GYDAD INTERNATIONAL

Filter Systems Fluid Condition Monitoring & Control



HYDAD Components, Systems and Service. All from one Company.

Our fluid engineering solutions are defined by the scope and complexity of our customers' requirements. Our products range from individually designed components in the fields of fluid engineering, hydraulics and electronics right up to complete systems for specific functions.

All components and systems are conceived and designed in-house. Experienced industrial and product specialists develop innovative products and efficient solutions for high-quality, cost-effective production. Throughout the globe, our production facilities share one common goal: quality. We take great pride in both our products and solutions.

Industries and Applications



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| Ove | rview |
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Introduction - A2; Cost Savings Calculations - A3; ISO Cleanliness Levels - A4

Contamination Monitors

| CS 1000 - B2; CSI-C-11 - B6; HY-Trax - Manual - B14; HY-Trax - High Viscosity - B16; HY-Trax - Telematics - B20; FCU 1000 - B24; | B |
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| TFL - B26; TFH - B28; RBSA - B30; MCS - B32; AS 1000 - B36; AS 3000 - B38; SMU 1200 - B40; FMS - B42; CTU 1000 - B44; | D |
| CTM-SC - B46 ; CTM-EB - B48 ; MM - B54 ; FAS - B55 ; FASH - B56 | |

Diagnostics - C1

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Offline Filtration Systems

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Replacement Elements

Pressure Elements - **E2**; Dimicron[®] Elements, Cartridge Elements, Spin-on Elements, Aquamicron[®] Elements, Betamicron[®]/Aquamicron[®] Elements, Betterfit[®] Interchange Elements - **E4**

Reference Materials

Viscosity Charts - F2



Filter System Division 580 West Park Road Leetsdale, PA 15056 +1.724.318.1100 Internet: www.hydac-na.com Email: FSP.catalog@hydac-na.com

NOTE

Information and related materials are subject to change without notice. This catalog, and all information and related materials it contains, are provided "as is." HYDAC makes no representation or warranty whatsoever regarding the completeness, accuracy, "up-to-dateness", or adequacy of, the HYDAC-NA domain and this catalog.

OVERVIEW Introduction

Contamination and degraded fluid quality cause inefficient operation, component wear, and eventually failures in all hydraulic and lubrication systems. The products in this catalog are the tools that are needed to prevent such occurrences. HYDAC recommends a three step approach to controlling contamination in any system:

Assess

Start by gathering complete information on the system. This includes:

- a list of the most critical components
- the manufacturer's recommended ISO class for each component
- the type of oil being used
- flow rate & operating pressure
- fluid temperature & ambient temperature
- system's operational characteristics
- details on all current filters in the system
- solid contamination levels (ISO class)
- water content levels
- details on all current filters in the system

Recommend & Implement

Next, specify your recommendations for upgrading the current filtration, and adding the appropriate supplementary filtration:

- pressure filters
- return line filters
- manifold cartridge/circuit protector filters
- element micron rating
- reservoir breathers or filler breathers
- strainer baskets
- addition of offline filtration loop
- use of portable filters for filling/temporary offline loops
- sufficient water removal protection
- proper fluid monitoring devices

Monitor & Maintain

Finally, use reliable methods for continuous monitoring of the fluid conditions including:

- solid contamination
- water content
- additive depletion
- element clogging
- periodic detailed analysis of actual fluid samples
- portable filters for correcting unacceptable levels



An OLFCM-15 on a plastic injection machine.





An OLF-60 on a test stand.

Microscope with camera attached to a monitor

OFS Filtration Station with HPU.

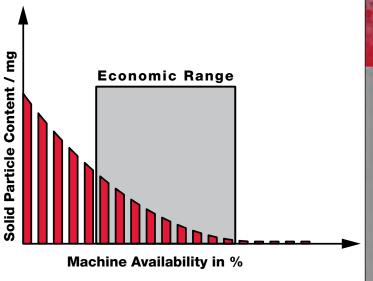


OLF Compact on a mining truck.



OVERVIEW Savings Realized by Proper Contamination Control

The money invested in contamination control can easily be justified when the resulting machine availability increases significantly. The graph below illustrates that there is a range in which this investment really pays off.



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Try our automated savings calculator at:

www.HYDACusa.com

Savings Calculation Example

This example demonstrates how to calculate the potential savings that will be realized by implementing a proper fluid service program.

| | Example | Your Data |
|--|-------------|--------------------------------------|
| Number of Machines | 50 | a |
| Operating Hours per year | 5,000 | b |
| Current Availability | 92% | c |
| Downtime Costs per hour | \$60 | d |
| Total Downtime Costs | \$1,200,000 | e (a x b x ^(100 - c) x d) |
| Downtime costs due to: | | |
| - mechanical/electrical failures (65%) | \$780,000 | f (e x .65) |
| - hydraulic failures (35%) of which: | \$420,000 | g (e x .35) |
| - 70% is due to the fluid | \$294,000 | h (g x .70) |
| - 30% is caused by other faults | \$126,000 | i (g x .30) |
| HYDAC Fluid Service can return 90% of the fluid related downtime costs | \$264,600 | j (h x .90) |

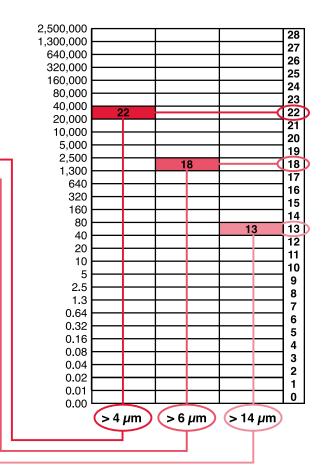
OVERVIEW ISO 4406 Code

Cleanliness levels are defined by three numbers divided by slashes (/). These numbers correspond to 4, 6, and 14 micron, in that order. Each number refers to an ISO Range Code, which is determined by the number of particles for that size (4,6, & 14 μ m) and larger present in 1 ml of fluid. Each range is double the range below. Refer to the chart below to see the actual ranges.

Example:

larger than $4\mu m = 22,340$ larger than $6\mu m = 1,950$ larger than $14\mu m = 43$

ISO Code = 22 / 18 / 13



Achieving the appropriate cleanliness level in a system

The only way to achieve and maintain the appropriate cleanliness level in a hydraulic or lubrication system is to implement a comprehensive filtration program. HYDAC offers all of the products needed to develop a comprehensive filtration program, including:

Solid Contamination

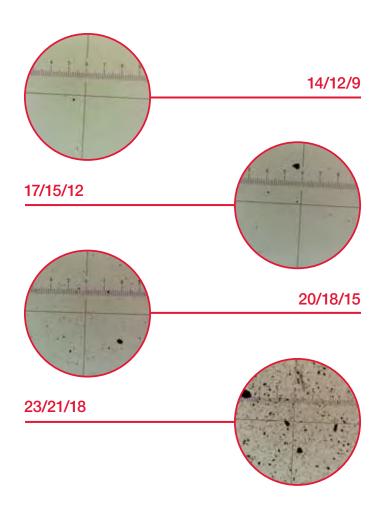
- Pressure filters
- Return line filters
- Offline filtration loops
- Oil transfer units for precleaning of new oil
 Portable and online contamination monitors
- Portable and online contamination mon
 Reservoir breathers and filler/breathers

Water Content

- Water content sensors
- Reservoir breathers with silica gel desiccant
- Vacuum dehydration water removal units
- Water removal elements

Fluid Analysis

- Bottle sampling kits
- Complete analysis kits





OVERVIEW

Finding the cleanliness level required by a system

- 1. Starting at the left hand column, select the most sensitive component used in the system.
- 2. Move to the right to the column that describes the system pressure and conditions.
- 3. Here you will find the recommended ISO class level, and recommended element micron rating.

| | Low/Mediun Under 20 (moderate c |)00 psi | High Pressure 2000 to 2999 psi (low/medium with severe conditions ¹) | | Very High Pressure 3000 psi and over (high pressure with severe conditions¹) | |
|--|---------------------------------------|-------------------|---|-------------------|---|-------------------|
| | ISO Target Levels | Micron Ratings | ISO Target Levels | Micron Ratings | ISO Target Levels | Micron Ratings |
| Pumps | | | | | | |
| Fixed Gear or Fixed Vane | 20/18/15 | 20 | 19/17/14 | 10 | 18/16/13 | 5 |
| Fixed Piston | 19/17/14 | 10 | 18/16/13 | 5 | 17/15/12 | 3 |
| Variable Vane | 18/16/13 | 5 | 17/15/12 | 3 | not applicable | not applicable |
| Variable Piston | 18/16/13 | 5 | 17/15/12 | 3 | 16/14/11 | 3(2 |
| Valves | | | | | | |
| Check Valve | 20/18/15 | 20 | 20/18/15 | 20 | 19/17/14 | 10 |
| Directional (solenoid) | 20/18/15 | 20 | 19/17/14 | 10 | 18/16/13 | 5 |
| Standard Flow Control | 20/18/15 | 20 | 19/17/14 | 10 | 18/16/13 | 5 |
| Cartridge Valve | 19/17/14 | 10 | 18/16/13 | 5 | 17/15/12 | 3 |
| Proportional Valve | 17/15/12 | 3 | 17/15/12 | 3 | 16/14/11 | 3(2 |
| Servo Valve | 16/14/11 | 3(2 | 16/14/11 | 3(2 | 15/13/10 | 3(2 |
| Actuators | | | | | | |
| Cylinders, Vane Motors, Gear Motors | 20/18/15 | 20 | 19/17/14 | 10 | 18/16/13 | 5 |
| Piston Motors, Swash Plate Motors | 19/17/14 | 10 | 18/16/13 | 5 | 17/15/12 | 3 |
| Hydrostatic Drives | 16/15/12 | 3 | 16/14/11 | 3(2 | 15/13/10 | 3(2 |
| Test Stands | 15/13/10 | 3(2 | 15/13/10 | 3(2 | 15/13/10 | 3(2 |
| Bearings | | | | | · | |
| Journal Bearings | 17/15/12 | 3 | not applicable | not applicable | not applicable | not applicable |
| Industrial Gearboxes | 17/15/12 | 3 | not applicable | not applicable | not applicable | not applicable |
| Ball Bearings | 15/13/10 | 3 ⁽² | not applicable | not applicable | not applicable | not applicable |
| Roller Bearings | 16/14/11 | 3 ⁽² | not applicable | not applicable | not applicable | not applicable |

1. Severe conditions may include high flow surges, pressure spikes, frequent cold starts, extremely heavy duty use, or the presence of water

2. Two or more system filters of the recommended rating may be required to achieve and maintain the desired Target Cleanliness Level.



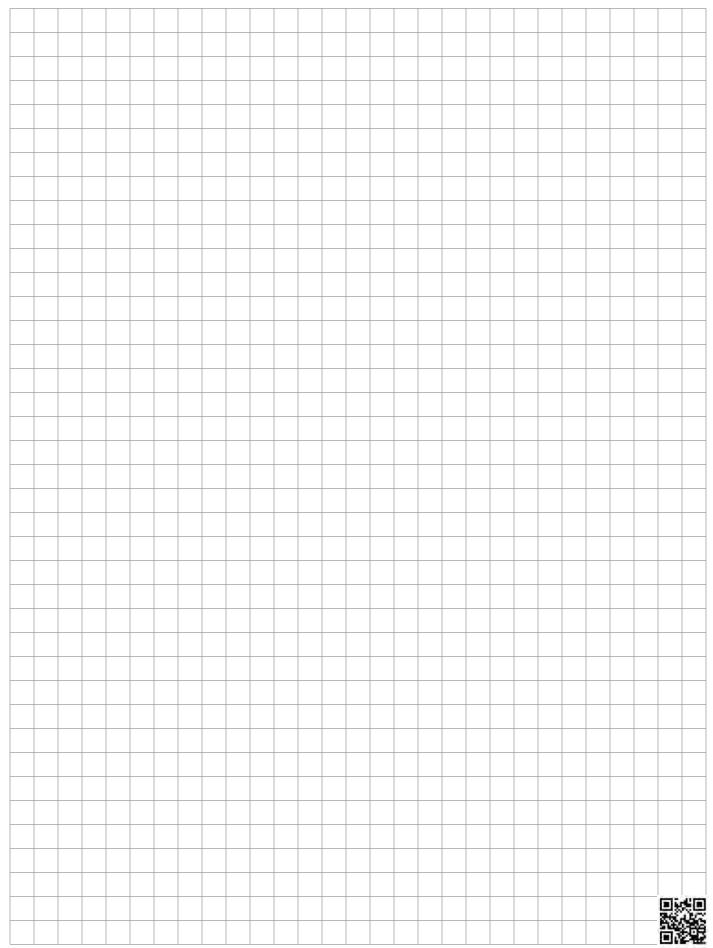
FREE Poster!

The information on these two pages is also available on our **ISO Cleanliness Guidelines** poster. Visit our web site to request your FREE copy.

www.hydac-na.com/sites/hydac-na Click on the link (bottom right): Free ISO Poster

OVERVIEW

Notes

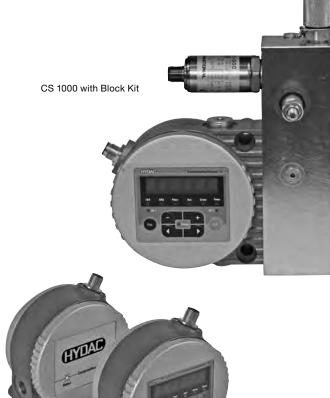


Contamination Management Contamination management pertains to the analysis and optimization of processes with regard to the cleanliness of components, systems and

Contamination management pertains to the analysis and optimization of processes with regard to the cleanliness of components, systems and the purity of the fluids used. Our fluid condition monitoring products include both in-line and offline sensors to measure contamination and/ or water saturation levels of the hydraulic system. By implementing fluid condition monitoring equipment in conjunction with the appropriate filtration equipment, a major portion of particulate contamination introduced during manufacturing and assembly can be effectively and efficiently removed. The result is cost savings by virtue of smaller performance deviations on test stands caused by the sudden clogging of particles in sensitive system components, as well as lower costs associated with warranty and non-warranty courtesy work.

CONTAMINATION MONITORS CS 1000 Series

Contamination Sensor





CS 1000 with display

Description

The CS 1000 Contamination Sensor is the latest HYDAC development for continuous measurement of solid contamination of fluids.

Using the latest technology and materials, the CS 1000 is a reliable measuring instrument that is permanently mounted on your mobile or industrial equipment.

The attractive cost-to-performance ratio makes it especially interesting for OEM applications. Online, real-time condition monitoring allows you to have total predictive maintenance.

Applications

Monitoring system on vehicles such as

- Construction equipment
- Agricultural machinery
- Mobile and stationary equipment
- Industrial hydraulic systems
- Integration into power unit monitoring systems
- Hydraulic test stands

Combination with filter unit

Features

- Version with or without display
- Display with pivot-function
- Display with 6-digit ISO Code (optional)
- Measurement of solid particle contamination in hydraulic and lubricating fluids
- Compact and rugged design
- Type of protection IP67



Technical Specifications

| Technical Specific | |
|--|---|
| General data | |
| Self-diagnosis | Continuous with error display via status LED and display |
| Display (only with CS 1x2x) | LED, 6 digits, in 17 segment format |
| Measured variables | ISO 99 (ISO 4406:1999) SAE (SAE AS 4059) or ISO 87 (ISO4406:1987) NAS (NAS 1638) |
| Installation position | (Recommended: Vertical Orientation with flow south to north |
| Ambient temperature range | -30 °C to +80 °C / -22 °F to 176 °F |
| Storage temperature range | -40 °C to +80 °C / -40 °F to 176 °F |
| Relative humidity | max. 95%, non-condensing |
| Seal material | FPM for CS1xx0 / EPDM for CS1xx1 |
| Protection class | III (safety extra-low voltage) |
| IP class | IP 67 (provided it is correctly connected) |
| Weight | 2.9 lb (1.3 kg) |
| Hydraulic data | |
| Measuring range | Sensor measures from Class ISO 9/8/7 (MIN) to Class ISO 25/24/23 (MAX) Calibrated in the range ISO 13/11/10 to 23/21/18 |
| Accuracy | +/- $\frac{1}{2}$ ISO class in the calibrated range |
| Operating pressure | max. 5075 psi / 250 bar |
| Hydraulic connection | Inline or hose connection (A,B): thread G1/4, ISO 228 or flange connection (C,D): DN 4 |
| Permitted measurement flow rate | 30 to 500 ml/min |
| Permitted viscosity range | 32 to 4635 SUS(1 to 1000 mm2/s) |
| Fluid temperature range | 0 to +85°C, +32 to +185°F |
| Electrical data | |
| Connection, male | M12x1, 8-pole, to DIN VDE 0627 or IEC61984 |
| Supply voltage | 9 to 36 VDC, residual ripple < 10% |
| Power consumption | 3 watts max. |
| Analogue output (2 conductor technique) | 4 to 20 mA output (active): Max. ohmic resistance 330Ω or 2 to 10 V output (active): Min. load resistance 820Ω Calibration ± 1 % FS |
| Switch output | passive, n-switching Power MOSFET: max. current 1.5 A; normally open |
| RS485 interface | 2-wire, half duplex to transfer the HSI protocol in conjunction with a PC |
| HSI (HYDAC Sensor Interface) | 1 wire, half duplex |

We do not guarantee the accuracy or completeness of this information. The information is based on average working condition. For exceptional operating conditions please contact our technical department. All details are subject to technical changes.

^^^

Model Code

| | | <u>CS 1 2 2 0 - A - 0 - 0 - 0 - 0 / - 0</u> |
|-----------|--------|---|
| Series - | | |
| CS | = | Contamination Sensor |
| Resolut | tion – | |
| 1 | = | 4 Particle Size Channels |
| ndicato | or Co | de |
| 2 | = | ISO 4406 : 1999; SAE AS 4059 (D) |
| | | $>4 \ \mu m(c) > 6 \ \mu m(c) > 14 \ \mu m(c) > 21 \ \mu m(c)$ |
| 3 | = | ISO 4406 : 1987; NAS 1638 |
| | | >2 μm >5 μm >15 μm >25 μm |
| | | ISO 4406 : 1999; SAE AS 4059 (D) |
| | | >4 μm(c) >6 μm(c) >14 μm(c) >21 μm(c) |
| Options | s —— | |
| 1 | = | without Display |
| 2 | = | with Display (270° rotation of display) |
| Fluids - | | |
| 0 | = | Hydraulic/Mineral oil |
| 1 | = | Phosphate Esters |
| Analog | Inter | faces |
| A | | 4 to 20 mA |
| В | = | 2 to 10 V |
| Switchi | ing Ou | utput |
| 0 | = | Limit Switching Output |
| Digital I | Interf | faces — |
| Õ | | RS485 |
| Electric | al Co | onnection |
| 0 | = | Plug M12x1, 8-pole (connection cable not included) |
| Mountir | na — | |
| 0 | = | Inline version |
| 1 | = | Flanged version |
| Modific | ation | Number |
| 000 | = | |
| K | = | CS Block Kit without AS1000 Sensor (requires Mounting Option 1) |
| KAS | | CS Block Kit with AS1000 Sensor (requires Mounting Option 1) |

KAS = CS Block Kit with AS1000 Sensor (requires Mounting Option 1)

KASD = CS Block Kit with AS3008 Sensor (requires Mounting Option 1)

Scope Of Delivery

- Contamination sensor
- Calibration Certificate
- Operation and Instruction manual - CD with FluMoS Light software and manuals

Accessories

- CSI-C-11 Sensor Interface: Part Number 4066011 (for WLAN or LAN Communication)

- Connection cable 6.5 ft. (2 m) with M12x1 connector, screened 8-pole: Part Number 03281220

- Connection cable 16.4 ft. (5 m) with M12x1 connector, screened 8-pole: Part Number 02702459
- Connection cable 9.8 ft. (3 m) with M12x1 connector, 8-pole: Part Number 02091414
- CSI-D-5 Contamination Sensor Interface: Part Number 03249563
- Power Supply-CS1XXX-PS1: Part Number 03376530

Model Codes containing RED are non-standard items - Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability

CS 1000 Block Kit

Includes: CS and AS Sensor Connection Cables, 2 Test Points, 2 Microflex hoses, FluMoS Light software

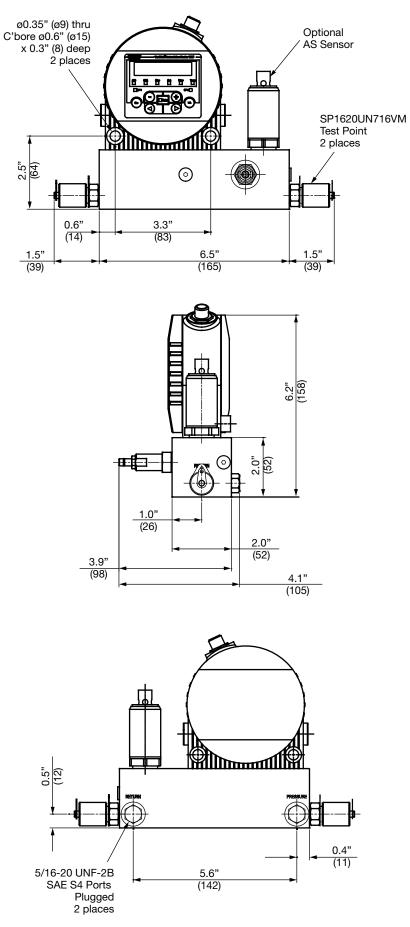
The Contamination Sensor Block KIT (CS 1000 Block KIT) combines two condition monitoring products, the CS 1000 series (Contamination Sensor) and the AS 1000 series (Aqua Sensor) into one plug and play unit. It serves as an on-line measurement of solid contamination and water in hydraulic and lube systems.

Note: Flow control is necessary when utilizing the CS 1000 sensor. Flow must be maintained through the sensor module to ensure accurate readings. Utilization of the CS Block Kit is required to maintain Sensor flow rate range as described in the Technical Specifications (at the left).

Quick Order Guide

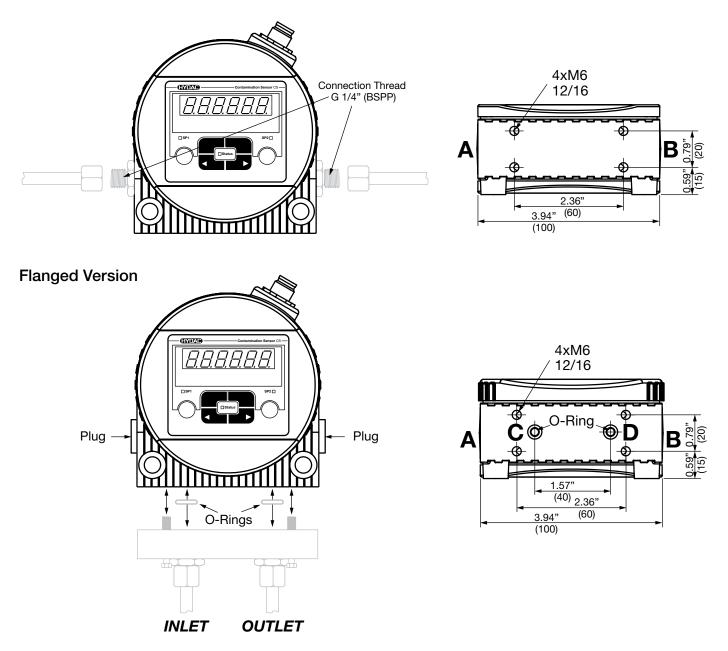
| Model Code | Part Number | Description |
|------------------------|---|---|
| CS1220-A-0-0-0-0/-000 | 03236362 4-20mA display model | |
| CS1210-A-0-0-0-0/-000 | 0-A-0-0-0 /-000 03240458 4-20mA non-display model | |
| CS1220-A-0-0-0-1 /-K | 02087348 | 4-20mA display model and CS Block Kit without AS Sensor |
| CS1220-A-0-0-0-1 /-KAS | 02086855 | 4-20mA display model and CS Block Kit with AS Sensor |

Dimensions CS 1000 with Block Kit

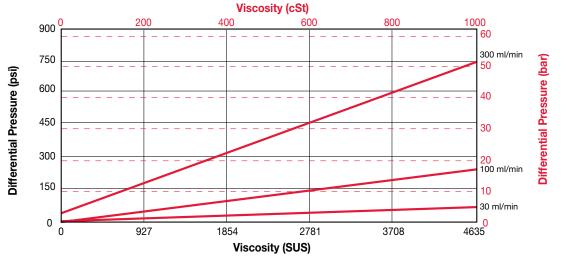


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

Hydraulic Connections Inline Version



Pressure - Viscosity Range



CONTAMINATION MONITORS CSI-C-11 Series

ConditionSensor Interface



Description

The ConditionSensor Interface CSI-C-11 is an easy-to-use, compact condition monitoring system for fluid-based machine condition monitoring.

Depending on the device configuration, up to two HYDAC HSI SMART (fluid) sensors and four analog sensors can be connected to the CSI-C-11 via M12 connectors and supplied with voltage. Once the sensor measurement values and signals have been read, they are stored on the integrated data logger, evaluated in terms of their plausibility and monitored to check whether limit values have been exceeded. Limit values can be set to custom values, or with a selection wizard per ISO:12669. If a limit value is exceeded, the CSI-C-11 will automatically send out an alarm via email or via the integrated Ethernet and fieldbus interface (Modbus®). This makes it possible to transfer the measured values to higher-level company networks, condition monitoring systems (CMs), control systems (PLCs) and the HYDAC CMX (cloud).

Applications

- Construction Equipment
- Agricultural Machinery
- Test Benches
- Industrial Hydraulic Systems
- Combination with Filter Unit
- Power Units
- Any hydraulic system that requires on-line monitoring
- Mobile and Stationary Mining Equipment

Features

- Two input channels for HYDAC HSI SMART sensors (e.g. fluid sensors)
- Four input channels for analog sensors (optional)
- Sensors and network cables are directly connected via M12x1 connectors
- Sensor readings can be transferred and displayed via wireless local area network (WLAN), Ethernet and Fieldbus (Modbus[®])
- The CSI-C-11 stores the measurement data
- An integrated algorithm checks the plausibility of the measured values
- A selection wizard helps to set alarm limits of fluid sensors according to ISO:12669
- Notifications can be received via e-mail or the network in the event of an alarm
- High protection class with IP 66 no switch cabinet is required

Technical Specifications

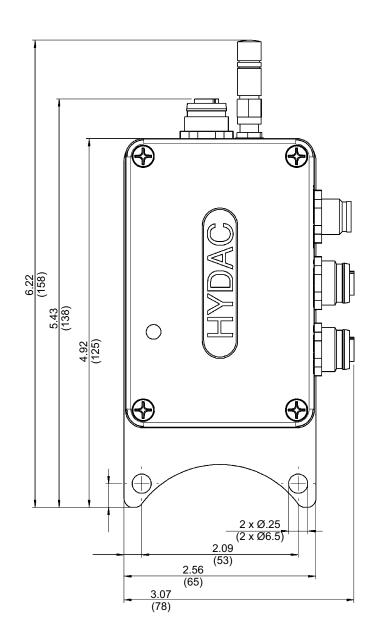
| | HYDAC Sensor Interface (HSI) for the |
|---|--|
| HSI interface | connection of two digital HSI SMART |
| | fluid sensors |
| | Sensor Interface for the connection of |
| | four analog sensors |
| | (type can be selected): |
| | – Current: 4 to 20 mA |
| | (ohmic resistance 500 Ω) |
| Analog Interface | 0 to 20 mA (ohmic resistance 500 Ω) |
| | - Voltage: 0 to 10 V, 0 to 5 V, |
| | 2 to 10 V, 1 to 5 V |
| | Measurement inaccuracy < 0.2% full |
| | scale (FS) |
| Output data | |
| | Protocol: |
| | – HSI TCP/IP (Port 49322) |
| Ethornot (ETLI) | – Modbus [®] TCP (Port 502) |
| Ethernet (ETH) 10 Base-T / 100 Base-TX | – HTTP (port 80) – FTP (port 20/21) |
| | – SMTP (port 25) |
| | – MQTT |
| | – REST-API |
| W-LAN (HSI only) | |
| 2.4 GHz, IEEE 802.11 | – HSI TCP/IP (port 49322) |
| b/g/n | |
| RS485 (2 wire, half duplex) | – Modbus® RTU |
| Environmental condition | |
| Operating temp. range | -13 to 185°F (-25 to 85°C) |
| Storage temp. range | -22 to 185°F (-30 to 85°C) |
| Relative humidity | 0 70%, non-condensing |
| | |
| CE marked | EN 61000-6-2, EN 61000-6-4 |
| Protection class | IP 66 |
| according to DIN 40050 | |
| Other data | |
| Supply voltage | 12 24 V DC ± 10 % |
| Current consumption (module) | 100 mA (plus connected sensors) |
| Sensor supply | 12 24 V DC (looped through) |
| | - Supply voltage: male connector, |
| | M12, 5-pin |
| | - HSI SMART sensor 1 and analog |
| | sensors 1–4: female connector, M12, |
| | 8-pin |
| Electrical connection | -HSI SMART sensor 2: female connector, M12, 5-pin |
| | – LAN: female connector, M12, 4-pin, |
| | D-coded (in accordance with |
| | IEC61076-2-101) |
| | - WLAN antenna: connector, RP SMA |
| | socket, female |
| Housing Dimensions | 5.2" x 3.1" x 1.4" (131 x 77.5 x 35.5 mm) |
| Housing | Aluminium housing |
| Weight | 0.79 lb. (≈ 360 g) |
| Internal measurement d | () |
| Size | 64 MB |
| Measurement interval | |
| 60 s | > 1300 days (with CS1000 + HLB1400 |
| | |
| Measurement interval | > 83000 days (with CS1000 + HLB1400 |

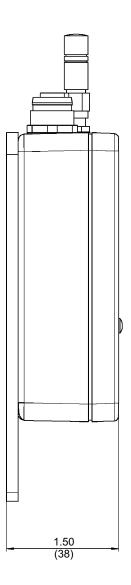


Model Code

| Type — CSI | = ConditionSensor Interface | <u>CSI</u> C <u>11</u> 0 0 0 / <u>000</u> |
|---------------|---|---|
| Housing |] ———— | |
| С | = Metal housing, compact | |
| Signal o | putput 1 | |
| 11 | Ethernet (Modbus[®] TCP, HSI TCP/IP) WLAN (HSI TCP/IP) | |
| Signal o | output 2 | |
| Ő | = RS485 (Modbus [®] RTU) | |
| Signal o | output 3 | |
| Õ | = none | |
| Signal o | butput 4 | |
| õ | 2 x HSI SMART | |
| 1 | = 2 x HSI SMART and 4 x analog | |
| Modific | ation | |
| 000 | = Standard | |

Dimensions



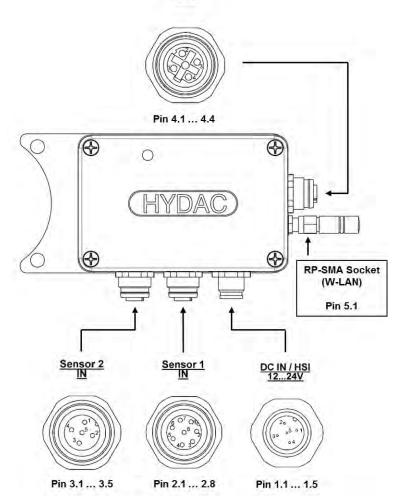


Dimensions are inches (millimeters) and for general information only.

Plug Pin Assignment

| Pin | Signal | Description | |
|-----|----------------|--------------------|------------------------------------|
| 1.1 | Vin 12 24 V DC | Device (CSI-C-11) | Supply voltage + |
| 1.2 | RS485 - | Fieldbus (RS485) | RS485 port for data transmission - |
| 1.3 | GND | Device (CSI-C-11) | GND supply voltage |
| 1.4 | RS485 + | Fieldbus (RS485) | RS485 port for data transmission + |
| 1.5 | HSI | Device (CSI-C-11) | Parameterization |
| 2.1 | S1 12 24 V DC | HSI SMART sensor 1 | Supply voltage + |
| 2.2 | A1 | Analog sensor 1 | Analog input 1 |
| 2.3 | S1 GND | HSI SMART sensor 1 | GND supply voltage |
| 2.4 | A2 | Analog sensor 2 | Analog input 2 |
| 2.5 | S1 HSI | HSI SMART sensor 1 | HSI signal input |
| 2.6 | A3 | Analog sensor 3 | Analog input 3 |
| 2.7 | A4 | Analog sensor 4 | Analog input 4 |
| 2.8 | A1–A4 GND | Analog sensor 1-4 | GND supply voltage |
| 3.1 | S2 12 24 V DC | HSI SMART sensor 2 | Supply voltage + |
| 3.2 | | | Not allocated |
| 3.3 | S2 GND | HSI SMART sensor 2 | GND supply voltage |
| 3.4 | | | Not allocated |
| 3.5 | S2 HSI | HSI SMART sensor 2 | HSI signal |
| 4.1 | ETH TX+ | Network (LAN) | Ethernet port data transmission + |
| 4.2 | ETH RX+ | Network (LAN) | Ethernet port data reception + |
| 4.3 | ETH TX- | Network (LAN) | Ethernet port data transmission - |
| 4.4 | ETH RX- | Network (LAN) | Ethernet port data reception - |
| 5.1 | ANT | Network (WLAN) | RP SMA socket WLAN-antenna |

LAN



| Accessories | |
|---|----------|
| Designation | Part-No. |
| Supply voltage | |
| PS5, power supply unit 100–240 V AC, 50–60 Hz, 1.1 A, IP40; female connector M12, 5-pin | 3399939 |
| ZBE47S-05, connection cable, female connector, 5-pin, with cable, length = 5 m | 3527626 |
| ZBE48S-05 connection cable, male connector, 5-pin, with cable, length = 8 m | 6070712 |
| Sensor connection cables | |
| ZBE43-005, connection cable CSI-C-11, male / female 8-pin, length = 0.5 m | 4193544 |
| ZBE43-05, connection cable CSI-C-11, male / female 8-pin, length = 5 m | 3281240 |
| ZBE30-005, connection cable CSI-C-11, male / female 5-pin, length = 0.5 m | 4193586 |
| ZBE30-05, connection cable CSI-C-11, male / female 5-pin, length = 5 m | 6040852 |
| Network cable (LAN) | |
| ZBE 45-05 network cable (patch), female connector, 4-pin, D-coded / RJ45 male connector, length = 5 m | 3346100 |
| ZBE 45-10, network cable (patch), female connector, 4-pin, D-coded / RJ45 male connector, length = 10 m | 3346101 |
| Connection adapter for additonal sensors | |
| ZBE CSI 60, sensor connection adapter, 4 x analog mating connector, 8-pin, cable length = 1 m | 4420372 |

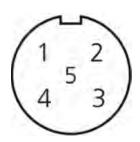
Preferred Models

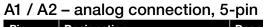
| Designation | Part-No. |
|---------------------|----------|
| CSI-C-11-0-0/-000 | 4066011 |
| CSI-C-11-0-0-1/-000 | 4247534 |

ZBE CSI 60 connection adapter – connection overview

The ZBE CSI 60 has connections for up to six sensors (4x analog sensors and 2x HSI SMART sensors) with the following connections.







| Pin | Designation | Description |
|-----|-------------|---|
| 1 | Signal+ | Analog current signal + (e.g. 4 to 20 mA) |
| 2 | n.c. | Not allocated |
| 3 | Signal- | Analog current signal - (e.g. 4 to 20 mA) |
| 4 | n.c. | Not allocated |
| 5 | n.c. | Not allocated |

Description

Not allocated

Not allocated

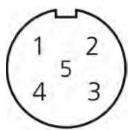
Supply voltage +24 V DC

Analog voltage signal (e.g. 0 to 10V)

GND supply voltage

2

2 3





A3 – analog connection, 5-pin Designation

+24V DC

n.c.

GND

Signal

n.c.

Pin

1

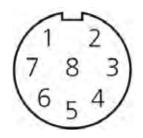
2

З

4

5

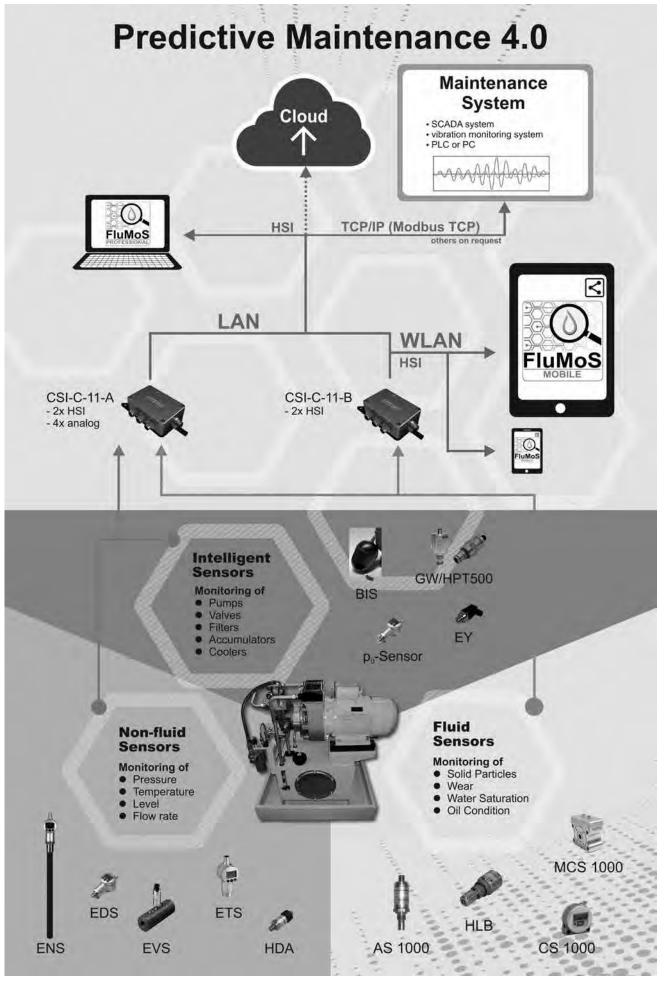
| Pin | Designation | Description | | | | | |
|-----|-------------|---------------------------------------|--|--|--|--|--|
| 1 | +24V DC | Supply voltage +24 V DC | | | | | |
| 2 | n.c. | Analog voltage signal (e.g. 0 to 10V) | | | | | |
| 3 | GND | GND supply voltage | | | | | |
| 4 | Signal | Not allocated | | | | | |
| 5 | n.c. | Not allocated | | | | | |



S1 / S2 - HSI SMART sensor connection, 8-pin

| Pin | Designation | Description |
|-----|-------------|-------------------------|
| 1 | +24V DC | Supply voltage +24 V DC |
| 2 | n.c. | Not allocated |
| 3 | GND | GND supply voltage |
| 4 | n.c. | Not allocated |
| 5 | HSI | HYDAC Sensor Interface |
| 6 | n.c. | Not allocated |
| 7 | n.c. | Not allocated |
| 8 | n.c. | Not allocated |





CONTAMINATION MONITORS FluidMonitoring Software FluMoS

FluidMonitoring Software FluMoS light

FluMoS Light fluid monitoring software is a software package for importing, displaying and processing data from HYDAC fluid sensors. 3 sensors can be connected at the same time!

FluMoS Light can be used in conjunction with the latest generation of HSI interface sensors (CS 1000, FCU 1000, MCS 1000, AS 1000, FMM, HYDACLab®) and the sensors without HSI interface (CS 2000, FCU 2000, FCU 8000).

The FluMoS Light software is used to:

- · Online display of measured values on the PC in table and graphic formats
- Storage of log files on hard disk
- Display of log files from hard disk/diskette and storage as graphic file
- Processing of stored log files with Microsoft Excel
- Remote monitoring of values measured by sensors
- Condition-based maintenance planning



FluidMonitoring Software FluMoS mobile

HYDAC FluMoS Mobile for Android - Your Access to HYDAC's FluidControl Units

Get your fluid condition monitoring measurement data on your Android device!

FluMoS Mobile is a tool for displaying and downloading measurement data from the FluidControl Unit FCU 1310 and FCU1315 via Bluetooth connection as well as the SensorMonitoring Unit SMU 1200 to your Android device. When the CS1000, AS1008 and MCS and other smart sensors are used in conjunction with the CSI-C-11, the FluMos Mobile App can be accessed via WiFi connection to display and download measured data.

FluMoS Mobile Features (Version 1.10)

- Displays current measurement values (solid particle contamination, water saturation and temperature) of your FluidControl Unit FCU1315 in table format.
- Displays measurement value progress (solid particle contamination, water saturation and temperature) of your FluidControl Unit FCU1315 in graphic format (one graphic per measurement channel)
- Selective download of log files in .dat format from the internal memory of the FCU1315 and FCU1310 or SMU 1200 to your Android device
- [possible with successor version]
- Online storage of measurement data on your Android device

You can easily forward the .dat files per e-mail to other devices such as a PC.

The files can then be processed in FluMoS.

FluidMonitoring Software FluMoS mobile - Screenshot

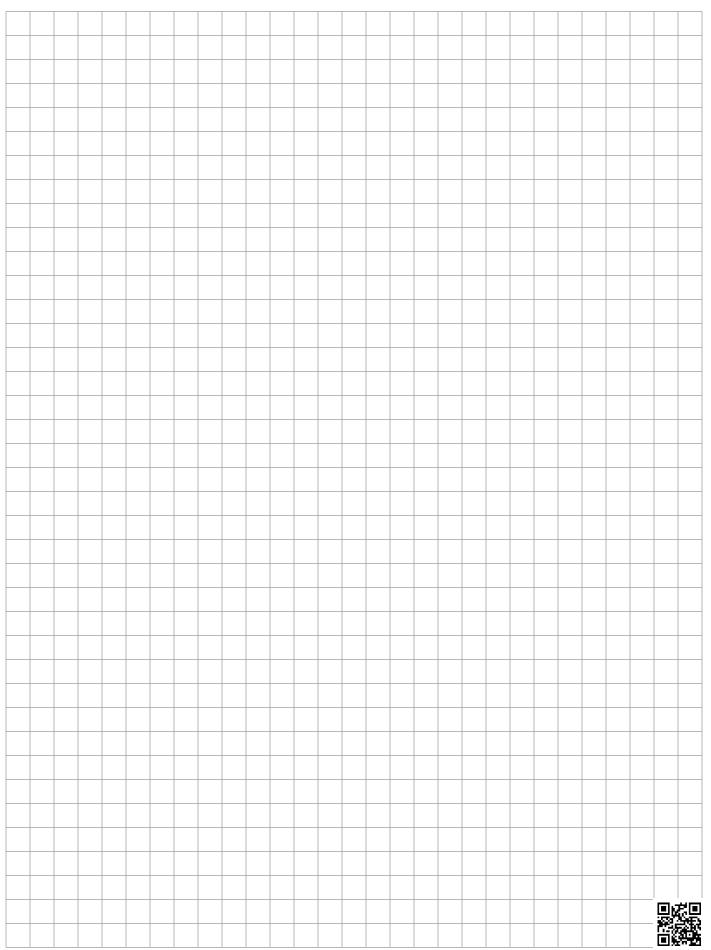


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Notes



HY Series

HY-TRAX[°] – Manually Controlled Fluid Sampling System



Features and Benefits

- Provides local visibility to the fluid condition of critical systems.
- Integrated micro VSD, (Variable Speed Drive), pump/motor provides optimal flow for accurate sensor readings in variable conditions.
- The HY-TRAX[®] Manually Controlled Fluid Sampling System allows a user to retrieve ISO cleanliness levels from a reservoir tank or a low-pressure line (<50 psi max).
- The compact design allows for installations with tight space constraints.
- The manual rheostat VSD pump controller is housed in a compact IP 40 enclosure and allows the user to adjust the pump flow for optimal sensor readings.
- Optional AC adapter available for converting 115V AC / 60 Hz to 24V DC.
- Rugged design for field use.
- Fluorocarbon elastomer (FKM) seals.
- Fluid viscosities up to 1622 SUS (350 cSt).
- Flow control valve providing optimal pressure for accurate sensor readings.

