

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

Model ST98 Flowmeter

*Firmware Revisions 2.XX
Doc. No. 06EN003291 Rev. A*

US PATENTS PENDING

Notice of Proprietary Rights

This document contains confidential technical data, including trade secrets and proprietary information which are the property of Fluid Components Intl (FCI).

Disclosure of this data to you is expressly conditioned upon your assent that its use is limited to use within your company only (and does not include manufacture or processing uses). Any other use is strictly prohibited without the prior written consent of FCI.

*© Copyright 1999 Fluid Components Intl
a limited liability company
All Rights Reserved*

CUSTOMER COMMITMENT PLEDGE

We will work closely with our customers to provide the best products and service

- at a competitive value
- on time
- with unquestioned support

in full compliance with our *COMPLETE CUSTOMER COMMITMENT*.

COMMITMENT TO QUALITY

In keeping with the overall commitment of management and employees of Fluid Components Intl to Total Quality Management, the Technical Publications Department expresses its pledge and mission to you, our customer:

“To support the creation and publication of world-class technical material which is technically accurate and practical, concise and user-friendly, attractive and professional in appearance, and consistent in form, format, content, and style.”

QUALITY IMPROVEMENT

We appreciate your comments and suggestions which support our effort to constantly improve our product and services. Please address comments and suggestions to your nearest field representative or in-house technical support representative. Thank you.

FCI Technical Publications Department

CUSTOMER SERVICE/TECHNICAL SUPPORT

FCI provides full in-house technical support. Additional technical representation is also provided by FCI field representatives. Before contacting a field or in-house representative, please perform the troubleshooting techniques outlined in this document.

By Mail

Fluid Components Intl
1755 La Costa Meadows Dr.
San Marcos, CA 92069
Attn: Customer Service Department

By Phone

Contact the area FCI regional representative. If a field representative is unable to be contacted or if a situation is unable to be resolved, contact the FCI Customer Service Department toll free at 1 (800) 854-1993.

By Fax

To describe problems in a graphical or pictorial manner, send a fax including a phone or fax number to the regional representative. Again, FCI is available by facsimile if all possibilities have been exhausted with the authorized factory representative. Our fax number is 1 (760) 736-6250; it is available 7 days a week, 24 hours a day.

By E-Mail

FCI Customer Service can be contacted by e-mail at: sales_technical_support@fluidcomponents.com.

Describe the problem in detail making sure a telephone number and best time to be contacted is stated in the e-mail.

International Support

For product information or product support outside the contiguous United States, Alaska, or Hawaii, contact your country's FCI International Representative or the one nearest to you. See the list on the following pages.

After Hours Support

For product information visit FCI's Worldwide Web at www.fluidcomponents.com. For product support call 1 (800) 854-1993 and follow the prerecorded instructions. A person from the Technical Support Staff will be paged and promptly return the call.

Appendix C contains a detailed explanation of the FCI customer service policy on returns, adjustments, in-field or factory repair, in- or out-of-warranty.

REVISIONS

REV.	DESCRIPTION	DATE	AUTHOR
-	INITIAL RELEASE	08/05/99	ROY SANDERS
A	See Change Bars. Major changes are due to new 2.xx Software and Revised circuit boards to Rev. A or Later.	03/01/00	ROY SANDERS

Contents

1. General Information	
Description	1 - 1
Theory of Operation	1 - 1
Insertion Sensing Element	1 - 1
In-Line Sensing Element	1 - 2
Transmitter Electronics	1 - 2
Instrument Configuration	1 - 2
Technical Specifications	1 - 3
Quick Start Menu (Abbreviated)	1 - 4
2. Installation	
Receiving/Inspection	2 - 1
Packing/Shipping>Returns	2 - 1
Factory Calibration Note	2 - 1
Pre-Installation Procedure	2 - 1
Use Standard ESD Precautions	2 - 1
Prepare or Verify Flow Element Location	2 - 2
Verify Dimensions	2 - 2
Verify Flow Direction for Flow Element Orientation and Placement	2 - 2
Verify The Serial Number Of The Flow Element and the Electronics	2 - 2
Install Insertion Flow Element	2 - 3
Compression Fitting Mounting	2 - 3
NPT Pipe Thread Mounting	2 - 3
Flanged Ferrule Mounting	2 - 3
In-Line Mounting	2 - 4
Install Flow Transmitter	2 - 4
Minimum Wire Size	2 - 5
Aluminum Enclosure Installation	2 - 5
Carbon Steel Enclosure Installation	2 - 7
Remote Hardware Location	2 - 8
Wiring the In-Line Flow Element	2 - 8
Serial Communication	2 - 9
Remote Enclosure Bracket Installation	2 - 10
Apply Power	2 - 10
3. Operation	
Introduction	3 - 1
Start Up	3 - 1
Using an FC88 Communicator	3 - 1
Menu Control and Organization	3 - 1
Quick Start Menu	3 - 3
Detailed Menu Description	3 - 4
Using Procomm Software	3 - 16
4. Maintenance	
Maintenance	4 - 1
Calibration	4 - 1
Electrical Connections	4 - 1
Remote Enclosure	4 - 1
Electrical Wiring	4 - 1
Flow Element Connections	4 - 1
Flow Element Assembly	4 - 1
5. Troubleshooting	
Quick Check	5 - 1
General Function Check	5 - 1
Tools Needed - General Function Check -	5 - 1
NAMUR Fault Indicaton	5 - 1
Application Verification	5 - 3

