Section 1:

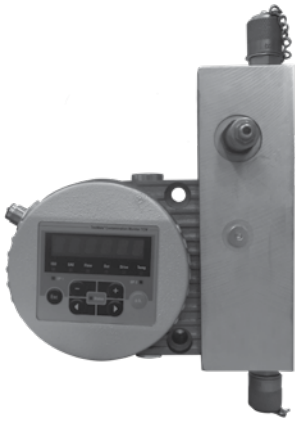
DIAGNOSTIC PRODUCTS

CS 1000 Contamination Sensor

Formerly Known as "TCM - TestMate Series"

- Usable with FluMoS Mobile App when connected to the CSI-C-11

CSI-C-11 Compatible Product



Includes: Unit, FluMoS Software, Operation Manual and Calibration Certificate

Features and Benefits

- Measures Particles in Four Sizes: >4, >6, >14 and >21 microns
- In-line or Manifold Mounting
- ISO or SAE codes can be output in 4-20 mA analog signal
- Compatible with Standard Mineral Fluids & Phosphate Esters
- Display and Keypad can be rotated (up to 270°)
- Inlet and Outlet Ports are Interchangeable (bidirectional) (without manifold only)
- Recommended recalibration: Only every 2 years

Description

The Contamination Sensor 1000 (CS 1000) continuously measures solid contamination in hydraulic fluid. Enclosed in a 4-inch diameter case, the CS 1000 utilizes an optical sensor and measures particles in four sizes: >4, >6, >14 and >21 microns. Measurement results can be output as a contamination code according to ISO 4406:1999 or SAE AS 4059(D).

The CS 1000 is designed for connection to hydraulic and lubrication lines with pressures up to 5075 psi (350 bar) and viscosities up to 4635 SUS (1000 cSt). The unit requires that a small flow of oil (between 30 mL/min and 500 mL/min) is diverted for measurement purposes.

The CS 1000 provides the user with a smaller, tougher, and more versatile stationary sensor. It provides instantaneous readings and is able to self-diagnose continuously with error indication via the status LED. The attractive cost-to-performance ratio makes it especially applicable for OEM applications. Online, real-time condition monitoring allows you to have total predictive maintenance.

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; SAE AS 4059(D)
Self-Diagnosis:	Continuously with error indication via status LED
Inlet/Outlet:	5075 psi (350 bar) max
Connections:	Inlet: ISO 228 G1/4 Threaded Outlet: ISO 228 G1/4 Threaded
Sensor Flow Rate:	30 to 500 mL/min
Permissible Viscosity Range:	32 to 4635 SUS (1 to 1,000 cSt)
Fluid Temperature Range:	32°F to 185°F (0°C to +85°C)
Power Supply Voltage:	9 to 36 VDC residual ripple <10%
Accuracy:	+/- ½ ISO class in the calibrated range
Power Consumption:	3 Watt max
Electrical Outputs:	4 to 20mA Analog; 2 to 10 V Analog (option) RS485
Electrical Specifications:	4 to 20 mA Analog output (max burden 330Ω); 2 to 10 V output (min. load resistor 820Ω) Limit switching output (Power MOSFET): max current 1.5A
Ambient Temperature Range:	-22°F to 176°F (-30°C to +80°C)
Storage Temperature Range:	-40°F to 176°F (-40°C to +80°C)
Relative Humidity:	95%, non-condensing max
Seal Material:	Mineral Oil: Viton® Phosphate Ester: EPR
Electrical Safety Class:	III (low voltage protection)
IP Class:	IP67
Weight:	2.9 lbs (1.3 kg)
Mounting Position:	Recommended vertical installation with direction of flow south to north through CS 1000 or manifold block

NOTES:

All Models feature an analog electrical output. Additionally, an electrical switching output can be configured to alert the operator about rising falling contamination level.

Viton® is registered trademark of DuPoint Dow Elastomers.

Contamination Sensor CS 1000

Formerly Known as "TCM - TestMate Series"

Features

- Enables the user to transfer data from CS 1000 to PC
- Enables user to change CS 1000 settings
- Enables user to have real time monitoring & data storage

What's Included

Converter box, 115 VAC to 24 VDC adapter, USB driver, FluMoS software, communication & power cables, case

Communication Kit Description: CSI-D-5 7632013

Features

- For WLAN or LAN transmission of data.
- Addition of data stage capabilities.

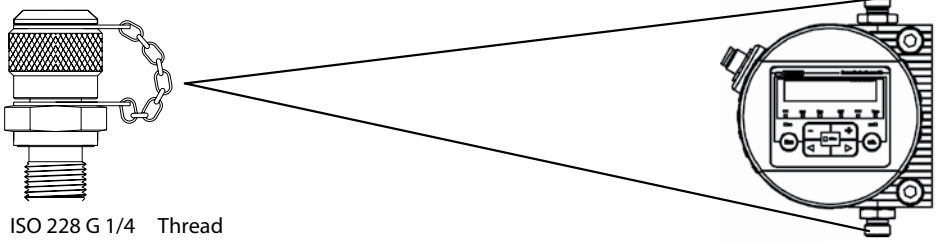
CSI-C-11 Sensor Interface Module P/N 4066011

Communication cable and power adapter can be ordered individually.

Description: Power Adaptor (PS5) P/N 7600801

G Thread	Sealing System	Description	Part Number
1/4" BSPP	WD Seal Viton	SP1620G14WDM	7622704

1620 Thread

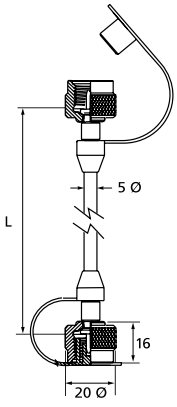


ISO 228 G 1/4 Thread

Schroeder Check

TestPoint Options for CS 1000

NOTES:
In-line version of CS.
In-line version cannot be mounted on manifolds



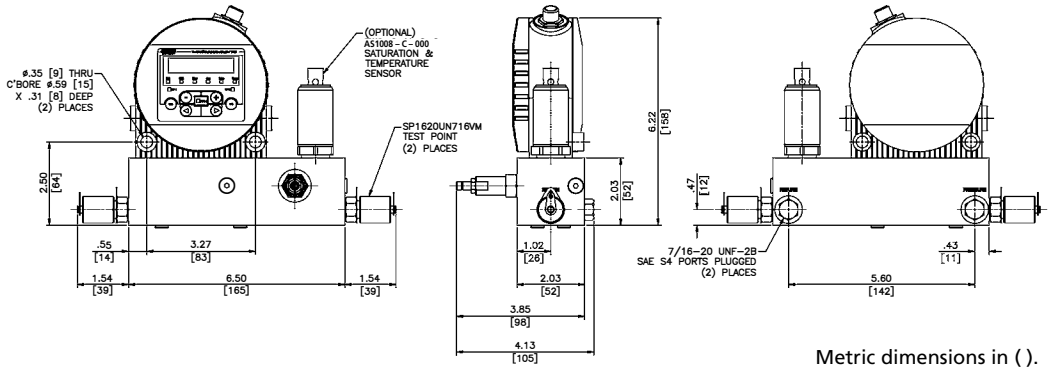
Length inches (mm)	ΔP (max) psi (bar)	Description	Part Number
6 (152)	6,500 (450)	SM4-1620-006	7612174
35 (889)	6,500 (450)	SM4-1620-035	7612175

Microflex Hose

Options for CS 1000

CS 1000 Contamination Sensor

CS with Optional CS Block Kit



Metric dimensions in ( ).

Model Number Selection

How to Build a Valid Model Number for a Schroeder CS 1000:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11
CS										

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11	
CS	1	2	2	0	A	0	0	0	0	000	= CS1220-A-0-0-0-0 /-000

BOX 1

Indicator Code
CS = Contamination Sensor

BOX 2

Resolution
1 = 4 Particle Size Channels

BOX 3

Indicator Code
2 = ISO 4406:1990 or SAE AS 4059(D) > 4 µm(c) > 6 µm(c) > 14 µm(c) > 21µm(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)

BOX 4

Options
1 = without Display
2 = with Display

BOX 5

Fluids
0 = Hydraulic/Mineral
1 = Phosphate Esters

BOX 6

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

BOX 7

Switching Output
0 = Limit Switching Output

BOX 8

Digital Interfaces
0 = RS485

BOX 9

Electrical Connection
0 = Plug M12x1, 8 Pole (Connection Cable Not Included)

BOX 10

Mounting
0 = Inline Version
1 = Flanged Version

BOX 11

Modification Number
000 = Standard
K = CS Block Kit without AS Sensor
KAS = CS Block Kit with A1000 Sensor
KASD = CS Block Kit with AS3008 Sensor

NOTE:

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)* 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 int he Technical Specifications *(at the left)*.

Contamination Sensor CS 1939

Features and Benefits

- Critical machine conditions are identified in early stages
- Continuous monitoring of oil conditions
- Condition-based maintenance planning

Market Applications

- Industrial hydraulic and lubrication systems
- Mobile hydraulics

- Compatible with:

FluMoS MOBILE

FluMoS LIGHT

FluMoS PROFESSIONAL

Description

The Contamination Sensor CS 1939 is an online fluid sensor for permanent monitoring of particle contamination in fluids.

The cleanliness results are presented according to ISO/SAE classifications.

This instrument combines the latest materials and technologies with proven engineering and provides the user with a compact and robust stationary sensor.

The attractive price/performance ratio makes it particularly advantageous for OEM applications for Condition Monitoring.

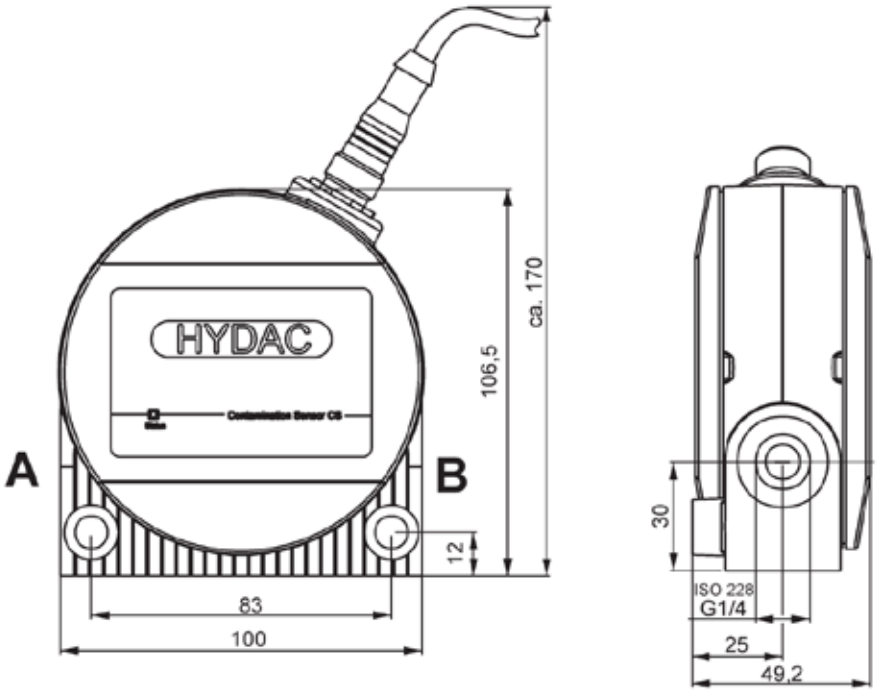
Specifications

Self-diagnosis:	Continuous with error display via status LED
Measured variables:	ISO 4406 SAE AS 4059
Service parameters:	Flow (status) Drive (%) Temp (°F) and (°C)
Installation position:	Recommended: vertical direction flow
Ambient temperature:	-22°F to 176°F (-30°C to 80°C)
Storage temperature range:	-40°F to 176°F (-40°C to 80°C)
Relative humidity:	max. 95%, non-condensing
Seal Material:	FPM for CS1939-0 / EPDM for CS1939-1
Protection class:	III (safety extra-low voltage)
Weight:	2.9 lb (1.3 kg)
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 / 350 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 cSt)
Fluid temperature range:	32°F to 185°F (32°C to 85°C)
Connection, male:	M12x1, 5-pole, to DIN VDE 0627 or IEC61984
Supply voltage:	9 to 36 VDC, residual ripple < 10%
Power consumption:	3 watts max.
CAN interface:	2-wire, half duplex SAE CAN J1939 protocol
HSI (Sensor Interface):	1 wire, half duplex

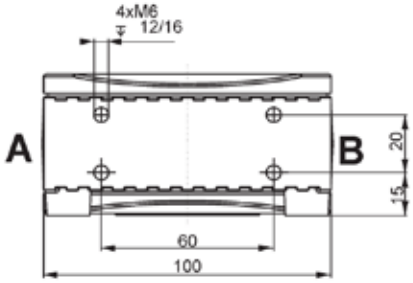
CS 1939 Contamination Sensor

Dimensions

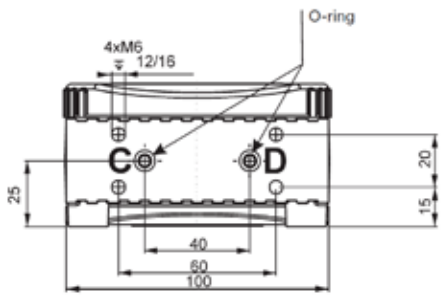
CS 1939 without display



Bottom view
Pipe or hose connection



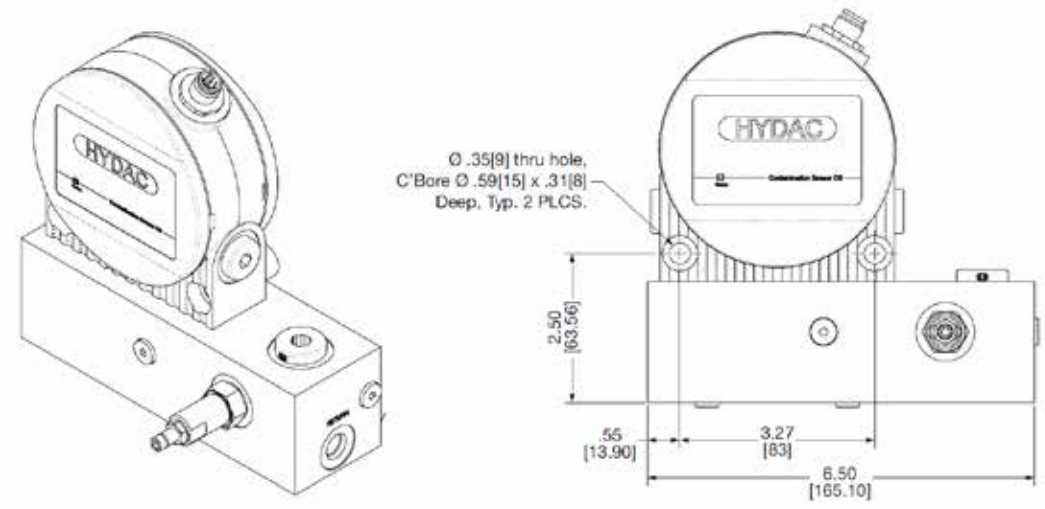
Flange connection

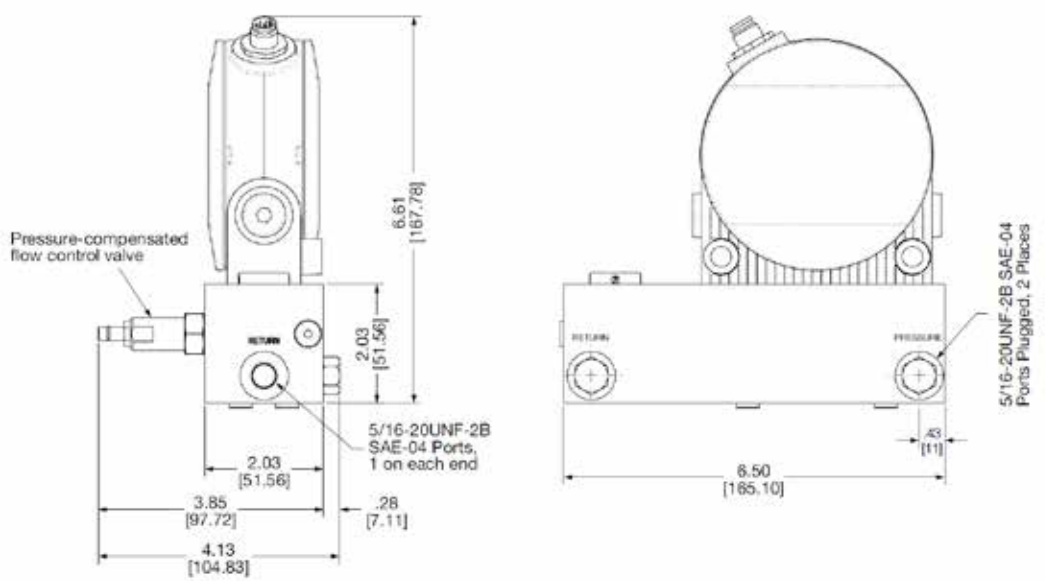


Metric dimensions in ( ).