Applications

- Mobile Equipment Technology
- Surface Mining
- Construction
- Monitoring of Oil Cleanliness in Storage Tanks
- Fleet Services
- Rail



Technical Specifications

| Measuring Range | Display ISO ranges be 25/24/23 Calibration v ISO 13/11/10 to 23/21/ | vithin the range | | | | | |
|---|--|---|--|--|--|--|--|
| Contamination Output Code | Standard: ISO 4406:1999 or SAE AS 4059(D) Optional: ISO 4406:1987; NAS 1638 and ISO 4406:1999 | | | | | | |
| Self-Diagnosis | Continuously with error indication via status LED | | | | | | |
| Pressure Rating | 50 psi (3.4 bar) max | | | | | | |
| Fluid Inlet/Outlet | SAE ORB, Size 4 | | | | | | |
| Seal Material | Fluorocarbon elastom | er (FKM) | | | | | |
| Pump Speed | 500-5000 RPM (adjust | able) | | | | | |
| Optimal Sampling Pump Flow Rate | 0.008-0.079 GPM (30- | -300 mL/min) | | | | | |
| Fluid Temp. Range | 32°F to 185°F (0°C to | +85°C) | | | | | |
| Ambient Temp. Range | -22°F to 176°F (-30°C | to 80°) | | | | | |
| Max Viscosity | 1622 SUS (350 cSt) | | | | | | |
| Pump Type | Gear Pump | | | | | | |
| Power Supply Voltage | 24 VDC +/- 10%, Resi | dual Ripple <10% | | | | | |
| Max. Power/Current Consumption | 100 Watt/ 4 amp | | | | | | |
| Electric Output | 4-20 mA analog output; 2-10 V analog (option for contamination monitor (CS1000) RS485 for communication w/FluMoS Software) | | | | | | |
| Electrical Specifications | 4 - 20 mA analog outp 2 to 10v output <i>(min loa</i> Limit switching output max current 1.5A | ad resistor 820 Ω) | | | | | |
| CS1000 Contamination Monitor Signal Ouput Connections located on Control Enclosure | USB-B Female Port for use with Windows- | | | | | | |
| Water Sensor (AS1008) Signal Output Connection | Water sensor (AS1008 Output 5 pole Male Po Control Enclosure | 8) M12-5 pole Signal ort, located on | | | | | |
| Electrical Safety Class | III (low voltage protection | n) | | | | | |
| Enclosure Ratings | IP 40 enclosure | | | | | | |
| Weight and Dimension | S | | | | | | |
| Communications Module Control | Fluid Sampling Sys. Manifold w/ CS1000 & VSD Pump/Motor | HY-TRAX [®] Manual Control Module | | | | | |
| with CS1000 Sensor | 10 lbs. (4.5 kg) | 5 lbs. (2.5 kg) | | | | | |
| | 10.3" x 6.8" x 4.3" (262 x 173 x 109 mm) | 9.3" x 5.7" X 2.6" (236 X 145 x 65 mm) | | | | | |
| | | | | | | | |

Model Code

| = HY-TRAX® System - Oils to 350cSt (includes 100 micron mesh strainer and pressure gauge in manifold block) |
|--|
| Preference |
| = Manifold supplied w/o CS1xx0 (customer will supply own manifold mount CS1xx0 with or without display) |
| = ISO Code >4/>6/>14 |
| = ISO Code >2/>5/>15 |
| ptions |
| = with display |
| |
| = Hydraulic/Mineral Oil |
| terfaces — |
| = 4 - 20 mA (Standard) |
| = 2 - 10V Analog Output |
| isor Option |
| = No Water Sensor (None Standard) |
| = with AS3008 Water Sensor |
| ptions — |
| = Manually Controlled - Panel with Rheostat flow control and signal output (Standard) |
| tions |
| = 24V DC (Standard) |
| = 115V AC |
| ession Loop —————————————————————————————————— |
| |
| = none |
| |

What's Included

- CS1000 Series Contamination Sensor
- Machined, 6061-T651 aluminum alloy manifold block with anodized surface treatment.
- Specially designed fitting for mating to pump/motor.
- Fluorocarbon elastomer (FKM) seals.
- Plugged water sensor port (G3/8 BSPP)
- VSD (Variable Speed Drive) Motor Power Supply and Control Cable
- Water Sensor (AS3008) Power Supply and Signal Cable (only supplied with optional water sensor (AS3008))
- Contamination Monitor (CS1000) output signal, USB-B Female Port for use with Windows-Based Computer and FluMoS Software, located on Control Enclosure
- Contamination Monitor (CS1000), output signal, M12 8 pole, Male Port, located on Control Enclosure, for use with PLC or RS485 Communication, analog or digital, 4 - 20 mA is standard, 2 -10 V is optional
- Flow control valve
- VSD (Variable Speed Drive) pump/motor
- Manual rheostat pump controller
- IP 40 enclosure
- Side or Front Inlet/Outlet Porting (SAE Size 04 ORB)
- 24 VDC Power Supply (NC3MP Female Connector)
- Optional 115 VAC Power Supply with Cord
- Contamination Monitor (CS1000) Power and Signal Cable
- Water Sensor (AS3008) M12 5 pole Signal Output Connection, Male Port, located on Control Enclosure
- Contamination monitor (CS1000) power connection, female M12 8 pole located on control enclosure
- Water sensor (AS3008) power connection, M12 5 pole Female located on control enclosure

CONTAMINATION MONITORS HY-HV Series

HY-TRAX[°] – High Viscosity Fluid Sampling System



Features and Benefits

- Provides local visibility to the fluid condition of critical systems.
- The HY-TRAX[®] High Viscosity Fluid Sampling System allows a user to monitor fluid condition from a reservoir tank or a lowpressure sampling point
- The compact design allows for installations with tight space constraints
- The potentiometer-based pump controller is housed in a compact IP40 enclosure
- Optional AC adapter available for converting 115V AC / 60 Hz to 24V DC
- Fluorocarbon elastomer (FKM) seals.
- Fluid viscosities up to 3,250 SUS (700 cSt)
- Adjustable flow control valve providing optimal pressure for accurate sensor readings

Applications

- Industrial gearboxes
- Wind turbine gearboxes
- Bulk fluid storage vessels
- Industrial hydraulics in cooler climates

What's Included

- HY-TRAX[®] High Viscosity Fluid Sampling System according to Model Code
- Sensor cables for integration with control module according to Model Code (pass-through communication cables ordered separately)
- Operation and maintenance manual

Technical Specifications

| reennear opeen | |
|---|---|
| Contamination measurement range according to ISO 4406:1999 | Full-scale: 9/8/7 to 25/24/23 Calibrated: 13/11/10 to 23/21/18 |
| Contamination output code | Standard: ISO 4406:1999 and SAE AS 4059(D) Optional: ISO 4406:1987, NAS 1638 and ISO 4406:1999 |
| Self-diagnostics | Continuous with error indication via status LED on CS1000 |
| Permissible inlet pressure range | -9.8 to 50 psig (-0.7 to 3.5 bar) |
| Maximum permissible operating pressure | 160 psig |
| Inlet port thread type | SAE J1926-1: 3/4-16 - Female |
| Outlet port thread type | SAE J514: 7/16-20 37 - Male |
| Seal material | FKM (Viton®) |
| Permissible fluid temperature range | 32°F to 185°F (0°C to 85°C) |
| Permissible ambient temperature range | 32°F to 104°F (0°C to 40°C) |
| Maximum permissible fluid viscosity | 3,250 SUS (700 cSt) |
| Pump type | External gear |
| Power supply voltage | 24V DC |
| Maximum power consumption | 100W |
| Contamination sensor analog ouput signal | Standard: 4-20mA (time-coded) Optional: 2-10V (time-coded) |
| Water sensor (AS1000 & AS3000) analog output signal | 4-20mA |
| Oil aging sensor (HLB) analog output signal | 4-20mA (time-coded) |
| Ingress protection rating | IP 40 (control enclosure), IP 34 (pump motor) |
| Weight | Control enclosure: 5 lbs. Fluid sampling and condition monitoring unit: 10 lbs. |



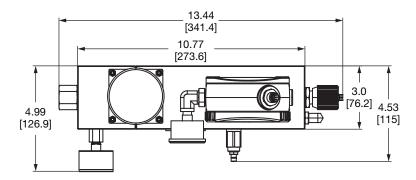
Model Code

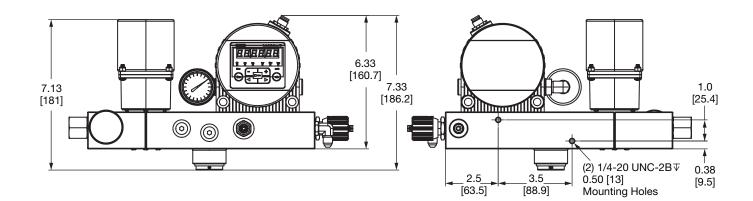
| Model – | | |
|--|---|--|
| HY-HV | = | HY-TRAX® High Viscosity System - Oils to 700cSt |
| | | (includes strainer and pressure gauge in manifold block) |
| ISO Code | e Pre | ference |
| NT | = | Manifold supplied w/o CS1xx0 |
| | | (customer will supply own manifold mount CS1xx0 with or without display) |
| 12 | = | ISO 4406:1999 and SAE AS 4059(D) |
| 13 | = | ISO 4406:1999 and SAE AS 4059(D) or ISO 4406:1987 and NAS 1638 |
| Display (| Optic | ns |
| 2 | = | with display |
| Fluids — | | |
| 0 | = | Hydraulic/Mineral Oil |
| | | |
| Analog li | nterf | aces (for CS1000) |
| • | | aces (for CS1000) |
| (omit) | = | 4 - 20 mA (Standard) |
| (omit) S | = | 4 - 20 mA (<i>Standard</i>) 2 - 10V Analog Output |
| (omit) S Option S | = = ensc | 4 - 20 mA (Standard) 2 - 10V Analog Output |
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| (omit) S Option S (omit) AS AS-D HLB1 | = enso = = = = = | 4 - 20 mA (Standard) 2 - 10V Analog Output rs None (Standard); plugged port for HLB1 or HLB2 option AquaSensor AS1008-C-000 AquaSensor AS3008-5-000 HYDACLAB® HLB14J8-1C000-000 HYDACLAB® HLB14J8-00S12-000 |
| (omit) S Option S (omit) AS AS-D HLB1 HLB2 | = enso = = = = = | 4 - 20 mA (Standard) 2 - 10V Analog Output rs None (Standard); plugged port for HLB1 or HLB2 option AquaSensor AS1008-C-000 AquaSensor AS3008-5-000 HYDACLAB® HLB14J8-1C000-000 HYDACLAB® HLB14J8-00S12-000 |
| (omit) S Option S (omit) AS AS-D HLB1 HLB2 Control ((omit) | = enso = = = = Dptic = | 4 - 20 mA (Standard) 2 - 10V Analog Output rs |
| (omit) S Option S (omit) AS AS-D HLB1 HLB2 Control (| = enso = = = = Dptic = | 4 - 20 mA (Standard) 2 - 10V Analog Output rs |

(omit) = none (Standard) L = Air-suppression

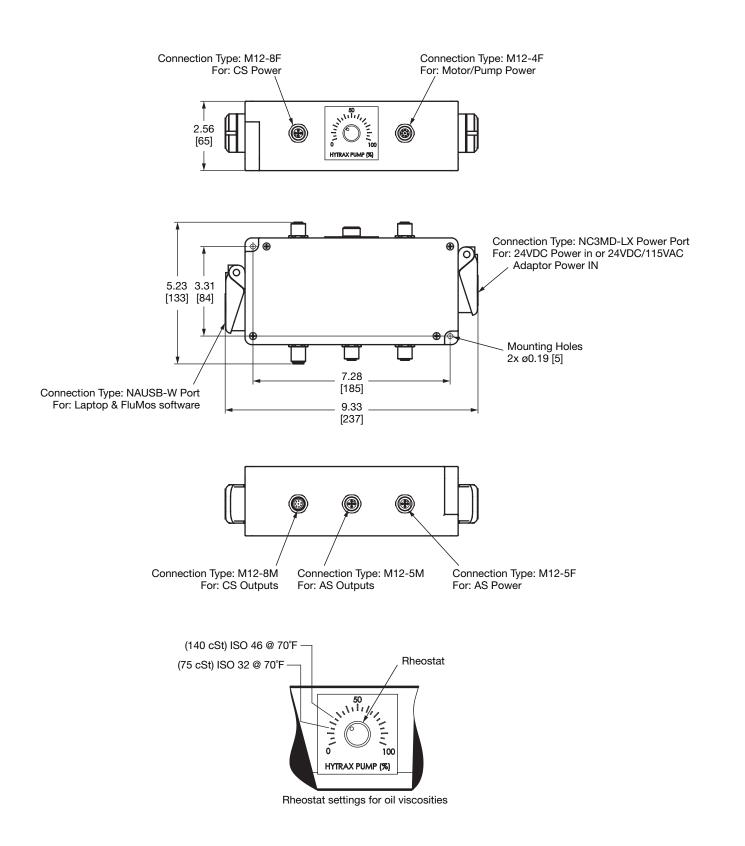
= Air-suppression hose loop (recommended)

Dimensions HY-HV-1220





Dimensions Manual Control Box for HYTRAX



Notes

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HY Series

Hy-TRAX[®] – Telematics Communications Module with Remote Controlled Sampling System



Features and Benefits

- Provides Remote Visibility to the Fluid Condition of Critical Systems.
- Integrated micro VSD (Variable Speed Drive) driven, pump/motor provides optimal flow for accurate sensor readings in variable conditions.
- This HY-TRAX[®] Remote Oil Contamination Sensor Package allows remote access via the internet and smart devices to fluid particle counts, temperature, and percent water saturation levels (optional) displayed on a customizable dashboard. The fluid sampling system collects data and the communications module transmits this data via GSM cellular at scheduled intervals. Users can receive alerts via email when a fluid's ISO contamination code or water saturation level (optional) reaches user defined critical levels. The unit can sample fluid directly from a fluid reservoir or low pressure line (<50 psi).
- The Communications Module automatically controls fluid flow to compensate for viscosity changes due to temperature or fluid type. All data is transmitted through a secure VPN and archived in a protected database in the cloud to allow real-time and historical analysis.
- The HY-TRAX[®] Communications Module will provide maintenance managers with the visibility and vital information necessary to proactively schedule preventative maintenance on local and remote equipment. Maintenance decisions can now be based on accurate and real-time data.
- The communications module components are mounted and housed in a rugged IP 40 enclosure.
- Fluid sampling system standard with Fluorocarbon elastomer (FKM) seals.
- Fluid viscosities up to 1623 SUS (350 cSt).
- 50 psi (3.5 bar) max. working pressure.
- Flow control valve providing optimal pressure for accurate sensor readings.

Applications

- Mobile Equipment Technology
- Surface Mining
- Construction
- Monitoring of Oil Cleanliness in Storage Tanks
- Fleet Services
- Rail

Technical Specifications

| Measuring Range | Display ISO ranges be and 9/8/7 Calibration ISO 13/11/10 to 23/21/ | within the range | | | | | | |
|---|---|---|--|--|--|--|--|--|
| Contamination Output Code | Standard: ISO 4406:1999 or SAE AS 4059(D) Optional: ISO4406:1987; NAS 1638 and ISO 4406:1999 | | | | | | | |
| Self-Diagnosis | Continuously with error status LED | or indication via | | | | | | |
| Pressure Rating | 50 psi (3.4 bar) max | | | | | | | |
| Fluid Inlet/Outlet | SAE ORB, Size 4 | | | | | | | |
| Seal Material | Fluorocarbon elastom | er (FKM) | | | | | | |
| Pump Speed | 500-5000 RPM (adjust | table) | | | | | | |
| Optimal Sampling Pump Flow Rate | 0.008-0.079 GPM (30- | 300 mL/min) | | | | | | |
| Fluid Temperature Range | 32°F to 185°F (0°C to - | +85°C) | | | | | | |
| Ambient Temperature Range | -22°F to 176°F (-30°C to 80°C) | | | | | | | |
| Max Viscosity | 1622 SUS (350 cSt) max. | | | | | | | |
| Pump Type | Gear Pump | | | | | | | |
| Power Supply | 24 volts DC | | | | | | | |
| Power Consumption | 4A | | | | | | | |
| Communications Module Signal Output | GSM cellular Commur monitoring website | nication to | | | | | | |
| Electrical Safety Class | III (low voltage protection), IP 40 enclosure | | | | | | | |
| Cellular Communications | AT&T Quad Band GSM (850, 900, 1800, 1900 MHz) | | | | | | | |
| Weight and Dimensions | | | | | | | | |
| Communications Module Control Sensor | HY-TRAX [®] Communications Module | Fluid Sampling Manifold w/ Communications Module & VSD Pump/Motor | | | | | | |
| | 10 lbs. (4.5 kg) | 20 lbs. (9.1 kg) | | | | | | |
| | 14.7" x 11.3" x 5.25" (374 x 287 x 133 mm) | | | | | | | |

Model Code

| | | | <u>HY</u> | - <u>12</u> | 1 | <u>Q</u> | / | <u> </u> | |
|----------|--------|--|-----------|-------------|---|----------|-------|----------|---|
| Model – | | | | | | | | | |
| HY | = | HY-TRAX [®] System - Oils to 350cSt | | | | | | | |
| | | (includes 100 micron mesh strainer and pressure gauge in manifold block) | | | | | | | |
| ISO Cod | le Pro | eference | | | | | | | |
| NT | = | Manifold supplied w/o CS1xx0 | | | | | | | |
| | | (customer will supply own manifold mount CS1xx0 with or without display) | | | | | | | |
| 12 | = | ISO Code >4/>6/>14 | | | | | | | |
| 13 | = | ISO Code >2/>5/>15 | | | | | | | |
| Display | Opti | | | | | | | | |
| 1 | = | without display | | | | | | | |
| 2 | = | with display | | | | | | | |
| Fluids – | | | | | | | | | |
| 0 | = | Hydraulic/Mineral Oil | | | | | | | |
| Analog I | Inter | faces | | | | | | | |
| (omit) | | | | | | | | | |
| Water S | enso | r Option | | | | | | | |
| (omit) | | No Water Sensor (None Standard) | | | | | | | |
| | | with AS3008 Water Sensor | | | | | | | |
| Control | Onti | one | | | | | | | |
| A | = | Telematic Communications Module with Dashboard Data Display (GSM Cellular, | •) | | | | | | |
| | | | / | | | | | | |
| Power C | | | | | | | | | 1 |
| (omit) | | 24V DC (Standard) | | | | | | | |
| Р | = | 115V AC | | | | | | | |
| Air Supp | press | ion Loop ———— | | | | | | | |
| (omit) | = | none | | | | | | | |
| | | | | | | | | | |

(omit) = none L = Looped hose and fittings

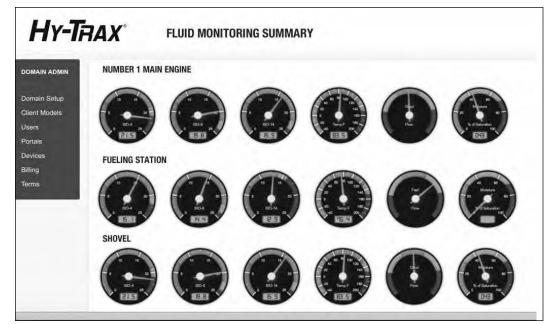
What's Included

- CS1000 Series Contamination Sensor
- Flow Control Valve
- GSM cellular communications
- VSD pump/motor
- Machined, 6061-T651 aluminum alloy manifold block with anodized surface treatment
- CS1000 Series Contamination Sensor (CS1000) Communications/Power Cable
- Specially designed fitting for mating to pump/motor
- Plugged water sensor port (G3/8 BSPP)
- IP 40 enclosure
- Water sensor (optional)
- 24V DC standard with optional 115V AC Power Supply
- Optional Water Sensor (AS3008) Communication/Power Cable
- Side or Front Inlet/Outlet Porting (SAE Size 04 ORB)

Example of HY-TRAX[®] Communications Modules Dashboard Contamination Chart

| Hy-Ti | AX | FLUID MONITORING DETAIL |
|---------------|----------------------------|--|
| DOMAIN ADMIN | NUMBER 1 MAI | |
| Domain Setup | Pump & Valve Test Bench | 10 |
| Client Models | | |
| Glient Models | | |
| Users | | |
| Portais | 100 | |
| | | Bu Bu |
| Devices | | 10 |
| Billing | | |
| Terms | | A A A A A A A A A A A A A A A A A A A |
| | | Count Date Time IOS 4 ISO 6 ISO 14 Temp F* Moist % |
| | | 1393141 11/14/14 09:56:15 18.6 17.0 12.2 89.4 0 Cleaniness Limits |
| | | 1393110 11/14/14 09:51:13 16:1 16:4 13:5 89:4 0 Max Min |
| | | 1393090 11/14/14 09:46:10 18.2 16.5 11,7 89.4 0 ISO 4 (4 µm) (22 ±) 10 ±) 1393067 11/14/14 09:41:108 18.7 17.2 12.4 86.3 0 ISO 6 (6 µm) 27 ±) 1 ±) |
| | | |
| | - | 1393012 11/14/14 09:31:04 18 7 17 2 12 7 86 4 0 ISO 14 (14 pm) 19 5 10 1 |
| | | 1392993 11/14/14 09:26:02 18.1 16.4 11.7 85.3 0 Temp (*) 130 1 80 1 |
| | (•) | 1392954 11/14/14 09:20:59 18.5 17.0 12.3 84.4 0 Saturation (%) (80 +) (10 +) |
| | | 1392930 11/14/14 09:15:57 18.9 17.5 12.9 84.0 0 |
| | | 1392902 11/14/14 09:10:55 18.5 17.1 12.8 84.0 D |
| | | 1392879 11/14/14 09:05:33 16.8 15.5 11.4 86.6 0 |

Example of HY-TRAX[®] Communications Modules Dashboard Gauge Panel



Notes

| | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|
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CONTAMINATION MONITORS FCU 1000 Series

Fluid Control Units - Portable Models







FCU 1315

Technical Specifications

FCU1310

Description

The FluidControl Unit FCU 1000 is a portable service unit, designed for the temporary measurement of solid particle contamination, water saturation and fluid temperature in hydraulic systems as well as Diesel fuels.

The integrated pump and the hoses contained in the FCU 1000 series scope of delivery allow operation in

- control circuits (oil hydraulics only)
- pressure circuits (oil hydraulics only) and
- pressureless reservoirs (oil hydraulics and Diesel fuels)

Important Instructions / Restrictions

- Designed for hydraulic oils (viscosity range 10 to 350 cSt)
- Designed for temporary operation up to max. 30 minutes, followed by a rest period of 10 minutes (no continuous operation)
- Operating pressure: -7.25 to 650 psi (-0.5 to 45 bar), with pressure adaptor: 215 to 5000 psi (15 to 345 bar)
- Not designed as a Bottle Sampler (minimal volume of 300 ml is required for a bottle sample analysis)

Applications

- Hydraulic systems
- Service for mobile hydraulics
- Maintenance
- Diesel storage, transfer, and filling

Features

- Two contamination calibrations in one instrument (reversible)
 ISO 4406:1987; NAS 1638
- ISO 4406:1999; SAE AS 4059 (D)
- Saturation and temperature measurement through the built-in AquaSensor 1000
- Integrated pump for measurement in pressureless reservoirs
- Operation with 24V DC network adaptor included in scope of delivery
- Interfaces: 5-pole plug, Bluetooth, USB data port

| General Data | |
|---|---|
| Self-diagnosis | continuously with error indication via status LED and display |
| Display | LED, 6 / 4 / 4 digits, in 17 segment format |
| Measured Value | ISO code/ SAE Class / NAS Class / Saturation level / Temperature |
| Measuring Range | Display from ISO code 9/8/7 (MIN) to ISO code 25/24/23 (MAX) Calibrated within the range ISO 13/11/10 to 23/21/18 Saturation level 0 to 100% / Temperature -13° to 212°F (-25 to 100°C) |
| Accuracy | +/-1/2 ISO class in the calibrated range / $\leq \pm 2$ % Full scale max. |
| Seal Material | FPM |
| Ambient Temperature Range | 32 to 113°F (0 to 45°C) |
| Storage Temperature Range | -40 to 176°F (-40 to 80°C) |
| IP class | IP 50 in operation IP67 closed |
| Weight | approx. 29 lbs (13 kg) |
| Hydraulic Data | |
| Operating Pressure with Adaptor for Pressure Lines | in: -7.25 to 650 psi (-0.5 to 45 bar) out: 0 to 7.5 psi (0 to 0.5 bar) in: 217 to 5000 psi (15 to 345 bar) out: 0 to 7.5 psi (0 to 0.5 bar) |
| Pressure max. | 5000 psi (345 bar) |
| Measurement Flow Rate | 30 to 300 ml/min (viscosity dependant) |
| Maximal Suction Height | 1 m |
| Permissible Viscosity Range with Adaptor for pressure lines | 46 to 1622 SUS (10 to 350 cSt) |
| Fluid Temperature Range | 32 to 158°F (0 to 70°C) |
| Electrical Data | |
| Power Supply Voltage | 24 V DC \pm 20%, residual ripple < 10% |
| Max. Power / Current Consumption | 100 Watt / 4 A |
| Interface | Bluetooth via FluMoS Mobile App Plug connection, 5-pole, male, M12x1 |

We do not guarantee the accuracy or completeness of this information. The information is based on average working conditions. For exceptional operating conditions please contact our technical department. All details are subject to technical changes.

Model Code

| | | $\frac{FCU}{1} \frac{1}{2} \frac{3}{2} \frac{1}{2} \frac{0}{2} - \frac{4}{2} - \frac{1}{2} - \frac{4}{2} - \frac{1}{2} - \frac{4}{2} - \frac{1}{2} - $ |
|----------|-------|--|
| Series – | | |
| FCU | = | Fluid Control Unit |
| Model – | | |
| 1 | = | 1000 Series, 4 particle size channels |
| Contam | inati | on Code |
| 3 | = | ISO 4406:1987; NAS 1638 / 2-5 μ m, 5-15 μ m, 15-25 μ m, > 25 μ m ISO 4406:1999; SAE AS 4059 (D) / > 4 μ m(c)> 6 μ m(c)> 14 μ m(c)> 21 μ m(c) reversible between |
| Housing | | |
| 1 | = | for Hydraulic and lubrication fluids based on mineral oils |
| 5 | = | Hydraulic and lubrication fluids based on mineral oils as well as diesel |
| Fluids – | | |
| 0 | = | Mineral Oil, Synthetic Esters/PAO, Quintolubric, Cosmolubric (Consult factory for other fluid types.) |
| Options | | |
| 4 | = | with Integrated Pump |
| Supply \ | /olta | ge |
| Û | = | |
| Integrat | ed S | ensor |
| AS | = | AquaSensor (AS 1000 series) |
| Power S | laqu | y Adapter — |

1 = 100 to 240 V AC / 50/60 Hz / 1 Phase, (Europe, USA/Canada, UK, Australia, Japan)

Model Codes containing RED are non-standard items - Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability

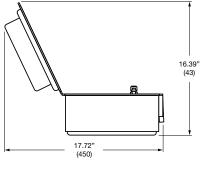
Scope of Delivery

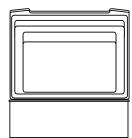
- Fluid Control Unit FCU 1000
- · Power supply AC adaptor with connecting cables to supply voltage for Europe, USA/Canada, UK, Australia, Japan
- Adaptor for pressure lines
- INLET pressure hose with screw connection for Test Point 1620, black, length = 6.7 ft. (2 m)
- INLET suction hose, open end, transparent, length = 6.7 ft. (2 m) (only FCU 1315)
- INLET suction hose, open end, clear, length = 1 ft. (0.3 m)
- INLET Bottle Sampling suction pipe, angled
- OUTLET return hose, open end, clear, length = 3.3 ft. (1 m)
- Operating and Maintenance Instructions / Calibration certificate
- Ground cable; ESD protection (only FCU 1315)
- USB Memory Stick
- CD with FluMoS Light Software and manuals

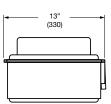
Accessories

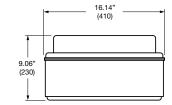
- Battery pack P/N 03504605
- Cable with universal plug (for cigarette lighter or socket from supply system on board), L = 32.8 ft. (10 m) P/N 03306236
- Field Verification Start-up Kit P/N 3443253
- Field Verification Refill Kit P/N 3443249

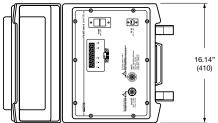
Dimensions











Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

CONTAMINATION MONITORS TFL Series

Total Fluid Life



Description

The Total Fluid Life is a state-of-the-art portable service unit, designed to provide invaluable, real-time insight into the health of synthetic oils, organic oils, mineral oils, and diesel fuel. This insight helps fluid users make informed decisions with regard to fluid replacement and treatment planning.

Features

- Laser Particle Counter measures particle contamination according to ISO 4406, NAS 1638, and SAE AS4059
- Water Sensor shows relative humidity of oil as % saturation
- Internal Gear Pump with bypass for processing pressurized and non-pressurized vessels
- Oil Life Sensor gives warning of oil life ending and also helps inform if an oil change is required
- Touch Screen allows users to navigate operational functions with ease and analyze data

Applications

Power Generation

Off Road Mining & Construction

Industrial Hydraulics

Wind Power

•

- Steel Making
- Marine

Technical Specifications

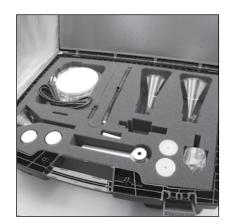
| General Data | |
|---|---|
| Measured Variables | ISO Code / SAE Class / NAS Class |
| | / TAN-Delta Number (Oil Life) / |
| | Saturation Level / Temperature |
| Particulate Measurement Standards | ISO 4406 (≥4(c) / ≥6(c) / ≥14(c) / ≥21(c)) , NAS 1638, SAE AS4059 |
| Particle Counter Measuring Range | Maximum ISO Code of 29 |
| Accuracy | ±0.5 ISO Code (Minimum concentration ISO MTD 2.8mg/L) |
| Operating Temperature Range | 32°F to 122°F |
| Fluid Compatibility | Mineral-based oils, Synthethic oils, Organic oils, Diesel Fuels |
| Dimensions (cover closed) | (L) 16.2" x (D) 12.7" x (H) 6.7" (main device; accessory case: (L) 22.6" x (D) 20.9" x (H) 8.0") |
| Environmental Protection | IP67 (cover closed) IP54 (cover open) |
| Maximum Ambient Humidity | 97% relative humidity, non- condensing |
| Weight | 20.8 lbs. (9.45kg) (main device; accessory case: 19lbs. [8.6kg]) |
| Calibration Verification | 12 months recommended |
| Frequency | |
| Hydraulic Data | |
| Operating Pressure | 36.3 psi (2.5 bar) Max. |
| | (5075 psi [350 bar] w/ adapter for pressurized lines) |
| System Pressure | |
| System Pressure Permissible Viscosity Range | pressurized lines) |
| | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high |
| Permissible Viscosity Range | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) |
| Permissible Viscosity Range Operating Temperature | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) |
| Permissible Viscosity Range Operating Temperature Fluid Temperature Range | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) |
| Permissible Viscosity Range Operating Temperature Fluid Temperature Range Pump Type | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) Gear |
| Permissible Viscosity Range Operating Temperature Fluid Temperature Range Pump Type Duty Cycle | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) Gear Continuous 1604 minimess test points, with 0.6m |
| Permissible Viscosity Range Operating Temperature Fluid Temperature Range Pump Type Duty Cycle Connections | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) Gear Continuous 1604 minimess test points, with 0.6m |
| Permissible Viscosity Range Operating Temperature Fluid Temperature Range Pump Type Duty Cycle Connections Electrical Data | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) Gear Continuous 1604 minimess test points, with 0.6m long 8mm tubing |
| Permissible Viscosity Range Operating Temperature Fluid Temperature Range Pump Type Duty Cycle Connections Electrical Data Power Supply Voltage | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) Gear Continuous 1604 minimess test points, with 0.6m long 8mm tubing 115V AC |
| Permissible Viscosity Range Operating Temperature Fluid Temperature Range Pump Type Duty Cycle Connections Electrical Data Power Supply Voltage Nominal Battery Voltage | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) Gear Continuous 1604 minimess test points, with 0.6m long 8mm tubing 115V AC 15.0V DC |
| Permissible Viscosity Range Operating Temperature Fluid Temperature Range Pump Type Duty Cycle Connections Electrical Data Power Supply Voltage Nominal Battery Voltage Charge Voltage | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) Gear Continuous 1604 minimess test points, with 0.6m long 8mm tubing 115V AC 15.0V DC 16.8V DC |
| Permissible Viscosity Range Operating Temperature Fluid Temperature Range Pump Type Duty Cycle Connections Electrical Data Power Supply Voltage Nominal Battery Voltage Charge Voltage Charge Capacity | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) Gear Continuous 1604 minimess test points, with 0.6m long 8mm tubing 115V AC 15.0V DC 16.8V DC 5.2Ah |
| Permissible Viscosity Range Operating Temperature Fluid Temperature Range Pump Type Duty Cycle Connections Electrical Data Power Supply Voltage Nominal Battery Voltage Charge Voltage Charge Capacity Charge Time | pressurized lines) 145 psi (10 bar) Max. 1-320 cSt (1-300 cSt with high pressure adapter) 32°F to 122°F 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) Gear Continuous 1604 minimess test points, with 0.6m long 8mm tubing 115V AC 15.0V DC 16.8V DC 5.2Ah 2 hours (80%) / 5 hours (100%) |

We do not guarantee the accuracy or completeness of this information. The information is based on average working conditions. For exceptional operating conditions please contact our technical department. All details are subject to technical changes.

Model Selection



Total Fluid Life



Accessory Kit Included with Total Fluid Life



High Pressure Adapter

Sold Separately C/F (P/N 7641529)

What's Included in the Accessory Kit

- 120VAC Power Supply (charger)
- Hotplate
- Temperature probe
- Magnetic stirrer
- 100 mm wide funnel
- (2) 100 mL sampling bottles
- Sampling/vacuum pump
- USB memory stick
- (2) stoppers (8mm hole)
- Viscosity cup
- High-pressure device
- (2) solid stoppers
- (2) 500 mL flasks
- Storage compartment for hoses and cables



CONTAMINATION MONITORS TFH Series

Total Fluid Health



Description

The Total Fluid Health is a revolutionary portable service unit, designed to measure and differentiate particulate contamination, as well as determine oil life, relative water content, and temperature. This real-time insight into the health of synthetic, organic, and mineral oils, as well as diesel fuel, helps users make informed decisions with regard to fluid replacement and treatment planning.

Features

- Direct Digital Imaging Sensor measures particle contamination according to ISO 4406, NAS 1638, and SAE AS4059; sorts particles into fatigue, cutting, sliding wear, fiber and bubble categories to estimate cause of contamination
- Oil Life Sensor gives warning of oil life ending and also helps inform if an oil change is required
- Touch Screen allows users to navigate operational functions with ease and analyze data
- Water Sensor shows relative humidity of oil as % saturation
- Internal Gear Pump with bypass for processing pressurized and non-pressurized vessels

Applications

- Power Generation
- Wind Power
- Industrial Hydraulics
- Steel Making
- Off Road Mining & Construction Marine

Technical Specifications

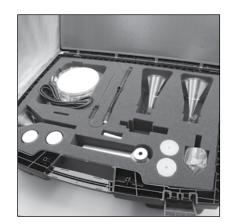
| Measured Variables Particle Differentiation / ISO Code / SAE Class / NAS Class / TAN-Delta Number (Oil Life) / Saturation Level / Temperature Particulate Measurement Standards ISO 4406 (≥4(c) / ≥6(c) / ≥14(c) / ≥21(c) / ≥38(c) / ≥70(c) / ≥100(c)) , NAS 1638, SAE AS4059 Particle Counter Measuring Range Maximum ISO Code of 29 Accuracy ±0.5 ISO Code (Minimum concentration ISO MTD 2.8mg/L) Operating Temperature Range 32°F to 122°F Fluid Compatibility Mineral-based oils, Synthethic oils, Organic oils, Diesel Fuels Dimensions (cover closed) (L) 16.2" x (D) 12.7" x (H) 6.7" (main device; accessory case: (L) 22.6" x (D) 20.9" x (H) 8.0") Environmental Protection IP67 (cover closed) IP54 (cover open) Maximum Ambient Humidity 97% relative humidity, non- condensing Weight 26.5 Ibs. (12.0kg) (main device; accessory case: 19lbs. [8.6kg]) Calibration Verification Frequency 12 months recommended | Technical Specificat | |
|---|-----------------------------|------------------------------------|
| SAE Class / NAS Class / TAN-Delta Number (Oil Life) / Saturation Level / Temperature Particulate Measurement Standards ISO 4406 (≥4(c) / ≥6(c) / ≥14(c) / ≥21(c) / ≥38(c) / ≥70(c) / ≥100(c)), NAS 1638, SAE AS4059 Particle Counter Measuring Range Maximum ISO Code of 29 Accuracy ±0.5 ISO Code (Minimum concentration ISO MTD 2.8mg/L) Operating Temperature Range 32°F to 122°F Fluid Compatibility Mineral-based oils, Synthethic oils, Organic oils, Diesel Fuels Dimensions (cover closed) IP54 (cover closed) IP54 (cover closed) IP54 (cover closed) IP54 (cover closed) IP54 (cover open) Maximum Ambient Humidity 97% relative humidity, non- condensing Weight 26.5 Ibs. (12.0kg) (main device; accessory case: 19lbs. [8.6kg]) Calibration Verification Frequency 12 months recommended Hydraulic Data 12 Inlet Pressure 36.3 psi (2.5 bar) Max. (5075 psi [350 bar] wi adapter for pressurized lines) System Pressure 145 psi (10 bar) Max. Permissible Viscosity Range 1-2400 cSt (1-300 cSt with high pressure adapter) Operating Temperature 32°F to 122°F Fluid Temperature Range 14°F to 131°F (oils) 14°F to 122°F (diesel fuel) Pump Type Gear | General Data | |
| Number (Oil Life) / Saturation Level / TemperatureParticulate MeasurementISO 4406 (≥4(c) / ≥6(c) / ≥14(c) / ≥21(c) / ≥38(c) / ≥70(c) / ≥100(c)), NAS 1638, SAE AS4059Particle Counter Measuring RangeMaximum ISO Code of 29Accuracy±0.5 ISO Code (Minimum concentration ISO MTD 2.8mg/L)Operating Temperature Range32°F to 122°FFluid CompatibilityMineral-based oils, Synthethic oils, Organic oils, Diesel FuelsDimensions (cover closed)(L) 16.2" x (D) 12.7" x (H) 6.7" (main device; accessory case: (L) 22.6" x (D) 20.9" x (H) 8.0")Environmental ProtectionIP67 (cover closed) IP54 (cover open)Maximum Ambient Humidity 97% relative humidity, non- condensingWeight26.5 lbs. (12.0kg) (main device; accessory case: 19lbs. [8.6kg])Calibration Verification Frequency12 months recommendedHydraulic Data Inlet Pressure14.5 psi (10 bar) Max.Permissible Viscosity Range 1-2400 cSt (1-300 cSt with high pressure adapter)Operating Temperature System Pressure14°F to 131°F (oils) 14°F to 131°F (oils) 14°F to 132°F (diesel fuel)Pump Type GearGearDuty CycleContinuousConnections1604 minimess test points, with 0.6m long 8mm tubingElectrical Data Power Supply Voltage115V ACNominal Battery Voltage15.0V DCCharge Capacity5.2Ah | Measured Variables | |
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| | Data Transmission | Internet, USB |

We do not guarantee the accuracy or completeness of this information. The information is based on average working conditions. For exceptional operating conditions please contact our technical department. All details are subject to technical changes.

Model Selection



Total Fluid Health



Accessory Kit Included with Total Fluid Health



High Pressure Adapter Sold Separately

What's Included in the Accessory Kit

- 120VAC Power Supply (charger)
- Hotplate
- Temperature probe
- Magnetic stirrer
- 100 mm wide funnel
- (2) 100 mL sampling bottles
- Sampling/vacuum pump
- USB memory stick
- (2) stoppers (8mm hole)
- Viscosity cup
- High-pressure device
- (2) solid stoppers
- (2) 500 mL flasks
- Storage compartment for hoses and cables

RBSA Series

Reservoir Breather Fluid Sampling Adapter



Description

The RBSA is an aluminum adapter that gives easy access to a hydraulic oil reservoir for fluid sampling. The Reservoir Breather Adapter gives the user access to the hydraulic oil to more easily determine the real-time particulate and water saturation contamination data.

Features

- Drop-in reservoir breather retrofit for fluid sampling provides clean easy access to the reservoir through the existing breather part
- Provides easy fluid quality sampling solution for HY-TRAX® and FCU1310 suction and return ports
- Hytrax adapter kit includes #6 & #4 JIC adapters with 6' connection hoses included
- FCU1310 adapter includes 1620 testpoint and 3' connection hose to FCU1310
- 24" SS drop tubes can be cut to length
- Standard 6 bolt breather pattern
- Anodized 6061 aluminum breather
- ¾" NPT for breather element

Applications

 All applications with a hydraulic reservoir utilizing a 6-bolt mounting connection

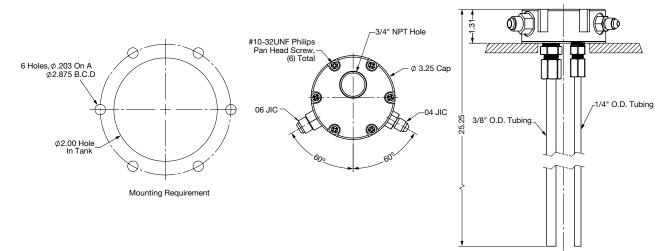
Technical Specifications

| - | |
|---------------------------------|--|
| Reservoir Mounting Pattern: | Fits standard 6-bolt |
| Supply Port Thread Size: | 9/16-18 UN |
| Return Port Thread Size: | 7/16-20 UN |
| Breather Port Thread Size: | ¾" NPT |
| Fittings: | Option 1: Includes #4 & #6 JIC fittings. Optional #6 & #4 JIC fittings and 6' supply/return hoses. Option 2: Includes 1620 test point and TMU connection hose. |
| Return Tubes: | Supplied with 3/8" and 1/4" return tubes. Tubes are 24" long and can be shortened if necessary. Housing constructed 6061 anodized aluminum. |

Mounting Pattern

Customer is responsible to cut an appropriately sized hole on top of their tank. This adapter has two (2) ports: one for Suction and one for Return. Also includes a breather port.

Reservoir pattern is six (6) .203" holes on a 4.94" BCD with a 4.25" diameter center hole. See Drawing S-1048.



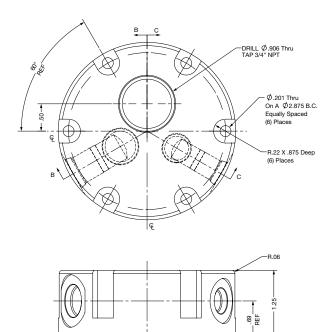
B30 HYDAC

Model Code

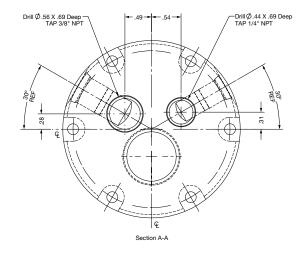
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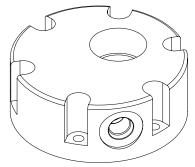
| Series — | | | |
|----------|---|--|--|
| RBSA | _ | Reservoir Breather Fluid Sampling Adapter | |
| RDSA | - | neservoir breather huid Sampling Adapter | |
| Options | | | |
| 1 | = | HY-TRAX [®] adapter fitting #6 & #4 JIC fittings and 6' supply/return hoses | |
| 2 | = | FCU1310 adapter (suction hose included) | |

Application Example

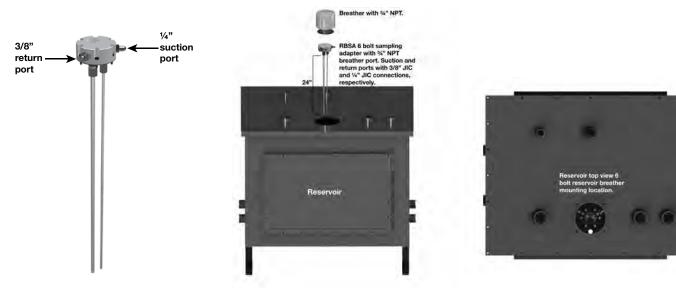








Mounting Views



CONTAMINATION MONITORS MCS Series

Metallic Contamination Sensor



Description

The MetallicContamination Sensor MCS 1000 is used for measuring and recording metallic wear particles in fluids. An inductive measuring method is used to detect and count the particles and classify them according to their size and metallurgical properties (ferromagnetic/non-ferromagnetic). The MCS 1000 is therefore an ideal tool for the continuous condition monitoring of large industrial gearboxes, pumps or bearing systems, and provides early information on any early-stage damage.

The sensor can be used on its own or in combination with other condition monitoring devices such as vibration monitoring systems.

The MCS 1000 can therefore be easily integrated into conditionbased or predictive maintenance approaches and it also helps to prevent unscheduled system downtimes.

Features

- Early detection of imminent damage
- Prevention of costly and unscheduled system downtimes
- Determination of the degree of wear and localization of wear sources based on the classification of the measured wear particles with regard to their size and metallurgy
- Easy integration into systems and plants due to standardized data interfaces and a large range of hydraulic accessories
- An ideal tool for the implementation of modern maintenance strategies and as an extension for existing machine conditionbased monitoring devices such as vibration monitoring systems

Applications

- Wind Turbines
- Marine Thrusters
 - Industrial Gear Boxes
- Mobile Drive Systems
- Lubrication SystemsFlushing Systems
- Test Stands
- Pumps

Technical Specifications

| Measured Variables | MCS 15xx | MCS 14xx | MCS 13xx | | |
|---|-------------------|--|-----------|--|--|
| Ferromagnetic (Fe) ptcl | > 200 µm | > 100 µm | > 70 µm | | |
| Non-ferromagnetic (nFe) ptcl | > 550 µm | > 300 µm | > 200 µm | | |
| (particle with volume equ | ivalent to that c | of a sphere of g | iven ø) | | |
| Particle classification | (6 size cla | cation in acco ISO 16232 asses; 3 Fe, 3 n depends on se | Fe; class | | |
| Max. particle rate (ptcl/sec.; proprotional to flow rate) | 8 to 160 | 9 to 180 | 0 to 200 | | |



Technical Specifications (cont'd)

| 6 13xx | | | | | | | |
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We do not guarantee the accuracy or completeness of this information. The information is based on average working conditions. For exceptional operating conditions please contact our technical department. All details are subject to technical changes.

Model Code

CONTAMINATION MONITORS

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|-----------------|--------|---|------------|-------------------|----------|--------------|---------------------|------------|---------------|---|
| Series - MCS | = | Metallic Contamination Sensor | | | | | | | | |
| Model - | | | | | | | | | | |
| 1 | = | 1000 Series | | | | | | | | |
| Detectio | on lin | nit / sensor cross-section | | | | | | | | |
| 3 | = | Fe particles > 70 μ m / ¼" | | | | | | | | |
| 4 | = | Fe particles > 100 μ m / ½" | | | | | | | | |
| 5 | = | Fe particles > 200 μm / 1" | | | | | | | | |
| Signal o | utpu | t / electrical interface | | | | | | | | |
| 8 | = | 2x switching output / RS485 (HSI, Modbus RTU) / Ethernet (HSI TCP/IP, Modbus TCP) | | | | | | | | |
| 9 | = | 2x switching output / CAN (CANopen) / Ethernet (HSI TCP/IP, Modbus TCP) | | | | | | | | |
| Signal in | nput | / electrical interface | | | | | | | | |
| 0 | = | Without | | | | | | | | |
| Media / | fluid | s | | | | | | | | |
| 0 | = | Mineral and synthetic oils | | | | | | | | |
| Hydraul | ic co | nnection | | | | | | | | |
| 1 | = | Flange connection, SAE 1/2" according to ISO 6162-1 | | | | | | | | |
| 2 | = | Flange connection, SAE ¾" according to ISO 6162-1 | | | | | | | | |
| 3 | = | Flange connection, SAE 1" according to ISO 6162-1 | | | | | | | | |
| 4 | = | Flange connection, SAE 4" according to ISO 6162-1 | | | | | | | | |
| 5 | = | Flange connection, SAE 1/2" according to ISO 6162-1 | | | | | | | | |
| Electric | al Ins | stallation | | | | | | | | |
| 2 | = | M12x1 male connection, 8-pin / Ethernet M12x1, 4-pin, D encoded according to IE | C6107 | 6-2-10 | 1 / mi | ni USB | | | | |
| | | | | | | | | | | |

Modification number —

000 = Standard

Scope of Delivery

- Sensor MCS 1000 series
- O-rings (NBR and FPM)
- Installation and Maintenance Instructions

Accessories - hydraulic

| Flange adapter | Part no. |
|--|----------|
| SAE 4" flange adapters (set) to pipe/hose connection, 42L according to ISO 8431-1 consisting of: - 2x Flange adapters - 2x O-Rings (NBR) - 8x Cheese-head screws - 8x Washers - 8x Spring washers" | 3435426 |
| SAE ½" Flange adapters (set) to pipe/hose connection, ½" according to ISO 8431-1 consisting of: - 2x Flange adapters - 2x O-Rings (NBR) - 8x Cheese-head screws" | 3788271 |
| SAE ¾" Flange adapters (set) for pipe/hose connection, ½" according to ISO 8431-1 consisting of: - 2x Flange adapters - 2x O-Rings (NBR) - 8x Cheese-head screws" | 3588249 |
| Flange adapter plate, SAE 4" – SAE 1 ½" | 3442518 |

System integration

HYDAC has a large number of solutions for the hydraulic, mechanical, electrical and data processing system integration for the sensors of the MCS 1000 series, such as:

- Selected flange adapters for hydraulic system integration through piping or hoses
- System integration that is specially matched to the product and the respective application (HYDAC ConditionMonitoring Kit CMK)
- Universal complete solutions for fluid condition monitoring (HYDAC CondtionMonitoring Package CMP)

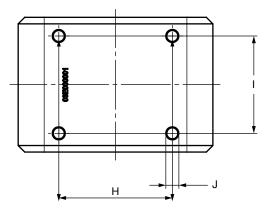
Please contact Filter Systems for further detailed information.

Accessories - electrical

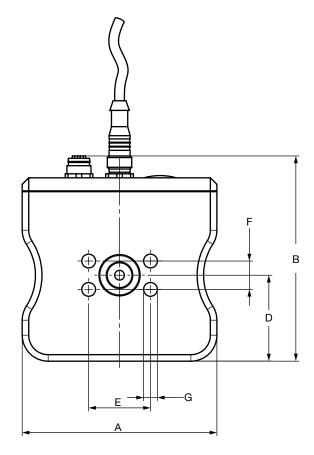
| Accessories - electrical | |
|---|----------|
| Connection cable | Part no. |
| ZBE42S-05 Connection cable, socket plug 8 pin with cable, open cable end, length = 5 m | 3281239 |
| ZBE44 mating connector with screw clamp, 8-pin, M12x1 | 3281243 |
| Connection cable | |
| ZBE43-05 Connection cable, coupling/ plug 8 pin, length = 5 m | 3281240 |
| ZBE43-10 Connection cable, coupling/ plug 8 pin, length = 10 m | 3519768 |
| ZBE30-02 Connection cable, coupling/ plug 5 pin, length = 2 m | 6040851 |
| ZBE30-05 Connection cable, coupling/ plug 5 pin, length = 5 m | 6040852 |
| Network cable (LAN) | |
| ZBE 45-05 Network cable (patch), Socket plug 4 pin, d-coded / male connector RJ45, length = 5 m | 3346100 |
| ZBE 45-10 Network cable (patch), Socket plug 4 pin,d-coded / male connector RJ45, length = 10 m | 4571668 |

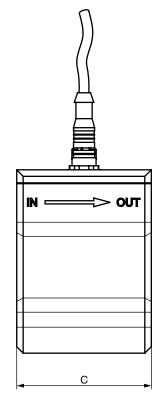
CONTAMINATION MONITORS

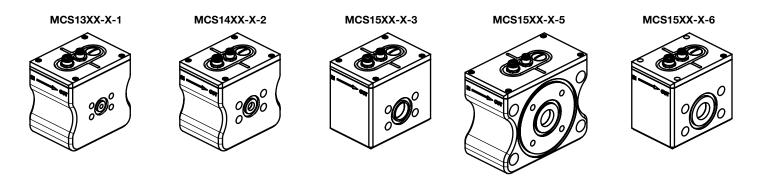
Dimensions



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|---|----------|-----|-----|----|------|------|------|-------|----|----|----|
| Γ | 13XX-X-1 | 120 | 113 | 83 | 53 | 38.1 | 17.5 | ø8 | 70 | 60 | M8 |
| ſ | 14XX-X-2 | 120 | 113 | 83 | 53 | 47.6 | 22.2 | ø11.5 | 70 | 60 | M8 |
| ſ | 15XX-X-3 | 162 | 106 | 83 | 38.5 | 52.4 | 26.2 | ø11.5 | 80 | 55 | M8 |
| ſ | 15XX-X-5 | 162 | 132 | 83 | 62 | 130 | 77.8 | ø17.5 | 95 | 60 | M8 |
| | 15XX-X-6 | 120 | 106 | 83 | 38.5 | 69.9 | 35.7 | ø13.5 | 90 | 35 | M8 |







Notes

| VUL | 00 | | | | | | | |
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CONTAMINATION MONITORS AS 1000 Series

Aqua Sensor



Description

The Aqua Sensor AS 1000 is a fluid sensor for detecting water in hydraulic and lubrication fluid, especially designed as OEM sensor for fluid condition monitoring.

The sensor measures the water content relative to the saturation concentration (saturation point) and outputs the saturation level (0 to 100%) as a 4 - 20 mA signal. A reading of 0% would indicate fluid that is free of water, while a reading of 100% would indicate a fluid that is saturated with water.

The AS 1000 can be used to simultaneously determine the temperature of the oil and output it as a 4 to 20 mA signal as well.

In so doing, the AS 1000 enables hydraulic and lubrication fluids to be monitored accurately, continuously and on-line.

Water in Oil

It is almost certain that there is water present in hydraulic and lubrication systems. These systems should be operated without the presence of free or emulsified water. The most common sources of water entering a system are ambient humidity, "splash" from process water, and new oil. Water contamination will accelerate the aging process of the oil resulting in oil oxidization, additive depletion, reduced lubrication, corrosion and damaged components. Most of these costly problems can be avoided by monitoring the water content of the operating fluids.

Sometimes the water content is difficult to determine, but with the HYDAC Aqua Sensor, determining the amount of water is easy! The most practical method for monitoring water content in oil is as a percent of the saturation level. Different oils are capable of dissolving varying amounts of water, therefore they have varying water saturation curves. The curve *(below)* is an example of the typical relationship of water saturation level versus fluid temperature in hydraulic and lubrication oils. By looking at the example graph it can be seen that this fluid is capable of holding more water, or has a higher saturation level, as the temperature increases.

