

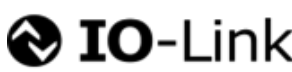
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| IO-Link Implementation |         |   |
|------------------------|---------|---|
| Vendor ID              |         | 234 (0x00EA)  |
| Device ID              | VSi V   | 100610 (0x018902)   |
|                        | VSi P10 | 100611 (0x018903)   |
|                        | VSi VP8 | 100613 (0x018905)   |
| SIO-Mode               |         | Yes   |
| IO-Link Revision       |         | 1.1 (compatible with 1.0)   |
| IO-Link Profile        |         | Smart Sensor Profile with 2 Binary Data Channels, 1 Process Data Variable, Teach-In and Diagnosis |
| IO-Link Bitrate        |         | 38.4 kBit/sec (COM2)  |
| Minimum Cycle Time     |         | 2.3 ms  |
| Process Data Input     |         | 2 bytes   |
| Process Data Output    |         | None  |

| Process Data       |                     |       |  |        |  |   |
|--------------------|---------------------|-------|--|--------|--|---|
| Process Data Input | Name                | Bits  | Data Type  | Access | Special Values   | Remark  |
| PD In Byte 0       | Vacuum in mbar, MSB | 7...0 | VSi V: 14-bit unsigned integer<br>VSi P10: 14-bit unsigned integer<br>VSi VP8: 14-bit signed integer | ro     | VSi V: 10000 = Overflow, 16383 = Underflow (pressure)<br>VSi P10: 10000 = Overflow, 16383 = Underflow (vacuum)<br>VSi VP8: 8191 = Overflow P, -8192 = Overflow V | Most significant 8 bits of sensor measurement value (mbar)  |
| PD In Byte 1       | Vacuum in mbar, LSB | 7...2 |  |        |  | Least significant 6 bits of sensor measurement value (mbar) |
|                    | Switching Point 2   | 1     | Boolean  | ro     |  | Logic state of switch point 2                               |
|                    | Switching Point 1   | 0     | Boolean  | ro     |  | Logic state of switch point 1                               |

| ISDU Parameters     |        |          |                    |                                    |              |  |        |                                  |   |
|---------------------|--------|----------|--------------------|------------------------------------|--------------|--|--------|----------------------------------|---|
| ISDU Index          |        | Subindex | Display Appearance | Parameter                          | Size         | Value Range  | Access | Default Value                    | Remark  |
| dec                 | hex    | dec      |                    |                                    |              |  |        |                                  |   |
| Identification      |        |          |                    |                                    |              |  |        |                                  |   |
| Device Management   |        |          |                    |                                    |              |  |        |                                  |   |
| 16                  | 0x0010 | 0        |                    | Vendor Name                        | 1...32 bytes |  | ro     | J. Schmalz GmbH                  | Manufacturer designation  |
| 17                  | 0x0011 | 0        |                    | Vendor Text                        | 1...32 bytes |  | ro     | www.schmalz.com                  | Internet address  |
| 18                  | 0x0012 | 0        |                    | Product Name                       | 1...32 bytes |  | ro     | VSi / VSi-D                      | General product name  |
| 19                  | 0x0013 | 0        |                    | Product ID                         | 1...32 bytes |  | ro     | VSi / VSi-D                      | Product variant name  |
| 20                  | 0x0014 | 0        |                    | Product Text                       | 1...32 bytes |  | ro     | VSi V M12-4                      | Order-code  |
| 21                  | 0x0015 | 0        | Snr                | Serial Number                      | 9 bytes      |  | ro     | 000000001                        | Serial number   |
| 22                  | 0x0016 | 0        |                    | Hardware Revision                  | 2 bytes      |  | ro     | 00                               | Hardware revision   |
| 23                  | 0x0017 | 0        | SoC                | Firmware Revision                  | 4 bytes      |  | ro     | 1.11                             | Firmware revision   |
| 240                 | 0x00F0 | 0        |                    | Unique ID                          | 20 bytes     |  | ro     |                                  | Unique device identification number   |
| 241                 | 0x00F1 | 0        |                    | Device Features                    | 11 bytes     |  | ro     |                                  | Type code of device features (see IODD)   |
| 250                 | 0x00FA | 0        | Art                | Article Number                     | 14 bytes     |  | ro     | 10.06.02.*                       | Order-number  |