CS 1939 with Block Kit (Requires minimum flow of 0.3 L/min., and minimum pressure of 6 bar)

Dimensions (cont.)





Metric dimensions in ( ).

CS 1939 Contamination Sensor

Model Number Selection

How to Build a Valid Model Number for a Schroeder CS 1939:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5
CS				

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	
CS	1939	0	0	000	**= CS1939-0-0/-000**

BOX 1

Type
CS

BOX 2

Indicator Code
1939 = Contamination Codes ISO 4406; SAE 4059 (D) / > 4 µm(c) > 6 µm(c) > 14 µm(c) > 21 µm(c) Interface/protocol: CAN/CAN SAE J1939 without Display (Electrical connection Plug M12x1, 5-pole)

BOX 3

Fluids
0 = based on Mineral Oil
1 = Phosphate Esters

BOX 4

Mounting
0 = Inline or hose connection
1 = Flanged connection

BOX 5

Modification Number
000 = Standard
K = CS Block Kit *(requires mounting option 1)*

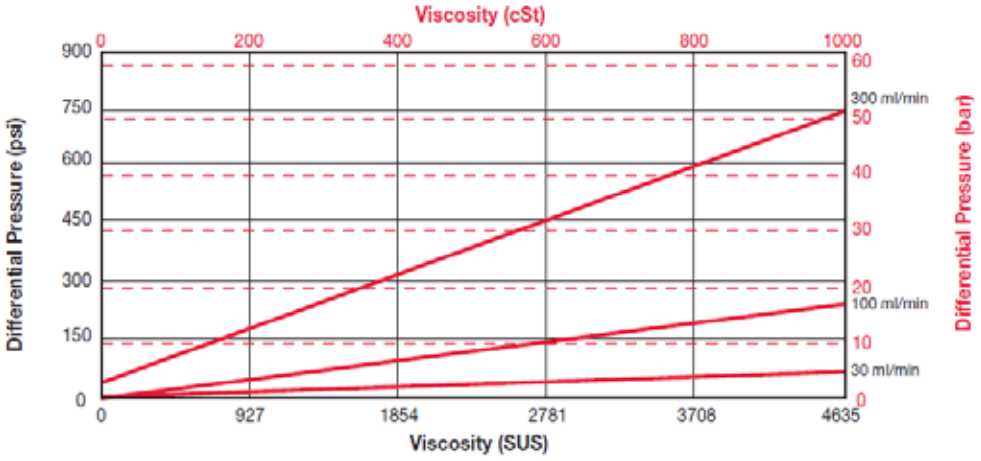
Scope of Delivery

- Contamination Sensor
- 2 x O-Ring
(only for flange connection version)
- Calibration Certificate
- CD with FluMoS Light Software and manual
- CD with detailed operating and maintenance instructions in different languages (PDF viewer software required)

Accessories

Designation	Part-No.
Supply voltage	
Female connector with 5 m cable, screened, 5-pole, M12x1	3527626
Female connector with 10 m cable, screened, 5-pole, M12x1	3527627
Extension cable 5 m, female connector 5-pole, M12x1 / Male connector 5-pole, M12x1	6040852
Female connector with screw terminal, 5-pole, M12x1	6049128
CSI-D-5 Contamination sensor interface	3249563
FluMoS Professional Software (CD)	3371637

Pressure - Viscosity Range



ConditionSensor Interface CSI-C-11

Features and Benefits

- Ability to view in real-time measured contamination results via Wireless Connection or *Bluetooth*® wireless technology with the FluMoS Mobile App
- Storage of the measured data directly on the CSI-C-11
- Easily interface digital sensors into existing LAN network
- Direct connection of up to two (2) SMART sensors via M12x1 connectors
- Integral bracket allows for easy installation on existing machines
- Due to high protection class of IP66, no switch cabinet for installation is required

FluMoS MOBILE

- Usable with FluMoS Mobile App

Market 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

Description

The ConditionSensor Interface CSI-C-11 is used to transmit digital sensor signals into a network protocol (HSI TCP/IP or Modbus® TCP), which can be transmitted to a stationary or mobile device via network cable (LAN) or wireless connection (W-LAN). Moreover, the CSI-C-11 is equipped with an internal memory and can be used as a data logger.

At the interface module, up to two sensors can be connected via M12 connector and supplied with power. In addition, the CSI-C-11 is equipped with an Ethernet connector (M12x1 socket), which allows the integration of connected sensors into company networks and control systems (PLC).

Specifications

HSI Interface:	Schroeder Sensor Interface for digital coupling of sensors
Ethernet 10 Base-T / 100 Base-TX W-LAN (HSI only) 2,4 GHz, IEEE 802.11 b/g/n:	Protocol: HSI TCP/IP (Port 49322) Modbus® TCP (Port 502)
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
Supply Voltage:	12 … 24 V DC ± 10 %
Current requirement (module):	100 mA (plus the consumption of the connected sensors)
Sensor supply:	12 … 24 V DC (looped through)
Electrical connection:	Supply voltage: Connector, M12, 5-pole, male SMART Sensor 1: Connector, M12, 8-pole, female SMART Sensor 2: Connector, M12, 5-pole, female LAN: Connector, M12, 4-pole, coding D (according to IEC61076-2-101), female W-LAN antenna: Connector, RP-SMA socket, female
Parameterisation:	via connector M12x1, 5-pole acc. to DIN VDE 0627 or W-LAN (FluMoS mobile)
Dimensions:	5.2" x 3.1" x 1.4" (131 x 77.5 x 35.5 mm)
Housing:	die cast aluminium
Weight:	0.79 lb. (≈ 360 g)
Size:	64 mB

CSI-C-11 ConditionSensor Interface

Model Number Selection

How to Build a Valid Model Number for a Schroeder CSI-C-11:

BOX 1	BOX 2	BOX 3	BOX 4
CSI			

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	
CSI	C	11	000	**= CSIC11000**

BOX 1	BOX 2	BOX 3	BOX 4
Type	**Housing**	**Output Type**	**Modification**
CSI	C = Aluminum Housing	11 = HSI Ethernet / W-LAN	000 = Standard

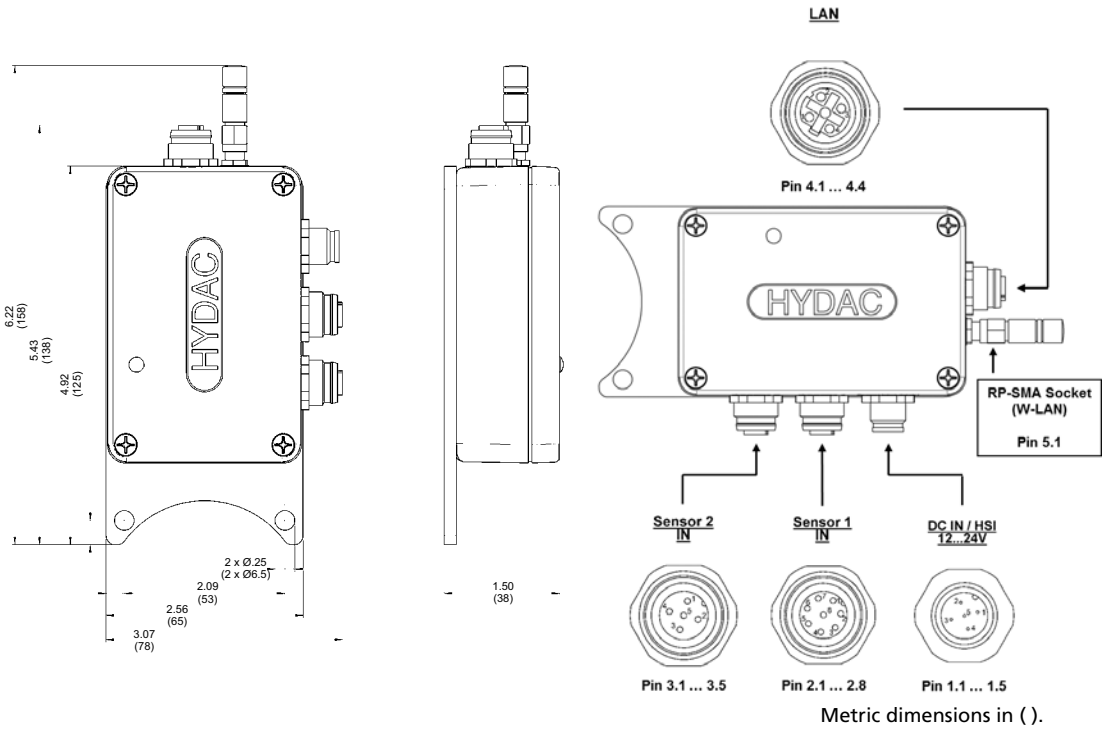
Accessories

Designation	Part-No.
Supply voltage	
PS5 power supply 100 – 240V AC, 50-60 Hz, 1,1 A, IP40; connector M12, 5-pole, female	3399939
ZBE-43-05 connecting cable, connector 5-pole with cable, length = 16.4 ft. (5 m)	3281240
ZBE-43-10 connecting cable, connector 5-pole with cable, length = 32.8 ft. (10 m)	3519768

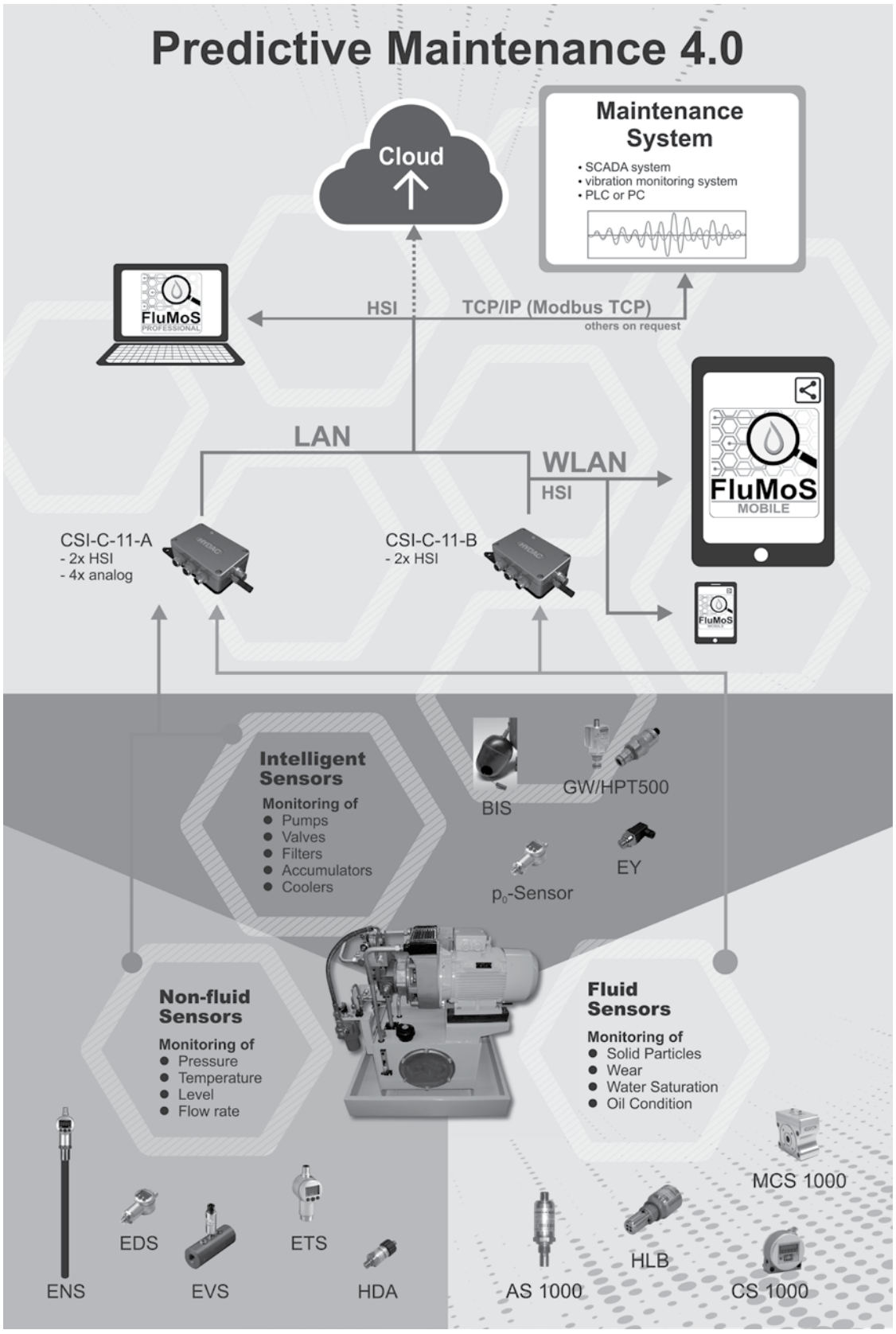
Sensor connection cable for CSM-E	
ZBE43-005 connecting cable CSI-C-11, coupling / plug 8-pole, length = 1.6 ft. (0.5 m)	4193544
ZBE30-005 connecting cable CSI-C-11, coupling / plug 5-pole, length = 1.6 Ft. (0.5 m)	4193586

Network cable (LAN)	
ZBE 45-05 network cable (Patch), connector 4-pole, coding D / connector RJ45, length = 16.4 ft. (5 m)	3346100
ZBE 45-10 network cable (Patch), connector 4-pole, coding D / connector RJ45, length = 32.8 ft. (10 m)	3346101

Dimensions



Metric dimensions in ( ).


