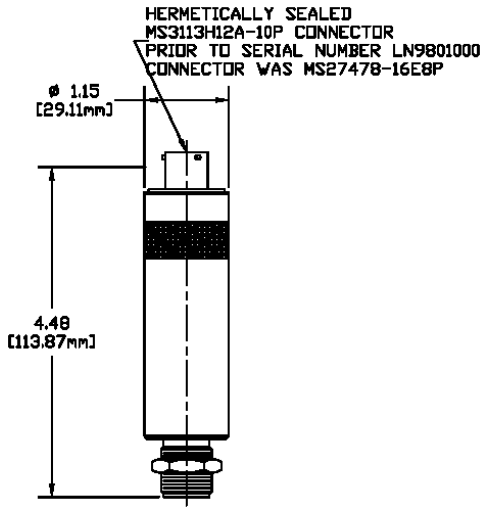


Figure 2: -1; Integral Pickoff, 10-pin MS

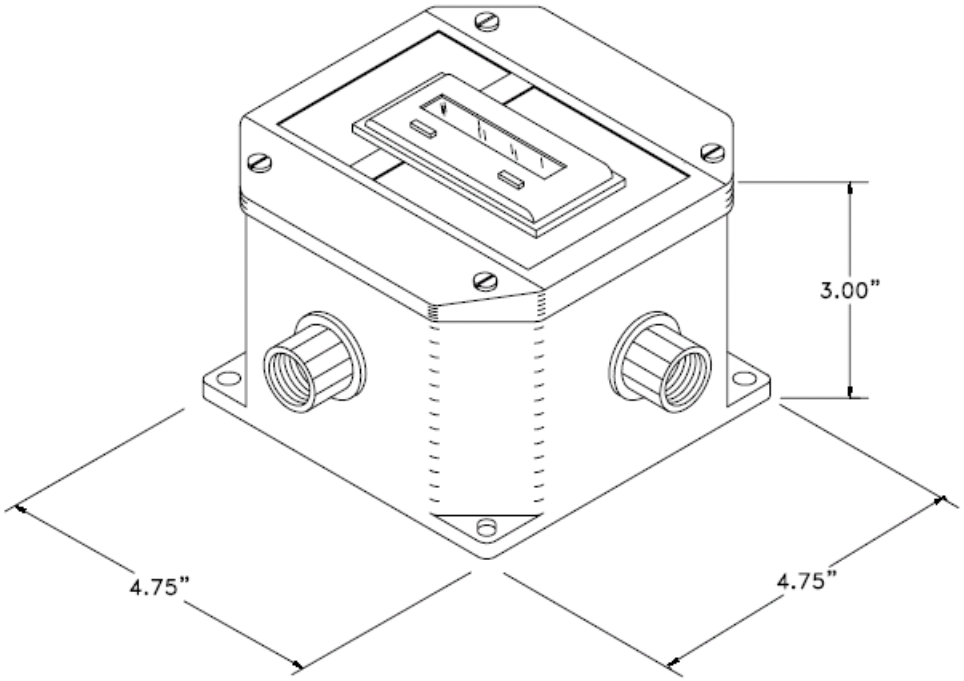


Figure 3 • B6 & BC; Link, NEMA 4X Enclosure with Conduit Hubs (model with Display shown).

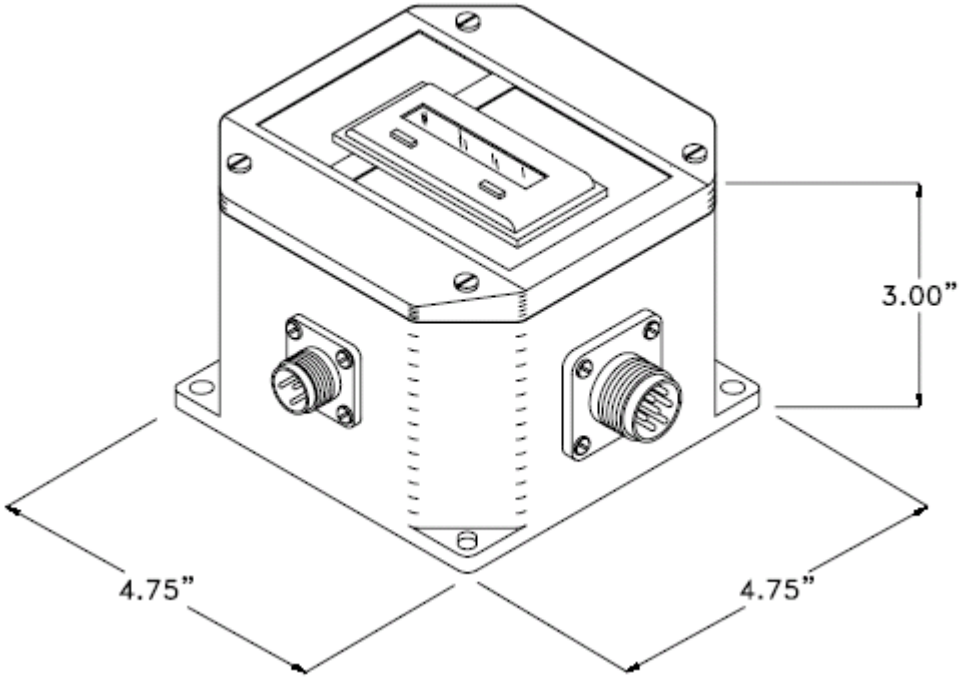


Figure 4 • B7 & BA; NEMA 4X Enclosure with MS Connectors (model with Display shown).

