HYDAC INTERNATIONAL

Filter Systems

Fluid Condition Monitoring & Control

PN#02075860 / 05.21 / FSP2105-2273

HYDAC

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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Section:

HYDAC

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NOTE

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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

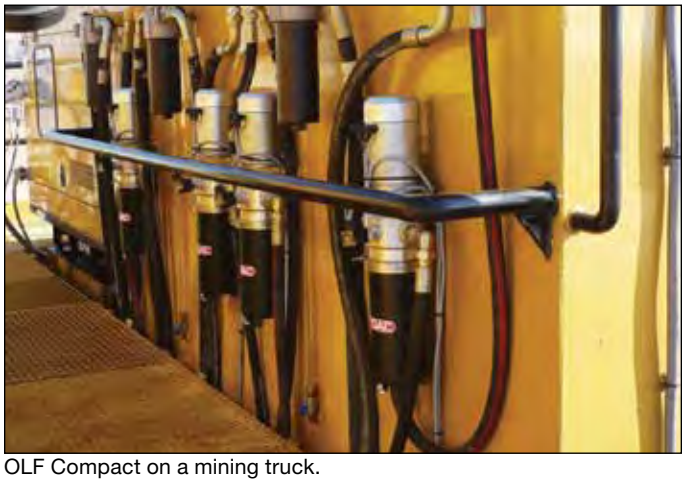
Finally, use reliable methods for continuous monitoring of the fluid conditions including:

- 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.

OFS Filtration Station with HPU.



OLF Compact on a mining truck.

Microscope with camera attached to a monitor

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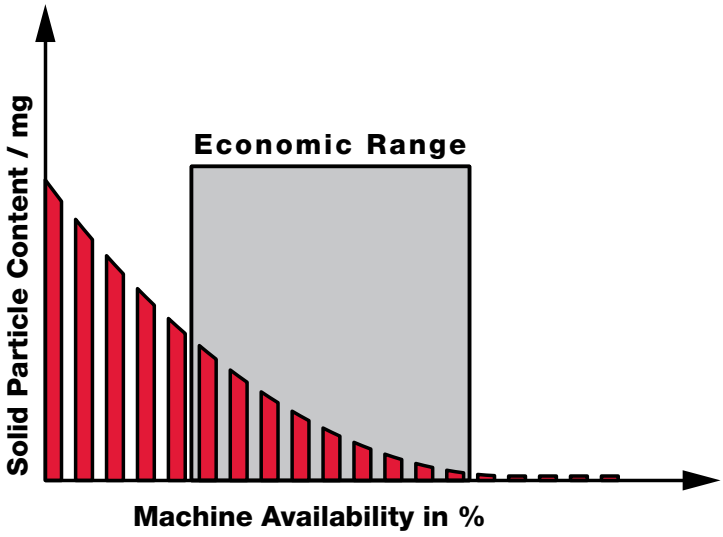
Savings Realized by Proper Contamination Control

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.



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 $\frac{(100 - c)}{100}$ 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)

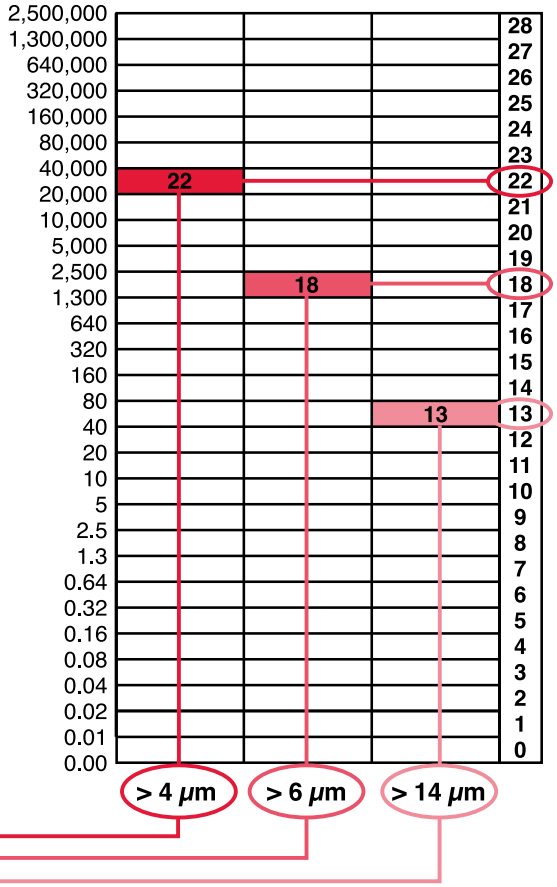
ISO 4406 Code

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, & 14µm) 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 4µm = 22,340
larger than 6µm = 1,950
larger than 14µm = 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

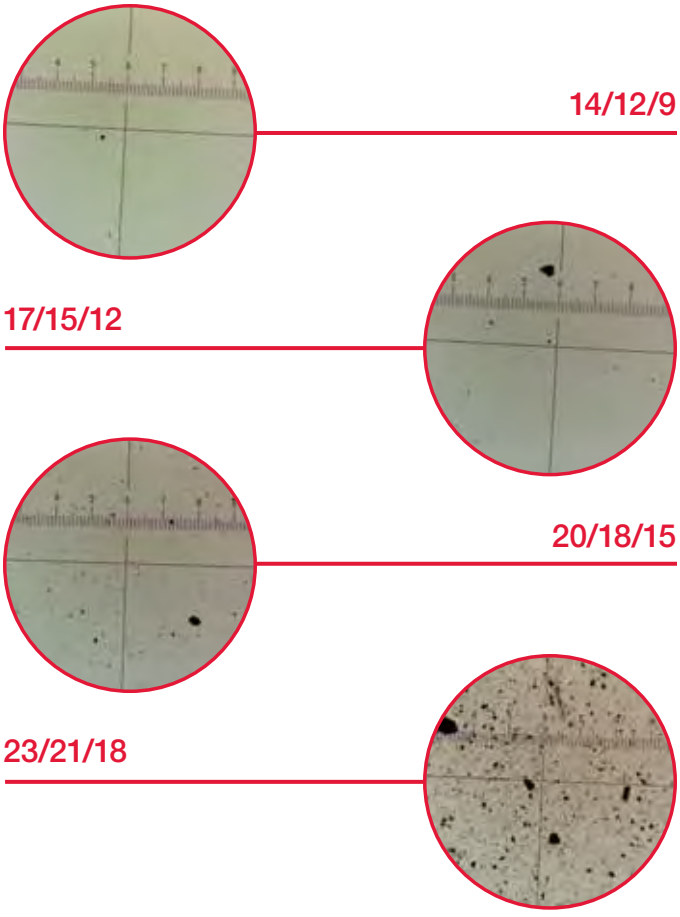
- Pressure filters
- Return line filters
- Offline filtration loops
- Oil transfer units for precleaning of new oil
- Portable and online contamination monitors
- Reservoir breathers and filler/breathers

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



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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/Medium Pressure Under 2000 psi (moderate conditions)		High Pressure 2000 to 2999 psi (low/medium with severe conditions[1])		Very High Pressure 3000 psi and over (high pressure with severe conditions[1])	
	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

Notes

B

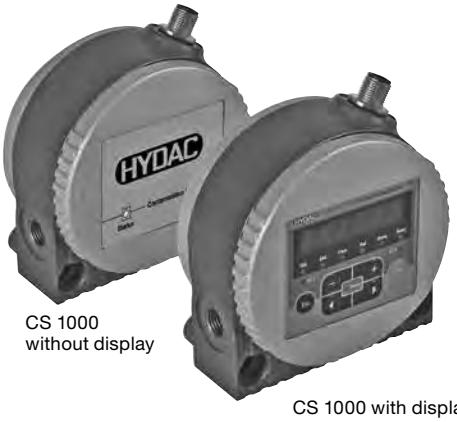
Contamination Management

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.

CS 1000 Series

Contamination Sensor

CS 1000 with Block Kit



CS 1000
without display

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

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	+/- ½ 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.

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Model Code

CS 1 2 2 0 - A - 0 - 0 - 0 - 0 / - 000

Series
CS = Contamination Sensor

Resolution
1 = 4 Particle Size Channels

Indicator Code
2 = ISO 4406 : 1999; SAE AS 4059 (D)
>4 µm(c) >6 µm(c) >14 µm(c) >21 µm(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
1 = without Display
2 = with Display *(270° rotation of display)*

Fluids
0 = Hydraulic/Mineral oil
1 = Phosphate Esters

Analog Interfaces
A = 4 to 20 mA
B = 2 to 10 V

Switching Output
0 = Limit Switching Output

Digital Interfaces
0 = RS485

Electrical Connection
0 = Plug M12x1, 8-pole *(connection cable not included)*

Mounting
0 = Inline version
1 = Flanged version

Modification Number
000 = standard
K = CS Block Kit without 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
- Operation and Instruction manual
- Calibration Certificate
- 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

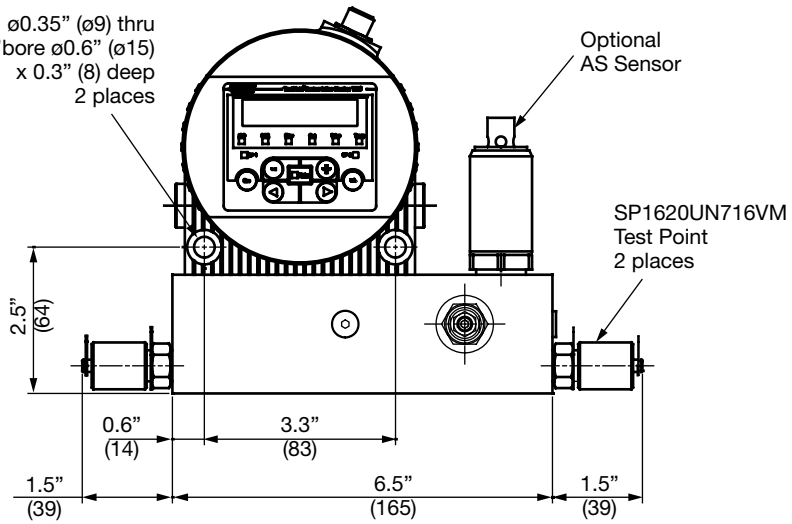
The Contamination Sensor Block KIT *(CS 1000 Block KIT)* combines two condition monitoring products, the CS 1000 series *(Contamination Sensor)* and the AS 1000 series *(Aqua Sensor)* into one plug and play unit. It serves as an on-line measurement of solid contamination and water in hydraulic and lube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

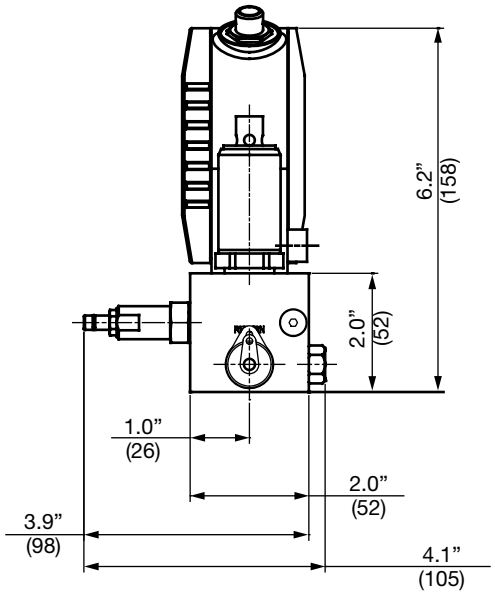
Note: Flow control is necessary when utilizing the CS 1000 sensor. Flow must be maintained through the sensor module to ensure accurate readings. Utilization of the CS Block Kit is required to maintain Sensor flow rate range as described in the Technical Specifications *(at the left)*.

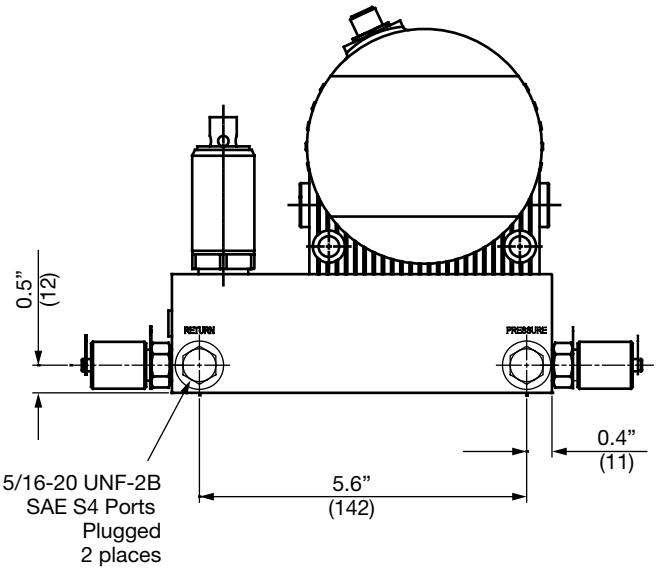
Quick Order Guide

Model Code	Part Number	Description
CS1220-A-0-0-0-0 /-000	03236362	4-20mA display model
CS1210-A-0-0-0-0 /-000	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

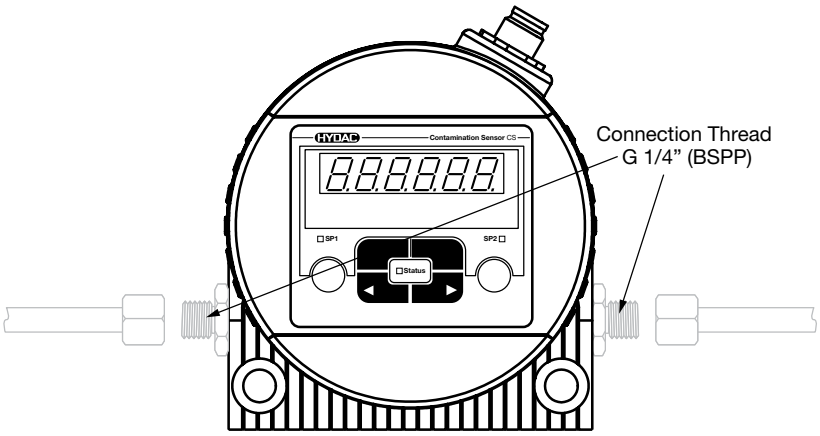


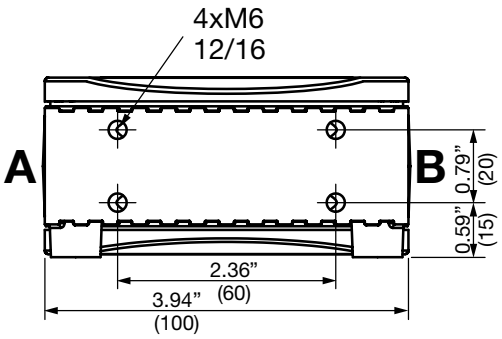




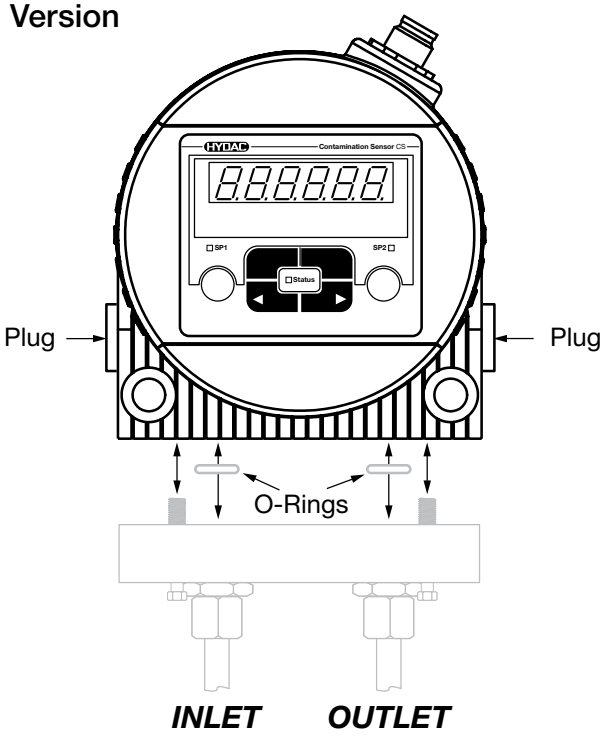
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

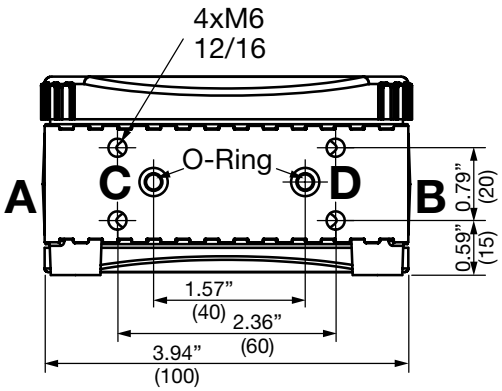
Hydraulic Connections
Inline Version



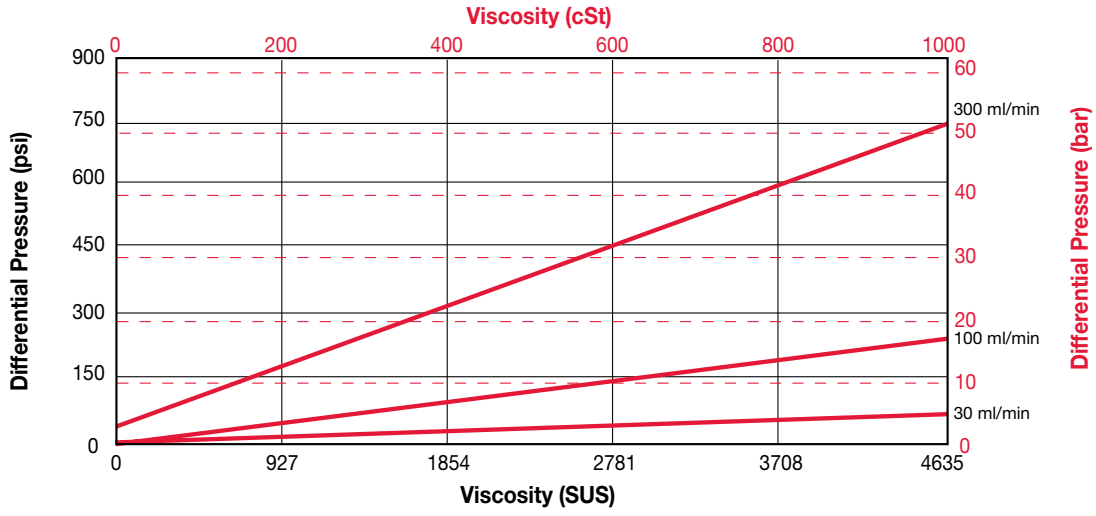


Flanged Version





Pressure - Viscosity Range



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

Input data	
HSI interface	HYDAC Sensor Interface (HSI) for the connection of two digital HSI SMART fluid sensors
Analog Interface	Sensor Interface for the connection of four analog sensors (type can be selected): – Current: 4 to 20 mA (ohmic resistance 500 Ω) 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	
Ethernet (ETH) 10 Base-T / 100 Base-TX	Protocol: – HSI TCP/IP (Port 49322) – Modbus® TCP (Port 502) – HTTP (port 80) – FTP (port 20/21) – SMTP (port 25) – MQTT – REST-API
W-LAN (HSI only) 2.4 GHz, IEEE 802.11 b/g/n	– HSI TCP/IP (port 49322)
RS485 (2 wire, half duplex)	– Modbus® RTU
Environmental conditions	
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 according to DIN 40050	IP 66
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)
Electrical connection	– Supply voltage: male connector, M12, 5-pin – HSI SMART sensor 1 and analog sensors 1–4: female connector, M12, 8-pin –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 data memory	
Size	64 MB
Measurement interval 60 s	> 1300 days (with CS1000 + HLB1400)
Measurement interval 60 min	> 83000 days (with CS1000 + HLB1400)

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Model Code

CSI C 11 0 0 0 / 000

Type
CSI = ConditionSensor Interface

Housing
C = Metal housing, compact

Signal output 1
11 = Ethernet (Modbus® TCP, HSI TCP/IP)
WLAN (HSI TCP/IP)

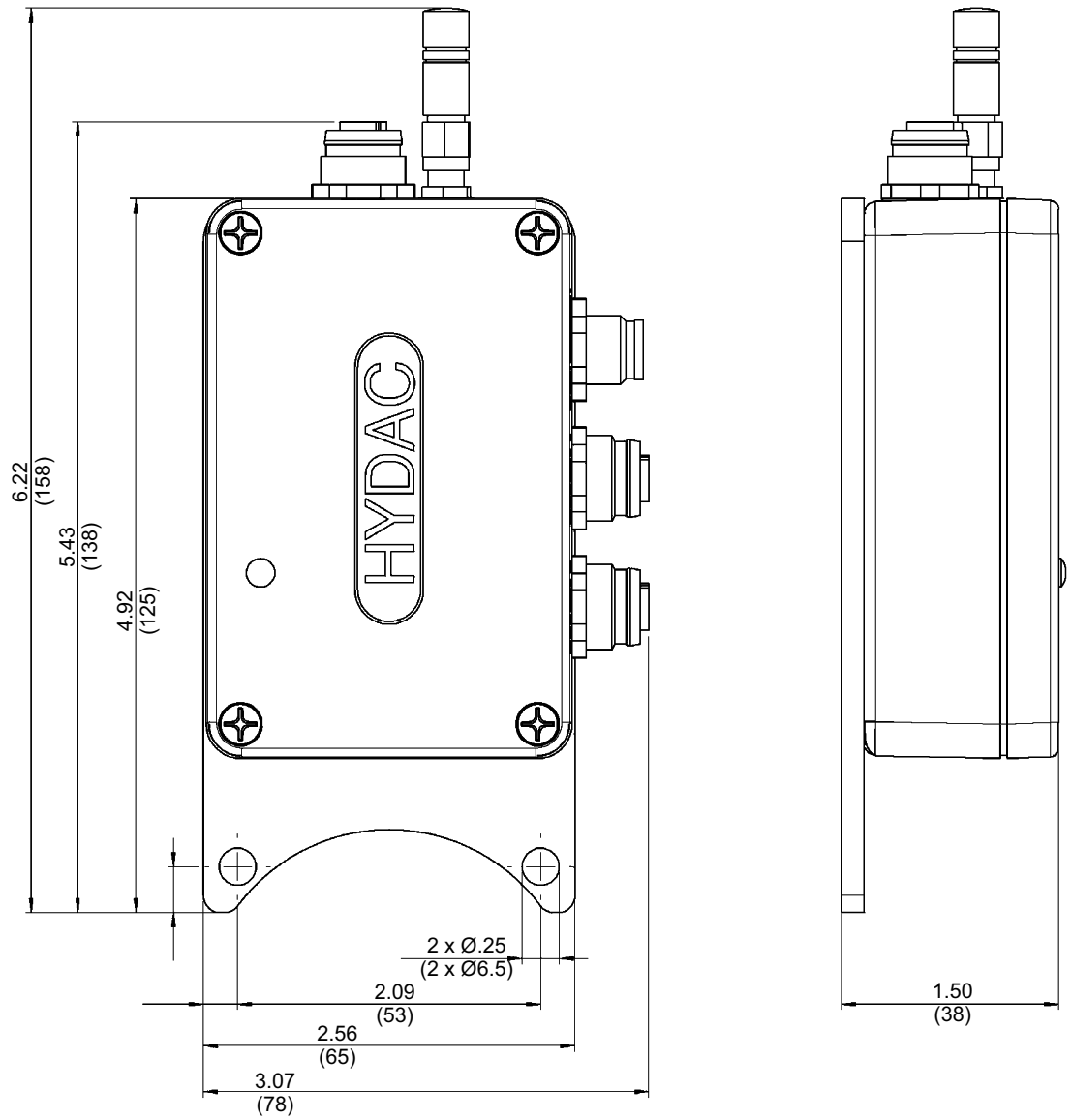
Signal output 2
0 = RS485 (Modbus® RTU)

Signal output 3
0 = none

Signal output 4
0 = 2 x HSI SMART
1 = 2 x HSI SMART and 4 x analog

Modification
000 = Standard

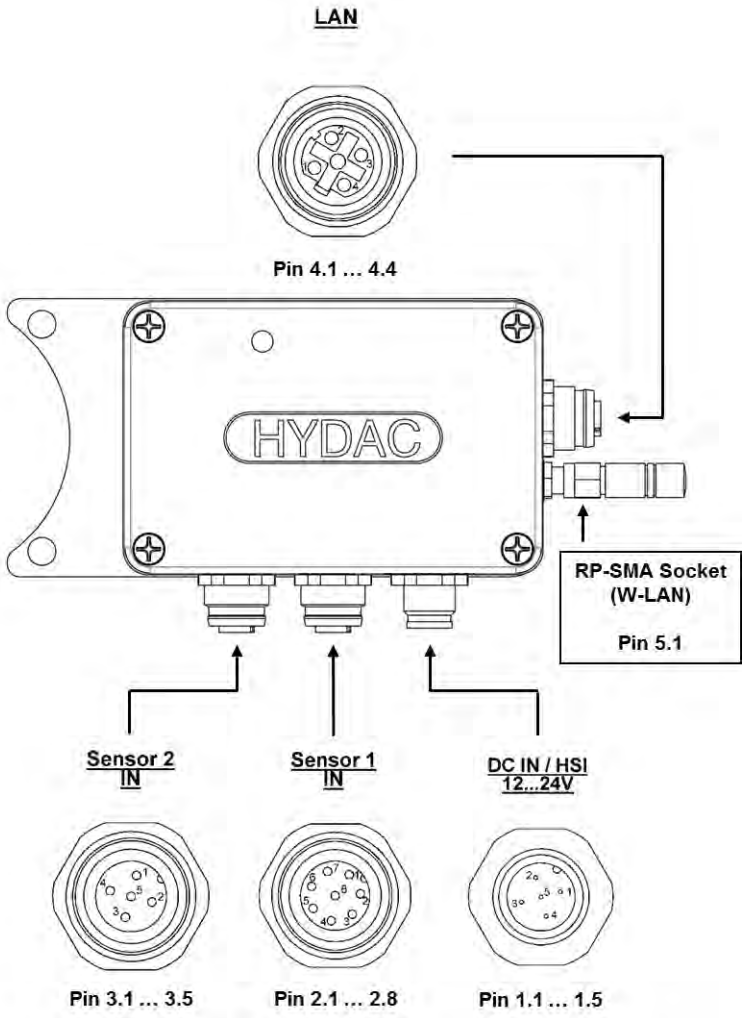
Dimensions



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



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

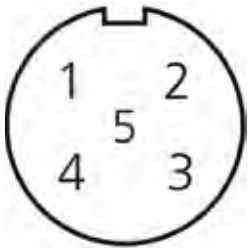
Connection adapter for additonal sensors	
ZBE CSI 60, sensor connection adapter, 4 x analog mating connector, 8-pin, cable length = 1 m	4420372

Preferred Models

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

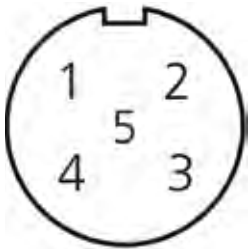
ZBE CSI 60 connection adapter – connection overview

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



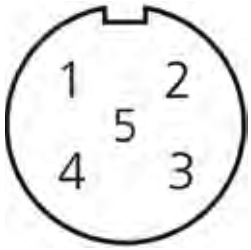
A1 / A2 – analog connection, 5-pin

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



A3 – analog connection, 5-pin

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

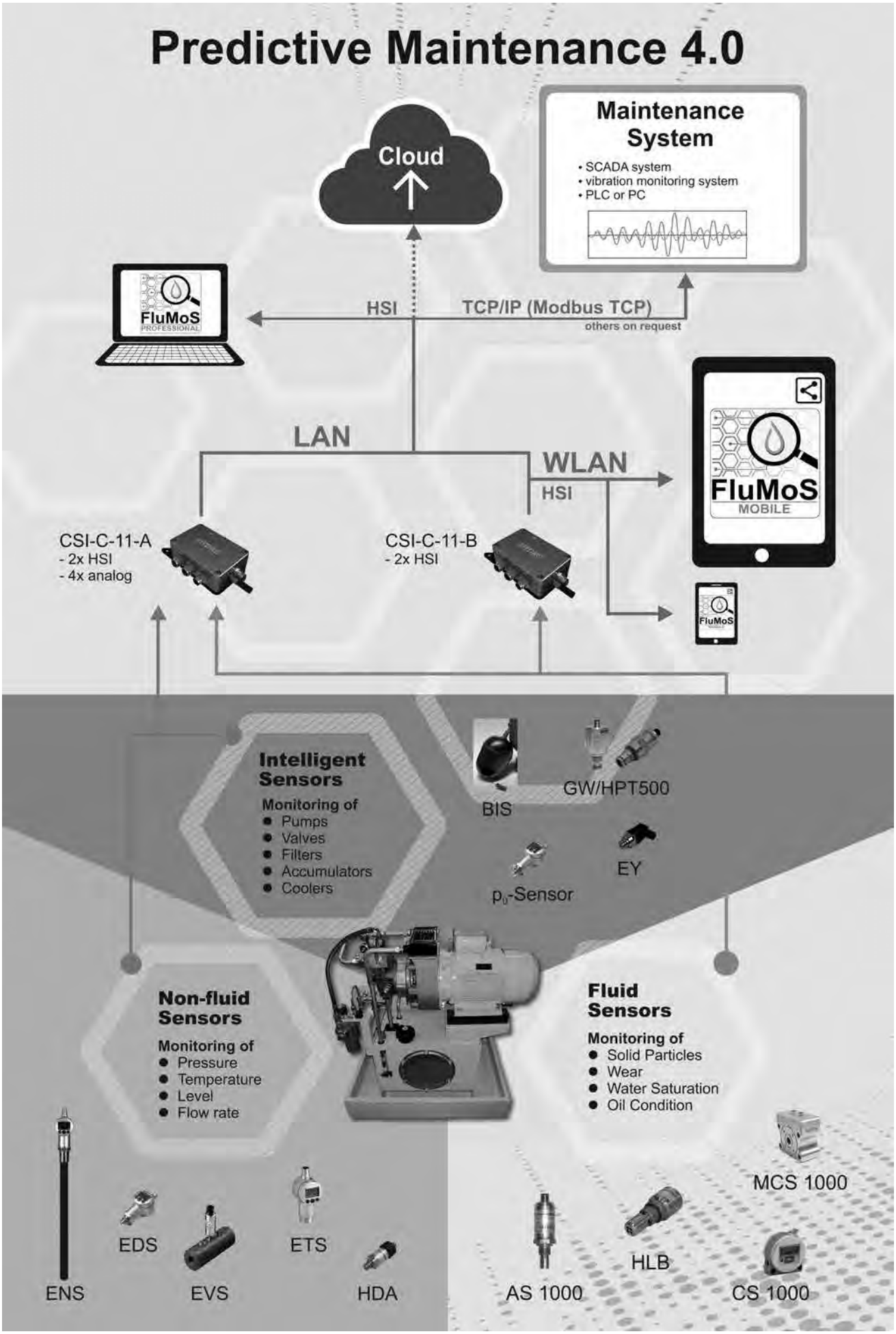


A4 – analog connection, 5-pin

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


Predictive Maintenance 4.0
Cloud
Maintenance System
• SCADA system
• vibration monitoring system
• PLC or PC
FluMoS PROFESSIONAL
HSI
TCP/IP (Modbus TCP)
others on request
LAN
WLAN
HSI
FluMoS MOBILE
CSI-C-11-A
- 2x HSI
- 4x analog
CSI-C-11-B
- 2x HSI
Intelligent Sensors
Monitoring of
Pumps
Valves
Filters
Accumulators
Coolers
BIS
GW/HPT500
EY
p_0-Sensor
Non-fluid Sensors
Monitoring of
Pressure
Temperature
Level
Flow rate
Fluid Sensors
Monitoring of
Solid Particles
Wear
Water Saturation
Oil Condition
ENS
EDS
EVS
ETS
HDA
AS 1000
HLB
MCS 1000
CS 1000

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

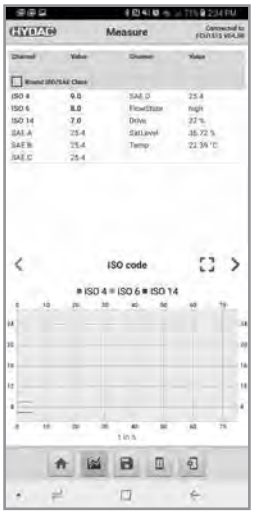
[possible with successor version]

- 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



PN#02075860 / 05.21 / FSP2105-2273

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 between 9/8/7 and 25/24/23 Calibration within the range ISO 13/11/10 to 23/21/18	
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 elastomer (FKM)	
Pump Speed	500-5000 RPM *(adjustable)*	
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%, Residual 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 output *(max burden 330 Ω)* 2 to 10v output *(min load resistor 820 Ω)* Limit switching output *(Power MOSFET)*: max current 1.5A	
CS1000 Contamination Monitor Signal Ouput Connections located on Control Enclosure	USB-B Female Port for use with Windows-based computer and FluMoS Software M12 8 pole, Male Port, Analog or Digital, for use with PLC or RS485 Communication, (4 - 20 mA is standard). 2 - 10 V is optional, must specify when ordering CS1000 Contamination Monitor	
Water Sensor (AS1008) Signal Output Connection	Water sensor (AS1008) M12-5 pole Signal Output 5 pole Male Port, located on Control Enclosure	
Electrical Safety Class	III *(low voltage protection)*	
Enclosure Ratings	IP 40 enclosure	
Weight and Dimensions		
Communications Module Control with CS1000 Sensor	Fluid Sampling Sys. Manifold w/ CS1000 & VSD Pump/Motor	HY-TRAX® Manual Control Module
	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)

PN#02075860 / 05.21 / FSP2105-2273

Model Code

HY - 12 2 0 _ - _ - _ - P -

Model
HY = HY-TRAX® System - Oils to 350cSt
(includes 100 micron mesh strainer and pressure gauge in manifold block)

ISO Code Preference
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 Options
2 = with display

Fluids
0 = Hydraulic/Mineral Oil

Analog Interfaces
(omit) = 4 - 20 mA *(Standard)*
S = 2 - 10V Analog Output

Water Sensor Option
(omit) = No Water Sensor *(None Standard)*
AS-D = with AS3008 Water Sensor

Control Options
(omit) = Manually Controlled - Panel with Rheostat flow control and signal output *(Standard)*

Power Options
(omit) = 24V DC *(Standard)*
P = 115V AC

Air Suppression Loop
(omit) = none
L = Looped hose and fittings

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

HY-HV Series

HY-TRAX® – High Viscosity Fluid Sampling System

Features and Benefits

- Provides local visibility to the fluid condition of critical systems.
- Integrated micro variable speed driven pump-motor provides optimal flow for accurate sensor readings in variable conditions
- The HY-TRAX® High Viscosity Fluid Sampling System allows a user to monitor fluid condition from a reservoir tank or a low-pressure 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

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.