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

Plug Pin Assignment

Pin	Signal	Description	
1.1	Vin 12 … 24 V DC	Device (CSI-C-11)	Power supply +
1.2	---	Device (CSI-C-11	n.a.
1.3	GND	Device (CSI-C-11)	Power supply GND
1.4	---	Device (CSI-C-11)	n.a.
1.5	HIS	Device (CSI-C-11)	Parameterisation
2.1	S1 12 … 24 V DC	Sensor 1	Power supply +
2.1	---	Sensor 1	n.a.
2.3	S1 GND	Sensor 1	Power supply GND
2.4	---	Sensor 1	n.a.
2.5	S1 HIS	Sensor 1	HSI signal
2.6	---	Sensor 1	n.a.
2.7	---	Sensor 1	n.a.
2.8	---	Sensor 1	n.a.
3.1	S2 12 … 24 V DC	Sensor 2	Power supply +
3.2	---	Sensor 2	n.a.
3.3	S2 GND	Sensor 2	Power supply GND
3.4	---	Sensor 2	n.a.
3.5	S2 HIS	Sensor 2	HSI signal
4.1	ETH TX+	Network (LAN)	Ethernet port data transmission +
4.2	ETH RX+	Network (LAN)	Ethernet port data receive +
4.3	ETH TX-	Network (LAN)	Ethernet port data transmission -
4.4	ETH RX-	Network (LAN)	Ethernet port data receive -
5.1	ANT	Network (W-LAN)	RP-SMA-socket W-LAN-antenna

Manually Controlled Fluid Sampling System

Patent pending

HY

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 allows the unit to operate on 115 VAC 60 Hz. 24 VDC is standard.
- Rugged design for field use.
- Viton® seals.
- Fluid viscosities up to 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

What's Included

- TestMate® Contamination Monitor (TCM)
- Machined, 6061-T651 aluminum alloy manifold block with anodized surface treatment.
- Specially designed fitting for mating to pump/motor.
- Viton® seals.
- Plugged water sensor port (G3/8)
- VSD (Variable Speed Drive) Motor Power Supply and Control Cable
- Water Sensor (TWS-D) Power Supply and Signal Cable (only supplied with optional water sensor (TWS-D))
- Contamination Monitor (TCM) output signal, USB-B Female Port for use with Windows-Based Computer and FluMoS Software, located on Control Enclosure
- Contamination Monitor (TCM), output signal, M12x1, 8 pole, Male Port, located on Control Enclosure, for use with PLC or RS485 Communication, analog or digital, 4 - 20 mA is standard, 2 to 10 V is optional
- Flow control valve
- VSD (Variable Speed Drive) pump/motor
- Manual rheostat pump controller
- IP 40 enclosure
- Fluid Inlet/Outlet Porting (SAE Size 04 ORB)
- 24 VDC Power Supply (NC3MP Female Connector)
- Optional 115 VAC Power Supply with Cord
- Contamination Monitor (TCM) Power and Signal Cable
- Water Sensor (TWS-D) M12x1, 5 pole Signal Output Connection, Male Port, located on Control Enclosure
- Contamination monitor (TCM) power connection, female M12x1, 8 pole located on control enclosure
- Water sensor (TWS-D) power connection, M12x1, 5 pole Female located on control enclosure

Manually Controlled Fluid Sampling System

HY-TRAX®

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:** 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:	Viton®
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°)
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 to 10 V analog (option for contamination monitor (CS)) RS485 for communication with FluMoS Software
Electrical Specifications:	4 - 20 mA analog output (max burden 330 Ω) 2 to 10 V output (min load resistor 82 Ω) Limit switching output (Power MOSFET): max current 1.5A
TestMate® Contamination Monitor (TCM) Signal Output Connections Located on Control Enclosure:	USB-B Female Port for use with Windows-based computer and FluMoS Software M12x1, 8 pole, Male Port, Analog or Digital, for use with PLC or RS485 Communication, (4 - 20 mA is standard). 2 to 10 V is optional, must specify when ordering TestMate® Contamination Monitor (TCM)
Water Sensor (TWS-D) Signal Output Connection Located on Control Enclosure:	Water sensor (TWS-D) M12x1, 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 TestMate® Sensor	Fluid Sampling System Manifold w/ TCM & VSD Pump/Motor	HY-TRAX® Manual Control Module	Fluid Sampling Manifold w/ Communications Module & VSD Pump/ Motor
	10 lbs. (4.5 kg)	5 lbs. (2.5 kg)	15 lbs. (6.8 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)	

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 invariable conditions.
- Designed to be used with Schroeder Industries TestMate® contamination monitor (TCM) and optional water sensor.
- 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 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 allows the unit to operate on 115 VAC 60 Htz.
- Rugged design for field use.
- Viton® seals.
- Fluid viscosities up to 350 cSt.
- Flow control valve providing optimal pressure for accurate sensor readings.
- Manual rheostat control adjusts VSD (Variable Speed Drive) pump speed to adjust for variances in fluid viscosities.

HY-TRAX® Fluid Sampling System Manifold with Manual Controller and VSD Pump/ Motor

What's Included

- Machined, 6061-T651 aluminum alloy manifold block with anodized surface treatment.
- Specially designed fitting for mating to pump/motor.
- Viton® seals.
- Plugged water sensor port (G3/8)
- VSD (Variable Speed Drive) Motor Power Supply and Control Cable
- Flow control valve
- VSD (Variable Speed Drive) pump/motor
- Manual rheostat pump controller
- IP 40 enclosure
- Fluid Inlet/Outlet Porting (SAE Size 04 ORB)
- 24 VDC Power Supply (NC3MP Female Connector)
- Optional 115 VAC Power Supply with Cord
- Water Sensor (TWS-D) M12x1, 5 pole Signal Output Connection, Male Port, located on control enclosure
- TestMate® Contamination monitor (TCM) power connection, female M12x1, 8 pole located on control enclosure
- Water sensor (TWS-D) power connection, M12x1, 5 pole Female located on control enclosure

HY Manually Controlled Fluid Sampling System

HY-TRAX®

Model Number Selection

How to Build a Valid Model Number for a Schroeder HY-TRAX® Manually Controlled Fluid Sampling System:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9
HY								

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	
HY		H		M					= HYHM

BOX 1

Model
HY

BOX 2

TestMate® Contamination Monitor (TCM)
Omit = TCM w/ display
ND = TCM w/ no display
NT = Manifold supplied w/ no TCM, Customer will supply TCM (manifold mount version needed)

BOX 3

Fluid Type
H = For use w/ Hydraulic & Diesel Fuel only*

BOX 4

TestMate® Contamination Monitor (TCM) Signal Output
Omit = 4-20 mA
S = 2 to 10 V analog output

BOX 5

TestMate® Contamination Monitor (TCM) Output Options
M = ISO 4406/SAE 4049
N = ISO 4406/NAS 1638

BOX 6

Water Sensor (TWS) Option
Omit = None
TWS-D = Water sensor w/ display

BOX 7

Manually Controlled Sampling System
Omit = Panel with Rheostat flow control, power and signal output for HY-TRAX® sampling system

BOX 8

Power Options
Omit = 24 VDC
P = 115 VAC

BOX 9

Air Suppression Loop
Omit = None
L = Looped hose and fitting

***Note: Off-road diesel contains dye. High concentrations of dye may interfere with particle count results. Please contact factory to review application.**

Telematic Communications Module with Remote Controlled Sampling System

Patent pending

Features and Benefits

- Provides Remote 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.
- 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 Viton® seals.
- Fluid viscosities up to 350 cSt.
- 50 psi (max.) working pressure.
- Flow control valve providing optimal pressure for accurate sensor readings.
- VSD, (Variable Speed Drive), pump/motor providing optimal flow for accurate sensor readings.

Applications

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

What's Included

- TestMate® Contamination monitor (TCM)
- Flow Control Valve
- GSM cellular communications
- VSD pump/motor
- Machined, 6061-T651 aluminum alloy manifold block with anodized surface treatment
- TestMate® Contamination Monitor (TCM) Communications/Power Cable
- Specially designed fitting for mating to pump/motor
- Plugged water sensor port (G3/8)
- IP 40 enclosure
- Water sensor (optional)
- 24 volts DC standard with optional 115 VAC Power Supply
- Optional Water Sensor (TWS-D) Communication/ Power Cable
- Fluid Inlet/Outlet Porting (SAE Size 04 ORB)

Telematic Communications Module with Remote Controlled Sampling System

HY-TRAX®

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:	Viton®
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°)
Max Viscosity:	1622 SUS (350 cSt)
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 TestMate® Sensor	Fluid Sampling System Manifold w/ TCM & VSD Pump/Motor	HY-TRAX® Communications Module	Fluid Sampling Manifold w/ Communications Module & VSD Pump/ Motor
	10 lbs. (4.5 kg)	10 lbs. (4.5 kg)	20 lbs. (9.1 kg)
	10.4" x 6.8" x 4.3" (264 x 173 x 109 mm)	14.7" x 11.3" x 5.25" (374 x 287 x 133 mm)	

HY-TRAX® Telematic Communications Module with Remote Controlled Sampling System

HY-TRAX® Fluid Sampling System Manifold with Contamination Sensor and VSD Pump/ Motor

Features and Benefits

- Integrated micro VFC, (Variable Speed Drive), pump/ motor provides optimal flow for accurate sensor readings in variable conditions
- Rugged design for field use
- Fluid viscosities up to 350 cSt
- 50 psi (max.) working pressure
- Flow control valve providing optimal pressure for accurate sensor readings
- Designed to be used with Schroeder Industries' communications module and optional water sensor

What's Included

- Machined, 6061-T651 aluminum alloy manifold block with anodized surface treatment.
- Specially designed fitting for mating to pump/motor.
- Viton® seals.
- Plugged water sensor port (G3/8)
- Flow control valve
- Contamination Monitor
- Micro VSD pump/motor
- Fluid Inlet/Outlet Porting (SAE Size 04 ORB)

HY-TRAX® Fluid Sampling Manifold with Communications Module and VSD Pump/ Motor

Features and Benefits

- Provides Remote 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.
- Designed to be used with Schroeder Industries contamination monitor (TCM - manifold mount version only) and optional water sensor.
- 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 or on demand. 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 (<50psi).
- 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 weatherproof IP 40 enclosure.
- Fluid sampling system standard with Viton® seals.
- Fluid viscosities up to 350 cSt.
- 50 psi (max.) working pressure.
- Flow control valve providing optimal pressure for accurate sensor readings.
- VSD, (Variable Speed Drive), pump/motor providing optimal flow for accurate sensor readings.

For Customers who have a TestMate® Contamination Monitor (CS) (CS must be 4-20 mA output)

What's Included

- Flow Control Valve
- GSM cellular communications
- VSD pump/motor
- Machined, 6061-T651 aluminum alloy manifold block with anodized surface treatment
- Specially designed fitting for mating to pump/motor
- IP 40 enclosure
- Plugged water sensor port (G3/8)
- Fluid Inlet/Outlet Porting (SAE Size 04 ORB)

HY-TRAX® Telematics Communications Module only operates with TCM's operating on Firmware 3.0 and 4-20 mA outputs. Older firmware versions will not communicate proper flow rate to the telematics module. Contact factory for more details.

Telematic Communications Module with Remote Controlled Sampling System

HY-TRAX®

HY-TRAX® Communications Module

HY-TRAX® Telematics Communications Module can be utilized on existing CS installations when the sensor receives adequate pressure (>120 psi) and flow (30-150 mL/min) from the hydraulic system. The CS must have 4-20 mA outputs and Firmware version 3.0.

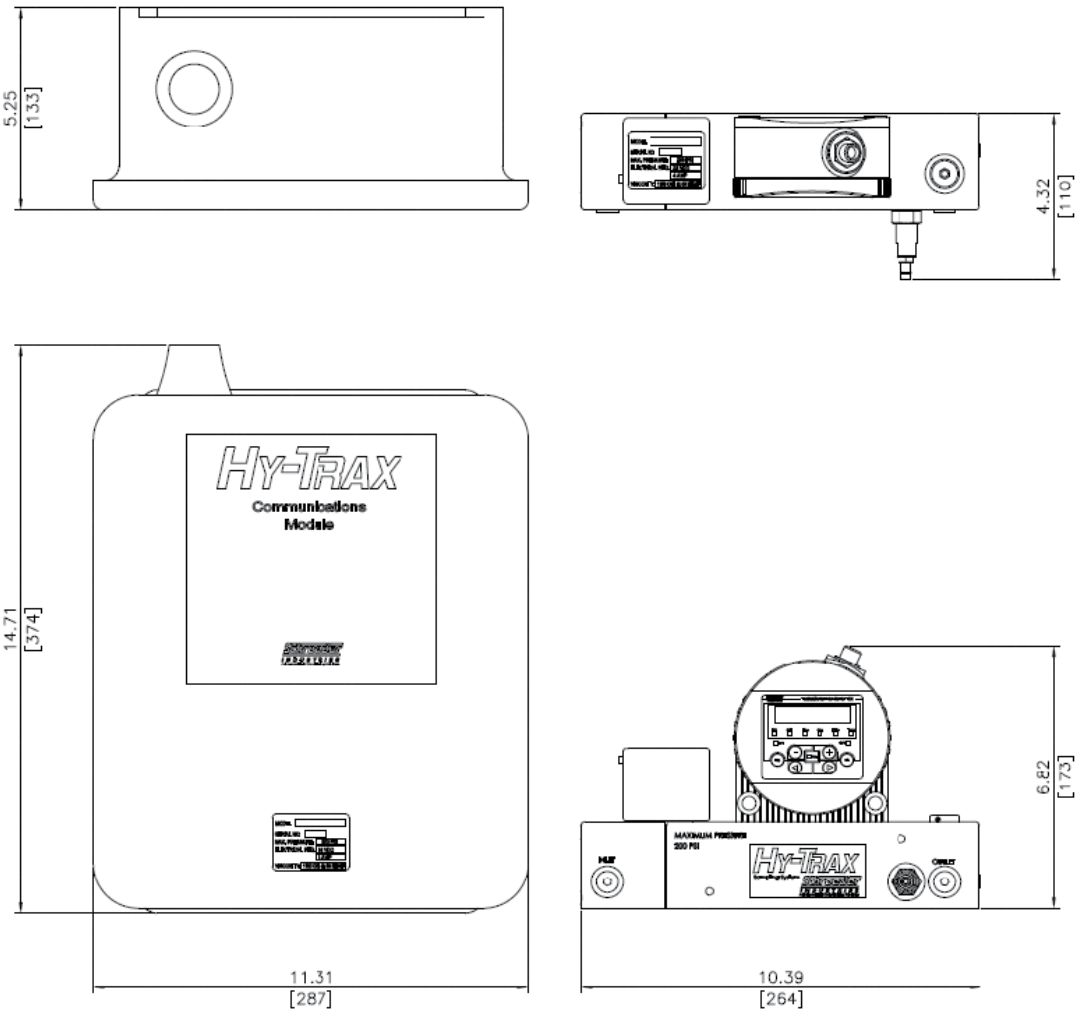
HY-TRAX® Communications Module Only.
Order part # HY-COMMMOD