Applications

- · Hydraulic systems that are sensitive to water
- Gear boxes
- Molding machines
- Turbines
- Transferrers

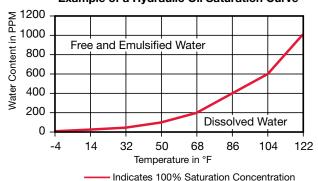


Technical Specifications

| Output Data - Humidity MeasurementOutput level (saturation level)4 to 20 mACalibrated accuracy $\leq \pm 2\%$ FS max.Accuracy in media measurements $\leq \pm 3\%$ FS typ.Pressure dependent $+ 0.02\%$ FS / barOutput Data - Temperature MeasurementOutput signal (temperature)4 to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194° F (0° to 90° C)Ambient temperature range -40° to 212° F (-40° to 100° C)Viscosity range 32 to 23175 SUS (1 to 5000 cSt)Flow velocity < 16 ft/sec (4.88 m/sec) | Input Data | |
|---|--|--|
| Operating pressuremax. 725 psi (40 bar)Burst pressure> 9000 psi (620 bar)Parts in contact with fluidStainless steel, FPM seal, ceramic with evaporated metalOutput Data - Humidity Measurement0 to 20 mAOutput level (saturation level)4 to 20 mACalibrated accuracy $\leq \pm 2\%$ FS max.Accuracy in media measurements $\leq \pm 3\%$ FS typ.Pressure dependent $+ 0.02\%$ FS / barOutput Data - Temperature MeasurementOutput signal (temperature)4 to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level)32° to 194°F (0° to 90°C)Ambient temperature range-40° to 212°F (-40° to 100°C)Viscosity range16 tf/sec (4.88 m/sec)Permissible fluidsFluids based on mineral oil and synthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Type of Protection acc. DIN 40050IP67Other DataM12x1.5 pole (DIN VDE 0627)Pin 2: Signal saturation level Pin 1: +UbM12x1.5 pole (DIN VDE 0627)Pin 4: Signal temperature Pin 5: not connectedM12x1.5 pole (DIN VDE 0627)Pin 4: Signal temperature Pin 5: not connectedStandardReverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Measuring range (temperature) | -13 to 212°F (-25 to 100°C) |
| Burst pressure $> 9000 \text{ psi} (620 \text{ bar})$ Parts in contact with fluidStainless steel, FPM seal, ceramic with evaporated metalOutput Data - Humidity MeasurementOutput level (saturation level)4 to 20 mACalibrated accuracy $\leq \pm 2\%$ FS max.Accuracy in media measurements $\leq \pm 3\%$ FS typ.Pressure dependent $+ 0.02\%$ FS / barOutput Data - Temperature MeasurementOutput signal (temperature)4 to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194°F (0° to 90°C)Ambient temperature range -40° to 212°F (-40° to 100°C)Viscosity range $32 to 23175$ SUS (1 to 5000 cSt)Flow velocity $< 16 \text{ ft/sec}$ (4.88 m/sec)Permissible fluidsFluids based on mineral oil and synthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Type of Protection acc. DIN 40050IP67Other DataM12x1.5 pole (DIN VDE 0627)Pin 2: Signal saturation level Pin 3: 0V / GNDM12x1.5 pole (DIN VDE 0627)Pin 4: Signal temperature Pin 5: not connectedM12x1.5 pole (DIN VDE 0627)Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Measuring range (saturation level) | 0 to 100% |
| Parts in contact with fluidStainless steel, FPM seal, ceramic with evaporated metalOutput Data - Humidity MeasurementOutput level (saturation level)4 to 20 mACalibrated accuracy $\leq \pm 2\%$ FS max.Accuracy in media measurements $\leq \pm 3\%$ FS typ.Pressure dependent $+ 0.02\%$ FS / barOutput Data - Temperature MeasurementOutput signal (temperature)4 to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194° F (0° to 90° C)Ambient temperature range -40° to 212° F (-40° to 100° C)Viscosity range $21 to 32175$ SUS (1 to 5000 cSt)Flow velocity < 16 ft/sec (4.88 m/sec)Permissible fluidsFluids based on mineral oil and synthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Type of Protection acc. DIN 40050IP67Other Data $\leq 5\%$ Supply voltage12 to 32 V DCResidual ripple $\leq 5\%$ Thread connectionG $3/8$ BSPP male threadTorque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connectionM12x1.5 pole (DIN VDE 0627)Pin 1: +UbM12x1.5 pole (DIN VDE 0627)Pin 4: Signal temperatureStandardPin 5: not connectedStandard | Operating pressure | max. 725 psi (40 bar) |
| Parts in contact with hildceramic with evaporated metalOutput Data - Humidity MeasurementOutput level (saturation level)4 to 20 mACalibrated accuracy $\leq \pm 2\%$ FS max.Accuracy in media measurements $\leq \pm 3\%$ FS typ.Pressure dependent $+ 0.02\%$ FS / barOutput Data - Temperature MeasurementOutput Signal (temperature)A to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194°F (0° to 90°C)Ambient temperature range -40° to 212°F (-40° to 100°C)Viscosity range $12 to 23175$ SUS (1 to 5000 cSt)Flow velocity< 16 ft/sec (4.88 m/sec) | Burst pressure | > 9000 psi (620 bar) |
| Output level (saturation level)4 to 20 mACalibrated accuracy $\leq \pm 2\%$ FS max.Accuracy in media measurements $\leq \pm 3\%$ FS typ.Pressure dependent $\pm 0.02\%$ FS / barOutput Data - Temperature MeasurementOutput signal (temperature)4 to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194°F (0° to 90°C)Ambient temperature range -40° to 212°F (-40° to 100°C)Viscosity range 32 to 23175 SUS (1 to 5000 cSt)Flow velocity < 16 ft/sec (4.88 m/sec)Permissible fluidsFluids based on mineral oil and synthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Type of Protection acc. DIN 40050IP67Other DataSupply voltageSupply voltage12 to 32 V DCResidual ripple $\leq 5\%$ Thread connectionG 3/8 BSPP male threadTorque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connectionM12x1.5 pole (DIN VDE 0627)Pin 3: 0V / GND Pin 4: Signal saturation levelM12x1.5 pole (DIN VDE 0627)Pin 5: not connectedStandardReverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Parts in contact with fluid | Stainless steel, FPM seal, ceramic with evaporated metal |
| Calibrated accuracy $\leq \pm 2\%$ FS max.Accuracy in media measurements $\leq \pm 3\%$ FS typ.Pressure dependent $+ 0.02\%$ FS / barOutput Data - Temperature MeasurementOutput signal (temperature)4 to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194°F (0° to 90°C)Ambient temperature range -40° to 212°F (-40° to 100°C)Viscosity range $(1 to 5000 cSt)$ Flow velocity < 16 ft/sec (4.88 m/sec)Permissible fluidsFluids based on mineral oil and synthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Supply voltage12 to 32 V DCResidual ripple $\leq 5\%$ Thread connectionG 3/8 BSPP male threadTorque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connectionM12x1.5 pole (DIN VDE 0627)Pin 1: +UbM12x1.5 pole (DIN VDE 0627)Pin 3: 0V / GNDM12x1.5 pole (DIN VDE 0627)Pin 4: Signal temperature Pin 5: not connectedStandardReverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Output Data - Humidity Measuren | nent |
| Accuracy in media measurements $\leq \pm 3\%$ FS typ.Pressure dependent $+ 0.02\%$ FS / barOutput Data - Temperature MeasurementOutput signal (temperature)4 to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194°F (0° to 90°C)Ambient temperature range -40° to 212°F (-40° to 100°C)Viscosity range -40° to 212°F (-40° to 100°C)Viscosity range (1 to 5000 cSt) Flow velocity < 16 ft/sec (4.88 m/sec)Permissible fluidsFluids based on mineral oil and synthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Supply voltage12 to 32 V DCResidual ripple $\leq 5\%$ Thread connectionG 3/8 BSPP male threadTorque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connection Pin 1: +UbM12x1.5 pole (DIN VDE 0627)Pin 3: 0V / GND Pin 4: Signal temperature Pin 5: not connectedStandardReverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Output level (saturation level) | 4 to 20 mA |
| Pressure dependent $+ 0.02\%$ FS / barOutput Data - Temperature MeasurementOutput signal (temperature)4 to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194°F (0° to 90°C)Ambient temperature range -40° to 212°F (-40° to 100°C)Viscosity range 32 to 23175 SUS (1 to 5000 cSt)Flow velocity < 16 ft/sec (4.88 m/sec)Permissible fluidsFluids based on mineral oil and synthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Type of Protection acc. DIN 40050IP67Other Data12 to 32 V DCResidual ripple $\leq 5\%$ Thread connectionG 3/8 BSPP male threadTorque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connection Pin 1: +UbM12x1.5 pole (DIN VDE 0627)Pin 3: OV / GND Pin 4: Signal temperature Pin 5: not connectedM12x1.5 pole (DIN VDE 0627)Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Calibrated accuracy | $\leq \pm 2\%$ FS max. |
| Output Data - Temperature MeasurementOutput signal (temperature)4 to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194° F (0° to 90° C)Ambient temperature range -40° to 212° F (-40° to 100° C)Viscosity range -40° to 212° F (-40° to 100° C)Viscosity range $(1 to 5000 \text{ cSt})$ Flow velocity $< 16 \text{ ft/sec}$ (4.88 m/sec)Permissible fluidsFluids based on mineral oil and synthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Type of Protection acc. DIN 40050IP67Other DataSupply voltageSupply voltage12 to 32 V DC Residual ripple $\leq 5\%$ Thread connectionG 3/8 BSPP male thread approx. 18 ft/lbs (24.4 Nm)Electrical connectionM12x1.5 pole (DIN VDE 0627)Pin 1: +UbM12x1.5 pole (DIN VDE 0627)Pin 3: OV / GNDM12x1.5 pole (DIN VDE 0627)Pin 4: Signal temperature Pin 5: not connectedStandardReverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Accuracy in media measurements | ≤ ± 3% FS typ. |
| Output signal (temperature)4 to 20 mA or 2-10VAccuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194° F (0° to 90° C)Ambient temperature range -40° to 212° F (-40° to 100° C)Viscosity range 32 to 23175 SUS (1 to 5000 cSt)Flow velocity< 16 ft/sec (4.88 m/sec) | Pressure dependent | + 0.02% FS / bar |
| Accuracy $\leq \pm 2\%$ FS max.Nominal temperature range (measuring saturation level) 32° to 194° F (0° to 90° C)Ambient temperature range -40° to 212° F (-40° to 100° C)Viscosity range 32 to 23175 SUS (1 to 5000 cSt)Flow velocity< 16 ft/sec (4.88 m/sec) | Output Data - Temperature Measu | urement |
| Nominal temperature range (measuring saturation level) 32° to $194^{\circ}F$ (0° to $90^{\circ}C$)Ambient temperature range -40° to $212^{\circ}F$ (-40° to $100^{\circ}C$)Viscosity range 32 to 23175 SUS (1 to 5000 cSt)Flow velocity< 16 ft/sec (4.88 m/sec)Permissible fluidsFluids based on mineral oil and synthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Type of Protection acc. DIN 40050IP67Other Data12 to 32 V DC Residual ripple $\leq 5\%$ Thread connectionG $3/8$ BSPP male threadTorque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connectionM12x1.5 pole (DIN VDE 0627)Pin 4: Signal temperature Pin 5: not connectedM12x1.5 pole (DIN VDE 0627)Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Output signal (temperature) | 4 to 20 mA or 2-10V |
| (measuring saturation level) 32^{-1} to 194^{-1} (0° to 90^{-1} C)Ambient temperature range -40° to 212° F (-40° to 100° C)Viscosity range 32 to 23175 SUS (1 to 5000 cSt)Flow velocity< 16 ft/sec (4.88 m/sec)Permissible fluidsFluids based on mineral oil and synthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Type of Protection acc. DIN 40050IP67Other DataSupply voltageSupply voltage12 to 32 V DC Residual ripple $\leq 5\%$ Thread connectionG 3/8 BSPP male threadTorque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connectionM12x1.5 pole (DIN VDE 0627)Pin 1: +UbM12x1.5 pole (DIN VDE 0627)Pin 4: Signal sturation levelM12x1.5 pole (DIN VDE 0627)Pin 5: not connectedStandardReverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Accuracy | $\leq \pm 2\%$ FS max. |
| Viscosity range32 to 23175 SUS (1 to 5000 cSt)Flow velocity< 16 ft/sec (4.88 m/sec) | | 32° to 194°F (0° to 90°C) |
| Viscosity range (1 to 5000 cSt) Flow velocity < 16 ft/sec (4.88 m/sec) | Ambient temperature range | -40° to 212°F (-40° to 100°C) |
| Permissible fluids Fluids based on mineral oil and synthetic and natural esters CE mark EN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2 Type of Protection acc. DIN 40050 IP67 Other Data Supply voltage 12 to 32 V DC Residual ripple ≤ 5% Thread connection G 3/8 BSPP male thread Torque rating approx. 18 ft/lbs (24.4 Nm) Electrical connection M12x1.5 pole Pin 1: +Ub M12x1.5 pole Pin 2: Signal saturation level M12x1.5 pole Pin 3: OV / GND (DIN VDE 0627) Pin 4: Signal temperature Standard Pin 5: not connected Standard | Viscosity range | |
| Permissible fluidssynthetic and natural estersCE markEN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-2Type of Protection acc. DIN 40050IP67Other DataSupply voltage12 to 32 V DCResidual ripple $\leq 5\%$ Thread connectionG 3/8 BSPP male threadTorque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connectionM12x1.5 polePin 1: +UbM12x1.5 polePin 2: Signal saturation levelM12x1.5 polePin 3: OV / GND(DIN VDE 0627)Pin 4: Signal temperatureStandardPin 5: not connectedStandard | Flow velocity | < 16 ft/sec (4.88 m/sec) |
| CE mark50082-1, EN 61000-6-2Type of Protection acc. DIN 40050IP67Other DataSupply voltage12 to 32 V DCResidual ripple $\leq 5\%$ Thread connectionG 3/8 BSPP male threadTorque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connectionM12x1.5 polePin 1: +UbM12x1.5 polePin 2: Signal saturation levelM12x1.5 polePin 3: OV / GND(DIN VDE 0627)Pin 4: Signal temperatureStandardPin 5: not connectedStandard | Permissible fluids | Fluids based on mineral oil and synthetic and natural esters |
| Other Data Supply voltage 12 to 32 V DC Residual ripple ≤ 5% Thread connection G 3/8 BSPP male thread Torque rating approx. 18 ft/lbs (24.4 Nm) Electrical connection M12x1.5 pole Pin 1: +Ub M12x1.5 pole Pin 3: 0V / GND (DIN VDE 0627) Pin 4: Signal temperature Pin 5: not connected Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection Standard | CE mark | |
| Other Data Supply voltage 12 to 32 V DC Residual ripple ≤ 5% Thread connection G 3/8 BSPP male thread Torque rating approx. 18 ft/lbs (24.4 Nm) Electrical connection M12x1.5 pole Pin 1: +Ub M12x1.5 pole Pin 3: 0V / GND (DIN VDE 0627) Pin 4: Signal temperature Pin 5: not connected Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection Standard | Type of Protection acc. DIN 40050 | IP67 |
| Residual ripple ≤ 5% Thread connection G 3/8 BSPP male thread Torque rating approx. 18 ft/lbs (24.4 Nm) Electrical connection minit + Ub Pin 1: +Ub M12x1.5 pole Pin 3: 0V / GND (DIN VDE 0627) Pin 4: Signal temperature minit + 00000000000000000000000000000000000 | Other Data | |
| Thread connectionG 3/8 BSPP male threadTorque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connectionFin 1: +UbPin 2: Signal saturation levelM12x1.5 polePin 3: 0V / GND(DIN VDE 0627)Pin 4: Signal temperatureDis 1: not connectedReverse polarity protection of the supply voltage, excess voltage, override and short circuit protectionStandard | Supply voltage | 12 to 32 V DC |
| Torque ratingapprox. 18 ft/lbs (24.4 Nm)Electrical connection Pin 1: +UbM12x1.5 polePin 2: Signal saturation levelM12x1.5 polePin 3: 0V / GND(DIN VDE 0627)Pin 4: Signal temperature Pin 5: not connectedM12x1.5 poleReverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Residual ripple | ≤ 5% |
| Electrical connection Pin 1: +Ub Pin 2: Signal saturation level Pin 3: 0V / GND Pin 4: Signal temperature Pin 5: not connected Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tion | Thread connection | G 3/8 BSPP male thread |
| Pin 1: +UbM12x1.5 polePin 2: Signal saturation levelM12x1.5 polePin 3: 0V / GND(DIN VDE 0627)Pin 4: Signal temperature(DIN vDE 0627)Pin 5: not connectedReverse polarity protection of the supply voltage, excess voltage, override and short circuit protec- tionStandard | Torque rating | approx. 18 ft/lbs (24.4 Nm) |
| supply voltage, excess voltage, override and short circuit protec- tion | Pin 1: +Ub Pin 2: Signal saturation level Pin 3: 0V / GND Pin 4: Signal temperature | |
| Weight approx. 5 oz (142 g) | supply voltage, excess voltage, override and short circuit protec- | Standard |
| | Weight | approx. 5 oz (142 g) |

Note: FS (Full Scale) = relative to the full measuring range

Example of a Hydraulic Oil Saturation Curve



PN#02075860 / 05.21 / FSP2105-2273

Model Code

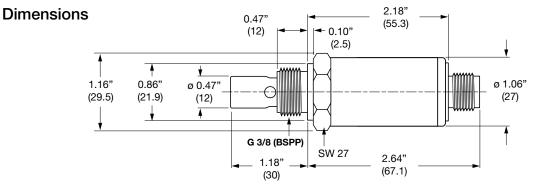
| | | | <u>AS</u> | 1 0 | 0 | 8 - (| C - 000 |
|----------|--------|--|-----------|-----|---|-------|---------|
| Series – | | | | ΤĪ | Ť | T | T T |
| AS | = | Aqua Sensor | | | | | |
| Measuri | ing R | ange | | | | | |
| 1 | = | Saturation level 0 to 100%; Temperature -13°F to 212*F (-25°C to 100°C) | | | | | |
| Fluids – | | | | | | | |
| 0 | = | Mineral oils | | | | | |
| 1 | = | Phosphate esters (HFD-R) | | | | | |
| Mechan | ical (| Connection | | | | | |
| 0 | = | G 3/8A DIN 3852 | | | | | |
| Electric | al Co | nnection | | | | | |
| 8 | = | Plug M12x1, 5-pole (connector not included) | | | | | |
| Signal T | echn | ology | | | | | |
| Č | = | Saturation level 4 to 20 mA (0 to 100%), Temperature 4 to 20 mA -13°F to 212*F (-25°C to 100°C | C) | | | | |
| Modific | ation | Number | | | | | |

000 = Standard

Items supplied

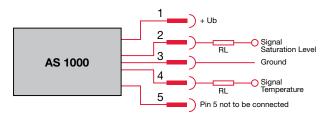
Aqua Sensor

Operation Manual



Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

Circuit Connection



Color Codes for connectors with cables:

- 1 = brown
- 2 = white
- 3 = blue
- 4 = black
- 5 = gray

AS 1000 G1/4 Housing Block Adapter

Part #03182134 Purchase separately



Accessories

ZBE 08 Connector 5 Pole M12x1 90°

ZBE 08 connector only (IP65) Part #06006786

ZBE 08-02-4 with 6.5 ft. (2 m) (IP67) Part #06006792

ZBE 08-05-4 with 16.4 ft. (5 m) cable (IP67) Part #06006791

HDA 5500-0-0-AC-000 Display Part #00908861

HDA 5500-0-0-DC-000 Display Part #00908862

HDA 5500-1-0-DC-000 Display Part #00908868

HDA 5500-1-1-AC-000 Display Part #00908869

HDA 5500-1-1-DC-000 Display Part #00908870









CONTAMINATION MONITORS AS 1200 Series

Aqua Sensor



Description

The AquaSensor AS 1200 is an advancement of the proven AS 1000 series for the online-detection of water in hydraulic oils and lubrication fluids as well as in diesel, especially designed as an OEM sensor for condition monitoring. It measures the degree of saturation and the temperature of the fluid.

In the version with 2 analogue outputs, the AS 1200 transmits the values for the degree of saturation and the temperature as a 4 $_{\rm *}$ 20 mA signal.

In the version with two switching outputs, the AS 1200 can be configured by the user via the HYDAC service units HMG 2500 and HMG 4000, the Condition Monitoring Unit CMU 1000 and the interface module CSI-B-2. The following parameters can be adjusted:

- Saturation level/temperature
- Switching directionSwitching delay times
- Switching pointsSwitching mode of switch outputs
- Operating temperature range

Water in Oil

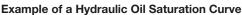
It is almost certain that there is water present in hydraulic and lubrication systems. These systems should be operated without the presence of free or emulsified water. The most common sources of water entering a system are ambient humidity, "splash" from process water, and new oil. Water contamination will accelerate the aging process of the oil resulting in oil oxidization, additive depletion, reduced lubrication, corrosion and damaged components. Most of these costly problems can be avoided by monitoring the water content of the operating fluids.

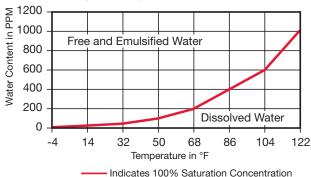
Sometimes the water content is difficult to determine, but with the HYDAC Aqua Sensor, determining the amount of water is easy! The most practical method for monitoring water content in oil is as a percent of the saturation level. Different oils are capable of dissolving varying amounts of water, therefore they have varying water saturation curves. The curve (*below*) is an example of the typical relationship of water saturation level versus fluid temperature in hydraulic and lubrication oils. By looking at the example graph it can be seen that this fluid is capable of holding more water, or has a higher saturation level, as the temperature increases.

Applications

Gear boxes

- Hydraulic systems that are sensitive to water
- Molding machinesTurbines
- Turbines
 Transferrers





Technical Specifications

| Input Data | |
|--|---|
| Saturation Level | 0 100% |
| | -25 100 °C |
| Temperature | -0.5 50 bar |
| Operating pressure Pressure resistance | |
| | ≤ 630 bar G3/8 A DIN 3852 |
| Mechanical connection | |
| Tightening torque, recommended | 25 Nm |
| Parts in contact with fluid | Mechanical connection: Stainless steel, ceramic with vacuum-metallized coating Seal: FKM |
| Output Data | |
| Pin 2: Saturation level | |
| Output signal | 4 20 mA (corresponds to 0 100 %); $R_{Lmax} = (U_B - 10 V) /$ 20 mA [kΩ] or switching output (configurable) |
| Calibration Accuracy | $\leq \pm 2\%$ FS max. |
| Accuracy in media measurements | $\leq \pm 3\%$ FS typ. |
| Response time ¹⁾ | ~ 2 min. in humid oil |
| Pressure dependence | ± 0.025% FS / bar |
| Pin 4: Temperature | |
| Output signal | 4 20 mA (corresponds to -25 100 °C); $R_{Lmax} = (U_B - 10 V) / 20 mA [k\Omega] or switching output (configurable)$ |
| Accuracy | $\leq \pm 2\%$ FS max. |
| Pin 5: | HSI (HYDAC Sensor Interface) automatic sensor detection |
| Switching outputs | |
| Decign | |
| Design | NPN or PNP transistor outputs (configurable as N/O or N/C) |
| Switching current | |
| | (configurable as N/O or N/C) |
| Switching current Environmental conditions Compensated temperature range | (configurable as N/O or N/C) |
| Switching current Environmental conditions | (configurable as N/O or N/C) max. 250 mA per output |
| Switching current Environmental conditions Compensated temperature range | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C -40 +100 °C |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range Fluid temperature range ²⁾ | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C -40 +100 °C -40 +125 °C / -25 +125 °C |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range Fluid temperature range ²⁾ Viscosity range | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C -40 +100 °C -40 +125 °C / -25 +125 °C 1 5000 cSt |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range Fluid temperature range ²⁾ Viscosity range Flow velocity | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C -40 +125 °C / -25 +125 °C 1 5000 cSt < 5 m/s Mineral oil-based fluids, diesel or ester-based fluids (HEES, |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range ²⁾ Fluid temperature range ²⁾ Viscosity range Flow velocity Fluid compatibility ³⁾ | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C -40 +125 °C / -25 +125 °C 1 5000 cSt < 5 m/s Mineral oil-based fluids, diesel or ester-based fluids (HEES, HETG) |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range ²⁾ Viscosity range Fluid temperature range ²⁾ Viscosity range Flow velocity Fluid compatibility ³⁾ CE mark Vibration resistance acc. to DIN EN 60068-2-6 Shock resistance acc. to DIN EN 60068-2-27 | $\begin{array}{l} (configurable as N/O or N/C) \\ max. 250 mA per output \\ \hline \\ 0 +90 ^{\circ}C \\ -40 +100 ^{\circ}C / -25 +100 ^{\circ}C \\ -40 +100 ^{\circ}C \\ -40 +125 ^{\circ}C / -25 +125 ^{\circ}C \\ 1 5000 cSt \\ < 5 m/s \\ \hline \\ Mineral oil-based fluids, diesel or ester-based fluids (HEES, HETG) \\ EN 61000-6-1 / -2 / -3 / -4 \\ \hline \\ 7.5 mm (5 Hz \leq f < 8.2 Hz) \\ 2 g (8.2 Hz \leq f < 2000 Hz) \\ \hline \\ 20 g (11 ms in 3 axes) \\ \hline \end{array}$ |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range ²⁾ Viscosity range Fluid temperature range ²⁾ Viscosity range Flow velocity Fluid compatibility ³⁾ CE mark Vibration resistance acc. to DIN EN 60068-2-6 Shock resistance acc. to DIN EN 60068-2-7 Protection type acc. to DIN EN 60529 ⁴⁾ | $\begin{array}{l} (configurable as N/O or N/C) \\ max. 250 mA per output \\ \hline \\ 0 +90 °C \\ -40 +100 °C / -25 +100 °C \\ -40 +100 °C \\ -40 +125 °C / -25 +125 °C \\ \hline 1 5000 cSt \\ < 5 m/s \\ \hline \\ Mineral oil-based fluids, diesel \\ or ester-based fluids (HEES, HETG) \\ \hline \\ EN 61000-6-1 / -2 / -3 / -4 \\ \hline \\ 7.5 mm (5 Hz \leq f < 8.2 Hz) \\ 2 g (8.2 Hz \leq f < 2000 Hz) \\ \hline \end{array}$ |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range ²⁾ Viscosity range Fluid temperature range ²⁾ Viscosity range Flow velocity Fluid compatibility ³⁾ CE mark Vibration resistance acc. to DIN EN 60068-2-6 Shock resistance acc. to DIN EN 60068-2-27 Protection type acc. to DIN EN 60529 ⁴⁾ Other data | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C -40 +125 °C / -25 +125 °C 1 5000 cSt < 5 m/s Mineral oil-based fluids, diesel or ester-based fluids (HEES, HETG) EN 61000-6-1 / -2 / -3 / -4 7.5 mm (5 Hz ≤ f < 8.2 Hz) 2 g (8.2 Hz ≤ f < 2000 Hz) 20 g (11 ms in 3 axes) IP 67 |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range ²⁾ Viscosity range Fluid temperature range ²⁾ Viscosity range Flow velocity Fluid compatibility ³⁾ CE mark Vibration resistance acc. to DIN EN 60068-2-6 Shock resistance acc. to DIN EN 60068-2-27 Protection type acc. to DIN EN 60529 ⁴⁾ Other data Supply voltage | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C -40 +125 °C / -25 +125 °C 1 5000 cSt < 5 m/s |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range ²⁾ Viscosity range Fluid temperature range ²⁾ Viscosity range Flow velocity Fluid compatibility ³⁾ CE mark Vibration resistance acc. to DIN EN 60068-2-6 Shock resistance acc. to DIN EN 60068-2-27 Protection type acc. to DIN EN 60529 ⁴⁾ Other data Supply voltage Residual ripple of supply voltage | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C -40 +125 °C / -25 +125 °C 1 5000 cSt < 5 m/s Mineral oil-based fluids, diesel or ester-based fluids (HEES, HETG) EN 61000-6-1 / -2 / -3 / -4 7.5 mm (5 Hz ≤ f < 8.2 Hz) 2 g (8.2 Hz ≤ f < 2000 Hz) 20 g (11 ms in 3 axes) IP 67 |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range ²⁾ Viscosity range Fluid temperature range ²⁾ Viscosity range Flow velocity Fluid compatibility ³⁾ CE mark Vibration resistance acc. to DIN EN 60068-2-6 Shock resistance acc. to DIN EN 60068-2-27 Protection type acc. to DIN EN 60529 ⁴⁾ Other data Supply voltage | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C -40 +125 °C / -25 +125 °C 1 5000 cSt < 5 m/s |
| Switching current Environmental conditions Compensated temperature range Operating temperature range ²⁾ Storage temperature range ²⁾ Viscosity range Fluid temperature range ²⁾ Viscosity range Flow velocity Fluid compatibility ³⁾ CE mark Vibration resistance acc. to DIN EN 60068-2-6 Shock resistance acc. to DIN EN 60068-2-27 Protection type acc. to DIN EN 60529 ⁴⁾ Other data Supply voltage Residual ripple of supply voltage | (configurable as N/O or N/C) max. 250 mA per output 0 +90 °C -40 +100 °C / -25 +100 °C -40 +100 °C -40 +125 °C / -25 +125 °C 1 5000 cSt < 5 m/s |

bete: Reverse polarity protection, short circuit protection provi FS (Full Scale) = relative to complete measuring range

¹⁾ Response time to a step change in RH. Time for the RH output to change by 63 % of the total RH change, RH = Relative Humidity

²⁾ In the standard up to -25 °C with FKM seal, -40 °C on request

³⁾ Other fluids on request

⁴⁾ With mounted mating connector in corresponding protection type



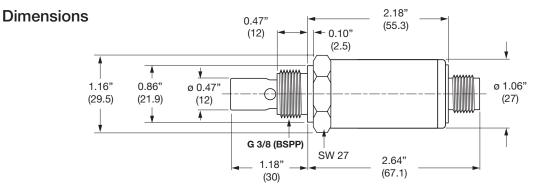
Model Code

| Series – | | | A | S | 1 | 2 | <u>8</u> | - X | <u> </u> |
|---------------------|--------|---|---|---|---|---|----------|-----|----------|
| AS | = | Aqua Sensor | | - | | | | | |
| Fluid ¹⁾ | | | | | | | | | |
| 2 | = | Mineral oil-based fluids, diesel or ester-based fluids (HEES, HETG) ²⁾ | | | | | | | |
| Mechan | ical (| Connection | | | | | | | |
| 0 | = | G 3/8A ISO 1179-2 | | | | | | | |
| Electric | al Co | nnection | | | | | | | |
| 8 | = | Plug M12x1, 5-pole (connector not included) | | | | | | | |
| Exit — | | | | | | | | | |
| С | = | | | | | | | | |
| | | Output 2 Pin 4 temperature (4 20 mA) | | | | | | | |
| 2 | = | 2 switching outputs, configurable | | | | | | | |
| Modifica | ation | Number | | | | | | | |
| 000 | = | Standard | | | | | | | |

Note:

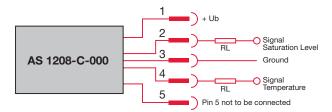
¹⁾ Special fluids on request

²⁾ FKM is usually compatible with diesel, however, this depends on what additives are used. Please contact your diesel supplier and ask for confirmation of the compatibility in combination with FKM.



Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

Circuit Connection



Color Codes for connectors with cables:

- 1 = brown
- 2 = white
- 3 = blue
- 4 = black
- 5 = gray

AS 1200 G1/4 Housing Block Adapter

Part #03182134 Purchase separately



Accessories

ZBE 08 Connector 5 Pole M12x1 90°

ZBE 08 connector only (IP65) Part #06006786

ZBE 08-02-4 with 6.5 ft. (2 m) (IP67) Part #06006792

ZBE 08-05-4 with 16.4 ft. (5 m) cable (IP67) Part #06006791

HDA 5500-0-0-AC-000 Display Part #00908861

HDA 5500-0-0-DC-000 Display Part #00908862

HDA 5500-1-0-DC-000 Display Part #00908868

HDA 5500-1-1-AC-000 Display Part #00908869

HDA 5500-1-1-DC-000 Display Part #00908870







CONTAMINATION MONITORS AS 3000 Series

Aqua Sensor



Description

The Aqua Sensor AS 3000 is the further development of the proven AS 1000 series for the online detection of water in oils, particularly as a sensor for condition monitoring.

It records the water saturation and the temperature of the operating fluid. The display allows you to view the current measured values or to adjust the parameter settings.

The measured values are output as a 4 to 20 mA signal and are the basis for two parameterizable switching outputs. The AS 3000 thus enables hydraulic and lubricating oils to be monitored accurately, continuously and online.

Applications

- Mobile hydraulics
- Hydraulics and lubrication systems in industry

Advantages

- 4 digit digital display, can be aligned in two axes
- User-friendly due to key programming
- Individual configuration
- Reliable on account of its compact, rugged design
- Economical sensor
- No calibration necessary for different oil types
- Pressure-resistant, even with pulsations
- Early detection of water problems thus preventing faults and unnecessary interruption to operations

Technical Specifications

| Technical Specifications | | | | | |
|---|--|--|--|--|--|
| Input Data | | | | | |
| Measuring range (temperature) | -13° to 212°F (-25° to 100°C) | | | | |
| Measuring range (saturation level) | 0 to 100% | | | | |
| Operating pressure | -7.25 to 725 psi (-0.5 to 50 bar) | | | | |
| Burst pressure | 9136 psi (≤ 630 bar) | | | | |
| Flow velocity | max. 16.4 ft/s (5 m/s) | | | | |
| Parts in contact with fluid | Connection part: Stainless steel / ceramic with evaporated metal Seal: FKM or EPDM | | | | |
| Output Data - Humidity Measuren | nent | | | | |
| Output level (saturation level) | 4 to 20 mA | | | | |
| Calibrated accuracy | $\leq \pm 2\%$ FS max. | | | | |
| Accuracy in media measurements | ≤ ± 3% FS typ. | | | | |
| Pressure dependent | + 0.02% FS / bar | | | | |
| Output Data - Switching Outputs | 1 | | | | |
| Version (parameterizable) | PNP transistor outputs Closer or opener Default settings: opener | | | | |
| Allocation (parameterizable) | Saturation level or temperature Default: saturation level Alarm 80% (SP 2), warning 60% (SP 1), Activation temp: 86° F / 30° C | | | | |
| Switch current | max. 1.2 A per output | | | | |
| Switch cycles | > 100 million | | | | |
| Output Data - Ambient Conditions | 5 | | | | |
| Nominal temperature range | 32° to 176°F (0° to 80°C) | | | | |
| (measuring saturation level) | 32 10 170 1 (0 10 00 0) | | | | |
| Storage temperature range | -40° to 176°F (-40° to 80°C) | | | | |
| Fluid temperature range | -40° to 176°F (-40° to 80°C) | | | | |
| Viscosity range | 32 to 23175 SUS (1 to 5000 cSt) | | | | |
| Permissible fluids | Fluids based on mineral oil and synthetic and natural esters | | | | |
| CE mark | EN 61000-6-1/2/3/4 | | | | |
| Type of Protection acc. DIN 40050 | IP67 | | | | |
| Other Data | | | | | |
| Supply voltage | 18 to 35 V DC | | | | |
| Residual ripple | ≤ 5% | | | | |
| Thread connection | G 3/8 BSPP male thread | | | | |
| Torque rating | approx. 18 ft/lbs (24.4 Nm) | | | | |
| Electrical connection | M12x1.5 pole (DIN VDE 0627) | | | | |
| Display | 4-digit, LED, 7 segment, red, height of digits 0.28" (7 mm) | | | | |
| | | | | | |
| Weight | approx. 3.88 oz (110 g) | | | | |

Note: FS (Full Scale) = relative to the full measuring range

000

E

AC 0 0 0 0

Model Code

| AS = Aqua Sensor | |
|---|--|
| Measuring Range | |
| 3 = 3000 Series Fluids | |
| 0 = Mineral oils 1 = Phosphate esters (HFD-R) | |
| Mechanical Connection 0 = G 3/8A DIN 3852 | |
| Electrical Connection 8 = Plug M12x1, 5-pole (connector not included) | |
| Signal Technology 5 = 2 switch outputs / 1 analog output | |
| Modification Number | |

Accessories

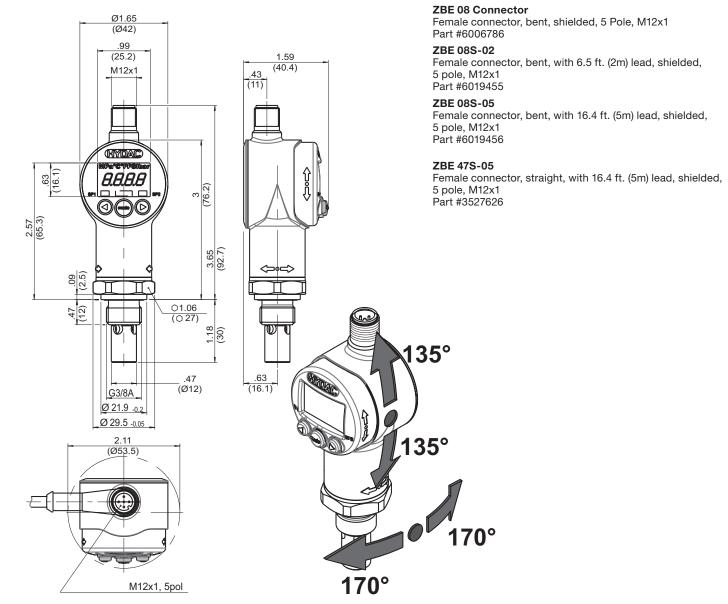
000 = Standard

Items supplied

Aqua Sensor

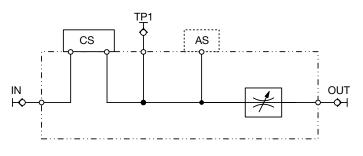
Operation Manual

Dimensions



CONTAMINATION MONITORS FMS Series Fluid Monitoring System

Hydraulic Schematic



FMS-FMM-P

Description

The Fluid Monitoring System FMS combines HYDAC's Condition Monitoring Products Contamination Sensor CS1000 and Aqua Sensor AS1000 and the Sensor Monitoring Unit in one system.

The FMS is used as a robust and stationary system for online measurement of solid particle contamination and water content in hydraulic and lubricant fluids (e.g. for the detection of leakages).

The SMU shows the cleanliness class and the fluid temperature as well as the relative humidity. These values are passed on via the signal output for further processing.

The FMS features all of the requisite connectors / adapters, enabling it to be easily connected to existing hydraulic circuits.

Depending on the version, the FMS is suitable for bypass flow and pressure circuits:

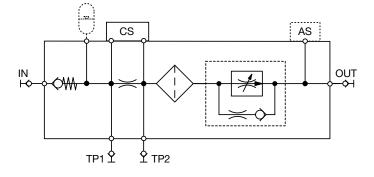
FMS-FMM-O... = 87 – 217.6 psi (6 – 15 bar) FMS-FMM-P... = 217.6 – 4351 psi (15 – 300 bar)

Advantages

- Cost-effective solution
- · Early warning of critical machine states
- Continuous fluid monitoring
- Condition-based maintenance planning

Caution!

The FMS is only to be used with mineral oils or mineral oil-based raffinates.



Technical Specifications

| FMS-FMM-O | |
|---|--|
| Operating pressure | 87 to 217 psi (6 to 15 bar) |
| Minimal differential pressure | 14.5 psid (1 bar), recommended >/= 43.5 psid (3 bar) |
| Connectors (IN / OUT) | Test point type 1604 or thread G 1/4 according ISO 228 |
| Sealing material | FPM |
| Permissible viscosity range | 37-1623 SUS (1 to 350 mm ² /s) |
| Fluid temperature range | 32° to 185° F (0° to 85° C) |
| Ambient temperature range | -22° to 176° F (-30° to 80° C) |
| Storage temperature range | -40° to 176° F (-40° to 80° C) |
| Weight | 29 lbs (~13 kg) |
| FMS-FMM-P | |
| Operating pressure without accumulator with accumulator | 217 to 4350 psi (15 to 300 bar) 217 to 3625 psi (15 to 250 bar) |
| Differential pressure | > 87 psi (15 bar) |
| Connectors (IN / OUT) | Test point type 1604 / thread G¼ according ISO 228 |
| Sealing material | FPM |
| Permissible viscosity range | 37-4635 SUS (1 to 1000 mm ² /s) |
| Fluid temperature range | 32° to 185° F (0° to 85° C) |
| Ambient temperature range | -22° to 176° F (-30° to 80° C) |
| Storage temperature range | -40° to 176° F (-40° to 80° C) |
| Weight | 44 lbs (~20 kg) |



^^^

Model Code

| | $\underline{FMS} - \underline{FMM-P} - \underline{CS} - \underline{AS} - \underline{SMU12} - \underline{01} / - \underline{000}$ |
|--|--|
| Type FMS = Fluid Monitoring System | |
| Hydraulic application — | |
| FMM-O = Offline, (bypass flow circulation 87 psi) < 15 bar FMM-P = Pressure Line, (pressure circuit 87 psi) > 15 bar | |
| ContaminationSensor CS = CS 1000 * Z(CS) = Prepared for CS 1000 | |
| AquaSensor AS = AS 1000 Z(AS) = Prepared for AS 1000 | |
| SensorMonitoring Unit SMU12 = SMU 1200 | |
| Sensor combination 01 = FMM-O-M-0-CS1310-A-AS-0-0-0/-000 SMU1260-TU-00 02 = FMM-P-L-0-CS1310-A-AS-0-1-0/-000 SMU1260-TU-00/- | |
| Customer modification number 000 = Customer modification number | |

*Type defined in sensor combination number

Items supplied

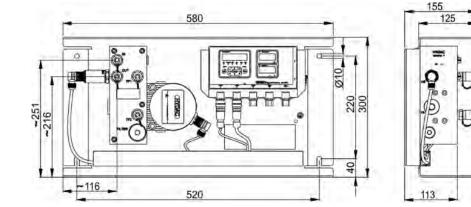
Dimensions FMS-FMM-0

• 1 FluidMonitoring System FMS

- 1 Power supply connection cable, L = 16.4' (5m)
- Technical Documentation, consists of:
- 1 Installation and Maintenance Instructions FMS
- 1 Operating and Maintenance Instructions SMU 1200
- 1 Operating and Maintenance Instructions AS 1000
- 1 Calibration certificate of the CS 1000

Upon receiving the FMS check it for any damage in transit. Do not put the FMS into operation unless it is in perfect condition. Report any damages in transit to the transport company or the responsible agent immediately. Do not put the unit into operation.

FMS-FMM-P



CONTAMINATION MONITORS CTU 1000 Series

Contamination Test Unit



Description

The HYDAC Cleanliness Test Unit CTU 1000 is designed to determine the technical cleanliness especially present on minor contaminated components.

The CTU 1000 was developed due to increased demand for system cleanliness and for monitoring and optimizing the cleanliness, of smaller components during production, storage and system assembly.

By determining the type, size and quantity of the contamination, quality standards can be checked and documented and the necessary steps towards optimization can be taken.

Applications

- Automotive suppliers
- Gear box builders
- Engine builders
- Manufacturers of hydraulic and lubrication systems and components

Benefits to You

- Cost reduction through lower production failure rates
- Identification and elimination of weak process steps
- Optimization of both internal and external handling processes
- Establishing of cleanliness standards both internal and external
- Documentation of component cleanliness
- Survey of fluid cleanliness and filtration concepts

Technical Specifications

| Overall dimensions | See next page |
|---|---|
| Weight | CTU10xx: ≈ 595 lbs (270 kg) ≈ 640 lbs (290 kg) <i>w/ultrasonic unit</i> CTU12xx: ≈ 685 lbs (310 kg) ≈ 728 lbs (330 kg) <i>w/ultrasonic unit</i> |
| Туре | Mobile (mounted on castors) |
| Power Consumption | 600 W (800 W with ultrasonic unit) |
| Ambient Temperature | 59° to 82°F (15° to 28°C) |
| Cleanroom Module | |
| Material of cleanroom | polished stainless steel |
| Filling w/analysis fluid | via analysis cabinet |
| Max. load capacity (evenly distributed) | CTU10xx = 105 lbs (47.5 kg) CTU12xx = 105 lbs (47.5 kg) |
| Control system | PC controlled with user-friendly software, rinse options and rinsing volume programmable |
| Reservoir and Filtration | on Module |
| Membrane holder | for ø1.85" (47 mm) to 1.97" (50 mm) filter membranes |
| Vacuum strainer | for quicker filtration of the analysis fluid |
| Diffuser | Distribution of analysis fluid on the membrane |
| Operating pressure | -12 to 87 psi (-0.8 to 6 bar) |
| Analysis fluid reservoir | 2x 5.2 gal (20 l) (1x reservoir, 1x suction reservoir) |
| Reservoir change-over | automatic |
| Filtration of analysis fluid | Fine filtration according ISO 4406 min. ISO 12/9 |
| Filter size, filtration rating | 2x LF BN/HC 60, 3 μm (1xx0 series) 2x MRF-1-E/1, 1μm (1xx1 series) |
| Integrated drip tray | 6.6 gal (25 liter) with drainage |
| Ultrasound | 100 W, 40KHz |
| Basket for ultrasonic unit | Dimensions: 7.9" (200 mm) x 4.3" (110 mm) x 1.6" (40 mm); Mesh width: 0.16" (4 mm) |
| Emission sound pressure level | L _{PA} < 70 db(A) |
| Services to be provide | ed by operator* |
| Compressed air | Air Filtered (min. 5µm) and dry compressed air, max. 94.3 (6.5 bar) to 101.5 psi (7.0 bar) Air flow rate: 15.8 gpm (60 lpm), Supply connection: DN 7.2 |
| Power Supply | according to order |
| *Not supplied | |

^{*}Not supplied

The information in this catalog relates to the operating conditions and applications described. For applications or operating conditions not described, please contact the relevant technical department. Subject to technical modifications.



Model Code

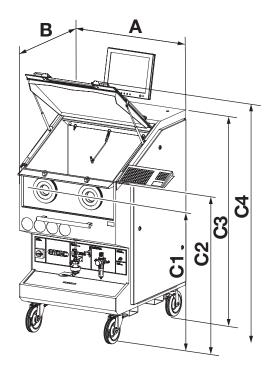
| <u>CTU</u> 1 Q 5 Q - M - Z - Z | / - <u>EA</u> |
|--|---------------|
| Type CTU = Contamination Test Unit | |
| | |
| Series 1 = 1000 series | |
| Size 0 = Dimensions of analysis chamber (<i>cleanbox</i>): 300 mm x 765 mm x 365 mm (<i>height (approx.) x width x depth</i>) 2 = Dimensions of analysis chamber (<i>cleanbox</i>): 460 mm x 765 mm x 650 mm (<i>height (approx.) x width x depth</i>) | |
| Version 4 = Version 2014 – Compression closure, cleanbox – Internal extraction, cleanbox – filled via 3/2 way ball valve and filling hose – Monitor arm (only 124x) – Nozzles with plug-in connection (plug-in nipple in analysis chamber) 5 = Version 2020 – nozzle and earthing – altered control – hardware | |
| Test Liquid 0 = Solvent cleaner (G60 Special, Flashpoint > 140°F (60°C), lower explosion limit > 0.6 Vol.%) 1 = Water with surfactants, admissible pH-range 6 to 10, no desalinated water | |
| Supply Voltage K = 120 V AC / 60Hz / 1 Phase USA / CDN M = 230 V AC / 50Hz / 1 Phase Europe N = 240 V AC / 50Hz / 1 Phase UK O = 240 V AC / 50Hz / 1 phase Australia P = 100 V AC / 50Hz / 1 phase Japan | |
| Extraction Process Z = Spray (medium pressure) U = Spray (medium pressure) plus ultrasound | |
| Supplementary Details Z = standard R = external rinsing connections 0.24" (Ø 6mm), between the manual actions A = Fluid connections A/B/C and R fitted with rapid quick-release fastener on outside, control line to CTM-E modules, manual change-over for filter membrane holder | |

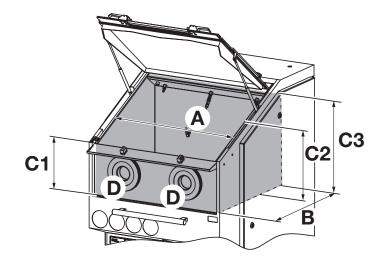
EA Extraction AIR

Air extraction only possible for variants 1x41 and 1x51

Note: Test Liquid not supplied with unit - G60 Special, 30L; PN 03205511

Dimensions





| Туре | A | В | C1 | C2 | C3 | C4 | Туре | Α | В | C1 | C2 | C3 | D |
|---------|---------------|----------------|----------------|----------------|----------------|--------------------|---------|---------------|---------------|---------------|---------------|-------------|-----------------------|
| CTU10XX | 38.8 (985) | 33.5 (850) | 46.1 (1170) | 50.8 (1290) | 59.1 (1500) | ≈ 66.9 ≈ (1700) | CTU10XX | 30.1 (765) | 14.4 (365) | 10.2 (260) | 13.2 (335) | 15 (380) | 2x ø 7.1 2x ø 180 |
| CTU12XX | 35.8 (910) | 44.9 (1140) | 45.7 (1160) | 50.2 (1280) | 68.9 (1750) | ≈ 81.5 ≈ (2070) | CTU12XX | 30.1 (765) | 25.6 (650) | 11.8 (300) | 17.5 (445) | 22 (560) | 2x ø 7.1 2x ø 180) |

CONTAMINATION MONITORS CTM-SC Series

Contamination Test Module - Supply & Control



Description

The Contamination Test Module CTM is a modular system designed to analyze the technical cleanliness of components. Solid contamination is washed off the surface of the component, samples are taken from the fluid and are subsequently analyzed using membranes.

The Contamination Test Module CTM-SC is the central module of the CTM series. It serves as the fluid supply and the control of the entire extraction processes and contains the graphical user interface.

Applications

- Automotive and supplier industry
- Gear and engine builders
- Mobile hydraulics
- Production of hydraulic / lubrication system components
- Aircraft industry

Benefits to You

- Reduction in costs as a result of fewer production failures
- Identification and elimination of weak process steps
- Reduction in start-up breakdowns
- Optimization of internal and external processes
- Documentation of the technical cleanliness of components

Special Features

- Analysis fluid can be pulsed if required
- Adjustment of compressed air
- Filling and drainage connection
- Control and monitoring of CTM-E modules
- Automatic pressure setting using software
- User-programmable extraction procedure

Technical Specifications

| Overall dimensions (height x width x length) | 5.9'x2.5'x2.6' (1.8m x 0.9m x 0.8m) |
|---|---|
| Housing material | S235JR powder-coated |
| Coupling connection | CPC coupling |
| Ambient Temperature | 59° to 82°F (15° to 28°C) |
| Weight | ≈ 551 lbs (250 kg) <i>(empty)</i> |
| Reservoir, test fluid | 2 x 5.3 gal (20 l) (1 x reservoir, 1 x collection tank) |
| Reservoir switch-over | Automatic |
| Filtration of analysis fluid | Fine filtration to ISO4406 min. 12/9 |
| Filter size | 2x MRF-1-E/1, 1 μm |
| Drip tray, integral | 6.6 gal (25 I) with drain |
| Compressed air supply | Nipple DN 7.2 |
| Compressed air supply (provided by customer) | Maximum 87 psi (6 bar), Air flow rate: 15.9 gpm (60 lpm) Dry and pre-filtered to 5 μm |
| Electrical Data | |
| Supply voltage | according to order |
| Power consumption | 600 Watt; 800 Watt with ultrasound |
| Protection class to DIN 40050 | IP 54 |

The information in this catalog relates to the operating conditions and applications described. For applications or operating conditions not described, please contact the relevant technical department. Subject to technical modifications.