PN#02075860 / 05.21 / FSP2105-2273

Model Code

HY-HV - 12 2 0 __ - __ - __ - P -

Model
HY-HV = HY-TRAX® High Viscosity System - Oils to 700cSt
(includes strainer and pressure gauge in manifold block)

ISO Code Preference
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 Options
2 = with display

Fluids
0 = Hydraulic/Mineral Oil

Analog Interfaces *(for CS1000)*
(omit) = 4 - 20 mA *(Standard)*
S = 2 - 10V Analog Output

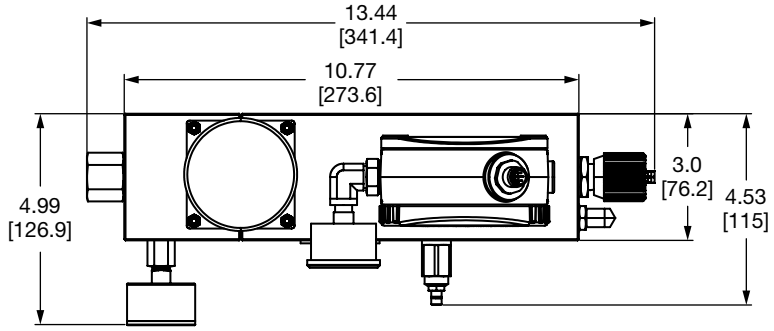
Option Sensors
(omit) = None *(Standard)*; plugged port for HLB1 or HLB2 option
AS-D = with AS3008 Water Sensor
AS = AquaSensor AS1008-C-000
AS-D = AquaSensor AS3008-5-000
HLB1 = HYDACLAB® HLB14J8-1C000-000
HLB2 = HYDACLAB® HLB14J8-00S12-000

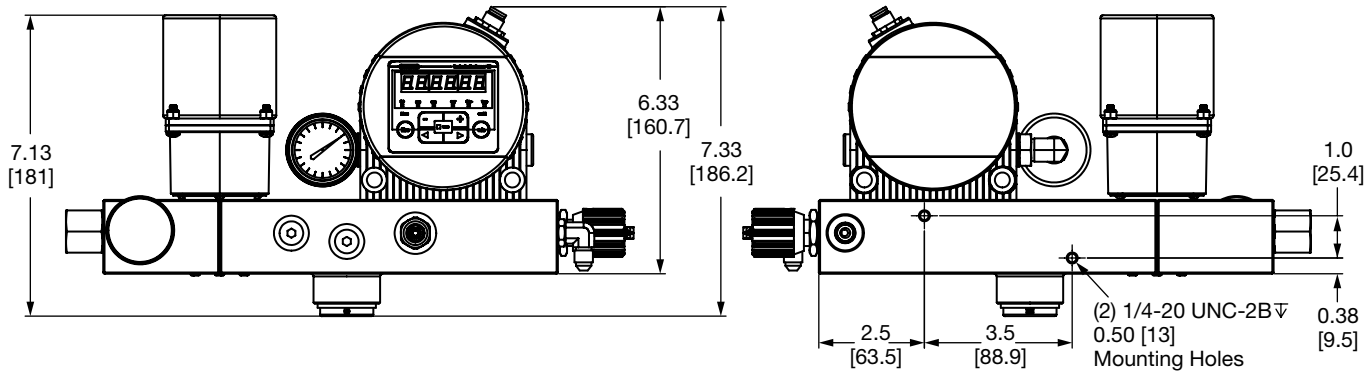
Control Options
(omit) = Manually Controlled - Panel with potentiometer-based flow control and signal output *(Standard)*

Power Options
(omit) = 24V DC w/ field-wireable female XLR connector *(Standard)*
P = 24V DC w/115V AC / 24V DC power supply with cable and plug

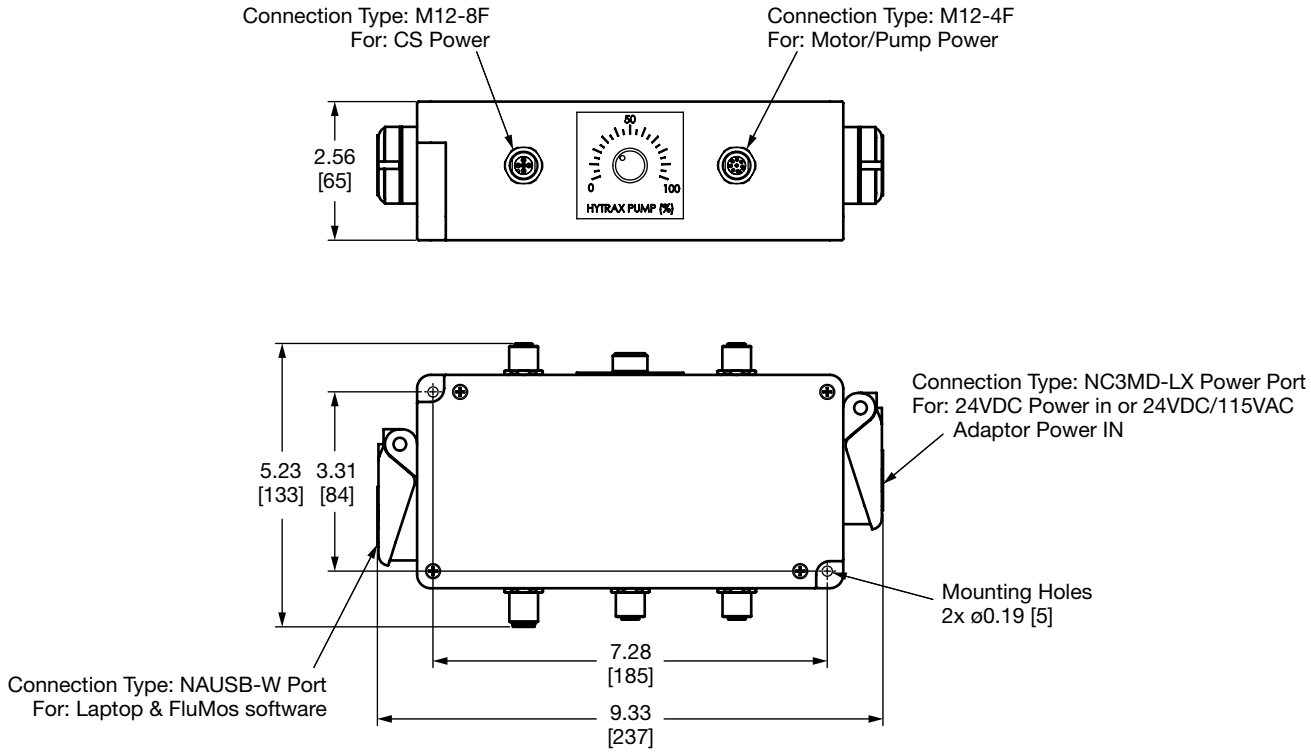
Air Suppression Loop
(omit) = none *(Standard)*
L = Air-suppression hose loop *(recommended)*

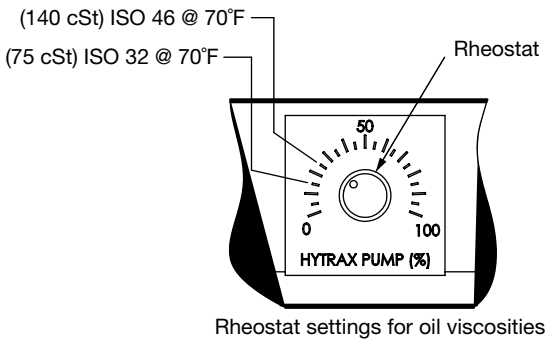
Dimensions
HY-HV-1220





Dimensions
Manual Control Box for HYTRAX





Rheostat settings for oil viscosities

Notes

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 pro-actively 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 between 25/24/23 and 9/8/7 Calibration within the range ISO 13/11/10 to 23/21/18	
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 indication via status LED	
Pressure Rating	50 psi (3.4 bar) max	
Fluid Inlet/Outlet	SAE ORB, Size 4	
Seal Material	Fluorocarbon elastomer (FKM)	
Pump Speed	500-5000 RPM (adjustable)	
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 Communication to monitoring website	
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)	

PN#02075860 / 05.21 / FSP2105-2273

Model Code

HY - 12 1 0 _ - _ - A - _ -

Model
- HY = HY-TRAX® System - Oils to 350cSt
  (includes 100 micron mesh strainer and pressure gauge in manifold block)

ISO Code Preference
- 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 Options
- 1 = without display
- 2 = with display

Fluids
- 0 = Hydraulic/Mineral Oil

Analog Interfaces
- (omit) = 4- 20 mA *(Standard)*

Water Sensor Option
- (omit) = No Water Sensor *(None Standard)*
- AS-D = with AS3008 Water Sensor

Control Options
- A = Telematic Communications Module with Dashboard Data Display *(GSM Cellular)*

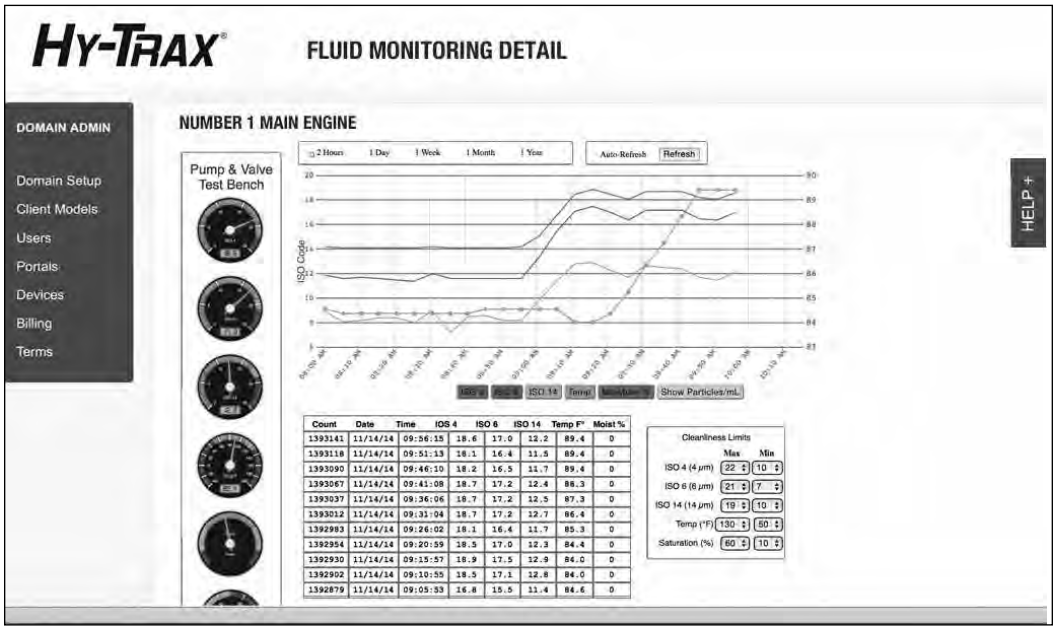
Power Options
- (omit) = 24V DC *(Standard)*
- P = 115V AC

Air Suppression Loop
- (omit) = none
- L = Looped hose and fittings

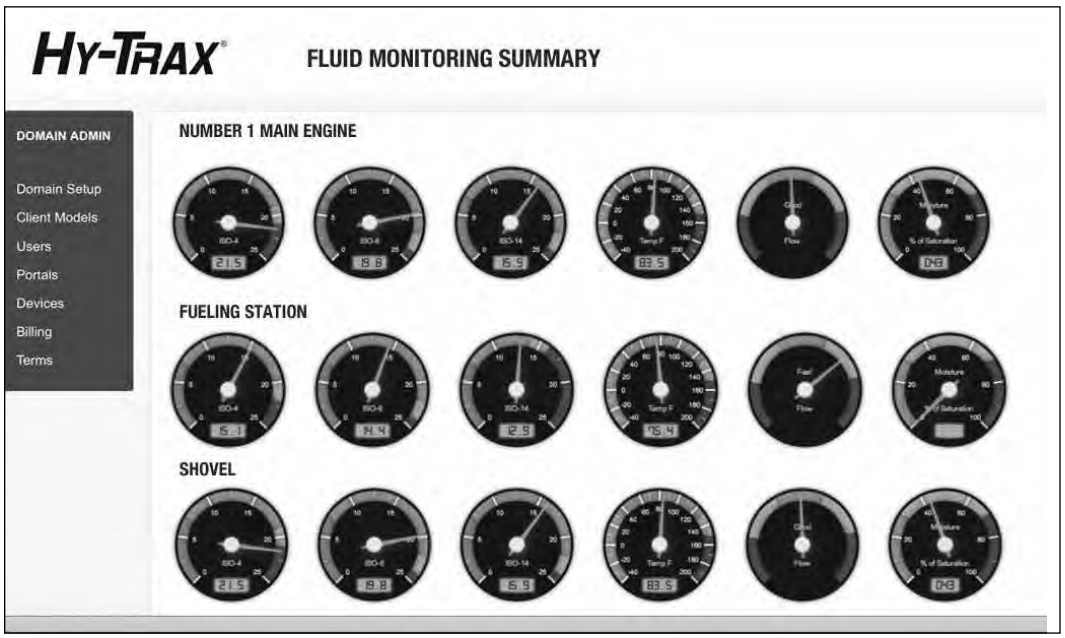
What's Included

- 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



Example of HY-TRAX® Communications Modules Dashboard Gauge Panel



Notes

FCU 1000 Series

Fluid Control Units - Portable Models

FCU1310

FCU 1315

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

Technical Specifications

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 / ≤ ± 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 ±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

FCU 1 3 1 0 - 4 - U - AS - 1

Series
FCU = Fluid Control Unit

Model
1 = 1000 Series, 4 particle size channels

Contamination Code
3 = ISO 4406:1987; NAS 1638 / 2-5 µm, 5-15 µm, 15-25 µm, > 25 µm
ISO 4406:1999; SAE AS 4059 (D) / > 4 µm(c)> 6 µm(c)> 14 µm(c)> 21 µm(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 Voltage
U = 24 V DC

Integrated Sensor
AS = AquaSensor *(AS 1000 series)*

Power Supply 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

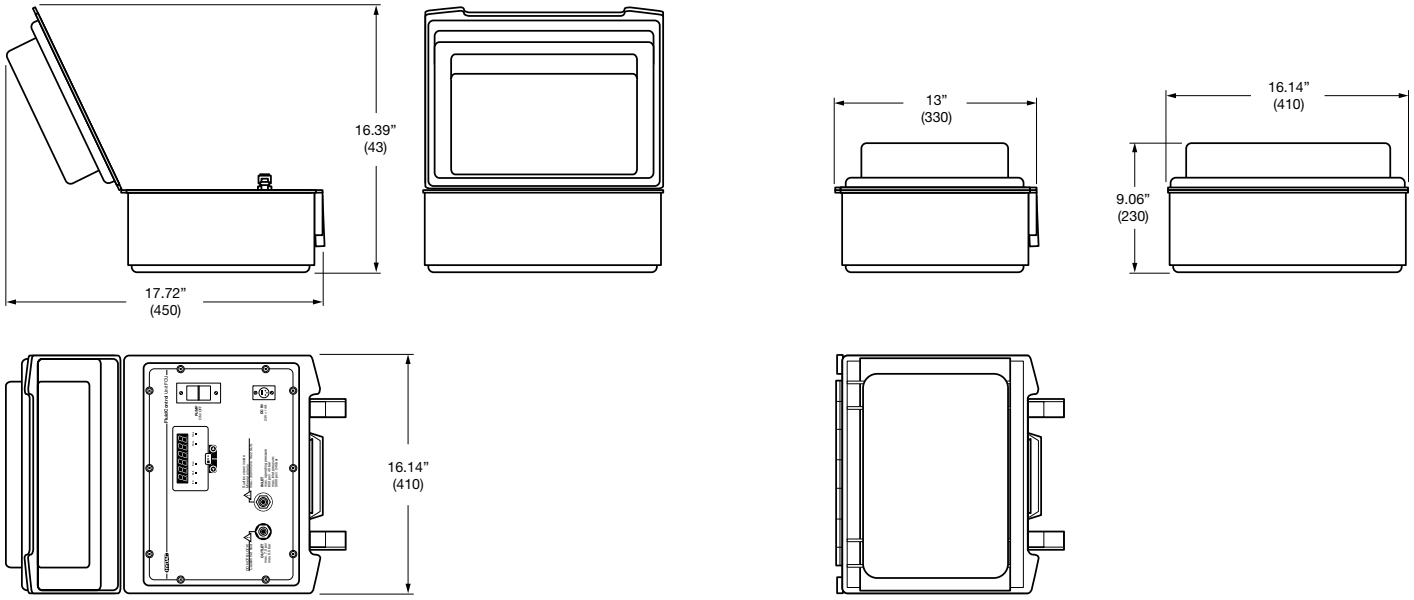
Scope of Delivery

- 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.

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
- Wind Power
- Off Road Mining & Construction
- Industrial Hydraulics
- 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 Frequency	12 months recommended
Hydraulic Data	
Operating Pressure	36.3 psi (2.5 bar) Max. (5075 psi [350 bar] w/ adapter for pressurized lines)
System Pressure	145 psi (10 bar) Max.
Permissible Viscosity Range	1-320 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
Duty Cycle	Continuous
Connections	1604 minimess test points, with 0.6m long 8mm tubing
Electrical Data	
Power Supply Voltage	115V AC
Nominal Battery Voltage	15.0V DC
Charge Voltage	16.8V DC
Charge Capacity	5.2Ah
Charge Time	2 hours (80%) / 5 hours (100%)
Run Time	Up to 6 hours (viscosity dependent)
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.

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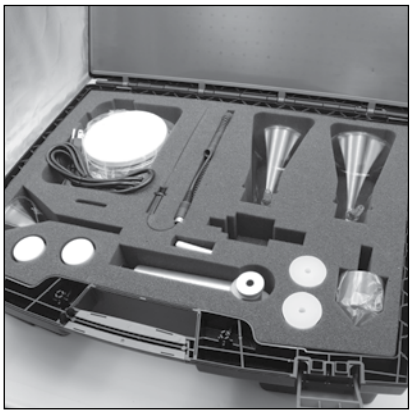
Model Selection

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

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
- Off Road Mining & Construction
- Industrial Hydraulics
- Steel Making
- Marine

Technical Specifications

General Data	
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 lbs. (12.0kg) (main device; accessory case: 19lbs. [8.6kg])
Calibration Verification Frequency	12 months recommended
Hydraulic Data	
Inlet Pressure	36.3 psi (2.5 bar) Max. (5075 psi [350 bar] w/ 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
Duty Cycle	Continuous
Connections	1604 minimess test points, with 0.6m long 8mm tubing
Electrical Data	
Power Supply Voltage	115V AC
Nominal Battery Voltage	15.0V DC
Charge Voltage	16.8V DC
Charge Capacity	5.2Ah
Charge Time	2 hours (80%) / 5 hours (100%)
Run Time	Up to 6 hours (viscosity dependent)
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.

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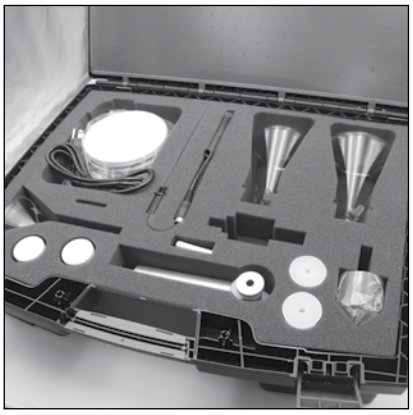
Model Selection

Total Fluid Health



Accessory Kit
Included with Total Fluid Health

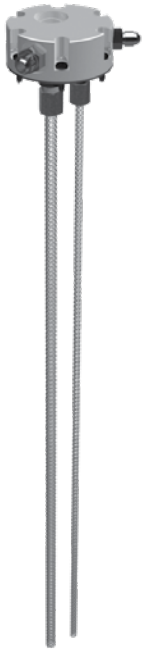
High Pressure Adapter
Sold Separately

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

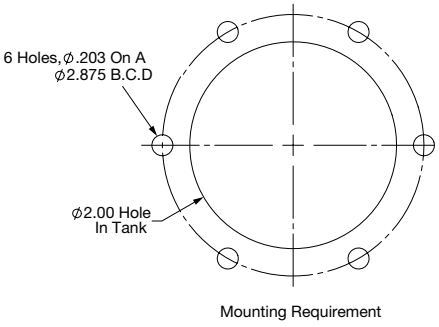
Technical Specifications

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 ¼" return tubes. Tubes are 24" long and can be shortened if necessary. Housing constructed 6061 anodized aluminum.

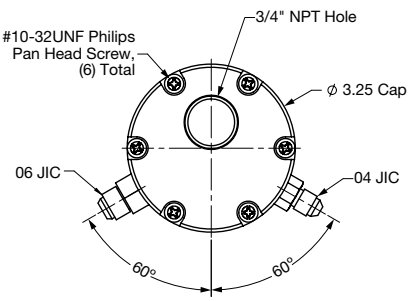
Mounting Pattern

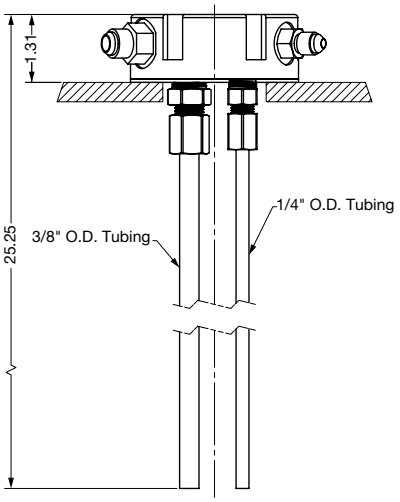
Customer is responsible to cut an appropriately sized hole on top of their tank. This adapter has two (2) ports: one for Suction and one for Return. Also includes a breather port.

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



Mounting Requirement





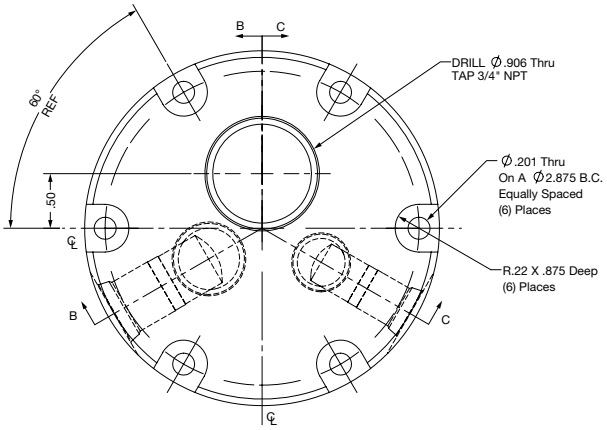
Model Code

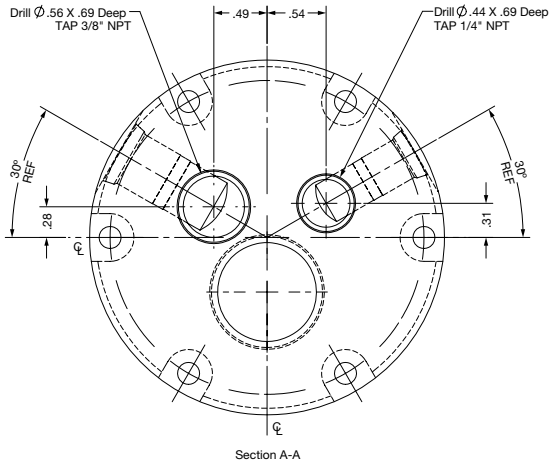
RBSA – 1

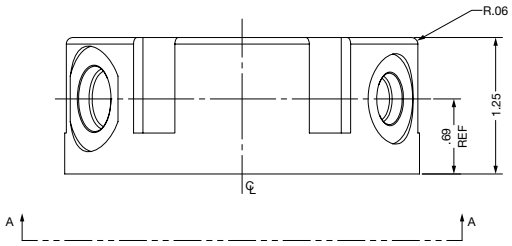
Series
RBSA = Reservoir Breather Fluid Sampling Adapter

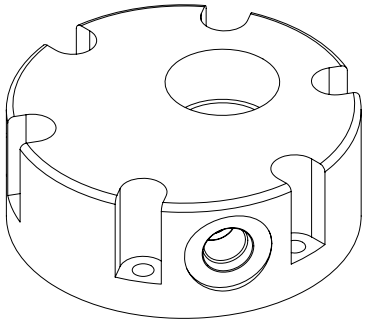
Options
1 = HY-TRAX® adapter fitting #6 & #4 JIC fittings and 6' supply/return hoses
2 = FCU1310 adapter (suction hose included)

Application Example

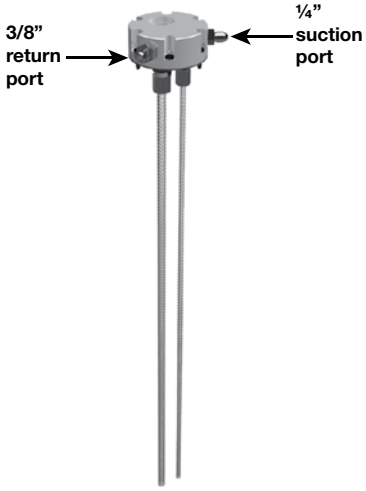


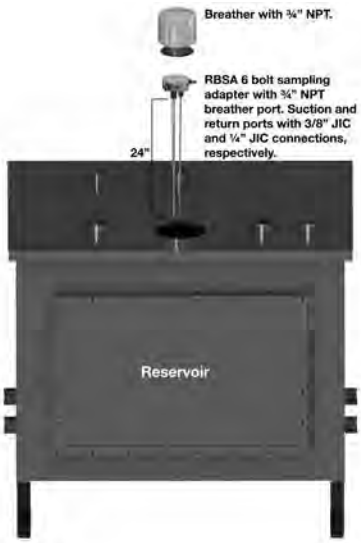


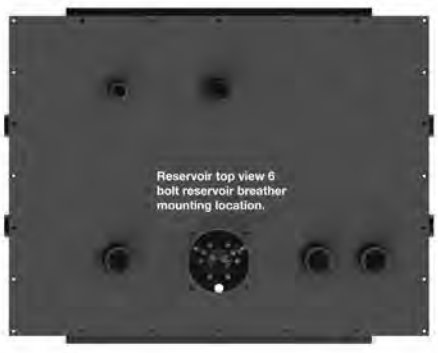




Mounting Views







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 condition-based 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 condition-based monitoring devices such as vibration monitoring systems

Applications

- Wind Turbines
- Marine Thrusters
- Industrial Gear Boxes
- Mobile Drive Systems
- Lubrication Systems
- Flushing 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 equivalent to that of a sphere of given ø)			
Particle classification	Size classification in accordance with ISO 16232 *(6 size classes; 3 Fe, 3 nFe; class assignment depends on sensor section)*		
Max. particle rate *(ptcl/sec.; proprotional to flow rate)*	8 to 160	9 to 180	0 to 200

Technical Specifications *(cont'd)*

Hydraulic Data	MCS 15xx	MCS 14xx	MCS 13xx
Flow rate	10-200 l/min	2-40 l/min	0.4 to 8 l/min
Operating pressure	Maximum 20 bar		
Fluid temperature range	-40 to 185°F (-40 to 85°C)		
Permissible fluids	Hydraulic and lubrication fluids based on mineral oil as well as synthetic oils *(e.g. poly-α-olefins – PAO)*		
Inlet / Outlet *(flange connection according to ISO 6162-1)*	SAE 1" SAE 1½" SAE 2" SAE 4"	SAE ¾"	SAE ½"
Electrical Data			
Supply voltage	18 to 36 V DC, residual ripple < 10%		
Power consumption	5 W maximum		
Electrical signal outputs			
2 Configurable switching outputs *(active, normally open)*	1 x particle ferromagnetic (Fe) 1 x particle non-ferromagnetic (nFe) or 1 x particle ferromagnetic (Fe) + non-ferromagnetic (nFe) 1 x Status signal or 1 x Alarm signal 1 x Status signal		
Switching log	Active Low or Active High *(adjustable)*		
Length of switching pulse of particle signal	adjustable, 5 to 200 ms		
Length of switching pulse of alarm output	adjustable, 30 to 86, 400 s, or continuously on to Reset		
Loading capacity of the switching outputs	1.5 A maximum		
HSI *(HYDAC Sensor Interface)*	physical: 1 wire, half duplex; protocol: HSI		
RS485 interface	physical: 2 wire, half duplex; protocols: HSI, Modbus RTU		
Ethernet interface	physical: 10Base-T / 100Base-TX protocols: HSI TCP/IP, Modbus TCP		
CAN interface	physical: CAN; protocol: CANopen		
USB interface *(only for service)*	physical: mini USB; protocol: propr.		
General Data			
Self diagnostics	Continuous, with error indication via Status LED and general operational readiness via Device-Ready-LED		
Ambient temperature	-40 to 158°F (-40 to 70°C)		
Sensor section (ø)	1" (25 mm)	½" (13 mm)	¼" (6 mm)
Protection class (DIN 40050)	IP 67		
Weight	~ 3.5 kg	~ 2.5 kg	~ 3 kg
Conformity & Certifications			
CE mark	EN61000-6-4 / -6-2 / -6-9 *(pulse magnetic field immunity) / -4-29 (voltage dips)*		
FC mark	FCC – Title 47 CFR Part 15		
Environmental tests	Vibration test/Shock test: EN60068-2-2 / -2-64 *(vibration)* EN60068-2-27 / -2-31 *(shock)* Climate test: EN60068-2-52 *(salt mist)* EN60068-2-1 / -2-2 / -2-14 / -2-30 / -2-38 / 2-78 *(termperature and humidity)*		
Certifications	Wind power: DNV – Renewables Cert. Marine: DNV – Type Approval		

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PN#02075860 / 05.21 / FSP2105-2273

Model Code

MCS 1 5 8 0 - 0 - 5 - 2 / -000

Series
MCS = Metallic Contamination Sensor

Model
1 = 1000 Series

Detection limit / sensor cross-section
3 = Fe particles > 70 µm / ¼”
4 = Fe particles > 100 µm / ½”
5 = Fe particles > 200 µm / 1”

Signal output / 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 input / electrical interface
0 = Without

Media / fluids
0 = Mineral and synthetic oils

Hydraulic connection
1 = Flange connection, SAE ½” 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 ½” according to ISO 6162-1

Electrical Installation
2 = M12x1 male connection, 8-pin / Ethernet M12x1, 4-pin, D encoded according to IEC61076-2-101 / mini 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:

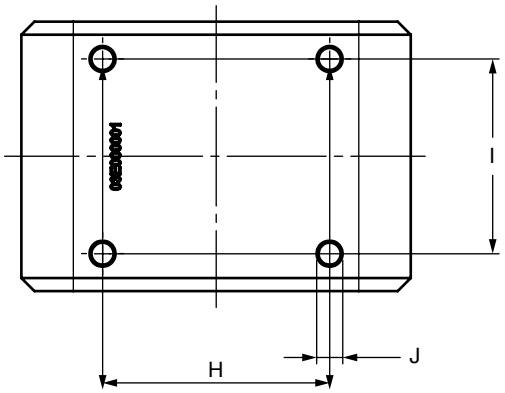
- Selected flange adapters for hydraulic system integration through piping or hoses
- System integration that is specially matched to the product and the respective application *(HYDAC ConditionMonitoring Kit CMK)*
- Universal complete solutions for fluid condition monitoring *(HYDAC CondtionMonitoring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

Please contact Filter Systems for further detailed information.

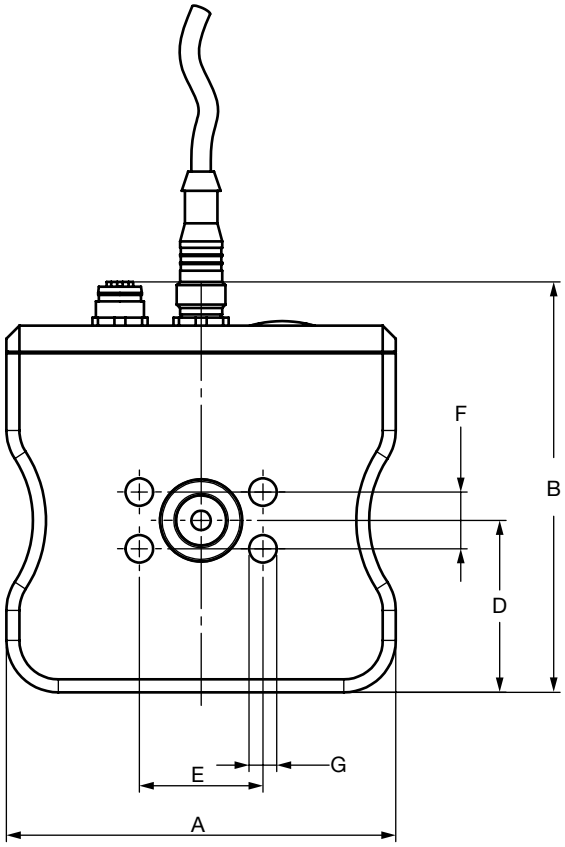
Accessories - electrical

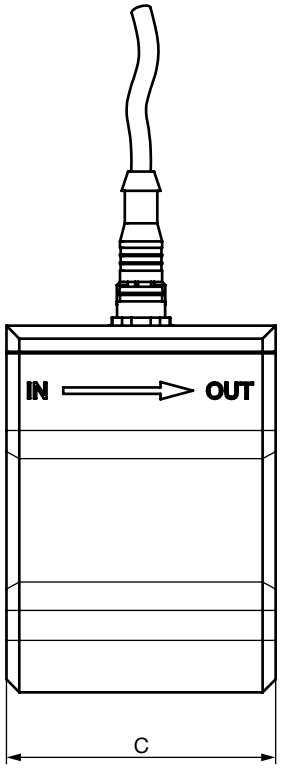
Connection cable	Part no.
ZBE42S-05 Connection cable, socket plug 8 pin with cable, open cable end, length = 5 m	3281239
ZBE44 mating connector with screw clamp, 8-pin, M12x1	3281243
Connection cable	
ZBE43-05 Connection cable, coupling/ plug 8 pin, length = 5 m	3281240
ZBE43-10 Connection cable, coupling/ 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

Dimensions

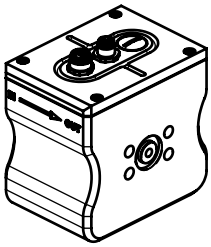


Type	A	B	C	D	E	F	G	H	I	J
13XX-X-1	120	113	83	53	38.1	17.5	ø8	70	60	M8
14XX-X-2	120	113	83	53	47.6	22.2	ø11.5	70	60	M8
15XX-X-3	162	106	83	38.5	52.4	26.2	ø11.5	80	55	M8
15XX-X-5	162	132	83	62	130	77.8	ø17.5	95	60	M8
15XX-X-6	120	106	83	38.5	69.9	35.7	ø13.5	90	35	M8

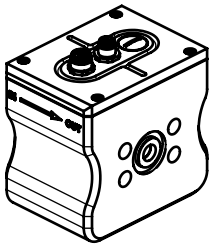




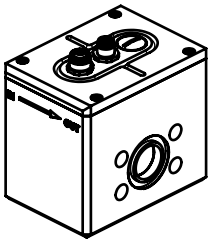
MCS13XX-X-1



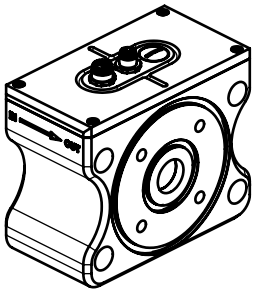
MCS14XX-X-2



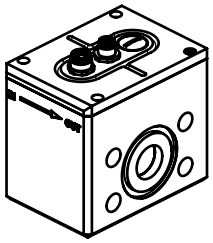
MCS15XX-X-3



MCS15XX-X-5



MCS15XX-X-6



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

Notes

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

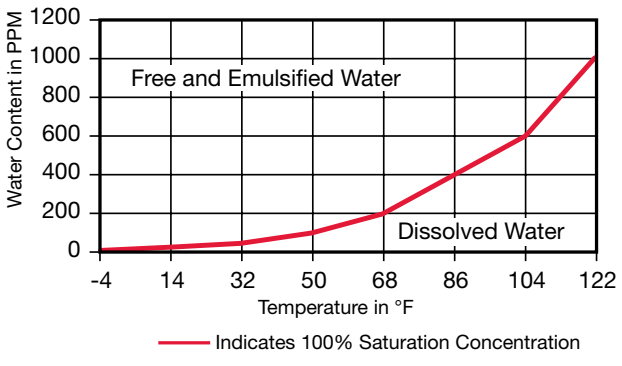
FluMoS MOBILE

Technical Specifications

Input Data	
Measuring range *(temperature)*	-13 to 212°F (-25 to 100°C)
Measuring range *(saturation level)*	0 to 100%
Operating pressure	max. 725 psi (40 bar)
Burst pressure	> 9000 psi (620 bar)
Parts in contact with fluid	Stainless steel, FPM seal, ceramic with evaporated metal
Output Data - Humidity Measurement	
Output level *(saturation level)*	4 to 20 mA
Calibrated accuracy	≤ ± 2% FS max.
Accuracy in media measurements	≤ ± 3% FS typ.
Pressure dependent	+ 0.02% FS / bar
Output Data - Temperature Measurement	
Output signal *(temperature)*	4 to 20 mA or 2-10V
Accuracy	≤ ± 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 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 Pin 1: +Ub Pin 2: Signal saturation level Pin 3: 0V / GND Pin 4: Signal temperature Pin 5: not connected	M12x1.5 pole (DIN VDE 0627)
Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection	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

AS 1 0 0 8 - C - 000

Series
AS = Aqua Sensor

Measuring Range
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)

Mechanical Connection
0 = G 3/8A DIN 3852

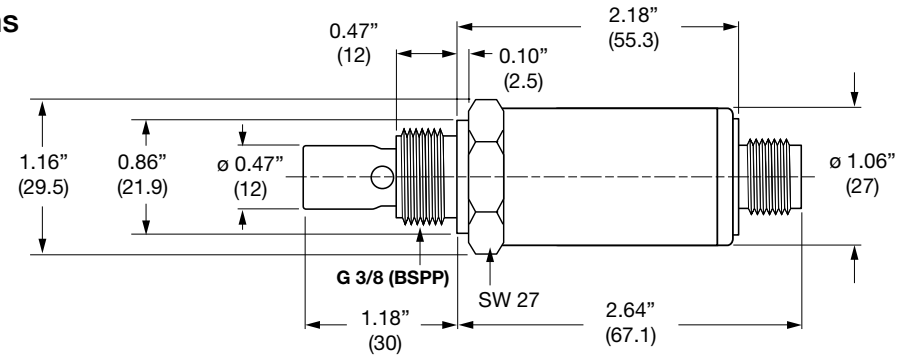
Electrical Connection
8 = Plug M12x1, 5-pole *(connector not included)*

Signal Technology
C = Saturation level 4 to 20 mA (0 to 100%), Temperature 4 to 20 mA -13°F to 212°F (-25°C to 100°C)

Modification Number
000 = Standard

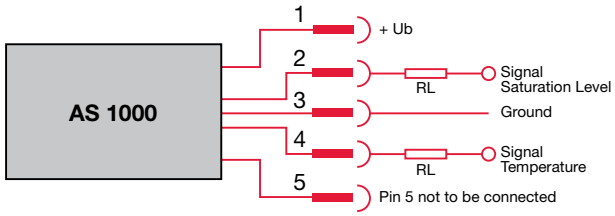
Items supplied
- Aqua Sensor
- Operation Manual

Dimensions



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

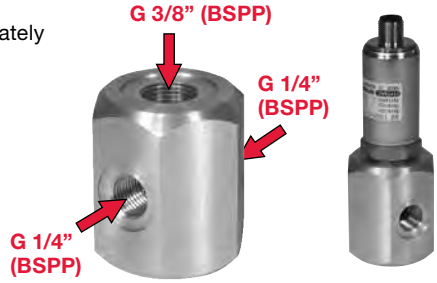
Circuit Connection



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

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 .. 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 points
- Switching mode of switch outputs
- Switching direction
- Switching delay times
- Operating temperature range

Water in Oil

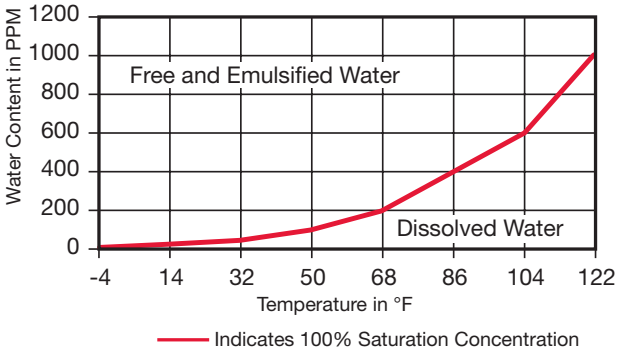
It is almost certain that there is water present in hydraulic and lubrication systems. These systems should be operated without the presence of free or emulsified water. The most common sources of water entering a system are ambient humidity, “splash” from process water, and new oil. Water contamination 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

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

Example of a Hydraulic Oil Saturation Curve



FluMoS MOBILE

Technical Specifications

Input Data	
Saturation Level	0 .. 100%
Temperature	-25 .. 100 °C
Operating pressure	-0.5 .. 50 bar
Pressure resistance	≤ 630 bar
Mechanical connection	G3/8 A DIN 3852
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 %); $R_{Lmax} = (U_B - 10\ V) / 20\ mA\ [k\Omega]$ or switching output (configurable)
Calibration Accuracy	≤ ± 2% FS max.
Accuracy in media measurements	≤ ± 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	≤ ± 2% FS max.
Pin 5:	**HSI** (**H**YDAC **S**ensor **I**nterface) automatic sensor detection
Switching outputs	
Design	NPN or PNP transistor outputs (configurable as N/O or N/C)
Switching current	max. 250 mA per output
Environmental conditions	
Compensated temperature range	0 .. +90 °C
Operating temperature range [2]	-40 .. +100 °C / -25 .. +100 °C
Storage temperature range	-40 .. +100 °C
Fluid temperature range [2]	-40 .. +125 °C / -25 .. +125 °C
Viscosity range	1 .. 5000 cSt
Flow velocity	< 5 m/s
Fluid compatibility [3]	Mineral oil-based fluids, diesel or ester-based fluids (HEES, HETG)
CE mark	EN 61000-6-1 / -2 / -3 / -4
Vibration resistance acc. to DIN EN 60068-2-6	7.5 mm (5 Hz ≤ f < 8.2 Hz) 2 g (8.2 Hz ≤ f < 2000 Hz)
Shock resistance acc. to DIN EN 60068-2-27	20 g (11 ms in 3 axes)
Protection type acc. to DIN EN 60529 [4]	IP 67
Other data	
Supply voltage	12 .. 32 V DC
Residual ripple of supply voltage	≤ 5%
Current consumption	≤ 30 mA without outputs
Weight	~ 145 g

Note: Reverse polarity protection, short circuit protection provided.

FS (**F**ull **S**cale) = 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

PN#02075860 / 02.23 / FSP2105-2273

Model Code

AS 1 2 0 8 - X - 000

Series
AS = Aqua Sensor

Fluid [1]
2 = Mineral oil-based fluids, diesel or ester-based fluids (HEES, HETG) [2]

Mechanical Connection
0 = G 3/8A ISO 1179-2

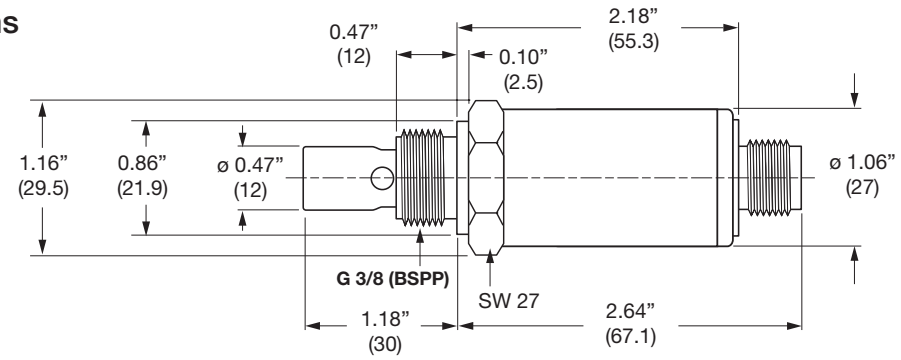
Electrical Connection
8 = Plug M12x1, 5-pole *(connector not included)*

Exit
C = Output 1 Pin 2 saturation degree (4 .. 20 mA)
Output 2 Pin 4 temperature (4 .. 20 mA)
2 = 2 switching outputs, configurable

Modification Number
000 = Standard

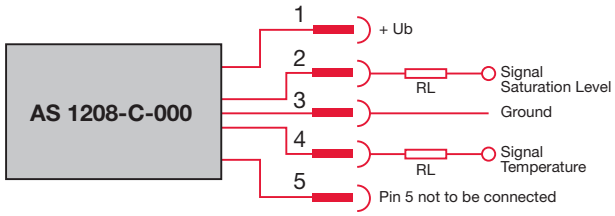
Note:
[1] Special fluids on request
[2] FKM is usually compatible with diesel, however, this depends on what additives are used. Please contact your diesel supplier and ask for confirmation of the compatibility in combination with FKM.