What's Included

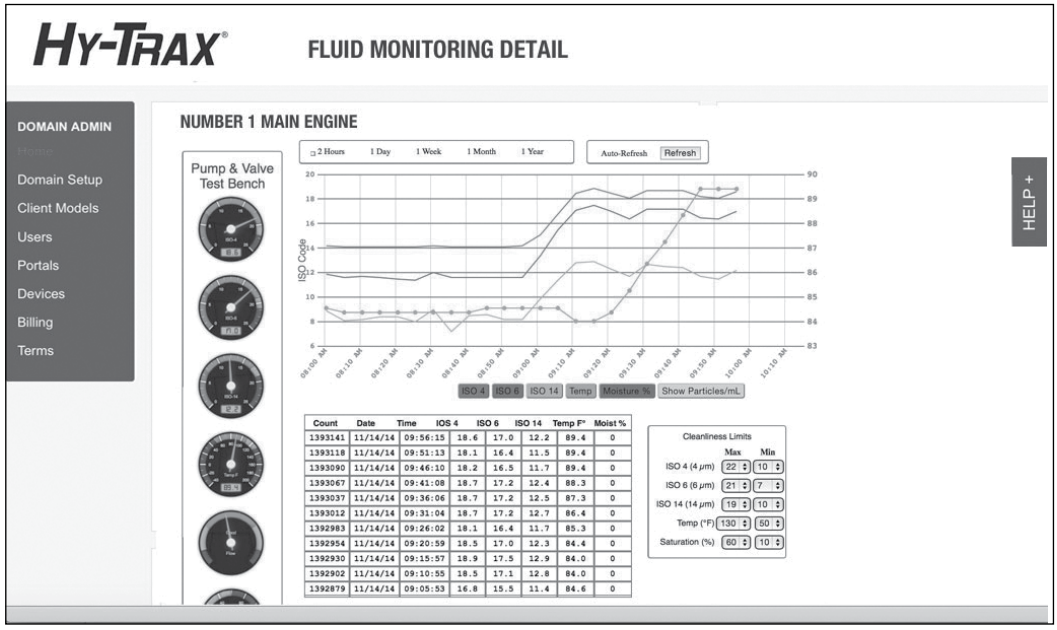
- GSM cellular communications
- IP 40 enclosure
- VSD, (Variable Speed Drive), Motor Controller
- 115 VAC Power Supply

Features and Benefits

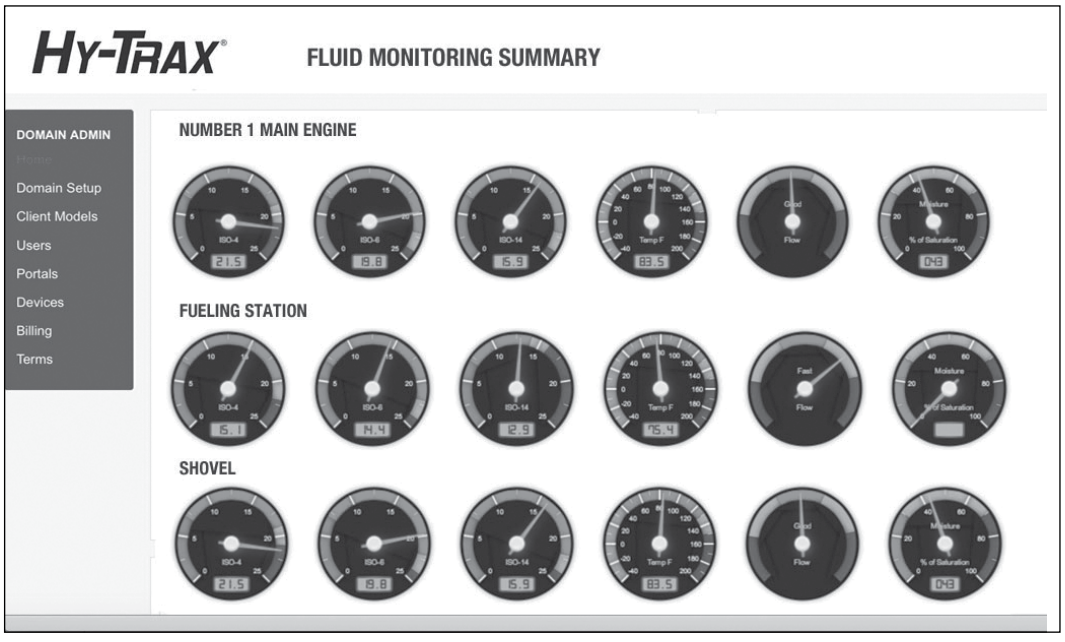
- Provides remote visibility to the fluid condition of critical systems.
- The HY-TRAX® Remote Oil Contamination Communications Module allows remote access via the Internet and smart devices to fluid particle counts, temperature and percent water saturation levels (optional) displayed on a customizable dashboard. The Communications Module collects and transmits data via GSM cellular at scheduled intervals. Users can receive alerts via email or text when the fluid's ISO contamination code or water saturation level (optional) reaches user defined critical levels.
- 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.



Telematic Communications Module with Remote Controlled Sampling System



Example of HY-TRAX® Communications Modules Dashboard Contamination Chart



Example of HY-TRAX® Communications Modules Dashboard Gauge Panel

Telematic Communications Module with Remote Controlled Sampling System

Model Number Selection

How to Build a Valid Model Number for a Schroeder HY-TRAX® Telematic Communications Module with Remote Controlled Fluid Sampling System:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9
HY								

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	
HY		H		M		A			= HYHMA

HY-TRAX® Telematics Communications Module only operates with CS's operating on Firmware V03.00. Older firmware versions will not communicate proper flow rate to the telematics module. Contact factory for additional information.

BOX 1

Model
HY

BOX 2

TestMate® Contamination Monitor (TCM)
Omit = TCM w/ display
ND = TCM w/ no display
NT = Manifold supplied w/ no TCM, Customer will supply TCM; TCM must be 4-20 mA output only

BOX 3

Fluid Type
H = For use w/ Hydraulic & Diesel Fuel only*

BOX 4

TestMate® Contamination Monitor (TCM) Signal Output
Omit = 4-20 mA
NOTE: For customers with existing TCMs w/ a 2 to 10 V analog output please see HY-TRAX® Manually Controlled Sampling System

BOX 5

TestMate® Contamination Monitor (TCM) Output Options
M = ISO 4406/SAE 4049
N = ISO 4406/NAS 1638

BOX 6

Water Sensor (TWS) Option
Omit = None
TWS-D = Water sensor w/ display

BOX 7

Communications Module w/ Remote Controlled Fluid Sampling System
A = Telematic Communications Module w/ Dashboard Data Display (GSM Cellular)
NOTE: For customers with existing TCMs w/ a 2 to 10 V analog output please see HY-TRAX® Manually Controlled Sampling System

BOX 8

Communications Module Power Options
Omit = 24 VDC
P = 115 VAC

BOX 9

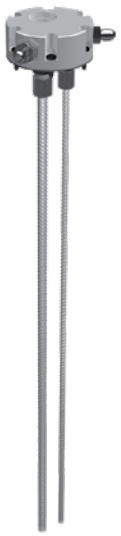
Air Suppression Loop
Omit = None
L = Looped hose and fitting

***Note: Off-road diesel contains dye. High concentrations of dye may interfere with particle count results. Please contact factory to review application.**

Reservoir Breather Fluid Sampling Adapter RBSA

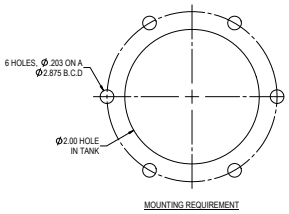
Features and Benefits

- 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 return ports
- HY-TRAX® adapter kit includes #6 & #4 JIC adapters with 6' connection hoses included
- 24" SS drop tubes can be cut to length
- Standard 6 bolt breather pattern
- Anodized 6061 aluminum breather
- ¾" NPT for breather element

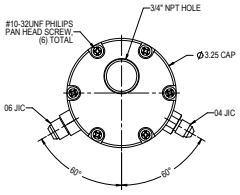


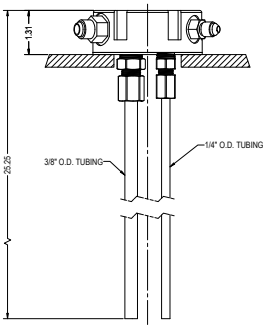
Market Applications

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



MOUNTING REQUIREMENT



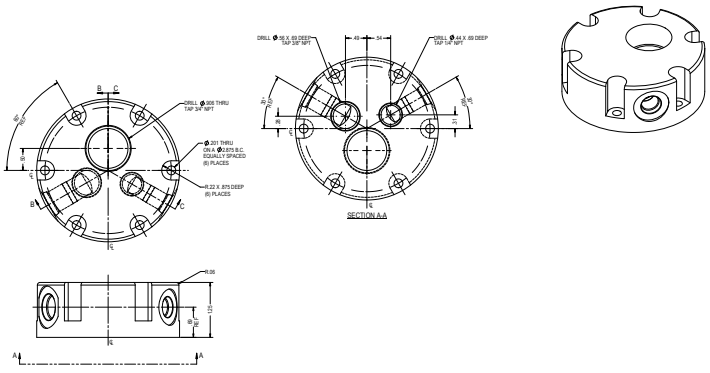


Specifications

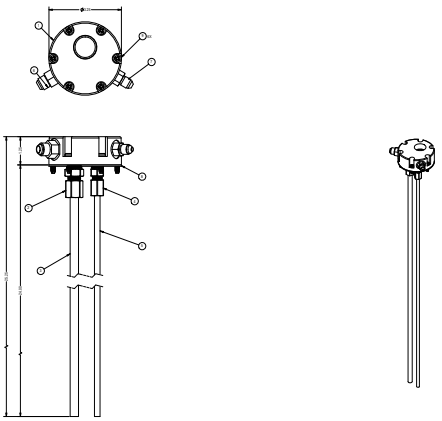
Reservoir Mounting Pattern:	Fits standard 6-bolt
Supply Port Thread Size:	9/16-18 UN
Return Port Thread Size:	7/16-20 UN
Breather Port Thread Size:	¾" NPT
Fittings:	#6 & #4 JIC fittings and 6' supply/return hoses.
Return Tubes:	Supplied with 3/8" and ¼" return tubes. Tubes are 24" long and can be shortened if necessary. Housing constructed 6061 anodized aluminum.

RBSA Reservoir Breather Fluid Sampling Adapter

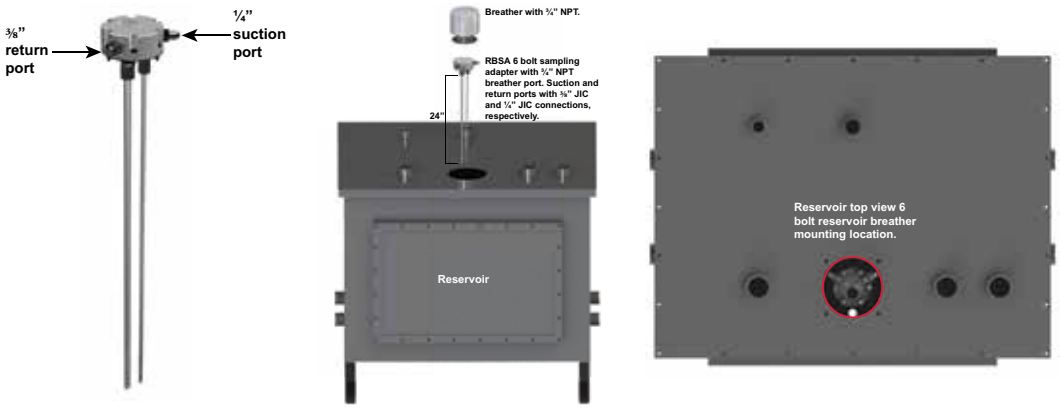
Application Example



Parts List Drawing



Reservoir Mounting Views



Model Number Selection

How to Build a Valid Model Number for a Schroeder Reservoir Breather Fluid Sampling Adapter RBSA:

BOX 1	BOX 2
RBSA	

Example: *NOTE: Box 2 can have multiple options.*

BOX 1	BOX 2	
RBSA	1	**= RBSA-1**

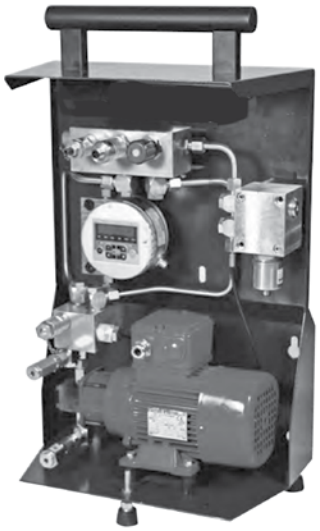
BOX 1	BOX 2
Model	**Options**
RBSA	1 = HY-TRAX® adapter fitting #6 & #4 JIC fittings and 6' supply/return hoses

Contamination Sensor Module CSM 1000

Formally Known as "TSU - TestMate® Sensor Unit"

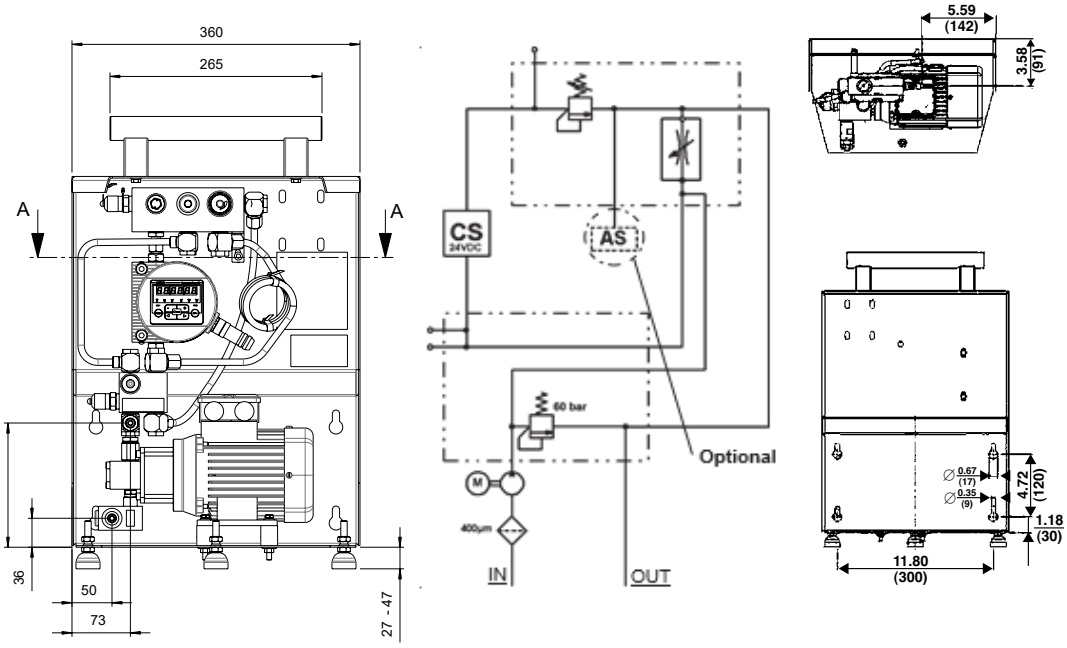
Description

The Contamination Sensor Module (CSM) is an online condition monitoring system for detecting particle contamination in hydraulic and lubrication fluids containing a high proportion of air bubbles. Air bubble suppression is used to dissolve the air bubbles so that they are not detected as particles. Moreover, it is the ideal solution for analyzing the particle content of fluids, independently of the rest of the hydraulic system. As an option, other condition monitoring sensors such as the AS 1000 Series Water Sensor can be incorporated.



Applications

- Lubrication systems in paper, steel and energy sectors
- Preventive, pro-active preparation of service/intervals
- Monitoring of component cleanliness on test benches
- Monitoring of oil cleanliness in storage tanks



CSM Installation in System

Basically there are three different possibilities for connecting the CSM to hydraulic and lubrication systems. Select the measuring point according to the type of information the customer requires from the system.