| 251                 | 0x00FB | 0        |                    | Article Revision                   | 2 bytes      |  | ro     | 00                               | Article revision  |
| 252                 | 0x00FC | 0        |                    | Production Date                    | 3 bytes      |  | ro     |                                  | Date code of production (month, year)   |
| 254                 | 0x00FE | 0        |                    | Detailed Product Text              | 1...64 bytes |  | ro     | VSi V M12-4                      | Detailed type description of the device   |
| Device Localization |        |          |                    |                                    |              |  |        |                                  |   |
| 24                  | 0x0018 | 0        |                    | Application Specific Tag           | 1...32 bytes |  | rw     | ***                              | User string to store location or tooling information  |
| 242                 | 0x00F2 | 0        |                    | Equipment Identification           | 1...64 bytes |  | rw     | ***                              | User string to store identification name from schematic   |
| 246                 | 0x00F6 | 0        |                    | Geolocation                        | 1...64 bytes |  | rw     | ***                              | User string to store geolocation from handheld device   |
| 247                 | 0x00F7 | 0        |                    | IODD Web Link                      | 1...64 bytes |  | rw     | ***                              | User string to store web link to IODD file  |
| 248                 | 0x00F8 | 0        |                    | NFC Web Link                       | 1...64 bytes |  | rw     | https://myproduct.schmalz.com/#/ | Web link to NFC app (base URL for NFC tag)  |
| 249                 | 0x00F9 | 0        |                    | Storage Location                   | 1...32 bytes |  | rw     | ***                              | User string to store storage location   |
| 253                 | 0x00FD | 0        |                    | Installation Date                  | 1...16 bytes |  | rw     | ***                              | User string to store date of installation   |
| Parameter           |        |          |                    |                                    |              |  |        |                                  |   |
| Device Settings     |        |          |                    |                                    |              |  |        |                                  |   |
| Commands            |        |          |                    |                                    |              |  |        |                                  |   |
| 2                   | 0x0002 | 0        |                    | System Command                     | 1 byte       | 5, 65, 130, 165, 66, 167, 168, 169   | wo     |                                  | 0x05 (dec 5): Force upload of parameter data into the master<br>0x41 (dec 65): Execute single-value teach for currently selected SPx<br>0x82 (dec 130): Restore device parameters to factory defaults<br>0xA5 (dec 165): Calibrate sensor<br>0xA7 (dec 167): Reset erasable counters ct1 and ct2<br>0xA8 (dec 168): Reset voltage HI/LO<br>0xA9 (dec 169): Reset sensor HI/LO |
| 58                  | 0x003A | 0        |                    | Teach-In Channel                   | 1 byte       | 1, 2   | rw     | 1                                | Select switch point 1 or 2 for teaching   |
| 59                  | 0x003B | 0        |                    | Teach-In Status                    | 1 byte       |  | ro     |                                  | Result of last teach-in command:<br>0x00 = Channel changed<br>0x07 = Teach-in failed<br>0x11 = Teach-in successful  |
| Access Control      |        |          |                    |                                    |              |  |        |                                  |   |
| 12                  | 0x000C | 0        |                    | Device Access Locks                | 2 bytes      | 0 - 7  | rw     | 0                                | Bit 0: Parameter access lock (lock ISDU-write access)<br>Bit 1: Data storage lock<br>Bit 2: Local parameterization lock (lock menu editing)   |
| 90                  | 0x005A | 0        |                    | Extended Device Access Locks       | 1 byte       | 0 - 3  | rw     | 0                                | Bit 0: NFC write lock<br>Bit 1: NFC disable   |
| 77                  | 0x004D | 0        | Pin                | Menu PIN code                      | 2 bytes      | 0 - 999  | rw     | 0                                | 0 = Menu editing unlocked<br>>0 = Menu editing locked with pin-code   |
| 91                  | 0x005B | 0        |                    | NFC PIN code                       | 2 bytes      | 0 - 999  | rw     | 0                                | Pass code for writing data from NFC app   |