Dimensions



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

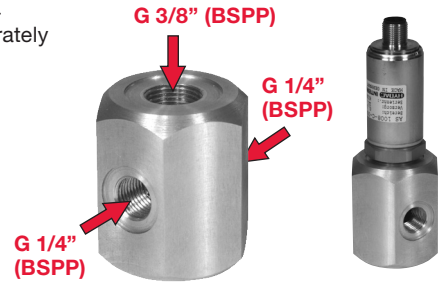
Circuit Connection



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

SMU 1200 Series

Sensor Monitoring Unit

Description

The Sensor Monitoring Unit SMU 1200 is a display unit for HYDAC fluid sensors and is designed to display and store measured data. The following combinations of fluid sensors can be connected directly:

- Contamination Sensor CS 1000 & Aqua Sensor AS 1000
- Metallic Contamination Sensor MCS 1000 & Aqua Sensor AS 1000

Advantages

- Data is stored in the SMU with a date and time stamp.
- Simple installation parallel to the customer system *(HYDAC Sensor Interface HSI for SMU 1200, transfer of the sensor's own analog and switching outputs)*.
- Simple installation using the magnetic holder or DIN rails.
- Plug & Work unit including the 16.4' (5m) connection cable required for direct connection of the sensors *(sensor connections via M12x1 male connectors, no programming necessary)*.
- Measured values can be read from the standard USB memory stick supplied via the USB master port.
- Simple data processing and data evaluation using MS-Excel or HYDAC FluidMonitoring Software FluMoS *('light version' available as freeware at www.hydac.com)*.
- Program restarts independently once voltage is restored; no loss of measured data.

Technical Specifications

Mounting position	Optional
Self-diagnostics	Continuously with error indication on display
Display	LED, 6/4/4-digit, each with 17 segments
Rough handling *(to IEC/EN 60068-2-31)*	Drop height 2" (50 mm)
Ambient temperature	32°F – 13°F (0 °C to +55 °C)
Storage temperature range	-40°F – 176°F (-40 °C to 80 °C)
Relative humidity	Maximum 95%, non-condensing
Weight	≈ 2.2 lb (≈ 1 kg)
Electrical Data	
Supply voltage	12 to 24 V DC (±10%) The SMU must not be used with vehicle supply systems without load dump protection of maximum 30 V DC.
Residual ripple	≤ 5%
Power consumption	15 Watt, 1.25 A max.
Accuracy of the real-time clock	± 5 s/day / ± 0.5 h/year
Clock buffer	≈ 20 years
Protection rating	III (safety extra-low voltage)
Protection class	IP 67

PN#02075860 / 05.21 / FSP2105-2273

Model Code

SMU 1 2 6 0 - TU - 00 / 000

Type
SMU = Sensor Monitoring Unit

Series
1 = 1000 Series

Data input
2 = Digital

Interface
6 = HSI + USB Master
7 = Ethernet + USB Master

Application
0 = Standard

Supply voltage
TU = 12 to 24 V DC

Sensor combination

	A	B
00 =	CS 1000	AS 1000
10 =	MCS 1000	AS 1000

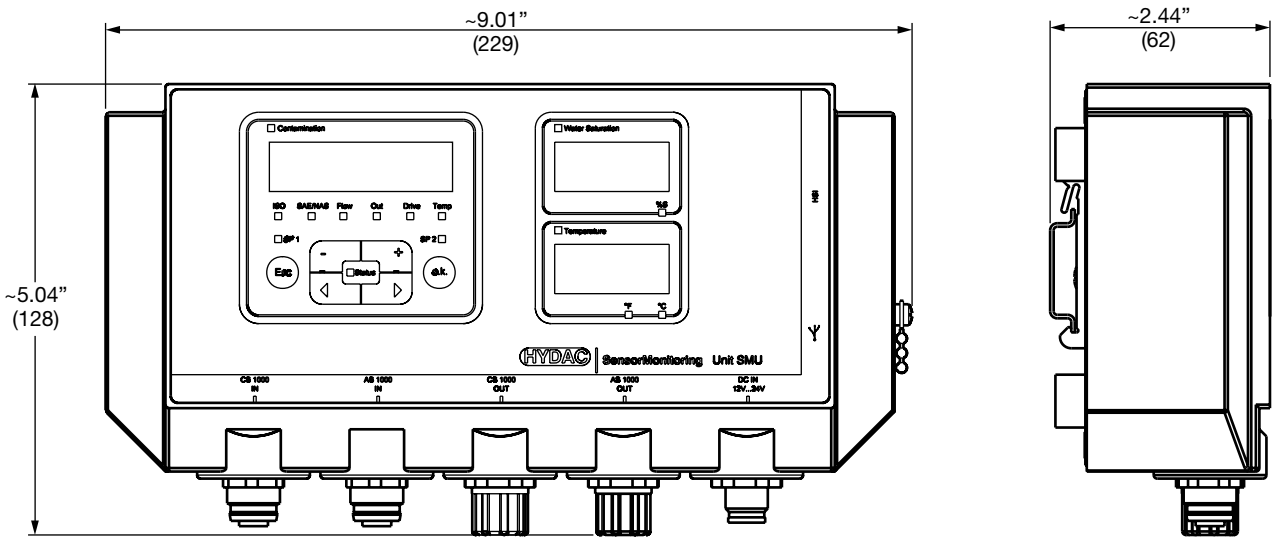
Customer modification number
000 = Customer modification number

Items supplied
- 1 SMU 1200 series
- 1 USB memory stick
- 1 connection cable 5 pole with flying leads for power supply, L = 16.4’ (5m)
- 2 connection cables appropriate to the sensor combination, L = 16.4’ (5m)
- 1 FluMoS light CD
- 1 User manual
- 1 DIN rail, L = 7.87” (20 cm)

Accessories

Power supply PS5,
100-240 V AC / 50-60 Hz / 1.1 A -> 24 V DC / 1000 mA,
Cable length = 3.28’ (1.8 m) PN: 3399939

Dimensions



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

FMS Series

Fluid Monitoring System

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

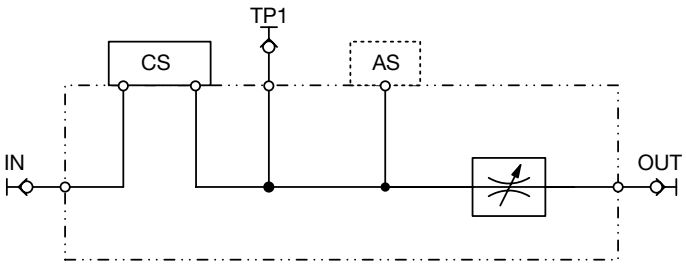
- Cost-effective solution
- Early warning of critical machine states
- Continuous fluid monitoring
- Condition-based maintenance planning

Caution!

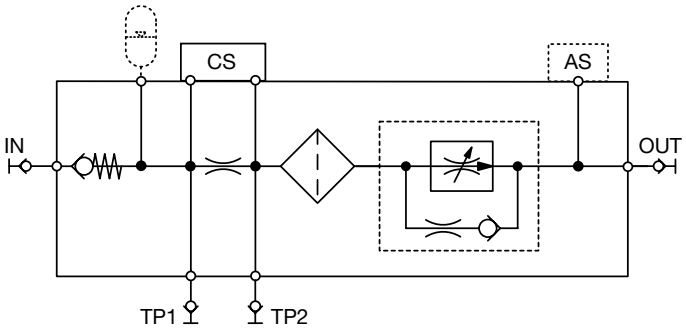
The FMS is only to be used with mineral oils or mineral oil-based raffinates.

Hydraulic Schematic

FMS-FMM-O



FMS-FMM-P



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 mm²/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 mm²/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)

PN#02075860 / 05.21 / FSP2105-2273

Model Code

FMS - FMM-P - CS - AS - SMU12 - 01 / - 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/-000
02 = FMM-P-L-0-CS1310-A-AS-0-1-0/-000 SMU1260-TU-00/-000

Customer modification number
000 = Customer modification number

*Type defined in sensor combination number

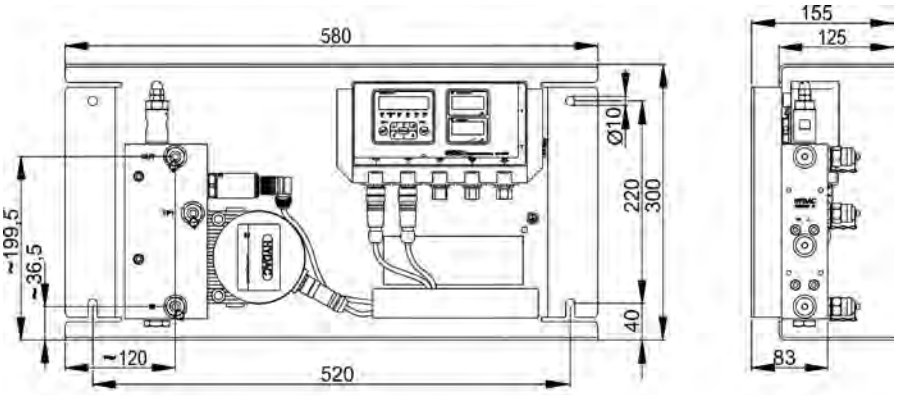
Items supplied
- 1 FluidMonitoring System FMS
- 1 Power supply connection cable, L = 16.4' (5m)

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

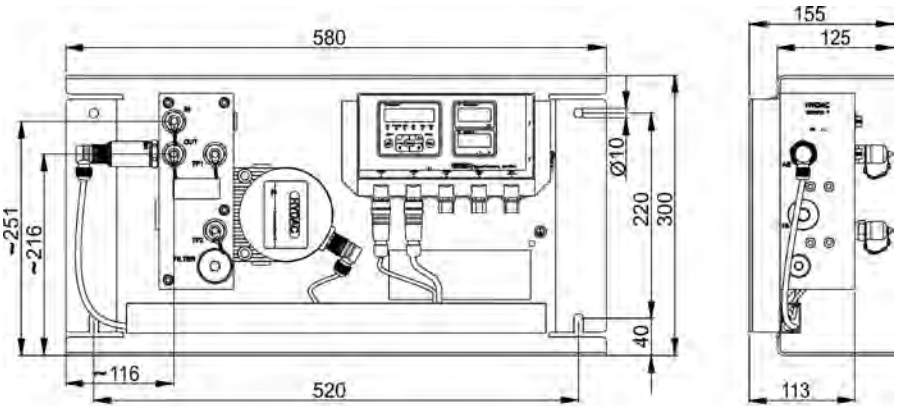
Upon receiving the FMS check it for any damage in transit. Do not put the FMS into operation unless it is in perfect condition. Report any damages in transit to the transport company or the responsible agent immediately. Do not put the unit into operation.

Dimensions

FMS-FMM-O



FMS-FMM-P



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

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) *w/ultrasonic unit* CTU12xx: ≈ 685 lbs (310 kg) ≈ 728 lbs (330 kg) *w/ultrasonic unit*
Type	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 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 provided 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

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.

PN#02075860 / 05.21 / FSP2105-2273

Model Code

CTU 1 0 5 0 - M - Z - Z / - EA

Type
CTU = Contamination Test Unit

Series
1 = 1000 series

Size
0 = Dimensions of analysis chamber *(cleanbox)*: 300 mm x 765 mm x 365 mm *(height (approx.) x width x depth)*
2 = Dimensions of analysis chamber *(cleanbox)*: 460 mm x 765 mm x 650 mm *(height (approx.) x width x depth)*

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

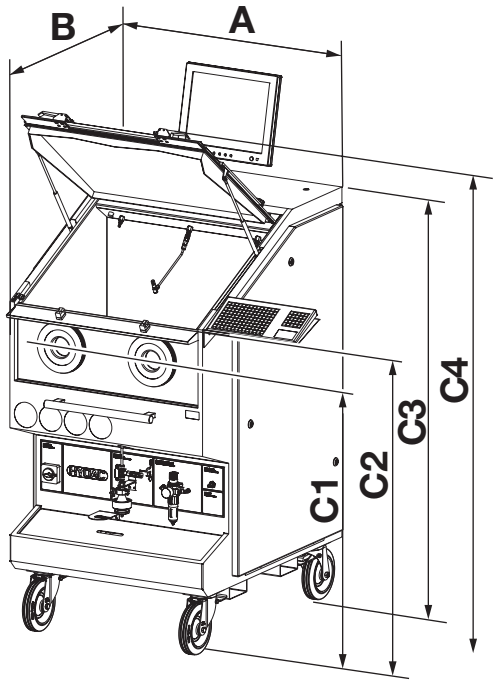
Extraction Process
Z = Spray *(medium pressure)*
U = Spray *(medium pressure)* plus ultrasound

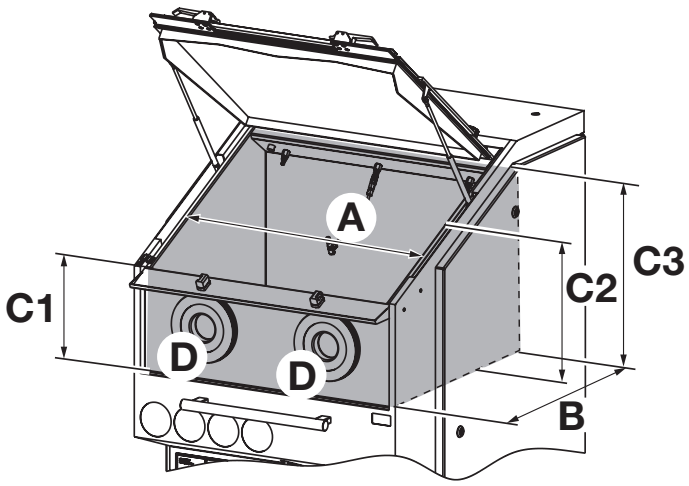
Supplementary Details
Z = standard
R = external rinsing connections 0.24" (Ø 6mm), between the manual actions
A = Fluid connections A/B/C and R fitted with rapid quick-release fastener on outside, control line to CTM-E modules, manual change-over for filter membrane holder

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





Type	A	B	C1	C2	C3	C4
CTU10XX	38.8 (985)	33.5 (850)	46.1 (1170)	50.8 (1290)	59.1 (1500)	≈ 66.9 ≈ (1700)
CTU12XX	35.8 (910)	44.9 (1140)	45.7 (1160)	50.2 (1280)	68.9 (1750)	≈ 81.5 ≈ (2070)

Type	A	B	C1	C2	C3	D
CTU10XX	30.1 (765)	14.4 (365)	10.2 (260)	13.2 (335)	15 (380)	2x ø 7.1 2x ø 180
CTU12XX	30.1 (765)	25.6 (650)	11.8 (300)	17.5 (445)	22 (560)	2x ø 7.1 2x ø 180)

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

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) *(empty)*
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 l) 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.

PN#02075860 / 05.21 / FSP2105-2273

Model Code

CTM SC 100 0 - M

Series
CTM = Contamination Test Module

Model
SC = Supply and control

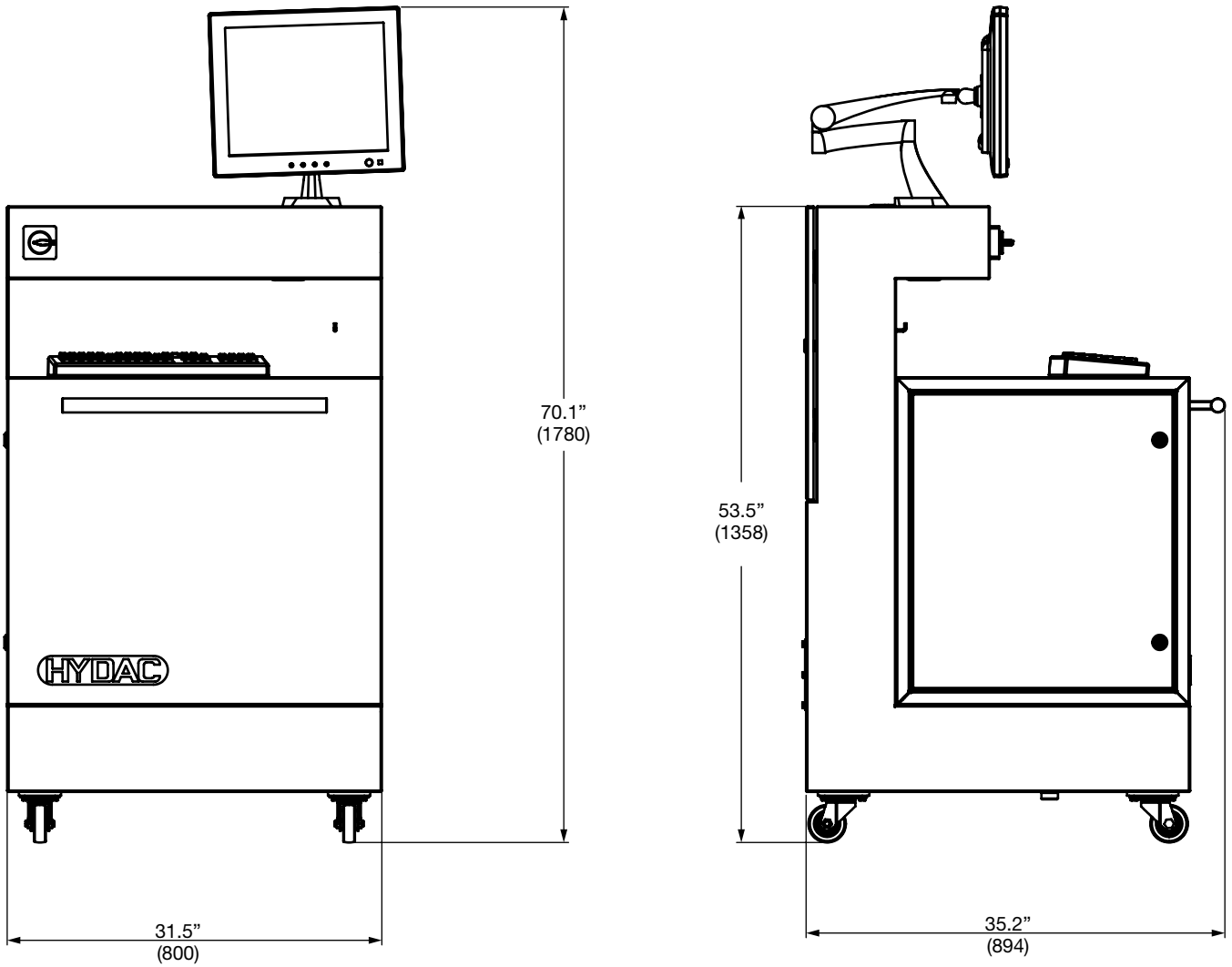
Series
100 = Standard

Analysis Fluid
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 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

Items supplied
- CTM-SC
  - incl. monitor and monitor bracket
  - PC with Windows operating system
  - PLC
  - Keyboard with touchpad
  - Foot switch
  - CTM-SC Software
- Operating and maintenance instructions

Dimensions



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

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 *(height x width x length)*	EB1200: 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) EB1600: 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 material	S235JR powder-coated
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 box)*	
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) **for evenly distributed load, no point load*
Opening of cover	electrical
Membrane holder	For ø1.85” (ø47 mm) filter membranes
Electrical Data	
Supply voltage	according to order
Power consumption	400 Watt
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.

PN#02075860 / 05.21 / FSP2105-2273

Model Code

CTM EB 12 0 0 - M - Z - Z / –

Series
CTM = Contamination Test Module

Model
EB = Extraction Box

Dimensions 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)

Execution of load
0 = standard
1 = heavy

Analysis Fluid
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 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

Extraction method
Z = spray, medium pressure

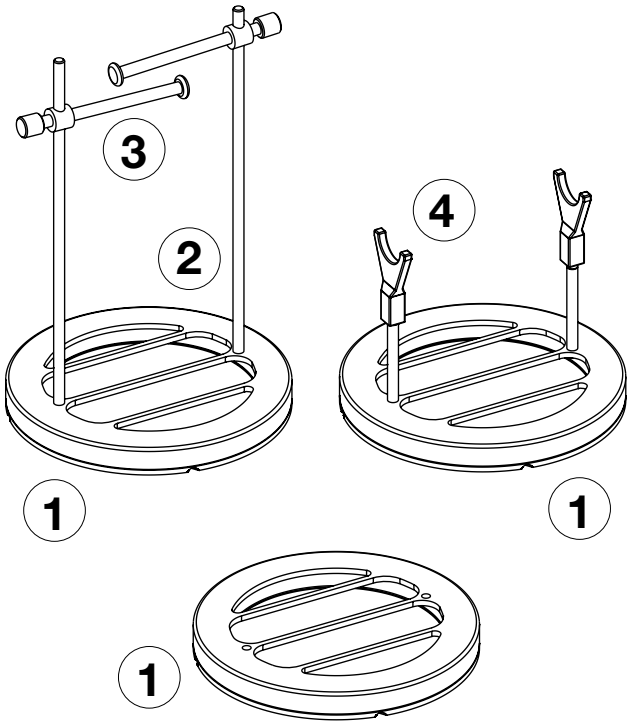
Supplementary details
Z = standard

Modifications
– = without modifications

Items supplied
- CTM-EB
- Operating and maintenance instructions

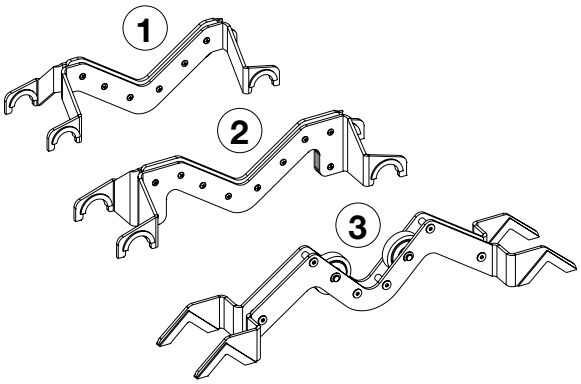
Accessory - CTM-EB Disk

- 1200 = Part. No. 3439102
- 2000 = Part. No. 3422445



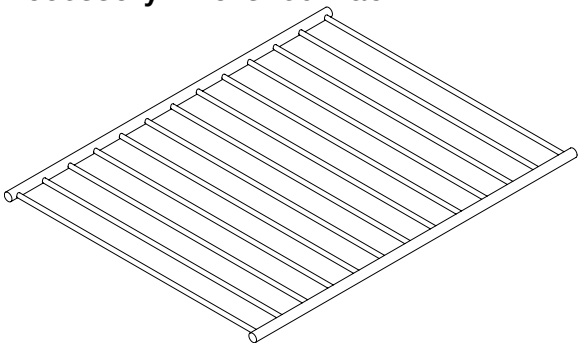
Item	Designation
1	Disk
2	Guide rod *(available in different lengths)*
3	Clamping rod *(available in different lengths)*
–	Y-shaped Bracket

Accessory - Angled Bracket



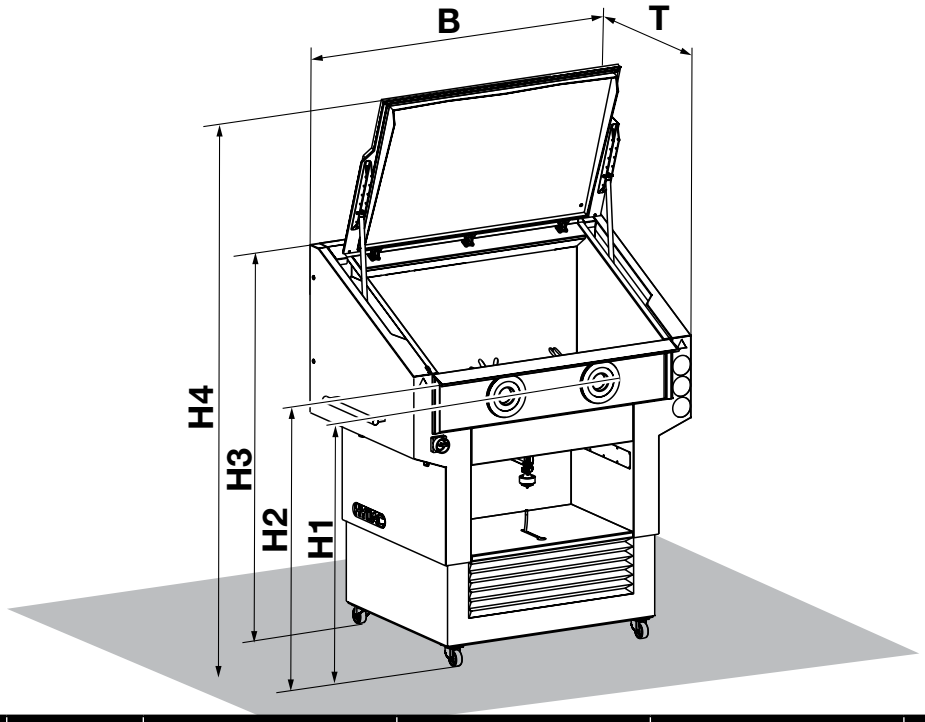
Item	Designation
1	Angled bracket – light duty
2	Angled bracket – medium duty
3	Angled bracket – heavy duty

Accessory - Polished Rack



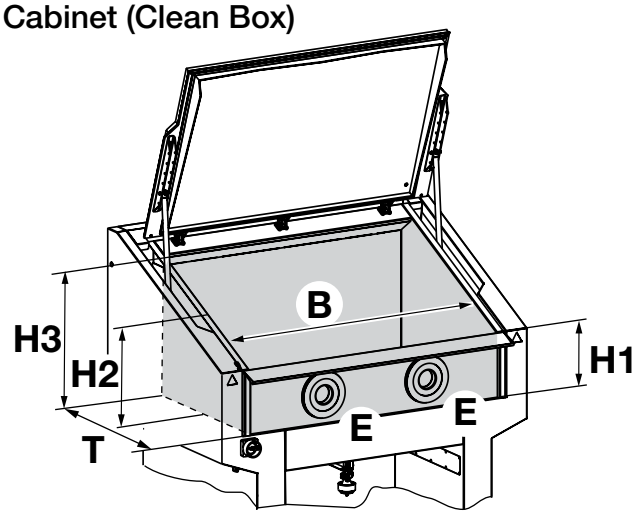
Supplied with the CTM-EB 1200.

Dimensions
CTM-EB overall



CTM-EB	B	T	H1	H2	H3	H4
12xx	43.7” (1110)	36.2” (920)	38.8” to 48.6” (985 to 1235)	47.0” to 54.9” (1195 to 1395)	59.5” to 69.3” (1510 to 1760)	84.6” to 94.5” (2150 to 2400)
14xx	72.0” (1830)	36.2” (920)	37.6” to 47.4” (955 to 1205)	45.0” to 54.9” (1145 to 1395)	59.5” to 69.3” (1510 to 1760)	70.9” to 80.7” (1800 to 2050)
16xx	43.7” (1110)	36.2” (920)	40.2” to 50.0” (1020 to 1270)	50.0” to 59.8” (1270 to 1520)	61.4” to 71.3” (1560 to 1810)	84.6” to 94.5” (2150 to 2400)
18xx	64.2” (1630)	42.1” (1070)	40.2” to 50.0” (1020 to 1270)	45.3” to 55.1” (1150 to 1400)	62.6” to 72.4” (1590 to 1840)	93.5” to 103.3” (2375 to 2625)
20xx	55.1” (1400)	45.3” (1150)	39.4” to 52.8” (1000 to 1340)	48.6” to 58.5” (1235 to 1485)	42.5” to 76.0” (1080 to 1930)	96.5” to 106.3” (2450 to 2700)
46xx	90.6” (2300)	36.2” (920)	39.0” to 48.8” (990 to 1240)	46.5” to 56.3” (1180 to 1430)	59.0” to 69.0” (1500 to 1750)	86.6” to 96.5” (2200 to 2450)

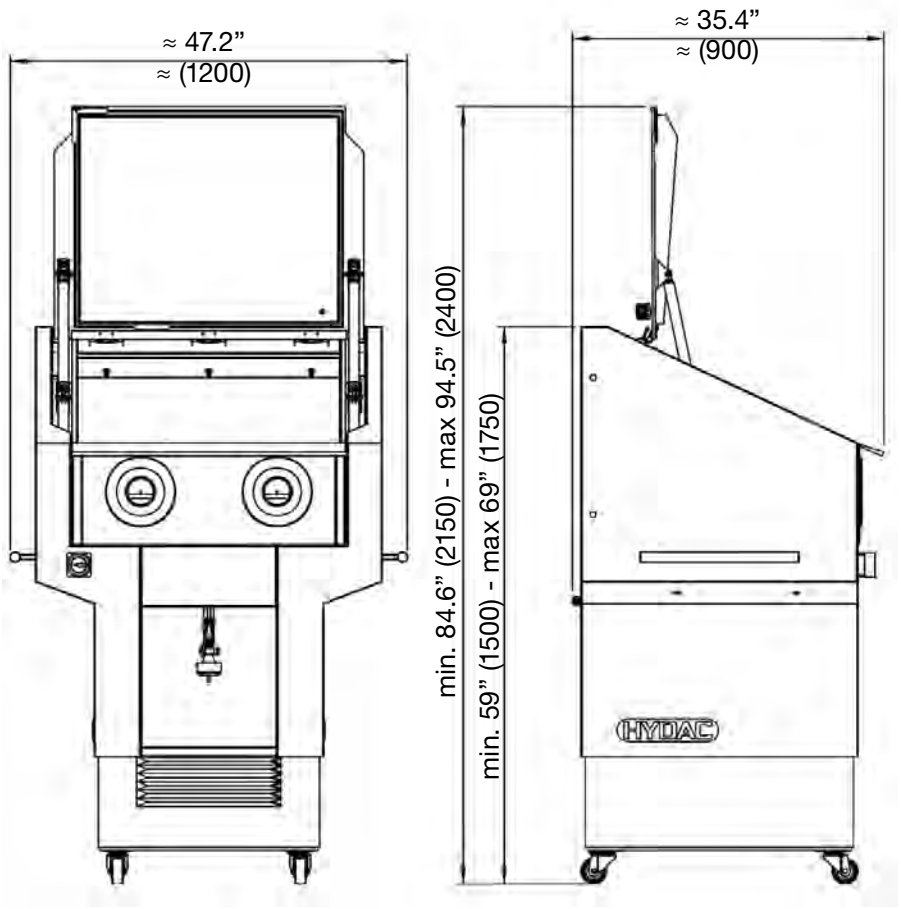
Dimensions of Extraction Cabinet (Clean Box)



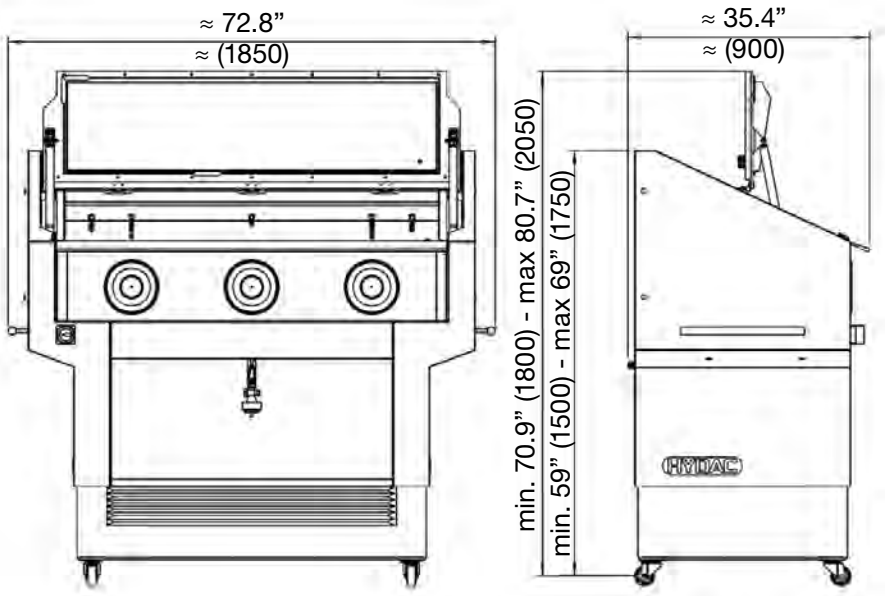
CTM-EB	B	T	H1	H2	H3	E
12xx	30.3” (770)	25.6” (650)	11.0” (280)	18.5” (470)	21.5”(545)	2 x ø7.1” (ø180)
14xx	55.1” (1400)	15.7” (400)	11.0” (280)	15.7” (400)	17.1” (435)	3 x ø7.1” (ø180)
16xx	26.4” (670)	24.4” (620)	23.4”(595)	27.6” (700)	30.1” (765)	2 x ø9.0” (ø230)
18xx	47.2” (1200)	30.7” (780)	10.6” (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)

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

Dimensions
CTM-EB 1200



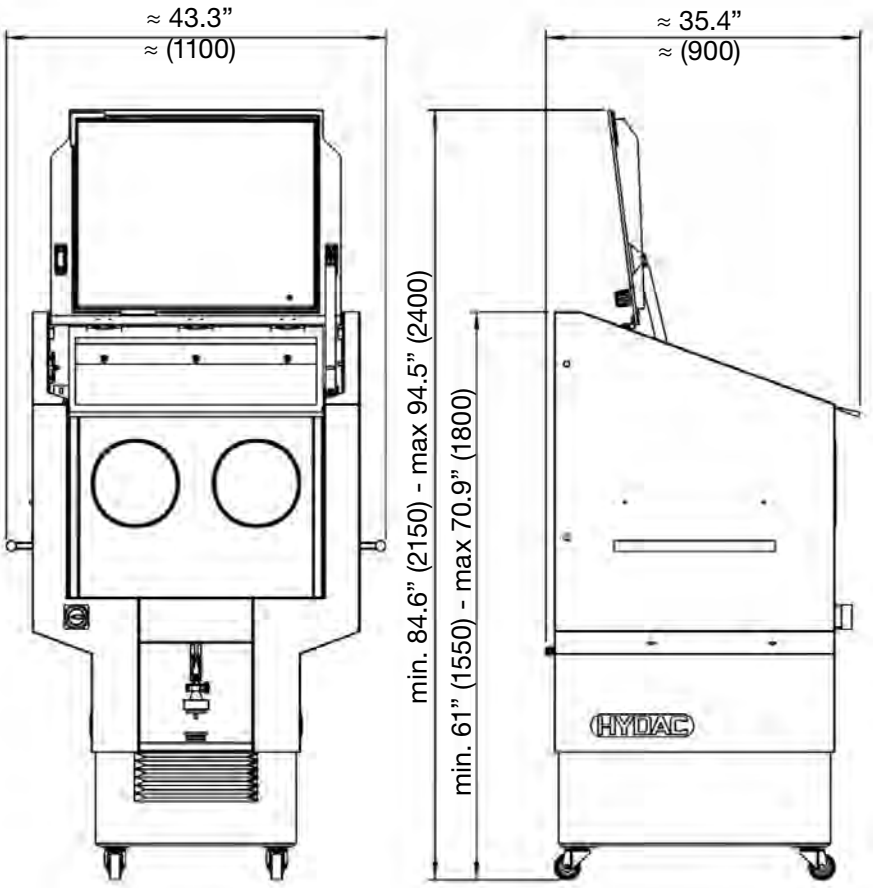
CTM-EB 1400



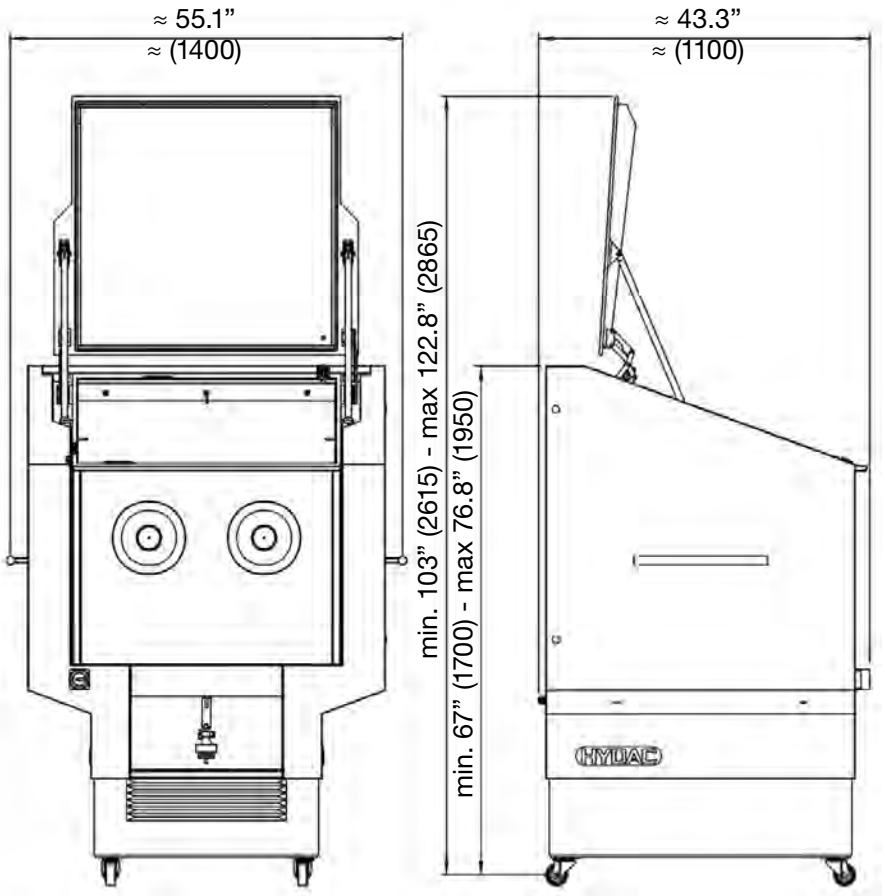
Dimensions are inches (mm) and for general information only, all critical dimensions should be verified by requesting a certified print.

Dimensions

CTM-EB 1600



CTM-EB 2000



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

Notes

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

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

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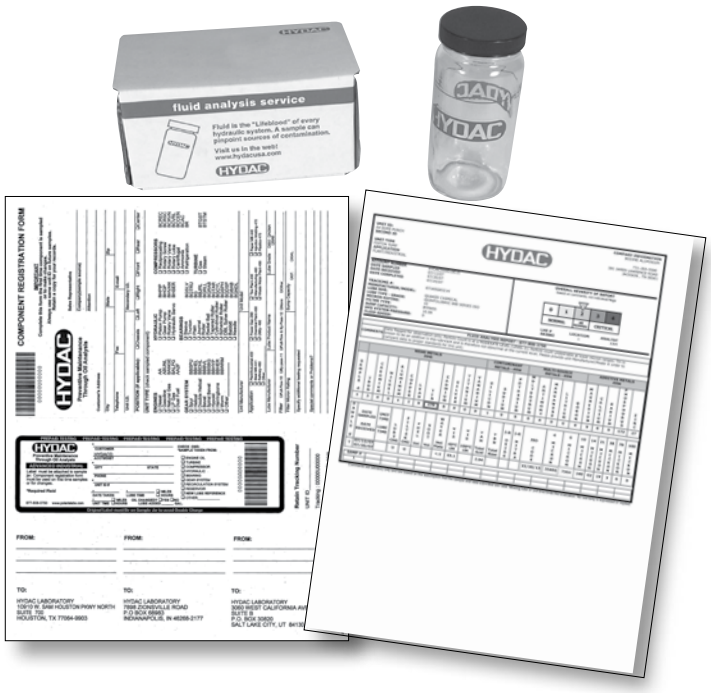
FAS Series
Fluid Analysis Service



Additional Oil Analysis Tests are available; contact factory for information

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.

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)

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

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	7619502
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	7626473
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

C

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.