1. Measuring from tank
   Indicates the overall condition of the oil. Inlet and outlet of the CSM are connected to the tank near the suction of the main pump.
2. Measuring from the pressure line before the filter
   This is the normal location for taking bottle samples. By using the CSM the amount of bottle sampling can be reduced and information on the oil condition is therefore available immediately. This test point is used mostly in lube systems.
3. Measuring from pressure line after the filter
   This test point is used in roll hydraulics and the reason for measuring oil after the filter is to ensure that clean oil is always available to the sensitive proportional valves and to other machine parts. Mainly used in roll hydraulics and particularly if customers have had problems with the proportional valves.

Important! The pressure should be reduced using a separate valve before the oil goes into the CSM.

CSM 1000 Contamination Sensor Module

Formally Known as "TSU - TestMate® Sensor Unit"

Specifications

Pump Type:		Gear pump
Operation Pressure: P_{in} *(INLET)*: P_{out} *(OUTLET)*: P_{out} (leakage line):		-5.8 - 7.3 psi (-0.4 to 0.5 bar) (standard pump) -5.8 - 1,740 psi (-0.4 to 120 bar) (pump, pressure inlet stable) 73 psi (5 bar) 7.3 psi (0.5 bar) (pump, pressure inlet stable)
Permissible Outlet Pressure:		73 psi (5 bar max.)
Connections:		INLET: Thread G 1/4, ISO 228 OUTLET: Thread G 1/4, ISO 228
Total Flow Rate:		approx. 100 mL/min (standard pump) approx. 180 mL/min (pump, pressure inlet stable)
Permissible Visc. Range for Measuring:		10 to 1000 cSt
Permissible Fluid Temp. Range:		32°F to 158°F (0°C to 70°C)
Permissible Fluids:		Hydraulic and lubrication fluids based on mineral oil
Power Consumption: *(motor pump group)*:		0.18 kW @ 50 Hz 0.21 kW @ 60 Hz
Ambient Temperature Range:		32°F to 131°F (0°C to 55°C)
Storage Temperature Range:		-4°F to 185°F (-20°C to 85°C)
Relative Humidity:		max. 90%, not condensing
IP Class:		IP55
Weight:		approx. 40 lbs. (18 kg)
Contamination Sensor:	Self-diagnosis:	continuously with error indication via status LED
	Measuring Range:	Display from class ISO 9/8/7 (MIN) up to class ISO 25/24/23 (MAX) Calibrated within the range ISO 13/11/10 to ISO 23/21/18
	Power Supply Voltage:	9 to 36 VDC, residual ripple <10%
	Power Consumption:	3 W max.
	Electrical Outputs:	Analog output 4 to 20 mA or 0 to 10 V RS485 interface or switching output

Model Number Selection

How to Build a Valid Model Number for a Schroeder CSM:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6
CSM					

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	
CSM	1220	1	1	W/N/X60/O60	AS	**= CSM-1220-1-1-W/N/X60/O60-AS**

BOX 1

Model
CSM

BOX 2

Contamination Code
1220 = ISO 4406:1999; SAE AS 4059(D)
1320 = ISO 4406:1987; NAS 1638

BOX 3

Pump
1 = Standard gear pump
2 = Pump, increased inlet pressure with oil leakage pipe
4 = Pump, increased inlet pressure, no oil leakage line, magnetic drive

BOX 4

Output
1 = 4-20 mA analog
2 = 0-10 V analog

BOX 5

Electrical Supply
W/N/X60/O60 = 230/460 V 60Hz 3PH 230/400 V 50Hz 3PH
L60 = 120V, 60Hz, 1Ph

BOX 6

Water Sensor
Omit = None
W = AS 1000 Water Sensor

What's Included

- CSM
- Operating and maintenance instructions
- CD with FluMoS software and manuals
- Calibration certificate contamination sensor

Schroeder Pro Total Fluid Life

TFL

Laser Particle Counter - 4, 6, 14, & 21 micron counts displayed as ISO, NAS, & SAE

Oil Life Sensor - gives warning of oil life ending and also helps inform if an oil change is required

Water Sensor - shows relative humidity of oil as % saturation

Touch Screen - allows users to navigate operational functions with ease and analyze data

Internal Gear Pump - with bypass for processing pressurized and non-pressurized vessels

Part of the Schroeder Industries 2030 Initiative

Description

The Schroeder Pro: 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.

Specifications

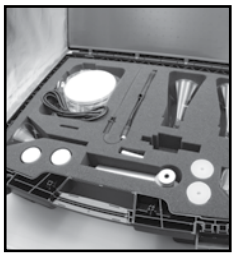
Measured Variables:	ISO Code / SAE Class / NAS Class / TAN-Delta Number (Oil Life) / Saturation Level / Temperature
Particulate Measurement Standards:	ISO 4406 (≥4(c) / ≥6(c) / ≥14(c) / ≥21(c)) , NAS 1638, SAE AS4059
Particle Counter Measuring Range:	Maximum ISO Code of 29
Accuracy:	±0.5 ISO Code (Minimum 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
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
Connection:	1604 minimess test points, with 0.6m long 8mm tubing
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

TFL Schroeder Pro Total Fluid Life

Model Selection

Schroeder Pro Series:
Total Fluid Life

7641077



Schroeder Pro Series:
Accessory Kit

Included w/ Schroeder Pro

Schroeder Pro Series: High
Pressure Adapter

Sold Separately

7641529

Items Supplied

- Schroeder Pro: Total Fluid Life

Accessory Kit with included items:

- 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

Schroeder Pro Total Fluid Health TFH

Features & Benefits

Laser Particle Counter - 4, 6, 14, & 21 micron counts displayed as ISO, NAS, & SAE

Oil Life Sensor - gives warning of oil life ending and also helps inform if an oil change is required

Water Sensor - shows relative humidity of oil as % saturation

Touch Screen - allows users to navigate operational functions with ease and analyze data

Internal Gear Pump - with bypass for processing pressurized and non-pressurized vessels

Digital Imaging - sensor sorts particles into fatigue, cutting, sliding wear, and fiber categories to estimate cause of contamination

Part of the Schroeder Industries 2030 Initiative

Description

The Schroeder Pro: 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.

Specifications

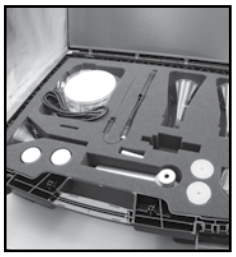
Measured Variables:	Particle Differentiation / ISO Code / SAE Class / NAS Class / TAN-Delta Number (Oil Life) / Saturation Level / Temperature
Particulate Measurement Standards:	ISO 4406 (≥4(c) / ≥6(c) / ≥14(c) / ≥21(c) / ≥38(c) / ≥70(c) / ≥100(c)) , NAS 1638, SAE AS4059
Particle Counter Measuring Range:	Maximum ISO Code of 29
Accuracy:	±0.5 ISO Code (Minimum concentration ISO MTD 2.8mg/L)
Operating Temperature Range:	32°F to 122°F
Fluid Compatibility:	Mineral-based oils, Synthethic oils, Organic oils, Diesel Fuels
Dimensions (cover closed):	(L) 16.2" x (D) 12.7" x (H) 6.7" (main device; accessory case: (L) 22.6" x (D) 20.9" x (H) 8.0")
Environmental Protection:	IP67 (cover closed) IP54 (cover open)
Maximum Ambient Humidity:	97% relative humidity, non-condensing
Weight:	26.5 lbs. (12.0kg) (main device; accessory case: 19lbs. [8.6kg])
Calibration Verification Frequency:	12 months recommended
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:	1-2400cSt (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
Connection:	1604 minimess test points, with 0.6m long 8mm tubing
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

TFH Schroeder Pro Total Fluid Health

Model Selection

Schroeder Pro Series:
Total Fluid Health

7641078



Schroeder Pro Series:
Accessory Kit

Included w/ Schroeder Pro

Schroeder Pro Series: High
Pressure Adapter

Sold Separately

7641529

Items Supplied

- Schroeder Pro: Total Fluid Life

Accessory Kit with included items:

- 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

Fluid Control Units - Portable Models FCU

Formally Known as "TMU - TestMate® Monitoring Unit"

Features and Benefits

- 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 (AS 1000)
- Integrated pump for measurement in pressureless reservoirs
- Operation with 24 VDC network adaptor included in scope of delivery
- Data storage capabilities
- Interfaces: 5-pole plug, Bluetooth, USB data port

Part of the Schroeder Industries 2030 Initiative

FluMoS MOBILE

- Usable with FluMos Mobile App
- Download and store measured data in real-time using FluMoS Mobile App via Bluetooth connection

Description

The FCU1310 combines the advantages of the portable contamination measurement units with the measurement technology of the Contamination Sensor (CS 1000) and AS 1000 Aqua Sensor.

The FCU is a portable service unit and is designed for measurement of solid particle contamination and water saturation in hydraulic systems. It is designed for temporary operation up to a maximum of 30 minute runtime followed by a rest period of 10 minutes and is not intended for continuous operation.

The FCU will measure contamination levels on mineral based hydraulic oils compatible with Viton® seals. The FCU is not compatible with water glycol fluids.

The integrated pump and the hoses with test point connections, which are included with the FCU, allow operation on pressureless reservoirs, control circuits, and high pressure circuits.

Specifications

General Data:	Self-Diagnosis:	Continuously with error indication via status LED and display
	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°F to 212°F (–25°C to 100°C)
	Accuracy:	± 1/2 ISO class in the calibrated range / ± 2 % Full scale max.
	Material of Sealings:	FPM Viton seals
	Ambient Temperature Range:	32°F to 113°F (0°C to 45°C)
	Storage Temperature Range:	-40°F to 176°F (-40°C to +80°C)
	Dimensions (cover closed):	9" H x 16" L x 13"D
	IP Class:	IP50 in operation IP67 closed
	Weight:	Approx. 29 lbs (13 kg)
Hydraulic Data:	Operating Pressure:	IN: -7.25 to 650 psi (-0.5 to 45 bar) OUT: 0 to 7.5 psi (0 to 0.5 bar)
	with Adapter for Pressure Lines:	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) (using included high pressure adapter)
	Maximum Suction Height:	39 in (1 m)
	Permissible Viscosity Range:	46 to 1622 SUS (10 to 350 cSt)
	Fluid Temperature Range:	32°F to 158°F (0°C to +70°C)
Electrical Data:	Power Supply Voltage:	24 VDC ± 20%, residual ripple < 10%
	Max. Power / Current Consumption:	100 Watt / 4 A
	Interface:	Plug connection, 5-pole, male, M12x1 and USB

FCU Fluid Control Units - Portable Models

Formally Known as "TMU - TestMate® Monitoring Unit"

Model Number Selection

How to Build a Valid Model Number for a Schroeder FCU:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9
FCU					–	–	–	

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	
FCU	1	3	1	0	– 4	– U	– AS	– 1	**= FCU 1310-4-U-AS-1**

BOX 1 – Series

FCU = Fluid Control Unit

BOX 2 – Model

1 = 1000 Series, 4 particle size channelst

BOX 3 – Contamination Code

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)

BOX 4 – Housing

1 = for Hydraulic and lubrication fluids based on mineral oils

5 = Hydraulic and lubrication fluids based on mineral oils as well as diesel

BOX 5 – Fluids

0 = Mineral Oil, Synthetic Esters/PAO, Quintolubric, Cosmolubric (Consult factory for other fluid types.)

BOX 6 – Options

4 = with Integrated Pump

BOX 7 – Supply Voltage

U = 24 V DC

BOX 8 – Integrated

AS = AquaSensor (AS 1000 series)

BOX 9 – Power Supply Adapter

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

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.

Items supplied with FCU-1310-4-U-AS-1 include:

- Fluid control Unit FCU 1000
- Power supply AC adapter with connecting cables to supply voltage for Europe, USA/Canada, UK, Australia, & Japan
- Adapter for pressure lines
- Inlet pressure hose with screw connection for 1620 test point, length = 2 meters (approx. 79 inches) in length
- Inlet suction hose, clear, open end, length = 0.3 meters (approx. 12 inches) in length
- Outlet return hose, open end, clear, length 1 meter (approx. 39 inches) in length
- Operation Manual & Calibration Certificate FluMoS Software
- USB Flash Drive

Accessories:

- Battery Pack (approx. 5 hours of use) Part No. 3504605

Metallic Contamination Sensor Series MCS

Formally Known as "TMS Metallic Contamination Sensor Series"

Features and Benefits

- Early detection of imminent gear unit damage
- Prevention of expensive plant downtime
- Optimal supplement to optical sensors
- Measurement of metallic particles (ferromagnetic and nonferromagnetic) > 70 µm
- Measurement result is not affected by air bubbles or liquid contamination in the liquid

Applications

- Gear boxes for wind energy
- Paper machine bearings
- Wind Turbines
- Marine Thrusters
- Industrial Gear Boxes
- Mobile Drive Systems
- Lubricating Systems
- Flushing Systems
- Test Standards
- Pumps

FluMoS MOBILE

- Compatible with FluMoS Mobile App when connected to the CSI-C-11

Description

The Metallic Contamination 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.

Comparison

Technical Details	MCS 15xx	MCS 14xx	MCS 13xx
Flow Rate	2.6... 52.8 gpm (10... 200 l/min)	0.5... 10.6 gpm (2... 40 l/min)	0.1... 2.1 gpm (0.4... 8 l/min)
Sensor Orifice Diameter	1" (25.4 mm)	1/2" (12.7 mm)	1/4" (6.3 mm)
Ferromagnetic (Fe) particles	> 200 µm	> 100 µm	> 70 µm
	Particle with volume equivalent to that of a sphere with given Ø		
Non-ferromagnetic (nFe) particles	> 550 µm	> 300 µm	> 200 µm
	Particle with volume equivalent to that of a sphere with given Ø		
Max. Particle Rate (particles/sec.; proportional to flow rate)	8 to 160	9 to 180	0 to 200

CSI-C-11 Compatible Product

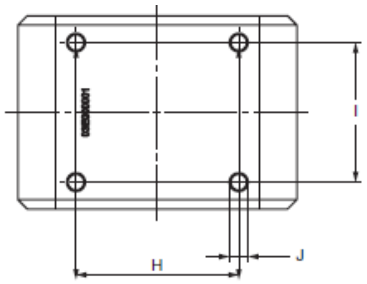
MCS Metallic Contamination Sensor Series

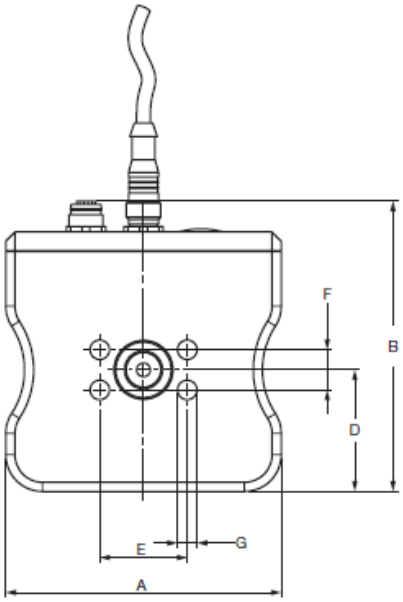
Formally Known as "TMS Metallic Contamination Sensor Series"

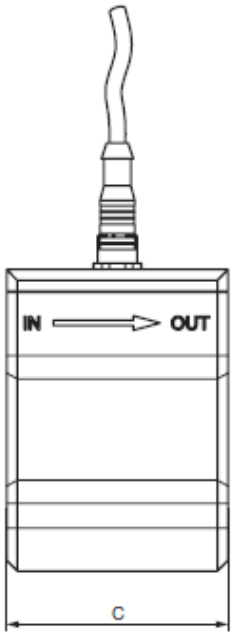
Dimensions

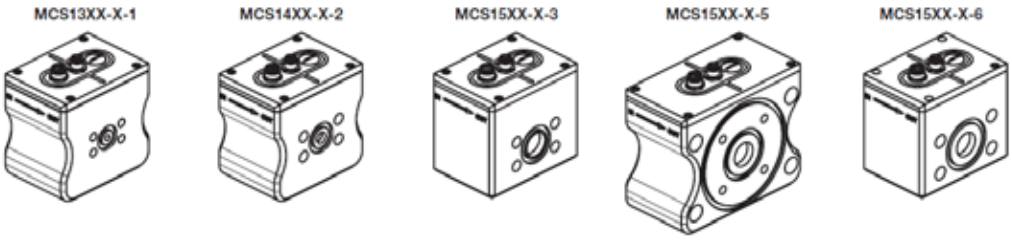
Metric dimensions in ( ).