| Initial Settings    |        |          |                    |                                    |              |  |        |                                  |   |
| 73                  | 0x0049 | 0        | P-n                | Signal Type                        | 1 byte       | 0 - 1  | rw     | 0                                | 0 = PNP<br>1 = NPN  |
| 74                  | 0x004A | 0        | uni                | Display Unit                       | 1 byte       | 0 - 3  | rw     | 0                                | 0 = mbar<br>1 = kPa<br>2 = inHg<br>3 = psi  |
| 76                  | 0x004C | 0        | Eco                | Eco-Mode                           | 1 byte       | 0 - 2  | rw     | 0                                | 0 = off<br>1 = on (full eco mode with display switching off completely)<br>2 = Lo (medium eco mode with display dimmed to 50%)  |
| 79                  | 0x004F | 0        | dIS                | Display Rotation                   | 1 byte       | 0 - 1  | rw     | 0                                | 0 = Standard<br>1 = Rotated   |
| Process Settings    |        |          |                    |                                    |              |  |        |                                  |   |
| Switch Point 1      |        |          |                    |                                    |              |  |        |                                  |   |
| 60                  | 0x003C | 1        | SP1/FH1            | Switch Point 1 - Upper Threshold   | 2 bytes      | V: 999 >= SP1 > rP1<br>999 >= FH1 > FL1+Hy1<br>P: 9999 >= SP1 > rP1<br>9999 >= FH1 > FL1+Hy1<br>VP: 8000 >= SP1 > rP1<br>8000 >= FH1 > FL1+Hy1 | rw     | V: 750<br>P: 5500<br>VP: -750    | Unit mbar   |
| 60                  | 0x003C | 2        | rP1/FL1            | Switch Point 1 - Lower Threshold   | 2 bytes      | V: rP1/FL1 >= 0<br>P: rP1/FL1 >= 0<br>VP: rP1/FL1 >= -999  | rw     | V: 600<br>P: 5000<br>VP: -600    | Unit mbar   |
| 61                  | 0x003D | 1        | Ou1                | Switch Point 1 - Logic             | 1 byte       | 0 - 1  | rw     | 0                                | 0 = NO<br>1 = NC  |
| 61                  | 0x003D | 2        | Ou1                | Switch Point 1 - Mode              | 1 byte       | 2, 3, 128, 129   | rw     | 3                                | 2 = Window Mode<br>3 = Two-Point Mode<br>128 = Condition Monitoring (not for VSi P10)<br>129 = Diagnostic Mode  |
| 61                  | 0x003D | 3        | Hy1                | Switch Point 1 - Window Hysteresis | 2 bytes      | 0 <= Hy1 <= FH1-FL1<br>V: Hy1 < 999<br>P: Hy1 < 9999<br>VP: Hy1 < 8000   | rw     | V: 20<br>P: 100<br>VP: 20        | Unit mbar   |
| 75                  | 0x004B | 1        | dS1                | Switch Point 1 - Switch-on delay   | 2 bytes      | 0 - 999  | rw     | 0                                | Unit ms   |
| 75                  | 0x004B | 2        | dr1                | Switch Point 1 - Switch-off delay  | 2 bytes      | 0 - 999  | rw     | 0                                | Unit ms   |
| Switch Point 2      |        |          |                    |                                    |              |  |        |                                  |   |



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|                           |        |      |         |                                    |              |   |    |                               |  |
|---------------------------|--------|------|---------|------------------------------------|--------------|---|----|-------------------------------|--|
| 62                        | 0x003E | 1    | SP2/FH2 | Switch Point 2 - Upper Threshold   | 2 bytes      | V: 999 >= SP2 > rP2<br>999 >= FH2 > FL2+Hy2<br>P: 9999 >= SP2 > rP2<br>9999 >= FH2 > FL2+Hy2<br>VP: 8000 >= SP2 > rP2<br>8000 >= FH2 >FL2+Hy2 | rw | V: 550<br>P: 5000<br>VP: 5500 | Unit mbar  |
| 62                        | 0x003E | 2    | rP2/FL2 | Switch Point 2 - Lower Threshold   | 2 bytes      | V: rP2/FL2 >= 0<br>P: rP2/FL2 >= 0<br>VP: rP2/FL2 >= -999   | rw | V: 500<br>P: 4500<br>VP: 5000 | Unit mbar  |
| 63                        | 0x003F | 1    | Ou2     | Switch Point 2 - Logic             | 1 byte       | 0 - 1   | rw | 0                             | 0 = NO<br>1 = NC   |
| 63                        | 0x003F | 2    | Ou2     | Switch Point 2 - Mode              | 1 byte       | 2, 3, 128, 129  | rw | 3                             | 2 = Window Mode<br>3 = Two-Point Mode<br>128 = Condition Monitoring (not for VSi P10)<br>129 = Diagnostic Mode   |
| 63                        | 0x003F | 3    | Hy2     | Switch Point 2 - Window Hysteresis | 2 bytes      | 0 <= Hy2 <= FH2-FL2<br>V: Hy2 < 999<br>P: Hy2 < 9999<br>VP: Hy2 < 8000  | rw | V: 20<br>P: 100<br>VP: 20     | Unit mbar  |
| 80                        | 0x0050 | 1    | dS2     | Switch Point 2 - Switch-on delay   | 2 bytes      | 0 - 999   | rw | 0                             | Unit ms  |