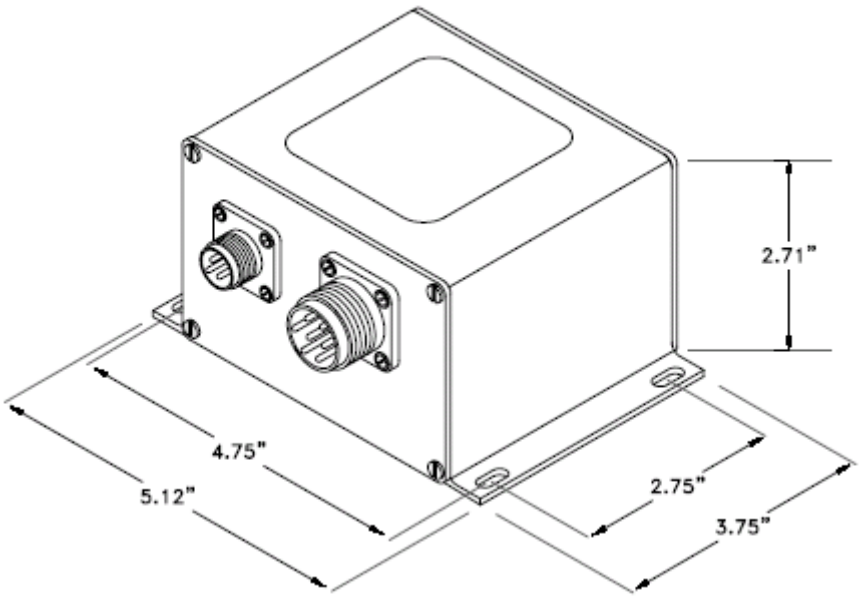


Figure 5 • A7; Aluminum Housing with MS Connectors

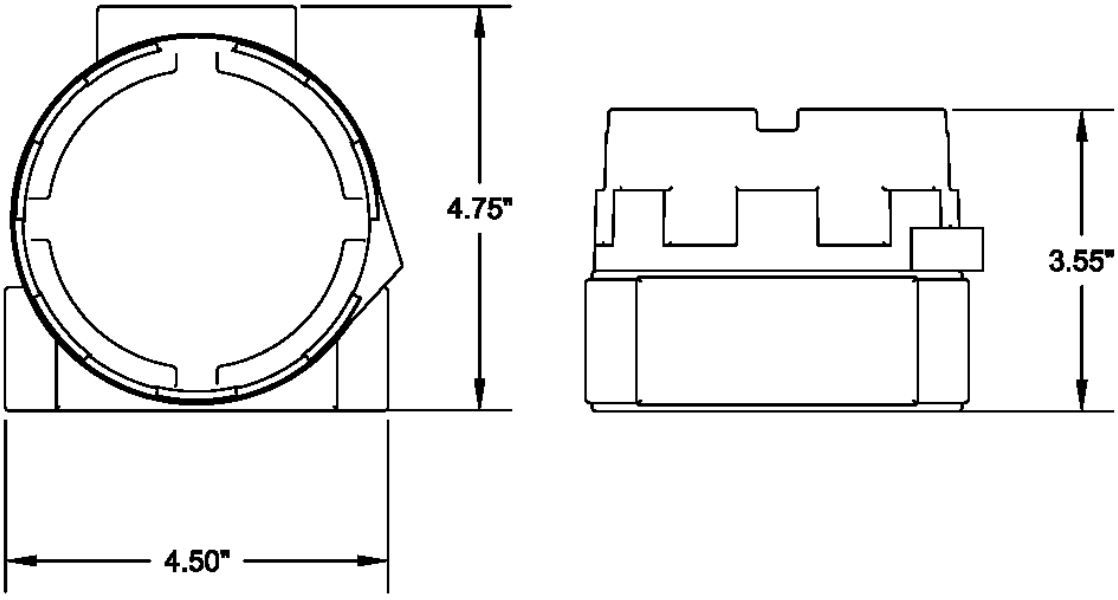


Figure 6 • -F Housing; Class 1, Div 1, Group B, C, & D

2.4 Electrical Installation

This section provides the professional installer with the wiring diagram for connecting the Linear Link™ to the user's system.

2.4.1 MS (Pickoff) Version

Warning!
Verify that the power is off before connecting or servicing!

- Turn off power.
- Solder the mating connector to the user's cable per Table 1.
- Align the connector to the top of the Linear Link™.
- Push down and twist to lock.

2.4.2 Condulet and Nema 4x w/ Conduit Hubs Version

Warning!
Verify that the power is off before connecting or servicing!

- Turn off power.
- Remove the enclosure cover.
- To connect earth ground to circuit common, solder connection at earth ground jumper (JP-14).
- Connect the enclosure to the user's conduit system.
- Verify that the pickoff is still fully seated in the pickoff well of the flowmeter.
- Strip the ends of the user's wire approximately 1/4".
- Insert the stripped ends of the user's wire to the appropriate mating terminals on the connector block (J2); see Table 2.
- Verify that the Linear Link™ cable connector is fully seated to its mating receptacle (J1) on the terminal board.
- Press the terminal plug into the terminal socket, ensuring it is fully seated, then tighten the screws at either end of the plug.
- Replace the enclosure cover.

2.4.3 Nema 4x w/ MS Connectors Version

Warning!
Verify that the power is off before connecting or servicing!

- Turn off power.
- Remove the enclosure cover
- To connect earth ground to circuit common, solder a 0-ohm resistor or solder bridge at JP14 (located at one of the two PCB mounting holes) when using a metal enclosure that is tied to earth ground. When using a non-metallic enclosure that is not tied to earth ground, earth ground can be connected to circuit common via pin 9, 10, 11, or 12 thru the MS connector. Standard configuration is with JP14 **not** installed.
- Solder the mating connector to the user's cable per Table 3.
- Connect a cable to the pickoff (3 pin) and the other end to the Nema 4x enclosure (3 pin), securely tighten.
- Connect another cable to the other MS connector (7 pin) on the enclosure and tighten.
- Replace the enclosure cover.
- Verify that the pickoff is fully seated in the pickoff well of the flowmeter.

2.4.4 Electrical Connections

Table 1: Electrical Connections, Pickoff Version

Linear Link™ Function		Pickoff Version (Connector , 10- Pin)
PWR	+10 to +32 VDC (Supply)	A
GND	Ground	B
TX	Transmit Data	C
RX	Receive Data	D
F OUT	Processed Pulse	E
F IN	Raw Pulse	F
VOLTAGE OUT	Voltage Out	G
CURRENT OUT	Current Out	H
NOT USED		J
NOT USED		K

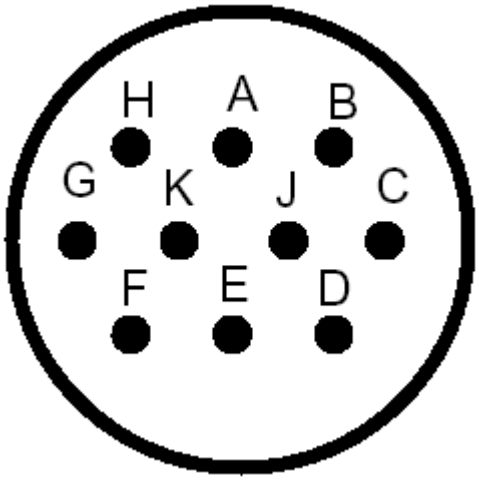


Figure 7 • Face view of 10-pin insert shown.

Table 2: Electrical Connections, NEMA 4X & Condulet Versions

Linear Link™ Function		Terminal Strip (NEMA 4X and Metal Conduit) Version (PCB 12-Pin)
PWR	+10 to +32 VDC (Std) (Supply)	1
PWR RETURN	Power Return	2
+ XDCR	Pickoff Input	3
- XDCR	Pickoff Input	4
F OUT	Processed Pulse	5
F IN	Raw Pulse	6
VOLTAGE OUT	Voltage Out	7
CURRENT OUT	Current Out	8
CIRCUIT	Common	9
CIRCUIT	Common	10
CIRCUIT	Common	11
CIRCUIT	Common	12

NOTE: If a cable shield is to be connected, it can be routed to Pins 9, 10, 11, or 12.