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









Metallic Contamination Sensor Series MCS

Formally Known as "TMS Metallic Contamination Sensor Series"

Specifications

General Data:	Ambient Temperature:	-40°F to 158°F (-40°C to +70°C)
	Diameter Sensor Cross-section:	MCS 13xx: 1/4" (6mm) MCS 14xx: 1/2" (13mm) MCS 15xx: 1" (25mm)
	Protection Class to DIN 40050:	IP 67
	Weight:	MCS 13xx: ~6.6 lbs (~3kg) MCS 14xx: ~5.6 lbs (~2.5kg) MCS 15xx: ~7.7 lbs (~3.5kg)
	Environmenal 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 (temperature and humidity)
	Certifications:	Wind power: DNV - Renewables Cert. Marine: DNV - Type Approval
	Self Diagnostics:	Continuous, with error indication via Status LED and general operational readiness via Device-Ready-LED
	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
Hydraulic Data:	Flow Rate:	MCS 13xx: 0.1-2.1 gpm (0.4-8 l/min) MCS 14xx: 0.5-10.6 gpm (2-40 l/min) MCS 15xx: 2.6-52.8 gpm (10-200 l/min)
	Operating Pressure:	290 psi (20 bar)
	Fluid Temperature Range:	-40°F to 185°F (-40°C to +85°C)
	Inlet/Outlet *(flange connection according to ISO 6162-1)*:	MCS 13xx: SAE 1/2" MCS 14xx: SAE 3/4" MCS 15xx: SAE 1", SAE 1-1/2", SAE 2", SAE 4"
	Permissible Fluids:	Hydraulic and lubrication fluids based on mineral oils as well as synthetic oils (e.g. poly-α-olefins – PAO)
External Electrical Data:	Supply Voltage:	18 - 36 VDC, residual ripple < 10%
	Power Consumption:	5 W max.
Internal Electrical Data:	2 Configurable Switching Outputs *(active, normally-open)*:	1 x Ferromagnetic particles (Fe) 1 x Non-ferromagnetic particles (nFe) OR 1 x Ferromagnetic particles (Fe) + Non-ferromagnetic particles (nFe) 1 x Status Signal OR 1x Alarm signal 1x Status signal
	Alarm Relays Capacity:	1.5 A max.
	RS485 Interface:	Physical: 2 wire, half duplex; Protocol: HSI, Modbus RTU
	HSI Interface (proprietary protocol):	Physical: 1 wire, half duplex; Protocols: HSI
	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
	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

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.

MCS Metallic Contamination Sensor Series

Formally Known as "TMS Metallic Contamination Sensor Series"

Model Number Selection

How to Build a Valid Model Number for a Schroeder MCS:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9
MCS								

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	
MCS	1	5	8	0	0	5	2	000	**= MCS1580-0-0-5-2/-000**

BOX 1 – Series

MCS =	Metallic Contamination Sensor

BOX 2 – Model

1 =	1000 Series

BOX 3 – Detection Limit/ Sensor Cross-Section

3 =	Fe particles > 70 µm / 1/4"
4 =	Fe particles > 100 µm / 1/2"
5 =	Fe particles > 200 µm / 1"

BOX 4 – Options

8 =	2x switching output / RS485 (HSI, Modbus RTU) / Ethernet (HSI TCP/IP, Modbus TCP)
2 =	2x switching output / CAN (CANopen) / Ethernet (HSI TCP/ IP, Modbus TCP)

BOX 5 – Signal Input/ Electrical Interface

0 =	Without

BOX 6 – Fluids

0 =	Mineral and synthetic oils

BOX 7 – Hydraluics Connections

1 =	Flange Connection, SAE ½" ISO 6162-1 (only for MSC13xx)
2 =	Flange Connection, SAE ¾" ISO 6162-1 (only for MCS14xx
5 =	Flange Connection, SAE 4" ISO 6162-1 (only for MCS15xx)

BOX 8 – Electrical Installation

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

BOX 9 – Modification Number

000 =	Standard

Scope of Delivery

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

Hydraulic Accessories

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

AquaSensor AS

Formally Known as "TestMate® Water Sensor"

Features and Benefits

- Compatible with hydraulic, lube oils and synthetic and natural esters
- Measures and displays saturation and temperature continuously in real-time
- Measured in saturation percentage, not ppm. This is preferable since it takes into account temperature and viscosity variations (see desired saturation level below)
- Data can be monitored to PC, PLC, etc.
- No calibration necessary for different oils
- Individual configuration (AS 3000 only)
- Flumos Mobile App compatibility (AS 1000 only)

FluMoS MOBILE

- Only the AS 1000 is Usable with FluMoS Mobile App when connected to the CSI-C-11.

Applications

- Hydraulic systems that are sensitive to water in oil
- Gear boxes
- Injection molding machines
- Turbines
- Transformers
- Mobile Hydraulics
- OEM

Description

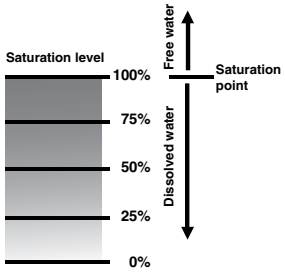
The AS sensors are online saturation and temperature sensors for the monitoring of hydraulic and lubrication fluids accurately and continuously. They measure the water content relative to the saturation concentration (saturation point) and outputs the degree of saturation (saturation level) in the range of 0 to 100% as a 4 to 20 mA signal. A reading of 0% would indicate the absence of water, while a reading of 100% would indicate that a fluid is free water. An integrated thermoelement on the sensor measures the temperature of the fluid in the range of -13°F to 212°F (-25°C to 100°C) and outputs it as a 4 to 20 mA signal.

The AS 3000 has a 4-digit, digital display that shows real-time measured values and allows for parameter adjustments. The digital display may also be rotated/aligned on two axes.

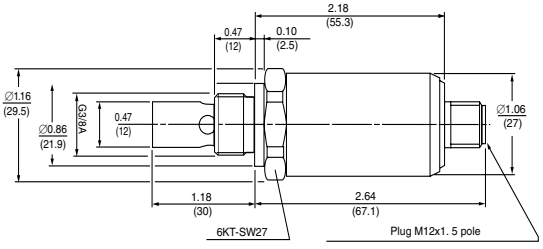
Desired Saturation Level

Since the effects of free and emulsified water are more harmful than those of dissolved water, water levels should remain well below the saturation point. However, even water in solution can cause damage and therefore every reasonable effort should be made to keep saturation levels as low as possible. As a guideline, we recommend maintaining saturation levels below 30% in all equipment.

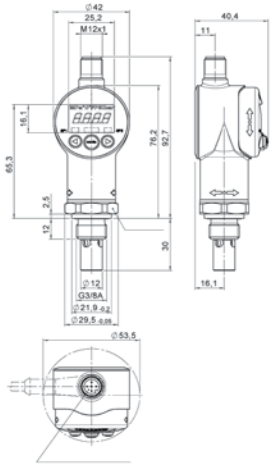
If you have any questions regarding technical details or the suitability of the AS sensors for your application, please contact our sales/technical department.



AS 1000



AS 3000



Metric dimensions in ( ).

AS AquaSensor

Formally Known as "TestMate® Water Sensor"

Specifications

Input Data	Measuring Range:	0 to 100% Saturation; -13°F to 212°F (25°C to 100°C)	
	Operating Pressure:	-7.25 to 725 psi max (-0.5 to 50 bar)	
	Burst Pressure:	9135 psi (630 bar) max	
	Parts in Contact with Media:	Connection Point: Stainless Steel/Ceramic with vacuum-metalized metal Seal: Viton = Mineral Oils/Esters, EPDM = Skydrol	
Output Data	*Humidity Measurement:*		
	Output Signal (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	
	Accuracy:	± 2% FS max	
Ambient Conditions	Nominal Temperature Range (saturation level measuring):	**AS 1000** 32°F to 194°F (0°C to 90°C)	**AS 3000** 32°F to 176°F (0°C to 80°C)
	Ambient Temperature Range:	-40°F to 212°F (-40°C to 100°C)	-40°F to 176°F (-40°C to 80°C)
	Viscosity Range:	32 to 23,175 SUS (1 to 5000 cSt)	
	Flow Velocity:	< 16 ft/s	Maximum 16 ft/s
	Media Tolerance:	Mineral oil-based fluids, natural and synthetic esters	
	CE Mark:	EN 50081-1, EN 50081-2, EN 50082-1, EN 61000-6-1-1/2/3/4	
	Type of Protection acc. DIN 40050:	IP 67	
Other Data	Supply Voltage:	12 to 32 VDC	18 to 35 VDC
	Residual Ripple Supply Voltage:	≤5%	
	Mechanical Connection:	G3/8A DIN 3852	
	Torque Rating:	18.5 ft-lbs	
	Electrical Connection:	M12x1, 5 pole (DIN VDE 0627)	
	Pin 1:	+Ub	Supply voltage: 18-35 VDC
	Pin 2:	Signal saturation level	Analog output
	Pin 3:	0V / GND	GND
	Pin 4:	Signal temperature	SP1 (alarm)
	Pin 5:	HSI Interface: 1 wire, half duplex	SP2 (warning)

FS (Full Scale) relative to the full measuring range

Model Number Selection

How to Build a Valid Model Number for a Schroeder AS:

BOX 1	BOX 2	BOX 3	BOX 4
AS	–	–	–

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	
AS	– 1	– 008	– C	**000 = AS-1-008-C-000**

BOX 1

Model
AS

BOX 2

Sensor Types
1 = No Display
3 = Digital Display

BOX 3

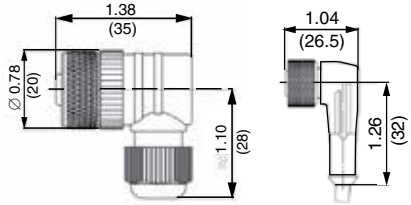
Type of Medium
008 = Mineral Oil
108 = Phosphate Ester

BOX 4

Signal Technology
5 = 2 Switch outputs/1 analog output *AS 3000 ONLY OPTION*
C = Output 1 Pin 2 saturation level (4 .. 20 mA) Output 2 Pin 4 temperature (4 .. 20 mA) *AS 1000 ONLY OPTION*

Accessories

Part Number	Description	Color Code
6006791	(5 pole) with 5m cable	Pin 1: Brown
7608409	(5 pole) with 5m screened cable	Pin 2: White
6023102	(5 pole) with 10m screened cable	Pin 3: Blue
		Pin 4: Black
		Pin 5: Grey



Sensor Monitoring Unit SMU

Features and Benefits

- Simple installation parallel to the customer system (Sensor Interface for SMU1200, transfer of the sensor's own analog and switching outputs) using the magnetic holder or top hat rails.
- High protection class IP67. Installation in a switch cabinet is not necessary
- Plug & Work unit including the 5m connection cable required for direct connection of the sensors (sensor connections via M12x1 male connectors, no programming necessary).
- Simple keypad operation.

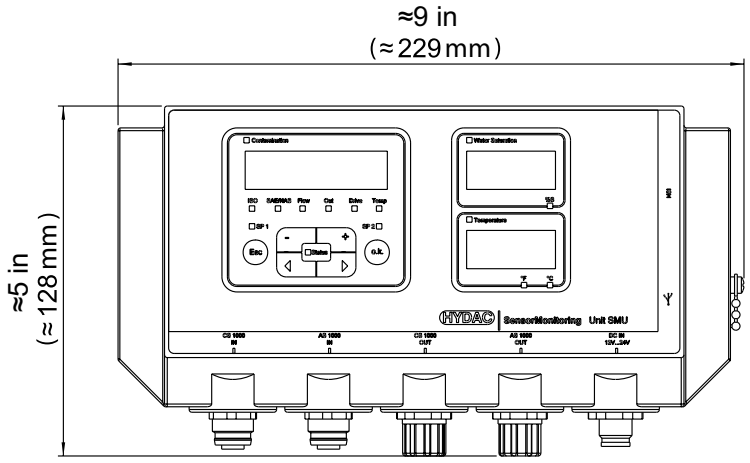
FluMoS MOBILE

- Usable with FluMoS Mobile App
- Download and store measured data in real-time using FluMoS Mobile App via Bluetooth connection

Description

The Sensor Monitoring Unit SMU1200 is a display unit for fluid sensors and is designed to display and store measured data. The following combinations of fluid sensors can be connected directly:

- Contamination Sensor TCM and water sensor TWS-C
- Metallic Contamination Sensor TMS and water sensor TWS-C



Metric dimensions in ( ).

SMU Sensor Monitoring Unit

Specifications

	Ambient Temperature:	32°F to 131°F (0°C to +55°C)
	Self diagnostics:	Continuously with error indication on display
	Display:	LED, 6/4/4-digit, each with 17 segments
	Topple (according to IEC/EN 60068-2-31):	Drop height 1 in.
	Storage temperature range:	-40°F to 176°F (-40 °C to +80°C)
	Relative humidity:	Maximum 95%, non-condensing
	Weight:	2 lbs.
Electrical data:	Supply voltage:	12 ... 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
	USB Master port:	USB Type A
	HSI:	1-wire half duplex
	Ethernet interface:	10 Base-T / 100 Base-Tx

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 Number Selection

How to Build a Valid Model Number for a Schroeder SMU:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7
SMU						

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	
SMU	1	2	6	0	TU	1	**= SMU1260TU1**

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5
Model	**Model**	**Data Input**	**Interface**	**Application**
SMU	1 = 1000 Series	2 = Digital	6 = HSI + USB Master	0 = Standard

BOX 6	BOX 7
Supply Voltage	**Data Input**
TU = 12 to 24V DC	1 = TCM & TWS-C
	2 = TMS & TWS-C

What's Included

- 1 SMU 1200 series
- 1 USB memory stick
- 1 connection cable 5 pole with flying leads for power supply, L = 5m
- 2 connection cables appropriate for the sensor combination, L = 5m
- 1 FluMoS Light CD
- 1 Operating manual
- DIN rail, 7.5" long.

