

V1/4 5 VFL.0 /-V-I4M020

| | |
|-------------|---|
| Vendor ID | 348 / 0x015C |
| Vendor Name | HYDAC FILTERTECHNIK GMBH |
| Vendor Text | Justus-von-Liebig-Str., D-66280 Sulzbach/Saar |
| Vendor URL | http://www.hydac.com |
| Device ID | 9287420 / 0x8DB6FC |


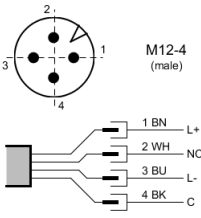
Communication

| | |
|--------------------|-------|
| IO - Link Revision | V1.1 |
| Bitrate | COM2 |
| Minimum Cycle Time | 10 ms |
| SIO Mode supported | no |

Features

| | |
|-----------------|--|
| Block Parameter | yes |
| Data Storage | yes |
| Profiles | 16384 / 0x4000 (Common Application Profile: Identification & Diagnosis) |
| Access Locks | Parameter: no Data Storage: yes Local Parameterization: no Local User Interface: no |

Device Variant

| | |
|---|---|
|   | 928742 |
| | V1/4 5 VFL.0 /-V-I4M020 |
| | Virtual Fluid Lab (VFL) for remaining life time calculation with IO-Link interface. |

Process Data

| Process Data In | | | | | | |
|---------------------------|---|----------|--------|-----------|--------|----------------|
| Name | Description | Subindex | Offset | Data Type | Length | Allowed Values |
| VFL | | 0 | | RecordT | 96 Bit | |
| Remaining Life Time | Remaining life time in h with 1 decimal place. | 1 | 64 Bit | UIntegerT | 32 Bit | |
| Operating Hours | Operating hours in h with 1 decimal place. | 2 | 32 Bit | UIntegerT | 32 Bit | |
| Error | Calculation inactive or disabled. See device status for details. | 3 | 5 Bit | BooleanT | 1 Bit | |
| Temperature Not Available | Temperature not available. Calculation uses reference temperature (40 °C). | 4 | 4 Bit | BooleanT | 1 Bit | |
| Filter Full | Filter full. | 5 | 3 Bit | BooleanT | 1 Bit | |
| Temperature Out Of Range | Temperature below temperature threshold or above maximum temperature (120 °C). No calculation done. | 6 | 2 Bit | BooleanT | 1 Bit | |
| Pressure Low | Pressure below pressure threshold. No calculation done. | 7 | 1 Bit | BooleanT | 1 Bit | |
| Initialization | Calculation in initialization phase. | 8 | 0 Bit | BooleanT | 1 Bit | |
| Process Data Out | | | | | | |
| Name | Description | Subindex | Offset | Data Type | Length | Allowed Values |
| Temperature | | 0 | | IntegerT | 16 Bit | |