Table 3: Electrical Connections, NEMA 4X with 3-pin & 10-pin MS Connectors

Linear Link™ Function		Terminal Strip PCB (Pin #)	MS (NEMA 4X & Aluminum) Version (10-Pin, J1 and 3-pin, J2)
PWR	+10 to +32 VDC (Supply)	1	J1-A
Pwr	Return	2	J1-B
F OUT	Processed Pulse	5	J1-C
F IN	Raw Pulse	6	J1-D
VOLTAGE OUT	Voltage Out	7	J1-E
CURRENT OUT	Current Out	8	J1-F
Circuit Common	Shield/Circuit Common	9	J1-G
Circuit Common	Shield/Circuit Common	11	J1-H
+ XDCR	Pickoff Input	3	J2-A
- XDCR	Pickoff Input	4	J2-B
Circuit Common	Shield	10	J2-C

NOTE: See Appendix A, Note 1 for information regarding 3-wire configuration.

2.5 Link Outputs:

The linearized scaled flowrate output is available on two separated outputs, as an analog and pulse signal.

F out	Linearized pulse output (5 V amplitude)
F in	Unscaled pulse output (5 V amplitude). This signal is the amplifier signal of the flowmeter before linearization. This is useful for monitoring the raw frequency generated by the flowmeter. Also used for injecting a pulse for verifying calibrations. **(See Note 2 of Appendix A)**
Voltage Out	This provides an analog 0 - 10 Volt output signal that corresponds to the linearized flowrate. See Figures 8 or 11.
Current Out	Use only on units configured as current (4 - 20 mA) output, this connects to the current grounding path. See Figure 9.

Analog Outputs

See Appendix A for wiring instructions for units prior to S/N LKA03070319

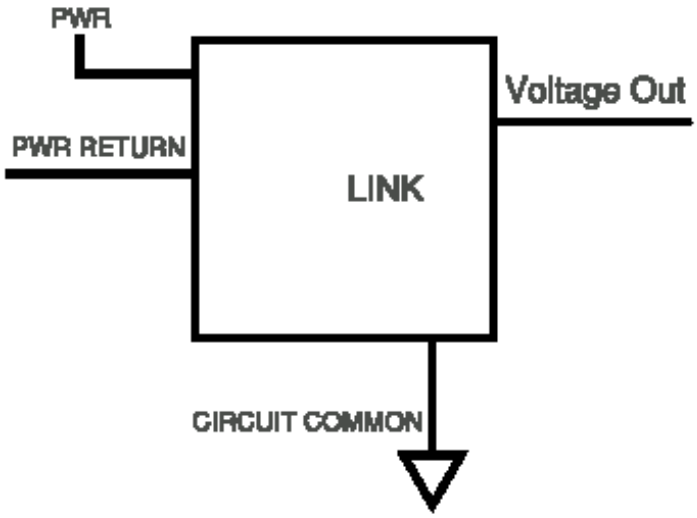


Figure 8 • Voltage Output, 4-Wire

Analog Outputs

See Appendix A for wiring instructions for units prior to S/N LKA03070319

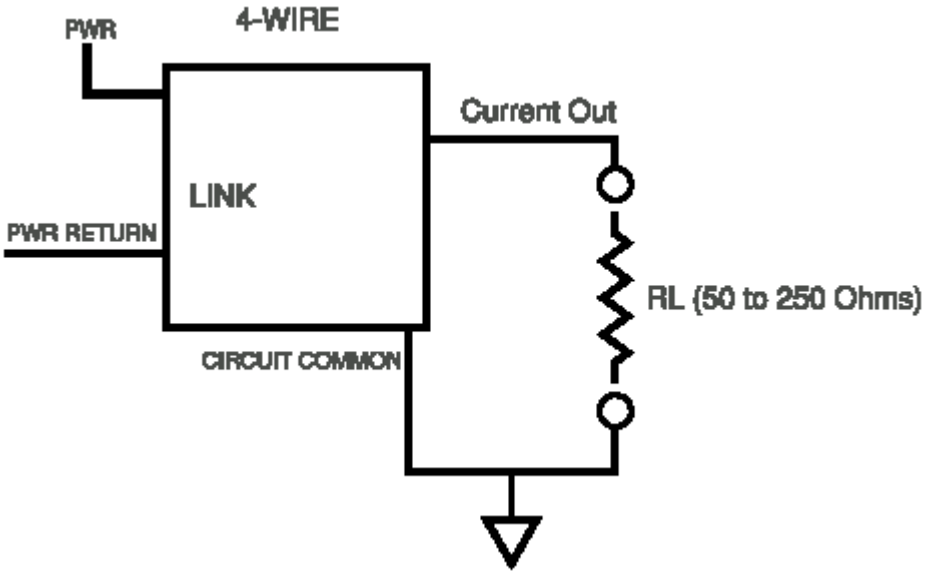


Figure 9 • Current Output, 4-Wire

Note: See Appendix A for 3-Wire configuration and operational considerations. This includes models prior to S/N LKA03070319.

For current out configuration with loads greater than 550 ohms, use the following formula: R_{load} = (Supply Voltage – 4)/0.02 (the minimum supply voltage is 15 VDC)

3 Calibrating the Linear Link™

3.1 When purchased as a mate to a specific turbine flowmeter, the Linear Link™ is fully programmed to the mating meter calibration with the units and scaling as requested in your purchase order. Likewise, subsequent Flow Technology, Inc. calibrations will re-program the Linear Link™ during the mating meter re-calibration.

3.2 To recalibrate the Linear Link™, the Visual Link™ program and a Smart Cable are required. Verify computer requirements as specified in paragraph 1.4. The Visual Link™ software is available for download on the Flow Technology, Inc. website (www.ftimeters.com) or as an additional item to the customer sales order. Visual Link™ programming instructions are available in the Help file. A PDF file is also included in the downloadable ZIP file.

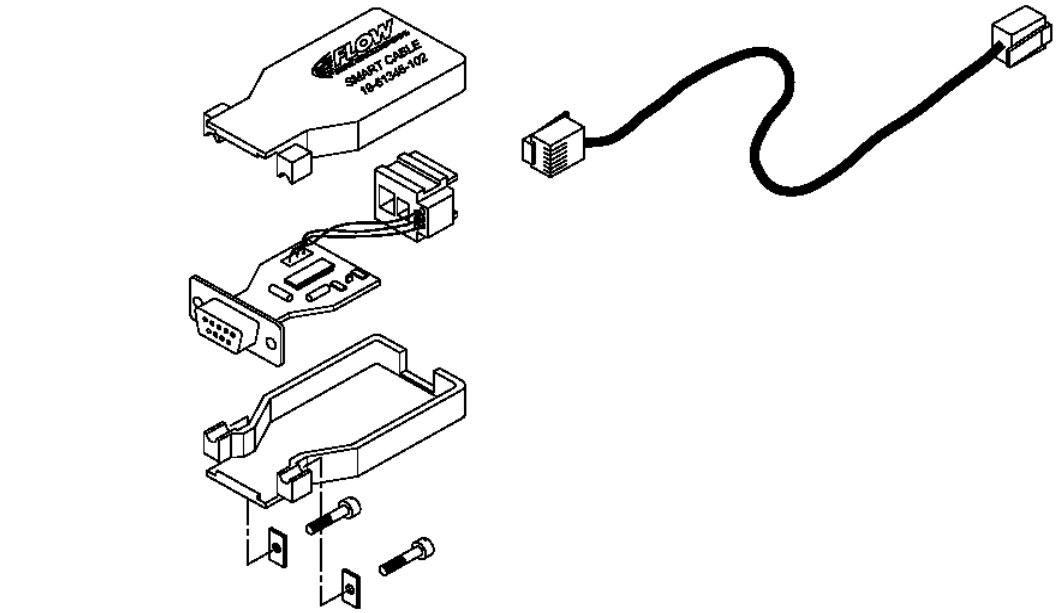


Figure 10 • LINK Interface Box with Smart Cable and RS-232 Serial Interface (P/N 19-61348-102)