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
CE 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

PN#02075860 / 05.21 / FSP2105-2273

Model Code

HMG 2500 - 000 - X

Operating Manual & Documents
US = English

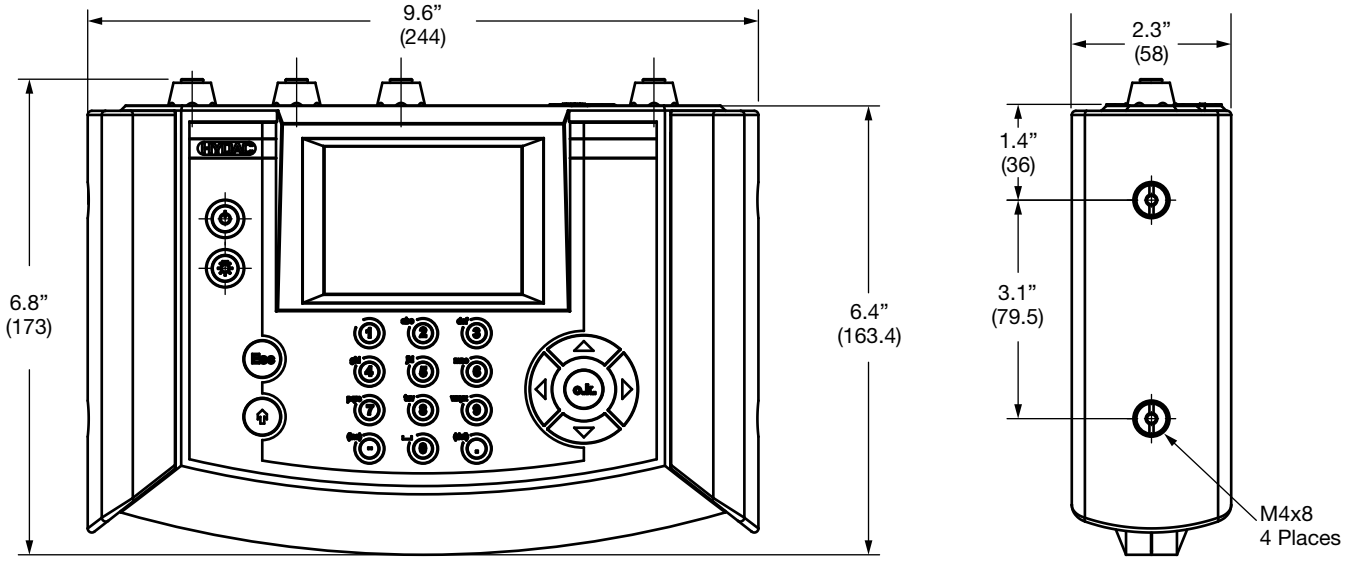
Scope of delivery

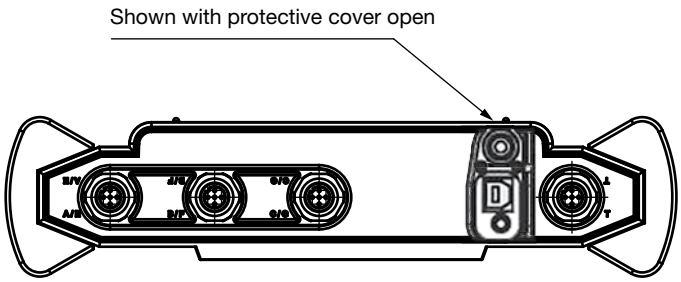
- HMG 2500
- Power supply for 90 .. 230 V AC
- Operating manual
- Data carrier with USB drivers, HMGWIN software
- USB connector cable

Accessories

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

Dimensions

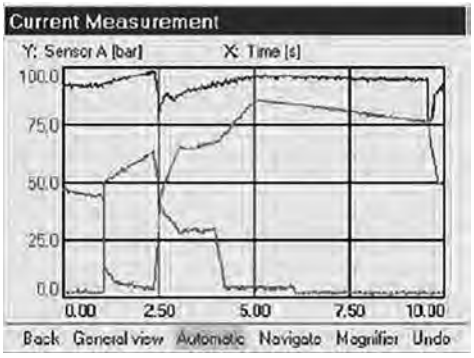




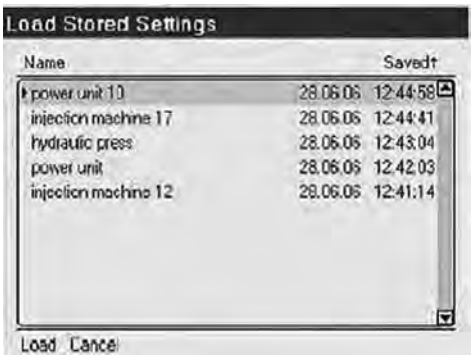
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

Function

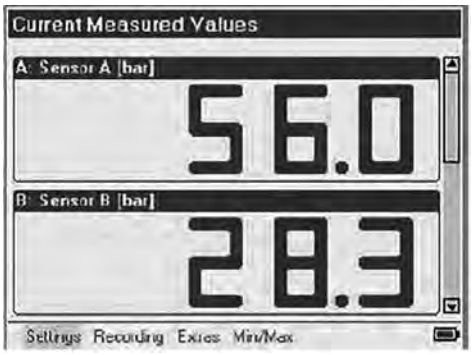
- Clear and graphical selection menus guide the operator intuitively to all the device functions available.
  A navigation pad on the keypad ensures rapid operation.
- The HMG 2500 can record signals from up to **four sensors simultaneously**. For this there are 4 robust standard input sockets.
- The 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.



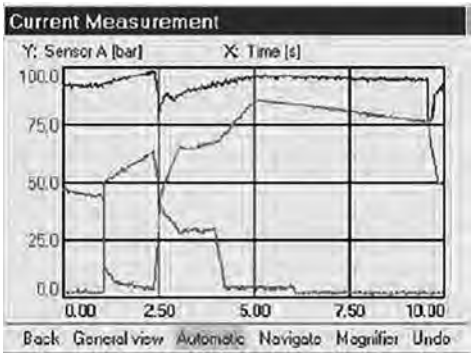
- The data memory for recording curves or logs can hold up to 500,000 measured values per recording. Over 100 of such data recordings in full length can be stored in an additional archiving memory.
- For targeted, event-driven curves or logs, the HMG 2500 has two independent triggers, which can be linked 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.



- 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.

HMGWIN:

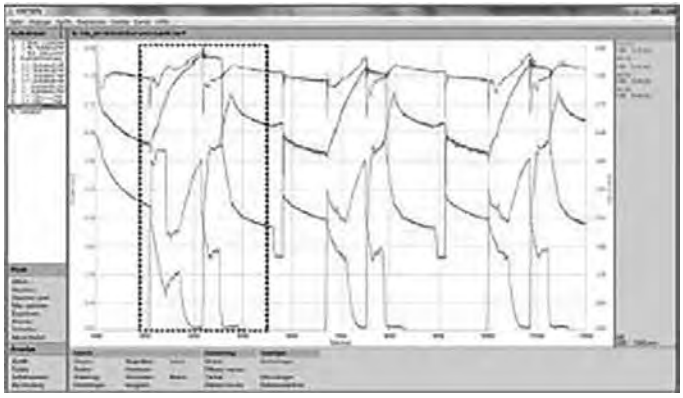
The PC software HMGWIN is also supplied with the device. This software is a convenient and simple package for analysing and archiving curves and logs which have been recorded using the HMG 2500, or for exporting the data for integration into other PC programs if required.

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.

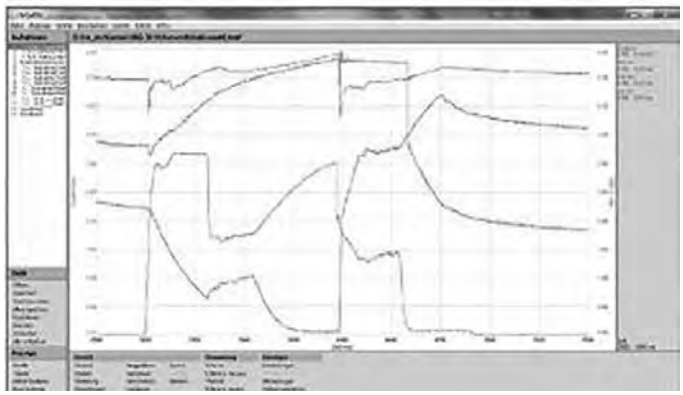
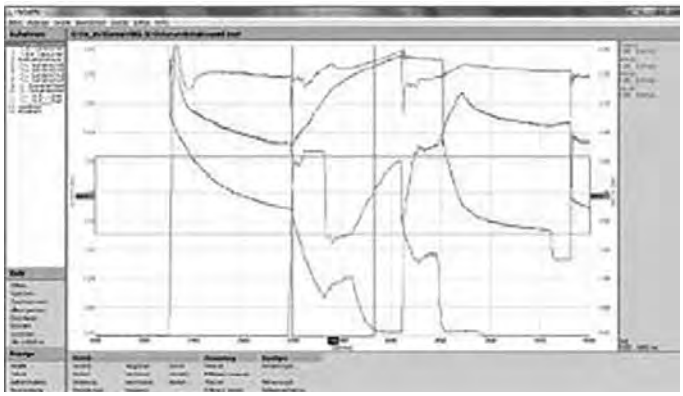


Fig.: Zoomed section of measurement curve

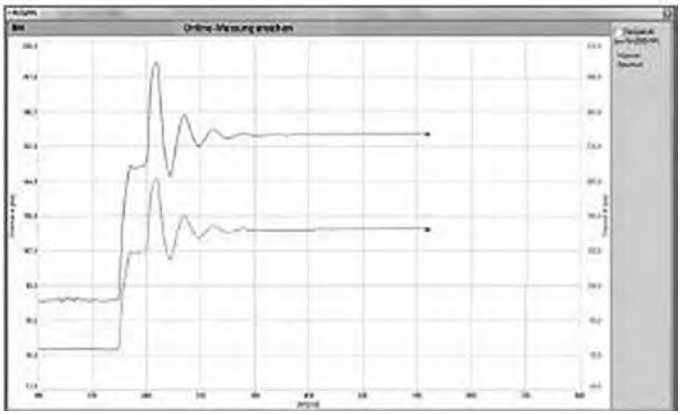
- **Accurate measurement** of the curves using the ruler tool (time values, amplitude values, and differentials)



- 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)

HMG 4000 Series

Portable Data Recorder

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

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 **I**nterface) 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 **I**nterface) 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.

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
- 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.

PN#02075860 / 05.21 / FSP2105-2273

Model Code

HMG 4000 - 000 - X

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	≤ ± 0.1 % FS at HSI, voltage, current ≤ ± 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	≤ ± 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	
Type	TFT-LCD Touchscreen
Quantity	5.7”
Resolution	VGA 640 x 480 Pixel
Backlight	10 to 100% adjustable
Interfaces	
USB Host	
Plug-in connection	USB socket, Type A, screened
USB Standard	2.0 (USB Full speed)
Transmission rate	12 Mbit/s
Voltage supply	5 V DC
Power supply	100 mA max.
Protection	Short-circuit protection to GND (0 V)
USB Slave	
Plug-in connection	USB socket, Type B, screened
USB Standard	2.0 (USB High speed)
Transmission rate	480 Mbit/s
Voltage supply	5 V DC
Power supply	100 mA max.
Protection	Short-circuit protection to GND (0 V)
Memory	
Measured value memory	16 GB for min. 500 measurements, each containing 8 million measured values
Technical standards	
EMC	IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8
Safety	EN 61010
IP class	IP 40
Environmental conditions	
Operating temperature	32 to 122°F (0 to 50°C)
Storage temperature	-4 to 140°F (-20 to 60°C)
Relative humidity	0 to 70%
Max. operating altitude	2000 m
DIMENSIONS	approx. 11.2” x 7.4” x 3.4”(285 x 189 x 87 mm)
Weight	approx. 4.1 lb. (1.85 kg)
Housing material	Plastic (Elastollan® R 3000 – TPU-GF)

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 push-pull 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:

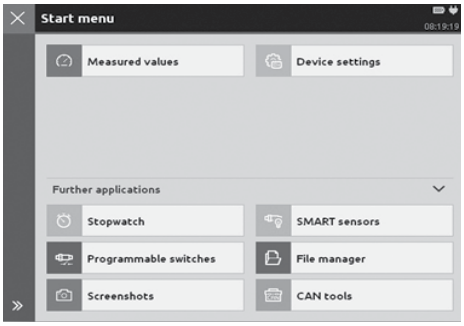
The information in this brochure relates to the operating conditions and applications described.

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

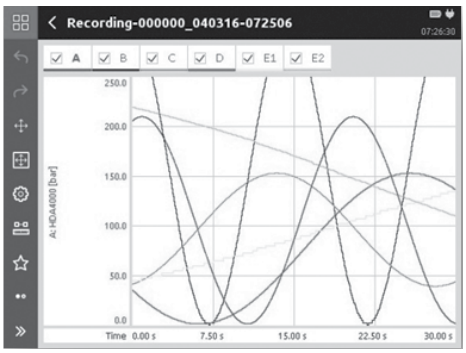
All technical details are subject to change without notice.

Function:

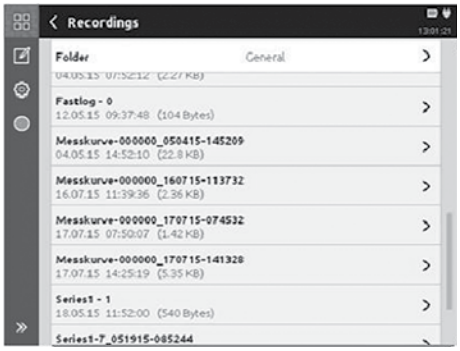
- Clear and graphical color selection menus intuitively guide the operator to all the device functions available and ensure fast implementation.



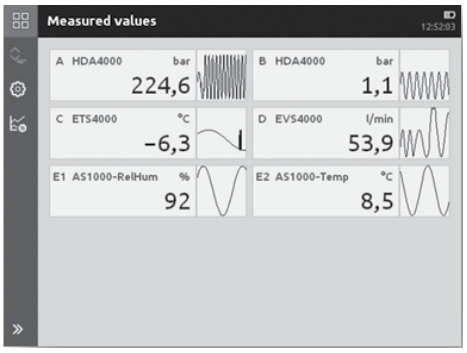
- The HMG 4000 can record the signals of up to **38 sensors simultaneously.**
  11 push-pull M12x1 input sockets are available as sensor interfaces. Apart from the push-pull sensor connection cable, M12x1 standard cables can also be used.
- The following sensors can be connected to the 8 black input 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 (**H**YDAC **C**AN **S**ensor **I**nterface) 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.



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



- 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.

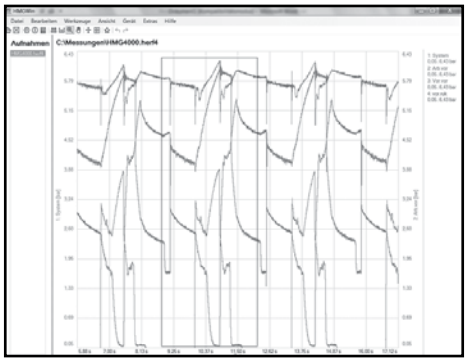
HMGWIN:

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.

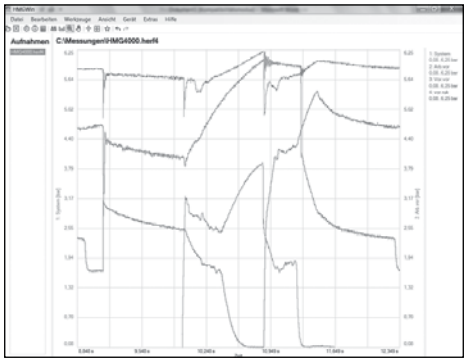
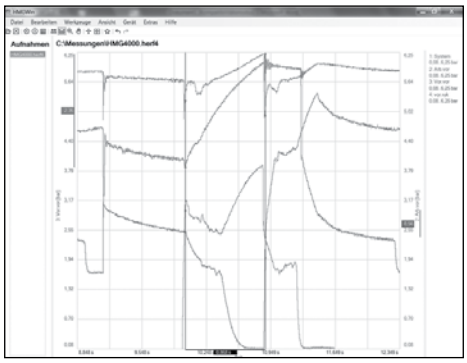
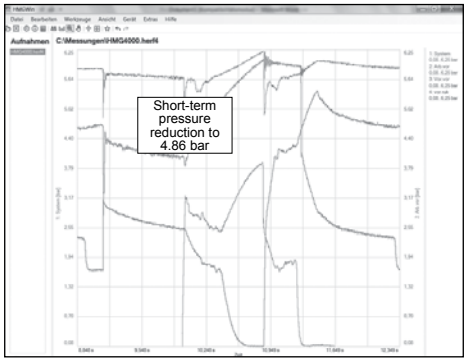


Fig.: Zoomed section of measurement curve

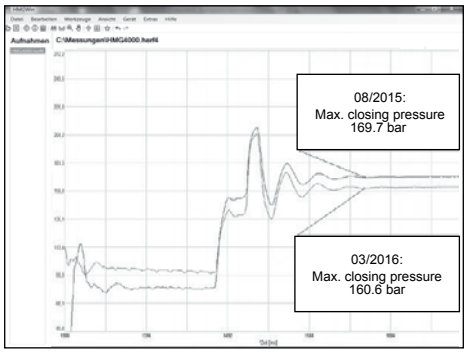
- Accurate measurement of the curves using the ruler tool (time values, amplitude values and differentials)



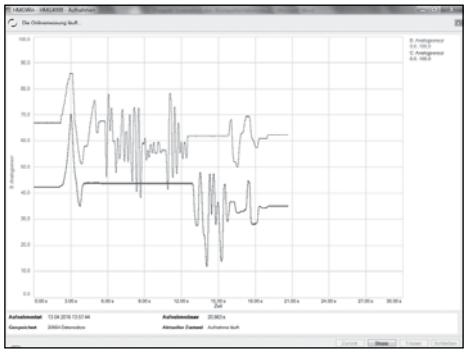
- Individual comments and measurement information can be added to the graph (function available mid-2017)



- 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.

Notes

D

Offline Filtration Systems

Today'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.

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

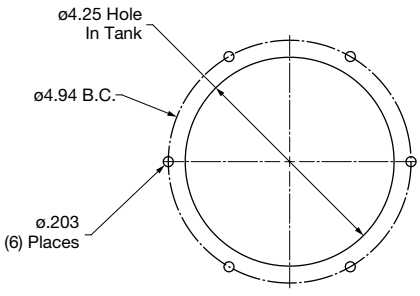
Technical Specifications

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

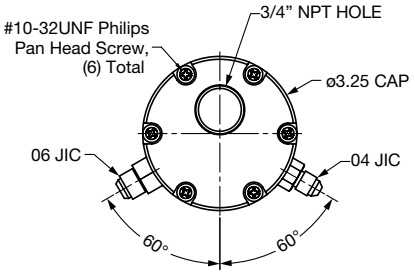
Mounting Pattern

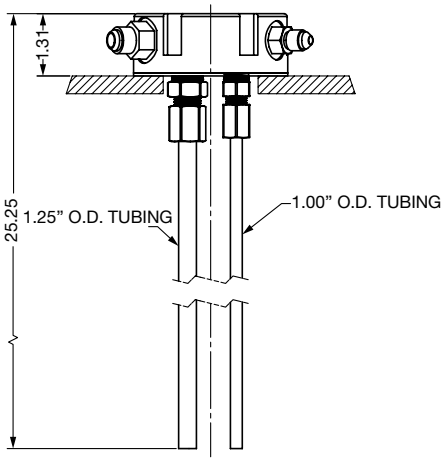
Customer is responsible to cut an appropriately sized hole on top of their tank. This adapter has two (2) ports: one for Suction and one for Return. Also includes a breather port.

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



Mounting Requirement





PN#02075860 / 05.21 / FSP2105-2273

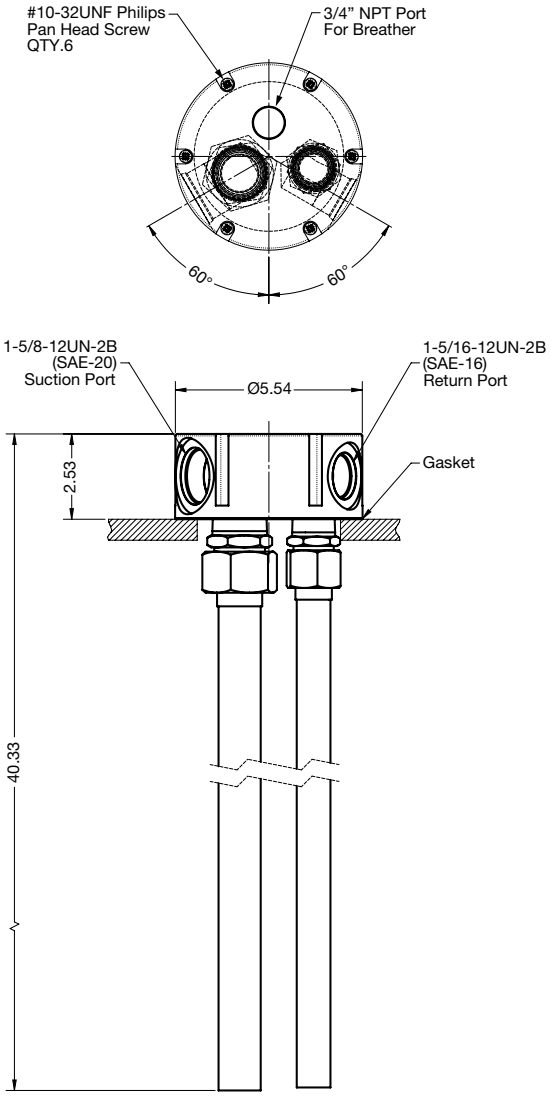
Model Code

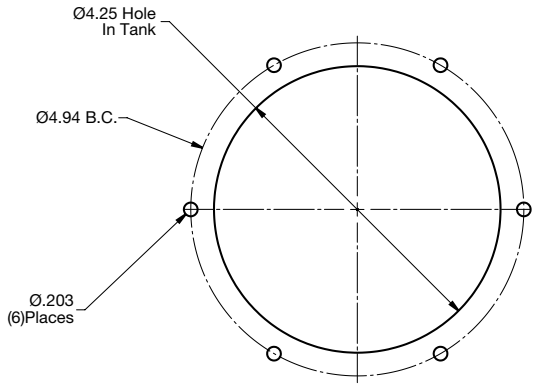
RFSA – 1

Series
RFSA = Reservoir Filtration System Adapter

Options
Omit = For use with Kidney Loop Filtration Products
1 = Optional OFCS/OFCD Fitting Kit

Installation Details



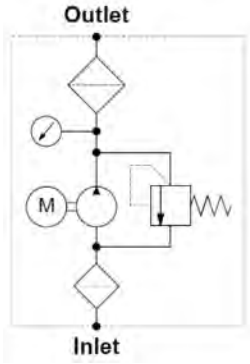


MOUNTING REQUIREMENT

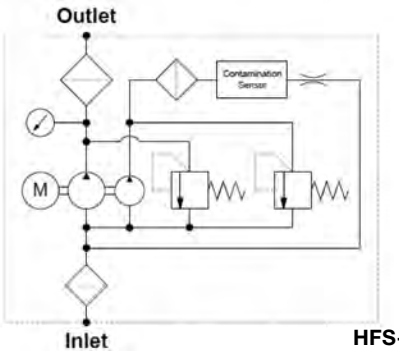
HFS-15 Series

Mobile Filter Unit

Hydraulic Schematic



HFS-15-E-...



HFS-10-P-...

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

Technical Specifications

Maximum Flow Rating	HFS-15-E-... 4 gpm (15 l/min; @ 50Hz) HFS-10-P-... 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	HFS-15-E-... 42 SUS 1623 SUS (5 to 350cSt) HFS-10-P-... 42 SUS 927 SUS (5 to 200cSt)
Length of power cable	9.8’ (3 m) *(incl. plug)*
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 lb (14 kg) HFS-10-P-... 36.4 lb (16.5 kg)
Hoses w/ crimped wands (standard)	Suction hose length: 8.2’ (2.5m) Return hose length: 8.2’ (2.5m) Hose material: PVC Wand material: Zinc-plated steel

PN#02075860 / 05.21 / FSP2105-2273

Model Code

HFS - 15 - E - 9 - NX - 10 - __ - E

Series
HFS = Mobile Filter Unit

Size
15 = 4 gpm (15 L/min) (for type “E” only)
10 = 2.6 gpm (10 L/min) (for type “P” only)

Type
E = Economy
P = Premium (with Condition Monitoring)

Element length
9 = 9”

Filter Media
NX = Particulate removal element
AM = Water Removal element

Filtration Rating
1, 3, 5, 10, 25

Power supply
OMIT = 120V-60Hz-1Ph (0.25kW)
M = 230V, 50Hz, 1pH (0.25kW)

Clogging indicator
E = Back-pressure indicator

Scope of delivery

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

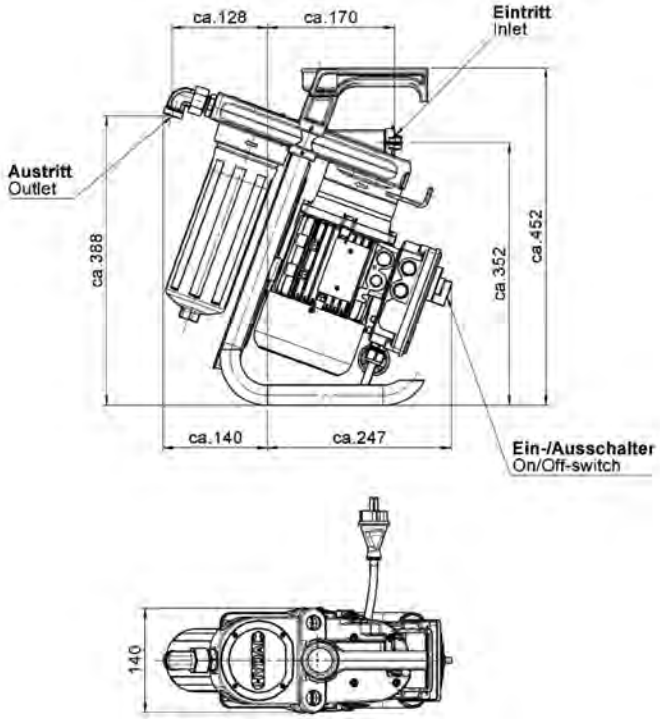
Filtration	Part no.	Filtration rating
HFS-15-001	7642315	1 µm
HFS-15-003	7642316	3 µm
HFS-15-005	7642317	5 µm
HFS-15-010	7642314	10 µm
HFS-15-025	7642318	25 µm
HFS15-AM	7642319	Water Removal

Hoses with threaded connection (depressurized suction up to max. 350 mm²/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

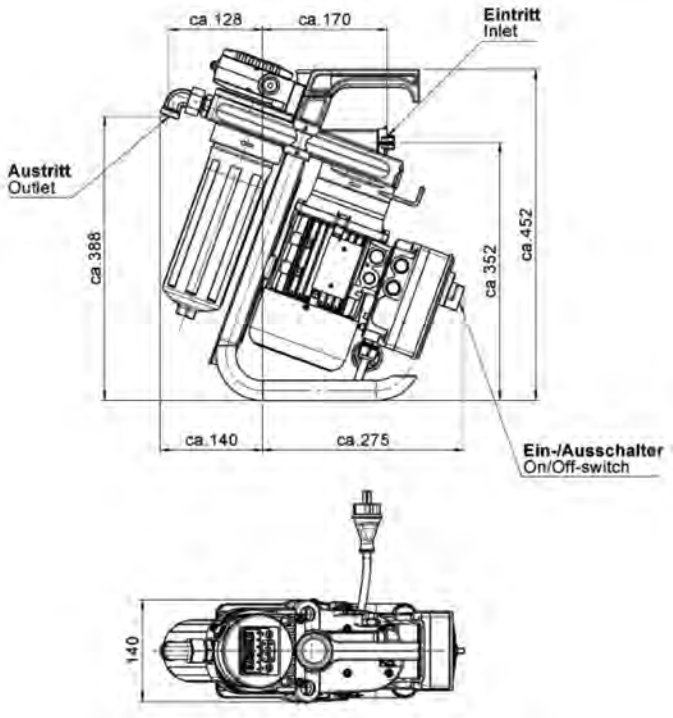
Accessories for hoses with threaded connection		
Description	Part no.	Function
MFU-15-SKDK-LF	4270559	Lance[1] (length of 1.30 m)
MFU-15-SKDK-SF	4270560	Suction filter[1]
MFU-15-SKDK-ZWF	4270518	Counter
MFU-15-SKDK-ZPF	4270561	Pump nozzle[2]
MFU-15-SKDK-ZPWF	4270519	Pump nozzle + counter[2]

[1]max. viscosity 200 mm²/S
[2]max. operation duration of the unit with closed pump nozzle of 5-10 min.

Dimensions – HFS-15E



Dimensions – HFS-10P



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

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) BackPack version - 39 lbs (17.7 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

Model Code

OF7-BC - K - 1 - 09 - MXxx - MXxx - B - E

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 (ßx(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 (ßx(c) ≥ 1000)
MXAM* = Aquamicron® Water Removal

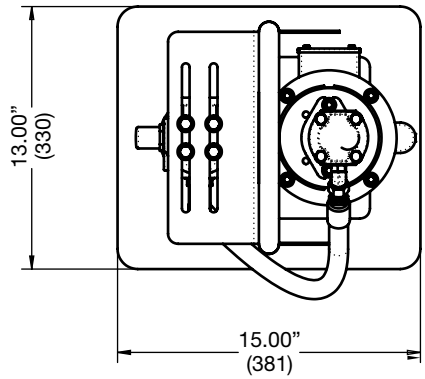
Seals
B = Buna

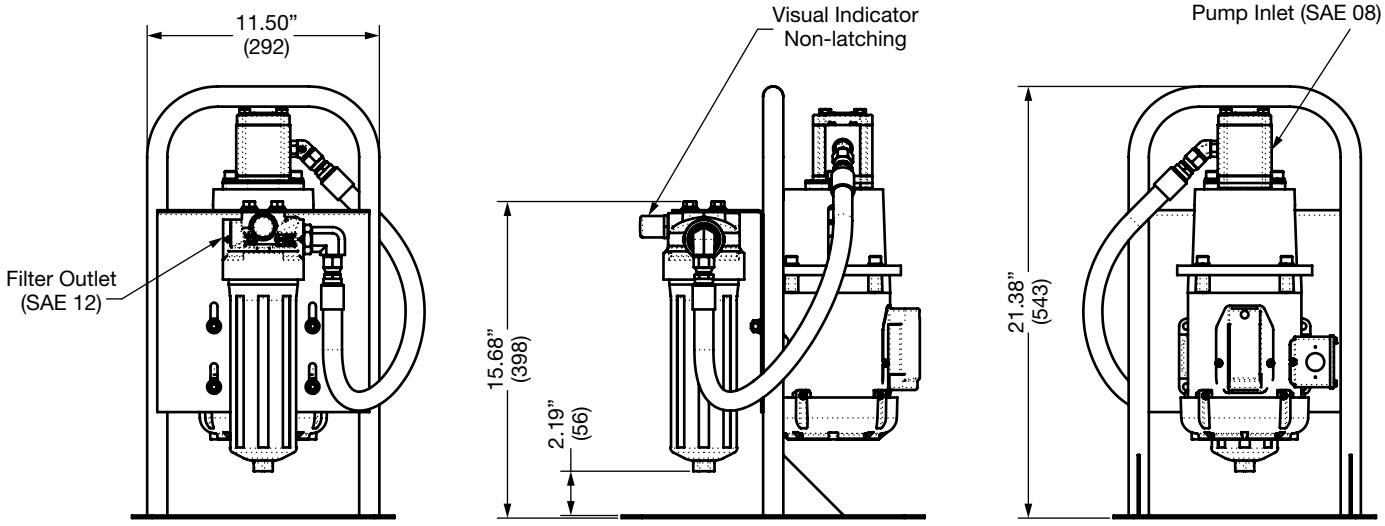
Clogging Indicator
E = Standard Visual Indicator

Options
BP = BackPack Version (Single Housing Only)

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

Dimensions





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

OFCD-BC Series

Compact Dual Stage Filtration System Basic Cart

Description

The HYDAC Basic Cart Mobile 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 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 - 10

Series
OFCD-BC = Compact Dual Stage Filter System Basic Cart

Number of Elements
1 = 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, MX20 = Betamicron® Absolute Filtration Rating (ßx(c) ≥ 1000)
MXAM* = Aquamicron® Water Removal

Element Size *(BN only - AM has no rating) (microns)*
MX03, MX05, MX10, MX25 = Betamicron® Absolute Filtration Rating (ßx(c) ≥ 1000)
MXAM* = Aquamicron® Water Removal

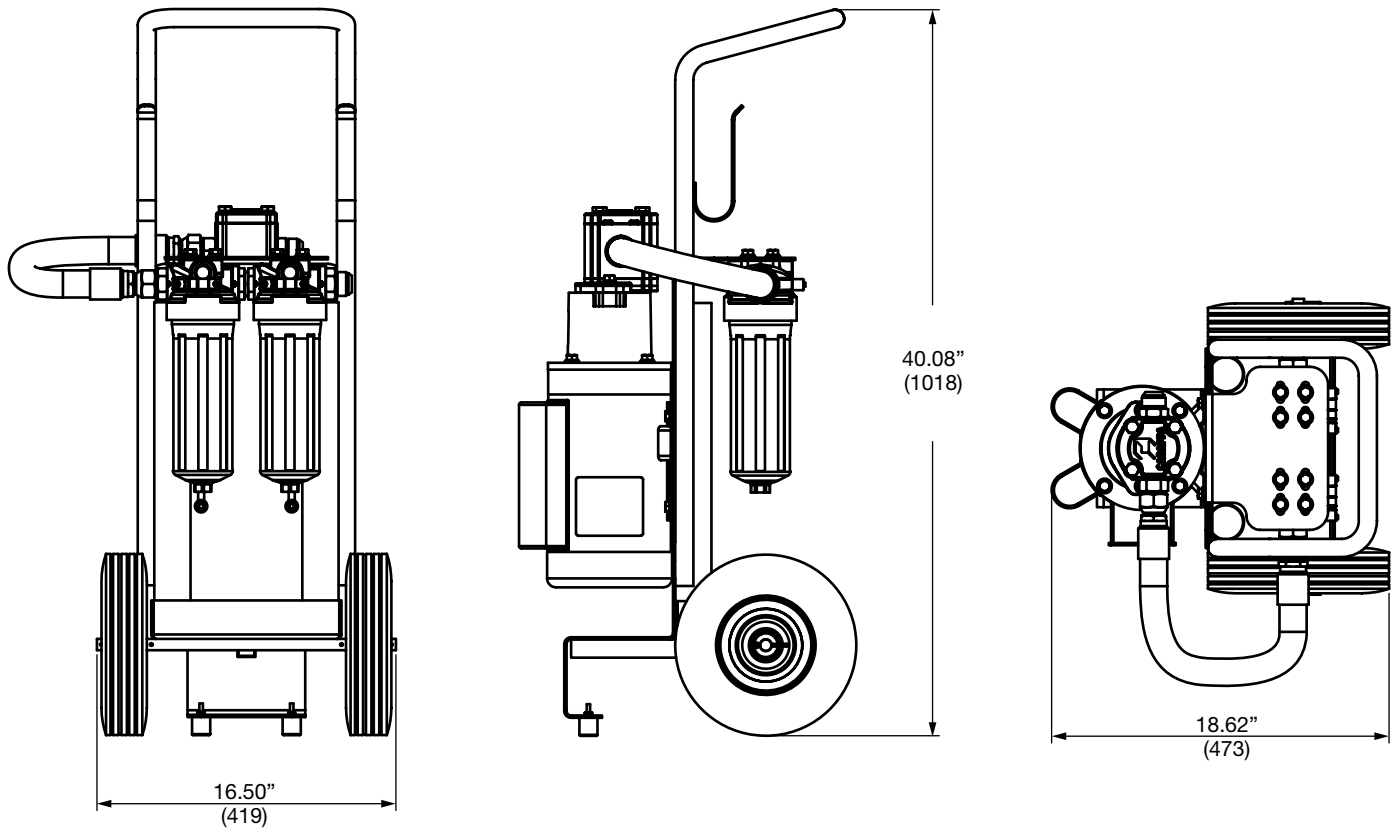
Seals
B = Buna

Pump
10 = 10 gpm

Voltage
(Omit) = 115 VAC 60 Hz
A = 230 VAC 60 Hz
B = 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.

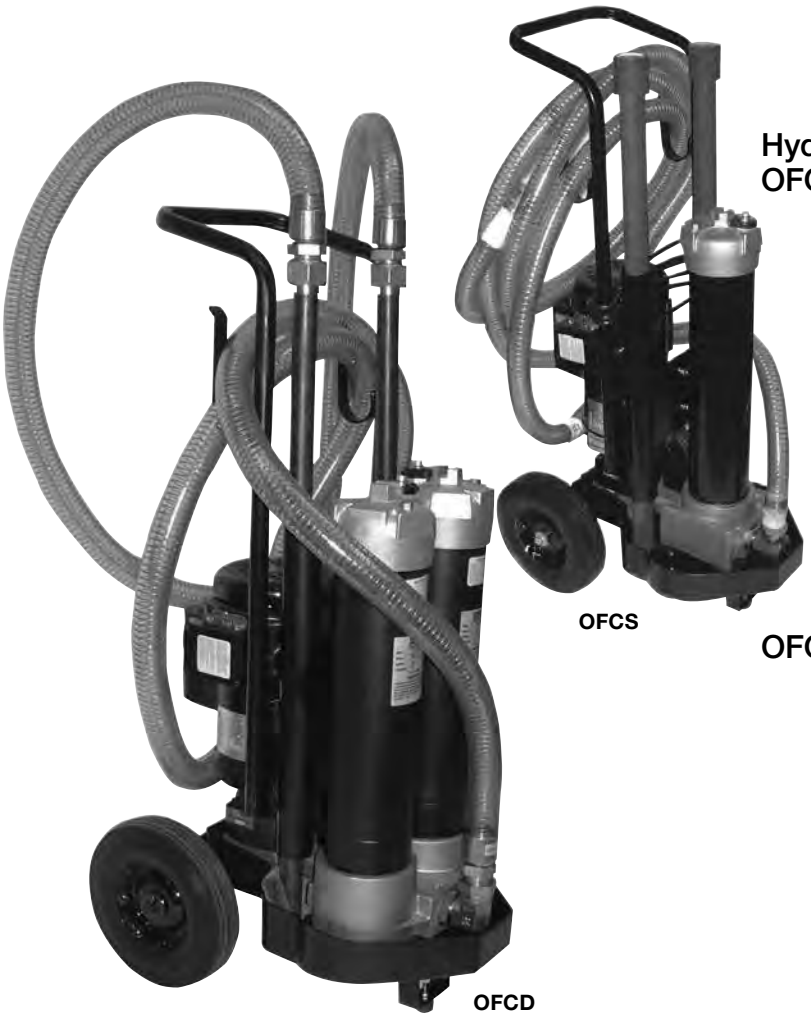
Dimensions



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

OFCS & OFCD Series

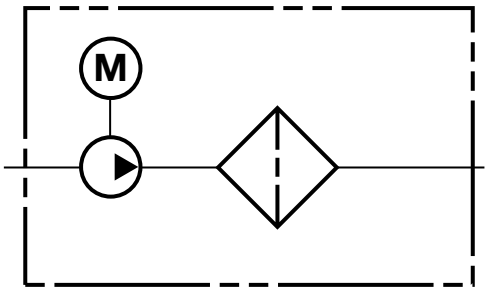
Single & Dual Stage Filtration Systems



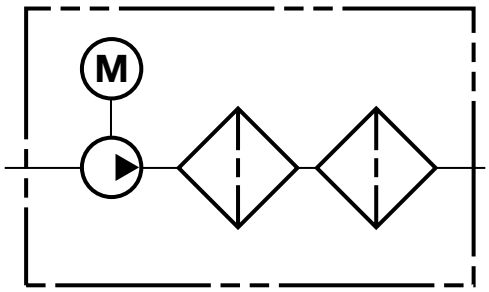
OFCS

OFCD

Hydraulic Schematics
OFCS Series



OFCD Series



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

Technical Specifications

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 - lbs (kg) 7 gpm 14 gpm	OFCS 190 (86) 197 (89)	OFCD 220 (100) 227 (103)

PN#02075860 / 05.21 / FSP2105-2273

Model Code

OFCD __ - 27 - BN 10 - BN 10 - B - A - 14 - G2187

Series
- OFCS = Single Filter System
- OFCD = Dual Filter System

Pneumatic Option
- *(omit)* = Electric motor *(standard)*
- P = Pneumatic motor only

Element Length
- 1-09 = One 9" Element Supplied
- 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" Elements supplied

Filter Media
- BN = Betamicron® Low Collapse
- AM* = Aquamicron® Water Removal
- G = Betamicron GeoSeal®

Filtration Rating *(BN only - AM has no rating) (microns)*
- 3, 5, 10, 20 = Betamicron® (BN/HC) Absolute Filtration Rating ($\beta_{x(c)} \geq 1000$)

Filter Media *(OFCD only)*
- BN = Betamicron® Low Collapse
- AM* = Aquamicron® Water Removal
- G = Betamicron GeoSeal®

Filtration Rating *(BN only - AM has no rating) (microns) (OFCD only)*
- 3, 5, 10, 20 = Betamicron® (BN/HC) Absolute Filtration Rating ($\beta_{x(c)} \geq 1000$)

Seals
- B = Buna N
- V = FPM

Voltage
- *(omit)* = 115 VAC 60HZ/1Phase
- A = 230 VAC 60HZ/3Phase
- B = 460 VAC 60HZ/3Phase
- C = 220 VAC 50HZ/1Phase
- D = 230 VAC 60HZ/1Phase

Pump Size
- 07 = 7 gpm
- 14 = 14 gpm

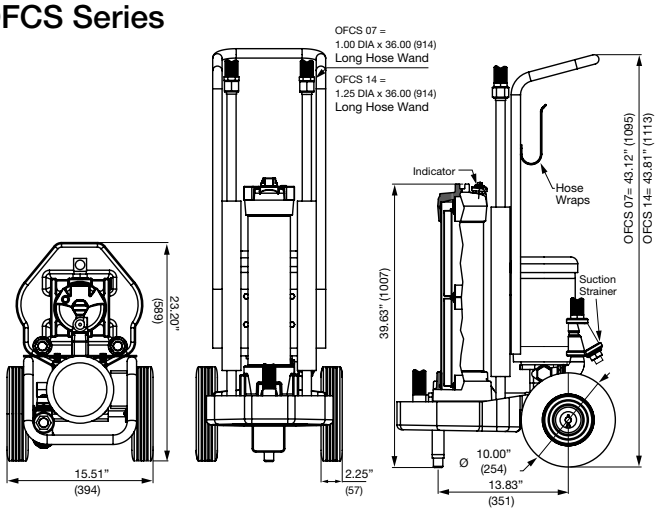
Options
- G2185 = for 14 gpm unit; up to 2500 SUS fluids; flow reduced to ~10 gpm
- G2187 = for 7 gpm unit; up to 2500 SUS fluids; flow reduced to ~3 gpm
- PC = HyTRAX Contamination Monitoring Unit *(will work with G2185 option for oils up to 2500SUS)*
  Note: Particle Counter Option only available in 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.