Variables

| Name | Description | Index | Subindex | Offset | Data Type | Length | Access Rights | Default | Allowed Values |
|-----------------------------------|--|-----------------|----------|---------|----------------|----------------|---------------|---------|----------------|
| Direct Parameters - Page 1 | Comprises the required parameters defining the communication characteristics and identifiers for device validation. | 0x00 (0) | 0 | | RecordT | 128 Bit | rw | | |
| Reserved | | | 1 | 120 Bit | UIntegerT | 8 Bit | ro | | |
| Master Cycle Time | Communication: Current communication cycle duration used by the master. This value defines the process data cycle. | | 2 | 112 Bit | UIntegerT | 8 Bit | ro | | |
| Min Cycle Time | Communication: Minimum communication cycle duration supported by the device. This value defines the lowest possible process data cycle. | | 3 | 104 Bit | UIntegerT | 8 Bit | ro | | |
| M-Sequence Capability | Communication: Information on the structure and the supported features of the communication messages. | | 4 | 96 Bit | UIntegerT | 8 Bit | ro | | |
| IO-Link Revision ID | Communication: Identifier for the currently used communication protocol revision. | | 5 | 88 Bit | UIntegerT | 8 Bit | ro | 17 | |
| Process Data Input Length | Communication: Information on width and features of the process input data (Process Data from Device to Master). | | 6 | 80 Bit | UIntegerT | 8 Bit | ro | | |
| Process Data Output Length | Communication: Information on width of the process output data (Process Data from Master to Device). | | 7 | 72 Bit | UIntegerT | 8 Bit | ro | | |
| Vendor ID 1 | Identification: Highest octet of the Vendor ID. Combined with the parameter Vendor ID 2, this parameter defines the 16-bit value of the unique Vendor ID as assigned by the IO-Link Community. | | 8 | 64 Bit | UIntegerT | 8 Bit | ro | | |
| Vendor ID 2 | Identification: Lowest octet of the Vendor ID. Combined with the parameter Vendor ID 1, this parameter defines the 16-bit value of the unique Vendor ID as assigned by the IO-Link Community. | | 9 | 56 Bit | UIntegerT | 8 Bit | ro | | |
| Device ID 1 | Identification: Highest octet of the Device ID. Combined with the parameters Device ID 2 and 3, this parameter defines the 24-bit value of the vendor-specific Device ID. | | 10 | 48 Bit | UIntegerT | 8 Bit | ro | | |
| Device ID 2 | Identification: Middle octet of the Device ID. Combined with the parameters Device ID 1 and 3, this parameter defines the 24-bit value of the vendor-specific Device ID. | | 11 | 40 Bit | UIntegerT | 8 Bit | ro | | |
| Device ID 3 | Identification: Lowest octet of the Device ID. Combined with the parameters Device ID 1 and 2, this parameter defines the 24-bit value of the vendor-specific Device ID. | | 12 | 32 Bit | UIntegerT | 8 Bit | ro | | |
| Reserved | | | 13 | 24 Bit | UIntegerT | 8 Bit | ro | | |
| Reserved | | | 14 | 16 Bit | UIntegerT | 8 Bit | ro | | |
| Reserved | | | 15 | 8 Bit | UIntegerT | 8 Bit | ro | | |
| System Command | Application: Command interface for devices without ISDU support. Validity and execution of commands are not confirmed. | | 16 | 0 Bit | UIntegerT | 8 Bit | wo | | |
| Direct Parameters - Page 2 | A set of parameters for devices without ISDU support. | 0x01 (1) | 0 | | RecordT | 128 Bit | rw | | |
| Device-specific Parameter 1 | | | 1 | 120 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 2 | | | 2 | 112 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 3 | | | 3 | 104 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 4 | | | 4 | 96 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 5 | | | 5 | 88 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 6 | | | 6 | 80 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 7 | | | 7 | 72 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 8 | | | 8 | 64 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 9 | | | 9 | 56 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 10 | | | 10 | 48 Bit | UIntegerT | 8 Bit | | | |

Variables

| Name | Description | Index | Subindex | Offset | Data Type | Length | Access Rights | Default | Allowed Values |
|---------------------------------|--|------------------|----------|--------|------------------|--------------------|---------------|---|--|
| Device-specific Parameter 11 | | | 11 | 40 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 12 | | | 12 | 32 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 13 | | | 13 | 24 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 14 | | | 14 | 16 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 15 | | | 15 | 8 Bit | UIntegerT | 8 Bit | | | |
| Device-specific Parameter 16 | | | 16 | 0 Bit | UIntegerT | 8 Bit | | | |
| System Command | Command interface for applications. A positive acknowledge indicates the complete and correct finalization of the requested function. | 0x02 (2) | 0 | | UIntegerT | 8 Bit | wo | | (128) Device Reset (130) Restore Factory Settings (164) Reset Min/Max Process Values (165) Calibrate Zero-Point (170) Reset VFL Calculation (240) Set Test Event 1 (241) Reset Test Event 1 (242) Set Test Event 2 (243) Reset Test Event 2 |
| Device Access Locks | The access to the device parameters can be restricted by setting appropriate flags within this parameter. | 0x0C (12) | 0 | | RecordT | 16 Bit | rw | | |
| Parameter Write Access | This lock prevents the write access to all read/write parameters of the device except for the parameter 'Device Access Locks'. | | 1 | 0 Bit | BooleanT | 1 Bit | | | (True) Locked (False) Unlocked |
| Data Storage | This lock prevents the write access to the device parameters via the data storage mechanism. | | 2 | 1 Bit | BooleanT | 1 Bit | | | (True) Locked (False) Unlocked |
| Local Parameterization | This lock prevents the device settings from being changed via local operating elements on the device. | | 3 | 2 Bit | BooleanT | 1 Bit | | | (True) Locked (False) Unlocked |
| Local User Interface | This lock prevents the access to the device settings and display via a local user interface. The user interface is disabled. | | 4 | 3 Bit | BooleanT | 1 Bit | | | (True) Locked (False) Unlocked |
| Vendor Name | The vendor name that is assigned to a Vendor ID. | 0x10 (16) | 0 | | StringT | max 64 Byte | ro | HYDAC FILTERTECHNIK GMBH | |
| Product Name | Complete product name. | 0x12 (18) | 0 | | StringT | max 64 Byte | ro | V1/4 5 VFL.0 /-V-I4M020 | |
| Product ID | Vendor-specific product or type identification (e.g., item number or model number). | 0x13 (19) | 0 | | StringT | max 64 Byte | ro | 928742 | |
| Serial Number | Unique, vendor-specific identifier of the individual device. | 0x15 (21) | 0 | | StringT | max 16 Byte | ro | | |
| Hardware Revision | Unique, vendor-specific identifier of the hardware revision of the individual device. | 0x16 (22) | 0 | | StringT | max 64 Byte | ro | | |
| Firmware Revision | Unique, vendor-specific identifier of the firmware revision of the individual device. | 0x17 (23) | 0 | | StringT | max 64 Byte | ro | | |
| Application-specific Tag | Possibility to mark a device with user- or application-specific information. | 0x18 (24) | 0 | | StringT | max 32 Byte | rw | *** | |
| Error Count | Number of errors that occurred in the technology-specific application since power on or restart. | 0x20 (32) | 0 | | UIntegerT | 16 Bit | ro | | |