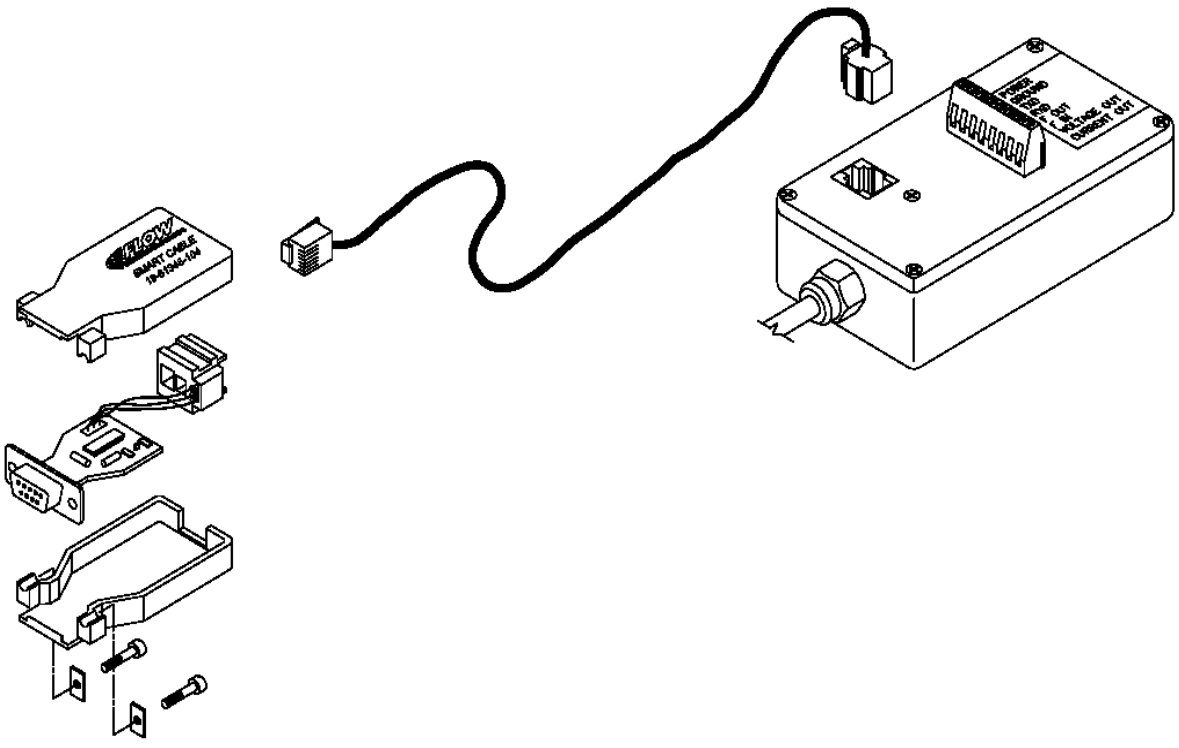


Figure 11 • LINK Interface Box with MS Connector Cable (P/N 19-61348-104)

4 Theory of Operation

Fluid traveling through each blade of the spinning rotor generates a pulse while passing through the electromagnetic field surrounding the pickoff coil. This pulse triggers a frequency clock in the Linear Link™, which times the distance between the rotor blades. This time duration, referred to as a **period**, is equal to known volume of flow passing through the rotor. These periods can be averaged to eliminate minute variations of blade geometry producing the best obtainable accuracy.

About the Pickoff:
The Linear Link™ is available in either a Mag pickoff version, or a RF pickoff version. The Mag version generates a magnetic field by the having a small magnet in the center core of the pickoff coil. The RF version uses a signal conditioner to generate a carrier wave. Generally the Mag version can operate through thicker flowmeter walls than the RF, but also introduces magnetic drag on the rotor. The RF version introduces no drag and is preferred for smaller meters, especially when operating in the lower extended flowranges.

The relationship between the volumetric flowrate and the frequency output of a flowmeter is known as the K-Factor (pulses per unit volume; i.e. pulses per gallon).

$$\text{K-Factor} = \frac{\text{Frequency}}{\text{Flowrate}} \quad \text{x} \quad \text{Time Base}$$

Turbine flowmeters are noted for their fast response times, repeatability and good linearity (within the 10:1 operating range in lighter viscosities). The relationship between K-Factor and flowrate becomes increasingly non-linear for turbine flowmeters operating at the low end of their flowranges where viscosity, bearing and magnetic pickoff drag have significant effects on rotor performance. Even though the meter is non-linear it remains repeatable over a wide flow range and therefore can be linearized.

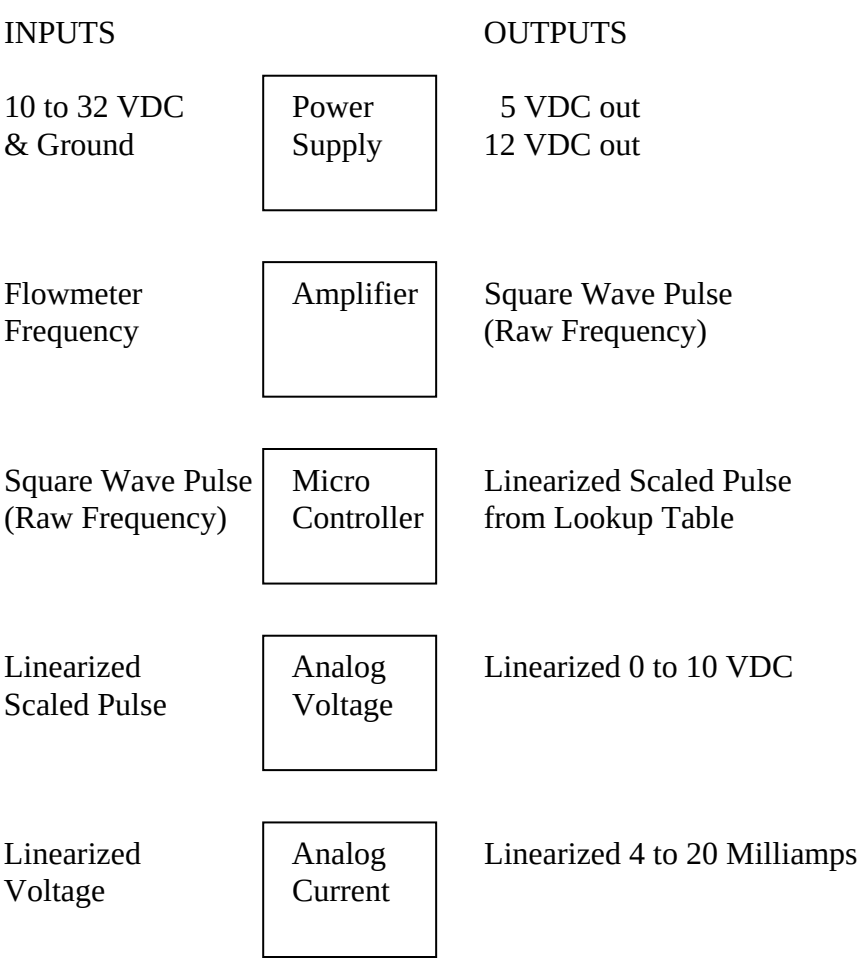
The Linear Link™ compensates for the deviation of a turbine meter from the ideal performance and generates a pulse signal that is linear to within ±0.1% of reading. The linearized K-Factor is generated by using the actual K-Factor as a reference. While programming the Linear Link™, the user may choose either a modified cubic spline or linear interpolation, to determine the correction for the deviation between the ideal K-Factor and the actual K-Factor.