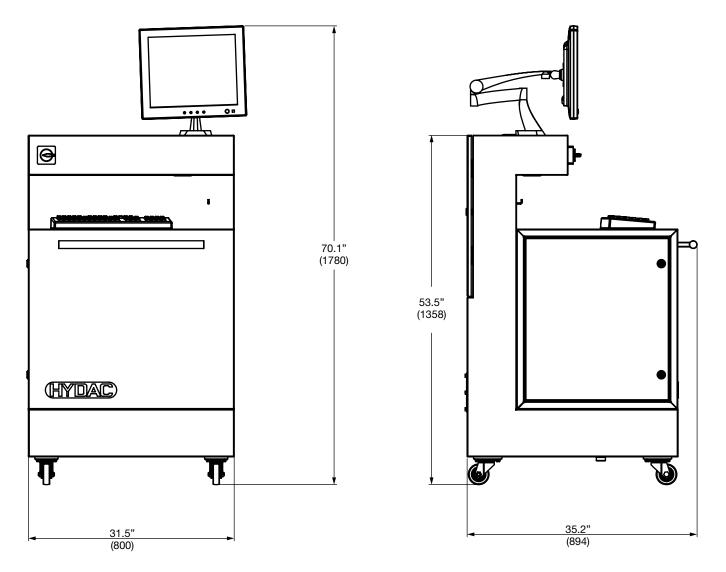
Model Code

| <u>стм</u> | <u>sc</u> | <u>100</u> | <u>o</u> - | M |
|------------|-----------|------------|------------|---|
| | | | | |

| Series – | | | | |
|-------------------------|--------|---|--|--|
| CTM | = | Contamination Test Module | | |
| Model – | | | | |
| SC | = | Supply and control | | |
| Series – | | | | |
| 100 | = | Standard | | |
| Analysis | ; Flui | d | | |
| 0 | = | Solvent A III Class (Flashpoint > 140° F (60° C), lower explosion limit > 0.6 Vol.%) | | |
| 1 | = | Water with surfactants, admissible pH-range 6 to 10, no deionized / demineralized water | | |
| Supply V | /oltag | ge | | |
| ĸ | = | 120 V AC / 60Hz / 1 Phase USA / CDN | | |
| М | = | 230 V AC / 50Hz / 1 Phase Europe | | |
| Ν | = | 240 V AC / 50Hz / 1 Phase UK | | |
| Items su | ipplie | ed | | |
| CTM | -SC | | | |
| - incl | . mor | nitor and monitor bracket | | |
| - PC | with ' | Windows operating system | | |
| - PLC | | | | |

- Keyboard with touchpad
 Foot switch
- CTM-SC Software
- Operating and maintenance instructions

Dimensions



CONTAMINATION MONITORS CTM-EB Series

Contamination Test Module - Extraction Box



Description

The Contamination Test Module CTM is a module system designed to analyze the technical cleanliness of components. Particle contamination is removed from the surface of the component, samples are taken from the washing fluid and are subsequently analyzed using membranes.

The extraction module CTM-EB is designed for spray extraction in conjunction with the CTM-SC.

Applications

- Automotive and supplier industry
- Transmission and engine builders
- Mobile hydraulics
- Manufacture of hydraulic and lubrication system components
- Aircraft Industry

Advantages

- Reduction in costs as a result of fewer production failures
- Identification and elimination of weak process steps
- Reduction in start-up breakdowns
- Optimization of internal and external processes
- Documentation of the technical cleanliness of components

Technical Specifications

| Overall dimensions | EB1200: |
|------------------------------|---|
| (height x width x length) | 59" max. 68.9"x47.2"x35.4" (min. 1.50 max. 1.75 x 1.20 x 0.90 m) |
| | EB1400: |
| | 59" max. 68.9"x72.8"x35.4" |
| | (min. 1.50 max. 1.75 x 1.85 x 0.90 m) |
| | ÈB1600: |
| | 61" max. 70.9"x43.3"x35.4" |
| | (min. 1.55 max. 1.80 x 1.10 x 0.90 m) |
| | EB2000: |
| | 66.9" max. 76.8"x55.1"x43.3" (min. 1.70 max. 1.95 x 1.40 x 1.10 m) |
| Housing motorial | S235JR powder-coated |
| Housing material | |
| Ambient Temperature | 59° to 82°F (15° to 28°C) |
| Working height adjustment | electrical |
| Weight when empty | CTM-EB 12xx: 440lbs. (~200 kg) |
| | CTM-EB 14xx: 529lbs. (~240 kg) CTM-EB 16xx: 485lbs. (~220 kg) |
| | CTM-EB 18xx: 485lbs. (~220 kg) |
| | CTM-EB 20xx: 573lbs. (~260 kg) |
| | CTM-EB 46xx: 617lbs. (~280 kg) |
| Coupling connection | CPC Coupling |
| Filtration of analysis fluid | Fine filtration to ISO4406 min. ISO 12/9 |
| Filter size | 3x MRF1-E/1, 1 μm |
| Extraction Cabinet (clean b | ox) |
| Material of Clean Box | Polished stainless steel 1.4301 |
| Maximum load capacity | EB1200: 69 lb (31.5 kg)* |
| | EB1210: 220 lb (100 kg) |
| | EB1400: 220 lb (100 kg)* |
| | EB1410: 331 lb (150 kg) |
| | EB1600: 220 lb (100 kg)* EB1610: 331 lb (150 kg) |
| | EB1800: 331 lb (150 kg)* |
| | EB1810: 331 lb (150 kg) |
| | EB2000: 220 lb (100 kg)* |
| | EB2010: 331 lb (150 kg) |
| | EB4600: 364 lb (165 kg)* |
| | EB4610: 331 lb (150 kg) |
| Opening of cover | *for evenly distributed load, no point load electrical |
| Membrane holder | For ø1.85" (ø47 mm) filter membranes |
| Electrical Data | For \$1.05 (\$47 mm) mer membranes |
| Supply voltage | according to order |
| Power consumption | 400 Watt |
| Protection class to | IP 54 |
| DIN 40050 | F 54 |

The information in this catalog relates to the operating conditions and applications described. For applications or operating conditions not described, please contact the relevant technical department. Subject to technical modifications.



Model Code

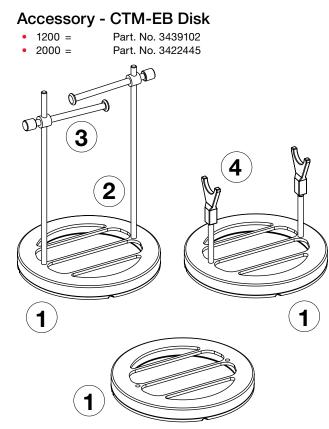
| | | <u>CTM EB 12 9 9 - M - Z - Z /</u> |
|-----------------|-------|---|
| Series — CTM | = | Contamination Test Module |
| Model — | | |
| EB | = | Extraction Box |
| Dimensio | ons d | of analysis cabinet (average height x width x depth) |
| 12 | = | 18.5" (470 mm) x 30.3" (770 mm) x 25.6" (650 mm) |
| 14 | = | 15.7" (400 mm) x 55.1" (1400 mm) x 15.7" (400 mm) |
| 16 | = | 28.0" (710 mm) x 27.6" (700 mm) x 24.4" (620 mm) |
| 20 | = | 33.9" (860 mm) x 35.4" (900 mm) x 35.4" (900 mm) |
| 46 | = | 22.4" (570 mm) x 69.7" (1770 mm) x 25.6" (650 mm) |
| Executio | n of | load |
| 0 | = | standard |
| 1 | = | heavy |
| Analysis | Flui | d |
| 0 | = | Solvent A III Class (Flashpoint > 60°C, lower explosion limit > 0.6 Vol.%) |
| 1 | = | Water with surfactants, admissible pH-range 6 to 10, no deionized / demineralized water |
| Supply V | olta | ge |
| K | = | 120 V AC / 60Hz / 1 Phase USA / CDN |
| М | = | 230 V AC / 50Hz / 1 Phase Europe |
| Ν | = | |
| Extractio | n m | ethod |
| Z | | spray, medium pressure |
| _ | | |
| Supplem | | ary detailsstandard |
| 2 | = | |
| Modifica | tion | S |

– = without modifications

Items supplied

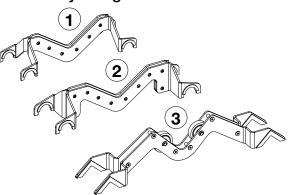
CTM-EB

• Operating and maintenance instructions



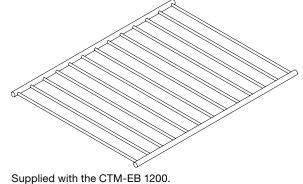
| Item | Designation | | | |
|------|---|--|--|--|
| 1 | Disk | | | |
| 2 | Guide rod (available in different lengths) | | | |
| 3 | Clamping rod (available in different lengths) | | | |
| - | Y-shaped Bracket | | | |

Accessory - Angled Bracket



| Item | Designation | | |
|------|------------------------------|--|--|
| 1 | Angled bracket – light duty | | |
| 2 | Angled bracket – medium duty | | |
| 3 | Angled bracket – heavy duty | | |

Accessory - Polished Rack



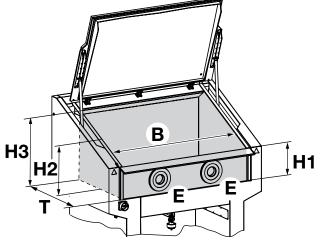
PN#02075860 / 05.21 / FSP2105-2273

Dimensions

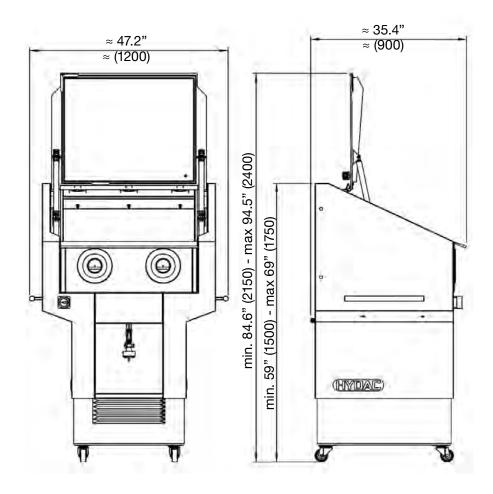
CTM-EB overall

| CTM-EB | В | Т | H1 | H2 | НЗ | H4 |
|--------|--------|--------|----------------|----------------|----------------|-----------------|
| 12xx | 43.7" | 36.2" | 38.8" to 48.6" | 47.0" to 54.9" | 59.5" to 69.3" | 84.6" to 94.5" |
| | (1110) | (920) | (985 to 1235) | (1195 to 1395) | (1510 to 1760) | (2150 to 2400) |
| 14xx | 72.0" | 36.2" | 37.6" to 47.4" | 45.0" to 54.9" | 59.5" to 69.3" | 70.9" to 80.7" |
| | (1830) | (920) | (955 to 1205) | (1145 to 1395) | (1510 to 1760) | (1800 to 2050) |
| 16xx | 43.7" | 36.2" | 40.2" to 50.0" | 50.0" to 59.8" | 61.4" to 71.3" | 84.6" to 94.5" |
| | (1110) | (920) | (1020 to 1270) | (1270 to 1520) | (1560 to 1810) | (2150 to 2400) |
| 18xx | 64.2" | 42.1" | 40.2" to 50.0" | 45.3" to 55.1" | 62.6" to 72.4" | 93.5" to 103.3" |
| | (1630) | (1070) | (1020 to 1270) | (1150 to 1400) | (1590 to 1840) | (2375 to 2625) |
| 20xx | 55.1" | 45.3" | 39.4" to 52.8" | 48.6" to 58.5" | 42.5" to 76.0" | 96.5" to 106.3" |
| | (1400) | (1150) | (1000 to 1340) | (1235 to 1485) | (1080 to 1930) | (2450 to 2700) |
| 46xx | 90.6" | 36.2" | 39.0" to 48.8" | 46.5" to 56.3" | 59.0" to 69.0" | 86.6" to 96.5" |
| | (2300) | (920) | (990 to 1240) | (1180 to 1430) | (1500 to 1750) | (2200 to 2450) |

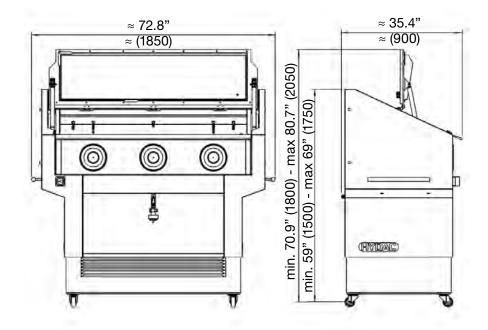
Dimensions of Extraction Cabinet (Clean Box)



| CTM-EB | В | т | H1 | H2 | H3 | E |
|--------|--------------|-------------|-------------|-------------|-------------|------------------|
| 12xx | 30.3" (770) | 25.6" (650) | 11.0" (280) | 18.5" (470) | 21.5"(545) | 2 x ø7.1" (ø180) |
| 14xx | 55.1" (1400) | 15.7" (400) | 11.0" (280) | 15.7" (400) | 17.1" (435) | 3 x ø7.1" (ø180) |
| 16xx | 26.4" (670) | 24.4" (620) | 23.4"(595) | 27.6" (700) | 30.1" (765) | 2 x ø9.0" (ø230) |
| 18xx | 47.2" (1200) | 30.7" (780) | 10.6" (270) | 17.7 (450) | 23.8" (605) | 2 x ø7.1" (ø180) |
| 20xx | 35.4" (900) | 35.2" (895) | 26.8" (680) | 31.5" (800) | 37.8"(960) | 2 x ø9.0" (ø230) |
| 46xx | 69.7" (1770) | 25.6" (650) | 14.2" (360) | 22.4" (570) | 24.2" (615) | 4 x ø9.0" (ø230) |

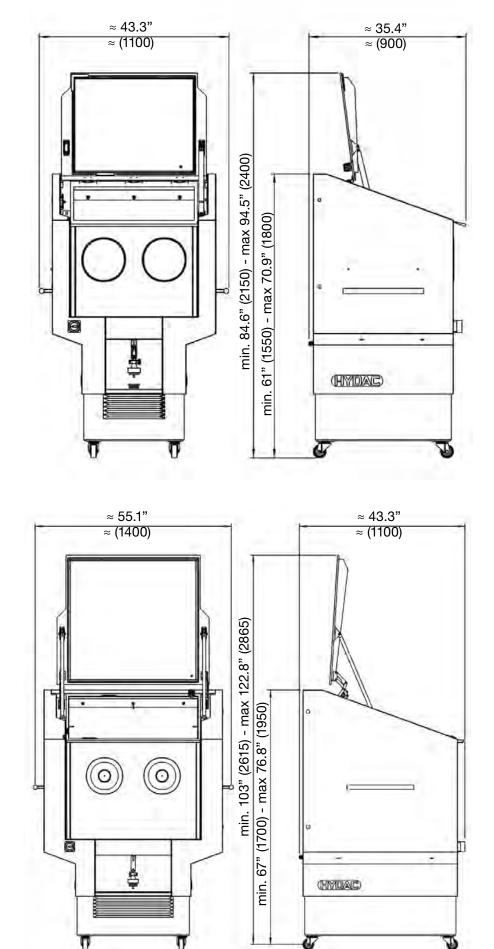


CTM-EB 1400

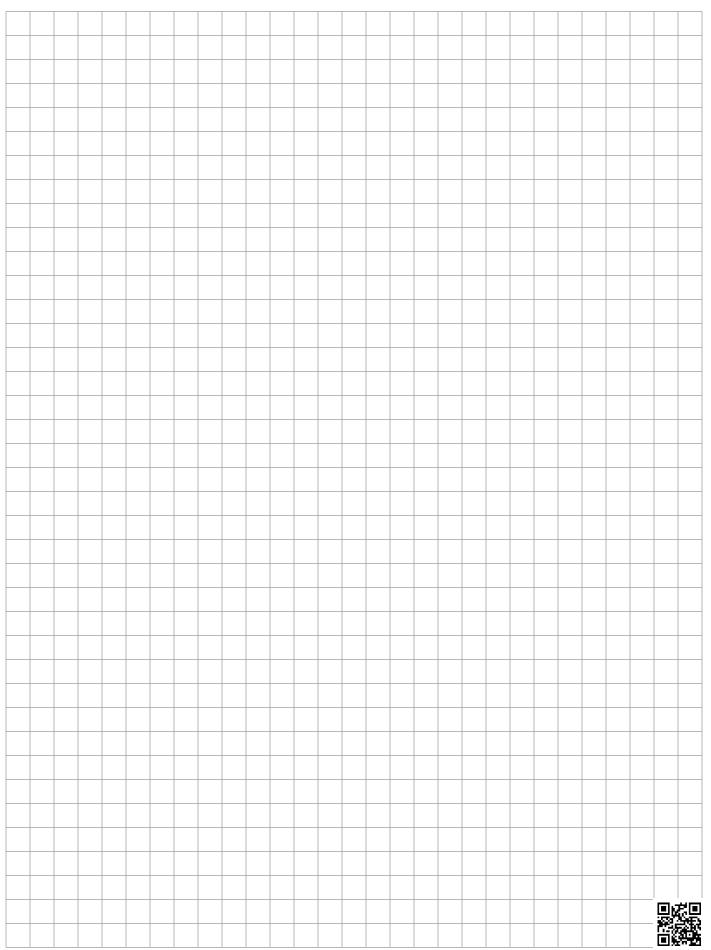


Dimensions CTM-EB 1600

CTM-EB 2000



Notes



CONTAMINATION MONITORS MM Series

Measuring Microscopes



Description

This microscope is designed specifically to be used for measuring contamination particles in oil samples on filter membranes. All models include coarse and fine focusing adjustments, as well as both X and Y directional slide table adjustments to make focusing and positioning the subject simple, even at maximum magnification.

There is a rotating lens holder with 3 achromatic objective lenses with magnifications of 4x, 10x, and 20x. The micrometer eyepiece provides an additional 10x magnification resulting in 40x, 100x, and 200x magnifications. The measuring scale on the eyepiece has a scale division of 1 mm in 100 parts, allowing measurement of particles at all three magnifications.

These units come with an integrated plug-in light source that provides sufficient illumination, even at maximum magnification.

The optional CCD digital camera attaches to the eyepiece and transfers images to a PC via a USB connection, making it easy to capture and transmit images from the microscope.

Ordering Information

| 0 | |
|--------------|--|
| MM-S5-P | Standard eyepiece 110 VAC 60 Hz powered light source |
| MM-S5-P-U | Standard eyepiece 110 VAC 60 Hz powered light source CCD camera with LPT-1 port for connection to laptop or PC |
| MM-KKE-P-C-U | Triocular eyepiece 110 VAC 60 Hz external cold light illumination CCD camera with LPT-1 port for connection to laptop or PC |

Technical Specifications

| MM-S5-P, MM-S5-P-U, | & MM-KKE-P-C-U | | | |
|---------------------------------|-----------------------------------|--|--|--|
| Huygens Eyepiece | 10 x M | | | |
| Achromatic Lens | 4x, 10x, 20x | | | |
| Magnification | 40x, 100x, 200x | | | |
| Supply Voltage | 110 V 60 Hz | | | |
| MM-S5-P-U & MM-KKE-P-C-U (only) | | | | |
| Image Digitization | CCD-Camera | | | |
| Video System | PAL color system | | | |
| Resolution | horiz. 460 lines, vert. 400 lines | | | |
| Image Processing | Video capture unit | | | |
| PC interface | LPT 1 port | | | |
| System Requirements | min. Pentium 100 Mhz., Windows 95 | | | |



FAS Series

Fluid Analysis Service



Additional Oil Analysis Tests are available; contact factory for information

Premium Oil Sample Testing

Test Kit part number: 02702060 (includes a box of 10 sample bottle kits)

Oil sample analysis for standard mineral hydraulic and lube oil includes the following tests:

- Spectrometals by ICP (24 Metals including Wear, Contaminant, Additive & Multi-Source) – D5185
- Viscosity @ 104°F (40°C) (ASTM D445)
- Water % by Crackle (Karl Fischer if Crackle is Positive)
- Total Acid Number TAN (ASTM D664)
- Particle Count (as per ISO4406:1999 3 digit ISO code 4, 6, 14)

Test Kit part number: 02095151 (includes a box of 10 sample bottle kits), the same as the above analysis as well as a photomicrograph

Water Glycol Sample Testing:

Test Kit part number: 02702057 (includes a box of 10 sample bottle kits)

This kit includes specific analysis parameters for the water to oil ratio of the Glycol. Karl Fischer Water is done and pH is tested instead of TAN. If the water concentration is tested out of specification to the identified lubricant, the lab will give the current concentration level and then make a recommendation for the acceptable water concentration percentage range for the stated lubricant. The tests included are as follows:

- Spectrometals (24 Metals by ICP including Wear, Contaminant, Additive & Multi-Source) – D5185
- Viscosity @ 104°F (40°C) ASTM D445
- Water by Karl Fischer in PPM ASTM D1744
- pH (If a Standard Mineral Oil is Identified, then TAN is done)
- ISO Particle Count (as per ISO4406:1999 -3 digit ISO code 4, 6, 14)

Oil Analysis Reports:

Each Fluid Analysis Kit contains:

- Clean Sample Bottle
- Component Registration Form (CRF)
- Packaging for mailing sample
- Prepaid Fluid Analysis Service

Choice of three ISO 17025 A2LA accredited laboratories to send the samples. Addresses are included on the Component Registration Form

- All locations are within 48 hours ground transit from nearly anywhere in the continental United States
- Results returned within 24-48 hours after lab receipt of the test samples
- Fast email or fax notification of high severity results A Component Registration Form (CRF) is included with each sample

bottle kit, but it only needs to be filled-out the first time each piece of equipment is sampled or to make changes. After the initial sample, the CRF information is stored under the Unit ID #.

Sample results will be e-mailed to the e-mail address supplied on the CRF. Additionally, a Username and Password will be emailed to each report recipient who provides an e-mail address on the Component Registration Form (CRF). This feature allows multiple users to view the reports simultaneously. The Username and Password provides the recipient with access to www.eoilreports.com where a personal internet account has been set-up. From this site, the full sample report with the capability of graphing and trending analysis is available online as well as the complete testing history is securely stored.

HYDAC Canada Fluid Analysis Services (Canada Customers Only)

Contamination Analysis

Test Kit Part Number: 02552392 (single); 02552390 (pack of 10) This kit identifies contamination before it hampers production and shortens component life and includes:

- Particle Count
- Water Content
- Viscosity
- Patch Test/Photo

Total Conditioning Analysis Kit

Test Kit Part Number: 02552393 (single); 02552391 (pack of 10) Includes all the above tests PLUS it determines: additive; wear metal; contaminant and oxidation levels. Tests included in this kit are:

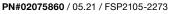
- Particle Count
- Water Content
- Total Acid Number
- Viscosity
- Patch Test/Photo
- Spectrographic Analysis

Water Glycol Analysis Kit

Test Kit Part Number: 02550327

This kit is designed exclusively for water glycol systems. Contamination, water content and viscosity are monitored. Tests included:

- Water Content
- Viscosity
- Patch Test/Photo
- Estimated ISO 4406 cleanliness code





CONTAMINATION MONITORS FASH Series

Fluid Analysis Sets



Features and Benefits

- Compatible with hydraulic and lube oils
- Provides results on site in a matter of minutes
- Determines solid contamination levels in hydraulic systems
- Includes all necessary equipment in a single lightweight case

Applications

- Perform quick on-site determination of contamination levels of solid particulate
- Supplement on-site laboratories
- Use as a tool to demonstrate need for improved filtration

Applicable standards

- ISO 4405 / 4406 / 4407
- Gravimetric methods for determining the amount of contamination in hydraulic fluids.

Description

The Fluid Analysis Set from HYDAC provides the necessary tools to determine levels of solid particulate contamination present in a particular fluid sample. Using the vacuum pump contained in the kit, the fluid sample is drawn through a membrane patch. The residual dirt left on the patch is viewed under a microscope and compared to photos of known contamination levels in the HYDAC Contamination Handbook *(included)* for a visual assessment.

Ordering Information

Part Number: 2086847

Items Included in the Kit

| quantity | Description | Part Nmber |
|----------|--|------------------|
| 1 | Hand-held vacuum pump | |
| 3 | Syringe, 30 mL | 7626475 |
| 50 | Disposable Petri Dishes | 7630320 |
| 1 | Forceps | 7626481 |
| 1 | Membrane patches, 0.45 µm, 25 mm, (100 pack) | 2701997 |
| 1 | Membrane patches, 0.8 µm, 25 mm, (100 pack) | 2701952 |
| 1 | Carrying Case | 7640195 |
| 1 | Microscope, 10x - 200x | 7635242 |
| 1 | Plastic funnel | 7626479 |
| 1 | Solvent dispenser bottle | |
| 1 | Solvent Dispenser bottle cap | 7640496 |
| 3 | Plastic sample bottle, 4 oz. | 7626480 |
| 1 | Solvent patch holder | 7632471 |
| 1 | Tubing, Tygon 3" | 7624738 |
| 1 | 10' section of 1/4" LDPE tubing | 2701999 |
| 1 | Fluid Control Contamination Handbook | EN 7.603.9/04.18 |

DIAGNOSTICS

Diagnostic Monitoring These units are designed for data capturing simple measurements (pressure, temperature, and flow rate) in hydraulic and pneumatic systems. Typical applications extend primarily to maintenance and servicing, troubleshooting and test stands, as well as, quality inspections.



C1 **HYDAC**

DIAGNOSTICS HMG 2500 Series

Portable Data Recorder



3.5" colour display Up to 4 sensors can be connected Automatic sensor recognition

Description

The HMG 2500 is an impressive, top performance portable measuring and data logging device.

Automated setting procedures, a simple, self-explanatory operator guide and many comprehensive functions ensure the operator is able to carry out a wide range of measuring tasks within a very short time.

This makes the HMG 2500 an ideal companion for employees in maintenance, commissioning and service.

The device is designed primarily to record pressure, temperature and flow rate values which are the standard variables in hydraulics and pneumatics.

For this purpose, special sensors are available. HMG 2500 recognises the measured value, measuring range and the unit of these sensors and automatically carries out the basic device settings accordingly.

In addition to this, the HMG 2500 has a digital input, i.e. for frequency or speed measurement, as well as a virtual measuring channel for the measurement of difference or performance.

Due to the wide range of functions and its simple handling, the HMG 2500 is just as appropriate for users who take measurements only occasionally as it is for professionals for whom measuring and documentation are routine.

The update capability of the HMG 2500 ensures that the user can benefit from future upgrades of the device software.

Features

- Simple and user-friendly operation
- Practical, robust design
- Large, full-graphics colour display •
- Quick and independent basic setting of the units by the use of automatic sensor recognition
- Up to 4 sensors can be connected simultaneously
- Up to 32 measurement channels can be depicted simultaneously
- Measurement rates up to 0.1 ms
- Very large data memory for archiving measurement curves
- Various measurement modes:
 - Measuring
 - Fast curve recording
 - Long term measurements
 - 2 independent triggers, can be linked logically
- Simple sensor connection by means of M12x1 push-pull
- connector
- PC connection - USB
 - RS 232
- Convenient visualisation, archiving and data processing using the HMGWIN and CMWIN software supplied

Technical Specifications

| Analogue inputs | | |
|--|--|--|
| Input signals 3 channels M12x1 Ultra-Lock flange sockets (5 pole) channel A channel C | HYDAC HSI analogue sensors HYDAC HSI SMART sensors | |
| Accuracy | ≤ ± 0.1 % FS | |
| Digital input | | |
| 1 channel via M12x1 Ultra- Lock flange socket (5 pole) Channel D | Digital status (high/low) Frequency (0.01 30,000 Hz) | |
| Calculated channel | | |
| Quantity | 1 channel via virtual channel E | |
| Sampling rate (dependent on number of active channels) | 0.1 ms, max. 1 input channel 0.2 ms, max. 2 input channels 0.5 ms, all 3 input channels 1.0 ms, for Smart sensors | |
| Resolution | 12 bit | |
| Memory | At least 100 measurement curves, each with 500,000 measured values | |
| Display | 3.5" colour display 7-segment display | |
| Interfaces | 1 USB, 1 serial port RS 232 | |
| 🕻 🗧 mark | EN 61000-6-1 / 2 / 3 / 4 | |
| Safety | EN 61010 | |
| Protection class | IP 40 | |
| Environmental conditions | | |
| Operating temperature | 0 +50 °C | |
| Storage temperature | -20 +60 °C | |
| Relative humidity | 0 70 % | |
| Dimensions | approx. 244 x 173 x 58 mm (B x H x T) | |
| Weight | approx. 1,100 g | |

Note: FS (Full Scale) = relative to complete measuring range

Model Code

Operating Manual & Documents -

US = English

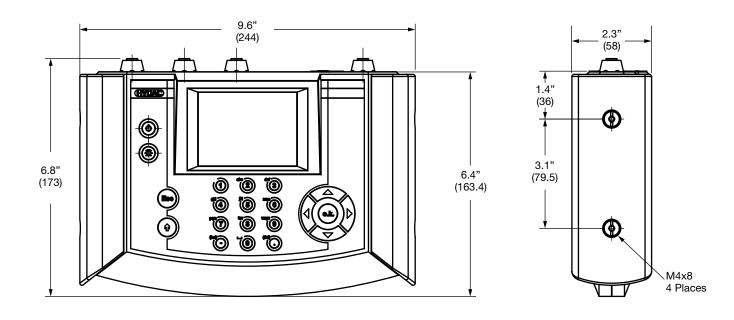
Scope of delivery

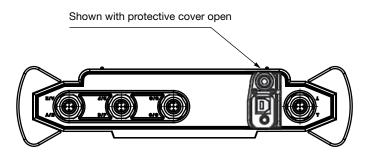
- HMG 2500
- Power supply for 90 .. 230 V AC
- Operating manual
- Data carrier with USB drivers, HMGWIN software
- USB connector cable

Accessories

 Additional accessories, such as electrical and mechanical connection adapters, power adapters, etc. can be found in the "Accessories Service Devices" catalogue section

Dimensions





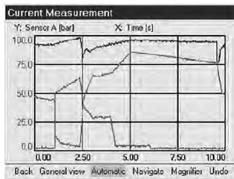
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

<u>HMG</u> 2500 - 000 - X

DIAGNOSTICS

Function

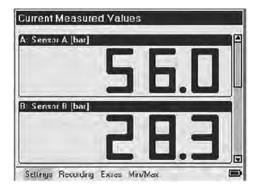
- Clear and graphical selection menus guide the operator intuitively to all the device functions available.
- A navigation pad on the keypad ensures rapid operation.
 The HMG 2500 can record signals from up to four sensors simultaneously. For this there are 4 robust standard input sockets.
- The following sensors can be connected to 3 of these input sockets:
- 3 analogue sensors (e.g. for pressure, temperature and flow rate) with the special digital HSI interface (HYDAC Sensor Interface); this means the basic device settings (measured variable, measuring range and unit of measurement) are undertaken automatically
- 3 Condition Monitoring sensors 1) (SMART sensors); again, the basic device settings are carried out automatically
- Frequency measurements, counter functions or triggers for data logging can be implemented via the fourth input socket with one digital input.
- Additionally, the HMG 2500 has a virtual measuring channel. The virtual measuring channel enables a differential measurement or a performance measurement by means of the sensors connected to the measuring channels "A" and "B".
- All input channels can operate simultaneously at a **sampling rate** of 0.5 ms (1.0 ms for SMART sensors). For the recording of highly dynamic processes, a sampling rate of 0.1 ms can be achieved.
- The most attractive function of the HMG 2500 surely is the capability of "online" recording and graphic illustration of dynamic processes, which means as a **measuring curve in** real time.



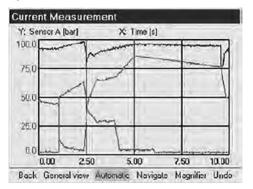
- The data memory for recording curves or logs can hold up to 500,000 measured values per recording. Over 100 of such data recordings in full length can be stored in an additional archiving memory.
- For targeted, event-driven curves or logs, the HMG 2500 has two independent triggers, which can be linked together logically.
- User-specific device settings can be stored and re-loaded at any time as required. This means that repeat measurements can be carried out on a machine again and again using the same device settings.

| Name | Savedt |
|----------------------|-------------------|
| power unit 10 | 28.06.06 12:44:58 |
| injection machine 17 | 28.06.05 12:44:41 |
| hydraulic press | 28.06.05 12:43:04 |
| power unit | 28.06.05 12.42.03 |
| injection machine 12 | 28.06.05 12:41:14 |
| | |
| | |

 Measured values, curves or texts are visualised on a full graphics colour display in different selectable formats and display forms.



 Numerous useful and easy-to-use auxiliary functions are available, e.g. zoom, ruler tool, differential value graph creation and individual scaling, which are particularly for use when analysing the recorded measurement curves.



• The HMG 2500 communicates with a PC via the built-in USB interface or RS 232 interface.



DIAGNOSTICS

HMGWIN:

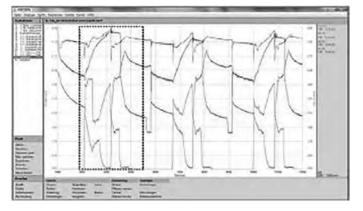
The PC software HMGWIN is also supplied with the device. This software is a convenient and simple package for analysing and archiving curves and logs which have been recorded using the HMG 2500, or for exporting the data for integration into other PC programs if required.

In addition it is possible to operate the HMG 2500 directly from the computer. Basic settings can be made, and measurements can be started online and displayed directly on the PC screen in real-time as measurement curves progress.

HMGWIN can be run on PCs with Windows Vista / XP / 2000 and Windows 7, 8.1 and 10 operating systems.

Some examples of the numerous useful additional functions:

- Transfer and archiving of measurements recorded using the HMG 2500.
- Display of the measurements in graph form or as a table.



• **Zoom function:** Using the mouse, a frame is drawn around an interesting section of a measurement curve, which is then enlarged and displayed.

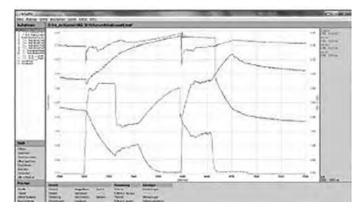
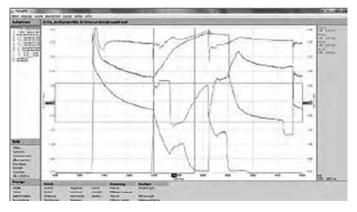
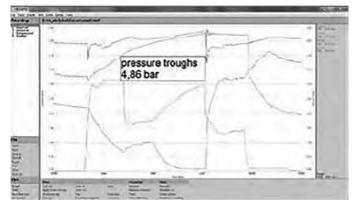


Fig.: Zoomed section of measurement curve

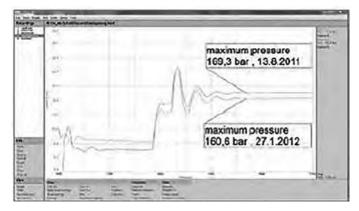
• Accurate measurement of the curves using the ruler tool (time values, amplitude values, and differentials)



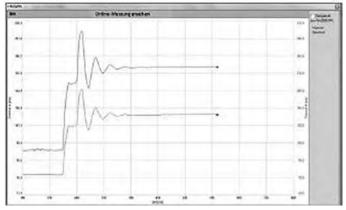
Individual comments and measurement information can be added to the graph



 Overlay of curves, for example to document the wear of a machine (new condition/current condition)



- Using mathematical operations (calculation functions, filter functions) new curves can be added.
- Snap-shot function: comparable to the function of a digital camera, a picture can be taken immediately of any graph and saved as a jpg file.
- A professional measurement report can be produced at the click of a mouse: HMGWIN 3000 has an automatic layout function. Starting with a table of contents, all recorded data, descriptions, and graphics and/or tables are combined into a professional report and saved as a pdf file.
- Online function (HMGWIN only): Starting, recording, and online display of measurements (similar to the function of an oscilloscope)



 Change of axis assignment of the recorded measurement parameters in graph mode (e.g. to produce a p-Q graph)

HYDAC C5

DIAGNOSTICS HMG 4000 Series

Portable Data Recorder



Description:

The HMG 4000 is a top performance high-end portable measurement and data acquisition equipement. It was mainly developed for all measured values in relation with hydraulic systems, such as pressure, temperature, flow rate and linear position. Moreover, it provides a very high flexibility, even when it comes to evaluating other measured values. The main applications are servicing, maintenance or test rigs.

The data recorder has a very easy-to-operate user interface due to its large 5.7" touchscreen. The operator can access all of the device's functions and settings by means of clearly presented selection menus.

The HMG 4000 can record the signals of up to 38 sensors at once.

For this purpose, HYDAC ELECTRONIC offer special sensors which are automatically recognised by the HMG 4000 and whose parameters such as measured values, measuring ranges and measuring units can be set.

On the one hand, there are the HYDAC **HSI** sensors (**H**YDAC **S**ensor Interface) for the measurement of pressure, temperature and flow rate, for the connection of which there are 8 analogue input channels.

Furthermore, there is the option of connecting HYDAC SMART sensors to these inputs. SMART sensors can display several different measured values at a time.

Up to 28 special HYDAC **HCSI** sensors (**H**YDAC **C**AN **S**ensor Interface) can be connected additionally via the CAN bus port, also supporting automatic sensor recognition.

The HMG 4000 can optionally be connected to an existing CAN network. This enables the recording of measured data transmitted via CAN bus (e.g. motor speed, motor pressure) in combination with the measured data from the hydraulic system.

The device also offers measurement inputs for standard sensors with current and voltage signals.

The HMG 4000 rounds off the application with two additional digital inputs (e.g. for frequency or rpm measurements).

The most impressing feature of the HMG 4000 is its ability to record the dynamic processes of a machine in the form of a measurement curve and render them as a graph.

HYDAC software HMGWIN, which is specific to the HMG 4000, is supplied for convenient post-processing, rendering and evaluation of measurements on your computer.

5.7" Color Touchscreen Up to 38 sensors can be connected Automatic Sensor Detection

Features:

- Large, full graphics colour display 5.7" touchscreen
- Capable of recording up to 38 sensors at once, 8 analogue, 2 digital sensors and 28 HCSI sensors via CAN bus.
- Up to 100 measurement channels can be depicted simultaneously
- High-speed sampling rate, up to 8 sensors at 0.1 ms at a time.
- Quick and automatic basic setting by use of automatic sensor recognition
- Analogue inputs 0 .. 20 mA, 4 .. 20 mA Voltage 0 .. 50 V, -10 .. 10 V
 PT 100/1000 input
- PT 100/1000 input
- Connection to a CAN bus system (also J1939)
- Simple and user-friendly operation, intuitive menu
- Practical, robust design
- Very large data memory for archiving measurement curves, enables the storage of 500 measurements with up to 8 million measured values.
- Various measurement modes:
 - Normal measuring
 - Fast curve recording
 - Long-term measurements
- Recording of dynamic processes "online" in real time
- · Event-driven measurements with several triggering options
- Programming function for HYDAC switch devices
- PC interface via USB
- USB Host connection for USB memory sticks
- Convenient visualisation, archiving and data processing using the HMGWIN software supplied.

C6 **HYDAC**

Operating Manual & Documents

US = English

Technical Specifications

| Analogue inputs | |
|--|---|
| Input signals 8 channels M12x1 Ultra-Lock flange sockets (5-pin) channel A to channel H | HYDAC HSI analogue sensors HYDAC HSI SMART sensors Voltage signals: e.g. 0.5 to 4.5 V, 0 to 10 V etc. (input ranges for 0 to 50 V, 0 to 10 V, 0 to 4.5 V, -10 to 10 V) Current signals, e.g. 4 to 20 mA, 0 to 20 mA (input range 0 to 20 mA) 1 x PT 100 / PT 1000 (at channel H) |
| Accuracy dependent on the input range | $\leq \pm 0.1$ % FS at HSI, voltage, current $\leq \pm 1$ % FS at PT 100 / PT 1000 |
| Digital inputs | |
| Input signals 2 channels M12x1 Ultra-Lock flange socket (5-pin) channel I, J | Digital status (high/low) Frequency (0.01 to 30,000 Hz) PWM duty cycle Durations (e.g. period duration) |
| Level | Switching threshold/switch-back threshold: 2 V/1 V Max. input voltage: 50 V |
| Accuracy | ≤ ± 0.1% |
| CAN | |
| Input signals 28 channels M12x1 Ultra-Lock flange socket (5-pin) channel K1 to K28 | HYDAC HCSI sensors, CAN, J1939, CANopen PDO, CANopen SDO |
| Baud rate | 10 kbit/s to 1 Mbit/s |
| Accuracy | $\leq \pm 0.1\%$ |
| Calculated channels | |
| Quantity | 4 channels via virtual port L (channel L1 to channel L4) |
| Programming interface | |
| For HYDAC I/O-Link devices | 1 channel via M12x1 Ultra-Lock flange socket (5-pin) |
| Voltage supply | |
| Network operation | 9 to 36 V DC via standard round plug 2.1 mm |
| Battery | Lithium-Nickel-Kobalt-Aluminium-Oxide 3.6 V; 9300 mAh |
| Battery charging time | approx. 5 hours |
| Battery life | w/o sensors roughly 11 hours with 2 sensors roughly 9 hours with 4 sensors roughly 7 hours with 8 sensors roughly 4 hours |
| Display | |
| Туре | TFT-LCD Touchscreen |
| Quantity | 5.7" |
| Resolution | VGA 640 x 480 Pixel |
| Backlight | 10 to 100% adjustable |
| Interfaces | |
| | |
| USB Host | |
| USB Host Plug-in connection | USB socket, Type A, screened |
| USB Host Plug-in connection USB Standard | 2.0 (USB Full speed) |
| USB Host Plug-in connection USB Standard Transmission rate | 2.0 (USB Full speed) 12 Mbit/s |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply | 2.0 (USB Full speed) 12 Mbit/s 5 V DC |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection | 2.0 (USB Full speed) 12 Mbit/s 5 V DC |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave Plug-in connection | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave Plug-in connection USB Standard | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave Plug-in connection USB Standard Transmission rate Voltage supply Power supply | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave Plug-in connection USB Standard Transmission rate Voltage supply | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave Plug-in connection USB Standard Transmission rate Voltage supply Power supply | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave Plug-in connection USB Standard Transmission rate Voltage supply Power supply Power supply Power supply Power supply Potection Memory Measured value memory | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave Plug-in connection USB Standard Transmission rate Voltage supply Power supply Power supply Power supply Power supply Protection Memory Measured value memory Technical standards | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million measured values |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Standard Transmission rate Voltage supply Power supply Power supply Protection Memory Measured value memory Technical standards EMC | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million measured values IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Standard Transmission rate Voltage supply Power supply Power supply Protection Memory Measured value memory Technical standards EMC Safety | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million measured values IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 EN 61010 |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Standard Transmission rate Voltage supply Power supply Power supply Protection Memory Measured value memory Technical standards EMC Safety IP class | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million measured values IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 EN 61010 |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Standard USB Standard Transmission rate Voltage supply Power supply Power supply Protection Memory Measured value memory Technical standards EMC Safety IP class Environmental conditions Operating temperature Storage temperature | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million measured values IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 EN 61010 IP 40 32 to 122°F (0 to 50°C) -4 to 140°F (-20 to 60°C) |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave Plug-in connection USB Standard Transmission rate Voltage supply Power supply </td <td>2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million measured values IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 EN 61010 IP 40 32 to 122°F (0 to 50°C)</td> | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million measured values IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 EN 61010 IP 40 32 to 122°F (0 to 50°C) |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Standard Transmission rate Voltage supply Power supply Power supply Protection Memory Measured value memory Technical standards EMC Safety IP class Environmental conditions Operating temperature Storage temperature Relative humidity Max. operating altitude | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million measured values IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 EN 61010 IP 40 32 to 122°F (0 to 50°C) -4 to 140°F (-20 to 60°C) 0 to 70% 2000 m |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Standard Transmission rate Voltage supply Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection Memory Measured value memory Technical standards EMC Safety IP class Environmental conditions Operating temperature Relative humidity Max. operating altitude DIMENSIONS | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million measured values IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 EN 61010 IP 40 32 to 122°F (0 to 50°C) -4 to 140°F (-20 to 60°C) 0 to 70% 2000 m approx. 11.2" x 7.4" x 3.4"(285 x 189 x 87 mm) |
| USB Host Plug-in connection USB Standard Transmission rate Voltage supply Power supply Protection USB Slave Plug-in connection USB Standard Transmission rate Voltage supply Power supply Power supply Power supply Power supply Potection Memory Measured value memory Technical standards EMC Safety IP class Environmental conditions Operating temperature Storage temperature Relative humidity Max. operating altitude | 2.0 (USB Full speed) 12 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) USB socket, Type B, screened 2.0 (USB High speed) 480 Mbit/s 5 V DC 100 mA max. Short-circuit protection to GND (0 V) 16 GB for min. 500 measurements, each containing 8 million measured values IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 EN 61010 IP 40 32 to 122°F (0 to 50°C) -4 to 140°F (-20 to 60°C) 0 to 70% 2000 m |

DIAGNOSTICS

<u>HMG</u> <u>4000</u> - <u>000</u> - <u>X</u>

Scope of delivery

- HMG 4000
- Power supply for 90 to 230 V AC
- Tether strap
- Operating Instructions
- Data carrier with USB drivers and HMGWIN software
- USB connector cable

Accessories

- Pressure, temperature and flow rate measuring transmitter with HSI sensor detection and CAN pressure measuring transmitter with HCSI sensor detections – see separate data sheet
- Additional accessories, such as the pushpull sensor connection cables, connection accessories for the HCSI CAN sensors, mechanical connection adapters, etc. can be found in the "Accessories Service Devices" catalog section.

Note:

The information in this brochure relates to the operating conditions and applications described.

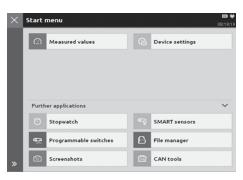
For applications or operating conditions not described, please contact the relevant technical department.

All technical details are subject to change without notice.

DIAGNOSTICS

Function:

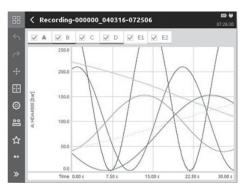
 Clear and graphical color selection menus intuitively guide the operator to all the device functions available and ensure fast implementation.



• The HMG 4000 can record the signals of up to **38 sensors** simultaneously.

11 push-pull M12x1 input sockets are available as sensor interfaces. Apart from the push-pull sensor connection cable, M12x1 standard cables can also be used.

- The following sensors can be connected to the 8 black input sockets:
 - 8 analogue sensors (e.g. for pressure, temperature, and flow rate) with the special digital HSI interface (HYDAC Sensor Interface); this means the basic device settings (measured variable, measuring range and unit of measurement) are undertaken automatically
 - 8 standard analogue sensors with current and voltage signals
 - 8 Condition Monitoring sensors* (SMART sensors); again, the basic device settings are carried out automatically
- The blue input socket provides 2 digital inputs, e.g. for 1 or 2 HYDAC speed sensors (2nd speed sensor connection via Y adapter). Frequency measurements, counting functions or triggers can also be implemented for data recording.
- Different CAN bus functions can be implemented via the red input socket:
 - Connection of up to 28 HYDAC HCSI sensors (HYDAC CAN Sensor Interface) by setting up a CAN bus with HCSI sensors and the relevant connection accessories, also with automatic parameterization.
 - Connecting to a CAN bus, you have the option of evaluating up to 28 CAN messages.
 - Configuration of CAN sensors; the parameterization is performed by means of EDS files, which can be stored and administrated in the HMG 4000.
- The yellow input socket serves as the interface for HYDAC pressure, temperature or level switches with I/O link as well as for the programming device HPG P1. These devices can be parameterized by means of the HMG 4000.
- The most attractive function of the HMG 4000 surely is the capability of "online" recording and graphic illustration of dynamic processes, which means as a measuring curve in real time. During the recording process of a measuring curve, you can zoom in the curve sections of interest using gestures on the touchscreen.



- For the purpose of recording highly dynamic processes, all 8 analogue input channels can be operated simultaneously at a **sampling rate** of 0.1 ms.
- The **data memory** for recording curves or logs can hold up to 8 million measured values.
- At least 500 of such data recordings in full length can be stored in an additional archiving memory.
- For specific, event-driven curves or logs, the HMG 4000 has four independent triggers, which can be linked together logically. In addition, there is a "start/stop" condition, by means of which a measurement can be initiated or finished.
- User-specific device settings can be stored and re-loaded at any time as required. This means that repeat measurements can be carried out on a machine again and again using the same device settings.

| 88 | < Recordings | | 12:01:21 |
|-------|---|-----------------|----------|
| 0 | Folder 04.05.15 07:5212 (227 | Ceneral (KB) | > |
| © | Fastlog - 0 12.05.15 09:37:48 (104.8 | sytes) | > |
| | Messkurve-000000_050415-145209 04.05.15 14:52:10 (22.8 KB) | | > |
| | Messkurve-000000_1607 16.07.15 11:39:36 (2.36 | | > |
| | Messkurve-000000_1707 17.07.15 07:50:07 (1.42 | | > |
| | Messkurve-000000_1707 17.07.15 14:25:19 (5.35 | | > |
| | Series1 - 1 18.05.15 11:52:00 (540 B | sytes) | > |
| » | Series1-7_051915-08524 | 4 | |

 Measured values, curves or texts are visualized on the full color graphics display in different selectable formats and display forms.

| | Measured values | 12:52:03 |
|---------|-----------------------------|----------------------|
| ୍କ ଡ | A HDA4000 bar B HD 224,6 | A4000 bar 1,1 WWW |
| 6 | C ETS4000 ℃ -6,3 ↓ D EV | 53,9 |
| | E1 AS1000-RelHum % 6 E2 AS | 1000-Temp °C 8,5 |
| | | |
| » | | |

 Numerous useful and easy-to-use auxiliary functions are available, e.g. zoom, tracker, differential value graph creation and individual scaling, which are particularly for use when analyzing the recorded measurement curves.

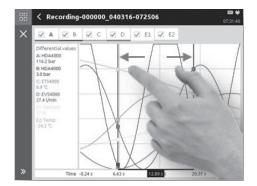


Figure: Using the magnifying gesture with two fingers, the operation is carried out – zooming in this case

 The communication between the HMG 4000 and a PC is performed via the built-in USB port. A HMG 4000 connected to your PC is recognized and depicted as a drive by the PC. You can thus move measured data to your PC conveniently. Optionally, data transfers can be carried out via a file manager by means of a USB memory stick.

DIAGNOSTICS

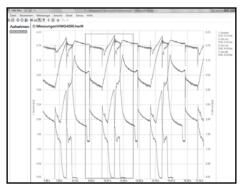
HMGWIN:

The PC software HMGWIN is also supplied with the device. This software is a convenient and simple package for analyzing and archiving curves and logs which have been recorded using the HMG 4000, or for exporting the data for integration into other PC programs if required.

In addition it is possible to operate the HMG 4000 directly from the computer. Basic settings can be made, and measurements can be started online and displayed directly on the PC screen in real-time as measurement curves progress.

HMGWIN can be run on PCs with Windows 7, Windows 8.1 and Windows 10 operating systems.

Some examples of the numerous useful additional functions: • Display of the measurements in graph form or as a table



• Zoom function:

Using the mouse, a frame is drawn around an interesting section of a measurement curve, which is then enlarged and displayed.