| 80                        | 0x0050 | 2    | dr2     | Switch Point 2 - Switch-off delay  | 2 bytes      | 0 - 999   | rw | 0                             | Unit ms  |
| Condition Monitoring [CM] |        |      |         |                                    |              |   |    |                               |  |
| 108                       | 0x006C | 0    | -L-     | Permissible Leakage Rate           | 2 bytes      | 0 - 999   | rw | 200                           | Unit mbar/sec  |
| Observation               |        |      |         |                                    |              |   |    |                               |  |
| Monitoring                |        |      |         |                                    |              |   |    |                               |  |
| Process Data              |        |      |         |                                    |              |   |    |                               |  |
| 40                        | 0x0028 | 0    |         | Process Data In Copy               | 2 bytes      |   | ro |                               | Copy of currently active process data input  |
| 64                        | 0x0040 | 1    |         | Sensor Value                       | 2 bytes      |   | ro |                               | Actual sensor value  |
| 64                        | 0x0040 | 2    |         | Sensor Value LO                    | 2 bytes      |   | ro |                               | Lowest measured sensor value since power-up  |
| 64                        | 0x0040 | 3    |         | Sensor Value HI                    | 2 bytes      |   | ro |                               | Highest measured sensor value since power-up   |
| 66                        | 0x0042 | 1    |         | Supply Voltage                     | 2 bytes      |   | ro |                               | Supply voltage as measured by the device (unit: 0.1 Volt)  |
| 66                        | 0x0042 | 2    |         | Supply Voltage LO                  | 2 bytes      |   | ro |                               | Lowest measured supply voltage since power-up  |
| 66                        | 0x0042 | 3    |         | Supply Voltage HI                  | 2 bytes      |   | ro |                               | Highest measured supply voltage since power-up   |
| Communication Mode        |        |      |         |                                    |              |   |    |                               |  |
| 564                       | 0x0234 | 0    |         | Communication Mode                 | 1 byte       |   | ro |                               | 0x00 = SIO mode<br>0x10 = IO-Link revision 1.0 (set by master)<br>0x11 = IO-Link revision 1.1 (set by master)  |
| Counters                  |        |      |         |                                    |              |   |    |                               |  |
| 140                       | 0x008C | 0    | cc1     | Counter cc1                        | 4 bytes      |   | ro |                               | Switch-on counter for switch point 1 (non-erasable)  |
| 141                       | 0x008D | 0    | cc2     | Counter cc2                        | 4 bytes      |   | ro |                               | Switch-on counter for switch point 2 (non-erasable)  |
| 143                       | 0x008F | 0    | ct1     | Counter ct1                        | 4 bytes      |   | ro |                               | Switch-on counter for switch point 1 (erasable)  |
| 144                       | 0x0090 | 0    | ct2     | Counter ct2                        | 4 bytes      |   | ro |                               | Switch-on counter for switch point 2 (erasable)  |
| Diagnosis                 |        |      |         |                                    |              |   |    |                               |  |
| Device Status             |        |      |         |                                    |              |   |    |                               |  |
| 32                        | 0x0020 | 0    |         | Error Count                        | 2 bytes      |   | ro |                               | Number of errors since last power-up   |
| 36                        | 0x0024 | 0    |         | IO-Link Device Status              | 1 byte       |   | ro |                               | 0 = Device is operating properly<br>1 = Maintenance required<br>2 = Out of specification<br>3 = Functional check<br>4 = Failure  |
| 37                        | 0x0025 | 1-15 |         | Detailed Device Status             | 15 x 3 bytes |   | ro |                               | Information about currently pending events<br>Fixed-length array format according to IO-Link specification V1.1  |
| 130                       | 0x0082 | 0    |         | Active Error Code                  | 1 byte       |   | ro |                               | 0 = No error<br>1-99 = Error code displayed by the device  |