The Linear Link™ linearizes the K-Factor curve of a turbine flowmeter by providing up to 100 points of correction. The microprocessor compensates for the non-linearity of each segment of the curve between the points. With the simple programming provided by the Visual Link™ software, every flowmeter equipped with a Linear Link™ could be given an identical K-Factor. This allows for direct inter-changeability without the need to re-program displays or batching controllers.

4.1 Over and Under Range

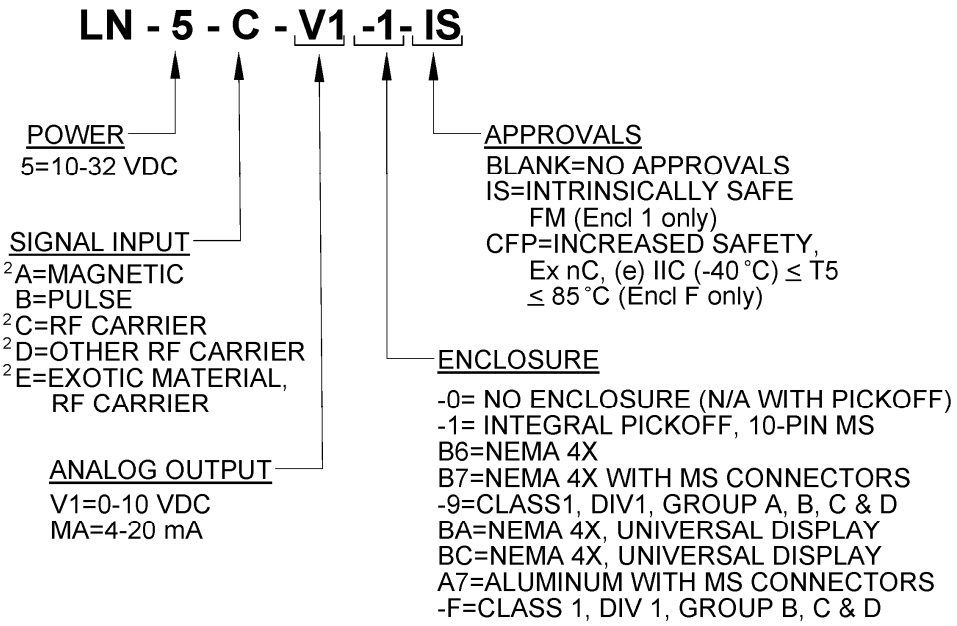
The Linear Link™ will continue to provide a corrected output for overspeed and underspeed conditions up to 125% above the maximum calibrated frequencies of the mating flowmeter and down to the point when the rotor stops. The Linear Link™ output during over and under range conditions are an extrapolation and are neither traceable nor guaranteed to be accurate.

4.2 Block Diagram



5 Model Numbering and Specifications

5.1 Link Model Numbering



Note: 15-32 VDC required for 4-20 mA output configuration. Use the following formula to calculate the maximum load for loads above 550 ohms: $\mathbf{R_{Load} = (Vs - 4)/.02}$ At 32 VDC the maximum load is 1.4K ohms.

[2] If desired, it is possible to bypass the transducer (flowmeter & pickoff) by disconnecting ±XDCR leads (non-pickoff style only) and injecting a 0-5 VDC square wave in on pin labeled Fin. The output impedance of the pulse source must be 50 ohms or less and the frequency source common must be connected to circuit common.

5.2 Linear Link™ Specifications

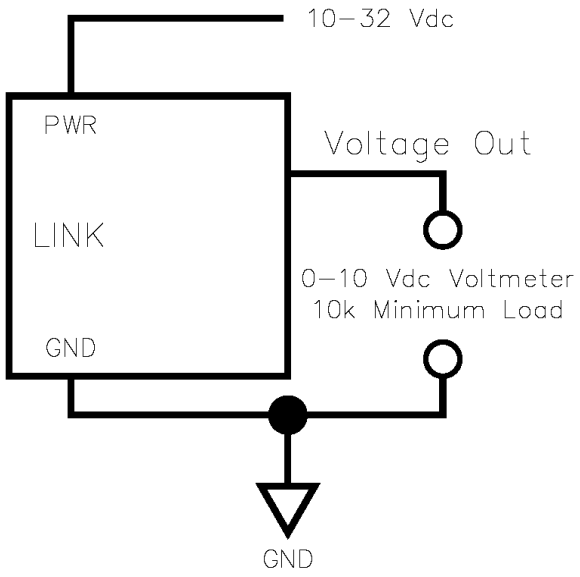
Applied Voltage In:	10 – 32 VDC 15-32 VDC required for 4-20 mA output
Power Consumption:	300 mW (excluding 4-20 mA)
Input Frequency:	5 - 3500 Hz
Input Type:	Mag & RF
Mag Input Sensitivity	20 mV p-p (below 100 Hz)
Output Frequency:	1 - 3500 Hz
Analog Voltage Output:	0 - 10 VDC
Analog Current Output:	4 - 20 mA
-Maximum Load:	R_{load} = (supply voltage - 4) / 0.02 (min supply voltage = 15 VDC)
Linearizer Latency:	10 mS
System Accuracy:	
-Frequency Output:	0.1% of reading
-Analog Output:	0.1% of full scale
Linearization Method:	High density linearly interpolated frequency mapping
Re-programmability:	1 million cycles
Operating Temperature:	-40° C to +85° C
Interface: (Calibration Only)	Two wire 19.2K bps serial USART connection to Personal Computer (with special cable).
Packaging:	2.9” Circular PCB Monobody 1" (303 SST) w/ hermetic MS connector
Materials:	Housing - 303 or 316 SST

Mating Connector Assembly (Pickoff)	10-Pin	FTI P/N 15-61560-101
Mating Connector Assemblies (Nema 4x MS)	3-Pin	FTI P/N 15-89515-102
	10-Pin	FTI P/N 15-89515-106

Appendix A: Wiring Information for 3-Wire and Earlier Link Models

Wiring for units, Serial Number LN9801000 to LKA03070319, with the 8-position terminal strip.