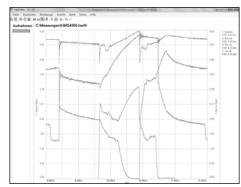
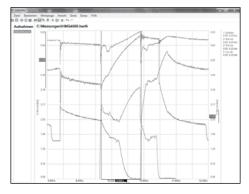
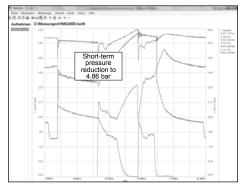


Fig.: Zoomed section of measurement curve

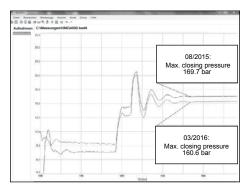
• Accurate measurement of the curves using the ruler tool (time values, amplitude values and differentials)



 Individual comments and measurement information can be added to the graph (function available mid-2017)



 Overlay of curves, for example to document the wear of a machine (new condition/current condition) (function available mid-2017)

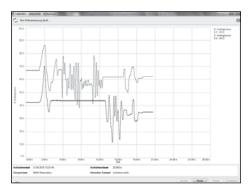


- Using mathematical operations (calculation functions, filter functions), new curves can be added.
- Snap-shot function: comparable to the function of a digital camera, a picture can be taken immediately of any graph and saved as a jpg file.
- A professional measurement report can be produced at the click of a mouse:

HMGWIN has an automatic layout function. Starting with a table of contents, all recorded data, descriptions and graphics and/or tables are combined into a professional report and saved as a pdf file.

• Online function (HMGWIN only):

Starting, recording, and online display of measurements (similar to the function of an oscilloscope) Change of axis assignment of the recorded measurement parameters in graph mode (e.g. to produce a p-Q graph)

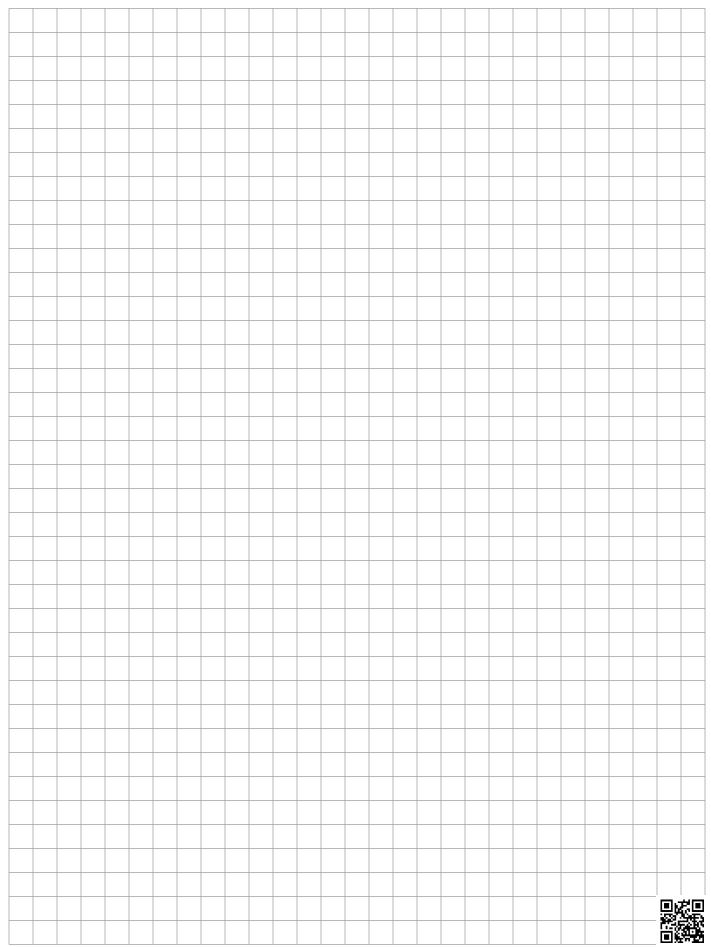


* SMART sensors

(Condition Monitoring 'sensors) are a generation of sensors from HYDAC which can provide a variety of different measurement variables.

DIAGNOSTICS

Notes



Offline Filtration Systems Today's hydraulic filter systems have seen a shift from reactionary to

Ioday's hydraulic filter systems have seen a shift from reactionary to preventative, and even predictive maintenance. Total system contamination management begins with our Fluid Conditioning Products. These are hydraulic oil filter systems for removing contaminants and water from various types of hydraulic fluids. Our offline hydraulic oil filter systems include both mobile filtration carts with and without contamination monitoring units, stationary filtration systems from 1.3 gpm flow rates to customizable kidney loop systems up to 140 GPM. Our dewatering units, both vacuum dehydration and mass transfer systems offered and can remove both free and dissolved water from fluids for any reservoir size at various flow rates.



OFFLINE FILTRATION SYSTEMS RFSA Series

Reservoir Filtration System Adapter



Description

The RFSA is an aluminum adapter that gives a kidney loop filter access to a reservoir. The adapter can accommodate kidney loop filtration rates up to approximately 15 gpm.

Features

- Suitable to use with many Filter Systems products including: OF5HS/OF5HD/OFCS/OFCD, OF7-BC, OFCD-BC, OFCD-MV, OFCD-HV, MAFH-A, OFS, OFS-AM, OLF
- 1.25" SAE O-Ring Boss Suction Port
- 1.00" SAE O-Ring Boss Return Port
- Suction and Return downtubes included and recommended to be cut to length and bent for proper fluid turnover in a reservoir
- Optional OFCS/OFCD Fitting Kit can be ordered separately. This includes adapters to install CAM-GROOVE hose couplings between Suction/Return hoses/wands and additional CAM-GROOVE adapters for installation in kidney loop adapter. Dust caps and plugs included

Applications

 All applications with a hydraulic reservoir utilizing a 6-bolt mounting connection

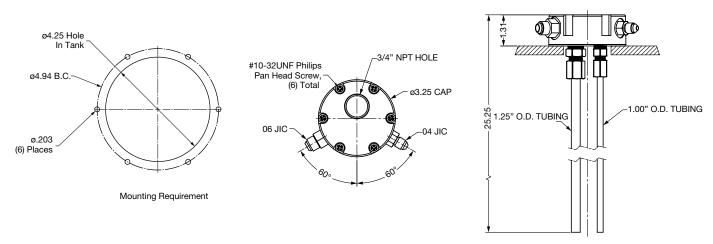
Technical Specifications

| Reservoir Mounting Pattern: | Fits standard 6-bolt |
|---------------------------------|---|
| Supply Port Thread Size: | 1.25" SAE O-Ring Boss Suction Port |
| Return Port Thread Size: | 1.00" SAE O-Ring Boss Return Port |
| Breather Port Thread Size: | ¾" NPT |
| Return Tubes: | Suction and Return downtubes included and recommended to be cut to length and bent for proper fluid turnover in reservoir |

Mounting Pattern

Customer is responsible to cut an appropriately sized hole on top of their tank. This adapter has two (2) ports: one for Suction and one for Return. Also includes a breather port.

Reservoir pattern is six (6) .203" holes on a 4.94" BCD with a 4.25" diameter center hole. See Drawing S-1048.



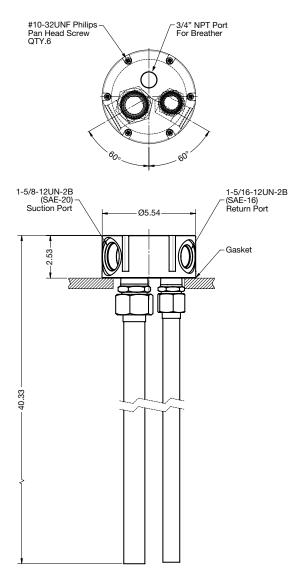
Model Code

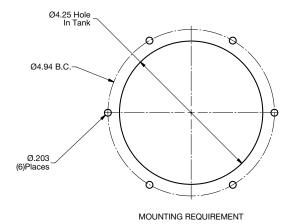
| RF | SA | - |
|----|----|---|
| | | |

1

| Series — RFSA | = | Reservoir Filtration System Adapter | |
|----------------------|---|--|-------|
| Options Omit 1 | = | For use with Kidney Loop Filtration Products Optional OFCS/OFCD Fitting Kit | J |

Installation Details

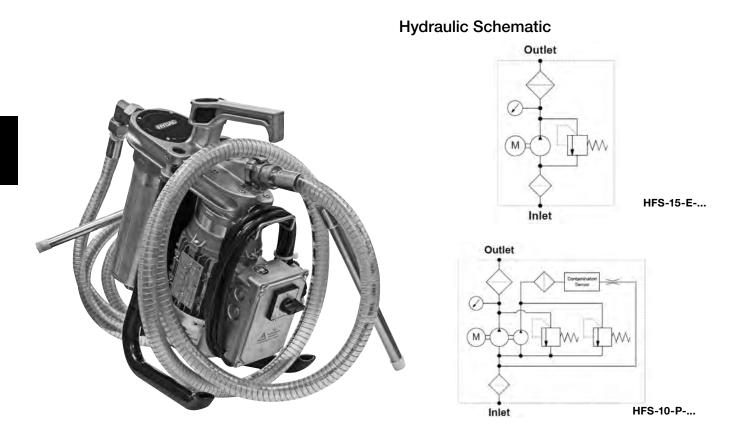




PN#02075860 / 05.21 / FSP2105-2273

OFFLINE FILTRATION SYSTEMS HFS-15 Series

Mobile Filter Unit



Description

The HFS Hand Held Portable filter unit is used as a service unit for filling hydraulic systems, flushing small hydraulic systems as well as for cleaning in bypass flow. Solid particle contamination as well as free water can be removed by the filter elements.

The HFS can also be supplied with a CS 1000 ContaminationSensor. This allows the solid particle contamination in the oil to be monitored at the same time. The cleanliness class results are displayed according to ISO and SAE classifications.

Features

- Improvement in service life for components and system filters
- Increased oil service life
- Increased machine availability
- Simple operation
- Compact design
- Integrated dry running protection
- Option: CS 1000 ensures continuous monitoring of oil cleanliness during cleaning

Applications

- Filtered and unfiltered filling of hydraulic systems
- · Temporary offline filtration of hydraulic systems
- Filtered or unfiltered fluid transfer
- Unfiltered drainage of hydraulic tanks
- Leakage oil recirculation at test benches

| Maximum Flow Rating | HFS-15-E HFS-10-P | 4 gpm (15 l/min; @ 50Hz) 2.6 gpm (10 l/min; @ 50Hz) |
|--|--|---|
| Pump type | Vane pump | |
| Maximum operating pressure | 58 psi (4.0 bar) | |
| Maximum permissible inlet pressure | -5.8 to 8.7 psi (-0 | .4 bar to + 0.6 bar) |
| Permissible viscosity range | | SUS 1623 SUS (5 to 350cSt) SUS 927 SUS (5 to 200cSt) |
| Length of power cable | 9.8' (3 m) <i>(incl. plug)</i> | |
| Permissible fluid temp. | 14-176°F (-10 +80 °C) | |
| Permitted ambient temperature range | 14-104°F (-10 to + | -40°C) |
| Seal material | FKM (Viton®) | |
| Empty weight | HFS-15-E 30.9 HFS-10-P 36.4 | |
| Hoses w/ crimped wands (standard) | Suction hose leng Return hose leng Hose material: P\ Wand material: Z | th: 8.2' (2.5m) /C |



Model Code

| | | <u>HFS</u> - <u>1</u> | <u>5 - E</u> - | <u>9 - N</u> | <u>X - 1</u> | 0 | <u> - E</u> |
|-----------------------------|---|-----------------------|----------------|--------------|--------------|---|-------------|
| Series — HFS | Mobile Filter Unit | | | | | | |
| | 4 gpm (15 L/min) (for type "E" only) 2.6 gpm (10 L/min) (for type "P" only) | | | | | | |
| - | Economy Premium (with Condition Monitoring) | | | | | | |
| Element le 9 | ngth - 9" | | | | | | |
| | a iculate removal element rer Removal element | | | | | | |
| Filtration F 1, 3, 5, 10 | | | | | | | |
| | bly | | | | | | |
| Clogging in | dicator | | | | | | |

E Back-pressure indicator =

Scope of delivery

- HFS (with filter element and hose/wand assembly)

- Operating and maintenance instructions

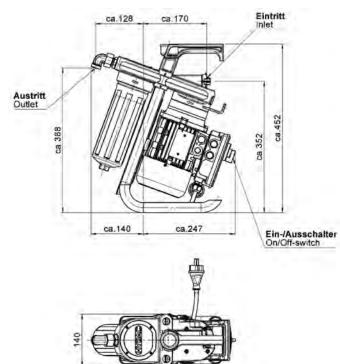
| Filtration | Part no. | Filtration rating |
|------------|----------|-------------------|
| HFS-15-001 | 7642315 | 1 µm |
| HFS-15-003 | 7642316 | 3 µm |
| HFS-15-005 | 7642317 | 5 µm |
| HFS-15-010 | 7642314 | 10 µm |
| HFS-15-025 | 7642318 | 25 µm |
| HFS15-AM | 7642319 | Water Removal |

| Hoses with threa | Hoses with threaded connection (depressurized suction up to max. 350 mm ² /s) | | | | |
|--|--|--------------------------------|-----------------|------------------------------------|--|
| Description | Part no. | Suction hose/ Pressure Hose | Thread | Material Section/ Pressure Hose | |
| MFU-15-SKDK5F | 4270516 | 2.5 m / 5 m | M30x2 / M26x1.5 | 1SN / 2TE | |
| Accessories for hoses with threaded connection | | | | | |
| Description | | Part no. | | Function | |
| MELLIS OKOKIE | | 4270550 | Lancol (| anath of 1.20 m | |

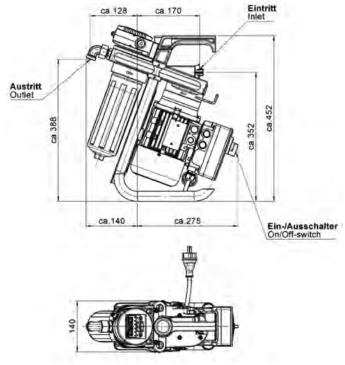
| Description | i artiio. | I unction |
|------------------|-----------|---------------------------------------|
| MFU-15-SKDK-LF | 4270559 | Lance ¹ (length of 1.30 m) |
| MFU-15-SKDK-SF | 4270560 | Suction filter ¹ |
| MFU-15-SKDK-ZWF | 4270518 | Counter |
| MFU-15-SKDK-ZPF | 4270561 | Pump nozzle ² |
| MFU-15-SKDK-ZPWF | 4270519 | Pump nozzle + counter ² |

 $^1\text{max.}$ viscosity 200 mm²/S $^2\text{max.}$ operation duration of the unit with closed pump nozzle of 5-10 min.

Dimensions – HFS-15E



Dimensions – HFS-10P



OFFLINE FILTRATION SYSTEMS OF7-BC Series

Compact Filtration System Basic Cart



Description

The HYDAC Basic Cart Filter System is a compact, self-contained, "light-duty" filtration system equipped with high efficiency, high capacity elements capable of removing particulate contamination and/or water quickly, conveniently and economically. It is perfect for cleaning up existing systems as well as for pre-filtering new fluids, since new fluids often have contamination levels significantly higher than that recommended for most hydraulic systems.

The filtration system's compact, lightweight design with replaceable element cartridge and reusable bowl, minimizes landfill waste. Element service is easily accomplished through the top-ported filter housings. The optional dual filter assembly allows for water and particulate removal or staged particulate contamination removal.

Features

- Compact size, easily transported
- Top-ported filter provides easy element service
- Bar-type Dirt Alarm[®] indicates when filter elements require a change
- Hoses and connection tubes included
- Optional BackPack Version available for ease of transport across distances



Applications

- Supplementing continuous filtration by system filters
- Cleaning up a hydraulic system following component replacement
- Filtering new fluid before it is put into service
- Transferring fluid from storage tanks and drums to system reservoirs

Technical Specifications

| Flow Rating: | 4 gpm (15.1 lpm) |
|-----------------------|---|
| Maximum Viscosity: | 1600 SUS (350 cSt) |
| Hose Pressure Rating: | 30 psig (2.0 bar) @ 150°F (65.6°C) Full vacuum @ 150°F (65.6°C) |
| Fluid Temperature: | 25°F to 150°F (-4°C to 65°C) |
| Material: | Element Case: Aluminum |
| Seal Material: | Buna N |
| Compatibility: | All petroleum based hydraulic fluid. Contact factory for use with other fluids |
| Motor: | 115 VAC Single phase 0.25 hp |
| Weight: | Single housing - 40 lbs (18.2 kg) Dual housing - 44 lbs (20 kg) (Does not include weight of hose/wands) |

Replacement Elements

| Model Code | Part No. |
|--------------------|----------|
| ELEMENT OFCDBC 003 | 02099361 |
| ELEMENT OFCDBC 005 | 02099362 |
| ELEMENT OFCDBC 010 | 02099363 |
| ELEMENT OFCDBC 020 | 02099364 |
| ELEMENT OFCDBC AM | 02099365 |



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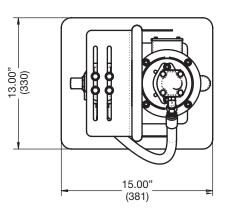
Model Code

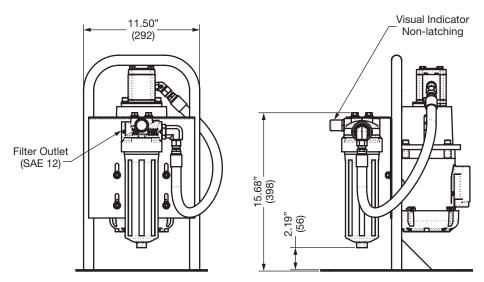
| OF7-BC | <u>2</u> <u>2</u> - <u>09</u> - <u>MXxx</u> - <u>MXxx</u> - <u>B</u> - |
|---|--|
| Series OF7-BC = Compact Filter System Basic Cart | |
| Voltage omit = 110 V AC, 60Hz, 1 Ph. A = 230V AC, 60Hz, 1 Ph. T = 12V DC (supplied with motor starter) | |
| Number of Housing 1 = One 9" element per housing 2 = One 9" element per housing Element Length | |
| 09 = One 9" element supplied per housing | |
| Element Size (BN only - AM has no rating) (microns) MX03, MX05, MX10, MX25 = Betamicron® Absolute Filtration Rating (βx(c) ≥ 1000) MXAM* = Aquamicron® Water Removal | |
| Element Size (BN only - AM has no rating) (microns) (OF7-BC Dual Stage Only) MX03, MX05, MX10, MX25 = Betamicron® Absolute Filtration Rating (βx(c) ≥ 1000) MXAM* = Aquamicron® Water Removal |] |
| Seals B = Buna | |
| Clogging Indicator E = Standard Visual Indicator | |

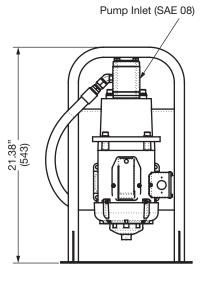
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*Aquamicron media should be in the first filter housing followed by the BN media in the second housing.

Dimensions







OFFLINE FILTRATION SYSTEMS OFCD-BC Series

Compact Dual Stage Filtration System Basic Cart



Description

The HYDAC Basic Cart Mobile Filter System is a compact, selfcontained, "light-duty" filtration system equipped with high efficiency, high capacity elements capable of removing particulate contamination and/or water quickly, conveniently and economically. It is perfect for cleaning up existing systems as well as for prefiltering new fluids, since new fluids often have contamination levels significantly higher than that recommended for most hydraulic systems.

The filtration system's compact, lightweight design with replaceable element cartridge and reusable bowl, minimizes landfill waste. Element service is easily accomplished through the top-ported filter housings. The OFCD-BC includes a drip pan to help catch any oil before it falls to the ground. The dual filter assembly allows for water and particulate removal or staged particulate contamination removal.

Features

- Compact size, easily transported
- Top-ported filter provides easy element service
- Bar-type Dirt Alarm[®] indicates when filter elements require a change
- Hoses and connection tubes included
- Drip pan catches oil before it falls to the ground

Applications

- Supplementing continuous filtration by system filters
- Cleaning up a hydraulic system following component replacement
- Filtering new fluid before it is put into service
- Transferring fluid from storage tanks and drums to system reservoirs

Technical Specifications

| Flow Rating: | 10 gpm (37.9- L/min) max | |
|-----------------------|---|--|
| Maximum Viscosity: | 1000 SUS (216 cSt) | |
| Hose Pressure Rating: | 30 psig (2.0 bar) @ 150°F (65.6°C) Full vacuum @ 150°F (65.6°C) | |
| Fluid Temperature: | 25°F to 150°F (-4°C to 65°C) | |
| Bypass Valve Setting: | Cracking: 25 psi (1.7 bar) | |
| Material: | Element Case: Aluminum | |
| Seal Material: | Buna N | |
| Compatibility: | All petroleum based hydraulic fluid. Contact factory for use with other fluids | |
| Motor: | 115 VAC Single phase 1 hp | |
| Weight: | 102 lbs. (46.3 kg) | |

Replacement Elements

| Model Code | Part No. |
|--------------------|----------|
| ELEMENT OFCDBC 003 | 02099361 |
| ELEMENT OFCDBC 005 | 02099362 |
| ELEMENT OFCDBC 010 | 02099363 |
| ELEMENT OFCDBC 020 | 02099364 |
| ELEMENT OFCDBC AM | 02099365 |

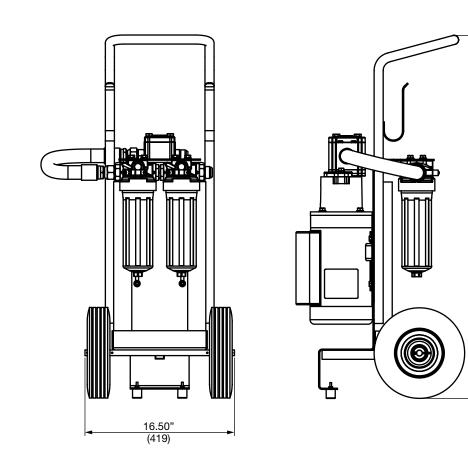


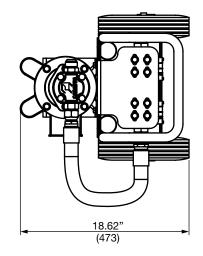
Model Code

| | | | OFCD-BC - 1 - 09 MX10 - MX05 - B - 2 |
|---------------------|-------------|---|--------------------------------------|
| Series — OFCD-E | 3C | = Compact Dual Stage Filter System Basic Cart | |
| Number o | | ements One 9" element per housing | |
| Element L 09 | | gth One 9" element supplied per housing | |
| | NX05 | (BN only - AM has no rating) (microns) 5, MX10, MX20 = Betamicron [®] Absolute Filtration Rating (ßx(c) ≥ ⁻ = Aquamicron [®] Water Removal | 1000) |
| | ۸X0٤ | (BN only - AM has no rating) (microns) 5, MX10, MX25 = Betamicron® Absolute Filtration Rating (βx(c) ≥ ⁻ = Aquamicron® Water Removal | 1000) |
| Seals — B | = | Buna | |
| Pump — 10 | = | 10 gpm | |
| () | = = = | 115 VAC 60 Hz 230 VAC 60 Hz 230 VAC 50 Hz (flow rate reduced to 8gpm; no plug supplied) | |
| | | | |

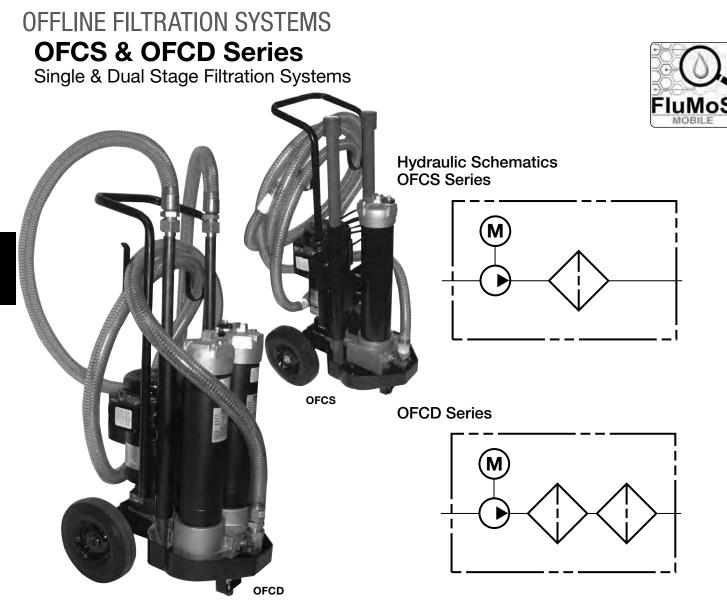
*Aquamicron media should be in the first filter housing followed by the BN media in the second housing.

Dimensions





40.08" (1018)



Description

The OFCS and OFCD Series are compact, self-contained filtration system equipped with high efficiency, high capacity elements capable of removing particulate contamination and/or water quickly, conveniently and economically. It is perfect for cleaning up existing systems as well as for prefiltering new fluids, since new fluids often have contamination levels significantly higher than that recommended for most hydraulic systems.

HY-TRAX manual fluid sampling system: HYDAC now offers the HY-TRAX manual fluid sampling system as an additional option allowing for real-time fluid condition monitoring. ISO particle counts are visually displayed on the CS1000. Users will now know when they have reached their desired ISO contamination levels.

CSI-C-11: HYDAC also offers the CSI-C-11 Communication Interface for WLAN or LAN transmission of data and data storage capabilities.

The OFCS single filtration unit can remove either water or particulate contamination. The OFCD dual filtration unit can be used to remove both water and particulate contamination, or for staged particulate contaminant removal.

Features

- Modular base eliminates hoses between components and minimizes leakage
- Base-ported filter provides easy element service from the top cap
- Ten-foot hose and extension tubes included (1" dia. for 7 gpm; 1.25" dia. for 14 gpm)
- Drip pan catches oil before it falls to the ground
- Integral suction strainer protects pump

Applications

- Supplementing continuous filtration by system filters
- Cleaning up a hydraulic system following component replacement
- Filtering new fluid before it is put into service
- Transferring fluid from storage tanks and drums to system reservoirs

| Flow Rating | 7 gpm max (26.5 lpm) or 14 gpm max (53 lpm) | | | | |
|--------------------------------------|---|--|--|--|--|
| Maximum Viscosity | 1000 SUS (216 cSt) Higher viscosity version available. | | | | |
| Hose Pressure Rating | 30 psig (2.0 bar) @ 150°F (65.6°C) Full vacuum @ 150°F (65.6°C) | | | | |
| Maximum Operating Temperature | -20° to 150°F (-29° to 65°C) | | | | |
| Bypass Valve Setting | Cracking: 30 psi (2 bar) | | | | |
| Material | Manifold and cap: Cast aluminum Element case: Steel | | | | |
| Compatibility | All petroleum based hydraulic fluid. Contact factory for use with other fluids. | | | | |
| Motor | 115 V AC Single phase 3/4 hp (7 gpm) or 1-1/2 hp (14 gpm) | | | | |
| Weight - Ibs (kg) 7 gpm 14 gpm | · Ibs (kg) OFCS OFCD 190 (86) 220 (100) 197 (89) 227 (103) | | | | |



| | | | <u>27</u> - | <u>BN</u> | <u>10</u> - <u>BN</u> | <u>10</u> - I | <u>B</u> - A | - <u>14</u> - | <u>G2187</u> |
|------------------------------------|--|----------------|-------------|-----------|-----------------------|---------------|--------------|---------------|--------------|
| Series — OFCS OFCD | Single Filter SystemDual Filter System | | | | | | | | |
| Pneumati | ic Option ———— | | | | | | | | |
| (omit) P | Electric motor (standard)Pneumatic motor only | | | | | | | | |
| Element L | | | | | | | | | |
| 1-09 2-09 3-09 18 27 | One 9" Element Supplied Two 9" Elements Supplied (must be same micror Three 9" Elements Supplied (must be same micror One 18" Element Supplied One 27" Elements supplied | | | | | | | | |
| Filter Med | dia ———— | | | | | | | | |
| BN AM* G | Betamicron[®] Low Collapse Aquamicron[®] Water Removal Betamicron GeoSeal[®] | | | | | | | | |
| Filtration | Rating (BN only - AM has no rating) (microns) | | | | | | | | |
| 3 5 10 20 | Betamicron [®] (BN/HC) Absolute Filtration Rating $(\beta_{x(c)} \ge 1000)$ | | | | | | | | |
| Filter Med BN AM* G | dia (OFCD only) | | | | | | | | |
| Filtration | Rating (BN only - AM has no rating) (microns) (OFCD only | ·) | | | | | | | |
| 3 5 10 20 | Betamicron [®] (BN/HC) Absolute Filtration Rating $(\beta_{x(c)} \ge 1000)$ | | | | | | | | |
| Seals — | | | | | | | | | |
| В | = Buna N V = FPM | | | | | | | | |
| Voltage – | | | | | | | | | |
| (omit) | = 115 VAC 60HZ/1Phase | | | | | | | | |
| A B | = 230 VAC 60HZ/3Phase = 460 VAC 60HZ/3Phase | | | | | | | | |
| C | = 220 VAC 50HZ/1Phase | | | | | | | | |
| D | = 230 VAC 60HZ/1Phase | | | | | | | | |
| Pump Size | e | | | | | | | | |
| 07 | = 7 gpm 14 = 14 gpm | | | | | | | | |
| Options – G2185 G2187 | | uced to ~3 gpm | า | | | | | | |

PC = HyTRAX Contamination Monitoring Unit (will work with G2185 option for oils up to 2500SUS)

Note: Particle Counter Option only available in 115V / 60 Hz power supply

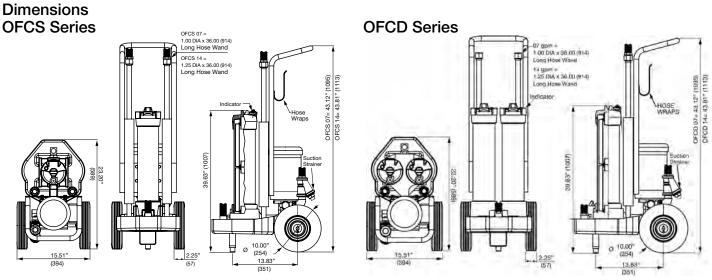
CSI = CSI-C-11 Sensor Interface Option for data acquistion (only with PC option)

CSI-W = CSI-C-11 Sensor Interface Option for data acquistion with AS1008 Water Saturation Sensor (only with PC option)

*Aquamicron media should be in the first filter housing followed by the BN media in the second housing.

For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Model Codes Containing RED are non-standard items – Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability

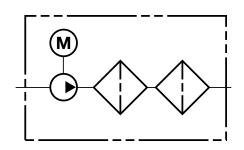


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

Model Code

OFFLINE FILTRATION SYSTEMS OFCD-MV Series Compact Dual Stage Filtration System up to 5,000 SUS

Hydraulic Schematic



Description

HYDAC's newest addition to the portable filtration carts offers the user the ability to filter up to 5,000 SUS fluids.

The OFCD-MV is a compact, self-contained filtration system equipped with high efficiency, high capacity elements capable of removing particulate contamination and/or water quickly, conveniently and economically. It is perfect for cleaning up existing systems as well as for prefiltering new fluids, since new fluids often have contamination levels significantly higher than that recommended for most hydraulic systems.

The OFCD-MV dual filtration unit can be used to remove both water and particulate contamination or for staged particulate contamination removal.

Features

- Ability to filter fluids having a viscosity up to 5,000 SUS
- Top-ported filter provides easy element service
- Ten-foot hose and extension tubes included

Applications

- Supplementing continuous filtration by the system's filters
- Cleaning up a hydraulic system following component replacement
- Filtering new fluid before it is put into service
- Transferring fluid from storage tanks and drums to system reservoirs

| Flow Rating | up to 10 gpm (37.9 lpm) | | | | |
|----------------------------------|---|--|--|--|--|
| Maximum Viscosity | up to 5,000 SUS (1079 cSt) | | | | |
| Hose Pressure Rating | 30 psig (2.0 bar) @ 150°F (65°C) Full vacuum @ 150°F (65°C) | | | | |
| Maximum Operating Temperature | -20° to 150°F (-29° to 65°C) | | | | |
| Bypass Valve Setting | Cracking: 30 psi (2 bar) | | | | |
| Material | Manifold and Cap: Cast Aluminum Element case: Steel | | | | |
| Compatibility | All petroleum based hydraulic fluid. Contact factory for use with other fluids | | | | |
| Motor | 1.0HP 110VAC/60HZ TEFC (6gpm) | | | | |
| WOLDI | 1.5HP 110VAC/60HZ (10gpm) | | | | |

Model Code

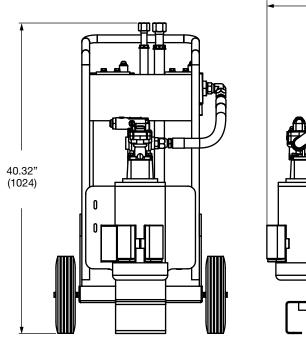
| | <u>OFCD-MV</u> - <u>18</u> - <u>G</u> <u>10</u> - <u>G</u> <u>10</u> - <u>V</u> - <u>G</u> |
|---|--|
| Series | |
| OFCD-MV = Dual Filter System | |
| Element Length 18 = One 18" element supplied per housing | |
| Filter Media | |
| G = Betamicron GeoSeal [®] GAM* = Aquamicron [®] Water Removal | |
| Filtration Rating (G only - GAM has no rating) (microns) | |
| $\begin{array}{llllllllllllllllllllllllllllllllllll$ | |
| Filter Media | |
| G = Betamicron GeoSeal [®] GAM* = Aquamicron [®] Water Removal | |
| Filtration Rating (G only - GAM has no rating) (microns) | |
| $\begin{array}{llllllllllllllllllllllllllllllllllll$ | |
| Seals | |
| V = FPM | |
| Pump Size (gpm) | |
| 6 = 6 gpm | |
| 10 = 10 gpm | |

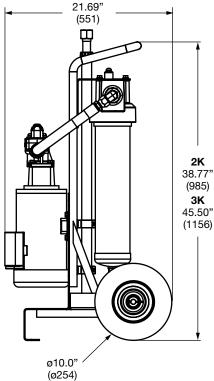
*Aquamicron media should be in the first filter housing followed by the Betamicron media in the second housing.

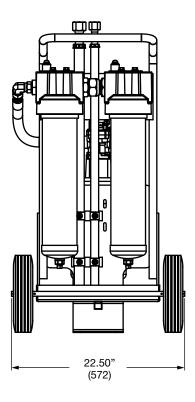
For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Model Codes Containing RED are non-standard items – Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability

Dimensions

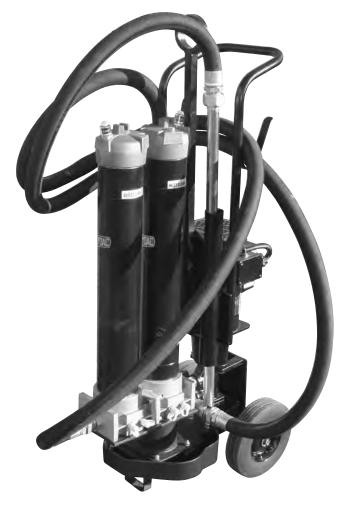




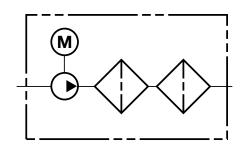


OFFLINE FILTRATION SYSTEMS OFCD-HV Series

Compact Dual Stage Filtration System for High Viscosity



Hydraulic Schematic



Description

A portable filtration cart that offers the user the ability to filter high viscosity fluids.

The OFCD-HV is a compact, self-contained filtration system equipped with high efficiency, high capacity elements capable of removing particulate contamination and/or water quickly, conveniently and economically. It is perfect for cleaning up existing systems as well as for prefiltering new fluids, since new fluids often have contamination levels significantly higher than that recommended for most hydraulic systems.

The OFCD-HV dual filtration unit can be used to remove both water and particulate contamination or for staged particulate contamination removal. Additional features include a modular base that eliminates hoses and fittings between components, a drip pan and easier element servicing.

Features

- An integrated lifting eye option for lifting the OFCD-HV
- Ability to filter fluids having a viscosity up to 15,000 SUS
- Base-ported filter provides easy element service from the top cap
- Ten-foot hose and extension tubes included
- Dip pan catches oil before it falls to the ground

Applications

- Cleaning high viscosity fluids used in wind applications
- Supplementing continuous filtration by the system's filters
- Cleaning up a hydraulic system following component replacement
- Filtering new fluid before it is put into service
- Transferring fluid from storage tanks and drums to system reservoirs

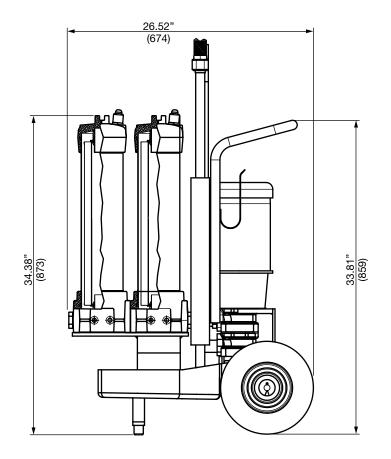
| Flow Rating | Maximum 3 gpm (11.4 lpm) | | | | |
|----------------------------------|--|--|--|--|--|
| Maximum Viscosity | 15,000 SUS (3236 cSt) | | | | |
| Hose Pressure Rating | 30 psig (2.0 bar) @ 150°F (65°C) Full vacuum @ 150°F (65°C) | | | | |
| Maximum Operating Temperature | -20° to 150°F (-29° to 65°C) | | | | |
| Bypass Valve Setting | Cracking: 40 psi (2.8 bar) | | | | |
| Material | Manifold and Cap: Cast Aluminum Element case: Steel | | | | |
| Compatibility | All petroleum based hydraulic fluid. Contact factory for use with other fluids | | | | |
| Motor | 115V AC Single phase, 1.5 HP | | | | |

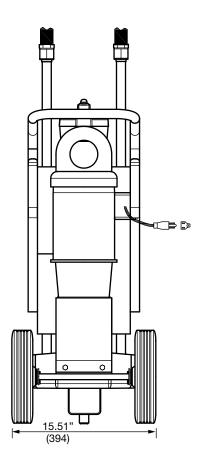
Model Code

| | | OFCD-HV - | <u>27</u> - <u>B</u> | <u>v 10</u> - | BN | <u>10</u> - | <u>B</u> - <u>3</u> |
|---------------------------------|---|-----------|----------------------|---------------|----|-------------|---------------------|
| Series OFCD-HV = | Dual Filter System | | | | | | |
| Element Length 18 = 27 = | One 18" element supplied per housing One 27" elements supplied per housing | | | | | | |
| AM* = | Betamicron [®] Low Collapse Aquamicron [®] Water Removal Betamicron GeoSeal [®] | | | | | | |
| Filtration Rating | $\begin{array}{l} \textbf{g} \; (BN only - AM has no rating) (microns) \\ \hline \\ \textbf{Betamicron}^{\circledast} \; \textbf{(BN/HC)} \\ \textbf{Absolute Filtration Rating} \\ (\textbf{B}_{x(c)} \geq 1000) \end{array}$ | | | | | | |
| Filter Media — BN = AM* = | Betamicron [®] Low Collapse Aquamicron [®] Water Removal | | | | | | |
| Filtration Rating | g (BN only - AM has no rating) (microns) ————————————————————— | | | | | | |
| 3 5 10 20 | Betamicron [®] (BN/HC) Absolute Filtration Rating $(\beta_{x(c)} \ge 1000)$ | | | | | | |
| Seals B = V = | Buna N FPM | | | | | | |
| Pump Size — 3 = | 3 gpm flow rate | | | | | | |

*Aquamicron media should be in the first filter housing followed by the BN media in the second housing. For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Dimensions





OFS Series

Filtration Station



Description

The HYDAC Filtration System (OFS) is capable of flushing, filtering, and monitoring ISO cleanliness with user-defined, automatic features. **The OFS is designed to transfer fluid through two filters in series for staged particulate or water/particulate removal.** Both filters are top-loading and include element indicators in the cap. A particle monitor reads samples from the pump discharge and displays ISO contamination codes on the control panel. The monitor allows the user to input the desired ISO cleanliness codes for the fluid. In auto mode, the system will run until the cleanliness codes are reached. Upon reaching the codes, the pump will stop and the cycle complete light will come on. When in manual mode, the system will run continuously and display the ISO codes. A water sensor is included for providing the water saturation of the fluid, both displayed on the control panel.

Features

- · Real time monitoring of ISO cleanliness classes
- Automatic shutdown when user defined ISO codes are reached
- USB port allows the ISO code data to be downloaded for further processing and/or printing
- 30 mesh suction strainer and 230 micron filter and included to protect the particle monitor from clogging
- The AS 1000 allows real-time water saturation and temperature values of the fluid to be displayed
- Bypass valve so cart can be used as a transfer cart
- Single lift point
- Plastic removable drip pan

Applications

- In-Plant Service Filter to desired cleanliness levels and extend component life
- Mobile Dealer Networks Aid in certified re-builds, service maintenance contracts and total maintenance & repair programs
- Original Equipment Manufacturer Filter to required roll-off cleanliness levels
- Lubricant Reclamation/Recycling Clean oil to extend oil life and reduce hazardous waste

| Flow Rating | 9 gpm (34 lpm) (AC option); 3-8 gpm (11.4 to 30.3 lpm) (DC option) |
|-----------------------|--|
| Motor | 1 1/2 HP, 115/220VAC motor (AC option) 1 HP, 90 V DC variable speed (DC option) |
| Viscosity | 1000 SUS (230cSt) |
| Operating Temperature | -20° F to 150° F (-29° C to 65° C) |
| Bypass Valve Setting | Cracking: 30 psi (2 bar) x 2 |
| Compatibility | All petroleum based hydraulic fluid. (Contact factory for use with other fluids.) |
| Element Change | 18" or 27" |
| Clearance | (depending on model configuration) |
| Weight | 245 lbs (112 kg) |



Model Code

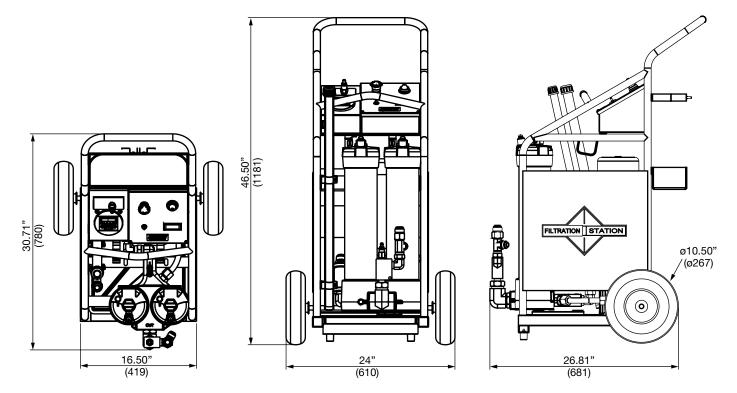
| | | <u>OFS - A - 1 - 27 - BN - 10 - BN - 01 - Y - 9</u> |
|----------------------------------|------------------------------------|---|
| Series – OFS | = | Filtration Station |
| Voltage A B C | | 120 VAC 60 Hz 1 Ph 220 VAC 60 Hz 1 Ph 220 VAC 60 Hz 1 Ph 220 VAC 50 Hz 1 Ph (A plug is not provided for these options.) |
| Number 1 2 3 | = = | lements (18" and 27" housings only) |
| Element 09 18 27 | = | In the set of |
| Element BN AM* | = | dia |
| Filtration 01, 03, | n Rat , 05, ⁻ | ting (BN only - AM has no rating) (microns) |
| Element BN AM* | = = | Betamicron® Aquamicron® |
| Filtration 01, 03, | | ting (BN only - AM has no rating) (microns) |
| Seals — V B | = | Fluoroelastomer (FPM) Buna N |
| Pump Si | ze (g | рт) ———————————————————————————————————— |
| 9 DC | | Fixed Speed Drive, Gear Pump, 9 gpm Variable Speed Drive, Gear Pump, 3 to 8 gpm |
| Options W | | AS1000 Water Sensor (standard on all units) |

AS1000 Water Sensor (standard on all units) w

*Aquamicron media should be in the first filter housing followed by the BN media in the second housing. For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Model Codes Containing RED are non-standard items - Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability

Dimensions



OFFLINE FILTRATION SYSTEMS OFS-AM Series

Filtration Station for Asset Management



Asset Management



- Real Time data displays cleanliness and water saturation
 Selectable ISO target levels
- Only 3 entry fields needed to start the system and record data

Description

The Offline Filtration Station for Asset Management (OFS-AM) is a complete fluid management system designed to manage fluid cleanliness, so that the greatest return of that asset is achieved. The OFS-AM is an all-in one system that monitors your fluid condition, filters out contaminants and tracks all the necessary data needed for trend analysis and record keeping by asset number or name. The on-board ruggedized PC records the ISO code and water saturation level, provides a graphical display of the data in real time and shuts down when the selected cleanliness level is reached. Each asset file created automatically is separately labeled and summarized to quickly inform maintenance on the condition of the fluid, and each run of the fluid is logged by date and time, providing a complete history of the equipment's fluid.

Features

- Complete tracking of hydraulic fluid conditions by equipment name
- Provides automatic record-keeping, trending and analysis of the fluid condition per fluid power system asset
- Ideal for managing multiple equipment assets
- Automatically shuts down when the selected ISO cleanliness is reached
- Dual staged filters for both water and/or particulate contamination removal
- Bypass valve allows the OFS-AM to be used as a transfer cart

Applications

- In-Plant Service Filter to desired cleanliness levels and extend component life
- Mobile Dealer Networks Aid in certified re-builds, service
 maintenance contracts and total maintenance & repair programs

| I | |
|----------------------|---|
| Flow Rating | 5 gpm (19 L/min) |
| Motor | 1.5 HP - 15 FLA at 120 volts AC |
| Viscosity | up to 1000 SUS (216 cSt) |
| Operating Temp. | -20°F to 150°F (-29°C to 65°C) |
| Bypass Valve Setting | Cracking: 30 psi (2 bar) x 2 |
| Compatibility | All petroleum based hydraulic fluid compatible with Viton® |
| Weight | 200 lbs (90.7 kg) approx. |
| Dimensions | 26.6" x 25.25" x 50.0"(675 x 641 x 1270 mm) |

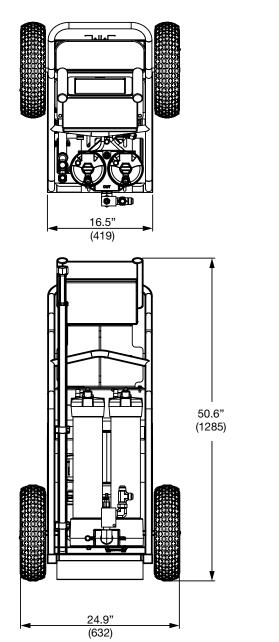
Model Code

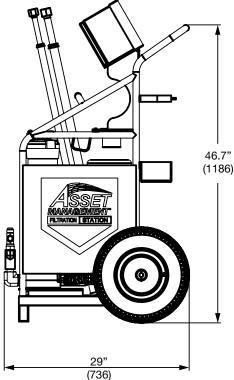
<u>OFS-AM</u> - <u>1</u> - <u>18</u> <u>G10</u> - <u>G05</u>

| Series OFS-AM | = Filtration Station for Asset Management |
|--------------------------|---|
| Number of Ele | ements |
| Element Leng 18 27 | gth |
| | (BN only - AM has no rating) (microns) $B10 = Betamicron GeoSeal® Absolute Filtration Rating (\beta_{x(c)} \ge 1000)= Aquamicron GeoSeal® Water Removal$ |
| Element Size | (BN only - AM has no rating) (microns) |

*Aquamicron media should be in the first filter housing followed by the BN media in the second housing. For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Dimensions





OFFLINE FILTRATION SYSTEMS OF5HS & OF5HD Series

Single & Dual Stage Kidney Loop Systems



Description

HYDAC's off-line Kidney Loop System is a stationary version of the mobile filtration system (OFCS & OFCD). It is a compact, selfcontained filtration system equipped with high efficiency, high capacity elements capable of removing particulate contamination and/or water quickly, conveniently and economically.

HY-TRAX manual fluid sampling system: HYDAC now offers the HY-TRAX manual fluid sampling system as an additional option allowing for real-time fluid condition monitoring. ISO particle counts are visually displayed on the CS1000. Users will now know when they have reached their desired ISO contamination levels.

CSI-C-11: HYDAC also offers the CSI-C-11 Communication Interface for WLAN or LAN transmission of data and data storage capabilities.

Features

- Modular base eliminates connections between components and minimizes leakage
- Base-ported filter provides easy element service from the top cap
- Visual Dirt Alarm[®] indicates when filter element needs to be changed
- Two 7/16 20 UNF sampling port included on all models

Applications

- Supplementing in-line filtration by system filters when adequate turnover cannot be attained
- Large volume systems requiring multiple filters in different locations
- Cleaning up a hydraulic system following component replacement

| Flow Rating | 7 gpm max (26.5 lpm) or 14 gpm max (53 lpm) | | | | | | |
|----------------------------------|--|--|--|--|--|--|--|
| Maximum Viscosity | 1000 SUS (216 cSt) Higher viscosity version available. | | | | | | |
| Maximum Operating Temperature | -20° to 150°F (-29° to 65°C) | | | | | | |
| Bypass Valve Setting | Cracking: 30 psi (2 bar) | | | | | | |
| Material | Manifold and cap: Cast aluminum Element case: Steel | | | | | | |
| Compatibility | All petroleum based hydraulic fluid. Contact factory for use with other fluids. | | | | | | |
| Motor | 115 V AC Single phase 3/4 hp (7 gpm) or 1-1/2 hp (14 gpm) | | | | | | |
| Weight | OF5HS-1: 101 lb (45.9 kg) OF5HS-2: 112 lb (50.9 kg) OF5HS-3: 123 lb (55.9 kg) OF5HD-1: 117 lb (53.2 kg) OF5HD-2: 139 lb (63.2 kg) OF5HD-3: 161 lb (73.2 kg) | | | | | | |

Model Code

| 2 aulia a | | | <u>OF5HD</u> - <u>27</u> - <u>BN</u> <u>10</u> - <u>BN</u> <u>10</u> - <u>B</u> - <u>A</u> - <u>14</u> · |
|---|----------------------|--|--|
| Series – | | | |
| OF5H | S = | Single Filter System | |
| OF5HI | D = | Dual Filter System | |
| Element | t Len | gth | |
| 1-09 | = | One 9" Element Supplied | |
| 2-09 | = | Two 9" Elements Supplied | d (must be same micron rating) |
| 3-09 | = | Three 9" Elements Supplie | ed (must be same micron rating) |
| 18 | = | One 18" Element Supplied | |
| 27 | = | One 27" Element supplied | |
| Element | t Med | lia | |
| BN | = | | = Aquamicron [®] G = Betamicron GeoSeal [®] |
| | | | |
| 3, 5, 1 | | ing (BN Only - Alvi has no raung | g) (microns) |
| -lement | t Med | lia (OE5HD only) | |
| | | nicron [®] $AM^* = Aqua$ | micron [®] G = Betamicron GeoSeal [®] |
| | | | |
| | | ting (BN only - AM has no rating | g) (microns) |
| 3, 5, 1 | 0, 25 | | |
| | | | |
| | | | |
| Beals — B | = | Buna N | V = FPM |
| В | | Buna N | V = FPM |
| В | | Buna N 115 VAC 60HZ/1Phase | V = FPM |
| B /oltage | | | V = FPM C = 220 VAC 50HZ/1Phase |
| B oltage (omit) | = | 115 VAC 60HZ/1Phase | |
| B /oltage (omit) A B | = = = | 115 VAC 60HZ/1Phase 230 VAC 60HZ/3Phase | C = 220 VAC 50HZ/1Phase |
| B /oltage (omit) A B | = = = | 115 VAC 60HZ/1Phase 230 VAC 60HZ/3Phase | C = 220 VAC 50HZ/1Phase D = 230 VAC 60HZ/1Phase |
| /oltage (omit) A B Pump Si | = = ize — = | 115 VAC 60HZ/1Phase 230 VAC 60HZ/3Phase 460 VAC 60HZ/3Phase | C = 220 VAC 50HZ/1Phase |
| B /oltage (omit) A B Pump Si 07 | = = ize — = | 115 VAC 60HZ/1Phase 230 VAC 60HZ/3Phase 460 VAC 60HZ/3Phase 7 gpm | C = 220 VAC 50HZ/1Phase D = 230 VAC 60HZ/1Phase |

unit; up to 2500 SUS fluids; flow reduced to ~3 gpm

PC HyTRAX Contamination Monitoring System Note: Particle Counter Option only available in 115V / 60 Hz power supply =

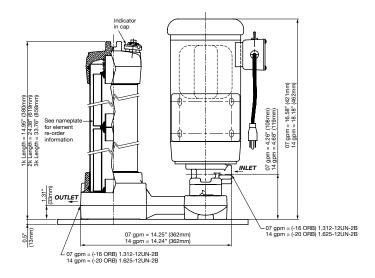
CSI-C-11 Sensor Interface Option for data acquistion (only with PC option) CSI =

CSI-W = CSI-C-11 Sensor Interface Option for data acquistion with AS1008 Water Saturation Sensor (only with PC option)

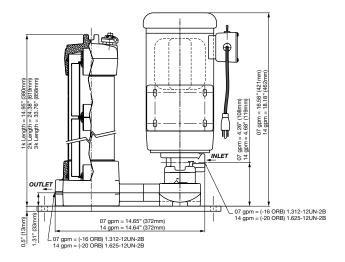
NOTE: Contact factory if EPR seals are required. *Aquamicron media should be in the first filter housing followed by the BN media in the second housing. For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Model Codes Containing RED are non-standard items - Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability.