Available Accessories

- Power supply PS5, 100-240 V AC / 50-60 Hz / 1.1 A 24 V DC / 1000 mA, Cable length = 1.8 m, Part no.: 3399939

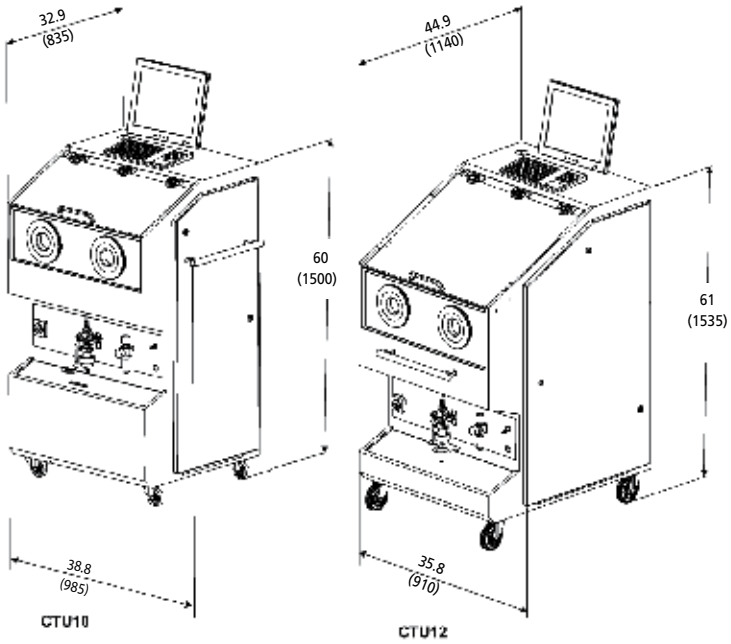
TestMate® Contamination Test Unit CTU

Features and Benefits

- 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

Description

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



Metric dimensions in ( ).

Specifications

	Overall Dimensions (H x W x L):	CTU10xx 71 in x 39 in x 35 in (1800 mm x 985 mm x 835 mm) CTU12xx 71 in x 36 in x 45 in (1800 mm x 910 mm x 1140 mm)
	Weight:	CTU10xx: ≈ 595 lbs (270 kg) ≈ 640 lbs (290 kg) *with ultrasonic unit* CTU12xx: ≈ 685 lbs (310 kg) ≈ 728 lbs (330 kg) *with ultrasonic unit*
	Mounting:	Mobile (mounted on casters)
	Power Consumption:	600 W *(800 W with ultrasonic)*
	Ambient Temperature:	59°F to 82°F (15°C to 28°C)
Cleanroom module	Material of Cleanroom:	Polished stainless steel
	Filling with Analysis Fluid:	Via analysis cabinet
	Max. Load Capacity:	CTU10xx = 105 lbs (47.5 kg) CTU12xx = 105 lbs (47.5 kg)
	Control:	PC-controlled with user-friendly software, rinse options and rinsing volume programmable

CTU TestMate® Contamination Test Unit

Specifications (cont.)

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 5.3 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, 1 µm (1xx1 series)
	Integrated Drip Tray:	6.6 gal (25 litre) with drainage
	Ultrasound:	100 W, 40KHz
	Dimensions:	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. 1741 psi (6 bar) Air flow rate: 15.8 gpm (60 lpm), Supply connection: DN 7.2
*Not supplied	Power Supply:	According to order

Model Number Selection

How to Build a Valid Model Number for a Schroeder CTU:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
CTU –	–	–	–	–	–	–	

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	
CTU –	1 –	2 –	4 –	0 –	K –	Z –	Z	**= CTU1240KZZ**

BOX 1

Series
CTU = Contamination Test Unit

BOX 2

Model
1 = Analysis Cabinet *(clean room)*

BOX 3

Installation Size
0 = Dimensions analysis cabinet: 11.8"x30.2"x14.4" *(300mm x 768mm x 365mm) (effective height x width x length)*
2 = Dimensions analysis cabinet: 18.1"x30.2"x25.6" (460mm x 768mm x 650mm) (effective height x width x length)

BOX 4

Analysis
3 = Version 2011 with ConTes software, 1um filtration and automatic pressure control
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)*

BOX 5

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

BOX 6

Supply Voltage
K = 120 VAC / 60Hz / 1 Phase USA / CDN
M = 230 VAC / 50Hz / 1 Phase Europe
N = 240 VAC / 50Hz / 1 Phase UK

BOX 7

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

BOX 8

Supplementary Details
Z = Standard
R = External rinsing connections 0.24" (Ø 6mm), between the hand holes
F = Fluid connections A/B/C and R fitted with rapid quick-release fastener on outside, Control line to CTM-E modules
A = Manual change-over for filter membrane holder

Note: Analyzing Fluid not supplied with unit - G60 Analyzing Fluid, 30L; PN 03205511

This information 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.

EasyTest Patch Kit EPK

Features and Benefits

- User-friendly visual analysis of solid contamination
- Compatible with mineral-based hydraulic fluids and lubricants, and petroleum distillates
- Enables solid contaminant quantification and identification
- Provides on-site results in a matter of minutes

Applications

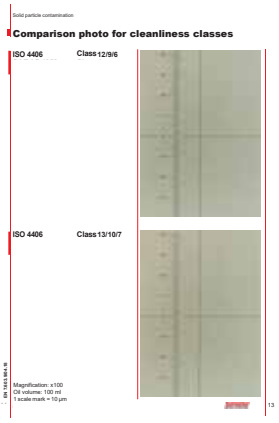
- Perform quick on-site determination of contamination levels of solid particles
- Supplement on-site laboratories
- Use as a tool to demonstrate need for solid contamination mitigation

Description

The Schroeder EasyTest Patch Kit (EPK) provides the necessary tools to determine the level of solid particulate contamination present in a fluid sample. Using the vacuum pump contained in the kit, the fluid sample is drawn through a membrane patch. The residual particulate left on the patch is viewed under a microscope and compared to photos of known contamination levels in the **L-2711 Schroeder Contamination Handbook** (included).

Schroeder:
EasyTest Patch Kit (EPK)

7630322



Model Selection + Items Supplied P/N 7640674

Kit as supplied includes:

Quantity	Description	P/N
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 ¼" LDPE tubing	2701999
1	L-2711 Contamination Handbook & Instructions	7627179

NOTES:

Solvent is not supplied w/ the EPK. Recommended solvents include Heptane (99% by GLC), or Isopropyl Alcohol.

Kit contents are subject to change at the discretion of the manufacturer.

WTK WaterTest Kit

Features and Benefits

- Easily performed determination of the absolute water content
- Direct comparison with the values measured in the lab thanks to the absolute water content being output in ppm
- High resolution in the lower measuring range
- Measurement series can be recorded for trend analysis
- Battery can be recharged via USB cable
- Illuminated display

Applications

- Perform quick on-site determination of contamination levels of water
- Supplement on-site laboratories
- Use as a tool to demonstrate need for water contamination mitigation

Description

The WaterTest Kit (WTK) is used for quantitative analysis of the absolute water content in mineral-oil-based lubricating and hydraulic fluids. The absolute water content is a measure of the actual water per volume of fluid. The measurement involves adding two reagents to the contaminated oil. This causes a pressure increase in the measurement cell that is output via the digital display as water content in vol. % or ppm.

Time per measurement: only approximately 5 minutes (without sample preparation).

Specifications

General Data:	Measuring Range:	0.02 to 1%* 0.1 to 5%* 100 to 1500 ppm* (0.01 to 0.15%) 200 to 6000 ppm* (0.02 to 0.6%) *) Measurement error < + 1.8 vol. % FS (full scale)
	Measurement data memory:	10 measurement series of 10 measurements each
	Weight including carry case:	2.7 kg
	Dimensions of carry case:	34 x 28 x 13.5 cm
Hydraulic Data:	Permitted fluid:	Mineral-oil-based lubricating and hydraulic fluid
	Permitted fluid temperature:	158°F (70°C)
Electrical Data:	Power Supply Voltage:	Internal battery rechargeable via USB cable

Model Selection + Items Supplied P/N 7640674

Schroeder:
WaterTest Kit (WTK)

7640674

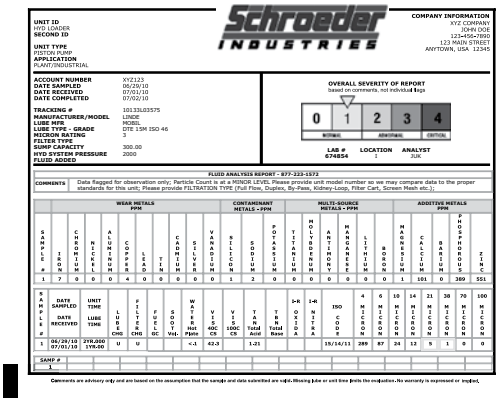
Kit as supplied includes:

Quantity	Description
1	Aluminum case
1	Measurement cell
1	Bottle containing reagent A (500 mL)
25	Sachet containing reagent B
1	Measuring beaker (100 mL)
1	Plastic tweezers
3	Agitator (in plastic case)
10	Syringe (1 mL)
3	Syringe (5 mL)
1	Test kit cleaner (250 mL)
1	Operating and maintenance manual
1	USB cable

NOTES:

Replacement pack consisting of consumables sufficient for 50 tests can be ordered separately.

Trouble Check Plus Fluid Analysis



THF Sample Report Form

Description

Schroeder's Trouble Check Plus is an easy to use fluid analysis service that can be utilized as part of any predictive maintenance program.

Schroeder offers two types of sample kits: one for hydraulic fluid (Description: THF P/N: 7624310) and one for water glycol (Description: TWG P/N: 7624741). Refer to the next section for tests performed for each of these kits. Upon receipt of order for any of these part numbers, a sample kit containing a clean sample bottle, blank form, and mailing container is shipped to the customer. After the sample has been taken, the customer simply completes the form and encloses it along with the sample in the mailing container provided. Kits are packaged and sold in lots of 10.

For each sample submitted, a lab report will be generated and forwarded directly to the user via e-mail or postal mail (per the user's request). Schroeder will maintain an electronic copy of all results for a two year period. It is strongly recommended that a MSDS (Material Safety Data Sheet) and a base line (unused) fluid sample be submitted with the initial sample to be analyzed. In addition to serving as a baseline for comparison to subsequent results, the sample of new oil will be used to determine warning limits for viscosity and TAN (total acid number).

Oil sample reports can be tracked online at: http://www.trackmysample.com/

Customers can create their own personal login and password to view all of their reports in one easy to use interface at: http://eoilreports.com/

Information gained by using this service can help identify potential problems in a hydraulic system at minimal cost to the user. Fluid analysis can provide answers to important questions such as these:

- Do I have the right filtration system in place for efficient contamination control?
- Is the fluid in my system experiencing changes that could negatively impact component life or system performance?

Part Numbers and Tests Performed

	Total Conditioning Analysis Kit (Description: THF P/N: 7624310)	Water Glycol Kit (Description: TWG P/N: 7624741)
Particle Count	✓	Patch Test
ISO 4406 Cleanliness Code	✓	Estimated
Water Content	✓	
Viscosity	✓	✓
TAN	✓	✓
Spectrographic Analysis	✓	

Explanation of Results

Particle Count and ISO Codes

Particle contamination is responsible for most of the wear in hydraulic systems. The level of contamination is determined automatically by a laser particle counter. The results are shown as the cumulative counts per milliliter of fluid according to ISO 4406:1999. (For water glycol fluids the patch test photo is used to estimate the ISO code). The current sample ISO code is displayed with the target ISO code. The target is based on the cleanliness level required for the most sensitive component in the system. An increase of 1 ISO digit is considered a caution limit and an increase of two ISO digits is critical. When the target ISO code is exceeded, improvement of the system filtration, elimination of the source of ingression or installation of auxiliary off-line filtration is required.

Water Content

High water content in oil encourages oxidation, corrosion and cavitation. The Karl Fischer Method in accordance with ASTM D 6304-04a determines the water content, which is displayed in percent (% or ppm). (Water glycol fluids normally have upper and lower limits that are set to manufacturer's specifications). Graphing results are available on-line. In general, water contents of up to 500 ppm are typically not critical for the operation of hydraulic and lubrication systems. When the water content exceeds approximately 500 ppm, the system should be protected against water penetration and measures should be introduced to extract water from the oil.

Viscosity

Maintaining the correct viscosity is important for achieving long component service life. Viscosity is reported in centistokes (cSt) @ 40° and 100°C as per ASTM D 445-04. Typically the limits are based on new oil data. Caution limits are calculated at ±10% new oil viscosity and critical limits at ±15% new oil viscosity. (Water glycol fluids can have limits set similarly but the water content should also be monitored as changes in it also affect the viscosity. The manufacturer should be consulted). Trending graphs are available on-line for all reported results. When large changes in viscosity are detected a partial drain of the affected oil and adding fresh fluid may correct the problem. However in some instances a complete oil change may be required.

Trouble Check Plus Fluid Analysis

Explanation of Results

Total Acid Number (TAN) *not applicable to Description: THF P/N: 7624310

Oxidation is the primary mechanism of oil degradation. The TAN measures the corrosive acidic by-products of oxidation. TAN results are reported in mg/g KOH (Potassium Hydroxide). Since all hydraulic fluids have some inherent acidic properties any increases in TAN must be compared to the new oil value as a baseline. Typically caution limits are set at +0.6 new oil value and critical limits are set at +1.0 new oil value. Certain application specific fluids may require limits set to manufacturer specifications. The results are graphed along with the limits to clearly show when oil oxidation has increased above acceptable levels. When the TAN has increased above the critical level, the oil should be changed immediately to prevent damage from occurring to your equipment.

Spectrographic Analysis *not applicable to Description: TWG P/N: 7624741

Additive, wear metal and contaminant levels are displayed in parts-per-million (ppm). The oil sample is analyzed for eighteen different elements. The results are also graphically displayed for easy detection of increasing or decreasing levels. The manufacturer blends additives into the oil in different forms and quantities. The additive package varies with the oil type. Wear metals indicate wear on particular components of an individual unit. These metals will indicate a wear problem on the microscopic level (< 8 microns) before the problem can be detected by conventional means. The existence of a wear problem is determined by absolute values of metals, and more importantly, by a relative increase or trend in one or more metals. Contaminants can be an indicator of internal or external contamination. The source and amount can be determined by a comparison with new oil data. Below is a list of additive types, wear metal and contaminant sources.

Additives	Function
Magnesium (Mg)	Dispersant / Detergent
Calcium (Ca)	Dispersant / Detergent
Barium (Ba)	Dispersant / Detergent
Zinc (Zn)	Anti-Wear
Molybdenum (Mo)	Anti-Wear
Phosphorous (P)	Anti-Wear
Wear Metals	**Typical Source**
Titanium (Ti)	Turbine Components, Bearings, Platings
Chromium (Cr)	Rings, Roller/Taper, Bearings, Rods, Platings
Iron (Fe)	Cylinders, Gears, Rings, Crankshafts, Liners, Bearings, Housings, Rust
Nickel (Ni)	Valves, Shafts, Gears, Rings, Turbine Components
Copper (Cu)	Bearings, Bushings, Bronze, Thrust-Washers, Friction Plates, Oil Cooler
Silver (Ag)	Bearings, Bushings, Platings
Aluminum (Al)	Pistons, Bearings, Pumps, Blowers, Rotors, Thrust-Washers, Dirt
Lead (Pb)	Bearing Overlays, Grease, Paint, Possible Additive in Gear Oils
Tin (Sn)	Bearings, Bushings, Piston Platings, Solder, Coolers
Vanadium	
Cadmium	
Contaminants	**Typical Source**
Sodium (Na)	Coolant, Sea Water, Dirt, Possible Additive
Boron (B)	Coolant, Sea Water, Possible Additive
Silicon (Si)	Dirt, Possible Additive (Anti-Foam)
Potassium (K)	

Status and Recommendations

Corrective actions are recommended when applicable. The status of the sample is rated in three categories:

- Normal - System is operating within the parameters established by baseline data & prior samples.
  - System requires no immediate action.
- Abnormal - System is operating outside of caution limits in one or more areas.
  - System requires scheduled maintenance.
- Critical - System is operating outside of critical limits in one or more areas.
  - System requires immediate attention.