Figure 12 • Voltage Output, 3-Wire



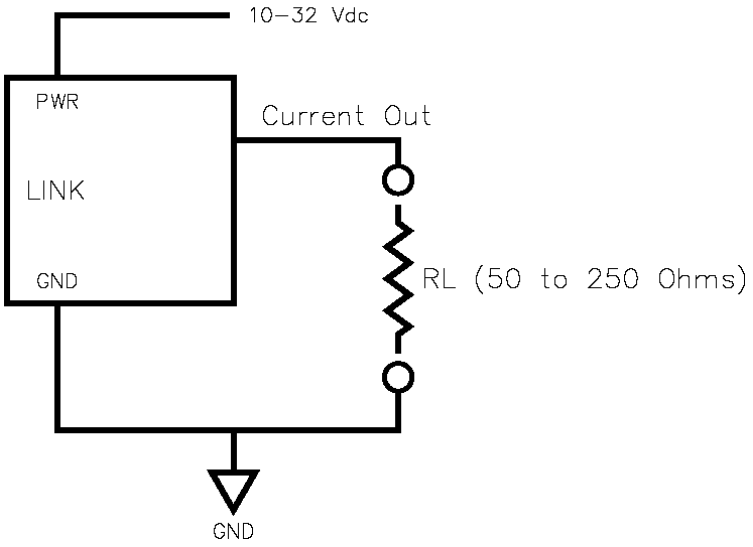


Figure 13 • Current Output, 3-Wire

NOTE 1: The figures above show 3-wire configurations of the Linear Link™ with the 8-position connector. The Linear Link™, with the 12-position connector, may be set up utilizing a 3-wire configuration, but this 3-wire configuration may possibly cause noise on the output. Converting to 3-wire from 4-wire requires a jumper from Pin 2 to Pin 9, 10, 11, or 12 of the 12-position connector. The preferred method for connecting the Linear Link™ with the 12-position connector is the 4-wire configuration. Also, for 12 pin version, the label GND in figures 12 & 13 above should be replaced with circuit common.

Wiring for units with Serial Number prior to LN98010000. The "VOLTAGE OUT" was labeled

"ANA+" and the "CURRENT OUT" was labeled "ANA-". For a unit configured for voltage out there is no change. For a unit configured for current out the load could be put into the positive or negative legs of the circuit and the excitation voltage had to be supplied to the "ANA+" lead. This allowed for more application flexibility by allowing the sensing load to be placed in either the High (Ana +) or the Low (Ana -) sides of the loop. See Figures 12 or 13.

Analog Outputs
Old Version Before Serial: LN98010000

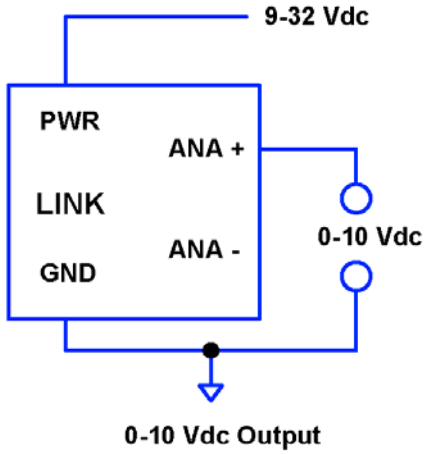


Figure 14 • Voltage Output (MS Model Prior to 1998)

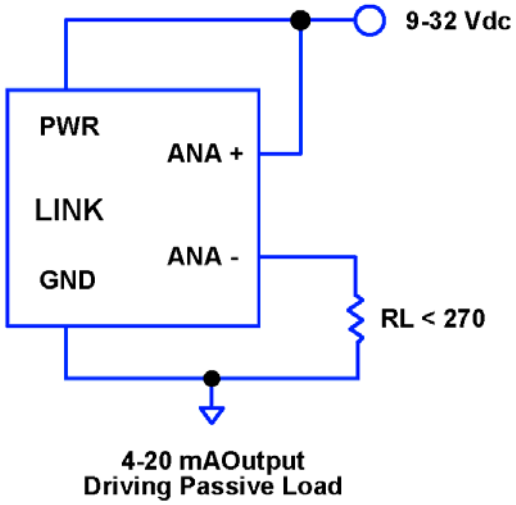


Figure 15 • Current Output - Option 1 (MS Model Prior to 1998)

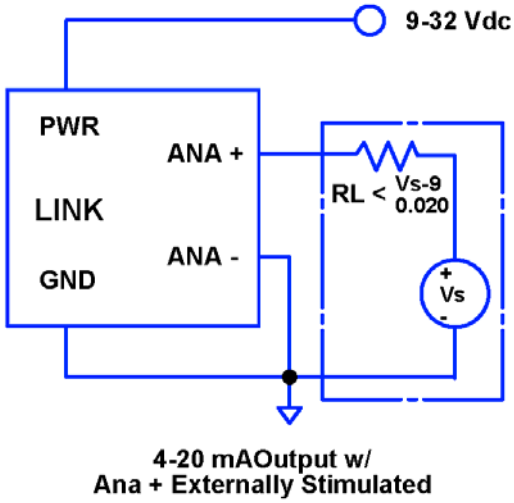


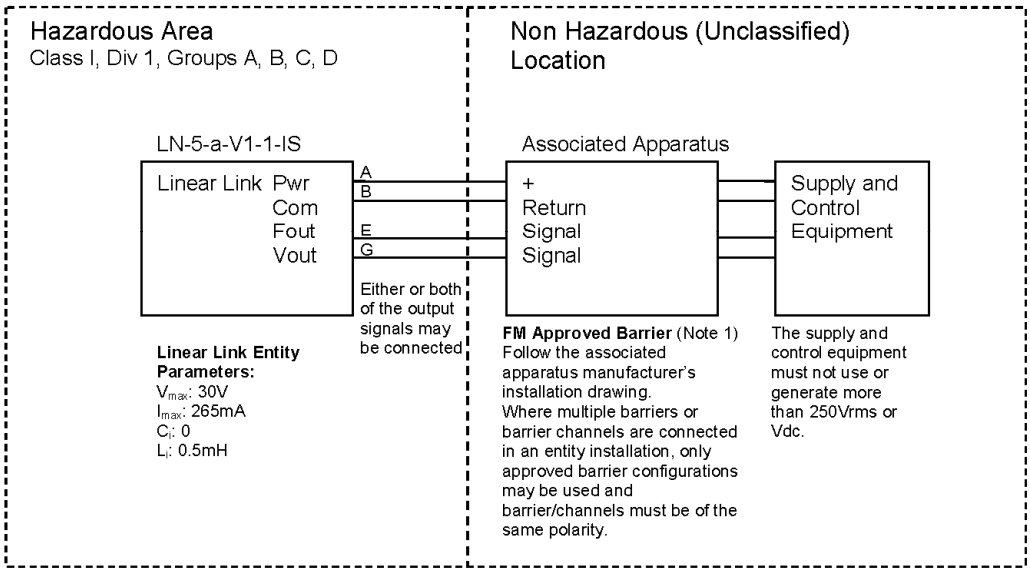
Figure 16 • Current Output - Option 2 (MS Model Prior to 1998)

NOTE 2: If desired, it is possible to bypass the transducer (flowmeter and pickoff) by disconnecting ±XDCR leads (non-pickoff style, only) and injecting a 0 –5 VDC square-wave input to the pin labeled F IN. The output impedance of the pulse source must be 50 ohms of less. The Pulse Common must be connected to the circuit board common.