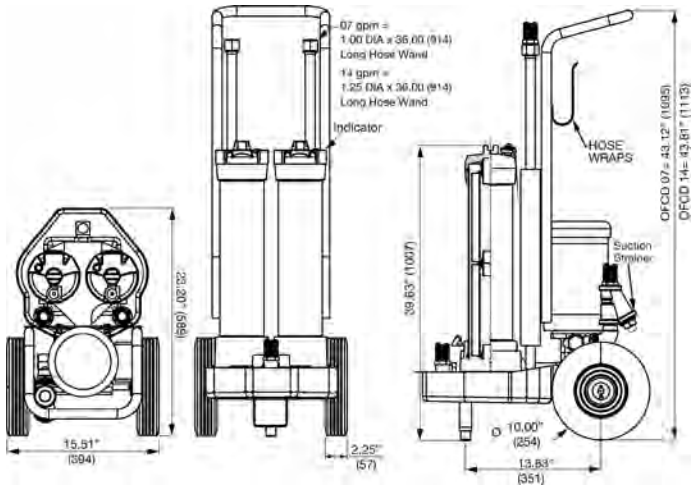
Model Codes Containing RED are non-standard items – Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability

Dimensions

OFCS Series



OFCD Series

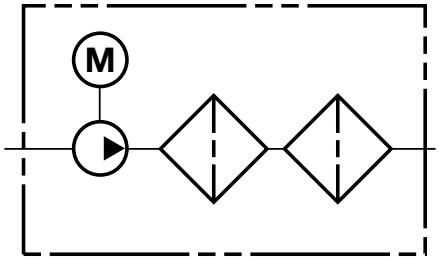


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

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

Technical Specifications

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)
	1.5HP 110VAC/60HZ (10gpm)

Model Code

OFCD-MV - 18 - G 10 - G 10 - V - 6

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)*
3
5
10
20
Betamicron® (BN/HC)
Absolute Filtration Rating
($ß_{x(c)} \geq 1000$)

Filter Media
G = Betamicron GeoSeal®
GAM* = Aquamicron® Water Removal

Filtration Rating *(G only - GAM has no rating) (microns)*
3
5
10
20
Betamicron® (BN/HC)
Absolute Filtration Rating
($ß_{x(c)} \geq 1000$)

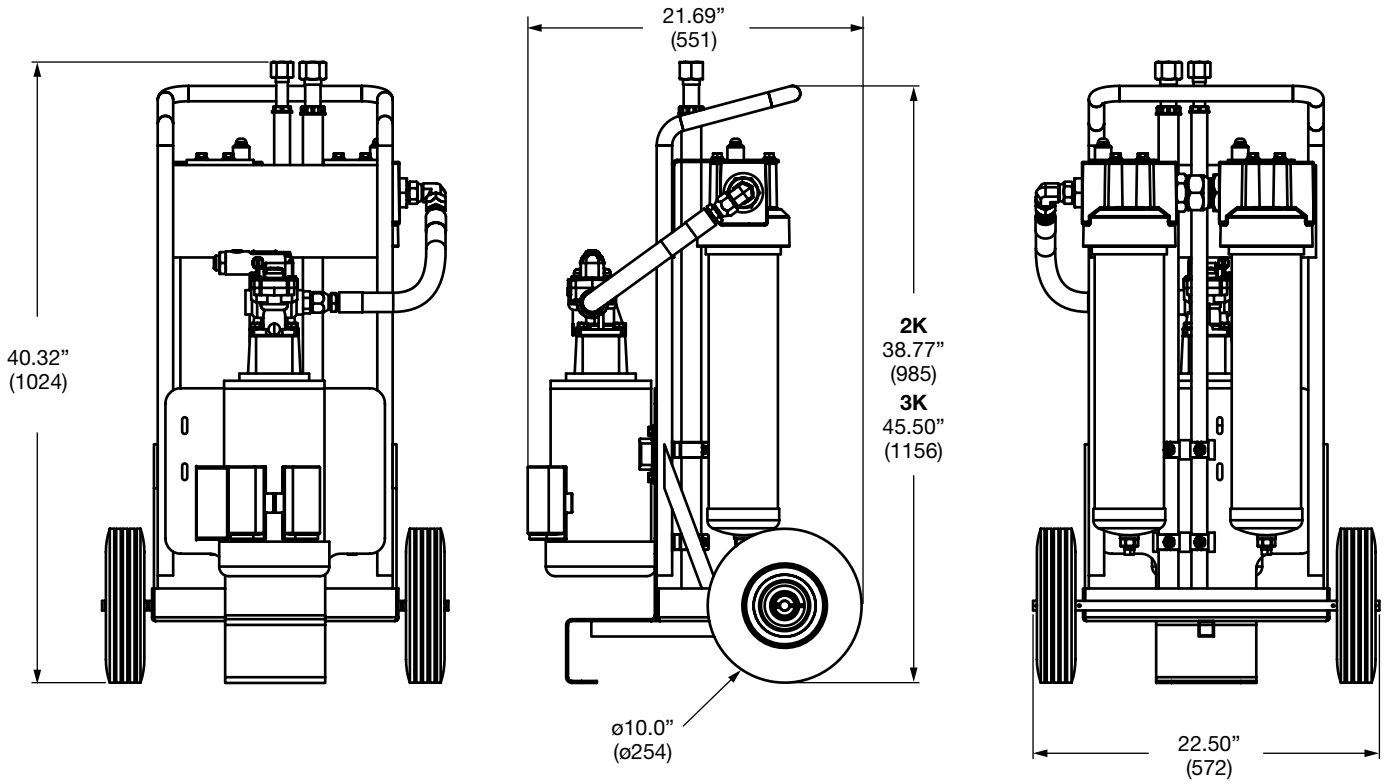
Seals
V = FPM

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

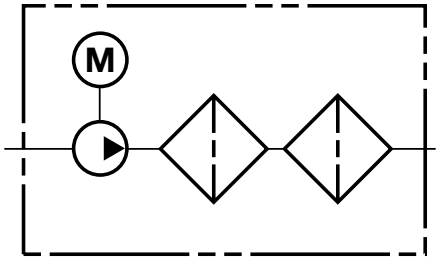


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

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.

Technical Specifications

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

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

PN#02075860 / 05.21 / FSP2105-2273

Model Code

OFCD-HV - 27 - BN 10 - BN 10 - B - 3

Series
- OFCD-HV = Dual Filter System

Element Length
- 18 = One 18” element supplied per housing
- 27 = One 27” elements supplied per housing

Filter Media
- BN = Betamicron® Low Collapse
- AM* = Aquamicron® Water Removal
- G = Betamicron GeoSeal®

Filtration Rating *(BN only - AM has no rating) (microns)*
- 3
- 5
- 10
- 20

Betamicron® (BN/HC) Absolute Filtration Rating ($\beta_{x(c)} \geq 1000$)

Filter Media
- BN = Betamicron® Low Collapse
- AM* = Aquamicron® Water Removal

Filtration Rating *(BN only - AM has no rating) (microns)*
- 3
- 5
- 10
- 20

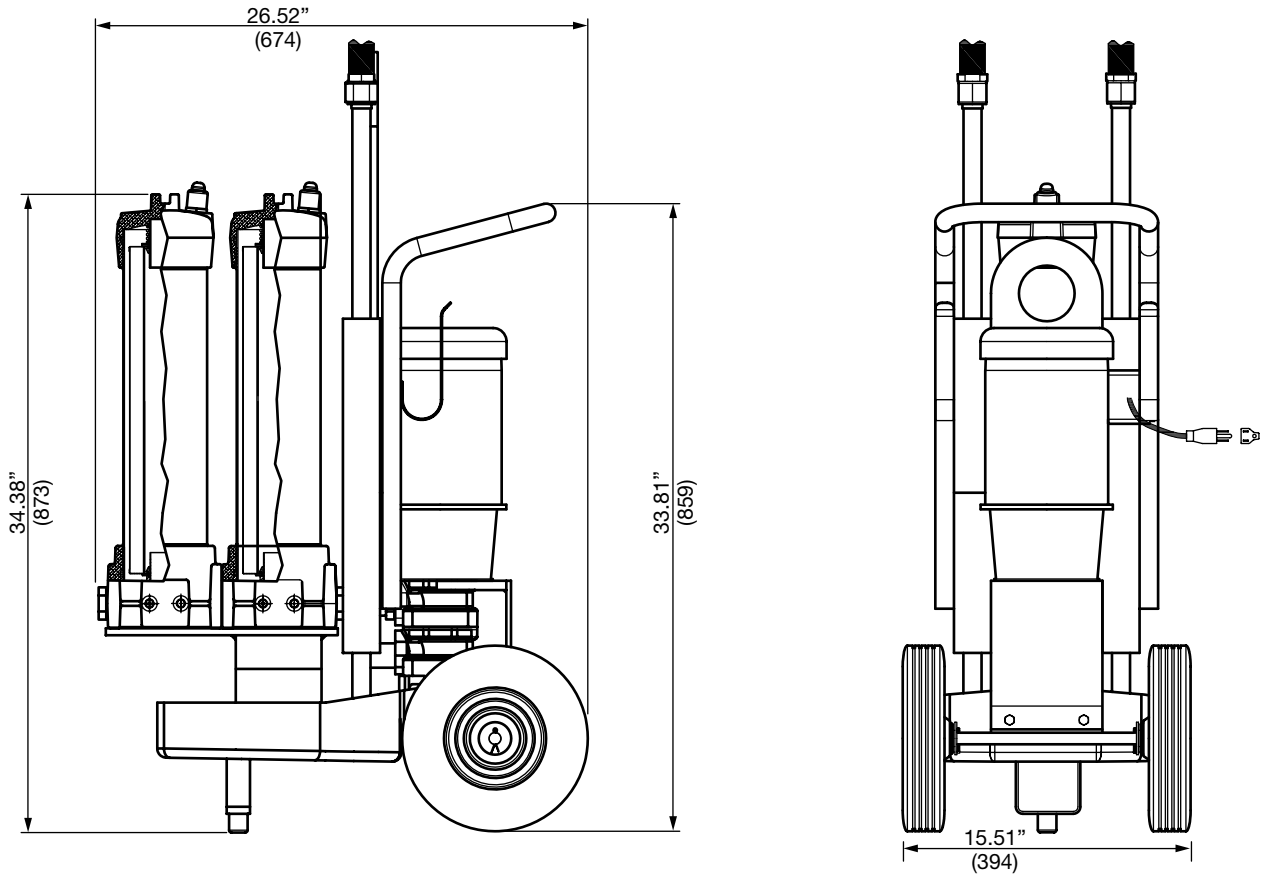
Betamicron® (BN/HC) Absolute Filtration Rating ($\beta_{x(c)} \geq 1000$)

Seals
- B = Buna N
- V = 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



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

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

Technical Specifications

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 Clearance	18” or 27” *(depending on model configuration)*
Weight	245 lbs (112 kg)

PN#02075860 / 05.21 / FSP2105-2273

Model Code

OFS - A - 1 - 27 - BN - 10 - BN - 01 - V - 9 - W

Series
OFS = Filtration Station

Voltage
A = 120 VAC 60 Hz 1 Ph
B = 220 VAC 60 Hz 1 Ph
C = 220 VAC 50 Hz 1 Ph
(A plug is not provided for these options.)

Number of Elements *(18" and 27" housings only)*
1 = Element length must be either 18" or 27"
2 = Two 9" elements per 18" housing
3 = Three 9" elements per 27" housing

Element Length *(18" and 27" housings only)*
09 = Two 9" elements per 18" housing
Three 9" elements per 27" housing
18 = One 18" element per 18" housing
27 = One 27" element per 27" housing

Element Media
BN = Betamicron®
AM* = Aquamicron®

Filtration Rating *(BN only - AM has no rating) (microns)*
01, 03, 05, 10, 25

Element Media
BN = Betamicron®
AM* = Aquamicron®

Filtration Rating *(BN only - AM has no rating) (microns)*
01, 03, 05, 10, 25

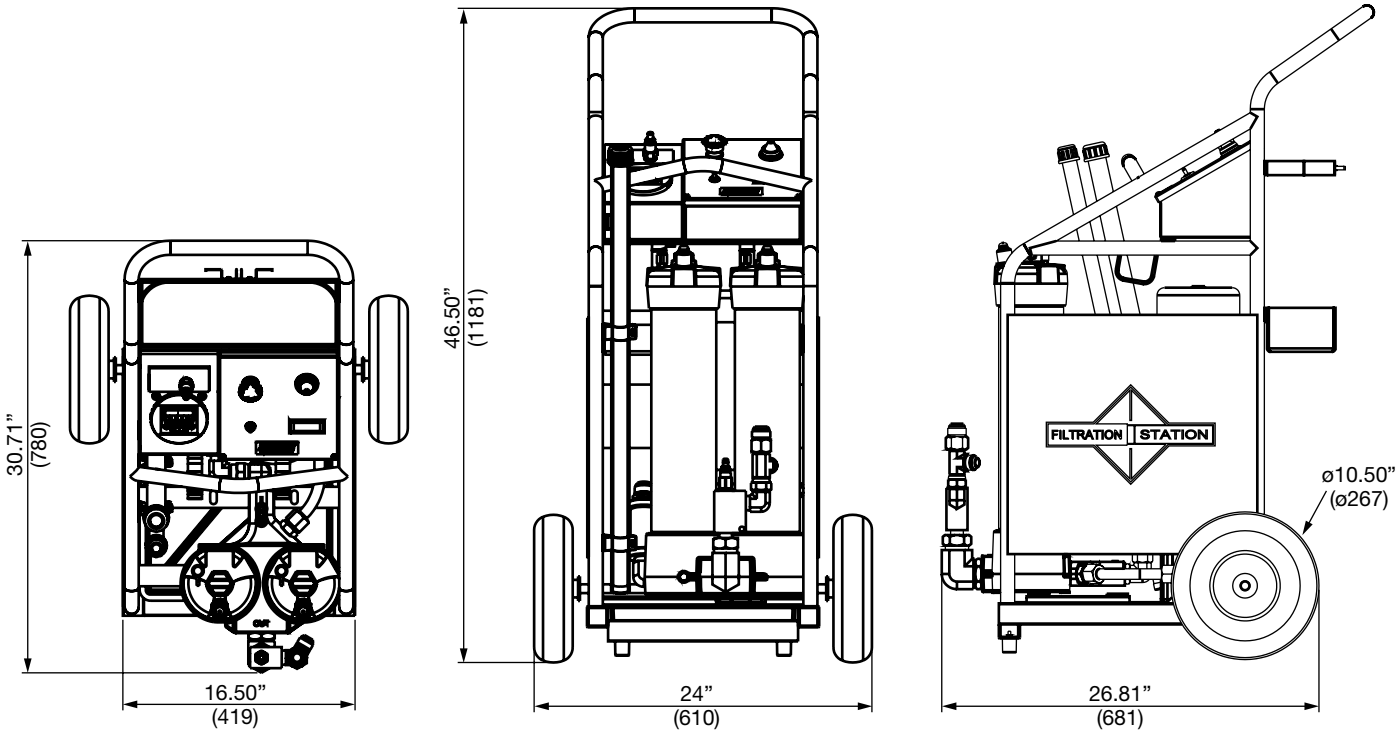
Seals
V = Fluoroelastomer (FPM)
B = Buna N

Pump Size *(gpm)*
9 = Fixed Speed Drive, Gear Pump, 9 gpm
DC = Variable Speed Drive, Gear Pump, 3 to 8 gpm

Options
W = AS1000 Water Sensor *(standard on all units)*

*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



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

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

Technical Specifications

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)

PN#02075860 / 05.21 / FSP2105-2273

Model Code

OFS-AM - 1 - 18 G10 - G05

Series
OFS-AM = Filtration Station for Asset Management

Number of Elements
1 = Element length must be either 18” or 27”

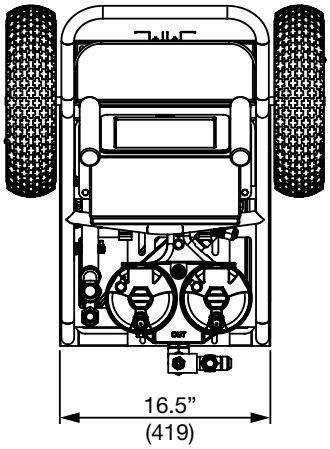
Element Length
18 = One 18” element supplied per housing
27 = One 27” element supplied per housing

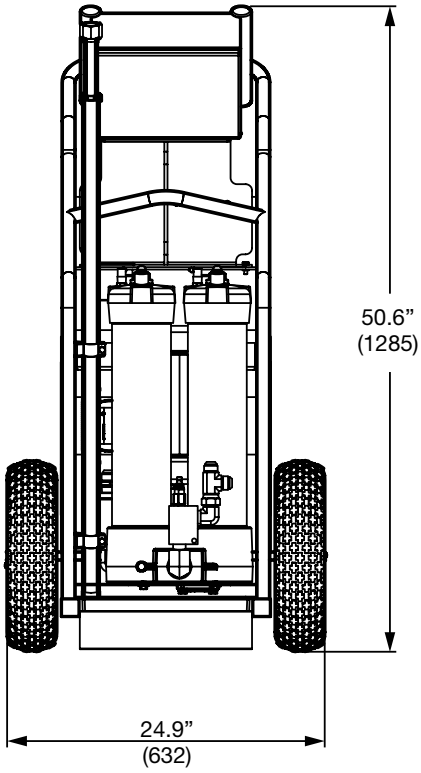
Element Size *(BN only - AM has no rating) (microns)*
G03, G05, G10 = Betamicron GeoSeal® Absolute Filtration Rating ($\beta_{x(c)} \geq 1000$)
GAM* = Aquamicron GeoSeal® Water Removal

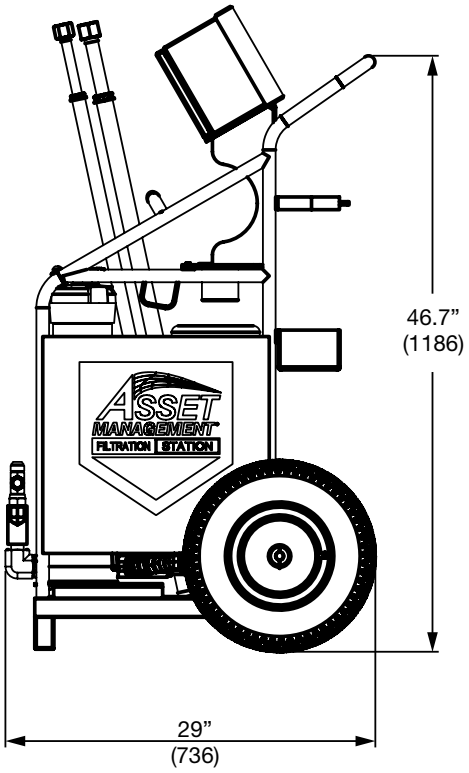
Element Size *(BN only - AM has no rating) (microns)*
G03, G05, G10 = Betamicron GeoSeal® Absolute Filtration Rating ($\beta_{x(c)} \geq 1000$)
GAM* = Aquamicron GeoSeal® Water Removal

*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







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

OF5HS & OF5HD Series

Single & Dual Stage Kidney Loop Systems

OF5HD

OF5HS

Description

HYDAC's off-line Kidney Loop System is a stationary version of the mobile filtration system (OFCS & OFCD). It 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.

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

Technical Specifications

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)

PN#02075860 / 05.21 / FSP2105-2273

Model Code

OF5HD - 27 - BN 10 - BN 10 - B - A - 14 -

Series
- OF5HS = Single Filter System
- OF5HD = Dual Filter System

Element Length
- 1-09 = One 9” Element Supplied
- 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 Media
- BN = Betamicron® AM* = Aquamicron® G = Betamicron GeoSeal®

Filtration Rating *(BN only - AM has no rating) (microns)*
- 3, 5, 10, 25

Element Media *(OF5HD only)*
- BN = Betamicron® AM* = Aquamicron® G = Betamicron GeoSeal®

Filtration Rating *(BN only - AM has no rating) (microns)*
- 3, 5, 10, 25

Seals
- B = Buna N V = FPM

Voltage
- *(omit)* = 115 VAC 60HZ/1Phase
- A = 230 VAC 60HZ/3Phase C = 220 VAC 50HZ/1Phase
- B = 460 VAC 60HZ/3Phase D = 230 VAC 60HZ/1Phase

Pump Size
- 07 = 7 gpm 14= 14 gpm

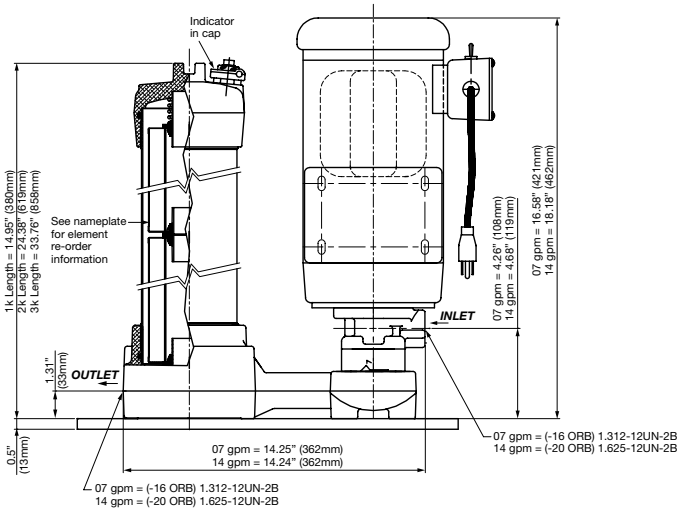
Options
- G2185 = for 14 gpm unit; up to 2500 SUS fluids; flow reduced to ~10 gpm
- G2187 = for 7 gpm unit; up to 2500 SUS fluids; flow reduced to ~3 gpm
- PC = HyTRAX Contamination Monitoring System *Note: Particle Counter Option only available in 115V / 60 Hz power supply*
- CSI = CSI-C-11 Sensor Interface 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)

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.

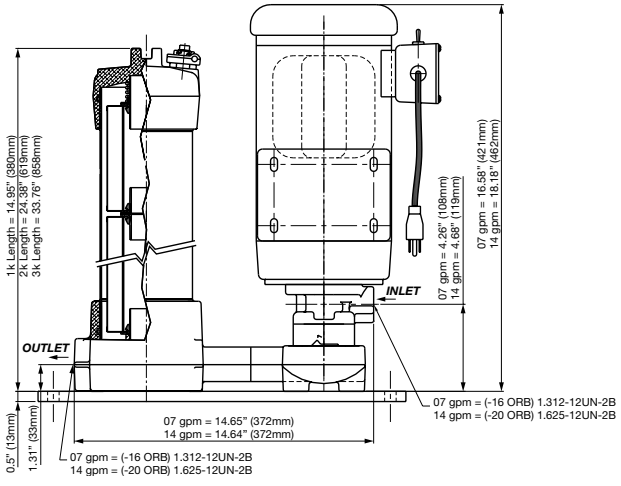
Model Codes Containing RED are non-standard items – Minimum quantities and longer lead times may apply - Contact HYDAC for information and availability.

Dimensions

OF5HS



OF5HD

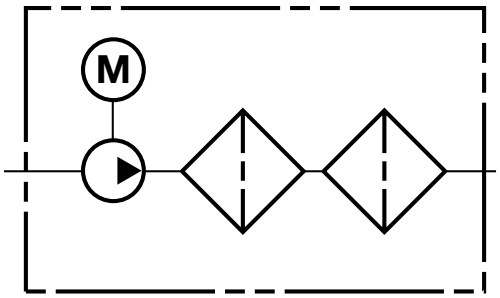


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

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

Technical Specifications

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

PN#02075860 / 05.21 / FSP2105-2273

Model Code

OF5HD-HV - 18 - G10 - G05 - V - G2820

Series
OF5HD-HV = Dual Filter System

Element Length
18 = One 18” Element supplied per housing

Element Size *(BN only - AM has no rating) (microns)*
G03, G05, G10 = Betamicron® Absolute Filtration Rating ($\beta_{x(c)} \geq 1000$)
GAM* = Aquamicron® Water Removal

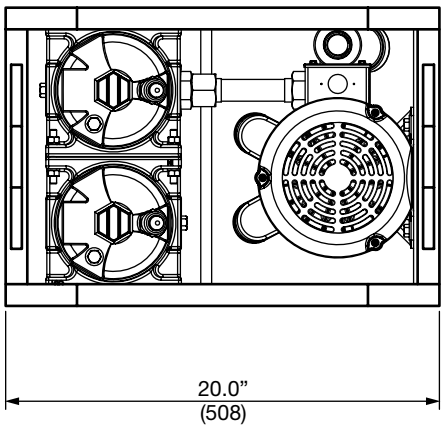
Element Size *(BN only - AM has no rating) (microns)*
G03, G05, G10 = Betamicron® Absolute Filtration Rating ($\beta_{x(c)} \geq 1000$)
GAM* = Aquamicron® Water Removal

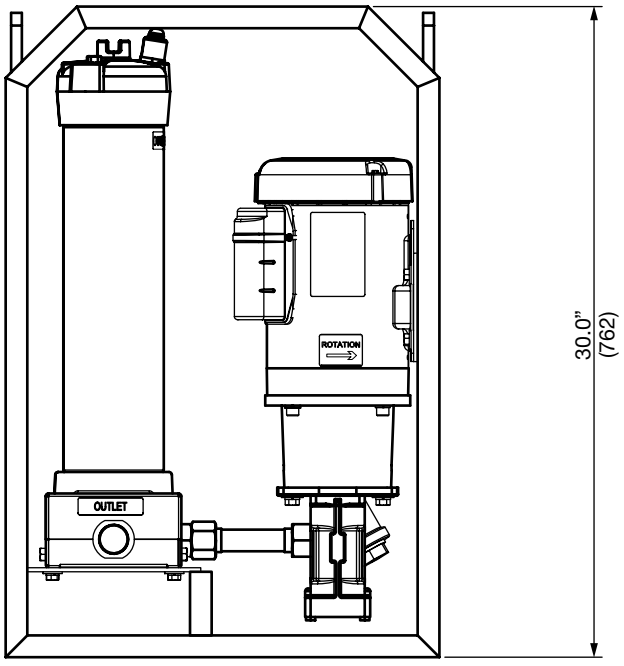
Seals
V = FPM

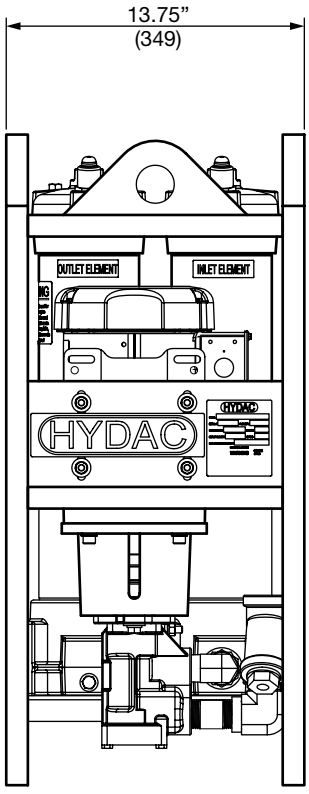
Options
G2820 = High Viscosity Filter Skid with rugged protective frame

*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







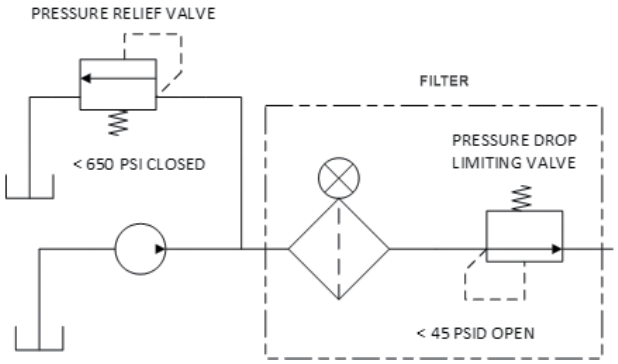
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

MCO Series

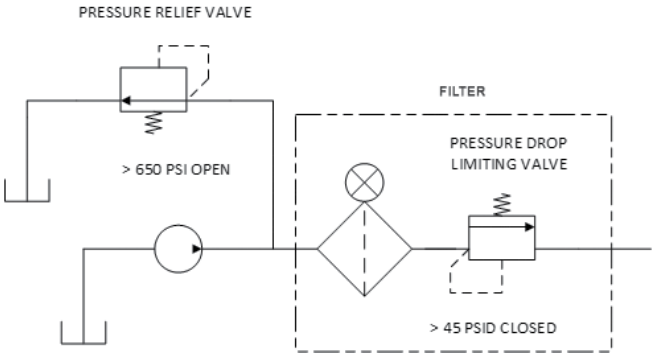
Fail-Safe In-Line Mechanical Clean Oil Dispensing Filter

Hydraulic Schematic

Normal Operation



"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 must
- 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 low cost 150 psi ßeta X ≥ 1000 rated element
- Low element cost is achieved through the use of a unique 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

Technical Specifications

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

PN#02075860 / 05.21 / FSP2105-2273

Model Code

MCO - 3 - 27 - G05 - G03 - G03 - B - S - D5 - RV

Series
MCO = Mechanical Clean Oil Filter System

Number of Housings
1, 2, 3

Element Length
27

Element Micron 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 Micron 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 Micron 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 Material
V = Viton®

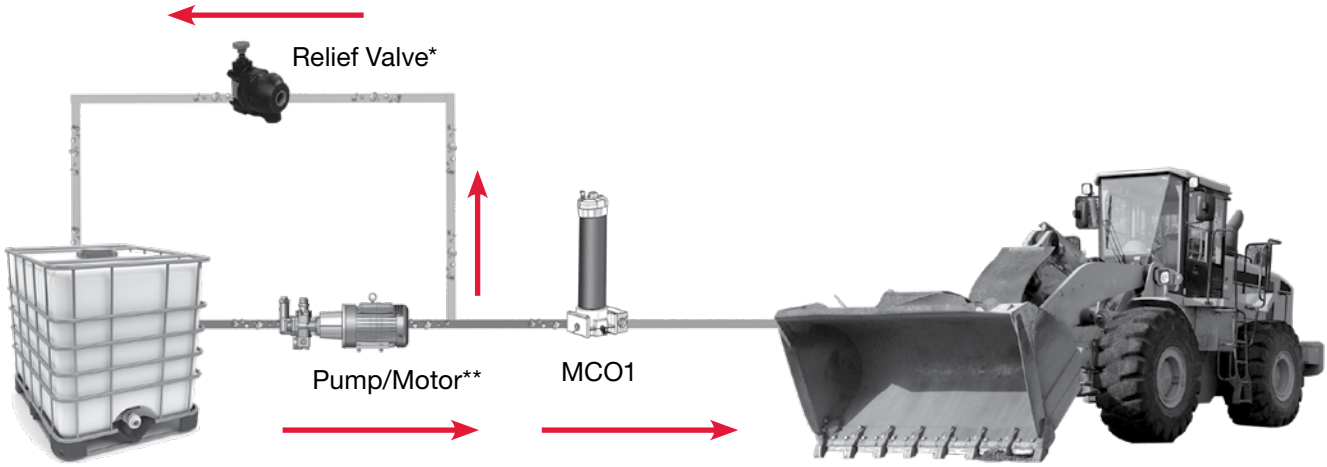
Porting
S = SAE 20
P = 1 1/4 NPTF

Indicator Options *(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.

OFAS & OFAD Series

Single & Dual Stage Air-Operated Kidney Loop Systems

OFAS

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.

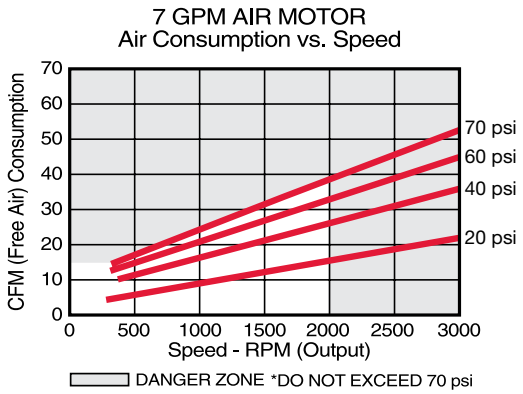
Applications

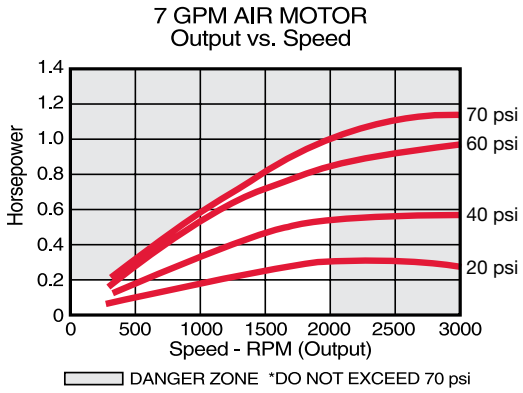
- Supplementing in-line filtration by system filters when adequate turnover cannot be attained
- Large volume systems requiring multiple filters in different locations
- Cleaning up a hydraulic system following component replacement
- Field applications on service trucks

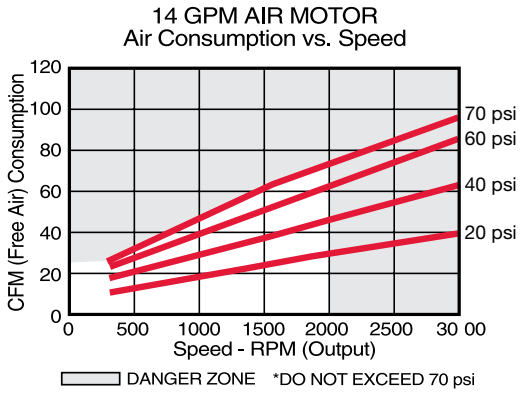
Technical Specifications

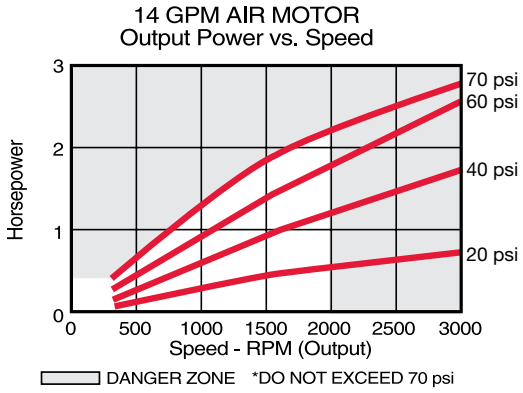
Flow Rating	7 gpm (26.5 L/min) max and 14 gpm (53.0 L/min) max
Maximum Viscosity	1000 SUS (216 cSt) Higher viscosity version available. Contact factory for details
Maximum Operating Temperature	-20° to 150°F (-29° to 65°C) For higher temperature applications contact factory.
Bypass Valve Setting	Cracking: 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)*

Performance









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

Model Code

OFAD - 27 - BN 10 - BN 10 - B - 14

Series
- OFAS = Air Operated Single Filter System
- OFAD = Air Operated Dual Filter System

Element Length
- 1-09 = One 9” Element Supplied
- 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 Media
- BN = Betamicron®
- AM* = Aquamicron®
- G = Betamicron GeoSeal®

Filtration Rating *(BN only - AM has no rating) (microns)*
- 3, 5, 10, 20

Element Media *(OFAD only)*
- BN = Betamicron®
- AM* = Aquamicron®
- G = Betamicron GeoSeal®

Filtration Rating *(BN only - AM has no rating) (microns)*
- 3, 5, 10, 20

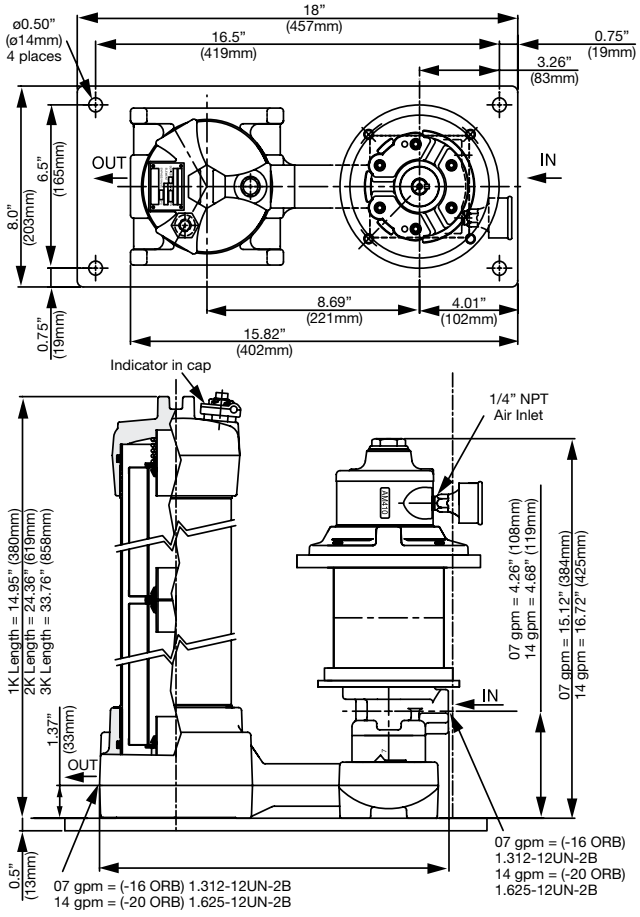
Seals
- B = Buna N

Pump Size
- 07 = 7 gpm
- 14 = 14 gpm

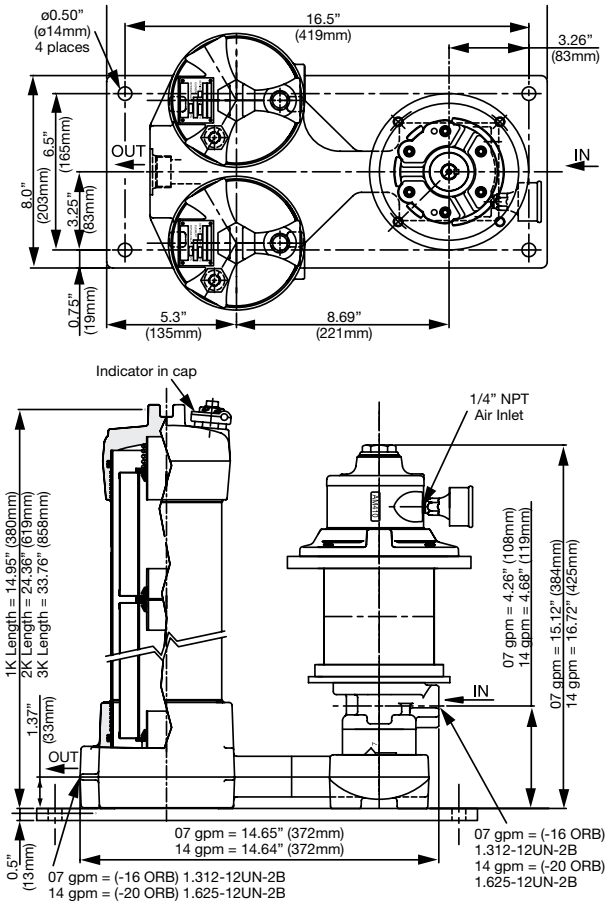
*Aquamicron media should be in the first filter housing followed by the BN media in the second housing.
For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