Equipment Needed	5 - 3
Check Serial Numbers	5 - 3
Check the Instrument Installation	5 - 3
Check for Moisture	5 - 3
Check Application Design Requirements	5 - 3
Verify Standard Versus Actual Process Conditions	5 - 3
Verify the Calibration Parameters	5 - 4
Check the Hardware	5 - 5
Equipment Required	5 - 5
Troubleshooting the Flow Element	5 - 5
Check the Flow Element Voltages	5 - 6
Verification Of The Electronics	5 - 7
Check the Flow Transmitter Voltages	5 - 7
Transmitter Circuit Calibration Check	5 - 7
Instrument Output Check	5 - 8
Spares	5 - 8
Defective Parts	5 - 9
Customer Service	5 - 9
Appendix A. Drawings	
Outline Drawings and Wiring Diagrams	A - 1
Appendix B. Glossary	
Abbreviations and Explanation of Terms	B - 1
Appendix C. Customer Service	
Policy and Procedures	C - 1

Figures

Figure 1-1. View of the Sensing Element	1 - 1
Figure 1-2. Cut-Away View of the In-Line Flow Element Tube	1 - 2
Figure 2-1. Model ST98 Insertion Flow Element Showing Orientation	2 - 2
Figure 2-2. Model ST98 In-Line Butt Weld Mount	2 - 4
Figure 2-3. Circuit Board Placement	2 - 6
Figure 2-4. Customer Connection Board	2 - 6
Figure 2-5. Remote Wiring Diagram	2 - 7
Figure 2-6. Optional Carbon Steel Enclosure	2 - 8
Figure 2-7. Wiring Diagram, DB-9 and DB-25 PC Connectors.	2 - 9
Figure 2-8. Remote Bracket Installation	2 - 10
Figure 3-1. Menu Selections Chart	3 - 2
Figure 5-1. Component Identification	5 - 5
Figure 5-2. TS2 Connector Plug	5 - 5
Figure 5-3. Terminal Block In Local Enclosure	5 - 5
Figure 5-4. Decade Box Connections	5 - 8
Figure A-1. Local Enclosure, NEMA Type 4X and Hazardous Location	A - 1
Figure A-2. Remote Aluminum Double Ended Enclosure NEMA 4X and Hazardous Location	A - 1
Figure A-3. Remote or Local Enclosure, Carbon Steel NEMA Type 4X, and Div 2	A - 2
Figure A-4. 3/4 Inch Ferrule NPT Process Connection	A - 3
Figure A-5. 3/4 Inch Ferrule NPT With Flange Process Connection	A - 3

Figure A-6. In-Line Flanged Process Connection A - 3
 Figure A-7. In-Line NPT Process Connection A - 4
 Figure A-8. Integral Option Wiring Diagram A - 4
 Figure A-9. Remote Wiring Diagram A - 4
 Figure A-10. Wiring Diagram Between Circuit Boards A - 5
 Figure A-11. Optional Display Ribbon Cable Conneciton A - 5
 Figure A-12. Remote Mounting Bracket A - 5

Tables

Table 1-1. Quick Start Menu 1 - 4
 Table 2-1. Maximum AWG Number 2 - 5
 Table 3-1. Quick Start Menu 3 - 3
 Table 5-1. NAMUR Fault Listing 5 - 2
 Table 5-2. Diagnostic Test Sequence on Display 5 - 4
 Table 5-3. Flow Element Resistance at TS2 or Local Terminal Block 5 - 6
 Table 5-4. Resistance Versus Wire Size 5 - 6
 Table 5-5. Approximate Flow Element Voltages at 70°F 5 - 6
 Table 5-6. Instrument Voltages 5 - 7

Symbols

The following symbols are used throughout the manual to draw attention to items or procedures that require special notice or care.



Caution: Warns of possible **personal danger** to those handling the equipment.



Alert: May cause possible **equipment damage**.



Note: Contains important information.