| 138                       | 0x008A | 1    |         | Extended Device Status - Type      | 1 byte       |   | ro |                               | Type code of active device status (see below)  |
| 138                       | 0x008A | 2    |         | Extended Device Status - ID        | 2 bytes      |   | ro |                               | ID code of active device status (see below)  |
| 139                       | 0x008B | 0    |         | NFC Status                         | 1 byte       |   | ro |                               | Result of recent NFC activity:<br>0x00: Data valid, write finished successfully<br>0x23: Write failed: Write access locked<br>0x30: Write failed: parameter(s) out of range<br>0x41: Write failed: parameter set inconsistent<br>0xA1: Write failed :invalid authorisation<br>0xA2: NFC not available<br>0xA3: Write failed: invalid data structure<br>0xA5: Write pending<br>0xA6: NFC internal error |
| Condition Monitoring [CM] |        |      |         |                                    |              |   |    |                               |  |
| 146                       | 0x0092 | 0    |         | Condition Monitoring               | 1 byte       |   | ro |                               | Bit 2: Leakage rate above limit -L- (not for VSi P10)<br>Bit 5: Primary voltage US outside of optimal range  |
| 160                       | 0x00A0 | 0    |         | Actual Leakage Rate                | 2 bytes      |   | ro |                               | Leakage rate, unit mbar/sec (not for VSi P10)  |

Parameter ISDU 138 - Extended Device Status

| Type | ID     | Type Color | Type Text                | Status Text  |
|------|--------|------------|--------------------------|--|
| 0x10 | 0x0000 | Green      | Everything OK            | Everything OK  |
| 0x21 | 0x0002 | Yellow     | Warning lower            | Leakage rate above limit                             |
| 0x22 | 0x0007 | Yellow     | Warning upper            | Primary supply voltage US outside of operating range |
| 0x22 | 0x000A | Yellow     | Warning upper            | Sensor calibration failed                            |
| 0x22 | 0x0017 | Yellow     | Warning upper            | Teach-In failed                                      |
| 0x41 | 0x000C | Orange     | Critical condition lower | Overload OUT1  |
| 0x41 | 0x000D | Orange     | Critical condition lower | Overload OUT2  |
| 0x41 | 0x0015 | Orange     | Critical condition lower | Overtemperature                                      |
| 0x42 | 0x0010 | Orange     | Critical condition upper | Primary supply voltage US too low                    |
| 0x42 | 0x0011 | Orange     | Critical condition upper | Primary supply voltage US too high                   |
| 0x42 | 0x0016 | Orange     | Critical condition upper | IO-Link communication interruption                   |
| 0x81 | 0x0000 | Red        | Defect lower             | Internal parameter data invalid                      |

Implemented IO-Link Events

| Event code |        | Event name                          | Event type   | Remark  |
|------------|--------|-------------------------------------|--------------|---|
| dec        | hex    |                                     |              |   |
| 4096       | 0x1000 | General malfunction                 | Error        | Error in internal data (E01)  |
| 16384      | 0x4000 | Overtemperature                     | Error        | Overtemperature in electronic circuit (E19)                             |
| 20736      | 0x5100 | General power supply fault          | Error        | Primary supply voltage US too low (E07)                                 |
| 20752      | 0x5110 | Primary supply voltage over-run     | Warning      | Primary supply voltage US too high (E17)                                |
| 30480      | 0x7710 | Short circuit                       | Error        | Overload or short circuit at one or more outputs (E11 and/or E12)       |
| 35872      | 0x8C20 | Measurement range over-run          | Error        | Overflow of sensor value, invalid measurement                           |
| 6144       | 0x1800 | Calibration OK                      | Notification | Calibration offset 0 set successfully                                   |
| 6145       | 0x1801 | Calibration failed                  | Notification | Sensor value too high or too low, offset not changed (E03)              |
| 6149       | 0x1805 | Teach-In completed successfully     | Notification | New values taught for SPx, rPx or FHx, FLx, hyx                         |
| 6150       | 0x1806 | Teach-In command failed             | Notification | Sensor value over-run, SPx not changed (E20)                            |
| 6153       | 0x1809 | Leakage rate above limit            | Warning      | Condition Monitoring: leakage rate above limit                          |
| 6156       | 0x180C | Primary supply voltage out of range | Warning      | Condition Monitoring: primary supply voltage US outside operating range |