Dimensions OF5HS



OF5HD

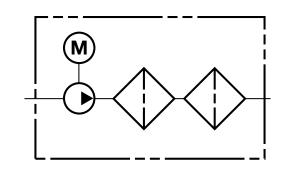


OFFLINE FILTRATION SYSTEMS OF5HD-HV Framed Series

Compact Dual Stage Filtration System for High Viscosity



Hydraulic Schematic



Description

HYDAC's newest addition to the off-line kidney loop family offers the user the ability to filter high viscosity fluids - up to 15,000 SUS.

The OF5HD-HV is a compact, self-contained filtration system equipped with high efficiency, high capacity elements capable of removing particulate contamination and/or water quickly, conveniently and economically. It is perfect for cleaning up existing systems as well as for prefiltering new fluids, since new fluids often have contamination levels significantly higher than that recommended for most hydraulic systems.

The OF5HD-HV dual filtration unit can be used to remove both water and particulate contamination or for staged particulate contamination removal. Additional features include a modular base that eliminates hoses and fittings between components with easy to change element design.

Features

- Rugged, protective frame with integrated lifting eyes for lifting the filter skid via crane or hoist
- Ability to filter fluids having a viscosity up to 15,000 SUS
- Modular base eliminates hoses between components and minimizes leakage
- Base-ported filter provides easy element service from the top cap
 18-inch housing is standard

Applications

- Compact design in protective frame allows for easy transport uptower in wind applications
- Supplementing continuous filtration by the system's filters
- Cleaning up a hydraulic system following component replacement
- Filtering new fluid before it is put into service
- Transferring fluid from storage tanks and drums to system reservoirs

| Flow Rating | Maximum 3 gpm (11.4 lpm) |
|----------------------------------|---|
| Maximum Viscosity | 15,000 SUS (2150 cSt) |
| Maximum Operating Temperature | -20° to 150°F (-29° to 65°C) |
| Bypass Valve Setting | Cracking: 40 psi (2.8 bar) |
| Material | Manifold and Cap: Cast Aluminum Element case: Steel Protective Frame: Tubular Steel |
| Compatibility | All petroleum based hydraulic fluid. Contact factory for use with other fluids |
| Motor | 115V AC Single phase, 1.5 HP |

Model Code

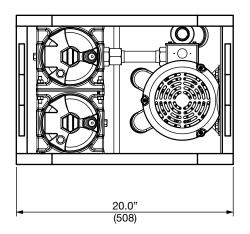
| OF5HD-HV - | 18 - | G10 - | G05 - | V - | G2820 |
|------------|------|-------|-------|-----|-------|
| | T | | | Т | |

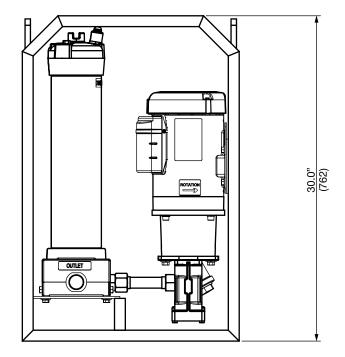
| Series — OF5HD-HV | = Dual Filter System | $\overline{}$ | | | |
|---|--|---------------|--|------|--|
| Element Lengt | th = One 18" Element supplied per housing | | | | |
| | BN only - AM has no rating) (microns) 10 = Betamicron [®] Absolute Filtration Rating (β _{x(c)} ≥ 1000) = Aquamicron [®] Water Removal | | | | |
| Element Size (E G03, G05, G1 GAM* | BN only - AM has no rating) (microns) 10 = Betamicron [®] Absolute Filtration Rating (β _{x(c)} ≥ 1000) = Aquamicron [®] Water Removal | | | | |
| Seals ——— V | = FPM | | | | |
| Options —— G2820 | = High Viscosity Filter Skid with rugged protective frame | | | | |

*Aquamicron media should be in the first filter housing followed by the BN media in the second housing.

For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Dimensions



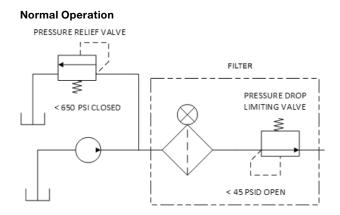


13.75"

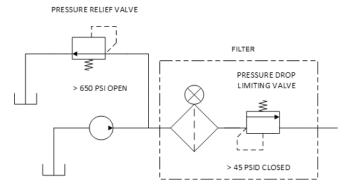
OFFLINE FILTRATION SYSTEMS MCO Series Fail-Safe In-Line Mechanical Clean Oil Dispensing Filter



Hydraulic Schematic



"Bypass" Operation



Description

- Fail-safe In-Line Mechanical Clean Oil Dispensing Filter rated for 900 psi and 30 gpm
- Ideal for dispensing applications where clean fluid delivery is a <u>must</u>
- Dispensed fluid is filtered or it is returned to the tank
- Field proven to deliver ISO cleanliness levels of 18/15/13 or better in a single pass
- Series filtration with MCO2 and MCO3 filters

Features

- Housings incorporate a non-bypassing but $\underline{low\ cost}$ 150 psi ßeta $X \geq 1000\ rated$ element
- Low element cost is achieved through the use of a <u>unique</u> proportional valve that, when used with an external relief valve, redirects the flow back to the tank as element DP increases
- As the element loads, the element service life indicator, located on the housing, **indicates** that service is required before the fluid flow begins to return to tank. Unfiltered "dirty" oil cannot pass the filter even if the service life indicator is ignored.
- Fluid Cleanliness Sampling Ports provided for proof of filtration into the system being filled
- Easy to install and designed with top service for easy element service

Applications

- Mobile equipment
- Cleaning up a hydraulic system following component replacement
- Filtering new fluid before it is put into service
- Transferring fluid from storage tanks and drums to system reservoirs

| Flow Rating | Up to 30 gpm (113 L/min) for 150 SUS (32 cSt) fluids |
|--|--|
| Max. Operating Pressure | 900 psi (60 bar) |
| Min. Yield Pressure | 3200 psi (220 bar), per NFPA T2.6.1 |
| Rated Fatigue Pressure | 750 psi (52 bar) per NFPA T2.6.1-R1-2005 |
| Temp. Range | -20°F to 225°F (-29°C to 107°C) |
| Bypass Setting | Non-Bypassing System |
| Porting Head & Cap Element Case | Cast Aluminum Steel |
| Weight of MCO-1K Weight of MCO-2K Weight of MCO-3K | 21 lbs. (9.5 kg) 32 lbs. (14.5 kg) 43 lbs. (19.5 kg) |
| Element Change Clearance | 17.50" (445 mm) for KK; 26.5" (673 mm) for 27K |

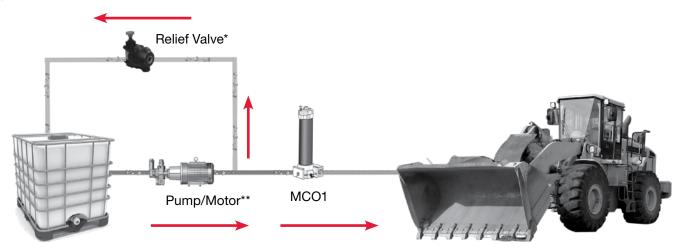


Model Code

| | MCO - 3 - 27 - G05 - G03 - G03 - B - S - D5 - R |
|------------------------|---|
| Series —— | |
| MCO | = Mechanical Clean Oil Filter System |
| Number of H 1, 2, 3 | |
| Element Len 27 | ngth |
| Element Mic | cron Rating First Filter (MCO1, MCO2, MCO3) |
| G01 | = 1 µm Z-Media [®] (synthetic) |
| G03 | = 3 µm Z-Media® (synthetic) |
| G05 | = 5 µm Z-Media® (synthetic) |
| G010 | = 10 μm Z-Media [®] (synthetic) |
| G025 | = 25 μm Z-Media [®] (synthetic) |
| Element Mic | cron Rating Second Filter (MCO2, MCO3) |
| G01 | = 1 µm Z-Media® (synthetic) |
| G03 | = 3 µm Z-Media® (synthetic) |
| G05 | = 5 µm Z-Media® (synthetic) |
| G10 | = 10 μm Z-Media [®] (synthetic) |
| G25 | = 25 μm Z-Media [®] (synthetic) |
| Element Mic | cron Rating Third Filter (MCO3 Only) |
| G01 | = 1 µm Z-Media® (synthetic) |
| G03 | = 3 µm Z-Media® (synthetic) |
| G05 | = 5 µm Z-Media® (synthetic) |
| G10 | = 10 μm Z-Media [®] (synthetic) |
| G25 | = 25 μm Z-Media [®] (synthetic) |
| Seal Materia | |
| V | = Viton® |
| Porting — | |
| S | = SAE 20 |
| Р | = 1 1/4 NPTF |
| Indicator Op | otions (Only for outlet block) |
| D5 | = Visual Pop-up |
| MS10 | = Electrical with DIN Connector (male end only) |
| MS11 | = Electrical with 12ft. 4-conductor wire |
| MS14 | Supplied with 5-pin Brad Harrison make connector and light (male end) |
| Relief Valve | - · · · |
| Omit | = Customer Supplied |
| RV | = HYDAC Relief Valve (set at 650 psi)* |
| | |

*The "RV" option is supplied as a loose item. Users have to install the relief valve within their Hydraulic System.

Application Circuit



* Product not included in base model pricing. ** Product is customer supplied.

OFFLINE FILTRATION SYSTEMS OFAS & OFAD Series

Single & Dual Stage Air-Operated Kidney Loop Systems

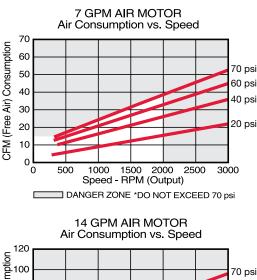


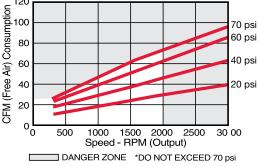
Description

HYDAC offers a kidney loop filtration system with a pneumatic motor in place of the standard electric motor. The pneumatic motor offers the same flow capability using the same components, but without the need for an electrical outlet. This provides a major advantage in the application of this unit. With no need for an electrical outlet, it is more portable than the standard electric-motored skids and carts.

Because most trucks and industrial machinery are already equipped with an air compressor, a simple connection to the 1/4" NPT port will easily power the 1.5 HP (or 4.0 HP) motor. At 70 psi, and 2000 rpm, this motor consumes less than 40 cfm (70 cfm for the 4.0HP motor) of compressed air. Because no electricity is used, the pneumatic motor is ideal for working in hazardous environments such as mines.

Performance

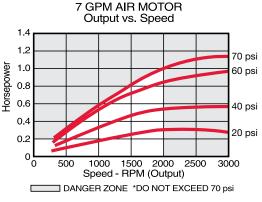


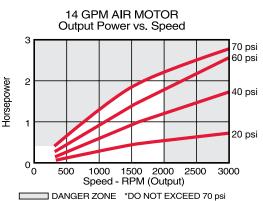


Note: Performance data represents a 4-vane model with no exhaust restriction.

- Supplementing in-line filtration by system filters when adequate turnover cannot be attained
- Large volume systems requiring multiple filters in different locations
- · Cleaning up a hydraulic system following component replacement
- Field applications on service trucks

| Flow Rating | 7 gpm (26.5 L/min) max and 14 gpm (53.0 L/min) max |
|----------------------------------|--|
| Maximum Viscosity | 1000 SUS (216 cSt) Higher viscosity version available. Contact factory for details |
| Maximum Operating Temperature | -20° to 150°F (-29° to 65°C) For higher temperature applications contact factory. |
| Bypass Valve Setting | Cracking: 30 psi (2 bar) |
| Material | Manifold and cap: Cast aluminum Element case: Steel |
| Compatibility | All petroleum based hydraulic fluid. Contact factory for use with other fluids. |
| Element Change Clearance | 9", 18" or 27" (depending on model configuration) |





Model Code

| OFAD | - | 27 | - 1 | BN | 10 | - B | SN · | 10 | - 1 | В | - | 14 |
|------|---|--------|-----|----|----|-----|------|----|-----|---|---|--------|
| | | \top | - | | T | | _ · | | - | Г | | \top |

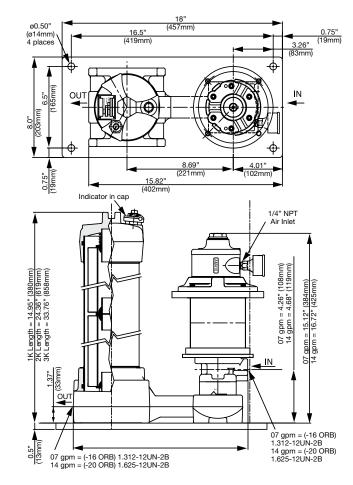
| Series — | | | | | | |
|------------------------|------|--|---|--|--|--|
| OFAS OFAD | | Air Operated Single Filter System Air Operated Dual Filter System | | | | |
| Element | Len | ath ———— | J | | | |
| 1-09 | = | | | | | |
| 2-09 | = | Two 9" Elements Supplied (must be same micron rating) | | | | |
| 3-09 | | Three 9" Elements Supplied (must be same micron rating) | | | | |
| 18 | | One 18" Element Supplied | | | | |
| 27 | = | One 27" Element supplied | | | | |
| Element | Med | lia | | | | |
| BN | = | Betamicron® | | | | |
| AM* | | Aquamicron [®] | | | | |
| G | | Betamicron GeoSeal® | | | | |
| Filtration 3, 5, 10 | | ting (BN only - AM has no rating) (microns) | | | | |
| Element | Med | lia (OFAD only) | | | | |
| BN | = | | | | | |
| AM* | = | Aquamicron® | | | | |
| G | = | Betamicron GeoSeal® | | | | |
| Filtration | Rat | ting (BN only - AM has no rating) (microns) ———————————————————— | | | | |
| 3, 5, 10 | | | | | | |
| Seals — | , - | | | | | |
| B B | = | Buna N | | | | |
| Pump Siz | ze — | | | | | |
| 07 | = | 7 gpm | | | | |
| | | | | | | |

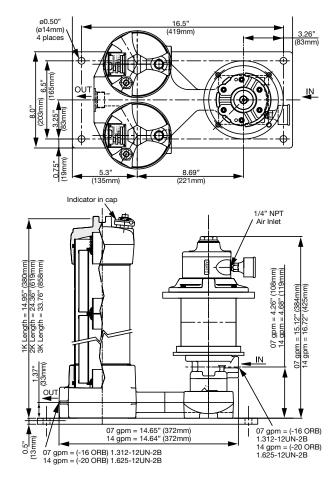
14 = 14 gpm

*Aquamicron media should be in the first filter housing followed by the BN media in the second housing. For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Dimensions OFAS

OFAD





OFFLINE FILTRATION SYSTEMS OFX Series

Filter Skids



Description

HYDAC's OFX Series filtration skids are compact, self-contained filtration systems equipped with high efficiency, high capacity elements capable of removing particulate contamination and/or water quickly and economically. They supplement in-line filters whenever the existing filtration is incapable of obtaining the desired ISO cleanliness level.

It is not uncommon for viscosity to be overlooked when specifying an off-line filtration unit. The results of this oversight can severely affect system efficiency and longevity, and render the filtration system useless when high viscosity fluid causes the filter to be in constant bypass. HYDAC considers maximum fluid viscosity, *(at the minimum operating temperature)* in conjunction with flow to properly size the pump and motor.

Standard OFX Series OFX2 – OFX6 skids include a hydraulic pump, electric motor, single or dual stage filtration, and standard or highcapacity housing(s). Many different component combinations provide the flexibility to match specific system viscosity, flow, and cleanliness requirements. Multiple housing lengths give the option of adding additional dirt holding capacity.

HYDAC's high viscosity OFX Series skids, OFX7 & OFX8, are designed to handle fluids that have a viscosity as high as 25,000 SUS. The skids have 39" long high capacity filters to efficiently clean the viscous fluids. The filters have a high dirt-holding capacity, capable of holding almost 1000 grams of dirt depending on the element. OFX7 & OFX8 Series skids include a pump, motor, high capacity filter, suction strainer, and dirt indicator. Various options can account for specific user needs.

Features

- · Protects and extends the life of expensive components
- Minimizes downtime and maintenance costs
- Designed to handle high viscosity oils up to 25,000 SUS (see Skid Selection)
- Many component combinations and variable starter options allow the flexibility to match specific user needs
- Four wheel cart option provides product portability
- Integral drip pan with drain plug
- Sample valves provided at filter base for fluid sampling
- Market leading HYDAC Betamicron[®] synthetic filtering media provides for quick, efficient clean up with maximum element life

Technical Specifications

| Flow Rating | Up to 82 gpm (310 L/min) | | | | | |
|----------------------|---|--|--|--|--|--|
| Temp. Range | 0°F to 180°F (-17°C to 82°C) | | | | | |
| Bypass Valve Setting | 50 psi (3.5 bar) for skid series OFX2, OFX3, OFX5, OFX7 & OFX8 | | | | | |
| | 40 psi (2.8 bar) for skid series OFX6 | | | | | |
| Fluid Viscosity | Up to 25,000 SUS (see Skid Selection) | | | | | |
| Compatibility | All petroleum based hydraulic fluids. Contact HYDAC for use with other fluids, including ester and skydrol | | | | | |
| Pump | OFX2, 3, 5, 6: Continuous duty gear pump with integral 150 psi relief. Flow dependent on skid series and motor. (<i>Refer to Pump, Motor & Weight Data table</i>) OFX7-OFX8: Positive displacement rotary screw-pumps. | | | | | |
| Motor | Horsepower dependent on skid series and flow. (Refer to Pump, Motor & Weight Data table) | | | | | |
| Porting | Dependent on flow. (Refer to Porting Data table) | | | | | |

Skid Selection

| Series | Viscosity Range | Maximum Flow | |
|--------|---------------------|---|------------------|
| OFX2 | 100 - 2000 SUS | (1) High Capacity or Standard Capacity | 82 gpm (310 lpm) |
| OFX3 | 100 - 5000 SUS | (1) High Capacity or Standard Capacity | 37 gpm (140 lpm) |
| OFX5 | 100 - 2000 SUS | (2) High Cap. or Std. Cap. in series | 82 gpm (310 lpm) |
| OFX6 | 100 - 5000 SUS | (2) High Cap. or Std. Cap. in series | 37 gpm (140 lpm) |
| OFX7 | 100 - 25,000 SUS | (1) High Capacity | 6 gpm (23 lpm) |
| OFX8 | 100 - 25,000 SUS | (2) High Capacity in parallel | 30 gpm (114 lpm) |

Porting Data

| Series | Flow (gpm) | Inlet Port Sizes | Outlet Port Szs. w/Std. Cap. Filters | Outlet Port Szs. w/High Cap. Filters |
|--------|---------------|---------------------|--|--|
| OFX2 | 17 | 1.50" NPT | - | #32 SAE (2") |
| OFX2 | 37 | 2" NPT | - | #32 SAE (2") |
| OFX2 | 60 | 2" NPT | - | #32 SAE (2") |
| OFX2 | 82 | 2" NPT | - | #32 SAE (2") |
| OFX3 | 17 | 2" NPT | - | #32 SAE (2") |
| OFX3 | 37 | 2" NPT | - | #32 SAE (2") |
| OFX5 | 17 | 1.50" NPT | #20 SAE (1.25") | #32 SAE (2") |
| OFX5 | 37 | 2" NPT | #24 SAE (1.50") | #32 SAE (2") |
| OFX5 | 60 | 2" NPT | #24 SAE (1.50") | #32 SAE (2") |
| OFX5 | 82 | 2" NPT | - | #32 SAE (2") |
| OFX6 | 17 | 2" NPT | #24 SAE (1.50") | #32 SAE (2") |
| OFX6 | 37 | 2" NPT | #24 SAE (1.50") | #32 SAE (2") |
| OFX7 | 06 | 1.50" NPT | - | #32 SAE (2") |
| OFX8 | 30 | 2.50" NPT | _ | #32 SAE (2") |

Model Code

| | | <u>OFX5</u> - <u>37</u> - <u>H</u> | <u>3 - BN</u> - | <u>3 - BN</u> | - <u>3</u> - <u>B</u> | - <u>N</u> - <u>N</u> | <u>N</u> - <u>B</u> | - <u>G</u> | <u>i - (</u> | <u> - P</u> |
|-----------|--|------------------------------------|------------------|---------------|-----------------------|-----------------------|---------------------|------------|--------------|-------------|
| Series _ | | | | T T | ΤT | T | ΓΤ | Τ | | ΓT |
| OFX | = Filter Skid | | | | | | | | | |
| Size | 678 | | | | | | | | | |
| Flow Rat | | | | | | | | | | |
| 06 | = 6 gpm (22.7 lpm) (size 7 only) | | | | | | | | | |
| 17 | = 17 gpm (64.3 lpm) <i>(size 2, 3, 5, 6)</i> | | | | | | | | | |
| 30 | = 30 gpm (113.6 lpm) (size 8 only) | | | | | | | | | |
| 37 | = 37 gpm (140 lpm) (size 2, 3, 5, 6) | | | | | | | | | |
| 60 82 | = 60 gpm (227 lpm) (sizes 2, 5) = 82 gpm (310.4 lpm) (size 2 and 5 only) | | | | | | | | | |
| | signation | | | | | | | | | |
| | ard Capacity (S) = 17, 37 gpm (sizes 2, 3, 5, 6), 82 gpm (s | sizes 2 & 5) | | | | | | | | |
| | Capacity (H) | | | | | | | | | |
| H3 | 6 gpm (size 7), 17 gpm (sizes 3 & 6), 30 37 gpm (sizes 2, 3, 5, 6), 82 gpm (sizes | s 2 & 5) | | | | | | | | |
| | edia (first stage all sizes) — | | | | | | | | | |
| BN AM | Betamicron[®] Aquamicron[®] water removal | | | | | | | | | |
| | n Rating (micron) (first stage all sizes) | | | | | | | | | |
| 3, 5, 10 | | | | | | | | | | |
| 5, 10, 2 | 20 = BN | | | | | | | | | |
| | (sizes 7 & 8) | | | | | | | | | |
| 10 = AN | | | | | | | | | | |
| | ala (second stage) | | | | | | | | | |
| BN AM | Betamicron[®] Aquamicron[®] water removal | | | | | | | | | |
| | | | | | | | | | | |
| 3, 5, 10 | n Rating (micron) (second stage) | | | | | | | | | |
| 5, 10, 2 | | | | | | | | | | |
| 10, 20 (| (size 8) | | | | | | | | | |
| 10 = AN | M | | | | | | | | | |
| Seals — | | | | | | | | | | |
| B H | = Buna (standard) = EPR | | | | | | | | | |
| V | = Fluroelastomer (FPM) | | | | | | | | | |
| Voltage - | . , | | | | | | | | | |
| N | = 230 /460 VAC 3 ph | | | | | | | | | |
| Е | = 575 VAC 3 ph (Built to CSA standards) | | | | | | | | | |
| Motor — | | | | | | |] | | | |
| Ν | = TEFC W = | Washdown (NEMA D | esign B) | | | | | | | |
| Starter C | Control Options* | | | | | | | | | |
| N | = None | | | | | | | | | |
| A B | = 230 VAC = 460 VAC | | | | | | | | | |
| E | = 575 VAC | | | | | | | | | |
| | g Indicator — | | | | | | | | | |
| N | = Visual pop-up in cap (standard) | | | | | | | | | |
| G | Differential pressure gauge | | | | | | | | | |
| М | = Electric with 12 ft. 4 in. conductor w | | | | | | | | | |
| С | = Differential pressure gauge with ele | ctric switch* | | | | | | | | |
| Options . | | | | | | | | | | 1 |
| N | = None - 4 wheeled cart (sizes 2, 2, 5, 6) | | | | | | | | | |
| C B | 4 wheeled cart (sizes 2, 3, 5, 6) Continuous bleed (for continuously as | arated systems - include | s can vent nort | valve and ret | urn line) | | | | | |
| | | natou systems - moluue | s sup vent port, | | | | | | | |
| P | Monitoring Particle Counter (oils to 3500SUS) | | | | | | | | | |
| ĊS | = CSI-C-11 option | | | | | | | | | |
| CSI-W | = CSI-C-11 with AS1008 option | | | | | | | | | |
| WD | Water Sensor with Display- AS3008 | 3 | | | | | | | | |

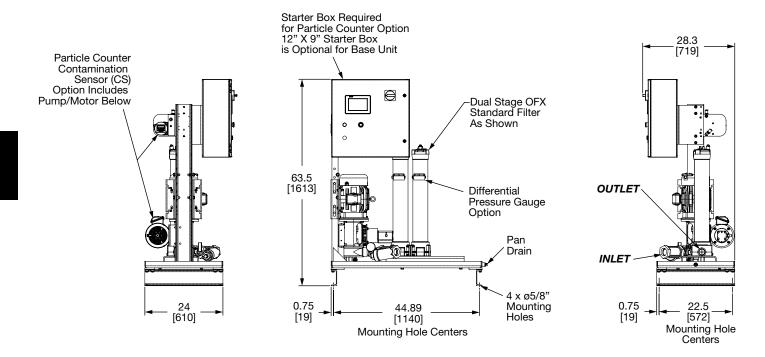
WD = Water Sensor with Display- AS3008

Omit = No Condition Monitoring Options

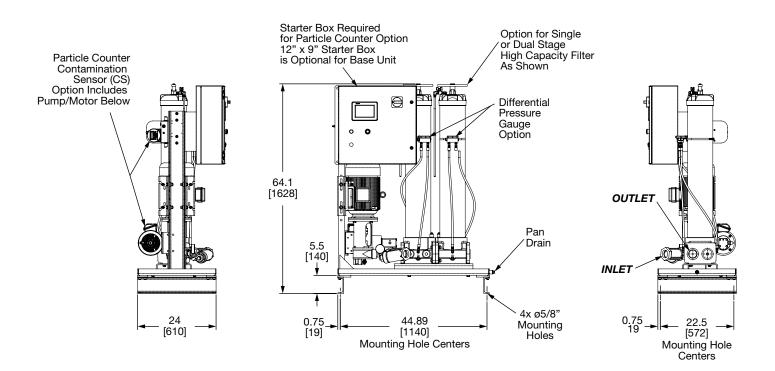
*Motor starter control option - C-series, non-disconnect shut-off, "motor on" light, electrical indicator "change element" light, and type 4x wash down enclosure. Vacuum Gauge and Suction Strainer Standard on all units

For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Dimensions Dual OFX5, & OFX6 Series Standard with 27" filter housing option

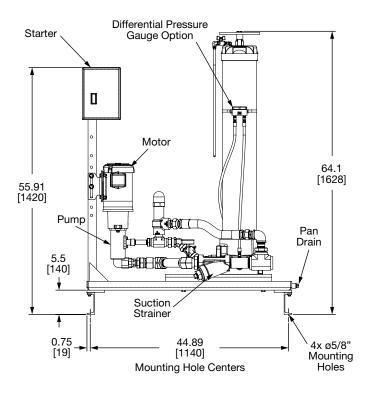


Dimensions Dual OFX5, & OFX6 Series with the H3 - high capacity housing option



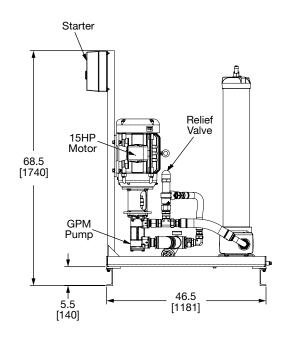
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print. Dimensions shown are in inches [millimeters].

Dimensions Single OFX7 Series with the H3 - high capacity housing option



OFFLINE FILTRATION SYSTEMS

Dimensions Dual OFX8 Series with the H3 - high capacity housing option



Pump and Motor Data

| Skid Series | Flow (gpm) | Motor (hp) | Skid Series | Flow (gpm) | Motor (hp) |
|-------------|------------|------------|-------------|------------|------------|
| | 17 | 3 | | 17 | 5 |
| X2 | 37 | 5 | X6 | 37 | 10 |
| λ2 | 60 | 10 | | | |
| | 82 | 10 | | | |
| X3 | 17 | 5 | - X7 | 06 | 2 |
| ~3 | 37 | 10 | ~// | | |
| | 17 | 5 | | 30 | 15 |
| X5 | 37 | 10 | X8 | | |
| ^D | 60 | 10 | | | |
| | 82 | 15 | | | |

Weight Data

| Skid Series | Flow (gpm) | Weight (lb)* | Skid Series | Flow (gpm) | Weight (lb)* |
|-------------|------------|-----------------|-------------|------------|-----------------|
| | 17 | 311-504 | | 17 | 370-659 |
| X2 | 37 | 348-577 | X6 | 37 | 502-607 |
| λ2 | 60 | Contact factory | 70 | | |
| | 82 | 597-705 | | | |
| Vo | 17 | 340-580 | X7 | 06 | Contact factory |
| X3 | 37 | 461-566 | ×/ | | |
| | 17 | 396-684 | | 30 | Contact factory |
| X5 | 37 | 497-849 | X8 | | |
| ^D | 60 | Contact factory | ~0 | | |
| | 82 | 947-1054 | | | |

Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print. Dimensions shown are in inches [millimeters].

OFFLINE FILTRATION SYSTEMS OLF Compact Series



Features

The OLF Compact filter is designed to be used offline to efficiently and cost effectively filter standard hydraulic oils which are highly contaminated. The OLF Compact is specifically designed to be used on hydraulic systems with a reservoir volume of up to 1000 gallons. The standard filters can be supplied as ready to install offline units complete with motor and pump units as shown or as individual filters.

Benefits

- Lower operating costs
- Extended element service life
- Extended fluid life
- Cleaner, more efficient systems
- Incinerable elements
- Easy installation

Applications

Typical applications include:

- Injection molding machinery
- Machine tools
- Gear boxes
- Mobile equipment
- Filtration of fluids for intermittently operated hydraulic systems and test stands

Technical Specifications

| reennical opeen | | | | |
|--|---|---|--|--|
| Operating Range | | | | |
| Viscosity: (see pressure drop curves) | to 700 SUS (150 cSt) (OLF-5) to 3000 SUS (650 cSt) (OLF-5/15) to 10,000 SUS (2160 cSt) (OLF-5/4) | | | |
| Operating Pressure: | 45 psi (3 bar) max up to 87 psi (-0.4 to 6 bar) | | | |
| Suction Pressure: | 11" Hg (-0.4 to 6 | bar) max | | |
| Inlet Pressure (Model with flow control valve): | 145 psi (10 bar) n | nin / 725 psi (50 bar) max | | |
| Fluid Temperature: | 32° to 175°F (0 to | o 80°C) | | |
| Ambient Temperature: | -4° to 104°F (-20 | to 40°C) | | |
| Seals: | NBR (standard) | | | |
| Maximum Flow Rate: | OLF-5 = 1.6 gpm OLF-5/15 = 4.9 g OLF-5/4 = 1.3 gp | pm (18.6 lpm) | | |
| Fluids | Standard Mineral Oils / Water/Oil based fluids (<i>Minimum</i> 40% Oil in Fluid) (Consult factory for other fluids.) | | | |
| Elements | | | | |
| Media: | Dimicron - 2µm, 20µm / Water Removal - 2µm, 20µm | | | |
| Number required: | OLF-5, 5/15, and 5/4 = 1 | | | |
| Dirt Holding Capacity - $\Delta P = 36 \text{ psi} (2.5 \text{ bar})$ | 200g ISO MTD <i>(N5DM) /</i> 185g ISO MTD <i>(N5AM)</i> | | | |
| Water Retention - $\Delta P = 36 \text{ psi} (2.5 \text{ bar}):$ | Approximately 0.5 quarts (0.5 liters) | | | |
| Beta Ratio: | βx > 1000 (absolute value) | | | |
| Maximum ∆P: | 45 psi (3 bar) | | | |
| Connections (All Female) | | | | |
| OLF-5 with motor/pump: | Inlet & Outlet: | 3/4 - 16UNF (SAE 8) (BSPP G1/2) | | |
| OLF-5/15 & 5/4: | Inlet & Outlet: | 1 5/16-12UN (SAE 16) (BSPP G1) | | |
| OLF-5 without motor/pump: | Inlet: Outlet: | 9/16-18UNF (SAE 6) (BSPP G3/8) 3/4-16UNF (SAE 8) (BSPP G1/2) | | |
| Weight | OLF-5-S = 15.5 lbs. (7.0 kg) OLF-5-E = 5.5 lbs. (2.5 kg) OLF-5/15 = 24.3 lbs. (11 kg) OLF-5/4 = 24.3 lbs. (11 kg) | | | |

Housing drain standard on all units

Black = SAE connections when using supplied adapters (standard) Red = BSPP connections if supplied adapters are not used



| Model Code |
|------------|
|------------|

| | | <u>OLF</u> | <u>5</u> - <u>\$</u> - <u>1</u> 2 | <u>20</u> - <u>K</u> - | <u>N5DM002</u> | <u>- E / 12</u> | / <u>CD</u> |
|--------------|---|----------------------------------|-----------------------------------|------------------------|----------------|-----------------|-------------|
| Series —— | | | | | | | |
| OLF-5 | Series 5 (1.6 gpm) | | | | | | |
| OLF-5/15 | = Series 15 (4.9 gpm) | | | | | | |
| OLF-5/4 | = Series 15 (1.3 gpm) | | | | | | |
| OLFCM-5/ | 15 = With Fluid Condition Monitoring | | | | | | |
| Pump Type – | | | | | | | |
| S | = Vane Pump* (standard) | | | | | | |
| E | = Flow Control Valve (series 5 only) | | | | | | |
| TV | = Toploader with Motor (available for | or OLF-5/15 & OLFCM-5/15 only) | | | | | |
| Power Consi | umption | | | | | | |
| 120 | = 120W for all OLF 5 | | | | | | |
| 200 | = 200W for all 24VDC | | | | | | |
| 370 | = 370W for all Series 5/15 & 5/4 | | | | | | |
| Z | Without motor-pump unit (series | 5 only) | | | | | |
| Voltage —— | | | | | | | |
| K | = 115V single phase | | | | | | |
| Μ | = 220V single phase | | | | | | |
| N | = 440V 3 phase | | | | | | |
| Т | = 12VDC | | | | | | |
| U | = 24VDC | | | | | | |
| Z | Without motor-pump unit | | | | | | |
| Element — | | | | | | | |
| N5DM002 | = 2 micron | | | | | | |
| N5DM005 | = 5 micron | | | | | | |
| N5DM010 | = 10 micron | | | | | | |
| N5DM020 | = 20 micron | | | | | | |
| N5AM002 | = 2 micron with water removal | | | | | | |
| N5AM020 | = 20 micron with water removal | | | | | | |
| Clogging Ind | | | | | | | |
| E | = Standard gauge (series 5 & 5/4 on | | | | | | |
| F | = Static electrical switch | VMF2F.0 (series 5 & 5/4 only) | | | | | |
| BM | = Differential visual | VM2BM.1 (series 5/15 & 5/4 only) | | | | | 1 |
| С | = Differential electrical | VM2C.0 (series 5/15 & 5/4 only) | | | | | |
| D | Differential electrical/visual | VM2D.0/L (series 5/15 & 5/4 on | ly) | | | | |
| | Connections | | | | | | |
| 12 | SAE Connections (standard) | | | | | | |
| | | | | | | | |
| Supplementa | ary Details | | | | | | |

С = with ContaminationSensor CS 1310 (without display; OLFCM only)

CD with ContaminationSensor CS 1320 (with display; OLFCM only) =

AC

= with ContaminationSensor CS 1310 and AquaSensor AS 1000 (without display; OLFCM only)

ACD = with ContaminationSensor CS 1320 and AquaSensor AS 3000 (with display; OLFCM only)

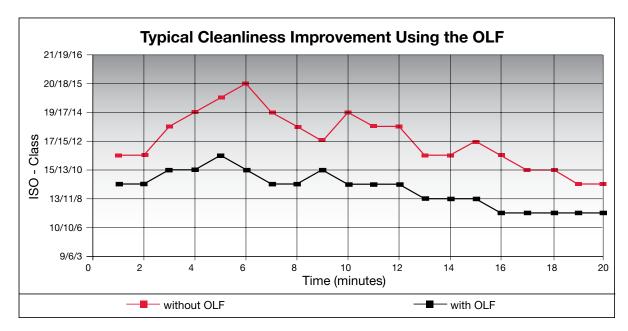
Consult Factory for special options.

Not all combinations available.

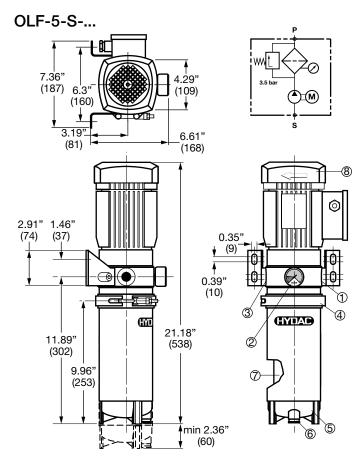
*Choose "S" for model without motor-pump and without flow control valve.

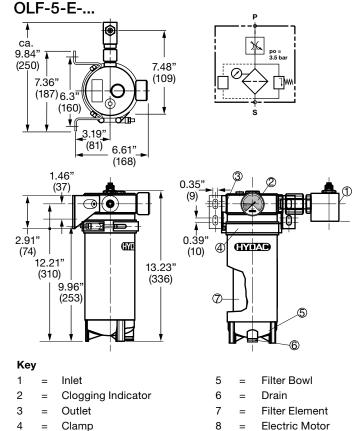
For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Model Codes Containing RED are non-standard items – Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability.

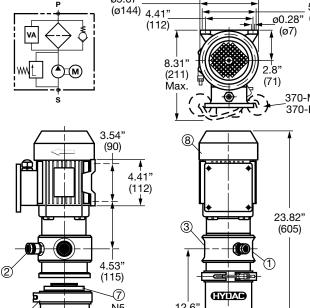


Dimensions

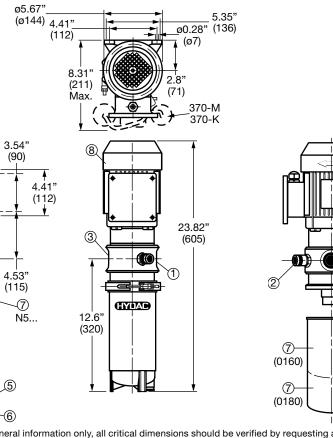


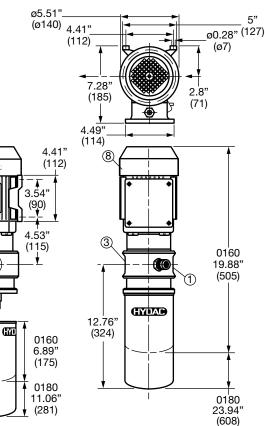


OLF-5/4-S-... and OLF-5/15-S...



OLF-5/4-SP-...





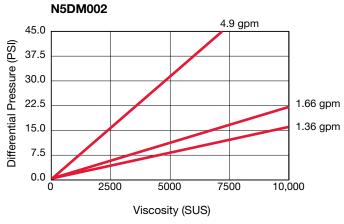
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

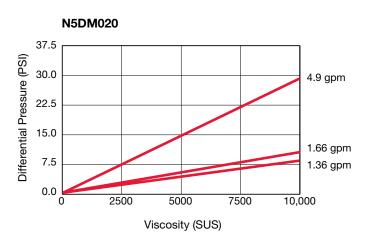
D34 HYDAC

4)

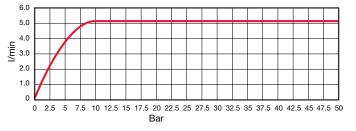
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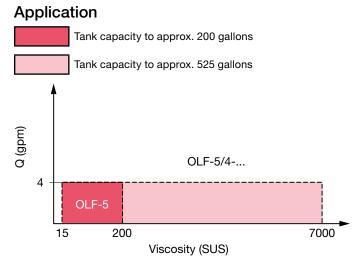
Differential Pressure





SRV Flow Control Valve Curve





OFFLINE FILTRATION SYSTEMS OLF Series



Features and Benefits

The OLF series of filters is designed to efficiently and cost effectively filter hydraulic oils, lubricating oils, cleaning fluids and coolants which are highly contaminated. The filters can be supplied either as individual filters or as ready-to-install offline units complete with optional motor and pump units.

- Lower Operating Costs
- Extended Element Service Life
- Cleaner, more efficient systems

Dimicron[®] Technology

Dimicron[®] technology, which incorporates membrane filtration and multi-disc construction, sets the OLF apart from conventional filters by providing it with exceptional dirt holding capacity and separation efficiency. Each filter element is able to capture and hold more than 1 pound of dirt, meaning that the OLF60, which uses four elements, will hold nearly 5 pounds of dirt. Membrane filtration provides the OLF with a separation efficiency over 99.9% for particles 2 micron and larger (β 2 > 1000) even in a single pass.

Applications

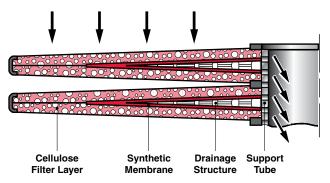
Typical applications include:

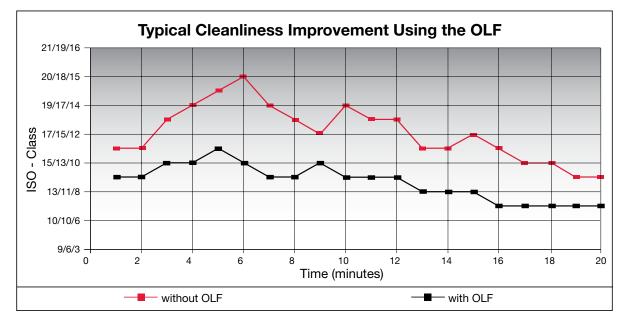
- Filling and flushing hydraulic units
- · Filtration of fluids for hydraulic systems and test stands
- · Filtration of cleaning fluids for parts washing machines
- Filtration of coolants

Dimicron® Element

The synthetic membrane ($2\mu m$ absolute) provides a high filtration rating while the cellulose filter layer collects and holds the bulk of the dirt load. This combination results in excellent removal efficiency, even in a single pass, and extremely high dirt holding capacity.







Model Code

| | <u>OLF - 15 / 15 - G - L60 - N15DM002 - E /</u> |
|------------------|---|
| Series —— | |
| OLF | = Stationary offline filter with integrated pressure gauge |
| Size | |
| 15 = 1 ele | ment, 30 = 2 elements, 45 = 3 elements, 60 = 4 elements |
| Pump Flow | Rate (must be less than or equal to size) |
| 15 | = 5 gpm |
| 30 | = 10 gpm This code entry (15,30, 45, 60) must be less than |
| 45 | = 15 gpm or equal to the size entry (15,30, 45, 60) |
| 60 | = 20 gpm |
| Z | = without pump |
| Pump Type | |
| G | = gear pump |
| Z | = Without motor-pump |
| Notor Volta | ge |
| L60 | = 115V, Single Phase |
| O60 | = 460V, Three Phase |
| Z | = Without motor-pump |
| - ilter Eleme | nt |
| N15DM00 | 2 = Dimicron [®] 2 µm Absolute |
| N15DM01 | 0 = Dimicron [®] 10µm Absolute |
| | 0 = Dimicron [®] 20 μm Absolute |
| N15DM03 | 0 = Dimicron [®] 30 μm Absolute |
| Z | = No filter element supplied |
| logging In | dicator |
| E | = Standard gauge |
| BM | = Differential visual VM2BM.1 |
| С | = Differential electrical VM2C.0 |
| D | = Differential visual/electrical |
| Options | |
| 12 | SAE adapters (supplied as standard) |
| V | = Viton [®] Seals (NBR seals are standard) |
| PKZ | = On/Off Switch and Overload Protective Motor Switch |
| С | = Cart-style mobile frame |
| PC | = Hytrax-HV Contamination Monitoring Unit (only with L60 motor voltage; contact HYDAC for other product configurations) |
| CSI | = CSI-C-11 Sensor Interface Option for data acquistion (only with PC option) |
| | OOL O 11 Operand Interface Option for data providing with AC1000 Water Optimation Operand (1, 19, 50, 19, 1) |

CSI-W = CSI-C-11 Sensor Interface Option for data acquisiton with AS1008 Water Saturation Sensor (only with PC option)

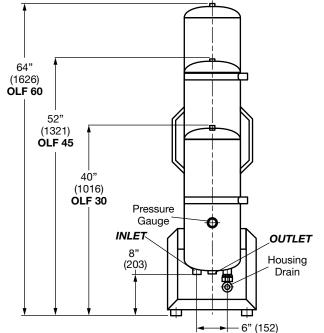
WD = AS3008 Water Sensor w/ Display Option (only with PC option)

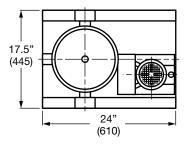
MP = Test point before filtration

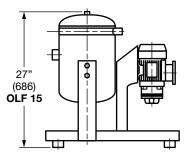
For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Model Codes Containing RED are non-standard items – Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability.

Dimensions







Technical Specifications

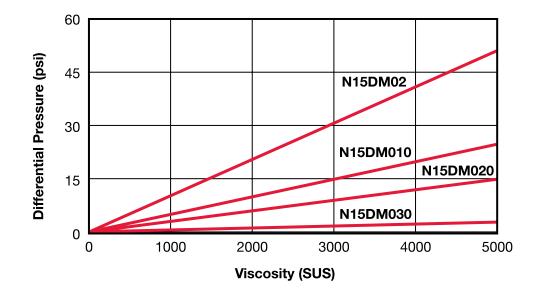
| Model | OLF-15 | OLF-30 | OLF-45 | OLF-60 | | | | |
|---|--|-------------------------------------|---------------------|--------------------|--|--|--|--|
| Connections | | Inlet = Female O-Ring Bo | ss; Outlet Male JIC | | | | | |
| Housing Inlet & Outlet | 1 5/16 - 12UN (SAE 16); G 1"* BSPP | | | | | | | |
| Pump Inlet: Gear | 1 1/16 -12UN (SAE 12); G 3/4" BSPP | 1 5/16 -12UN (SAE 16); G 1" BSPP | 1 7/8 -12UN (SAE | 24); G 1 1/2" BSPP | | | | |
| Filter Element | N15DMxxx(1x) | N15DMxxx(2x) | N15DMxxx(3x) | N15DMxxx(4x) | | | | |
| Contamination Retention Capacity | 1.1lbs (500g) | 2.2lbs (1000g) | 3.3lbs (1500g) | 4.4lbs (2000g) | | | | |
| Filter Efficiency | | βx > 100 | 0 | | | | | |
| Permissible ∆p Across the Element | | 72.5 psi (5 | bar) | | | | | |
| Element Weight | 6.6lbs (3 kg) | 13.2lbs (6 kg) | 19.8lbs (9 kg) | 26.4lbs (12 kg) | | | | |
| Material of Filter Housing | | Stainless Steel | | | | | | |
| Capacity of Pressure Vessel | Pressure Vessel 5.25 gal. (20 l) 10.50 gal. (39.7 l) 15.75 gal. (59.6 l) | | 15.75 gal. (59.6 l) | 20.5 gal. (28.1 l) | | | | |
| Max. Operating Pressure - Filter Housing | 85 psi (5.86) | | | | | | | |
| Material of Seals - Housing | NBR (standard) | | | | | | | |
| Housing Weight | 25lbs (11.3 kg) | 33lbs (15 kg) | 53lbs (24 kg) | 62lbs (28.1 kg) | | | | |
| Fluid Temperature | 15 to 175°F (-9.4 to 79.4°C) | | | | | | | |
| Motor-Pump Units | 5 gpm (18.9 lpm) | 10 gpm (37.8 lpm) | 15 gpm (56.8 lpm) | 20 gpm (75.5 lpm) | | | | |
| Pump Operating Pressure | 65 psi (4.5 bar) | | | | | | | |
| Gear Pump Viscosity Range | | 7-5000 SUS (14 to | o 1078 cSt) | | | | | |
| Gear Pump Motor Capacity | 370 W | 570 W | 1500 W | 1500W | | | | |
| Material of Seals - Pumps | | NBR (stand | lard) | | | | | |
| Dry Weight of OLF System | 50 lbs. (22.7 kg) | 77 lbs. (34.9 kg) | 116 lbs. (57.6 kg) | 132 lbs. (60 kg) | | | | |

Housing drain standard on all units

BLACK = SAE connections when using adapters which are supplied standard

RED = BSPP connections if supplied adapters are not used

Differential Pressure at 3.96 gpm (15 L/min)



Sizing Offline Filtration

The following calculations will help to approximate the attainable system cleanliness level when applying offline filtration.

