

Table of Contents

| | |
|--|----|
| Preface..... | 7 |
| Introduction..... | 9 |
| 1. Scope 11 | |
| 1.1 Features Tested..... | 11 |
| 1.2 Features Not Tested..... | 11 |
| 2. References | 12 |
| 2.1 The HART-Field Communications Protocol Specifications..... | 12 |
| 2.2 Other HCF Documents..... | 12 |
| 2.3 Related Documents | 12 |
| 3. Definitions..... | 12 |
| 4. Symbols/Abbreviations..... | 13 |
| 5. Approach | 14 |
| 5.1 Testing Sequence..... | 15 |
| 5.2 Conventions | 15 |
| 5.3 Comparing Floating-Point Numbers | 16 |
| 6. Deliverables..... | 17 |
| 7. Test Definitions | 18 |
| 7.1 CAL000 Check for Common Practice Commands..... | 18 |
| 7.2 CAL001 Verify Write Protect..... | 21 |
| 7.3 CAL033 Read Device Variables..... | 43 |
| 7.4 CAL034 Write Primary Variable Damping Value..... | 46 |
| 7.5 CAL035 Write Primary Variable Range Values | 50 |
| 7.6 CAL036 Set Primary Variable Upper Range Value | 57 |
| 7.7 CAL037 Set Primary Variable Lower Range Value..... | 60 |
| 7.8 CAL039 (Reserved) | 63 |
| 7.9 CAL040 Enter/Exit Fixed Current Mode..... | 64 |
| 7.10 CAL041 Perform Self Test | 67 |
| 7.11 CAL042 Perform Device Reset..... | 68 |
| 7.12 CAL043 Set Primary Variable Zero..... | 70 |
| 7.13 CAL044 Write Primary Variable Units..... | 72 |

| | | |
|------|---|-----|
| 7.14 | CAL045 Trim Loop Current Zero..... | 75 |
| 7.15 | CAL046 Trim Loop Current Gain..... | 78 |
| 7.16 | CAL047 Write Primary Variable Transfer Function..... | 81 |
| 7.17 | CAL049 Write Primary Variable Transducer Serial Number..... | 83 |
| 7.18 | CAL050 Read Dynamic Variable Assignments..... | 85 |
| 7.19 | CAL051 Write Dynamic Variable Assignments..... | 86 |
| 7.20 | CAL052 Set Device Variable Zero..... | 90 |
| 7.21 | CAL053 Write Device Variable Units..... | 93 |
| 7.22 | CAL054 Read Device Variable Information..... | 96 |
| 7.23 | CAL055 Write Device Variable Damping Value..... | 98 |
| 7.24 | CAL056 Write Device Variable Transducer Serial Number..... | 103 |
| 7.25 | CAL057 (Reserved)..... | 106 |
| 7.26 | CAL058 (Reserved)..... | 106 |
| 7.27 | CAL059 (Reserved)..... | 106 |
| 7.28 | CAL060 Read Analog Channel And Percent Of Range..... | 107 |
| 7.29 | CAL061 (Reserved)..... | 108 |
| 7.30 | CAL062 Read Analog Channels..... | 109 |
| 7.31 | CAL063 Read Analog Channel Information..... | 110 |
| 7.32 | CAL064 Write Analog Channel Additional Damping Value..... | 111 |
| 7.33 | CAL065 Write Analog Channel Range Values..... | 116 |
| 7.34 | CAL066 Enter/Exit Fixed Analog Channel Mode..... | 124 |
| 7.35 | CAL067 Trim Analog Channel Zero..... | 128 |
| 7.36 | CAL068 Trim Analog Channel Gain..... | 132 |
| 7.37 | CAL069 Write Analog Channel Transfer Function..... | 136 |
| 7.38 | CAL070 Read Analog Channel Endpoint Values..... | 139 |
| 7.39 | CAL071 Lock Device..... | 140 |
| 7.40 | CAL072 Squawk..... | 147 |
| 7.41 | CAL073 Find Device..... | 148 |
| 7.42 | CAL074 Verify I/O System Commands..... | 150 |
| 7.43 | CAL078 Command Aggregation..... | 161 |
| 7.44 | CAL079 Write Device Variable..... | 163 |
| 7.45 | CAL080 Verify Device Variable Trim Commands..... | 166 |

| | | |
|----------|--|-----|
| 7.46 | CAL091 Trending | 172 |
| 7.47 | CAL101 I/O Subsystem Burst Mode | 182 |
| 7.48 | CAL107 (Reserved) | 189 |
| 7.49 | CAL108 (Reserved) | 189 |
| 7.50 | CAL109 (Reserved) | 189 |
| 7.51 | CAL110 (Reserved) | 189 |
| 7.52 | CAL115 Event Notification | 190 |
| 7.53 | CAL512 Country Code | 203 |
| ANNEX A. | Reusable Test Procedure Definitions | 205 |
| A.1 | CheckCommandImplemented (Cmd) | 205 |
| A.2 | CheckForRecommendedCommand (Cmd) | 205 |
| A.3 | CompareAnalogChannelValue(aChan, aValue, failurepoint) | 205 |
| A.4 | FindNextAnalogChannel(aChan) | 205 |
| A.5 | FindNextDeviceVariable(dVar) | 206 |
| A.6 | IdentifyDevice () | 207 |
| A.7 | ReadPV() | 207 |
| A.8 | TestValidFrame () | 208 |
| A.9 | VerifyLoopCurrent(v, failurepoint) | 208 |
| A.10 | VerifyNotWriteProtected() | 208 |
| A.11 | VerifyRangeAndPV(lrv, urv, units, PV, failurepoint) | 209 |
| A.12 | VerifyResponseAndByteCount(r, b) | 209 |
| A.13 | VerifyAssociatedCommands(Cmd[0], Cmd[1], Cmd[2]...) | 210 |
| ANNEX B. | Failure Point Cross Reference | 211 |
| ANNEX C. | Test Report | 214 |
| ANNEX D. | Revision History | 218 |
| D.1 | Changes from Revision 3.0 to 4.0 | 218 |
| D.2 | Changes from Revision 2.0 to 3.0 | 219 |
| D.3 | Changes from Revision 1.0 to 2.0 | 220 |