Appendix B: Block Diagrams for Intrinsically Safe Units

On Drawings 76-61827 in the model number a, b, c, & d are just character fields

LN-5-a-V1-1-IS



Notes:

1. The barrier must be approved under the FM entity concept.
2. Installation must be in accordance with ANSI/ISA-RP12-06-01 (Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instruments Part 1: Intrinsic Safety) and the ANSI-NFPA 70 (National Electrical Code)
3. The structure to which the Linear Link is mounted must be at the same earth potential as the barrier earth ground.
4. Supply (Pwr), signal (Vout) and signal (Fout) must be run in individual twisted shielded pairs.
5. The voltage output Linear Link is a 10-30 volt powered device, which outputs 0-10V linear signal and a 0-5V pulse output. Typically, only one of the output signals is connected but both may be used.

Equipment that is FM approved for intrinsic safety may be connected to FM approved barriers based on the "Entity Concept". The combination is then intrinsically safe if the FM entity concept is acceptable to the authority having jurisdiction (AHJ) of the installation.

The FM approved barrier must meet the following criterion:

V_{oc} or $U_o \le V_{max}$ or U_i
I_{sc} or $I_o \le I_{max}$ or I_i
C_a or $C_o \ge C_i + C_{cable}$
L_a or $L_o \ge L_i + L_{cable}$
The configuration of the associated apparatus must be FM approved under entity concept

No changes may be made to this drawing without FM approval

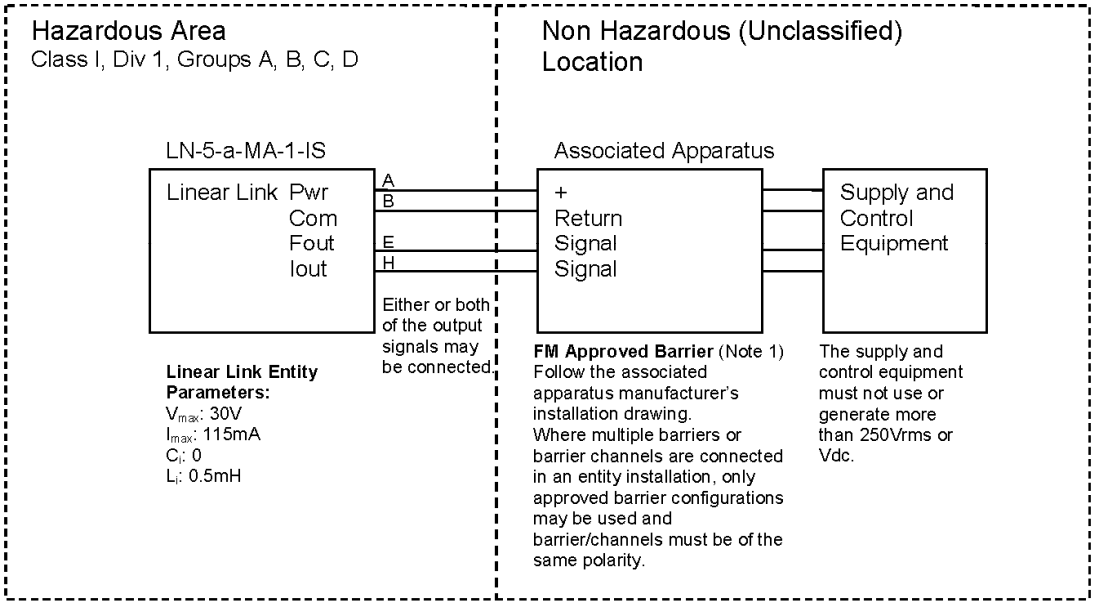
Installation Control Drawing	Last ECO	Date	Approved
	21225	9/27/10	R REED

TITLE: **FM Installation Control Drawing** **Linear Link** **Pulse Out & Voltage Out**	PREPARED	DATE	APPROVED	DATE
	J. Walker	4/12/2010		

Size	Drawing No.	Rev	
A	76-61827	H	Sheet 4 of 8

SF-69985 Rev A per ECO 20855

LN-5-a-MA-1-IS



Notes:

1. The barrier must be approved under the FM entity concept.
2. Installation must be in accordance with ANSI/ISA-RP12-06-01 (Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instruments Part 1: Intrinsic Safety) and the ANSI-NFPA 70 (National Electrical Code)
3. The structure to which the Linear Link is mounted must be at the same earth potential as the barrier earth ground.
4. Supply (Pwr), signal (Iout) and signal (Fout) must be run in individual twisted shielded pairs.
5. The current output Linear Link is a 15-30 volt powered device, which outputs 4-20mA linear signal and a 0-5V pulse output. Typically, only one of the output signals is connected but both may be used.

Equipment that is FM approved for intrinsic safety may be connected to FM approved barriers based on the "Entity Concept". The combination is then intrinsically safe if the FM entity concept is acceptable to the authority having jurisdiction (AHJ) of the installation.

The FM approved barrier must meet the following criterion:

V_{oc} or $U_o \le V_{max}$ or U_i
I_{sc} or $I_o \le I_{max}$ or I_i
C_a or $C_o \ge C_i + C_{cable}$
L_a or $L_o \ge L_i + L_{cable}$
The configuration of the associated apparatus must be FM approved under entity concept