Step 1: Select the approximate contamination ingression rate from the chart below. HYDAC quantitative investigations have yielded the following approximate figures.

| Type of System | Contamination Ingression (µg/gal) Surroundings | | | | | | |
|---------------------------|---|--------|----------|--|--|--|--|
| | Clean | Normal | Polluted | | | | |
| Closed circuit | 1 | 3 | 5 | | | | |
| Injection molding machine | 3 | 6 | 9 | | | | |
| Standard hydraulic system | 6 | 9 | 12 | | | | |
| Lubrication system | 8 | 11 | 14 | | | | |
| Mobile equipment | 10 | 13 | 16 | | | | |
| Heavy industrial press | 14 | 18 | 22 | | | | |
| Flushing test equipment | 42 | 60 | 78 | | | | |

Step 2: Make the correction required for offline filtration. The contamination input selected above must be multiplied by the factor:

Main System Flow Rate / Desired Offline Flow Rate

Note: Main system flow rate must be corrected for cycle time. For example, if the flow rate is 500 gpm, but only runs for 20% of the system cycle, the main system flow rate would be 100 gpm. (500 gpm X 20%)

This yields the expression:

Contamination Factor = Contamination Input (µg/gal) х

Calculate the contamination factor using this expression.

Step 3: Determine the attainable cleanliness level. Locate the calculated contamination factor on the y-axis of the attached graph. Go to the right to find the intersection point on the curve corresponding to the desired absolute filter micron rating. Read the resulting attainable cleanliness level on the x-axis. (In case of dynamic flow through the offline filter, the attainable cleanliness level will be 2 to 3 times worse than indicated by the graph.)

Offline Filtration Sizing Example

Type of System: Heavy industrial press Surroundings: Normal Main System Flow Rate: 150 gpm Desired Offline Flow Rate: 20 gpm = 135 (OLF 60)

Step 1: Using this criterion select the approximate contamination ingression rate from the chart above.

This yields a contamination input of **18** µg/gal based on a *heavy industrial press* with *normal* surroundings.

Step 2: Make the correction required for offline filtration.

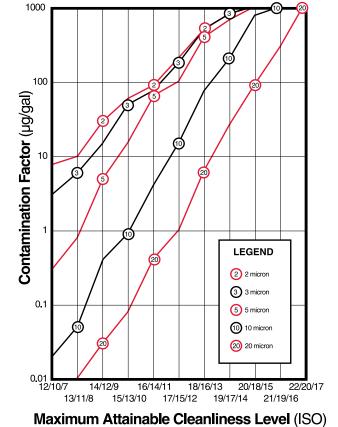
Contamination Factor = 18 µg/gal x 150 gpm / 20 gpm = 135

Step 3: Determine the approximate attainable cleanliness level for each micron rating using the attached graph. If the attainable cleanliness level is not acceptable, the desired offline flow rate should be increased. The approximate attainable levels for this example are as follows.

2µm - ISO 17/15/12

20µm - Between ISO 20/18/15 and ISO 21/19/16

PN#02075860 / 05.21 / FSP2105-2273



OFFLINE FILTRATION SYSTEMS

HYDAC D39

Main System Flow Rate (gpm) Desired Offline Flow Rate (gpm)

OFFLINE FILTRATION SYSTEMS IXU 1/4 Series

Ion eXchange Unit



Description

The user-friendly lon eXchange Unit is designed to condition flame resistant, phosphate-ester-based (HFD-R) hydraulic and lubrication fluids.

They effectively remove acidic products of decomposition and dissolved metal soaps caused by the hydrolysis and/or oxidation of the fluid.

The units are applied to hydraulic and lubrication oil tanks of up to \approx 5285 gallons (\approx 20,000 liters) with a volumetric flow of \approx 2.4 gpm (\approx 9 l/min) in the bypass flow.

Mobile or stationary IXU are available.

The IXU uses HYDAC Ion eXchange Elements (IXE).

Features

- Effective removal of acids and metallic salts
- No extractable metals or particles, as in the case of fuller's earth or active aluminum oxide
- Easy to service units
- Available as complete unit for service, and as a modular system for retrofitting existing bypass circuits or for OEM

Advantages

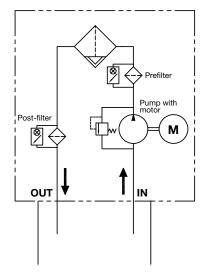
- Extended service life of the operating fluid
- · Reduction in functional problems, e.g. with servo valves
- Greater machine and system availability

Water contamination is a primary source of acidic product generation in HFD-R fluids. We additionally recommend continuous dewatering, for example, using an NAV.

Applications

- Power plants
- Steel industry
- Other applications with ester-base, flame resistant fluids

Hydraulic Schematic



* optional equipment, see ordering details VA = Clogging indicator

Technical Specifications

| Hydraulic Data | |
|--|--|
| Neutralization value achievable | < 0.1 mg KOH / g possible |
| Typically, possible to use up to | 1 mg KOH / g |
| Flow rate | IXU 1 ≈ 0.5 gpm (≈ 2.2 l/min) IXU 4 ≈ 2.4 gpm (≈ 8.9 l/min) |
| Fluid temperature | 86 to 140 °F (30 to 60 °C) |
| Max. operating pressure | 87 psi (6 bar) |
| Permissible suction pressure at suction inlet IN | -5.8 to 14.5 psi (-0.4 to 1 bar) |
| Viscosity range | 80 to 370 SUS (15 to 80 cSt) |
| Permissible operating fluid | HFD-R – Flame resistant, phosphate-based hydraulic fluids. |
| Connectors IN / OUT | 1/2" Male JIC |
| Pump type | Gear |
| Electrical Data | |
| Power supply voltage | See ordering details |
| Power consumption | 0.25 to 0.6 kW / 16 Amps |
| Ambient Conditions | |
| Operating temperature range | 32 to 104 °F (0 to 40 °C) |
| Storage temperature range | 32 to 140 °F (0 to 60 °C) |
| Relative humidity | 0 to 80%, non-condensing |
| Protection class to DIN 40050 | IP 55 |
| General Data | |
| Length of electrical connection cable (optional) | 5' (1.5 m) |
| Sealing material | FKM (Viton®) |
| Sound level at 1m | < 80 dB(A) |
| Weight* <i>(empty)</i> | IXU 1 = 155 lbs (70 kg), IXU 4 = 660 lbs (300 kg) |
| Fluid cleanliness required | ISO 19/17/14 (ISO 4406:1999) 9A/9B/9C (SAE AS4059) |

*Weight noted is for a stationary unit.

Model Code

| | | | <u>IXU</u> - | <u>4</u> - | <u>M</u> - | <u>G</u> | - Ę | - | G <u>10</u> | - <u>BM</u> | - G <u>05</u> | <u>/-PK</u> |
|------------|------|--|--------------|------------|------------|----------|-----|---|-------------|-------------|---------------|-------------|
| Series — | | | | | | | | | | | | |
| IXU | = | Ion eXchange Unit | | | | | | | | | | |
| Size — | | | | | | | | | | | | |
| 1 | = | 1 Ion eXchange element NAIXE200 \approx 0.5 gpm (2.2 l/min) | | | | | | | | | | |
| 4 | = | 4 Ion eXchange elements NAIXE200 \approx 2.4 gpm (8.9 l/min) | | | | | | | | | | |
| Туре — | | | | | | | | | | | | |
| M | = | mobile | | | | | | | | | | |
| S | = | stationary | | | | | | | | | | |
| Type of p | ump |) ———— | | | | | | | | | | |
| G | = | gear pump | | | | | | | | | | |
| Z | = | without | | | | | | | | | | |
| Power su | pply | / voltage | | | | | | | | | | |
| F | = | 230 V, 60 Hz, 3 Ph | | | | | | | | | | |
| K | = | 115 V, 60 Hz, 1 Ph | | | | | | | | | | |
| 0 | = | 460 V, 60 Hz, 3 Ph | | | | | | | | | | |
| Z | = | without (only available with "Z" pump type option) | | | | | | | | | | |
| Prefilter | | | | | | | | | | | | |
| G05 | = | with 5µm element | | | | | | | | | | |
| G10 | = | with 10µm element | | | | | | | | | | |
| Clogging | indi | icator — | | | | | | | | | | |
| BM | = | differential pressure indicator – visual | | | | | | | | | | |
| С | = | differential pressure indicator – electrical | | | | | | | | | | |
| Postfilter | r 1 | | | | | | | | | | | |
| G05 | = | with 5µm element | | | | | | | | | | |
| G10 | = | with 10µm element | | | | | | | | | | |
| Supplem | enta | ry details | | | | | | | | | | |
| PKZ | = | with on-off switch and overload protective motor switch (incl | lude with | Mobile | e Opti | on) | | | | | | |

FA1 = with on-off switch, overload protective motor switch and cut-out when filter clogged (requires neutral wire in power supply)

FA2 = with on-off switch, overload protective motor switch and cut-out when filter clogged (does not require neutral wire in power supply)

Model Codes Containing RED are non-standard items – Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability.

Sizing

| Tank Volume | Ion eXchange Unit |
|--|-------------------|
| < 924.6 gal. (< 3,500 liters) | IXU-1 |
| 924.6 – 3,962.6 gal. (3,500 – 15,000 liters) | IXU-4 |
| > 3,962.6 gal. (> 15,000 liters) | 2x IXU-4 |

Ion eXchange Element & Filter Elements

| Ion eXchange Element | Part No. |
|---|----------|
| NAIXE200 | 7645980 |
| Particle Filter Element (pre-filter and post-filter) | Part No. |
| 5.03.18D 05 BN4 /-V-G | 2077497 |
| 5.03.18 D 10 BN4 /-V-G | 2056369 |

Scope of delivery

- IXU according to the model purchased. Ion eXchange elements (NAIXE200, see Ion eXchange Element & Filter Elements) purchased separately.
- Operation and maintenance manual

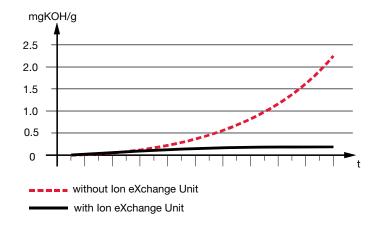
Order examples:

IXU-1-M-G-O-G10-BM-G05-PKZ requires: 1x NAIXE200

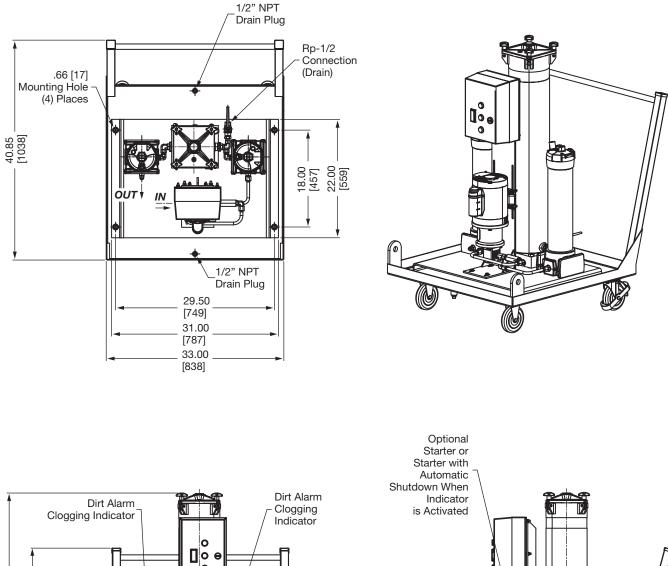
IXU-4-M-G-O-G10-BM-G05-PKZ requires: 4x NAIXE200

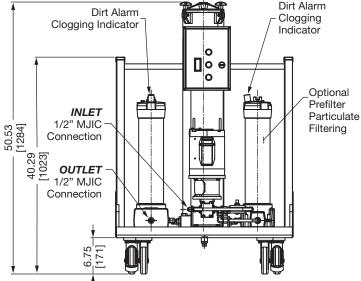
Performance

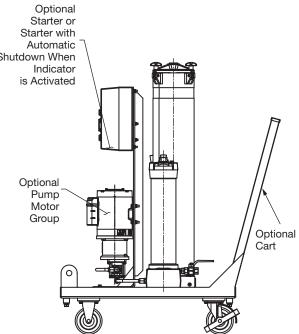
Example of acidification in HFD fluids with and without lon eXchange Unit

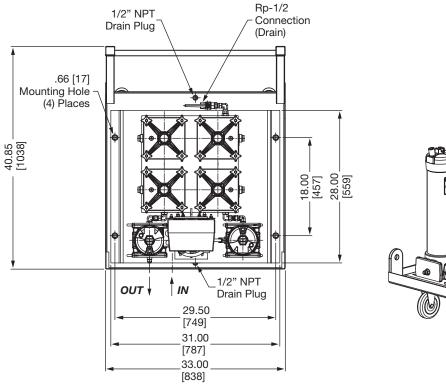


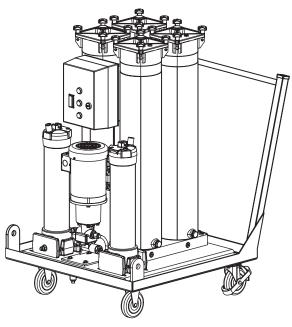
OFFLINE FILTRATION SYSTEMS Dimensions IXU1 Series

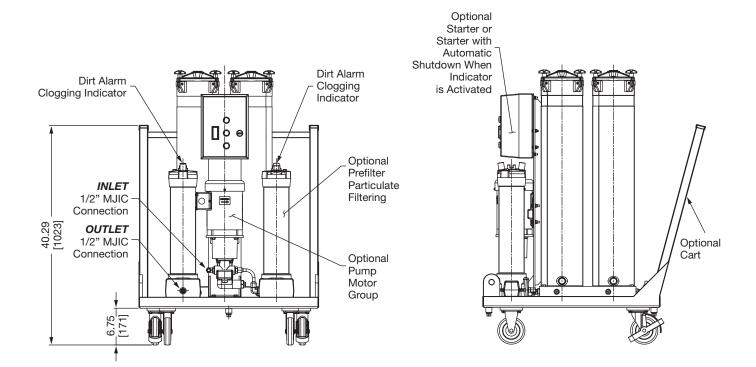










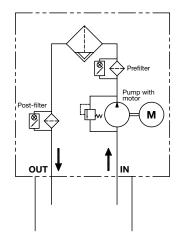


OFFLINE FILTRATION SYSTEMS VMU 1/4 Series

Varnish Mitigation Unit



Hydraulic Circuit Diagram



Description

The user-friendly Varnish Mitigation Unit is designed to condition mineral oils. The VMU is particularly effective at removing oil aging products (varnish) from mineral oils.

Varnish takes the form of insoluble oil aging products which settle in reservoirs, valves and bearings. These can be non-filterable gels or solid paint-like deposits.

The VMU series offline filtration system removes varnish through adsorption on an active filter element surface.

Features

- Removal of solid or gel-type oil aging products
- Operating reliability of the system is increased because there are fewer deposits in hydraulic components
- Increases oil service life
- Available as a complete unit for service, and as a modular system for retrofitting existing bypass circuit or for OEM

Applications

- Power plants
- Steel industry

Technical Specifications

| Hydraulic Data | |
|--|--|
| MPC value achievable | < 20 |
| Flow rate | VMU 1 ≈ 0.6 gpm (≈ 2.2 l/min) VMU 4 ≈ 2.4 gpm (≈ 8.9 l/min) |
| Fluid temperature | 86 to 140 °F (30 to 60 °C) |
| Max. operating pressure | 87 psi (6 bar) |
| Permissible suction pressure at suction inlet IN | -5.8 to 14.5 psi (-0.4 to 1 bar) |
| Viscosity range | 80 to 370 SUS (15 to 80 cSt) |
| Permissible operating fluid | Mineral-based fluids |
| Connections IN / OUT | 1/2" Male JIC |
| Pump type | Gear |
| Electrical Data | |
| Power supply voltage | See ordering details |
| Power consumption | 0.25 to 0.6 kW / 16 Amps |
| Ambient Conditions | |
| Operating temperature range | 32 to 104 °F (0 to 40 °C) |
| Storage temperature range | 32 to 140 °F (0 to 60 °C) |
| Relative humidity | 0 to 80%, non-condensing |
| Protection class to DIN 40050 | IP 55 |
| General Data | |
| Length of electrical connection cable | 5' (1.5 m) |
| Sealing material | FKM (Viton [®]) |
| Sound level at 1m | < 80 dB(A) |
| Weight* <i>(empty)</i> | VMU 1 = 155 lbs (70 kg), VMU 4 = 660 lbs (300 kg) |
| Fluid cleanliness required | ISO 19/17/14 (ISO 4406:1999) 9A/9B/9C (SAE AS4059) |

*Weight noted is for a stationary unit.

Model Code

| | | <u>VMU</u> - 4 | 4 - ! | <u>M</u> - | <u>G</u> - | <u>o</u> - | <u>G0</u> | <u>5</u> - <u>B</u> | <u>M</u> - | <u>G05</u> | <u>/-P</u> |
|------------|----------|---|--------------|------------|------------|------------|-----------|---------------------|------------|------------|------------|
| Series — | | | | | | | | | | | |
| VMU | = | Varnish Mitigation Unit | | | | | | | | | |
| Size —— | | |] | | | | | | | | |
| 1 | = | 1x Varnish Mitigation element NAVME \approx 0.5 gpm (2.2 l/min) | | | | | | | | | |
| 4 | = | 4x Varnish Mitigation elements NAVME \approx 2.4 gpm (8.9 l/min) | | | | | | | | | |
| Туре — | | | | | | | | | | | |
| M | = | mobile | | | | | | | | | |
| S | = | stationary | | | | | | | | | |
| Type of p | | - | | | | | | | | | |
| G | սոդ = | gear pump | | | | | | | | | |
| z | _ | without | | | | | | | | | |
| _ | | | | | | | | | | | |
| | | ly voltage | | | | | | | | | |
| F | = | ,, _, | | | | | | | | | |
| K | | | | | | | | | | | |
| 0 7 | | | | | | | | | | | |
| Z | = | without (only available with "Z" pump type option) | | | | | | | | | |
| Prefilter | | | | | | | | | | | |
| G05 | = | with 5µm element | | | | | | | | | |
| G10 | = | | | | | | | | | | |
| Clogging | j indi | | | | | | | | | | |
| BM | = | differential pressure indicator – visual | | | | | | | | | |
| С | = | differential pressure indicator – electrical | | | | | | | | | |
| Postfilter | r — | | | | | | | | | | |
| G05 | = | with 5µm element | | | | | | | | | |
| G10 | = | with 10µm element | | | | | | | | | |
| Sunnlem | enta | ary details | | | | | | | | | |
| PK7 | | with on-off switch and overload protective motor switch (standard) | | | | | | | | | |

with on-off switch and overload protective motor switch (standard) PKZ =

with on-off switch, overload protective motor switch and cut-out when filter clogged (requires neutral wire in power supply) FA1 =

with on-off switch, overload protective motor switch and cut-out when filter clogged (does not require neutral wire in power supply) FA2 =

For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog. Model Codes Containing RED are non-standard items - Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability.

Sizing

| Tank Volume | Varnish Mitigation Unit |
|---|-------------------------|
| < 4,230 gal. (<16,000 liters) | VMU-1 |
| 4,230 to 15,850 gal. (16,000 to 60,000 liters) | VMU-4 |

Scope of delivery

- VMU according to the model purchased. Varnish Mitigation elements (NAVME, see VMU Element & Filter Elements) purchased separately.
- ٠ Operating and maintenance manual

VMU Element & Filter Elements

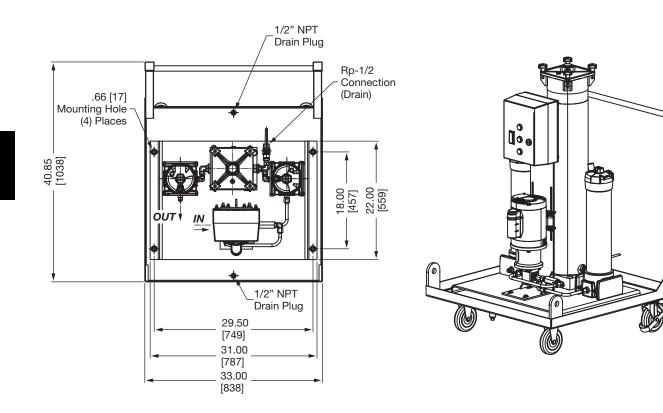
| VMU Element | Part No. |
|---|----------|
| NAVME Element | 2210730 |
| Replacement Filter Element | |
| (z, y, z) filts $y = 0$, $z, y, z + z - z + i - y - z + i + y + z + i + y + z + i + y$ | Doub Ma |
| (prefilter & protection filter) | Part No. |
| 5.03.18D 05 BN4 /-V-G | 2094528 |

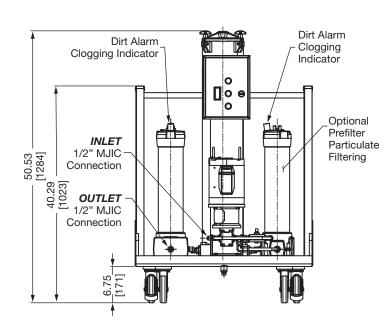
Order examples:

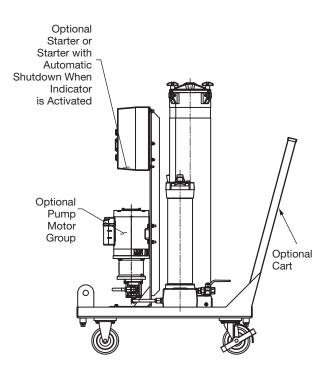
VMU-1-M-G-O-G10-BM-G05-PKZ requires: 1x NAVME200

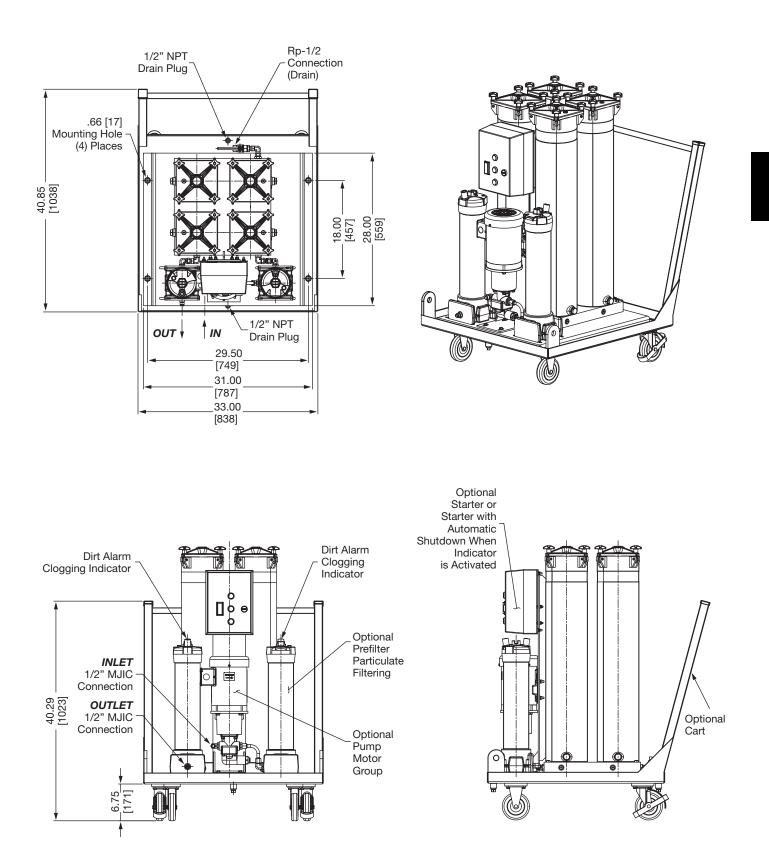
VMU-4-M-G-O-G10-BM-G05-PKZ requires: 4x NAVME200











OFFLINE FILTRATION SYSTEMS VEU Series Varnish Elimination Unit





Description

The service-friendly Varnish Elimination Unit (VEU) is used to prepare mineral oils and is particularly effective at removing oil aging products (varnish) from mineral oils. Varnish takes the form of oil-insoluble aging products which settle in the tank, in valves or in bearings. These can be filterable gels or solid paint-type deposits. The VEU-F series product is used in bypass flow. The removal of varnish is based on reducing the oil solubility for varnish with subsequent filtration using a combination of a HYDAC heat exchanger with a Dimicron[®] filter element technology.

Features

- Removal of solid and gel-like oil aging products
- Increased operating reliability of the system as a result of fewer deposits in hydraulic valves
- Increase in the oil service life
- Available to existing systems and for new systems

Applications

- Turbine Lubrication Systems
- Plastic Injection Molding Machines
- Industrial Forges and Presses

Technical Specifications

| Series | VEU-A | VEU-W | | | |
|---|--|--------------|--|--|--|
| Flow rate | VEU-x-10 = 10gpm VEU-x-15 = 15gpm | | | | |
| Permissible fluid viscosity range | 75 to 2000 SUS | | | | |
| Permitted operating fluids | Mineral- | based | | | |
| Fluid Service Temperature | 32° to 140°F | 32° to 176°F | | | |
| Maximum pump operating pressure | 87 p | si | | | |
| Maximum ΔP across filter elements | 72.5 | psi | | | |
| Permissible inlet pressure range | -5.8 to 7 psi | | | | |
| INLET port connection | VEU-x-10 = 1-5/8 x 12UN - Male VEU-x-15 = 1-7/8-12UN - Male | | | | |
| OUTLET port connection | 1-5/16 x 12UN - Male | | | | |
| Water INLET port connection (VEU-W only) | 1-1/2 x NP | T - Male | | | |
| Water OUTLET port connection (VEU-W only) | 1-1/2 x NP | T - Male | | | |
| Supply voltage | 460V AC / 60 575V AC / 60 | | | | |
| Seal material | FKM (V | iton®) | | | |
| Permissible ambient temperature range | 32 to 104°F | | | | |
| Permissible storage temperature range | 0 to 140°F | | | | |
| Permissible relative humidity | 0 to 80%, non-condensing | | | | |
| Approximate weight (empty) | 1,100 lbs. 1,150 lbs. | | | | |

Model Code

| | | | VEU | - A | - <u>1</u> 4 | <u>5 - I</u> | <u>vi</u> - <u>c</u> | <u> 60</u> - | <u>DM0</u> | <u>2 Ç</u> |
|-----------------|--------|---|-----|-----|--------------|--------------|----------------------|--------------|------------|------------|
| Series — VEU | = | Varnish Elimination Unit | | | | | | | | |
| Cooling I | Meth | nod | | | | | | | | |
| A | = | Air | | | | | | | | |
| W | = | Water | | | | | | | | |
| Flow Rat | e — | | | | | | | | | |
| 10 | = | 10 gpm | | | | | | | | |
| 15 | = | 15 gpm | | | | | | | | |
| Version - | | | | | | | | | | |
| S | = | Stationary | | | | | | | | |
| Μ | = | Mobile | | | | | | | | |
| Motor Vo | oltage | e | | | | | | | | |
| O60 | = | 460V / 3 Phase | | | | | | | | |
| P60 | = | 575V / 3 Phase | | | | | | | | |
| Filter Ele | men | t | | | | | | | | |
| DM02 | = | N15DM002, 2µm Absolute | | | | | | | | |
| DM05 | = | N15DM005, 5µm Absolute | | | | | | | | |
| DM10 | = | N15DM010, 10µm Absolute | | | | | | | | |
| Clogging | , Indi | icator ———— | | | | | | | | |
| C | = | Electrical differential pressure switch with indicator light in control panel | | | | | | | | |

Sizing

As a rough guide, the VEU can be sized according to the tank volume of the system.

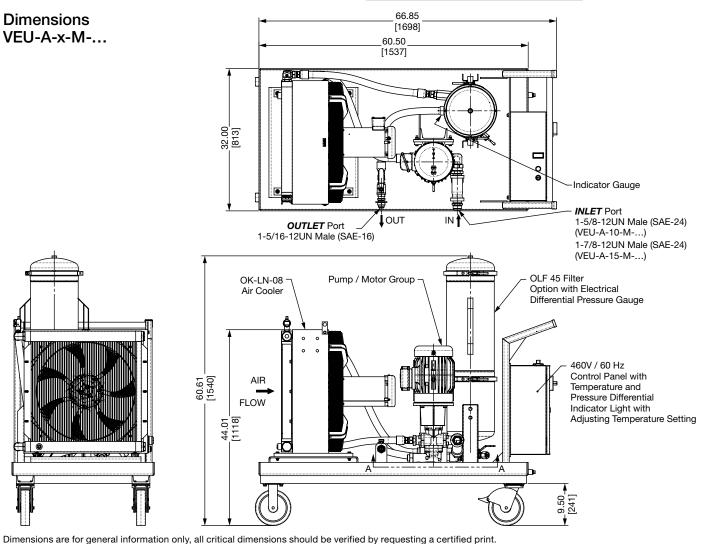
| Size | Tank Vol. Min. (gal) | Tank Vol. Max. (gal) |
|----------|----------------------|----------------------|
| VEU-x-10 | 150 | 1200 |
| VEU-x-15 | 225 | 2000 |

Replacement Filter Elements 3 elements required

| Model number | Part number |
|--------------|-------------|
| N15DM002 | 1251590 |
| N15DM005 | 3252552 |
| N15DM010 | 3115180 |

Scope of Delivery

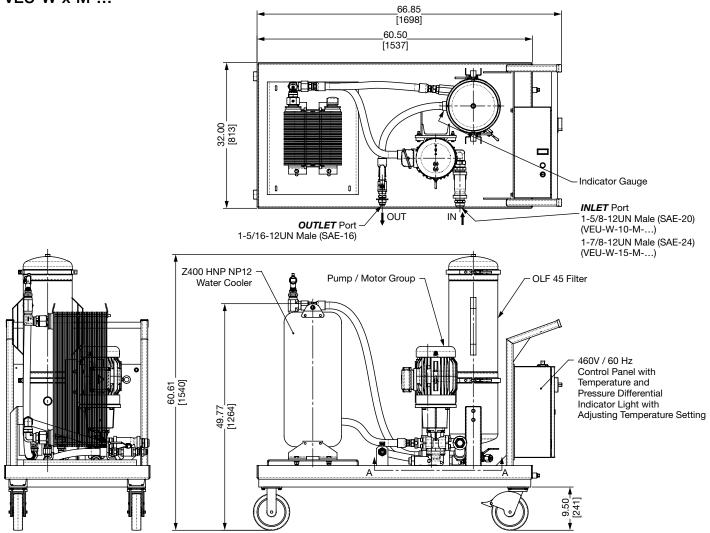
- VEU according to Model Code
 Operating and Maintenance
 - Maintenance Instructions



PN#02075860 / 05.21 / FSP2105-2273

Dimensions

VEU-W-x-M-...



Notes

| | | | | | | | | | | | | | | |
|--|--|--|--|--|--|------|------|------|------|------|------|------|------|--|
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OFFLINE FILTRATION SYSTEMS NxTM TriMicron Element Series



Description

The filter elements in the TriMicron series have been specially developed for the combined filtration of

- fine solid particle contamination,
- water and
- oil-ageing products from hydraulic and lubrication oils in the bypass flow.

They are a combination of pleated and SpunSpray depth filter elements. The filter layers are produced using melt-blown technology (synthetic fibers).

Features

- Excellent filtration performance ($\beta_{5(c)} > 1000$)
- Low initial differential pressure
- High contamination retention capacity
- Fine particle contamination, water and oil aging products removed by depth filter material
- Broad range of fluid compatibility
- Simple element change

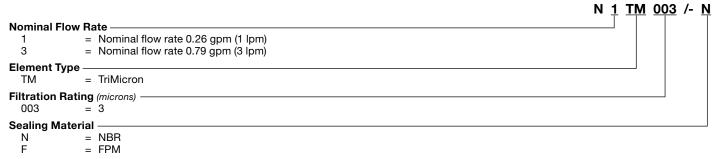
Applications

- Offline filtration in lubrication systems (e.g. in wind turbines)
- Offline filtration in hydraulic systems
- Transmission and hydraulic test rigs

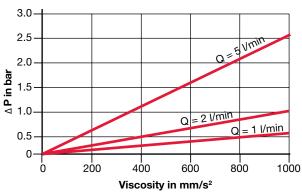
Technical Specifications

| Model | N1 | N3 | | | | |
|--|-----------------------------|----------|--|--|--|--|
| Contamination Retention Capacity ISOMTD at $\Delta P = 36.3$ psi (2.5 bar) | ~ 410 g | ~ 2500 g | | | | |
| Water Retention Capacity | ~ 680 ml | ~ 2.1 l | | | | |
| Beta value β _{5(c)} @ 29 psi (2 bar) | > 1,000 | | | | | |
| Filtration Rating | 3 µm | | | | | |
| Differential Pressure at Starting Point | 1.45 psid (< 0.1 bar) | | | | | |
| Permitted Fluid Temperature Range | 14 to 176 °F (-10 to 80 °C) | | | | | |
| Storage Temperature Range | 41 to 104 °F (5 to 40 °C) | | | | | |

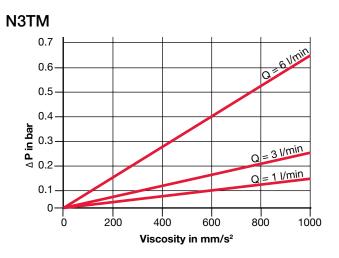
Model Code



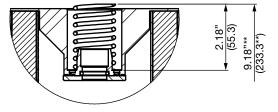
Element Differential Pressure N1TM



0.81" (020.5)



* spring unloaded ** spring loaded



OFFLINE FILTRATION SYSTEMS NxTM ECO TriMicron Element Series



Description

The filter elements in the TriMicron series have been specially developed for the combined filtration of fine solid particle contamination, water and oil-ageing products from hydraulic and lubrication oils in the bypass flow.

They are a combination of pleated and SpunSpray depth filter elements. The filter layers are produced using melt-blown technology (synthetic fibers).

Applications

- Offline filtration in lubrication systems (e.g. in wind turbines)
- Offline filtration in hydraulic systems
- Transmission and hydraulic test rigs

Features and Benefits

- Excellent filtration performance (β_{5(c)} > 1000)
- Low initial differential pressure
- High contamination retention capacity
- Fine particle contamination, water and oil aging products removed by depth filter material
- Broad range of fluid compatibility
- Simple element change

Technical Specifications

| Model | N1TM003 / ECO | N14TM003/-ECO | N3TM003 / ECO | 42.0TM/-ECO | | | | |
|--|-----------------------------|---------------------|--------------------|-------------|--|--|--|--|
| Part Number | 7643926 | 7643925 | 7647238 | 7644096 | | | | |
| Multipass Test | in Accordance w | ith ISO 16889 | | | | | | |
| Dirt Holding Capacity @ 2.5 bar ∆P | >250g | >400g | 800g | >550g | | | | |
| Filtration Efficiencyß(c) | 200 | 200 | >500 | >500 | | | | |
| Water Holding Capacity | 400 mL | 560 mL | >500mL | 500 mL | | | | |
| Influence on oil | Composition | | | | | | | |
| Foam Behavior (Flender Foam Test) | increase of 2% | | | | | | | |
| Oil Additives (Silicon and Boron) | | almost no r | eduction | | | | | |
| Construction of | Filter Element | | | | | | | |
| Contaminants Removed | Pa | rticles, water and | oil aging products | 3 | | | | |
| Filter Element Design | Synthet | ic media for partic | ulate and water re | moval | | | | |
| Filtration Rating | 3 µm | | | | | | | |
| Permitted Fluid Temp. Range | 14 to 176 °F (-10 to 80 °C) | | | | | | | |
| Storage Temp. Range | 41 to 104 °F (5 to 40 °C) | | | | | | | |

NOTE: Customer should re-use existing spring and adapter plate



Notes

| VUL | 00 | | | | | | | | | | | | | | |
|-----|----|------|------|------|--|--|------|------|------|------|------|------|------|----------------------|----------|
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MAFH-A Series

Dehydration Station



Description

Water contamination in hydraulic systems can severely reduce the life of hydraulic systems and fluids. The MAFH is designed to eliminate 100% of free and up to 90% of dissolved water from small reservoirs, barrels, and gear boxes. Using a patented transfer process, the MAFH efficiently removes water and particulate contamination quickly in all environments. A proprietary design reduces aeration of free and entrained gases of returned fluid. The unit was designed to be extremely portable due to small footprint and cart to access tight areas.

Principle of Operation

The MAFH uses patented mass transfer dewatering technology. Ambient air is conditioned to increase its water holding capability before injecting to the reaction chamber. Fluid is equally distributed and cascaded down through reticulated media and the conditioned air stream. Water is transformed to water vapor and is expelled from the unit as a moist air stream. The relative humidity of the incoming fluid is continually monitored by an integral AS 1000 AquaSensor and displayed real-time on the control panel.

Applications

- Steel and rolling mills
- Pulp and paper plants
- Power generation plants
- Tool machines / Plastic machines
- Hydraulic operated presses
- Fluid reclamation and recycling

Features

- · High dewatering rates and particulate removal in one system
- Simple controls; RUN/DRAIN modes
- Reduce fluid recycling cost
- No expensive vacuum pump to service and replace
- Patented mass transfer technology uses ambient air to optimize and control dewatering rates
- Remove free and dissolved water
- Highly effective in low and high humidity environments
- 2.4 kW heater option for unheated reservoirs

Technical Specifications

| Dimensions | 45.2"(H) x 36.7"(W) x 20.3"(D) | | | | | | | | |
|-------------------------------------|--|--|--|--|--|--|--|--|--|
| Weight | 295 lbs (134 kg) | | | | | | | | |
| Inlet Connections | 1" SAE | | | | | | | | |
| Outlet Connections | I SAE | | | | | | | | |
| Flow Rate | 120 gallons/hour or 2.0 gpm | | | | | | | | |
| Permissible Inlet Pressure Range | -5.8 psig (-0.4 bar) to 32 psia (2.2 bar) | | | | | | | | |
| Max. Permissible Outlet Pressure | 75 psig (5 bar) | | | | | | | | |
| Fluid Service Temp. | 100° F to 150°F (10°C to 79°C) | | | | | | | | |
| Power Supply | 110V AC / 60Hz / 1 Ph. (Standard; alternative power supply options available) | | | | | | | | |
| Heater Options | 220V/ 60hz/ 1 Phase, 460V/ 60hz/ 3 Phase | | | | | | | | |
| Attainable Water Content | < 50 ppm | | | | | | | | |
| Relative Humidity Display | Standard, 0-99% Range | | | | | | | | |
| Materials of Construction | Reaction Vessel: Stainless steel Seals: <i>FKM (Viton</i> ®) | | | | | | | | |
| Max. Permissible Fluid Viscosity | 1000 SUS (Standard) 500 SUS (w/ Option 'X') | | | | | | | | |
| Operating Fluids | Recommended for use with Hydraulic Fluids and Petroleum Based Fluids; (Consult factory for use with other fluid types) | | | | | | | | |

Model Code

| | | MAFH | <u>I-A</u> - | <u>v</u> . | • 🖊 | <u>l</u> - , | <u>A</u> - | ₿· | - <u>05</u> | j |
|----------------------------|---|--|--------------|------------|-----|--------------|------------|----|-------------|---|
| Series — MAFH-A | = | Dehydration station | | | | | | | | |
| Seals —— | | | | | | | | | | |
| V | = | Viton® | | | | | | | | |
| Nobility — | | | | | | | | | | |
| S | = | Stationary | | | | | | | | |
| Μ | | Caster base | | | | | | | | |
| /oltage — | | | | | | | | | | |
| A | = | 110V AC / 60Hz / 1 Ph. | | | | | | | | |
| В | = | 220V AC / 60 Hz / 1 Ph. | | | | | | | | |
| С | = | 220V AC / 50Hz / 1 Ph. | | | | | | | | |
| D | = | 460V/60hz/3 Phase (Heater option only) | | | | | | | | |
| ir Source | | | | | | | | | | |
| В | = | Integral blower | | | | | | | | |
| Filter Eleme 01, 03, 05 | | : Rating (micron) 0, 25 | | | | | | | | |
| • • • | | | | | | | | | | |

Options

 X
 = Class 1, Div 2 explosion-proof, Supplied Voltage: 460V / 60Hz / 3Ph (contact factory if this option is required in for your application)

 H
 = Heater Option (220V/ 60hz, or 460V/ 60hz ONLY)

 Y
 = Built with CSA approved components (requires CSA inspection on-site)

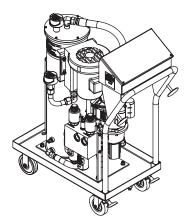
= Built with CSA approved components (requires CSA inspection on-site)

For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

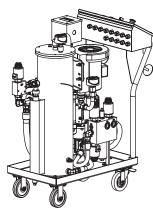
5

Model Codes Containing RED are non-standard items – Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability.

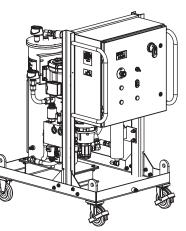
Dimensions MAFH-A-V-S-A-B-xx



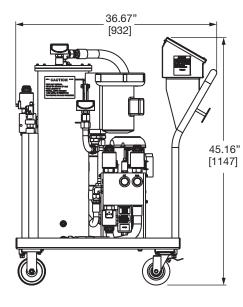
MAFH-A Standard (110V)



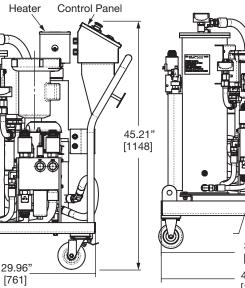
MAFH-A w/Heater (220V)

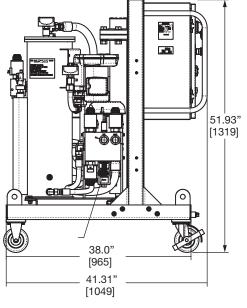


MAFH-A w/Heater (460V)



Dimensions are for general information only.





MAFH-E Series

Dehydration Station



Description

Water contamination in hydraulic systems can severely reduce the life of hydraulic systems and fluids. The MAFH-E is designed to eliminate 100% of free and up to 90% of dissolved water from reservoirs, barrels, and gear boxes. Using a patented transfer process, the MAFH-E efficiently removes water and particulate contamination quickly in all environments. A proprietary design reduces aeration of free and entrained gases of returned fluid. The unit was designed to be extremely portable using either the integrated lifting lugs located on each corner of the cart or the optional wheeled cart.

Principle of Operation

The MAFH-E uses a new mass transfer dewatering technology. Ambient air is conditioned to increase its water holding capability before injecting to the reaction chamber. Fluid is equally distributed and cascaded down through reticulated media and the conditioned air stream. Water is transformed to water vapor and is expelled from the unit as a moist air stream. The relative humidity of the incoming fluid is continually monitored by an integral AS 1000 AquaSensor and displayed real-time on the control panel.

Applications

- Steel and rolling mills
- Pulp and paper plants
- Power generation plants
- Tool machines / Plastic machines
- Hydraulic operated presses
- Oil conditioning

Features

- High Dewatering Rates and particulate removal in one system
- Simple Controls; RUN/DRAIN modes
- Reduce fluid recycling cost
- No expensive vacuum pump to service and replace
- Patented mass transfer technology uses ambient air to optimize and control dewatering rates
- Remove free and disolved water
- Highly effective in low and high humidity

Technical Specifications

| Dimensions | 32" W x 59" L x 70.25" H |
|---------------------------|--|
| Dry Mass | Without Heater: 1050lbs (476 kg); With Heater: 1230lbs (558 kg) |
| Inlet Connections | 1-1/2" MJIC |
| Outlet Connections | 1-1/2" MJIC |
| Oil Viscosity | Min 75 SUS; Max 2500 SUS (14 to 539 cSt) |
| Flow Rate | up to 22 gpm (1320 gallons/hour) |
| Inlet Pressure | Atmospheric |
| Outlet Pressure | To 100psi (6.9 bar) |
| Fluid Service Temperature | 50°F to 160°F (10°C to 71°C) |
| Power Supply | 460V/3/60Hz, 13 amps 460V/3/60Hz, 28 amps w/Heater 575V/3/60Hz, 10.5 amps 575V/3/60Hz, 23 amps w/Heater |
| Attainable Water Content | <50ppm |
| Relative Humidity Display | Standard, 0-99% Range |
| Construction | Base Frame: Carbon Steel Vessel: Stainless Steel Seals: Viton |
| Protection Class | NEMA-2 |



Model Code

| | | <u>MAFH-E</u> | <u>- ¥</u> - | <u>M</u> - A | <u>- B</u> | - <u>K</u> | - <u>05</u> | - <u>H</u> |
|---------------------------------|--|---------------|--------------|--------------|------------|------------|-------------|------------|
| Series – MAFH | -E = Dehydration Station | | | | | | | |
| Flow Ra (omit) 22 VF | | | | | | | | |
| Seals — V | = Fluoroelastomer (FPM) | | | | | | | |
| Mobility S M | = Stationary = Mobile | | | | | | | |
| A B | = 460V/3/60 Hz = 575V/3/60Hz | | |] | | | | |
| Air Sour B | ce = Integral Blower | | | | | | | |
| Filter Ho K Q Media* (| busing = 27" filter housing = 39" filter housing | | | | | | | |
| 01, 03 | , 05, 10, 25 | | | | | | | |
| Obliona | I Heater | | | | | | | |

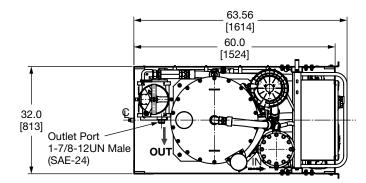
Optional Heater

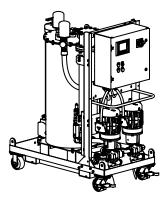
Ъ = 12500W Heater

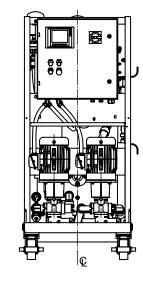
* = K filter housing will use the GeoSeal elements

Q filter housing will use the 39QCLQF Filter Systems elements For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

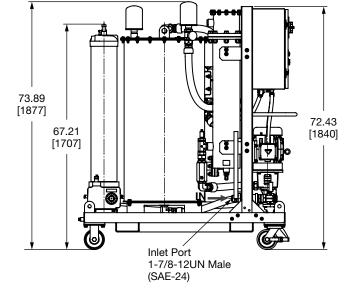
Dimensions







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OFFLINE FILTRATION SYSTEMS NAV Series

North American Vacuum Dehydrator



Description

The North American Vacuum Dehydrator (NAV) uses vacuum dehydrating technology to remove both free and dissolved water, and gases, from oil. In addition to water and gas, the NAV also removes solid contaminants from the oil with the use of highly efficient filter elements installed on the unit. The NAV is designed for use with larger applications, such as the conditioning of oil in larger hydraulic and lube reservoirs.

Features and Benefits

- Water Sensor standard on all units to show percent saturation
- Removes 100% of free and over 90% of dissolved water, as well as 100% of free and over 90% of dissolved gases
- Maintenance, operating, troubleshooting instructions are in HMI (touchscreen)
- Automatic mode enables user-defined system shutdowns
- Use of a low maintenance, dry running claw vacuum pump helps to avoid any dangerous, chemically reactive by-products

Applications

- Steel Mills
- Pulp and Paper Plants
- Power Generation Plants
- Any customer with a water problem in a large reservoir

Technical Specifications

| NAV30 | NAV5 | | | | | |
|--|--|--|--|--|--|--|
| 39" W x 76" L x 74" H | 36" W x 67" L x 78" H | | | | | |
| 1990 lbs (903 kg) | 1500 lbs | | | | | |
| 2" NPT | 1 1⁄2" NPT | | | | | |
| 1 ½" NPT | 1" NPT | | | | | |
| 30 gpm (114 L/min) | 5 gpm | | | | | |
| 22 in. Hg | g - 10 psi | | | | | |
| 110 psi | (7.6 bar) | | | | | |
| 39°F to 170°F (3.8°C to 77°C) | | | | | | |
| 39°F to 105°F (3 | 3.8°C to 40.6°C) | | | | | |
| 150-3280 SUS (23-700 cSt) | | | | | | |
| 460V | | | | | | |
| <10 | opm | | | | | |
| Standard | , 0 - 99% | | | | | |
| FK | (M | | | | | |
| Base Frame: Carbon Steel Vessel: Carbon Steel Seals: Viton | | | | | | |
| NEMA 4 | | | | | | |
| | 39" W x 76" L x 74" H 1990 lbs (903 kg) 2" NPT 1 ½" NPT 30 gpm (114 L/min) 22 in. Hg 110 psi 39°F to 105°F (3 39°F to 105°F (3 150-3280 SUS 46 <10 Standard Fk Base Frame: Vessel: Ca Seals: | | | | | |



NI A \ /

Model Code

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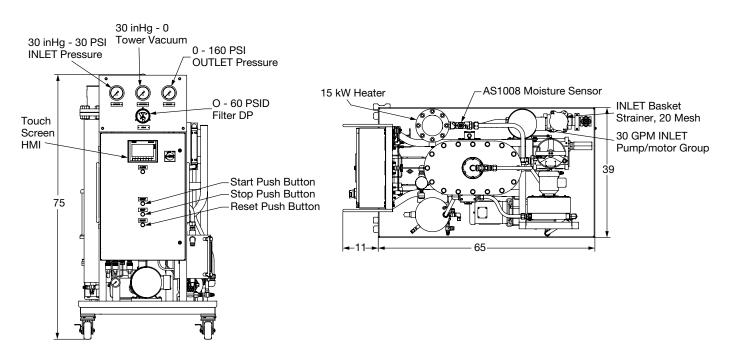
25

25 Micron

| Series – | | | NAV - | · <u>3(</u> | <u>)</u> - I | <u>vi</u> - <u>i</u> | <u>2 - 1</u> | <u>a</u> - <u>I</u> | 1 - 1 | <u>10</u> |
|------------|--------|--|-------|-------------|--------------|----------------------|--------------|---------------------|--------------|-----------|
| NAV | = | North American Vacuum Dehydrator | | | | | | | | |
| Flow Rat | te — | | | | | | | | | |
| 30 | = | 30 gpm | | | | | | | | |
| 5 | = | 5 gpm | | | | | | | | |
| Operatin | ng Flu | uid ———— | | | | | | | | |
| M | = | Mineral Oils (including oils w/ max. Viscosity as identified in specifications | | | | | | | | |
| Туре — | | | | | | |] | | | |
| 1 | = | Stationary | | | | | | | | |
| 2 | = | Mobile | | | | | | | | |
| Voltage/ | Frea | uency | | | | | | | | |
| A | | 460V / 60Hz / 3Ph+PE | | | | | | | | |
| Heater – | | | | | | | | | | |
| Н | = | Standard | | | | | | | | |
| Filtratior | ו Rat | ting | | | | | | | | |
| 3 | = | 3 Micron | | | | | | | | |
| 5 | = | 5 Micron | | | | | | | | |
| 10 | = | 10 Micron | | | | | | | | |

Model Codes containing RED are non-standard items - Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability

Dimensions NAV North American Vacuum Dehydrator



FAM5 Series

Fluid Aqua Mobile



Description

The FluidAqua Mobil FAM 5 is designed for dewatering, degassing and filtering hydraulic and lubrication fluids.