Dimensions

OFAS



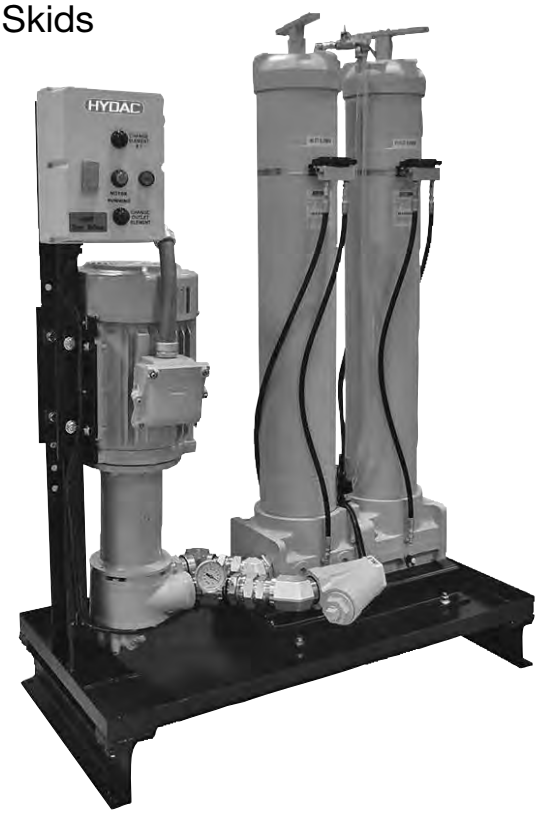
OFAD



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

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 high-capacity 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. *(Refer to Pump, Motor & Weight Data table)* 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	Filter Housing(s)	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")

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Model Code

OFX5 - 37 - H3 - BN - 3 - BN - 3 - B - N - N - B - G - C - P

Series
OFX = Filter Skid

Size
2, 3, 5, 6, 7, 8

Flow Rate
06 = 6 gpm (22.7 lpm) *(size 7 only)*
17 = 17 gpm (64.3 lpm) *(size 2, 3, 5, 6)*
30 = 30 gpm (113.6 lpm) *(size 8 only)*
37 = 37 gpm (140 lpm) *(size 2, 3, 5, 6)*
60 = 60 gpm (227 lpm) *(sizes 2, 5)*
82 = 82 gpm (310.4 lpm) *(size 2 and 5 only)*

Filter Designation
Standard Capacity (S)
S3 = 17, 37 gpm *(sizes 2, 3, 5, 6)*, 82 gpm *(sizes 2 & 5)*

High Capacity (H)
H3 = 6 gpm *(size 7)*, 17 gpm *(sizes 3 & 6)*, 30 gpm *(size 8)*, 37 gpm *(sizes 2, 3, 5, 6)*, 82 gpm *(sizes 2 & 5)*

Filter Media *(first stage all sizes)*
BN = Betamicron®
AM = Aquamicron® water removal

Filtration Rating *(micron) (first stage all sizes)*
3, 5, 10, 20
5, 10, 20
10, 20 *(sizes 7 & 8)*
= BN
10 = AM

Filter Media *(second stage)*
BN = Betamicron®
AM = Aquamicron® water removal

Filtration Rating *(micron) (second stage)*
3, 5, 10, 20
5, 10, 20
10, 20 *(size 8)*
= BN
10 = AM

Seals
B = Buna *(standard)*
H = EPR
V = Fluroelastomer (FPM)

Voltage
N = 230 /460 VAC 3 ph
E = 575 VAC 3 ph *(Built to CSA standards)*

Motor
N = TEFC
W = Washdown *(NEMA Design B)*

Starter Control Options*
N = None
A = 230 VAC
B = 460 VAC
E = 575 VAC

Clogging Indicator
N = Visual pop-up in cap *(standard)*
G = Differential pressure gauge
M = Electric with 12 ft. 4 in. conductor wire
C = Differential pressure gauge with electric switch*

Options
N = None
C = 4 wheeled cart *(sizes 2, 3, 5, 6)*
B = Continuous bleed *(for continuously aerated systems - includes cap vent port, valve and return line)*

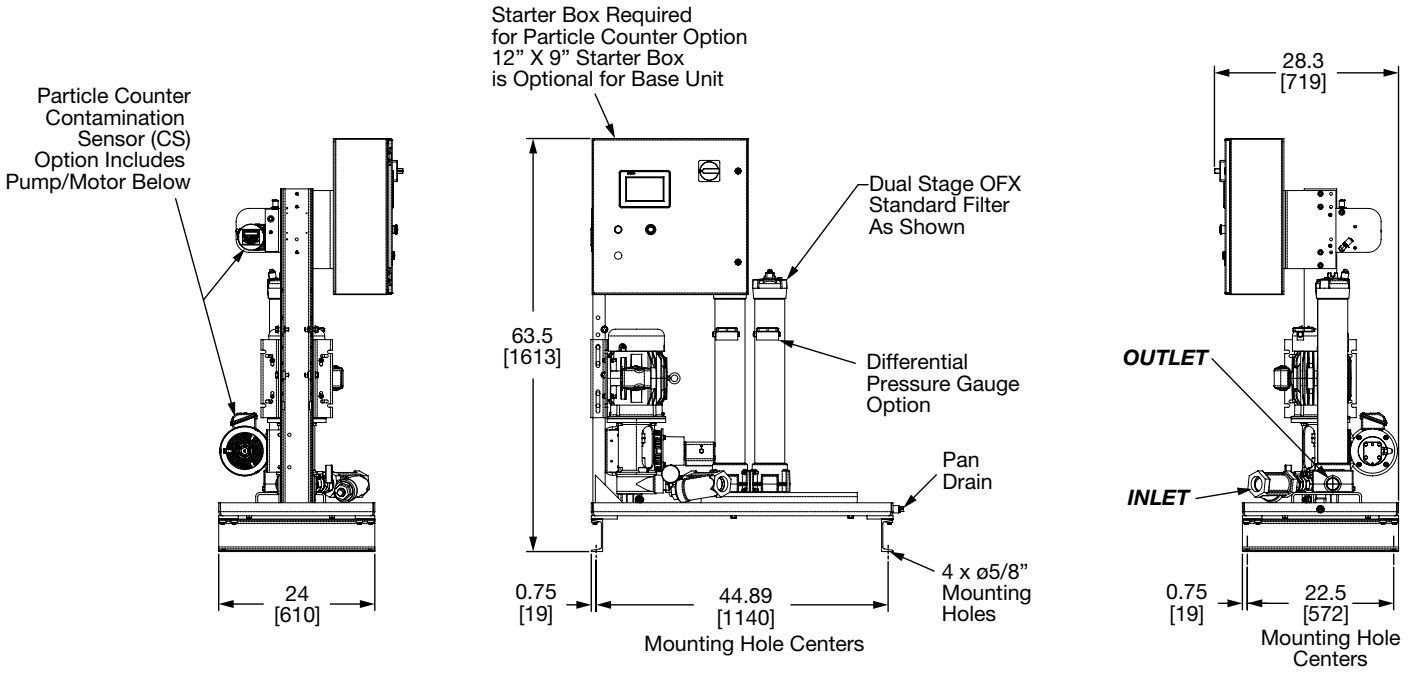
Condition Monitoring
P = Particle Counter (oils to 3500SUS)
CS = CSI-C-11 option
CSI-W = CSI-C-11 with AS1008 option
WD = Water Sensor with Display- AS3008
Omit = No Condition Monitoring Options

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

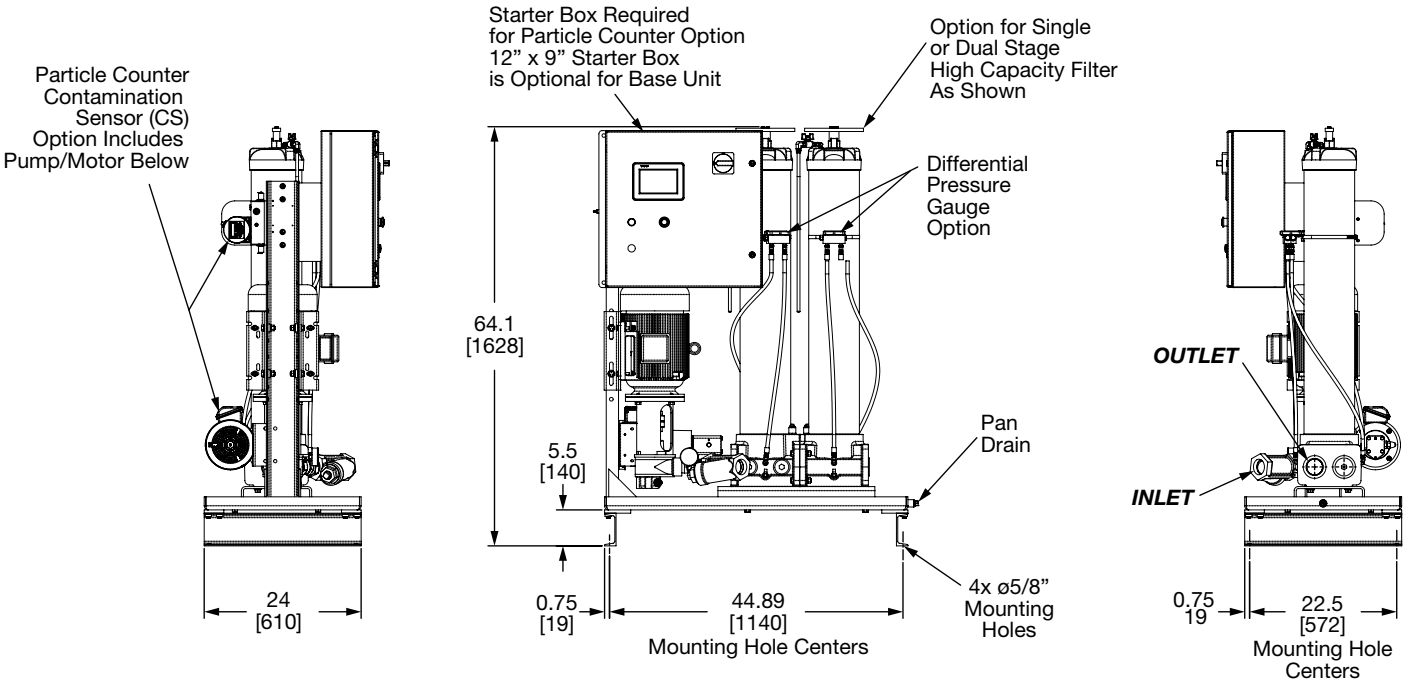
Vacuum Gauge and Suction Strainer Standard on all units

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

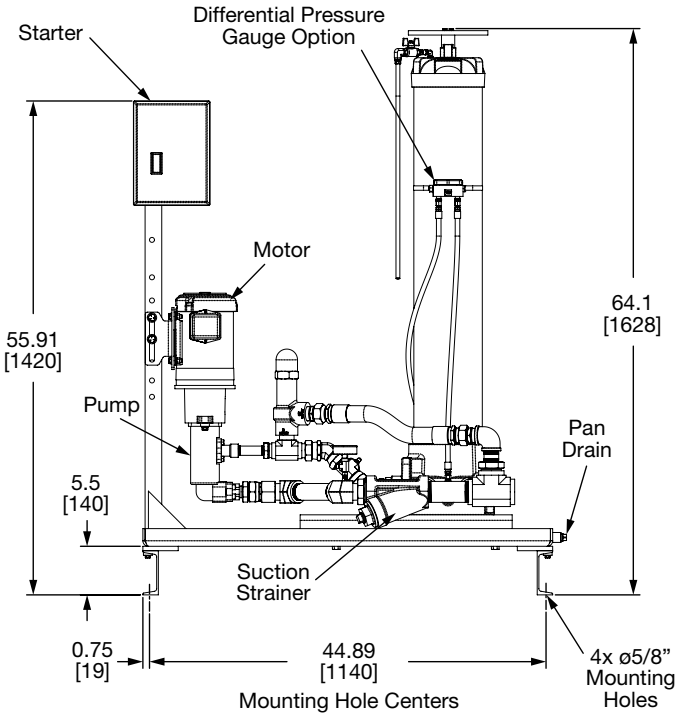


Dimensions
Dual OFX5, & OFX6 Series
with the H3 - high capacity housing option

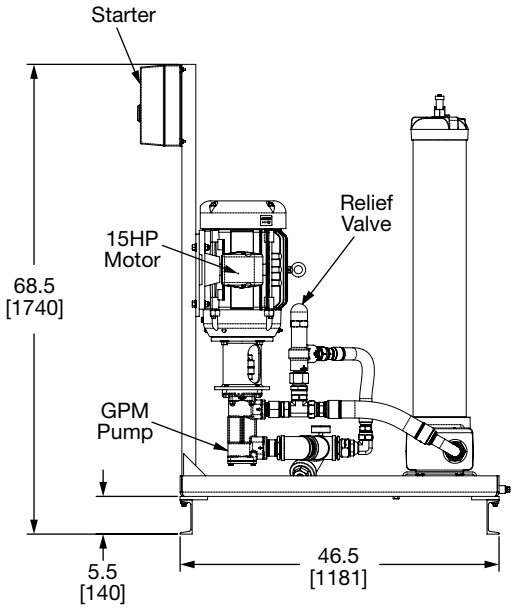


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print. Dimensions shown are in inches [millimeters].

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



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)
X2	17	3	X6	17	5
	37	5		37	10
	60	10			
	82	10			
X3	17	5	X7	06	2
	37	10			
X5	17	5	X8	30	15
	37	10			
	60	10			
	82	15			

Weight Data

Skid Series	Flow (gpm)	Weight (lb)*	Skid Series	Flow (gpm)	Weight (lb)*
X2	17	311-504	X6	17	370-659
	37	348-577		37	502-607
	60	Contact factory			
	82	597-705			
X3	17	340-580	X7	06	Contact factory
	37	461-566			
X5	17	396-684	X8	30	Contact factory
	37	497-849			
	60	Contact factory			
	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].

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

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) min / 725 psi (50 bar) max	
Fluid Temperature:	32° to 175°F (0 to 80°C)	
Ambient Temperature:	-4° to 104°F (-20 to 40°C)	
Seals:	NBR *(standard)*	
Maximum Flow Rate:	OLF-5 = 1.6 gpm (6.1 lpm) OLF-5/15 = 4.9 gpm (18.6 lpm) OLF-5/4 = 1.3 gpm (4.9 lpm)	
Fluids	Standard Mineral Oils / Water/Oil based fluids *(Minimum 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 - ΔP = 36 psi (2.5 bar)	200g ISO MTD *(N5DM...)* / 185g ISO MTD *(N5AM...)*	
Water Retention - ΔP = 36 psi (2.5 bar):	Approximately 0.5 quarts (0.5 liters)	
Beta Ratio:	ßx > 1000 *(absolute value)*	
Maximum ΔP:	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

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Model Code

OLF-5 - S - 120 - K - N5DM002 - E / 12 / CD

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 OLF-5/15 & OLFCM-5/15 only)*

Power Consumption
- 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
- M = 220V single phase
- N = 440V 3 phase
- T = 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 Indicator
- E = Standard gauge *(series 5 & 5/4 only)*
- F = Static electrical switch — VMF2F.0 *(series 5 & 5/4 only)*
- BM = Differential visual — VM2BM.1 *(series 5/15 & 5/4 only)*
- C = Differential electrical — VM2C.0 *(series 5/15 & 5/4 only)*
- D = Differential electrical/visual — VM2D.0/L... *(series 5/15 & 5/4 only)*

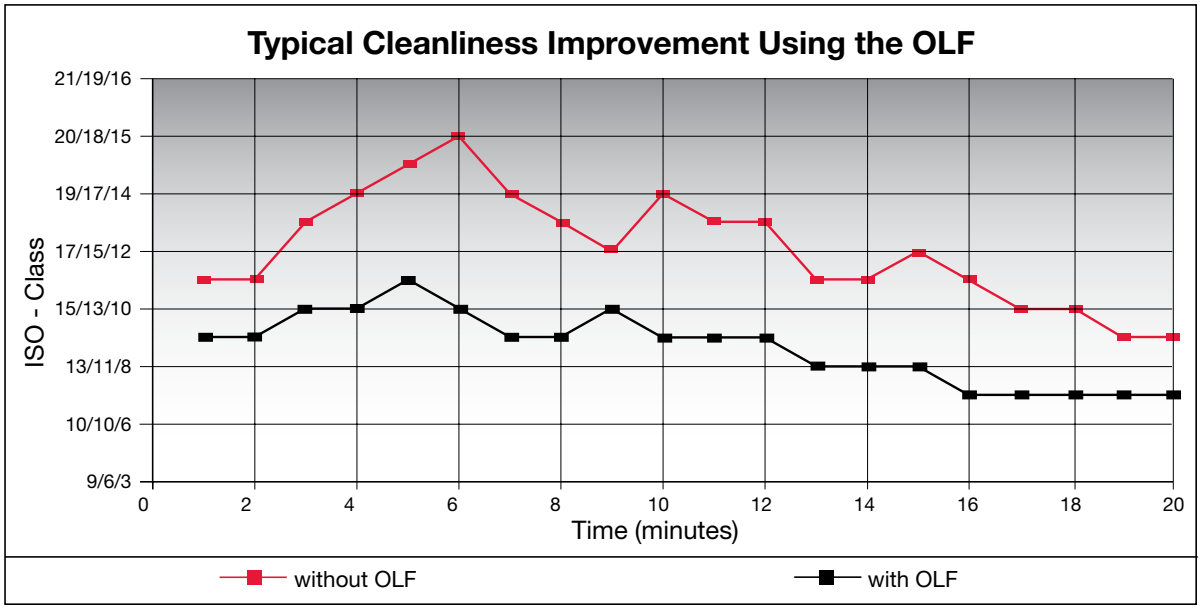
Mechanical Connections
- 12 = SAE Connections *(standard)*

Supplementary Details

L24, L48, L115, L230 = Lamp for D-type clogging indicator *(LXX, XX = voltage)*
- C = 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)*

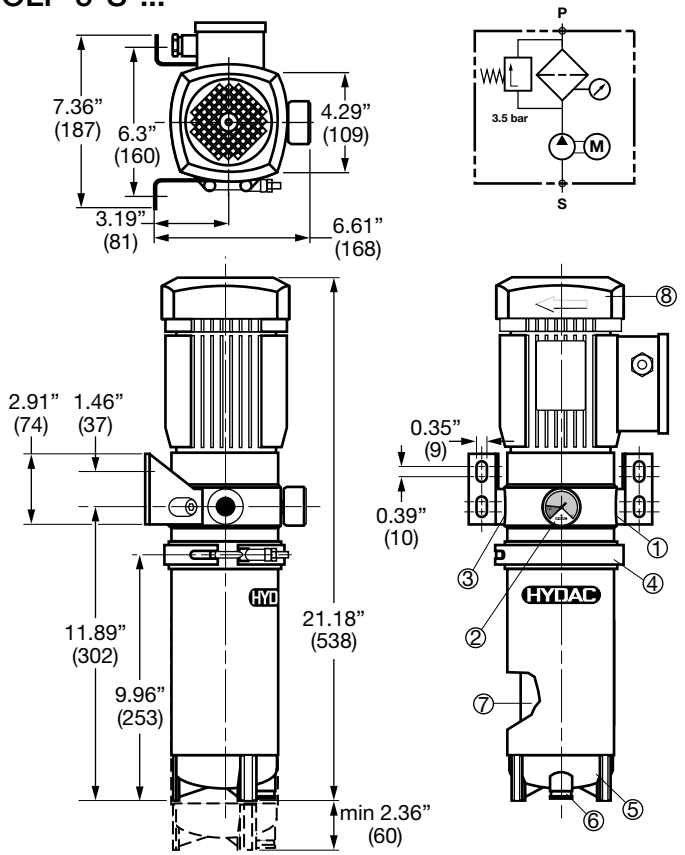
Consult Factory for special options.
Not all combinations available.
*Choose “S” for model without motor-pump and without flow control valve.
For replacement element part numbers, please see Section E - REPLACEMENT ELEMENTS of this catalog.

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

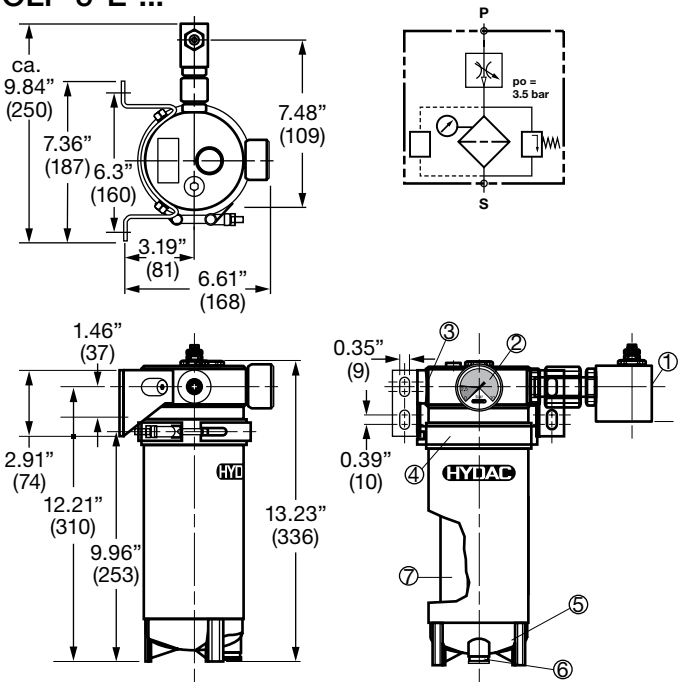


Dimensions

OLF-5-S-...



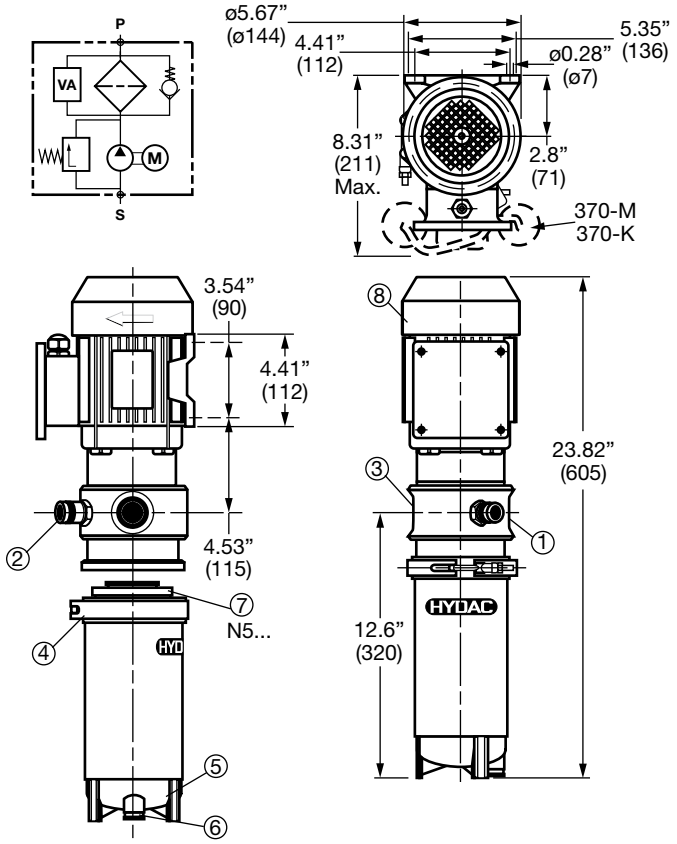
OLF-5-E-...



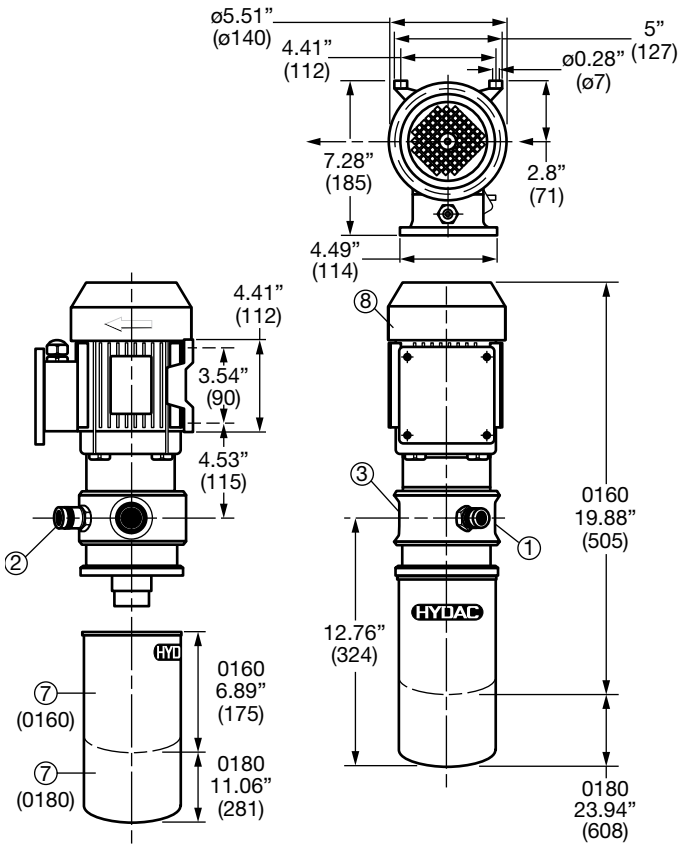
Key

1	=	Inlet	5	=	Filter Bowl
2	=	Clogging Indicator	6	=	Drain
3	=	Outlet	7	=	Filter Element
4	=	Clamp	8	=	Electric Motor

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



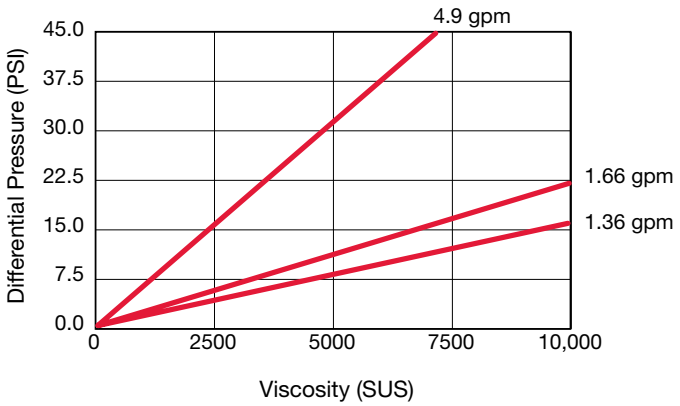
OLF-5/4-SP-...



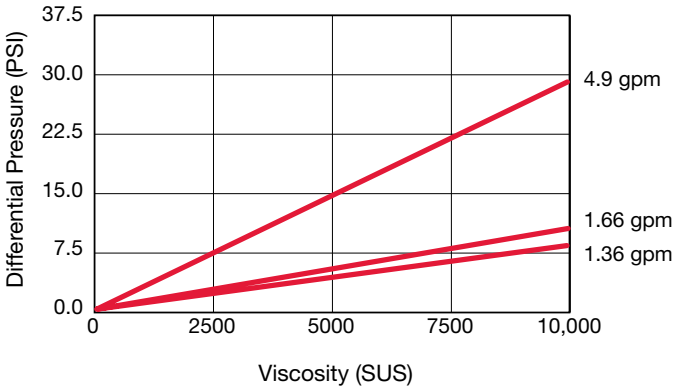
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

Differential Pressure

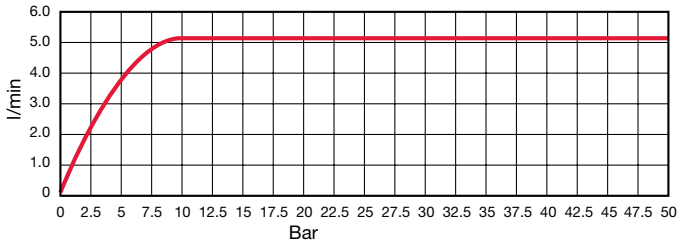
N5DM002



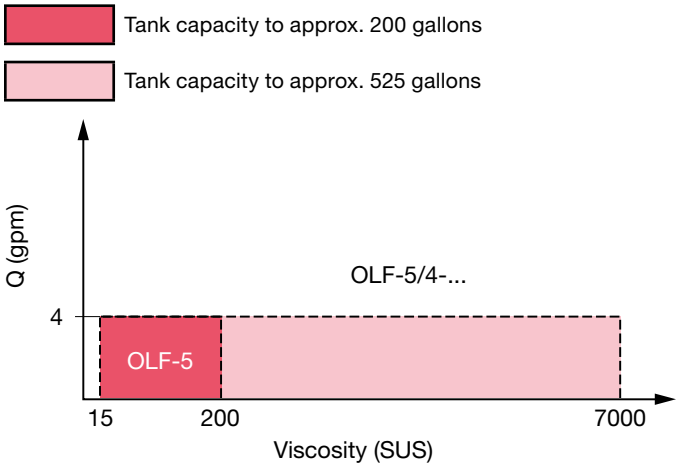
N5DM020



SRV Flow Control Valve Curve



Application



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 (ß2 > 1000) even in a single pass.

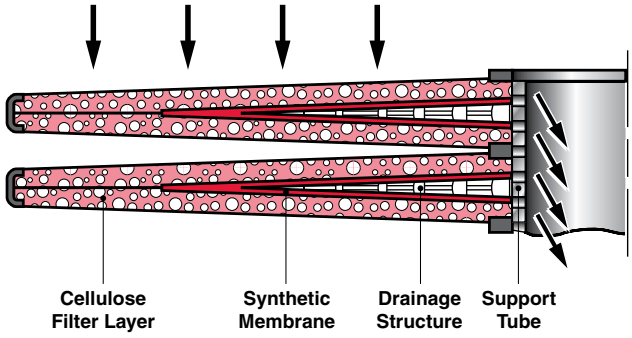
Applications

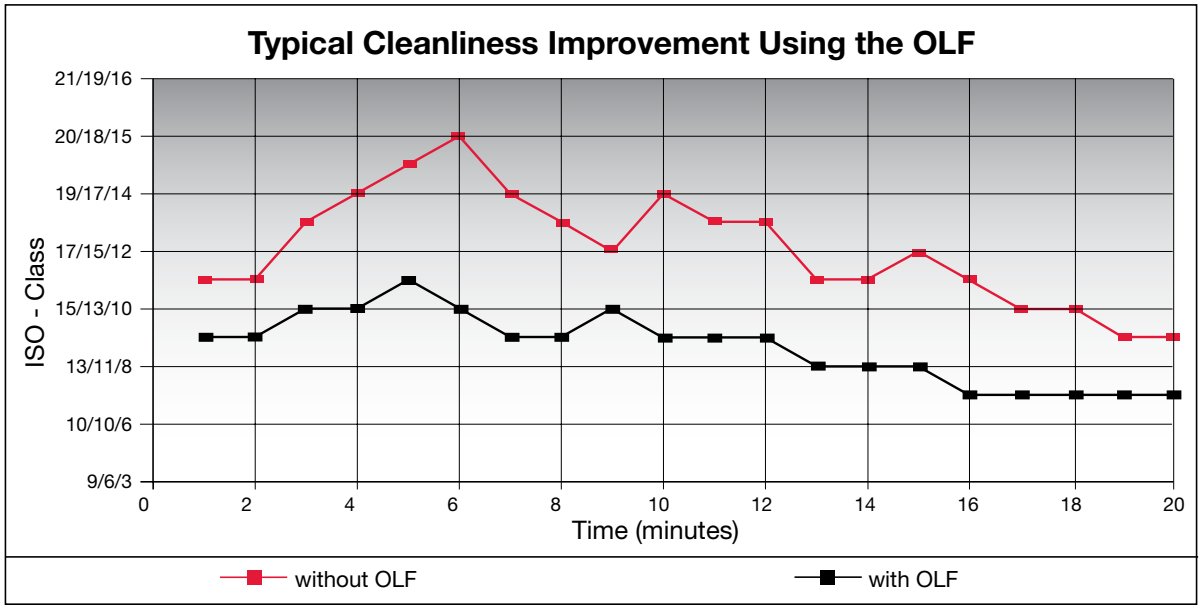
Typical applications include:

- 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 *(2µm 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.





PN#02075860 / 05.21 / FSP2105-2273

Model Code

OLF - 15 / 15 - G - L60 - N15DM002 - E / 12

Series
OLF = Stationary offline filter with integrated pressure gauge

Size
15 = 1 element, 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
45 = 15 gpm
60 = 20 gpm
Z = without pump

This code entry (15,30, 45, 60) must be less than or equal to the size entry (15,30, 45, 60)

Pump Type
G = gear pump
Z = Without motor-pump

Motor Voltage
L60 = 115V, Single Phase
O60 = 460V, Three Phase
Z = Without motor-pump

Filter Element
N15DM002 = Dimicron® 2 µm Absolute
N15DM010 = Dimicron® 10µm Absolute
N15DM020 = Dimicron® 20 µm Absolute
N15DM030 = Dimicron® 30 µm Absolute
Z = No filter element supplied

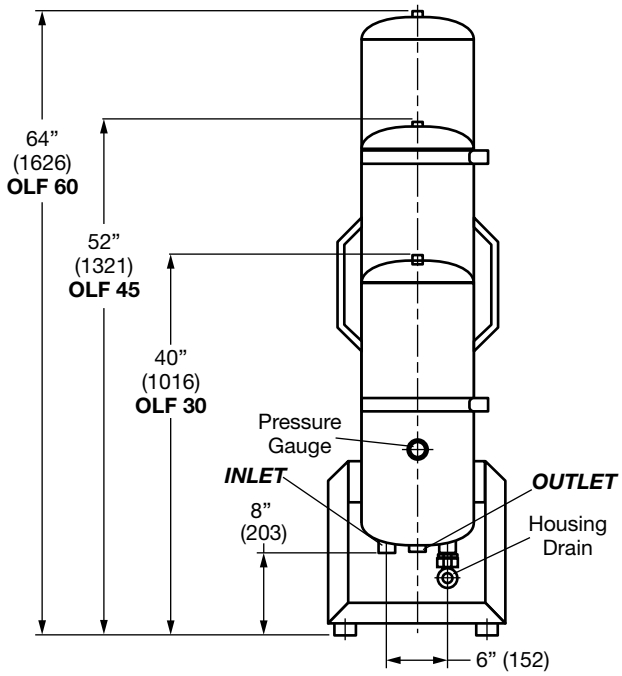
Clogging Indicator

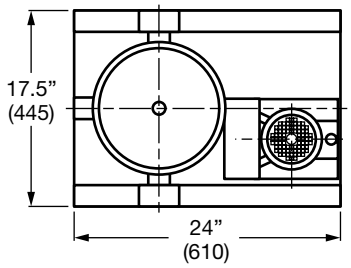
E	= Standard gauge	
BM	= Differential visual	VM2BM.1
C	= Differential electrical	VM2C.0
D	= Differential visual/electrical	

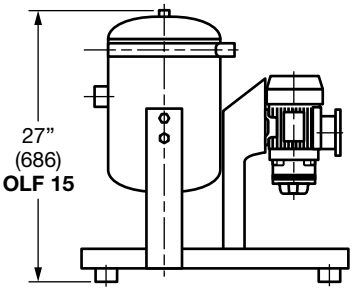
Options
12 = SAE adapters *(supplied as standard)*
V = Viton® Seals *(NBR seals are standard)*
PKZ = On/Off Switch and Overload Protective Motor Switch
C = Cart-style mobile frame
PC = *Hytrax-HV* Contamination Monitoring Unit ***(only with L60 motor voltage**; contact HYDAC for other product configurations)*
CSI = CSI-C-11 Sensor Interface Option for data acquistion *(only with PC option)*
CSI-W = CSI-C-11 Sensor Interface Option for data acquistion 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







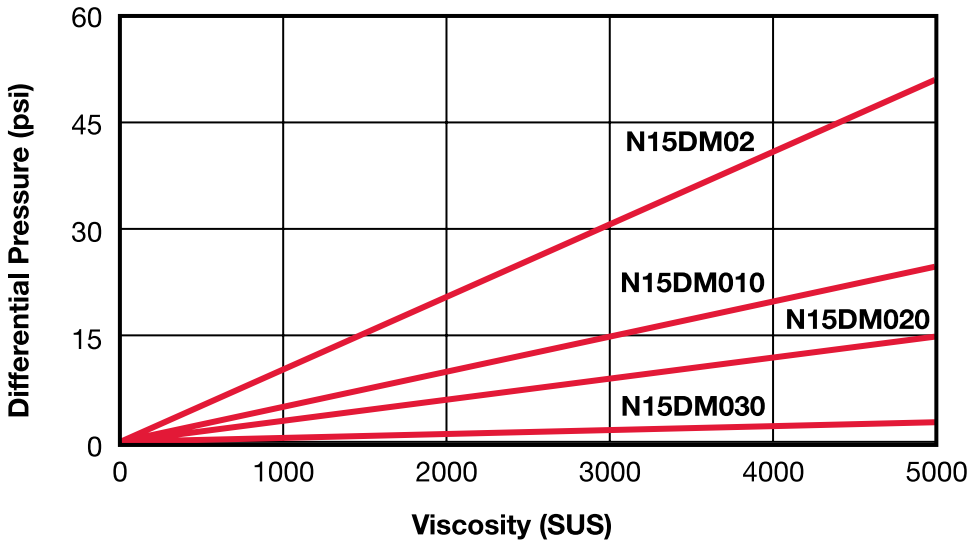
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

Technical Specifications

Model	OLF-15	OLF-30	OLF-45	OLF-60
Connections	Inlet = Female O-Ring Boss; 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	ßx > 1000			
Permissible Δp 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	5.25 gal. (20 l)	10.50 gal. (39.7 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 1078 cSt)			
Gear Pump Motor Capacity	370 W	570 W	1500 W	1500W
Material of Seals - Pumps	NBR *(standard)*			
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)



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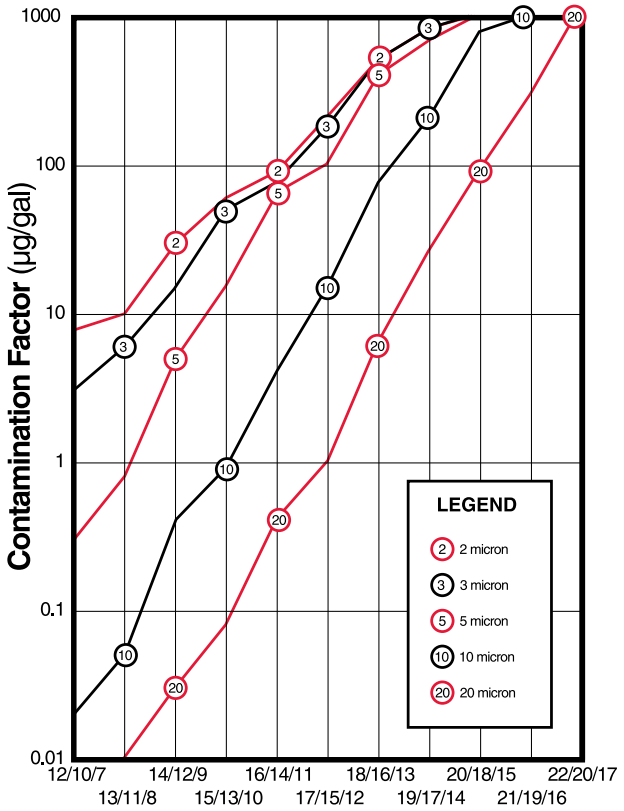
Sizing Offline Filtration

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:

$$\textbf{Contamination Factor} = \textbf{Contamination Input}\ (\mu g/gal) \times \frac{\textbf{Main System Flow Rate}\ (gpm)}{\textbf{Desired Offline Flow Rate}\ (gpm)}$$

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.