Variables

| Name | Description | Index | Subindex | Offset | Data Type | Length | Access Rights | Default | Allowed Values |
|----------------------------|---|-----------|----------|---------|--------------|-------------|---------------|---------|--|
| Device Status | Indicator for the current device condition and diagnosis state. | 0x24 (36) | 0 | | UIntegerT | 8 Bit | ro | | (0) Device is OK (1) Maintenance required (2) Out of specification (3) Functional check (4) Failure [5..255] Reserved |
| Detailed Device Status | List of all currently pending events in the device. | 0x25 (37) | 0 | | ArrayT[8] | 24 Byte | ro | | |
| Detailed Device Status [0] | | | 1 | 168 Bit | OctetStringT | 3 Byte | ro | | |
| Detailed Device Status [1] | | | 2 | 144 Bit | OctetStringT | 3 Byte | ro | | |
| Detailed Device Status [2] | | | 3 | 120 Bit | OctetStringT | 3 Byte | ro | | |
| Detailed Device Status [3] | | | 4 | 96 Bit | OctetStringT | 3 Byte | ro | | |
| Detailed Device Status [4] | | | 5 | 72 Bit | OctetStringT | 3 Byte | ro | | |
| Detailed Device Status [5] | | | 6 | 48 Bit | OctetStringT | 3 Byte | ro | | |
| Detailed Device Status [6] | | | 7 | 24 Bit | OctetStringT | 3 Byte | ro | | |
| Detailed Device Status [7] | | | 8 | 0 Bit | OctetStringT | 3 Byte | ro | | |
| Process Data Input | Last valid process input data of the device. | 0x28 (40) | 0 | | | | ro | | |
| Process Data Output | Last valid process output data written to the device. | 0x29 (41) | 0 | | | | ro | | |
| Function Tag | | 0x19 (25) | 0 | | StringT | max 32 Byte | rw | *** | |
| Location Tag | | 0x1A (26) | 0 | | StringT | max 32 Byte | rw | *** | |
| Parameter 1 | Pressure threshold in bar with 2 decimal places. | 0x40 (64) | 0 | | IntegerT | 16 Bit | rw | 20 | [5..100] |
| Parameter 2 | Temperature threshold in °C. | 0x41 (65) | 0 | | IntegerT | 16 Bit | rw | 35 | [0..40] |
| Parameter 3 | Filtration end pressure in bar with 1 decimal place. | 0x42 (66) | 0 | | IntegerT | 16 Bit | rw | 50 | [10..100] |
| Parameter 4 | Viscosity at 40 °C in cSt with 2 decimal places. | 0x43 (67) | 0 | | IntegerT | 32 Bit | rw | 4500 | [10..100000] |
| Parameter 5 | Viscosity at 100 °C in cSt with 2 decimal places. | 0x44 (68) | 0 | | IntegerT | 32 Bit | rw | 670 | [10..100000] |
| Parameter 6 | Service parameter with 2 decimal places. Do not use. | 0x45 (69) | 0 | | IntegerT | 16 Bit | ro | -33 | [-500..-20] |
| Parameter 7 | Service parameter with 2 decimal places. Do not use. | 0x46 (70) | 0 | | IntegerT | 16 Bit | ro | -300 | [-500..-20] |
| Parameter 8 | Service parameter with 1 decimal place. Do not use. | 0x47 (71) | 0 | | UIntegerT | 32 Bit | ro | 99990 | [10000..1000000] |
| Parameter 9 | Service parameter. Do not use. | 0x48 (72) | 0 | | UIntegerT | 32 Bit | ro | 6000 | [1000..10000] |
| Parameter 10 | Service parameter with 1 decimal place. Do not use. | 0x49 (73) | 0 | | UIntegerT | 32 Bit | ro | 500 | [10..10000] |
| Parameter 11 | Service parameter. Do not use. | 0x4A (74) | 0 | | UIntegerT | 32 Bit | ro | 3 | [1..2000] |
| Parameter 12 | Service parameter. Do not use. | 0x4B (75) | 0 | | UIntegerT | 16 Bit | ro | 30 | [0..80] |
| Parameter 13 | Service parameter. Do not use. | 0x4C (76) | 0 | | UIntegerT | 16 Bit | ro | 80 | [50..99] |
| Parameter 14 | Service parameter. Do not use. | 0x4D (77) | 0 | | IntegerT | 16 Bit | ro | 500 | [10..500] |
| Parameter 15 | Service parameter. Do not use. | 0x4E (78) | 0 | | BooleanT | 1 Bit | ro | true | |
| Parameter 16 | Service parameter with 2 decimal places. Do not use. | 0x4F (79) | 0 | | ArrayT[14] | 224 Bit | ro | | |
| Parameter 16 [0] | | | 1 | 208 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [1] | | | 2 | 192 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [2] | | | 3 | 176 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [3] | | | 4 | 160 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [4] | | | 5 | 144 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [5] | | | 6 | 128 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [6] | | | 7 | 112 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [7] | | | 8 | 96 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [8] | | | 9 | 80 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [9] | | | 10 | 64 Bit | IntegerT | 16 Bit | ro | | |