It operates on the principle of vacuum dewatering to eliminate free and dissolved water as well as free and dissolved gases. By using HYDAC Dimicron filter technology which has a high contamination retention capacity and filtration efficiency, the FAM 5 is extremely cost effective.

Perfect for service work thanks to its compact and mobile design. In the stationary version it provides perfect continuous protection for applications where operating fluids require optimal care, in which valuable bio-oils or fire-resistant fluids are used, or where water frequently gets into the system.

Features

- Small, compact and easy-to-use unit with Siemens LOGO controller as well as control panel for quick use during service calls or emergencies
- Reliable and convenient for fixed and permanent use due to extensive monitoring functions
- Optional integrated heater to increase dewatering performance, especially for cold or high viscosity oils
- Optional integrated water content and particle measurement technology with continuous display of the measurements, storage of the values and control of the unit
- Very low residual water content, gas content and particle contamination result in longer oil change intervals, improved life expectancy of components, higher machine availability and as a result, a reduction in the Life Cycle Cost (LCC)

Applications

- Steel and rolling mills
- Pulp and paper plants
- Power generation plants
- Tool machines / Plastic machines
- Hydraulic operated presses
- Oil conditioning

Technical Specifications

| Flow rate at 60 Hz | ~ 1.6 gpm (~ 6 l/min) | | | | | |
|--|---|--|--|--|--|--|
| | Fluids compatible with NBR seals: | | | | | |
| Permitted fluids** | Mineral oils to DIN 51524 Gear oils to DIN 51517, 51524 Fluids compatible with FKM (FPM,Viton®) seals: Synthetic esters (HEES) DIN 51524/2 Vegetable oils (HETG, HTG) HFD-R fluids (not for pure phosphate ester which require EPDM seals) | | | | | |
| Sealing material | NBR or FKM (FPM,Viton®) see Model Code "Operating Fluid" | | | | | |
| Filter size of fluid filter | OLF 5 | | | | | |
| Filter element for fluid filter (xxx = filtration rating) | N5DMxxx Filter element must be ordered separately, see table "Filter elements for fluid filters" | | | | | |
| Clogging indicator | Differential pressure switch with cut-off function when filter is clogged | | | | | |
| Type of vacuum pump | Rotary vane vacuum pump | | | | | |
| Pump type for filling and draining | Gear pump | | | | | |
| Operating pressure (outlet) | 0 to 116 psi (0 to 8 bar) | | | | | |
| Permitted pressure at suction port (without suction hose) | -2.9 to 14.5 psi (-0.2 to 1 bar) | | | | | |
| Permitted operating viscosity range** | 78 to 1623 SUS (15 to 350 mm2/cSt) – w/o integrated heater 78 to 2550 SUS (15 to 550 mm2/cSt) – with integrated heater | | | | | |
| Permitted viscosity range for particle measurement | 15 to 200 mm ² /s – with measuring equipment ACS, AC | | | | | |
| Fluid temperature range** | 50 to 176 ° F (10 to 80 °C) | | | | | |
| Ambient temperature** | 32 to 104 °F (0 to 40 °C) | | | | | |
| Storage temperature range** | 32 to 104 °F (0 to 40 °C) | | | | | |
| Relative ambient humidity** | maximum 90%, non-condensing | | | | | |
| Electrical power consumption (without heater) / required external fuse* | \approx 1 kW / 16 A for circuit breakers with trip characteristics type C | | | | | |
| Heating output (optional) | Max. 2.4 kW (depending on the nominal voltage, see Model Code) | | | | | |
| Protection class | IP 54 | | | | | |
| Length of power cable / plug | 10 m / CEE (depending on the nominal voltage, see Model Code) | | | | | |
| Length of connection hoses | 197" (5 m) (mobile version only) | | | | | |
| Material of hoses | see Model Code | | | | | |
| Hydraulic connections | see table "Connection Summary" | | | | | |
| Weight when empty | ~26.5 lb. ≈ 120 kg | | | | | |
| Achievable residual water content | < 100 ppm – hydraulic & lubricating oils < 50 ppm – turbine oils (ISO VG 32/46) < 10 ppm – transformer oils *** | | | | | |

*Maximum specifications given, equipment-dependent **For other fluids, viscosities or temperature ranges, please contact us

***Units are not suitable for "Online" and "Onload" operation

(transformer in operation and connected to grid).

D62 HYDAC

Model Code

| FAM = Fluid Aqua Mobile ize 5 = ~1.32 gpm (~ 5 l/min) at 50 Hz; ~ 1.63 gpm (~ 6 l/min) at 60 Hz pperating fluid M = Mineral oil - NBR seals, NBR hoses, tested with mineral oil* I = Insulating oil - NBR seals, NBR hoses, tested with insulating oil (e.g. Shell Diala)* /** X = HFD-R fluids - Flurcelastomer (FPM) seals, UPE/PE-PA hoses, tested with HFD-R fluid (e.g. Fyrquel)* B = Biodegradable (ester-based) - Flurcelastomer (FPM) seals, NBR hoses, tested with biodegradable operating fluid based on esters* Itechanical type 1 = Stationary (with feet) 2 = Mobile (with castors and connection hoses) oltage / Frequency / Power supply A = 400 V/50 Hz/3Ph+PE P = 230 V/60 Hz/3Ph+PE ¹⁰ B = 415 V/50 Hz/3Ph+PE P = 230 V/60 Hz/1Ph+PE E = 220 V/60 Hz/3Ph+PE N = 220 V/60 Hz/1Ph+PE K = 480 V/60 Hz/3Ph+PE ¹⁰ AD = 220 V/60 Hz/1Ph+PE K = 480 V/60 Hz/3Ph+PE ¹⁰ X = other voltage on request M = 230 V/50 Hz/1Ph+PE G = 0LF5 ype of Vacuum Pump R = Rotary vane vacuum pump | | <u>FAM - 5 - M - 2 - Q - 05 - R - H - S - ACS - 00 - /</u> |
|--|-------------------|--|
| 5 = - 1.32 gpm (~ 5 l/min) at 50 Hz; ~ 1.63 gpm (~ 6 l/min) at 60 Hz perating fluid Immeral oil - NBR seals, NBR hoses, tested with mineral oil* 1 = Insulating oil - NBR seals, NBR hoses, tested with mineral oil* 1 = Insulating oil - NBR seals, NBR hoses, tested with mineral oil* 1 = Insulating oil - NBR seals, NBR hoses, tested with mineral oil* 1 = Insulating oil - NBR seals, NBR hoses, tested with mineral oil* 1 = Insulating oil - NBR seals, NBR hoses, tested with insulating oil (e.g. Shell Dialay' /** X = X = HFD-R fluide - Fluroelastomer (FPM) seals, NBR hoses, tested with indegradable operating fluid based on esters* technical type | Series — FAM = | Fluid Aqua Mobile |
| perating fluid M | Size — | |
| M = Mineral oil - NBR seals, NBR hoses, tested with mineral oil* I = Insulating oil - NBR seals, NBR hoses, tested with insulating oil I = Insulating oil - NBR seals, NBR hoses, tested with insulating oil (e.g. Sheil Diala) / ** = HcDR fluids - Fluroelastomer (FPM) seals, UPE/PE-PA hoses, tested with HFD-R fluid (e.g. Fyrquel)* B = Biodegradable (setr-based) - Fluroelastomer (FPM) seals, NBR hoses, tested with biodegradable (setr-based) - Fluroelastomer (FPM) seals, NBR hoses, tested with biodegradable (setra-based) I = Stationary (with feet) 2 = Mobile (with castors and connection hoses) oltage / Frequency / Power supply = A = 400 V/50 Hz/3Ph+PE P B = 415 V/50 Hz/3Ph+PE P = B = 415 V/50 Hz/3Ph+PE N = C = Mobile (with castors and connection hoses) oltage / Frequency / Power supply A = 400 V/50 Hz/3Ph+PE N B = 415 V/50 Hz/3Ph+PE N = 300 V/50 Hz/3Ph+PE N C = A A00 V/50 Hz/3Ph+PE <td>5 =</td> <td>~ 1.32 gpm (~ 5 l/min) at 50 Hz; ~ 1.63 gpm (~ 6 l/min) at 60 Hz</td> | 5 = | ~ 1.32 gpm (~ 5 l/min) at 50 Hz; ~ 1.63 gpm (~ 6 l/min) at 60 Hz |
| 1 = Insulating oil - NBR seais, NBR hoses, tested with insulating oil (e.g. Shell Diale)'.* X = HFD-R fluide, S, Fryquely' X = HFD-R fluide, S, Fryquely' B = Biodegradable (ester-based) - Fluroelastomer (FPM) seals, NBR hoses, tested with HD-R fluid (e.g. Fryquely') B = Biodegradable (ester-based) - Fluroelastomer (FPM) seals, NBR hoses, tested with biodegradable operating fluid based on esters' techanical type | Operatin | g fluid |
| (e.g. Shell Diala)' /** fill of the set of | | |
| tested with HFD-R fluid (e.g. Fyrque)? B = Biodegradable (ester-based) - Fluroelastomer (FPM) seals, NBR hoses, tested with biodegradable operating fluid based on esters? I = Stationary (with feet) 2 = Mobile (with castors and connection hoses) Oltage / Frequency / Power supply A = 400 V/50 Hz/3Ph+PE O = 460 V/60 Hz/3Ph+PE? B = 415 V/50 Hz/3Ph+PE P = 230 V/60 Hz/3Ph+PE E = 220 V/60 Hz/3Ph+PE S = 380 V/50 Hz/3Ph+PE E = 220 V/60 Hz/3Ph+PE N D = 220 V/60 Hz/1Ph+PE K = 480 V/60 Hz/3Ph+PE? X = other voltage on request M = 230 V/50 Hz/1Ph+PE V = Rotary vane vacuum pump iter Size of Fine Filter Z = Without heater H = Heater (for 200 to 359 V = 1 kW, for 360 to 690 V = 2.4 kW, heater only possible from 200 V) ontrol Concept S = standard, operating language de/en. Included in scope of delivery on USB memory stick for subsequent installation: tr/ren, es/en, pt/en, it/en, ni/en, da/en, fi/en, sv/en, zh/en (other languages on request) Easuring Equipment Z = without A = AquaSensor AS 1000 vith control function AC = AquaSensor AS 1000 + ContaminationSensor CS 1000, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function O = The latest version is always supplied. upplementary Details | | (e.g. Shell Diala)* / ** |
| B = Biodegradable (ester-based) - Fluroelastomer (FPM) seals, NBR hoses, tested with biodegradable operating fluid based on esters' 1 = Stationary (with feet) 2 = Mobile (with castors and connection hoses) 0ltage / Frequency / Power supply A = 400 V/50 Hz/3Ph+PE 4 = 400 V/50 Hz/3Ph+PE 5 = 5 attoinary (with feet) A = 400 V/50 Hz/3Ph+PE P = 220 V/60 Hz/3Ph+PE B = 415 V/50 Hz/3Ph+PE C = 220 V/60 Hz/3Ph+PE B = 440 V/60 Hz/3Ph+PE A = 400 V/60 Hz/3Ph+PE F = 220 V/60 Hz/3Ph+PE K = 480 V/60 Hz/3Ph+PE K = 480 V/60 Hz/3Ph+PE K = 480 V/60 Hz/3Ph+PE M = 230 V/50 Hz/13Ph+PE K = 480 V/60 Hz/3Ph+PE M = 230 V/50 Hz/13Ph+PE K = 480 V/60 Hz/3Ph+PE K = 480 V/60 Hz/3Ph+PE K = 480 V/60 Hz/3Ph+PE K = 8 Rotary vane vacuum pump eator | X = | |
| NBR hoses, tested with biodegradable operating fluid based on esters' techanical type 1 = Stationary (<i>with feet</i>) 2 = Mobile (<i>with castors and connection hoses</i>) O = 460 V/60 Hz/3Ph+PE' A = 400 V/50 Hz/3Ph+PE P = 230 V/60 Hz/3Ph+PE'' B = 415 V/50 Hz/3Ph+PE S = 380 V/50 Hz/3Ph+PE E = 220 V/60 Hz/3Ph+PE' S = 380 V/50 Hz/3Ph+PE H = 440 V/60 Hz/3Ph+PE' X = other voltage on request H = 440 V/60 Hz/3Ph+PE' X = other voltage on request M = 230 V/50 Hz/1Ph+PE Z = Without heater Z = Without heater H = Heater (for 200 to 359 V = 1 kW, for 360 to 690 V = 2.4 kW, heater only possible from 200 V) ontrol Concept Z = Without heater H = Heater (for 200 to 359 V = 1 kW, for 360 to 690 V = 2.4 kW, heater only possible from 200 V) ontrol Concept Z = Without heater H = Heater (for 200 to 359 V = 1 kW, for 360 to 690 V = 2.4 kW, heater only possible from 200 V) ontrol Concept Z = Without heater H = Heater (for 200 to 359 V = 0 then, the date, filen, sv/en, zh/en (other languages on request) Heasuring Equipment Z = without A = AquaSensor AS 1000 + ContaminationSensor CS 1000, with control function AC = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function | в = | |
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| 2 = Mobile (with castors and connection hoses) oltage / Frequency / Power supply A = 400 V/50 Hz/3Ph+PE B = 415 V/50 Hz/3Ph+PE P B = 415 V/50 Hz/3Ph+PE P E = 200 V/50 Hz/3Ph+PE S H = 440 V/60 Hz/3Ph+PE N S = 380 V/50 Hz/3Ph+PE K = 480 V/60 Hz/3Ph+PE X = other voltage on request M = 230 V/50 Hz/1Ph+PE Yee Other voltage on request M = 230 V/50 Hz/1Ph+PE Yee Other voltage on request M = 230 V/50 Hz/1Ph+PE Yee Other voltage on request M = 230 V/50 Hz/1Ph+PE Yee Other voltage on request Beater | Mechanie | cal type |
| oltage / Frequency / Power supply A = 400 V/50 Hz/3Ph+PE O = 460 V/60 Hz/3Ph+PE A = 410 V/50 Hz/3Ph+PE P = 230 V/60 Hz/3Ph+PE B = 415 V/50 Hz/3Ph+PE S = 380 V/50 Hz/3Ph+PE E = 220 V/60 Hz/3Ph+PE N = 220 V/60 Hz/1Ph+PE K = 480 V/60 Hz/3Ph+PE' X = other voltage on request M = 230 V/50 Hz/1Ph+PE V = other voltage on request M = 230 V/50 Hz/1Ph+PE T = other voltage on request M = 230 V/50 Hz/1Ph+PE T = other voltage on request M = 230 V/50 Hz/1Ph+PE T = other voltage on request M = 230 V/50 Hz/1Ph+PE T = other voltage on request M = Rotary vane vacuum pump T T R = Rotary vane vacuum pump T T S = standard, operating language de/en. Included in scope of delivery on USB memory stick for subsequent installation: fr/en, es/en, pt/en, it/en, nl/en, da/en, fi/en, sv/en, zh/en (other languages on request) Heasuring Equipment T Z = without A = AquaSensor AS 1000 with control function | | |
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| iiter Size of Fine Filter 05 = OLF5 ype of Vacuum Pump R = Rotary vane vacuum pump leater Z = Without heater H = Heater (for 200 to 359 V = 1 kW, for 360 to 690 V = 2.4 kW, heater only possible from 200 V) control Concept S = standard, operating language de/en. Included in scope of delivery on USB memory stick for subsequent installation: fr/en, es/en, pt/en, it/en, nl/en, da/en, fi/en, sv/en, zh/en (other languages on request) leasuring Equipment Z = without A = AquaSensor AS 1000 with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function Modification Number | A = | $400 \text{ V/50 Hz/3Ph+PE}$ O = $460 \text{ V/60 Hz/3Ph+PE}^{\circ}$ |
| iiter Size of Fine Filter 05 = OLF5 ype of Vacuum Pump R = Rotary vane vacuum pump leater Z = Without heater H = Heater (for 200 to 359 V = 1 kW, for 360 to 690 V = 2.4 kW, heater only possible from 200 V) control Concept S = standard, operating language de/en. Included in scope of delivery on USB memory stick for subsequent installation: fr/en, es/en, pt/en, it/en, nl/en, da/en, fi/en, sv/en, zh/en (other languages on request) leasuring Equipment Z = without A = AquaSensor AS 1000 with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function Modification Number | Б = | 415 V/50 HZ/3Ph+PE P = 230 V/60 HZ/1Ph+PE |
| iiter Size of Fine Filter 05 = OLF5 ype of Vacuum Pump R = Rotary vane vacuum pump leater Z = Without heater H = Heater (for 200 to 359 V = 1 kW, for 360 to 690 V = 2.4 kW, heater only possible from 200 V) control Concept S = standard, operating language de/en. Included in scope of delivery on USB memory stick for subsequent installation: fr/en, es/en, pt/en, it/en, nl/en, da/en, fi/en, sv/en, zh/en (other languages on request) leasuring Equipment Z = without A = AquaSensor AS 1000 with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function Modification Number | H = | 220 V(60 Hz/37H+PC) $S = 200 V(60 Hz/3PH+PC)$ |
| iiter Size of Fine Filter 05 = OLF5 ype of Vacuum Pump R = Rotary vane vacuum pump leater Z = Without heater H = Heater (for 200 to 359 V = 1 kW, for 360 to 690 V = 2.4 kW, heater only possible from 200 V) control Concept S = standard, operating language de/en. Included in scope of delivery on USB memory stick for subsequent installation: fr/en, es/en, pt/en, it/en, nl/en, da/en, fi/en, sv/en, zh/en (other languages on request) leasuring Equipment Z = without A = AquaSensor AS 1000 with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function Modification Number | K = | $480 \text{ V/60 Hz/3Ph+PE}^{1}$ X = other voltage on request |
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| ype of Vacuum Pump | Filter Siz | e of Fine Filter |
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| H = Heater (for 200 to 359 V = 1 kW, for 360 to 690 V = 2.4 kW, heater only possible from 200 V) Sontrol Concept | Heater – | |
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| Ieasuring Equipment Z = without A = AquaSensor AS 1000 with control function AC = AquaSensor AS 1000 + ContaminationSensor CS 1000, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000, with control function ACS = AquaSensor AS 1000 + ContaminationSensor CS 1000 + SensorMonitoring Unit display and storage of values, with control function Iodification Number | | |
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| Iodification Number 00 = The latest version is always supplied. upplementary Details | , | |
| 00 = The latest version is always supplied. upplementary Details | Modifica | |
| upplementary Details | | |
| | | |
| | | |

- None = standard
 - V = Fluroelastomer (FPM) seals for "M" and "I" fluids

¹⁾Supplied without connector

*Residues of test fluid will remain in the unit after testing

**Units not suitable for "Online" and "Onload" operation (transformer in operation and connected to grid)

For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Type of Vacuum Pump

The vacuum pump used is an oil lubricated rotary vane pump.

The air discharged by the vacuum pump can, in addition to water, contain constituent elements of the operating fluid concerned, as well as any gases it contained.

Therefore, please ensure that the area in which the FAM is operated is adequately ventilated.

Heater

By using the built-in heater, the dewatering capacity can be increased, particularly in the case of high viscosity fluids or fluids at low temperatures.

If the temperature of the fluid is raised by $50^{\circ}F(10^{\circ}C)$ then the dewatering capacity increases by up to 50%. The ideal temperature for dewatering is ~122 to $140^{\circ}F$ (~50 to $60^{\circ}C$).

Generally speaking, for operating viscosities of between 2086 to 2550 SUS (350 to 550 mm2/cSt) the heater option must be selected and the heater must be used.

Control Concept

- Siemens LOGO controller
- 6-line text display (bilingual)
- Automatic, state-based and energy-saving operation through control of the power unit via optionally integrated or external AquaSensor using MIN/MAX values
- Error messages as plain text display
- Manual operation for manual activation of components
- Ethernet connection and web server for remote monitoring

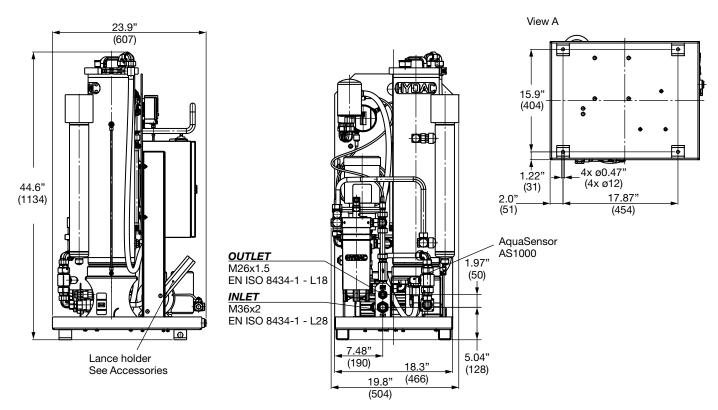
Instrumentation

If the water and particle measuring options (AquaSensor and ContaminationSensor) are included, it is possible to display the water content relative to the saturation point (saturation level, relative humidity), as well as the particle contamination and temperature of the fluid. The measured data is stored in the SensorMonitoring Unit with a date and time stamp and can be easily transferred using a USB memory stick.

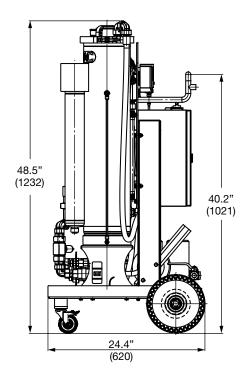


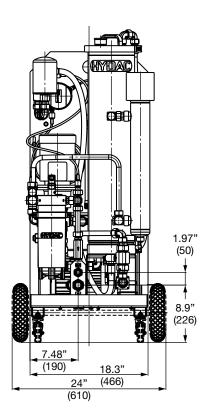


Dimensions FAM5 Stationary

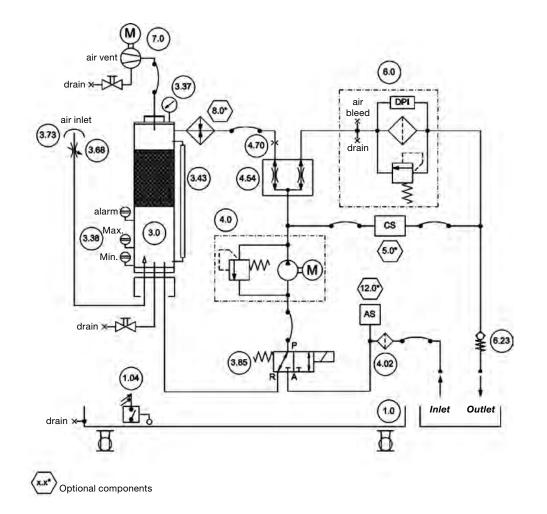


Dimensions FAM5 Mobile





Dimensions are in inches (millimeters) and for general information only, all critical dimensions should be verified by requesting a certified print.



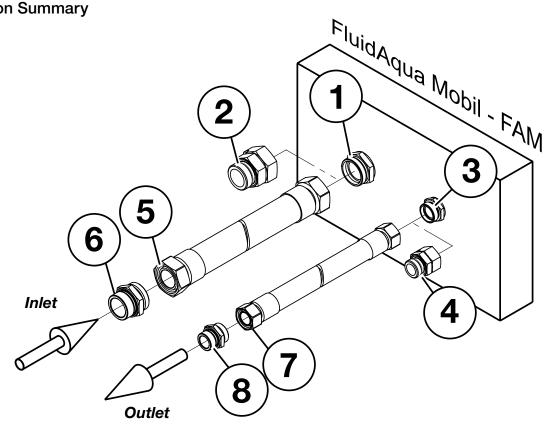
| Item | Description |
|------|--|
| 1.0 | Drip tray |
| 1.04 | "Drip tray full" float switch |
| 3.0 | Vacuum column |
| 3.38 | Level sensor for vacuum column |
| 3.68 | Needle valve to regulate the necessary vacuum in the vacuum column |
| 3.73 | Breather filter |
| 3.85 | 3/2 directional valve |
| 4.0 | Motor pump assembly |
| 4.02 | Suction screen |
| 4.54 | Flow divider |
| 5.0 | ContaminationSensor CS1000 (optional) |
| 6.0 | Fluid filter for elimination of solid particles, with differential pressure switch for filter monitoring |
| 7.0 | Vacuum pump |
| 8.0 | Heater (optional) |
| 12.0 | AquaSensor AS 1000 (optional) |

Filter Elements

Please order the filter element for the fluid filter separately and install it before commissioning. You will need one of the following filter elements for the fluid filter:

| Туре | Filtration rating | Seals | Part number |
|---------|-------------------|----------------------|-------------|
| N5DM002 | 2 μm | Fluroelastomer (FPM) | 349494 |
| N5DM005 | 5 μm | Fluroelastomer (FPM | 3068101 |
| N5DM010 | 10 µm | Fluroelastomer (FPM) | 3102924 |
| N5DM020 | 20 µm | Fluroelastomer (FPM) | 3023508 |

Connection Summary



| Item | FAM 5 |
|------------------------------|----------------------------------|
| 1 - FAM inlet connector | 28L / M36x2 (male thread)* |
| 2 - Adapter | Adapter G1 A (male thread)** |
| 3 - FAM outlet connector | 18L / M26x1.5 (male thread)* |
| 4 - Adapter | Adapter G 1/2 A (male thread)** |
| 5 - Suction hose connection | 28L / M36x2 (female thread)*** |
| 6 - Adapter | Adapter G1 A (male thread)** |
| 7 - Pressure hose connection | 18L / M26x1.5 (female thread)*** |
| 8 - Adapter | Adapter G 1/2 A (male thread)** |

Connection Form D to ISO 8434-1 Series L

(corresponds to ISO 12151, Form S, Series L)

** Screw-in spigot to ISO 1179-2 (Form E)

*** Connection Form N to ISO 8434-4 Series L

(corresponds to ISO 12151, Form SWS, Series L)

Items 1 and 3 are supplied with the stationary FAM. Items 1, 3, 5 and 7 are supplied with the mobile FAM.

Sizing

As a rough guide, the FluidAqua Mobil can be sized according to the tank volume of the system.

| Tank Volume gallons (L) | Model |
|-------------------------|-------|
| <528 (< 2,000) | FAM 5 |

In general, it must however be noted that sizing will depend on the application, the fluid, the temperature of the fluid and the ambient temperature, the fluid quantity and the water ingress into the system. These have a great affect on the dewatering efficiency. Therefore the specifications can only serve as an indication.

| | Dewatering Rate |
|------------------------|-----------------|
| Water Content | |
| Fluid Temperature | |
| Detergent Additives | ↓ |
| FAM Flow Rate | |

External interfaces

The controller has external interfaces for remote control of the unit: • Start/stop from external (relay)

- Device ready - no error, unit ready for operation (potential-free contact)
- Operating state unit ON/OFF (potential-free contact)
- Filter contaminated (potential-free contact)

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|---|--------------|---|-------|---|---|---|----|----|
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| Description | Material | Part No. |
|---|----------|----------|
| Lance set for suction and return hose, consisting of: 2x lances ø0.71" (ø18 mm), length = 19.7" (0.5 m 1x lance holder incl. mounting material) | FPM | 3685146 |
| Connection, adapter set, metric/inch comprising: Items 2, 4, 6 and 8 (see Connection Overview) | FPM | 4337754 |

Items supplied

- Fluid Aqua Mobile
- Suction and return hose (only on mobile version)
- 0.26 gal. (1L) vacuum pump oil for initial filling of vacuum pump

Control cabinet key

- Technical documentation:
- Operating and Maintenance Manual
- Electrical wiring diagram

- Test certificate

- CE declaration of conformity

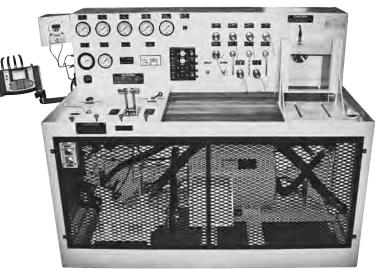
Notes

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OFFLINE FILTRATION SYSTEMS HTB Series

Hydraulic Test Bench





Description

The HYDAC HTB hydraulic test bench is the ultimate diagnostic tool, capable of thoroughly testing a vast array of new or rebuilt components and subassemblies prior to their installation in a working system. Test bench instrumentation has been designed to make diagnosis fast and accurate, with virtually no requirement for connecting external instruments. The bench panel includes a digital flow gauge, a tachometer to measure the speed of tested pumps or motors, and a reservoir temperature gauge. Individual gauges measure pressure on the test bench main pump, the pump or motor being tested, the test bench load pump, the cylinder and valve pressure port, and the test bench super charge pump.

Every HTB includes efficient HYDAC hydraulic filters to keep the bench oil at optimum cleanliness, providing assurance that newly rebuilt components will not be subjected to harmful levels of dirt. To keep filters operating at peak efficiency, the instrument panel includes a red pilot light that signals the operator when any bench filter needs a new element.

These benches have been refined for over 30 years by HYDAC engineers, based on the comments and requests of over 700 test bench owners. The versatile hydraulic circuitry present in each of the three models can shorten troubleshooting time and take the guesswork out of diagnoses. Current models are powerful, compact units that pay for themselves quickly in saved maintenance time and expenses.

Applications

- Pumps and motors can be tested dynamically. Pump and motor testing is aided by the wide speed and torque ranges built into the bench and by the universal mounting bracket and mounting accessories that come with the bench. An open loop hydrostatic variable volume hydraulic system provides the power and speed control for the drive shaft. Motors can be dynamically tested, under load, for operating efficiency. Pumps can be tested for external leakage and volumetric efficiency in either direction, at speeds from 100 to 2400 rpm. The test bench can also be used to break-in pumps and motors to manufacturer's specifications before they are installed in a system.
- **Cylinder** leaks are easy to find. Double-acting cylinders may be cycled, and tested for both internal and external leakage at any point of piston travel. Scored cylinder walls and defective packing are easily detected. Single-acting cylinders are tested at maximum stroke.
- Valve testing time is minimized. Pressures can be set, external and internal leakage spotted, flow and pressure data can be generated and checked against operating requirements and overall valve efficiency determined. Optional electrical and pilot pressure supplies are available on the bench for testing solenoid-actuated and pilotoperated valves.

Features

- An ingenious universal mounting bracket makes mounting pumps and motors on the bench a simple, quick operation
- Mounting plates are furnished to accommodate flange-mounted and foot-mounted pumps or motors
- Drive adapter equipment includes inserts for keyed shafts, an insert chuck and a universal drive shaft
- Quick disconnect porting on the bench provides convenient hook-up for test components
- Includes a factory-trained technician for a two-day, on-site training session
- Two complete operating manuals are supplied with each bench
- Kits and spare parts available for upgrades and maintenance







D68 **HYDAC**

Model Code

| HP - | B = | Hydraulic Test Bench | | | | | <u>HTB 100 A AD</u> |
|---------------------|------------|---|---------|------------|-------------------------------------|----------------------|---------------------|
| 50, Volta | 100, ne | 150 | | | | | |
| | • | V 60Hz, B = 460V 60Hv, C = 575V | V 60Hz, | D = | = 380V 50Hz, E = 415V 50Hz, | F = 380V 60Hz | |
| Optic | ns – | | | | | | |
| А | = | Water Cooled Heat Exchanger | G | = | Closed Loop Circuit | | |
| В | = | Solenoid & Pilot Operated Valve Group | р Н | = | HMG Digital Electronic Group | | |
| С | = | Jib Crane Group | I | = | Air Cooled Heat Exchanger | | |
| D | = | Filtration Group (included on all HTB's | s) J | = | 25 GPM Case Drain Meter | | |
| Е | = | Safety Enclosure Group | κ | = | Digital Gauges | | |
| | | Splined Shaft Group* | L | = | CŠ1000 Kit Hose & Fitting Group* | | |

*Note: Ordered as a separate line item.

Model Codes containing RED are non-standard items – Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability.

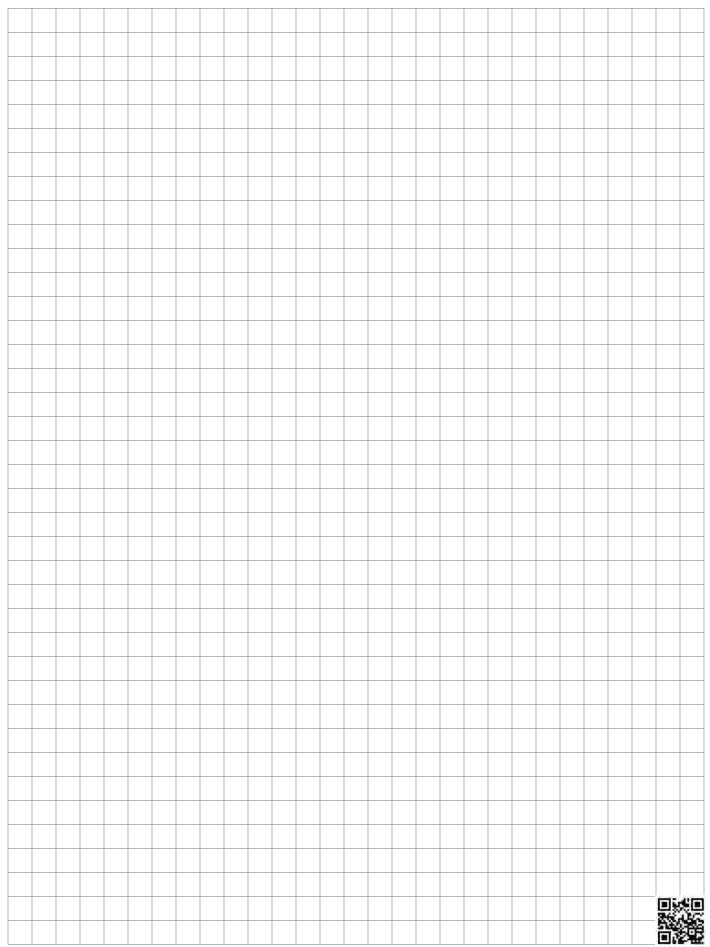


Hose and Fittings Group Option

(contains hose connection with female quick disconnects on both ends, plus a series of separate national pipe thread, straight thread, and SAE four-bolt flange adapters, ranging in size from 3/8" through 2", equipped with male quick disconnects)

| Features | Model HTB-50-E | Model HTB-100-E | Model HTB-150-E |
|--|---|--|--|
| Speed Range in either direction | 200 to 2400 rpm | 200 to 2400 rpm | 200 to 2400 rpm |
| Power Available for testing pumps Expressed torque | 275 ft-lbs to 1200 rpm | 458 ft-lbs to 1200 rpm (decreasing proportionately to 2400 rpm) | 670 ft-lbs to 1200 rpm |
| Expressed in horsepower | 60 hp at 1200 rpm | 115 hp at 1200 rpm (with constant hp to 2400 rpm) | 150 hp at 1200 rpm |
| Test Pressure | 0 to 5000 psi (345 bar) | 0 to 5000 psi (345 bar) | 0 to 5000 psi (345 bar) |
| Test Motor Load Maximum in either direction | 275 ft-lbs (373 Nm) | 458 ft-lbs (621 Nm) | 670 ft-lbs (908 Nm) |
| Electrical Drive Motor-230/460V, 1800 rpm; 3 phase, 60 hertz (A start-stop push button is mounted on the bench: Starter(s) is/are not included. Customer must advise type of starter(s) and service voltage he will use.) | 50 hp | 100 hp | 100 hp and 50 hp |
| Hydraulics Main Bench Pump (variable piston) | 23 gpm/5000 psi (87 L/min/345 bar) | 38 gpm/5000 psi (144 L/min/345 bar) | 38 gpm/5000 psi (144 L/min/345 bar) |
| Auxiliary Main Pump (variable piston) | N/A | N/A | 23 gpm/5000 psi (87 L/min/345 bar) |
| Supplemental Pump | 20 gpm/2000 psi (76 L/min/138 bar) | 20 gpm/2000 psi (76 L/min/138 bar) | 20 gpm/2000 psi (76 L/min/138 bar) |
| Pressure and Return Ports | 1" quick disconnects | 1" quick disconnects | 1" quick disconnects |
| Suction Porting | 1" & 2" quick disconnects | 1" & 2" quick disconnects | 1" & 2" quick disconnects |
| Flow Gauge Scales | Three | Scales: 2 to 14; 8 to 36; 24 to 100 | gpm (all models) |
| Reservoir Capacity | 100 gallons (378 L) | 100 gallons (378 L) | 200 gallons (757 L) |
| General | Full flow 3 micron filtration maintains excellent system cleanliness level; bench includes 30" x 30" work pan, oil level gauge, fill cap mesh strainer, digital tachometer. | | |
| Bench Dimensions and Weight | 62" H x 76" L x 43" W 4100 lbs (1860 kg) | 62" H x 76" L x 43" W 4500 lbs (2041 kg) | 62" H x 76" L x 55" W 6000 lbs (2722 kg) Auxiliary Power Unit 30" H x 50" L x 30" W 900 lbs (408 kg) |

Notes



REPLACEMENT ELEMENTS

Replacement Elements Each of our hydraulic filtration systems are equipped with high efficiency elements to remove solid particulates and/or water quickly and efficiently. A complete listing of the replacement elements used through-out the Filter Systems catalog can be found on the following pages.

REPLACEMENT ELEMENTS

Pressure Elements

Used in OFS Series, OFCS & OFCD Series, OFAS & OFAD Series, OF5HS & OFCD-HV Series, and OFX Skid - Standard Capacity Series

| 9 inch El | 9 inch Elements | | lements | 27 inch E | lements |
|------------------------------|-----------------|-----------------|----------|-----------------|----------|
| Model Code | Part No. | Model Code | Part No. | Model Code | Part No. |
| 5.03.09D03BN | 02060528 | 5.03.18D03BN | 02060430 | 5.03.27D03BN | 02065003 |
| 5.03.09D03BN/-V | 02056713 | 5.03.18D03BN/-V | 02071680 | 5.03.27D03BN/-V | 02082855 |
| 5.03.09D05BN | 02060529 | 5.03.18D05BN | 02060431 | 5.03.27D05BN | 02065004 |
| 5.03.09D05BN/-V | 02056714 | 5.03.18D05BN/-V | 02056457 | 5.03.27D05BN/-V | 02073488 |
| 5.03.09D10BN | 02060530 | 5.03.18D10BN | 02060432 | 5.03.27D10BN | 02065005 |
| 5.03.09D10BN/-V | 1278599 | 5.03.18D10BN/-V | 02056492 | 5.03.27D10BN/-V | 02056493 |
| 5.03.09D20BN | 02060531 | 5.03.18D20BN | 02060433 | 5.03.27D20BN | 02065006 |
| 5.03.09D20BN/-V | 1294016 | 5.03.18D20BN/-V | 02072428 | 5.03.27D20BN/-V | 02096052 |
| 5.03.09D40AM | 02075265 | 5.03.18D40AM | 02091879 | 5.03.27D40AM | 02088358 |
| - | _ | - | _ | 5.03.27D40AM/-V | 02088359 |
| - | - | - | - | - | — |
| 5.03.09D10BN/AM | 02075258 | - | _ | - | _ |
| 5.03.09D40AM/-V | 02561740 | - | _ | - | — |
| HK/HJ (connector element) | 7630900 | - | - | - | _ |

Element Performance

| Micron Rating | Filtration Rating per ISO 4572/NFPA T3.10.8.8 Using automated particle counter (APC) calibrated per ISO 4402 | | wrt ISC | calibrated | |
|------------------|---|--------|---------|------------|---------|
| Element | Bx≥75 | Bx≥100 | Bx≥200 | Bx≥200 | Bx≥1000 |
| 5 | 2.5 | 3.0 | 4.0 | 4.8 | 6.3 |
| 10 | 7.4 | 8.2 | 10.0 | 8.0 | 10.0 |
| 25 | 18.0 | 20.0 | 22.5 | 19.0 | 24.0 |

Dirt Holding Capacity

| 9" Element Micron Rating | DHC(gm) | 18" Element Micron Rating | DHC(gm) |
|-----------------------------|---------|------------------------------|---------|
| 5 | 119 | 5 | 238 |
| 10 | 108 | 10 | 216 |
| 25 | 93 | 25 | 186 |

Used in OFCD-MV Series, OFS-AM Series, OF5HD-HV Series, MAFH-E Series

| 18 inch | Element | 27 inch El | ement |
|-------------------|----------|-------------------|----------|
| Model Code | Part No. | Model Code | Part No. |
| 5.03.18D03BN/-V-G | 02094523 | 5.03.27D03BN/-V-G | 02098195 |
| 5.03.18D05BN/-V-G | 02094528 | 5.03.27D05BN/-V-G | 02200583 |
| 5.03.18D10BN/-V-G | 02094529 | 5.03.27D10BN/-V-G | 02200584 |
| 5.03.18D20BN/-V-G | 02098097 | 5.03.27D20BN/-V-G | 02200585 |
| 5.03.18D10AM/-V-G | 02097600 | 5.03.27D40AM/-V-G | 02098194 |

Note: G = Betamicron GeoSeal® (r) replacement elements

Element Performance

| Micron Rating | Filtration Rating per ISO 4572/NFPA T3.10.8.8 Using automated particle counter (APC) calibrated per ISO 4402 | | | wrt ISC | n Rating) 16889 Calibrated D 11171 |
|------------------|---|--------|--------|---------|--|
| Element | Bx≥75 | Bx≥100 | Bx≥200 | Bx≥200 | Bx≥1000 |
| 3 | <1.0 | <1.0 | <2.0 | 4.0 | 4.8 |
| 5 | 2.5 | 3.0 | 4.0 | 4.8 | 6.3 |
| 10 | 7.4 | 8.2 | 10 | 8.0 | 10.0 |

Dirt Holding Capacity

| 18" Element Micron Rating | DHC(gm) | 27" Element Micron Rating | DHC(gm) |
|------------------------------|---------|------------------------------|---------|
| 3 | 230 | 3 | 345 |
| 5 | 238 | 5 | 357 |
| 10 | 216 | 10 | 324 |

E2 HYDAC

REPLACEMENT ELEMENTS

Used in OFX Skid - High Capacity Series

| 16 inch Element | | 39 inch El | ement |
|-----------------|----------|-----------------|----------|
| Model Code | Part No. | Model Code | Part No. |
| 1.14.16D03BN | 1252836 | 1.14.39D03BN | 1252840 |
| 1.14.16D03BN/-V | 1252837 | 1.14.39D03BN/-V | 1252841 |
| 1.14.16D06BN | 1252838 | 1.14.39D06BN | 1253294 |
| 1.14.16D06BN/-V | 7602185 | 1.14.39D06BN/-V | 2094525 |
| 1.14.16D12BN | 1253292 | 1.14.39D12BN | 1253295 |
| 1.14.16D12BN/-V | C/F | 1.14.39D12BN/-V | 02071197 |
| 1.14.16D25BN | 1253293 | 1.14.39D25BN | 1253384 |
| 1.14.16D25BN/-V | 1252839 | 1.14.39D25BN/-V | C/F |

Used in MAFH-A Series

| Model Code | Part No. |
|-----------------------------|----------|
| 5.12.09D10BN/-V | 02561354 |
| 5.12.09B03BN/-V | 02093367 |
| 5.12.09B05BN/-V | 02091885 |
| Breather Element (Shrouded) | 02561357 |
| Breather Element (Cart) | 1296639 |

Element Performance

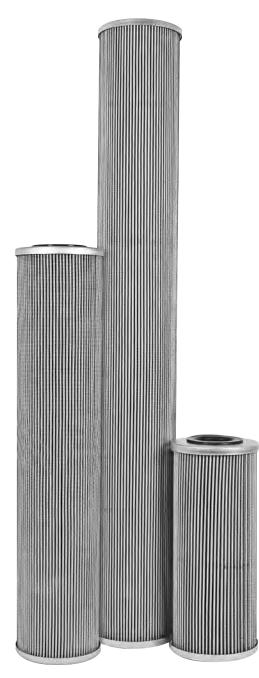
| Micron Rating | Filter Rating | DHC (gm) |
|---------------|----------------|----------|
| 1 | β 4.2(c) ≥1000 | 55 |
| 3 | β 4.8(c) ≥1000 | 57 |
| 5 | ß 6.3(c) ≥1000 | 62 |
| 10 | ß 10(c) ≥1000 | 52 |

Used in IXU 1/4 Series

| Model Code | Part No. |
|------------------------|----------|
| IXE 200 | 03348961 |
| 5.03.18D05BN/V SO103H | 02077497 |
| 5.03.18D10BN/-V SO103H | 02056369 |

Used in OFCD-BC Series, OF7-BC Series

| Model Code | Part No. |
|--------------------|----------|
| ELEMENT OFCDBC 003 | 02099361 |
| ELEMENT OFCDBC 005 | 02099362 |
| ELEMENT OFCDBC 010 | 02099363 |
| ELEMENT OFCDBC 020 | 02099364 |
| ELEMENT OFCDBC AM | 02099365 |



REPLACEMENT ELEMENTS **Dimicron[®] Elements**

Used in OLF Series & FAMH Series

| Micron Rating | Part No. |
|---------------|---------------|
| 2 | 01251590 |
| 10 | 03115180 |
| 20 | 00349576 |
| 30 | 03048790 |
| | 2 10 20 |

Be sure to order the correct number of elements:

OLF 15 = 1, OLF 30 = 2, OLF 45 = 3, OLF 60 = 4

Cartridge Elements

Used in FAM5 & OLF Compact Series

| Model Code | Micron Rating | Media Type | Part No. |
|------------|---------------|-------------|----------|
| N5DM002* | 2 | Dimicron® | 00349494 |
| N5DM005* | 5 | Dimicron® | 03068101 |
| N5DM010* | 10 | Dimicron® | 03102924 |
| N5DM020* | 20 | Dimicron® | 03023508 |
| N5AM002* | 2 | Aquamicron® | 00349677 |
| N5AM020* | 20 | Aquamicron® | 03040345 |

*Cartridge element can not be used with OLF 5/4-SP

Aquamicron[®] (AM) Elements

Aquamicron® filter elements are specially designed to separate water from mineral oils. They are only supplied in the dimensions of HYDAC return line filter elements from size 330 and larger. This means that they can be installed in all HYDAC filter housings from size 330 which are fitted with return line filter elements.

The increasing pressure loss in a filter element which is being saturated with water indicates, by means of standard clogging indicators, that it is time to change the element. When the Aquamicron® technique is employed, particle contaminants are also separated from the hydraulic medium as a by-product. This means that the Aquamicron® element doubles as a safety filter. The "filtration rating" is 40 μ m absolute (B40 \ge 100 to $\Delta p = 43.5$ psi / 3 bar).

In order to guarantee the greatest efficiency, it is recommended that these elements be installed in an off-line recirculation loop configuration.

For complete details please contact your HYDAC distributor.



Betamicron[®]/Aquamicron[®] (BN/AM) Elements

BN/AM filter elements are specifically designed to absorb water and achieve absolute filtration of solid particles from mineral oils, HFD-R oils, and rapidly biodegradable oils. A super absorber reacts with the water present in the fluid and expands to form a gel from which the water can no longer be extracted even by increasing the system pressure. These filter elements do not remove dissolved water below the saturation level of the hydraulic medium. Solid particle filtration (3 µm, 10 µm absolute) is achieved due to the Betamicron® filter construction.

For complete details please contact your HYDAC distributor.

Betterfit® Interchange Elements

HYDAC's family of interchange elements has a new name and a new focus. The former Betafit line will now be called Betterfit, and will incorporate an exclusive outer wrap that not only improves performance, but also provides quality protection. It features a unique oval-hole design that improves flow for more efficient filtration, ensuring long system life and cost savings. This is a one-of-a-kind oval design, so you can be assured that when your element includes this outer wrap that it is a HYDAC original and not a low quality imitation.







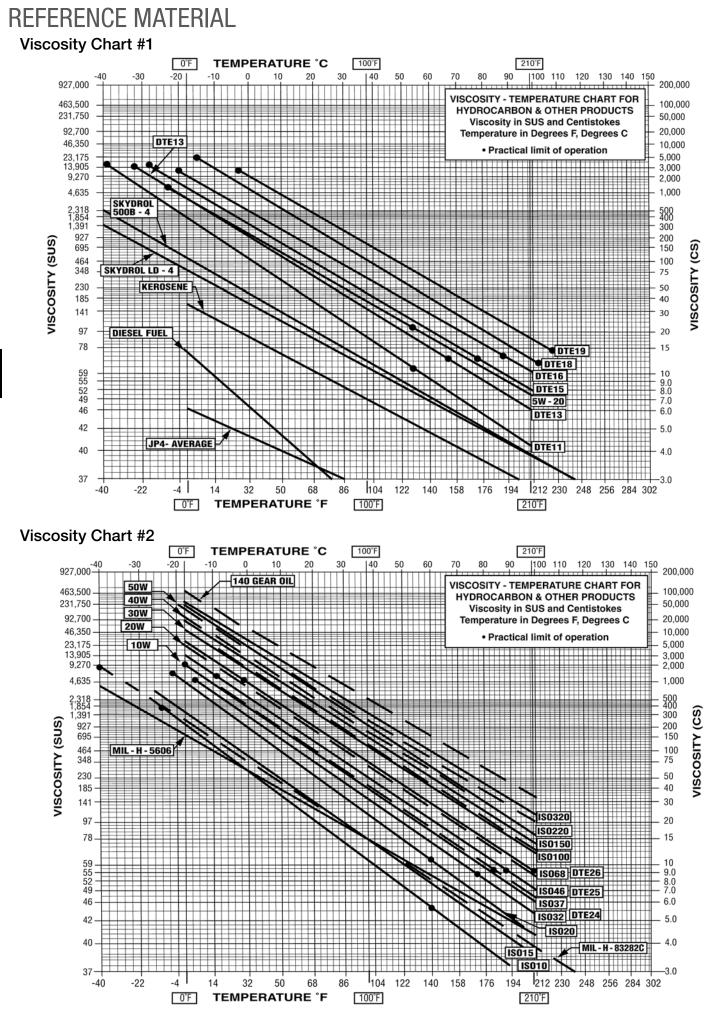




E4 (HYDAC)

REFERENCE MATERIAL

Reference Material A quick reference of information and conversion charts to help guide you through this catalog.



F2 **HYDAC**

Ordering HYDAC Literature...

HYDAC literature is available for ordering.

Email us at HYD.catalog@hydac-na.com using the appropriate Part Number (PN) and name. Other brochures, manuals and technical documents are also available when ordering from our website.

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