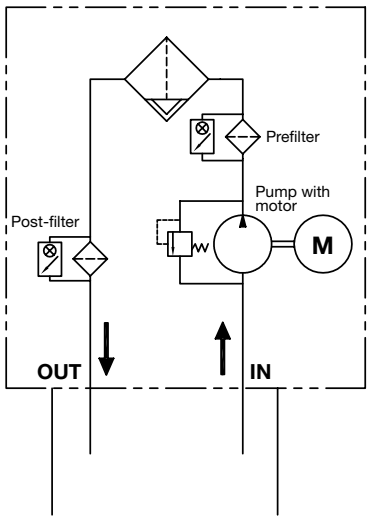
2µm - ISO 17/15/12

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

IXU 1/4 Series

Ion eXchange Unit

Hydraulic Schematic



* optional equipment, see ordering details
VA = Clogging indicator

Description

The user-friendly Ion 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 ≈ 5285 gallons (≈ 20,000 liters) with a volumetric flow of ≈ 2.4 gpm (≈ 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

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* *(empty)*	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.

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Model Code

IXU - 4 - M - G - F - G10 - BM - G05 /-PKZ

Series
IXU = Ion eXchange Unit

Size
1 = 1 Ion eXchange element NAIXE200 ≈ 0.5 gpm (2.2 l/min)
4 = 4 Ion eXchange elements NAIXE200 ≈ 2.4 gpm (8.9 l/min)

Type
M = mobile
S = stationary

Type of pump
G = gear pump
Z = without

Power supply voltage
F = 230 V, 60 Hz, 3 Ph
K = 115 V, 60 Hz, 1 Ph
O = 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 indicator
BM = differential pressure indicator – visual
C = differential pressure indicator – electrical

Postfilter
G05 = with 5µm element
G10 = with 10µm element

Supplementary details
PKZ = with on-off switch and overload protective motor switch (include with Mobile Option)
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

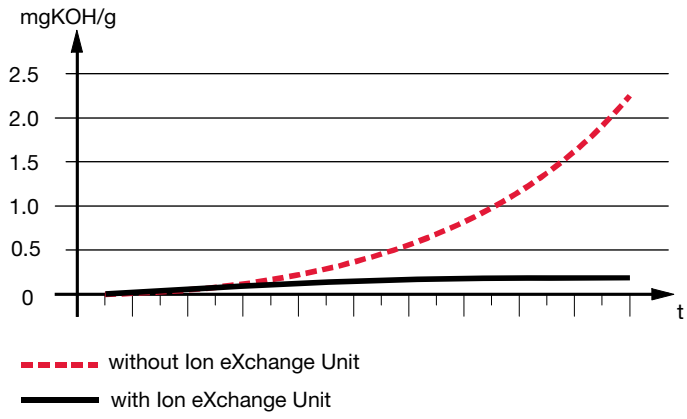
Order examples:

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

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

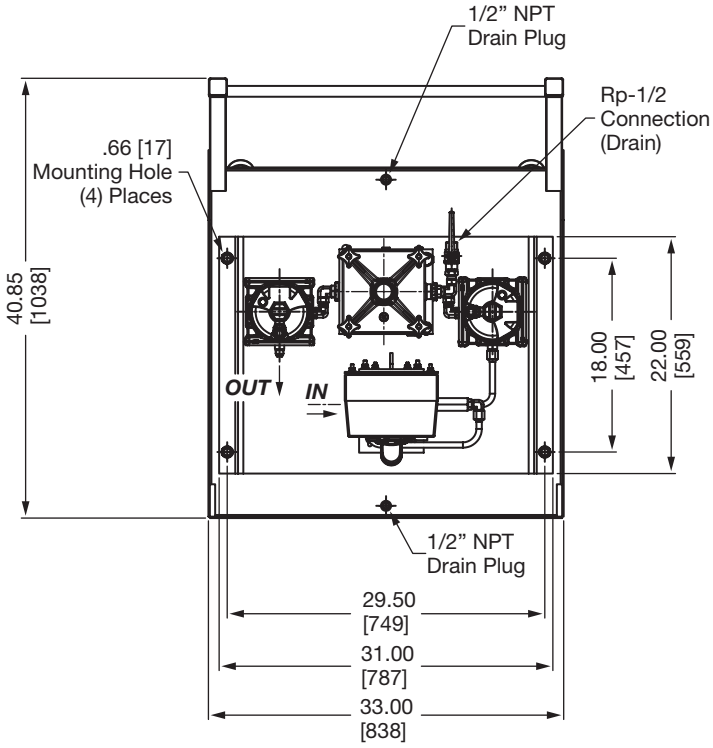
Performance

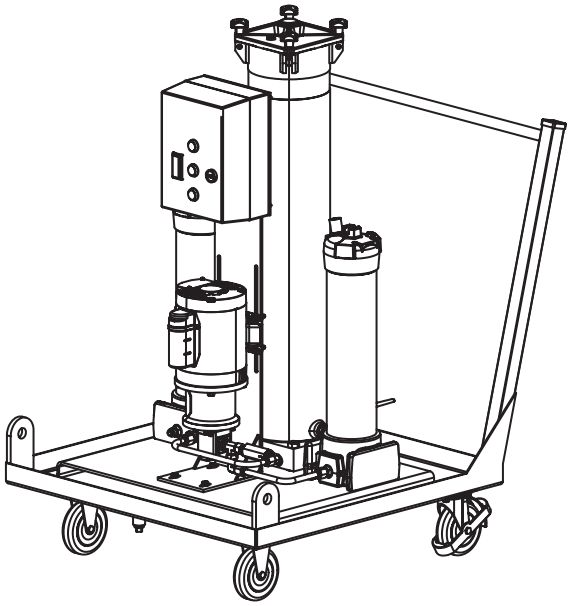
Example of acidification in HFD fluids with and without Ion eXchange Unit

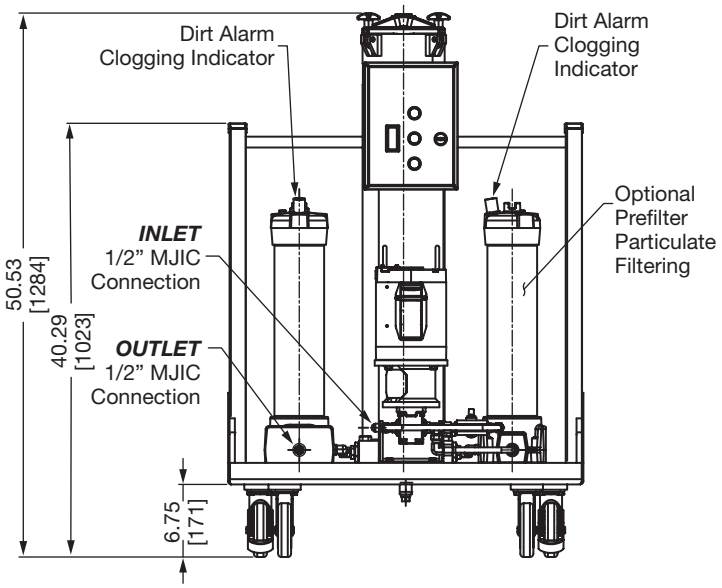


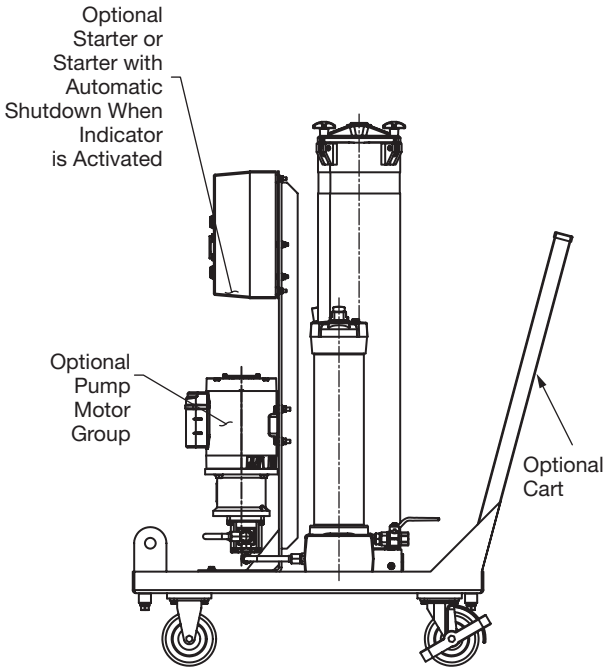
OFFLINE FILTRATION SYSTEMS

Dimensions IXU1 Series



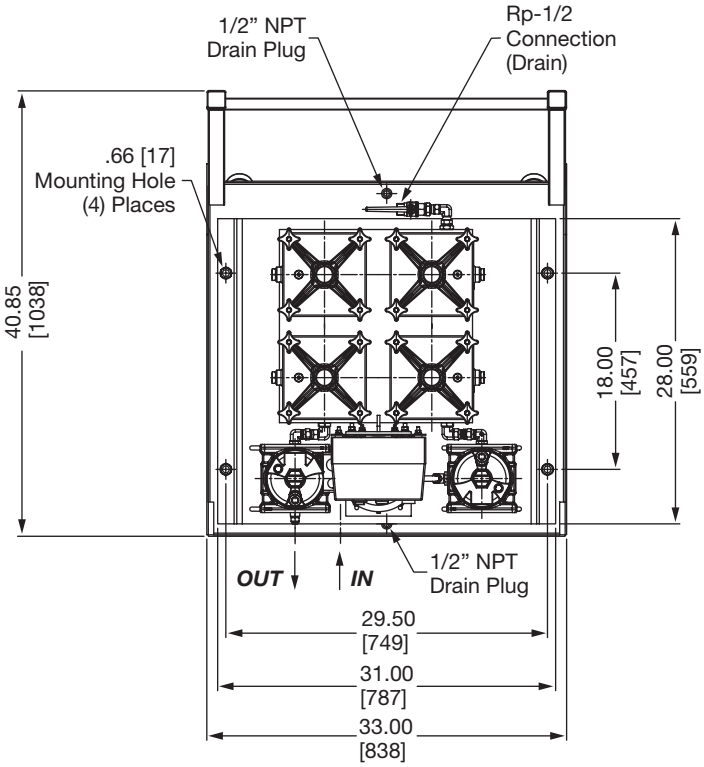


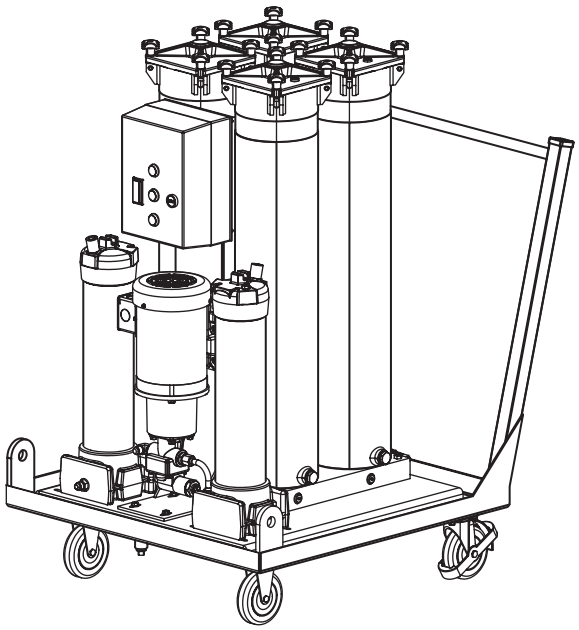


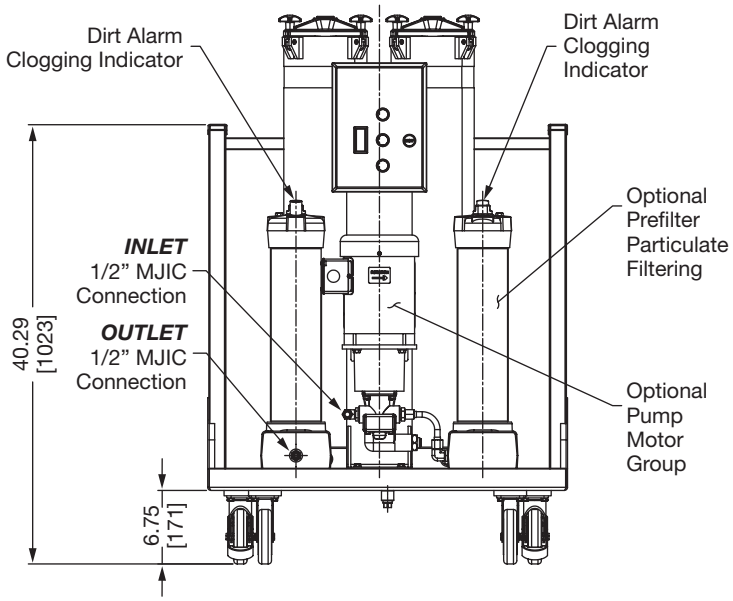


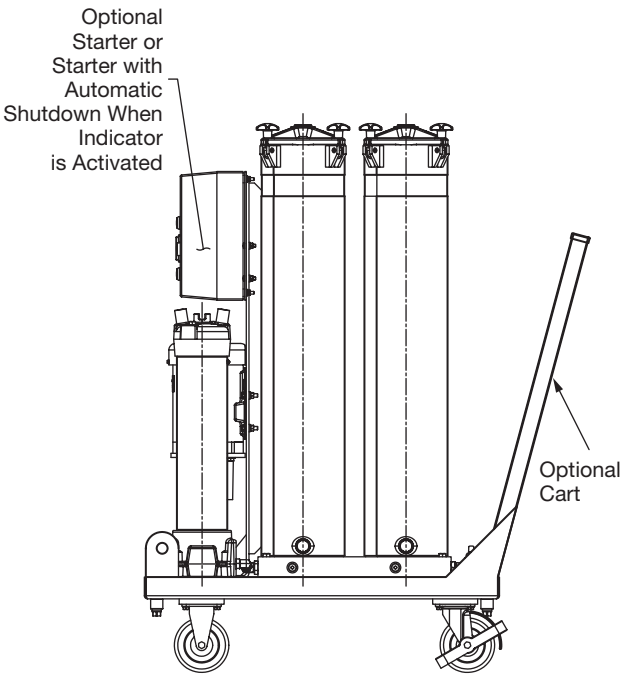
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

Dimensions IXU4 Series







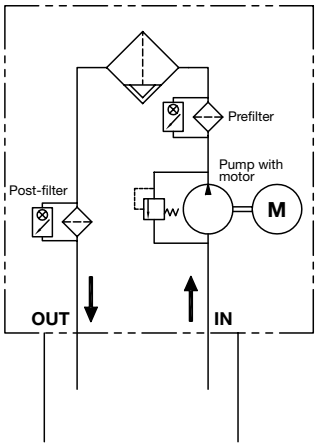


Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

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* *(empty)*	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.

PN#02075860 / 08.22 / FSP2105-2273

Model Code

VMU - 4 - M - G - O - G05 - BM - G05 /-PKZ

Series
VMU = Varnish Mitigation Unit

Size
1 = 1x Varnish Mitigation element NAVME ≈ 0.5 gpm (2.2 l/min)
4 = 4x Varnish Mitigation elements NAVME ≈ 2.4 gpm (8.9 l/min)

Type
M = mobile
S = stationary

Type of pump
G = gear pump
Z = without

Power supply voltage
F = 230 V, 60 Hz, 3 Ph
K = 115 V, 60 Hz, 1 Ph
O = 460 V, 60 Hz, 3 Ph (standard)
Z = without (only available with “Z” pump type option)

Prefilter
G05 = with 5µm element
G10 = with 10µm element

Clogging indicator
BM = differential pressure indicator – visual
C = differential pressure indicator – electrical

Postfilter
G05 = with 5µm element
G10 = with 10µm element

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

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.
- Operating and maintenance manual

VMU Element & Filter Elements

VMU Element	Part No.
NAVME Element	2210730
Replacement Filter Element *(prefilter & protection filter)*	**Part No.**
5.03.18D 05 BN4 /-V-G	2094528
5.03.18 D 10 BN4 /-V-G	2094529

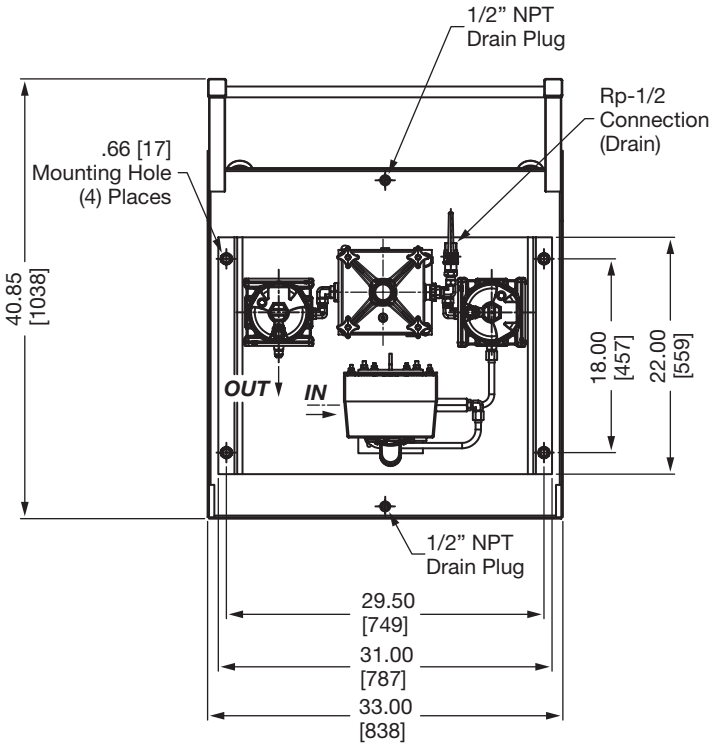
Order examples:

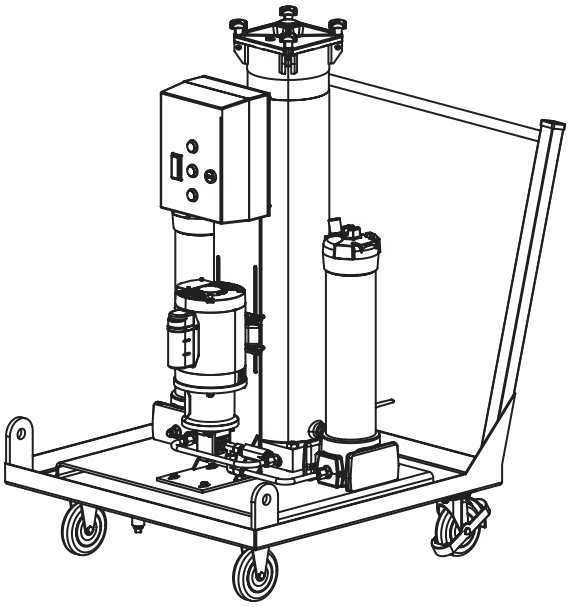
VMU-1-M-G-O-G10-BM-G05-PKZ requires:
1x NAVME200

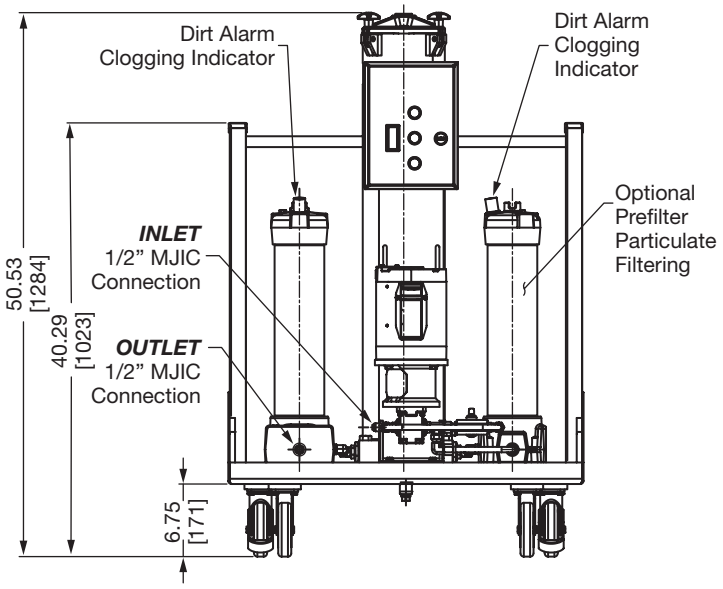
VMU-4-M-G-O-G10-BM-G05-PKZ requires:
4x NAVME200

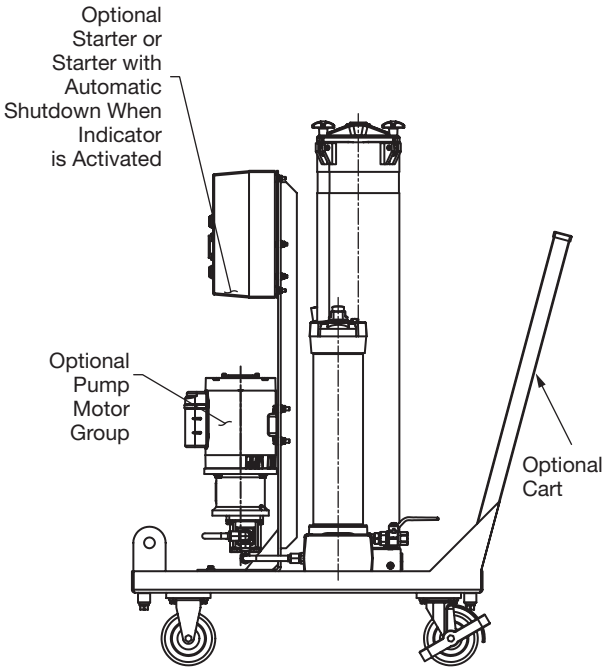
OFFLINE FILTRATION SYSTEMS

Dimensions VMU1 Series



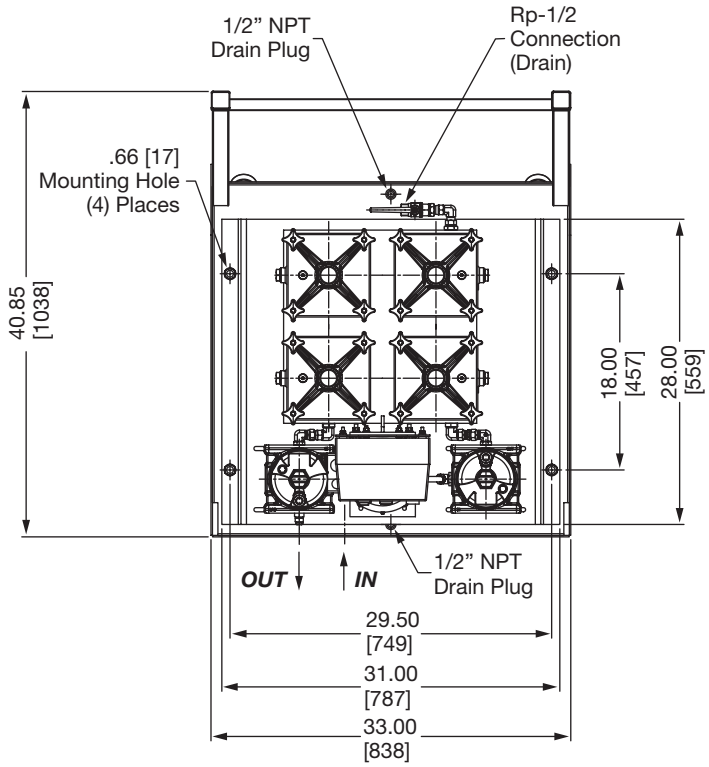


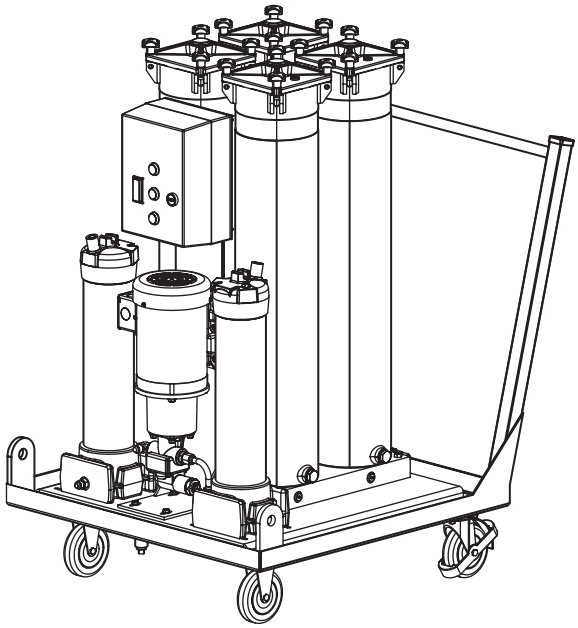


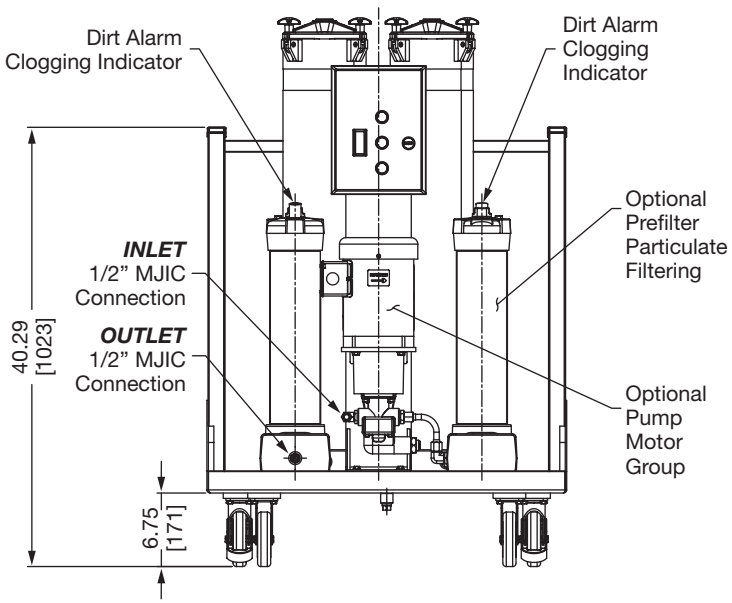


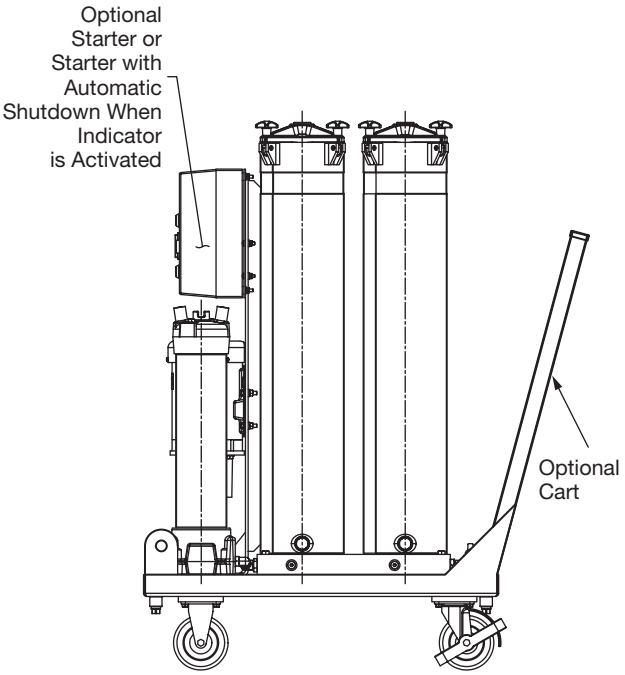
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

Dimensions VMU4 Series









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

VEU Series

Varnish Elimination Unit

VEU-A-x-M-…

VEU-W-x-M-…

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 psi	
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 NPT - Male	
Water OUTLET port connection *(VEU-W-… only)*	1-1/2 x NPT - Male	
Supply voltage	460V AC / 60Hz / 3 Ph. 575V AC / 60Hz / 3 Ph.	
Seal material	FKM (Viton®)	
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.

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Model Code

VEU - A - 15 - M - O60 - DM02 C

Series
VEU = Varnish Elimination Unit

Cooling Method
A = Air
W = Water

Flow Rate
10 = 10 gpm
15 = 15 gpm

Version
S = Stationary
M = Mobile

Motor Voltage
O60 = 460V / 3 Phase
P60 = 575V / 3 Phase

Filter Element
DM02 = N15DM002, 2µm Absolute
DM05 = N15DM005, 5µm Absolute
DM10 = N15DM010, 10µm Absolute

Clogging Indicator
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

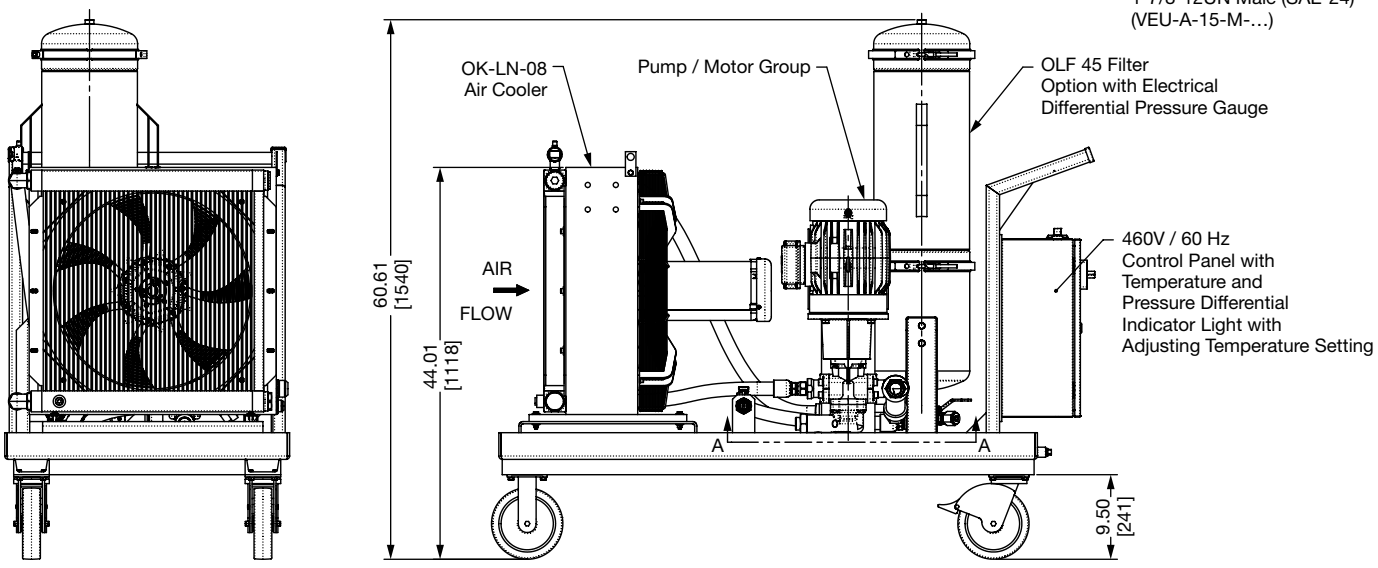
3 elements required

Model number	Part number
N15DM002	1251590
N15DM005	3252552
N15DM010	3115180

Scope of Delivery

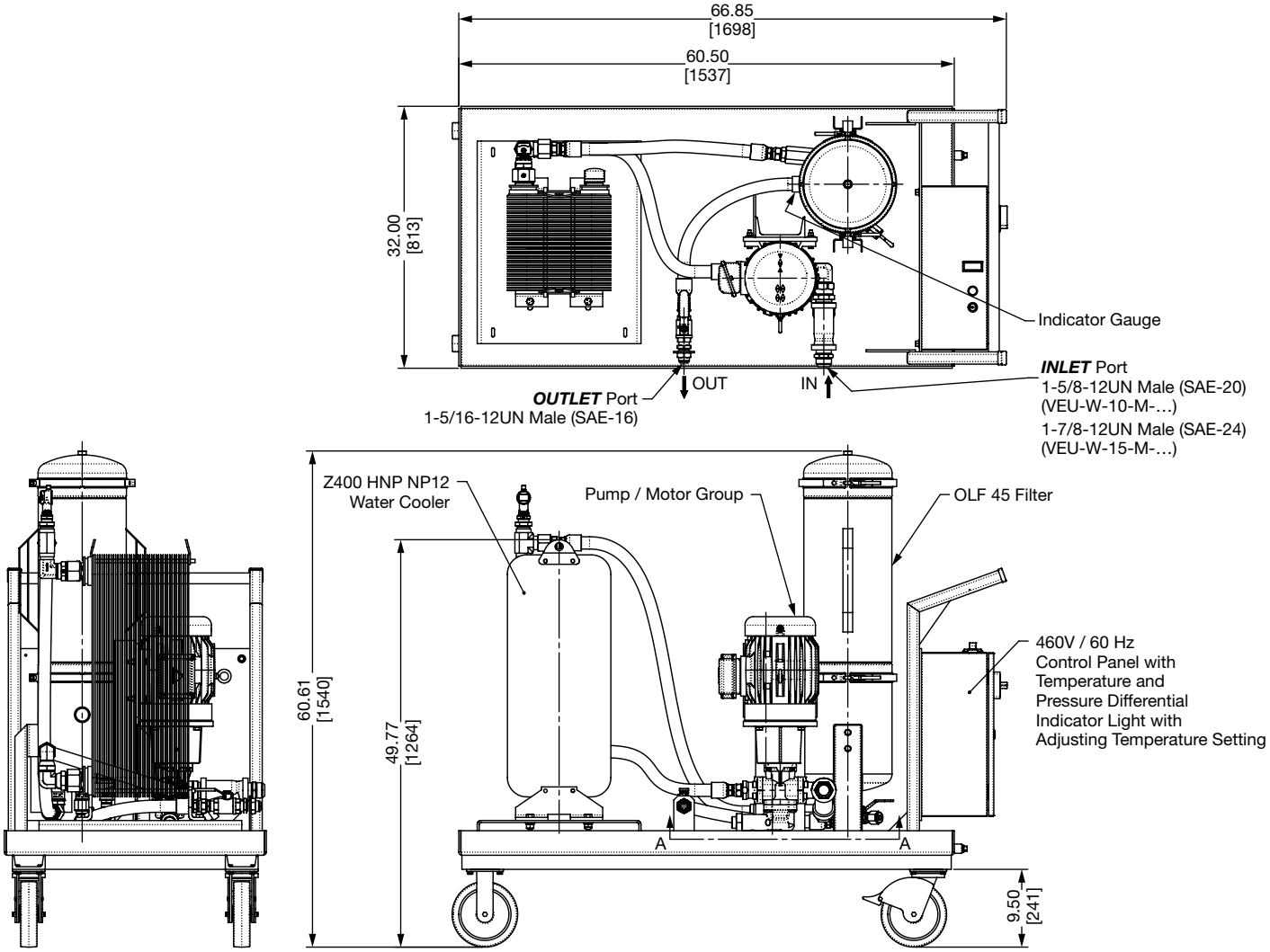
- VEU according to Model Code
- Operating and Maintenance Instructions

Dimensions VEU-A-x-M-…



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

Dimensions
VEU-W-x-M-…



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

Notes

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 ($ß_{5(c)} > 1000$)
- 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 ΔP = 36.3 psi (2.5 bar)	~ 410 g	~ 2500 g
Water Retention Capacity	~ 680 ml	~ 2.1 l
Beta value $ß_{5(c)}$ @ 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)	

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Model Code

N 1 TM 003 /- N

Nominal Flow Rate
- 1 = Nominal flow rate 0.26 gpm (1 lpm)
- 3 = Nominal flow rate 0.79 gpm (3 lpm)

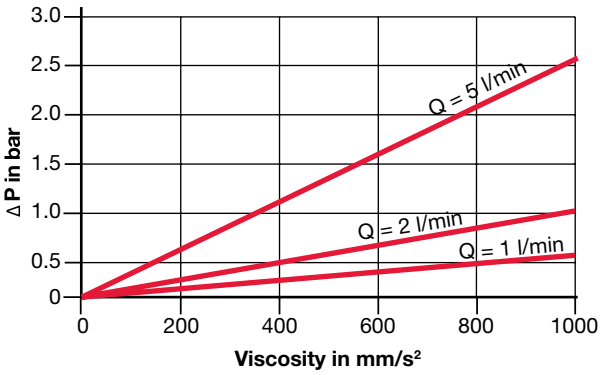
Element Type
- TM = TriMicron

Filtration Rating *(microns)*
- 003 = 3

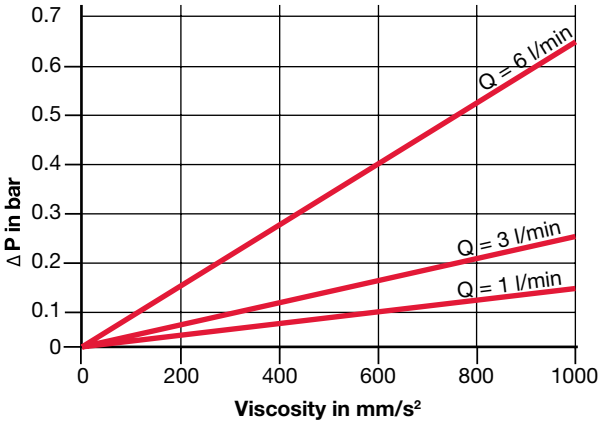
Sealing Material
- N = NBR
- F = FPM

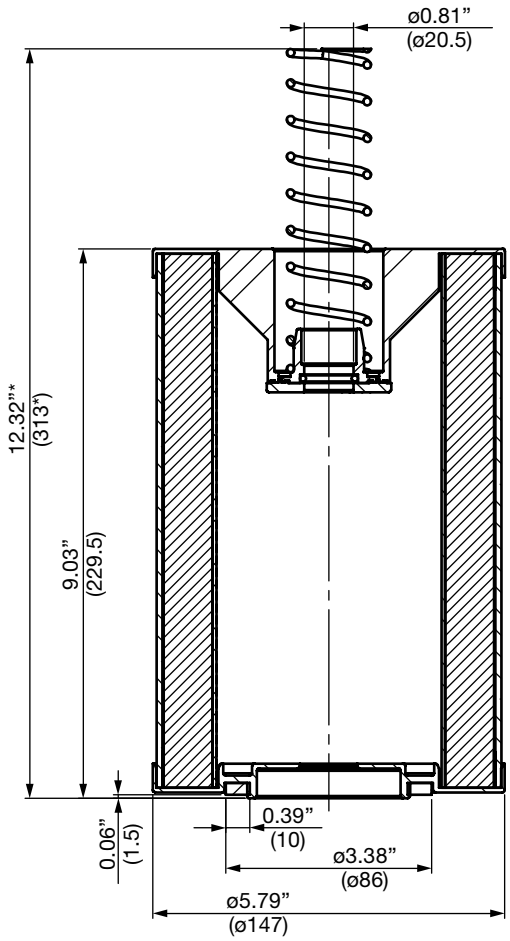
Element Differential Pressure

N1TM

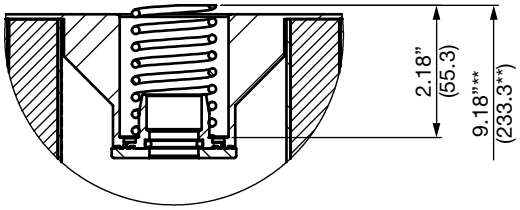


N3TM





* spring unloaded
** spring loaded



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

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 ($\beta_{5(c)} > 1000$)
- 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

Technical Specifications

Model	N1TM003 / ECO	N14TM003/-ECO	N3TM003 / ECO	42.0TM/-ECO
Part Number	7643926	7643925	7647238	7644096
Multipass Test in Accordance with ISO 16889				
Dirt Holding Capacity @ 2.5 bar ΔP	>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 reduction			
Construction of Filter Element				
Contaminants Removed	Particles, water and oil aging products			
Filter Element Design	Synthetic media for particulate and water removal			
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

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Notes

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

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	
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)
Attainable Water Content	< 50 ppm
Relative Humidity Display	Standard, 0-99% Range
Materials of Construction	Reaction Vessel: Stainless steel Seals: *FKM (Viton®)*
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)*

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Model Code

MAFH-A - V - M - A - B - 05 - __

Series
MAFH-A = Dehydration station

Seals
V = Viton®

Mobility
S = Stationary
M = Caster base

Voltage
A = 110V AC / 60Hz / 1 Ph.
B = 220V AC / 60 Hz / 1 Ph.
C = 220V AC / 50Hz / 1 Ph.