Variables

| Name | Description | Index | Subindex | Offset | Data Type | Length | Access Rights | Default | Allowed Values |
|------------------------------------|--|-------------------|----------|---------|-------------------|----------------|---------------|----------|----------------------|
| Parameter 16 [10] | | | 11 | 48 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [11] | | | 12 | 32 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [12] | | | 13 | 16 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 16 [13] | | | 14 | 0 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 | Service parameter with 2 decimal places. Do not use. | 0x50 (80) | 0 | | ArrayT[14] | 224 Bit | ro | | |
| Parameter 17 [0] | | | 1 | 208 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [1] | | | 2 | 192 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [2] | | | 3 | 176 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [3] | | | 4 | 160 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [4] | | | 5 | 144 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [5] | | | 6 | 128 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [6] | | | 7 | 112 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [7] | | | 8 | 96 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [8] | | | 9 | 80 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [9] | | | 10 | 64 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [10] | | | 11 | 48 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [11] | | | 12 | 32 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [12] | | | 13 | 16 Bit | IntegerT | 16 Bit | ro | | |
| Parameter 17 [13] | | | 14 | 0 Bit | IntegerT | 16 Bit | ro | | |
| Remaining Life Time | Remaining life time in h with 1 decimal place. | 0x60 (96) | 0 | | UIntegerT | 32 Bit | ro | | |
| Operating Hours | Operating hours in h with 1 decimal place. | 0x61 (97) | 0 | | UIntegerT | 32 Bit | ro | | |
| Status | Status of remaining life time calculation. | 0x64 (100) | 0 | | RecordT | 8 Bit | ro | | |
| Initialization | Calculation in initialization phase. | | 1 | 0 Bit | BooleanT | 1 Bit | | | |
| Pressure Low | Pressure below pressure threshold. No calculation done. | | 2 | 1 Bit | BooleanT | 1 Bit | | | |
| Temperature Out Of Range | Temperature below temperature threshold or above maximum temperature (120 °C). No calculation done. | | 3 | 2 Bit | BooleanT | 1 Bit | | | |
| Filter Full | Filter full. | | 4 | 3 Bit | BooleanT | 1 Bit | | | |
| Temperature Not Available | Temperature not available. Calculation uses reference temperature (40 °C). | | 5 | 4 Bit | BooleanT | 1 Bit | | | |
| Error | Calculation inactive or disabled. See device status for details. | | 6 | 5 Bit | BooleanT | 1 Bit | | | |
| Device Temperature | Device temperature process values since manual reset. Manual reset can be done with Standard Command 164. | 0x7F (127) | 0 | | RecordT | 48 Bit | ro | | |
| Current Value | Current device temperature value in °C with 1 decimal place. | | 1 | 32 Bit | IntegerT | 16 Bit | | | |
| Min Value | Minimum device temperature value in °C with 1 decimal place. | | 2 | 16 Bit | IntegerT | 16 Bit | | | |
| Max Value | Maximum device temperature value in °C with 1 decimal place. | | 3 | 0 Bit | IntegerT | 16 Bit | | | |
| Pressure Filter Constant | Filter time constant for pressure process values in ms. Time constants below the sample rate of 1 ms have no effect. | 0x84 (132) | 0 | | UIntegerT | 16 Bit | rw | 0 | [0..1000] |
| Pressure Calibration Offset | Zero-point calibration offset for pressure input signal in %FS with 3 decimal places. Zero-point calibration can be done with Standard Command 165. | 0x85 (133) | 0 | | IntegerT | 16 Bit | ro | 0 | [-3000..3000] |