No changes may be made to this drawing without FM approval

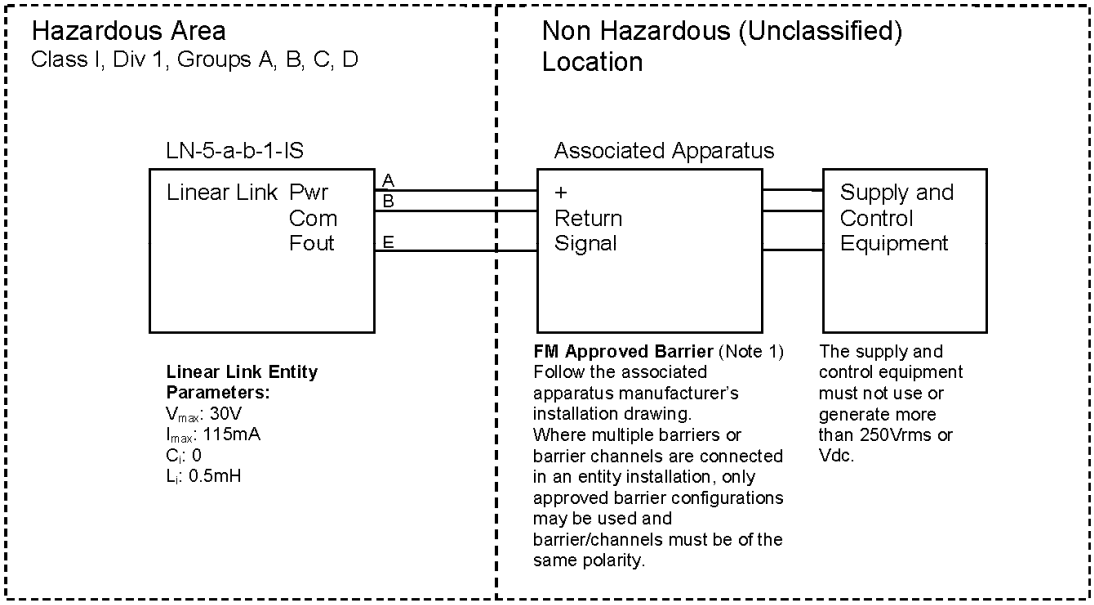
Installation Control Drawing	Last ECO	Date	Approved
	21225	9/27/10	R REED

TITLE: **FM Installation Control Drawing** **Linear Link** **Pulse Out & Current Out**	PREPARED	DATE	APPROVED	DATE
	J. Walker	4/12/2010		

Size	Drawing No.	Rev	
A	76-61827	H	Sheet 5 of 8

SF-69985 Rev A per ECO 20855

LN-5-a-b-1-IS



Notes:

1. The barrier must be approved under the FM entity concept.
2. Installation must be in accordance with ANSI/ISA-RP12-06-01 (Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instruments Part 1: Intrinsic Safety) and the ANSI-NFPA 70 (National Electrical Code)
3. The structure to which the Linear Link is mounted must be at the same earth potential as the barrier earth ground.
4. Supply (Pwr), signal (Vout) and signal (Fout) must be run in individual twisted shielded pairs.
5. The voltage output Linear Link is a 10-30 volt powered device, which outputs 0-10V linear signal and a 0-5V pulse output. The current output Linear Link is a 15-30 volt powered device, which outputs 4-20mA linear signal and a 0-5V pulse output.
   For pulse output only operation, do not connect the Vout or Iout wires.

Equipment that is FM approved for intrinsic safety may be connected to FM approved barriers based on the "Entity Concept". The combination is then intrinsically safe if the FM entity concept is acceptable to the authority having jurisdiction (AHJ) of the installation.

The FM approved barrier must meet the following criterion:

V_{oc} or $U_o \le V_{max}$ or U_i
I_{sc} or $I_o \le I_{max}$ or I_i
C_a or $C_o \ge C_i + C_{cable}$
L_a or $L_o \ge L_i + L_{cable}$
The configuration of the associated apparatus must be FM approved under entity concept

No changes may be made to this drawing without FM approval

Installation Control Drawing	Last ECO	Date	Approved
	21225	9/27/10	R REED

TITLE: **FM Installation Control Drawing** **Linear Link** **Pulse Out**	PREPARED	DATE	APPROVED	DATE
	J. Walker	4/12/2010		
	Size	Drawing No.	Rev	
	A	76-61827	H	Sheet 6 of 8

SF-69985 Rev A per ECO 20855

Appendix C: Declaration of Conformity (Increased Safety)

8930South Beck Avenue, Suite #107, Tempe, Arizona 85284

Phone: (480) 240-3400 **Fax:** (480) 240-3401 Date: June 9, 2009

CE - DECLARATION OF CONFORMITY

Manufacture Name: FTI Flow Technology Inc.

Manufacturer Address: 8930 South Beck Avenue, Suite 107, Tempe, AZ 85284 USA

Type of Equipment: Linearizing Flow Measuring Transmitter

Application of Council Directive: 2004/108/EC

Standards to which Conformity is Declared:

EN 61000-6-2:2005 – Generic standards – Immunity standard for Industrial Environments

EN 61000-6-4:2006 – Generic standards – Emission standard for Industrial Environments

Test Report: d0950009 and EB-69789

Application of Council Directive: ATEX Directive 94/9/EC

Standards to which Conformity is Declared:

FTI declares compliance for Equipment Group II, Category 3, through Annex VIII "Internal Control of Production" to EN 60079-7:2007 Type Protection "e".

Transmitter Model Number: LN-5-x-yz-FCFP

x = A: Magnetic pick-off input
B: Square wave pulse input
C: Modulated carrier pick-off input

yz = MA: 4 – 20mA analog output
V1: 0 – 10 VDC analog output

Junction Box: 73-65658-101, 73-65658-102

Pick-off Part Number: 27-66503-102
27-66503-103
27-32400-102
27-32400-103

Serial Number(s) All Year of First Manufacture 2003

Place Tempe, AZ, USA

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standards, and this Declaration is supported by a Technical File located at the Factory

Ralph Daffill, General Manager
FTI Flow Technology, Inc.

AC-66648-02 Rev F per ECO 20612

Appendix D: Declaration of Conformity (CE Noise Immunity)

8930South Beck Avenue, Suite #107, Tempe, Arizona 85284

Phone: (480) 240-3400 **Fax:** (480) 240-3401 **Date:** June 9, 2009

CE - DECLARATION OF CONFORMITY

Application of Council Directive: 2004/108/EC

Manufacture Name: FTI Flow Technology Inc.

Manufacturer Address: 8930 South Beck Avenue, Suite 107, Tempe, AZ 85284 USA

Type of Equipment: Linearizing Flow Measuring Transmitter

Standards to which Conformity is Declared:

EN 61000-6-2:2005 – Generic standards – Immunity standard for Industrial Environments

EN 61000-6-4:2006 – Generic standards – Emission standard for Industrial Environments

Test Report: d0950009 and EB-69789

Transmitter Model Number: LN-5-x-yzaabbb

x = A: Magnetic pickoff input
B: Square wave pulse input
C: RF carrier pickoff input

yz = MA: 4-20mA analog output
V1: 0-10VDC analog output

aa = -9: Crouse-Hinds EABL36SA
-F: Adalet XIHFCX3
A7: Aluminum enclosure with MS connectors
B6: NEMA 4X
B7: NEMA 4X with MS connectors
BA: NEMA 4X with universal display and MS connectors
BC: NEMA 4X with universal display

bbb = 052: 0-24VDC pulse output, self declared conformant based on previous test results and best engineering judgment.

Serial Numbers: All Year of First Manufacture: 2003

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standards, and this Declaration is supported by a Technical File located at the Factory

Ralph Duffill, General Manager
FTI Flow Technology, Inc.

AC-66648-03 Rev D per ECO 20505