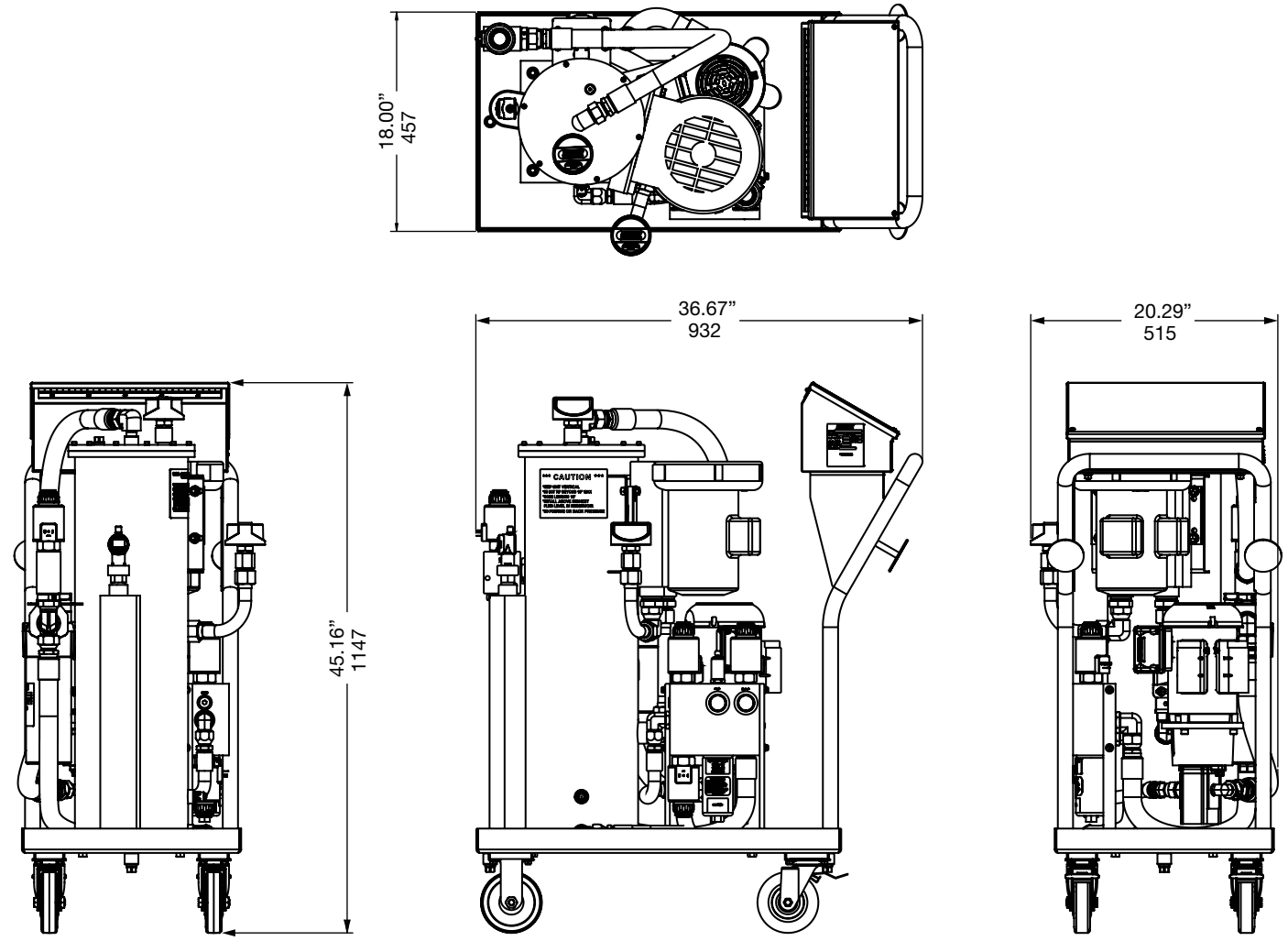
Air Source
B = Integral blower

Filter Element Rating (micron)
01, 03, 05, 10, 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 = 2.4kW Heater *(Option ONLY available with 220V/60Hz/1Ph Voltage)*
Y = Built with CSA approved components *(requires CSA inspection on-site)*

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



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

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Model Code

MAFH-E - __ - V - M - A - B - K - 05 - H

Series
MAFH-E = Dehydration Station

Flow Rate
(omit) = 15gpm
22 = 22gpm
VF = 3-15gpm Variable Flow

Seals
V = Fluoroelastomer (FPM)

Mobility
S = Stationary
M = Mobile

Voltage
A = 460V/3/60 Hz
B = 575V/3/60Hz

Air Source
B = Integral Blower

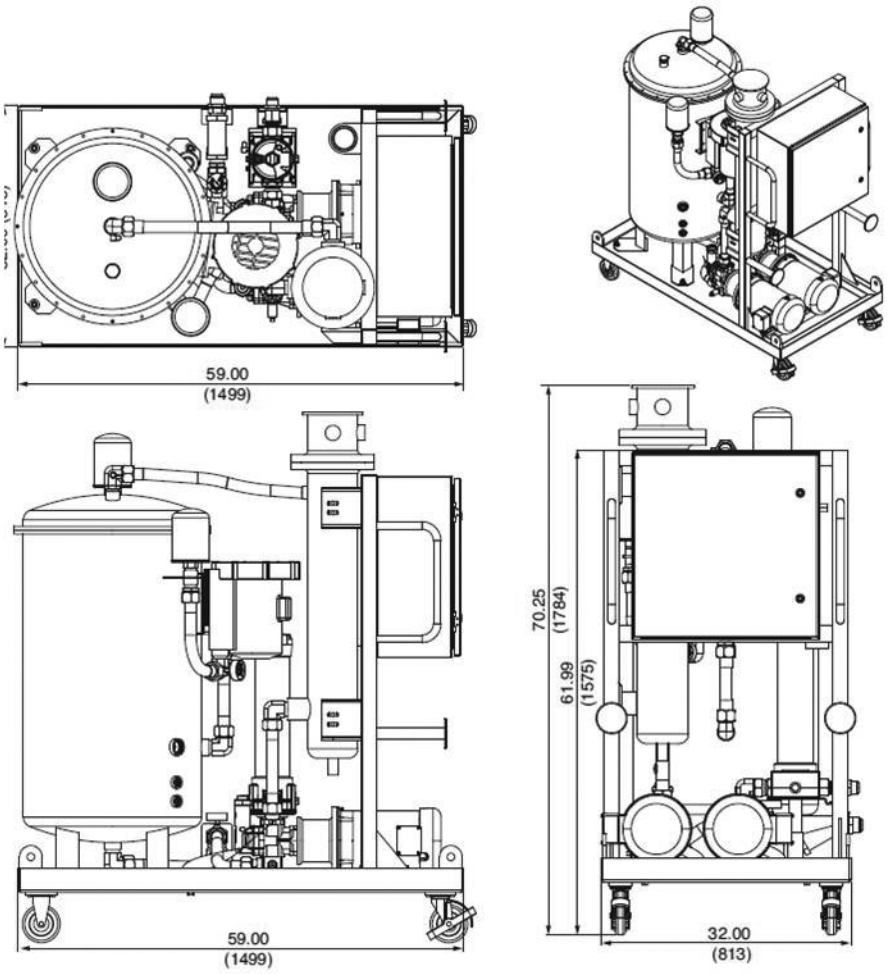
Filter Housing
K = 27” filter housing
Q = 39” filter housing

Media* (microns)
01, 03, 05, 10, 25

Optional Heater
H = 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



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

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

Model	NAV30	NAV5
Overall Dimensions *(height x width x length)*	39” W x 76” L x 74” H	36” W x 67” L x 78” H
Dry Mass	1990 lbs (903 kg)	1500 lbs
Inlet Connections	2” NPT	1 ½” NPT
Outlet Connections	1 ½” NPT	1” NPT
Flow Rate	30 gpm (114 L/min)	5 gpm
Inlet Pressure	22 in. Hg - 10 psi	
Outlet Pressure	110 psi (7.6 bar)	
Fluid Service Temperature	39°F to 170°F (3.8°C to 77°C)	
Operating Temperature	39°F to 105°F (3.8°C to 40.6°C)	
Fluid Viscosity	150-3280 SUS (23-700 cSt)	
Power Supply	460V	
Attainable Water Content	<10ppm	
Relative Humidity Display	Standard, 0 - 99%	
Seals	FKM	
Constructions	Base Frame: Carbon Steel Vessel: Carbon Steel Seals: Viton	
Protection Class	NEMA 4	

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Model Code

NAV - 30 - M - 2 - A - H - 10

Series
NAV = North American Vacuum Dehydrator

Flow Rate
30 = 30 gpm
5 = 5 gpm

Operating Fluid
M = Mineral Oils (including oils w/ max. Viscosity as identified in specifications

Type
1 = Stationary
2 = Mobile

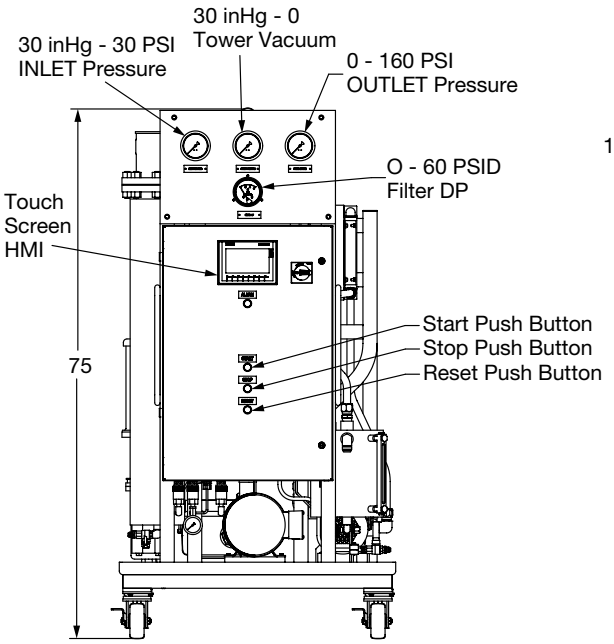
Voltage/Frequency
A = 460V / 60Hz / 3Ph+PE

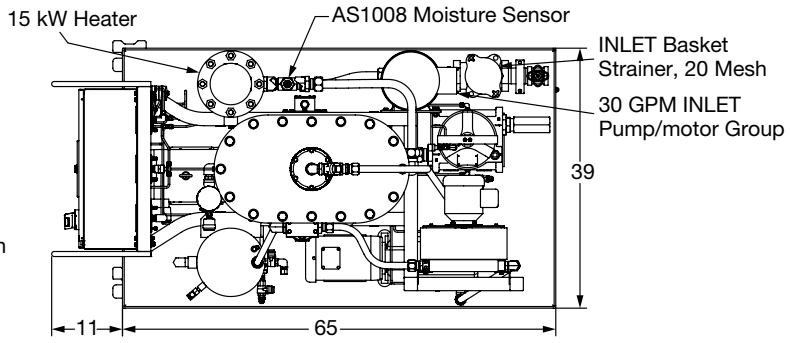
Heater
H = Standard

Filtration Rating
3 = 3 Micron
5 = 5 Micron
10 = 10 Micron
25 = 25 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





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

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)
Permitted fluids**	Fluids compatible with NBR seals: • 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 mm²/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*	≈ 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).

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Model Code

FAM – 5 – M – 2 – O – 05 – R – H – S – ACS – 00 – /–V

Series
FAM = Fluid Aqua Mobile

Size
5 = ~ 1.32 gpm (~ 5 l/min) at 50 Hz; ~ 1.63 gpm (~ 6 l/min) at 60 Hz

Operating 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 - Fluroelastomer (FPM) seals, UPE/PE-PA hoses, tested with HFD-R fluid (e.g. Fyrquel)*
B = Biodegradable (ester-based) - Fluroelastomer (FPM) seals, NBR hoses, tested with biodegradable operating fluid based on esters*

Mechanical type
1 = Stationary *(with feet)*
2 = Mobile *(with castors and connection hoses)*

Voltage / Frequency / Power supply

A	=	400 V/50 Hz/3Ph+PE	O	=	460 V/60 Hz/3Ph+PE[1)]
B	=	415 V/50 Hz/3Ph+PE	P	=	230 V/60 Hz/1Ph+PE
E	=	220 V/60 Hz/3Ph+PE	S	=	380 V/50 Hz/3Ph+PE
H	=	440 V/60 Hz/3Ph+PE[1)]	AD	=	220 V/60 Hz/1Ph+PE
K	=	480 V/60 Hz/3Ph+PE[1)]	X	=	other voltage on request
M	=	230 V/50 Hz/1Ph+PE			

Filter Size of Fine Filter
05 = OLF5

Type of Vacuum Pump
R = Rotary vane vacuum pump

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)*

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)*

Measuring 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 + SensorMonitoring Unit display and storage of values, with control function

Modification Number
00 = The latest version is always supplied.

Supplementary 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˚F(10°C) then the dewatering capacity increases by up to 50%. The ideal temperature for dewatering is ~122 to 140˚F (~50 to 60°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.

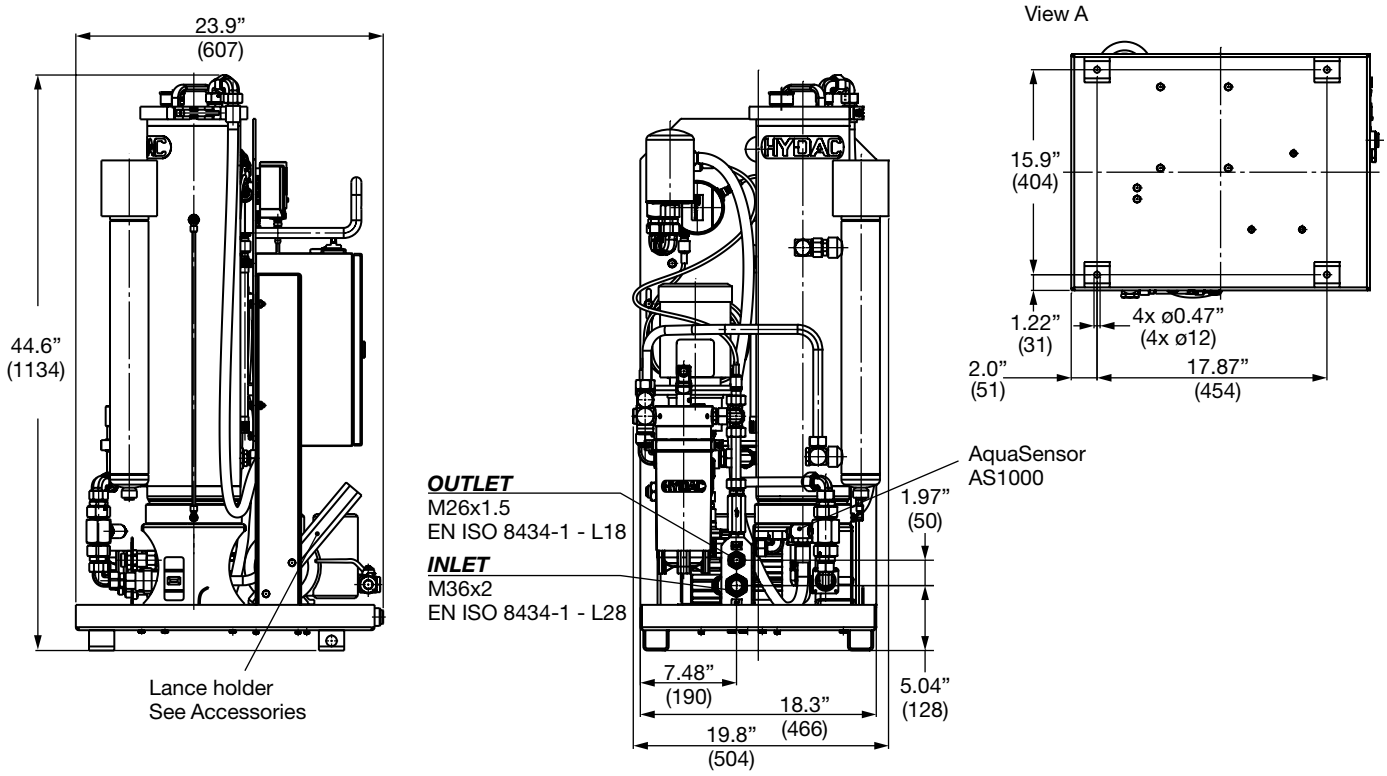
Control Concept

- 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

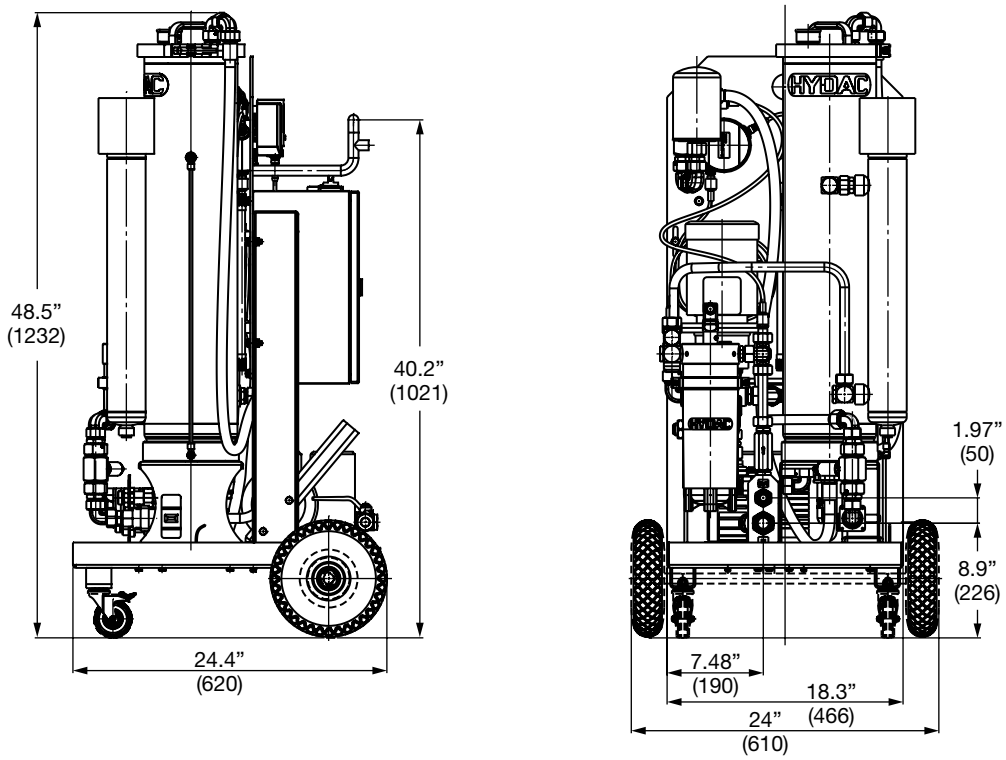
Instrumentation

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

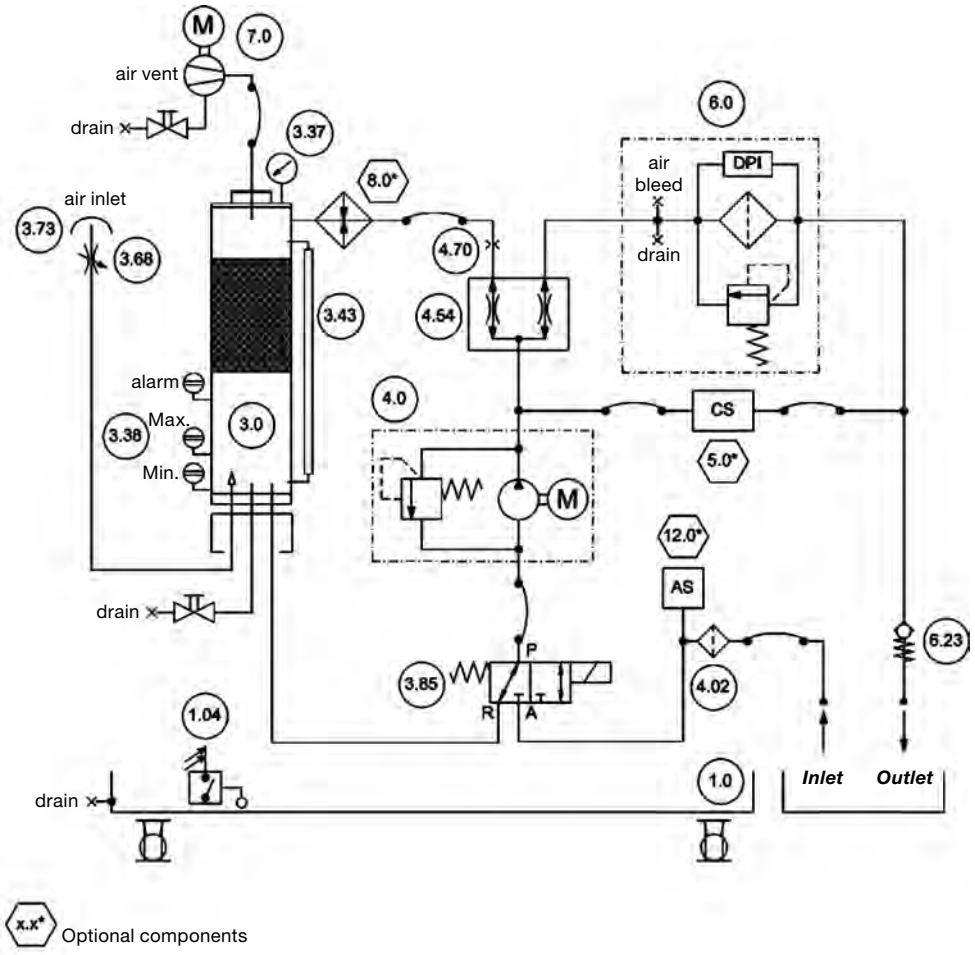


Dimensions
FAM5 Mobile



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

Hydraulic Schematic



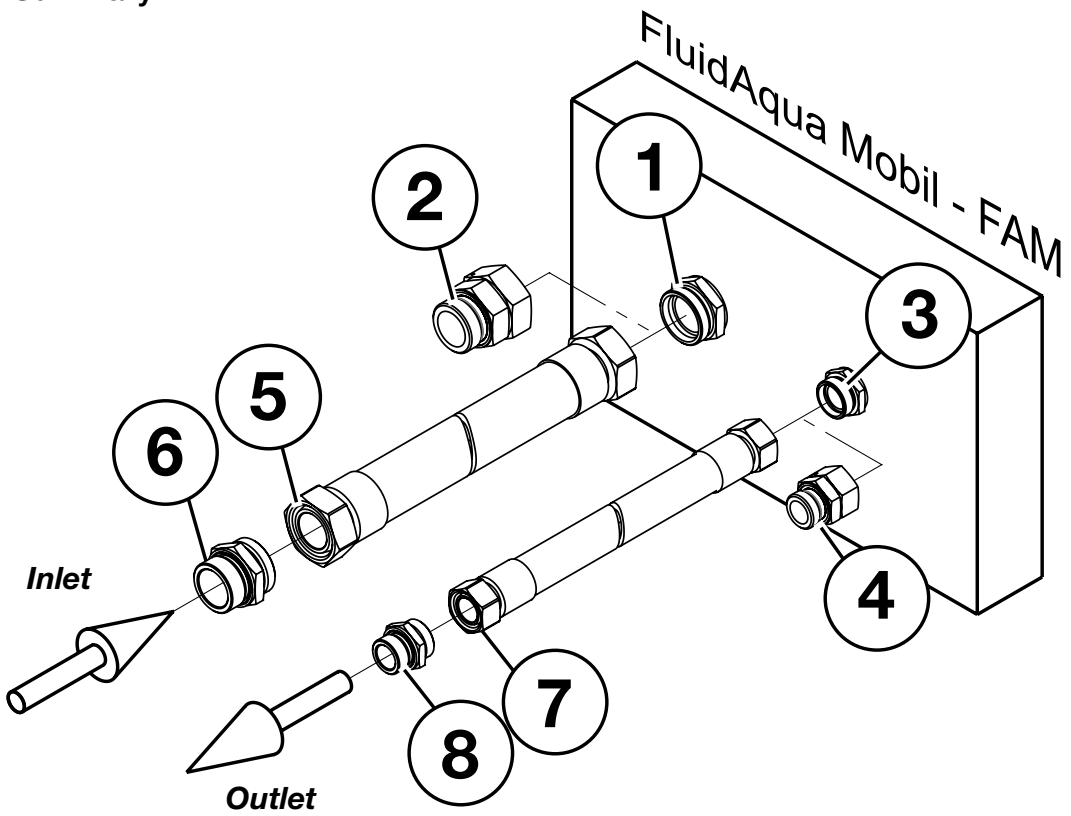
Item	Description
1.0	Drip tray
1.04	"Drip tray full" float switch
3.0	Vacuum column
3.38	Level sensor for vacuum column
3.68	Needle valve to regulate the necessary vacuum in the vacuum column
3.73	Breather filter
3.85	3/2 directional valve
4.0	Motor pump assembly
4.02	Suction screen
4.54	Flow divider
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:

Type	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 ½ 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 ½ 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.

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)*

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 ↑	↑

Accessories

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

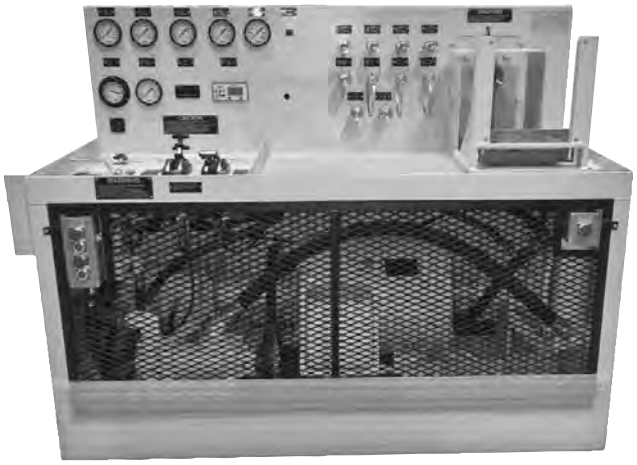
- Fluid Aqua Mobile
- Suction and return hose *(only on mobile version)*
- 0.26 gal. (1L) vacuum pump oil for initial filling of vacuum pump
- Control cabinet key
- Technical documentation:
  - Operating and Maintenance Manual
  - Electrical wiring diagram
  - Test certificate
  - CE declaration of conformity

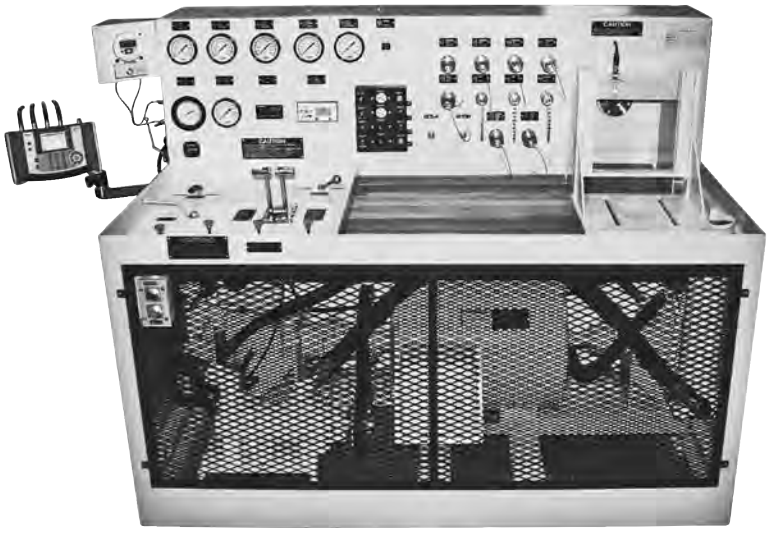
PN#02075860 / 05.21 / FSP2105-2273

Notes

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.

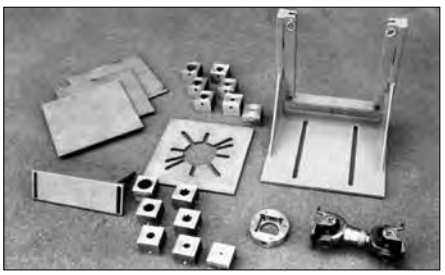
These benches have been refined for over 30 years by HYDAC engineers, based on the comments and requests of over 700 test bench owners. The versatile hydraulic circuitry present in each of the three models can shorten troubleshooting time and take the guesswork out of diagnoses. Current models are powerful,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

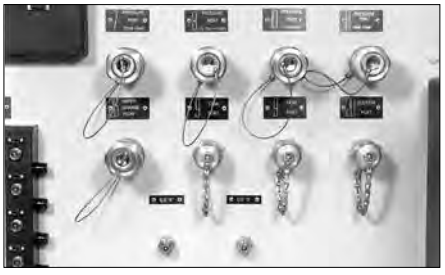
Applications

- **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 pilot-operated 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





PN#02075860 / 05.21 / FSP2105-2273

Model Code

HTB 100 A AD

Series
HTB = Hydraulic Test Bench

HP
50, 100, 150

Voltage
A = 230V 60Hz, **B** = 460V 60Hv, **C** = 575V 60Hz, **D** = 380V 50Hz, **E** = 415V 50Hz, **F** = 380V 60Hz

Options

A	=	Water Cooled Heat Exchanger	G	=	Closed Loop Circuit
B	=	Solenoid & Pilot Operated Valve Group	H	=	HMG Digital Electronic Group
C	=	Jib Crane Group	I	=	Air Cooled Heat Exchanger
D	=	Filtration Group (included on all HTB's)	J	=	25 GPM Case Drain Meter
E	=	Safety Enclosure Group	K	=	Digital Gauges
		Splined Shaft Group*	L	=	CS1000 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 a 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

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.

Pressure Elements

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

9 inch Elements		18 inch Elements		27 inch Elements	
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*			Filtration Rating wrt ISO 16889 *Using APC calibrated per ISO 11171*	
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 Element	
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*			Filtration Rating wrt ISO 16889 *Using APC calibrated per ISO 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

Used in OFX Skid - High Capacity Series

16 inch Element		39 inch Element	
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	ß 4.2(c) ≥1000	55
3	ß 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

Dimicron® Elements

Used in OLF Series & FAMH Series

Model Code	Micron Rating	Part No.
N15DM002	2	01251590
N15DM010	10	03115180
N15DM020	20	00349576
N15DM030	30	03048790

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 µm absolute (ß40 ≥ 100 to Δp = 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

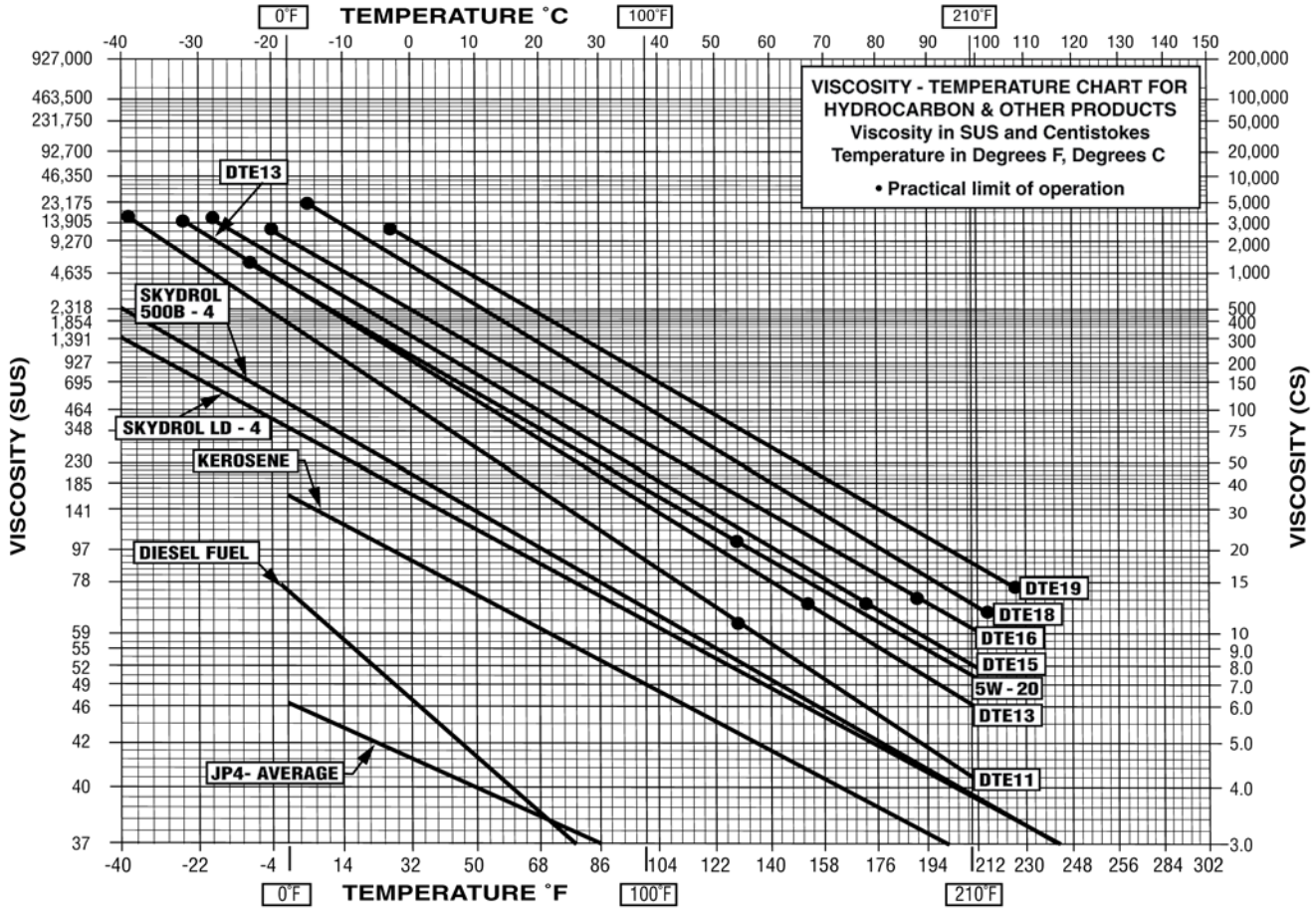
HYDAC’s family of interchange elements has a new name and a new focus. The former Betafit line will now be called Betterfit, and will incorporate an exclusive outer wrap that not only improves performance, but also provides quality protection. It features a unique oval-hole design that improves flow 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.

F

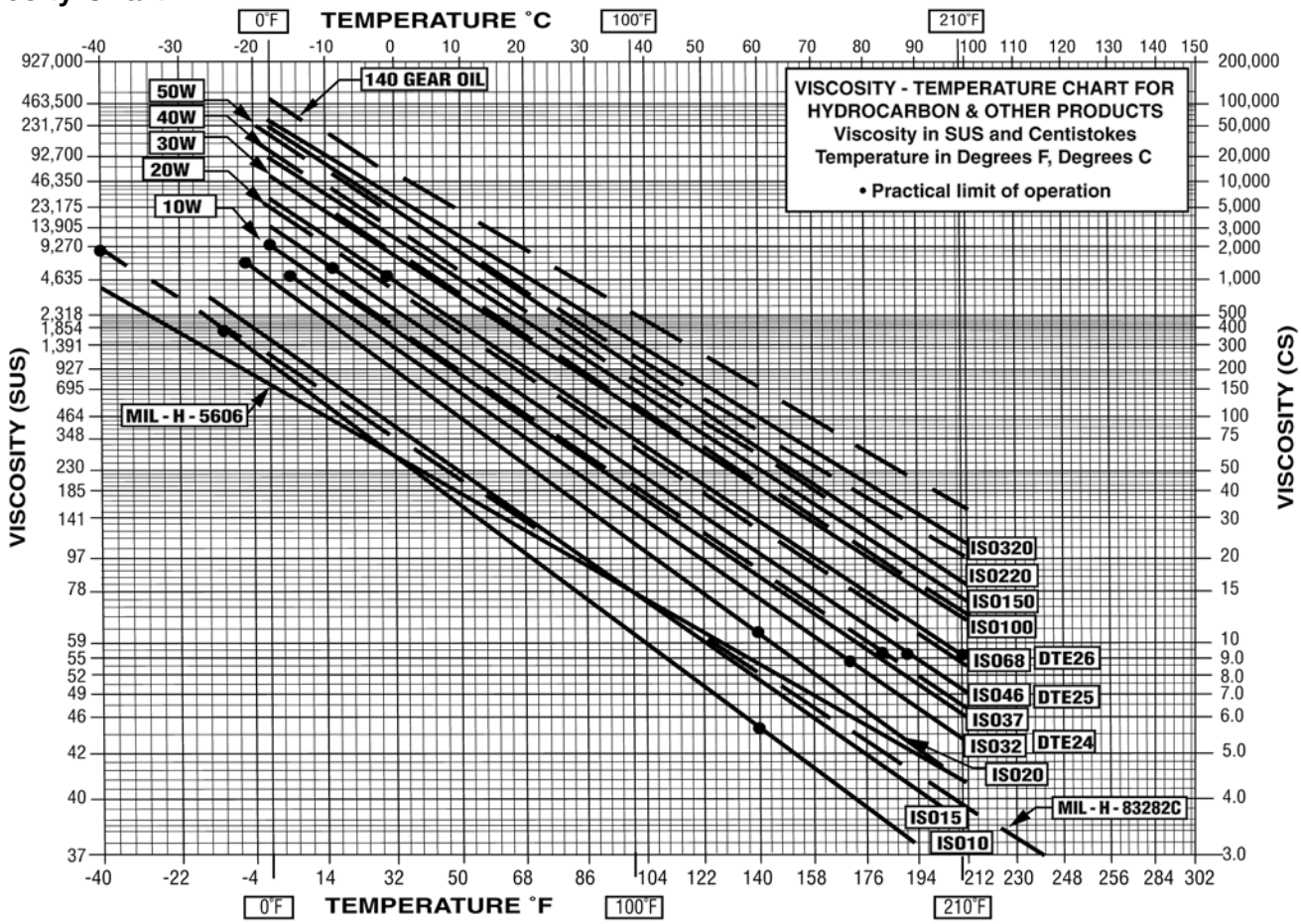
Reference Material

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

Viscosity Chart #1



Viscosity Chart #2



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.

Overview Brochure
PN02088157

Filters Catalog
PN02081318

Accumulators Catalog
PN02068195

Compact Hydraulics Catalog* (online only)

Elec. Sensors & Controls Brochure PN2205620

Standard Coolers Catalog - PN02085359

Filter Systems Catalog PN02075860

Control Technology* Catalog (online only)

Accessories Catalog PN02080105

Mobile Valves Brochure PN02092408

Hydraulic Cylinders Brochure PN2204454

Process Technology* Catalog (online only)

***These catalogs are digital file versions only.**

Various market and product brochures are also available for ordering.

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