Events

| Code | Type | Name | Description |
|----------------|---------|---------------------------------------|---|
| 0x4210 (16912) | Warning | Device temperature overrun | Clear source of heat |
| 0x4220 (16928) | Warning | Device temperature underrun | Insulate device |
| 0x5000 (20480) | Error | Device hardware fault | Exchange device |
| 0x6320 (25376) | Error | Parameter error | Check datasheet and values |
| 0x8C00 (35840) | Error | Technology-specific application fault | Reset device |
| 0x8C20 (35872) | Error | Measurement range exceeded | Check application |
| 0x8DFE (36350) | Error | Test Event 1 | Test event 1 for conformance test. Event appears after writing Standard Command 240. Event disappears after writing Standard Command 241. |
| 0x8DFF (36351) | Error | Test Event 2 | Test event 2 for conformance test. Event appears after writing Standard Command 242. Event disappears after writing Standard Command 243. |

Error Types

| Error Code | Additional Code | Name | Description |
|------------|-----------------|--|---|
| 0x80 (128) | 0x11 (17) | Index not available | Read or write access attempt to a non-existing index. |
| 0x80 (128) | 0x12 (18) | Subindex not available | Read or write access attempt to a non-existing subindex of an existing index. |
| 0x80 (128) | 0x20 (32) | Service temporarily not available | Parameter not accessible due to the current state of the technology-specific application. |
| 0x80 (128) | 0x22 (34) | Service temporarily unavailable - device control | Parameter not accessible. The technology-specific application is currently in a remotely triggered operation. |
| 0x80 (128) | 0x23 (35) | Access denied | Write access to a read-only parameter or read access to write-only parameter. |
| 0x80 (128) | 0x30 (48) | Parameter value out of range | Written parameter value is outside of the permitted value range. |
| 0x80 (128) | 0x31 (49) | Parameter value above limit | Written parameter value is above its specified value range |
| 0x80 (128) | 0x32 (50) | Parameter value below limit | Written parameter value is below its specified value range |
| 0x80 (128) | 0x33 (51) | Parameter length overrun | Written parameter is longer than specified. |
| 0x80 (128) | 0x34 (52) | Parameter length underrun | Written parameter is shorter than specified. |
| 0x80 (128) | 0x35 (53) | Function unavailable | Written command is not supported by the technology-specific application |
| 0x80 (128) | 0x36 (54) | Function temporarily unavailable | Written command is unavailable due to the current state of the technology-specific application. |
| 0x80 (128) | 0x40 (64) | Invalid parameter set | Written single parameter value collides with other existing parameter settings. |
| 0x80 (128) | 0x41 (65) | Inconsistent parameter set | Parameter set inconsistencies at the end of block parameter transfer. Device plausibility check failed. |
| 0x81 (129) | 0x10 (16) | Persistent memory error | No details. |
| 0x81 (129) | 0x11 (17) | Parameter store failed | Parameter could not be stored in persistent memory. |