Model Number Selection

Model Code	
Description: THF P/N: 7624310	Total Conditioning Analysis Kit
Description: TWG P/N: 7624741	Water Glycol Kit

NOTES:

Sample kits sold in case lots of 10 pieces. No samples will be processed without completed paperwork supplied with kits.

Features and Benefits

- Simple and user-friendly operation
- Large, full color graphics display
- Quick and independent basic setting by use of automatic sensor recognition
- HMG 2500 can only be used with Schroeder HSI and Schroeder SMART sensors
- Up to 4 sensors and 32 measurement channels can be connected simultaneously
- Sampling rates up to 0.1 ms
- Very large data memory for archiving measurement curves
- Various measurement modes: Normal measuring, Fast curve recording, Long-term measurement
- 2 independent triggers, can be linked logically
- Simple sensor connection with M12x1 push-pull connector
- PC connection: USB and RS 232
- Convenient visualization, archiving and data processing using the HMGWIN software supplied

Description

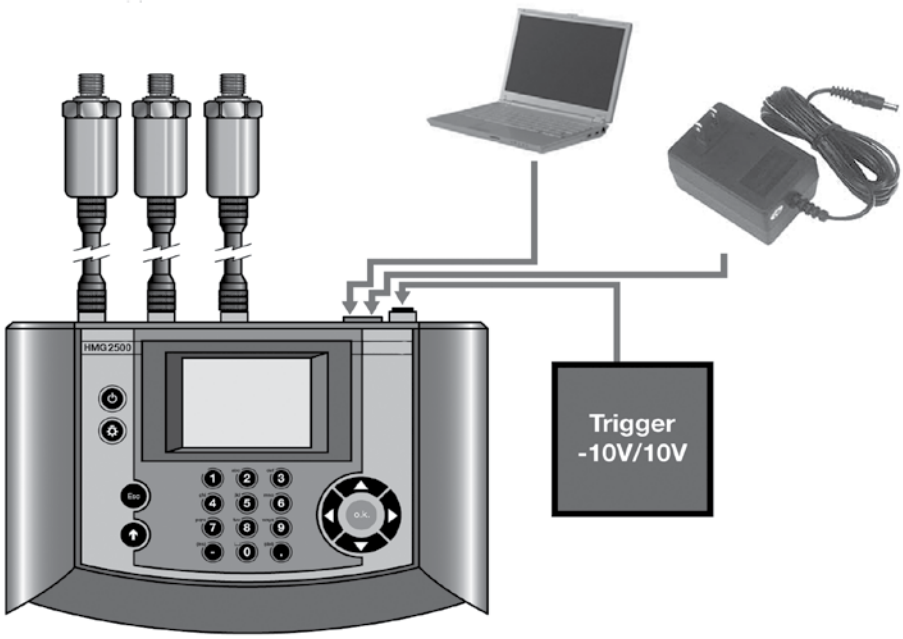
Automated setting procedures, a simple, self-explanatory operator guide and many comprehensive functions ensure the operator is able to carry out a wide range of measurement tasks within a very short time. This makes the HMG 2500 an ideal companion for employees in maintenance, commissioning and service.

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. The HMG 2500 recognizes the measured variable, 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, e.g. for frequency or speed measurement, as well as a virtual measurement channel for the measurement of difference or performance.

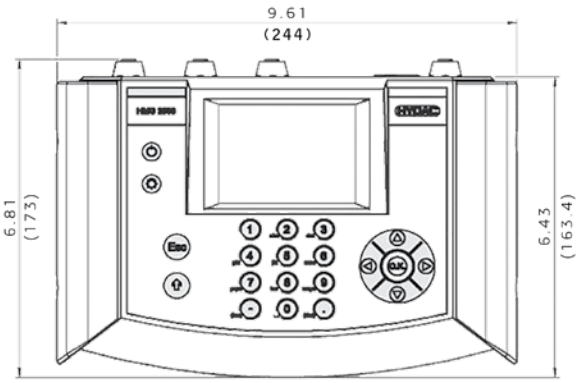
Due to the wide range of functions and its simple handling, the HMG 2500 is just as appropriate for users who take measurements only occasionally as it is for professionals for whom measuring and documentation are routine.

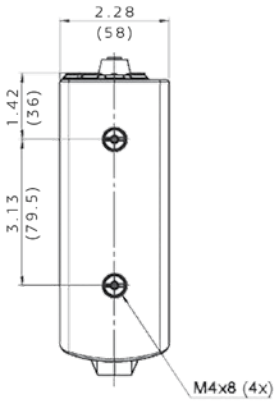
The HMG 2500 is designed to accept future upgrades of the device software.

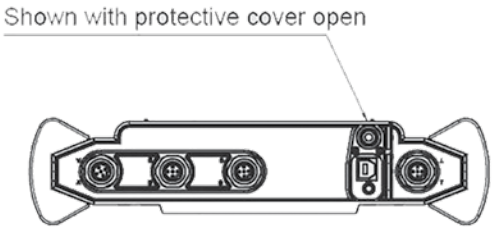


CS 1000
CS 1939
CSI-C-11
HY-TRAX®
RBSA
CSM
TFL
TFH
FCU
MCS
AS
SMU
CTU
EPK
Trouble Check Plus
HMG2500
HMG4000
ET-100-6
HTB
RFSA
HFS-BC
HFS-15
MFD-BC
MFS, MFD
HY-TRAX® Retrofit System
MFD-MV
MFS-HV
AMS, AMD
FS
AMFS
KLS, KLD
MCO
AKS, AKD
LSN, LSA, LSW
X Series
OLF Compact
OLF
OLF-P
NxTM
VEU
IXU
Triton-A
Triton-E
NAV
SVD01
SVD
OXS
Appendix

Dimensions

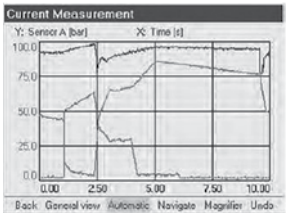


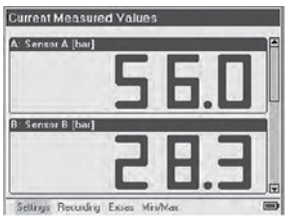


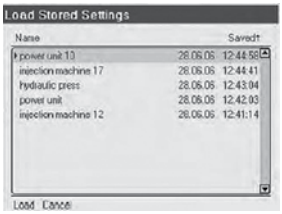


Function

- 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 monitor signals from up to 4 **sensors simultaneously**.
- 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 (Sensor Interface); this means the basic device settings (measured variable, measuring range and unit of measurement) are undertaken automatically
  - 3 analogue sensors (e.g. for pressure, temperature and flow rate) with the special digital HSI interface (Sensor Interface); *reference HSI information above*
- 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 measurement channel which enables a differential measurement or a performance measurement by means of the sensors connected to the measurement channels "A" & "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 impressive function of the HMG 2500 is without doubt its ability to record dynamic processes as a **measurement curve** "online", i.e. in real-time, and to render them as graphs in the field
- 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 specific, **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 visualized on a **full color graphics 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 analyzing the recorded measurement curves







Software

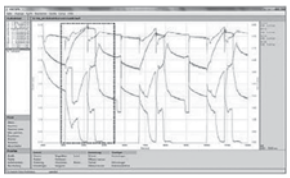
The HMG 2500 communicates with a computer via a USB or RS 232 port. Schroeder offers HMGWIN 2500, the matching software for the HMG 2500, for convenient post-processing, rendering, and evaluation of measurements on a pc. It also enables the HMG 2500 to be operated directly from a computer in real time.

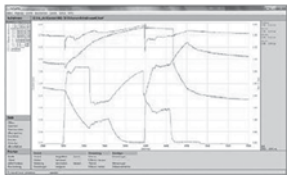
The HMG 2500 is equipped with specially developed software providing for fast data collection and processing. A measurement curve can comprise up to 500,000 measured values. The HMG 2500's measured value memory is capable of storing at least 100 of these curves.

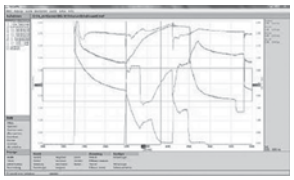
The Schroeder software, CMWIN, is also supplied that allows direct communication with SMART (HSI) sensors connected to the HMG 2500 from your PC.

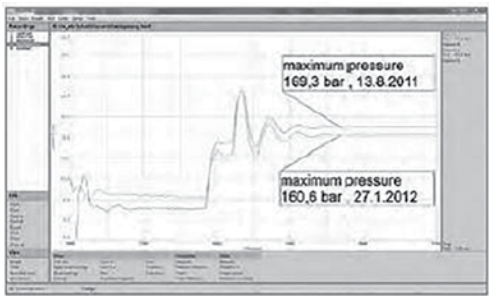
Some examples of the numerous useful additional functions:

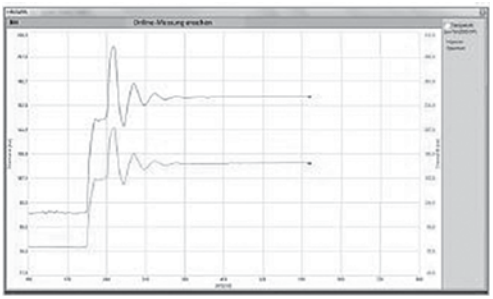
- Transfer and archiving of measurements recorded using the HMG 2500
- Display of the measurements in graph form or as a table
- **Zoom function:** Using the mouse, a frame is drawn around an interesting section of a measurement curve, which is then enlarged and displayed
- **Accurate measurement** of 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 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)











Technical Data

Analog Inputs	
Input signals	HSI analogue sensors
3 channels M12x1 Ultra-Lock flange sockets (5-pin) channel A to channel C	HSI SMART sensors
Accuracy	≤ ± 0.1% FS
Digital Input	
1 channel via M12x1 Ultra-Lock flange socket Channel D	Digital status (high/low) Frequency (0.01 to 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	Min. 100 measurement curves, each with 500,000 measured values
Display	3.5" color display 7-segment display
Interfaces	1 USB, 1 serial interface RS 232
CE mark	EN 61000-6-1 / 2 / 3 / 4
Safety	EN 61010
IP class	IP 40
Ambient conditions	
Operating temperature	32°F to 122°F (0°C to 50°C)
Storage temperature	-4°F to 140°F (-20°C to 60°C)
Relative humidity	70%, non-condensing max
Weight	approx. 2.43 lb (1.1 kg)

Order Details

Model Code

Description: HMG 2500 - 000 - US
P/N 925295

Operating manual and documentation

US = English

Scope of delivery

- HMG 2500
- Power supply for 90 to 230 V AC
- Operating Instructions
- 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 for HMG Series" catalog pages.

Features and Benefits

- Large, full graphics color display 5.7" touch screen
- Capable of recording up to 38 sensors at once, 8 analog, 2 digital sensors and 28 HSCI sensors via CAN bus
- Up to 100 measurement channels can be depicted simultaneously
- High-speed measuring rate, up to 8 sensors at 0.1 ms at a time
- Rapid and automatic basic setting of the device by means of automatic sensor detection
- Analog inputs 0.. 20 mA, 4 .. 20 mA Voltage 0 .. 50V, -10 .. 10 V
- PT 100/1000 input
- Connection to a CAN bus system (also J1939)
- Simple and user-friendly operation, intuitive menu
- Very large data memory for archiving measurement curves enables the storage of 500 measurements with up to 8 Million measured values
- Various measurement modes: Measuring, Fast curve recording, Long term measurements
- Recording of dynamic processes "online" in real time
- Event-driven measurements with several triggering options
- PC interface via USB
- USB Host connection for USB memory sticks
- Convenient visualization, archiving and data processing using the HMGWIN software

Description

The HMG 4000 hand–held measuring unit is a portable measuring and data logging device. It was mainly developed for all values measured in relation with hydraulic systems, such as pressure, temperature, flow rate and position. Moreover, it provides a very high flexibility, even when it comes to evaluating other measuring values. The main applications are servicing, maintenance or test rigs.

The HMG 4000 has a very easy-to-operate user interface due to its large 5.7" touchscreen. The operator can access all of the unit'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, Schroeder Industries offer special sensors, which are automatically detected by the HMG 4000 and whose parameters such as measurement values, measuring ranges and measuring units can be set.

On the one hand, there are the HSI Sensors (Sensor Interface) for the measurement of pressure, temperature and flow rate, for the connection of which there are 8 analog input channels. Furthermore, there is the option of connecting Schroeder SMART sensors to these inputs. SMART senors can display several different measured variables at a time.

Up to 28 special HCSI-Sensors (CAN Sensor Interface) can be connected additionally via the CAN bus Port, also supporting automatic sensor detection.

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, providing two additional digital inputs (e.g. for frequency or rpm measurements).

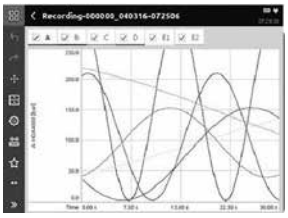
The most impressing feature of the HMG 4000 is its ability to record the dynamic processes of a machine in the form of a measurement curve and render them as a graph — and, moreover, online and in real-time.

Schroeder software HMGWIN which is specific to the HMG 4000, is supplied for convenient postprocessing, rendering and evaluation of measurements on your computer.

Function

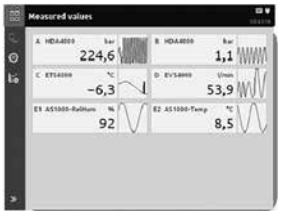
- Clear and graphical selection menus intuitively guide the operator to all the device functions available and ensure fast implementation.
- HMG 4000 can detect the signals of up to **38 sensors simultaneously**. 11 Push-pull M12x1 input sockets are available as sensor interfaces. Apart from the push-pull sensor connection cable, M12x1 standard cables can also be used.
- The following sensors can be connected to 8 of these input sockets:
  - 8 analogue sensors (e.g. for pressure, temperature and flow rate) with the special digital HSI interface (Sensor Interface); this means the basic device settings (measured variable, measuring range and unit of measurement) are performed automatically.
  - 8 standard analog sensors with current and voltage signals
  - 8 condition monitoring sensors (SMART sensors), the basic device settings are also performed automatically.

- The blue input socket provides 2 digital inputs, i.e. for 1 or 2 speed sensors (2nd speed sensor connection via Y adapter). Frequency measurements, counting functions or triggers can as well be implemented for data recording.
- Different **CAN bus** functions can be utilized via the red input socket.
  - Connection of up to 28 HCSI sensors (CAN Sensor Interface) by setting up a CAN bus with HCSI sensors and the relevant connection accessories, also with automatic parameterization.
  - Connecting to a CAN bus, you have the option of evaluating up to 28 CAN messages
  - Configuration of **CAN Sensors**, the parameterization is performed by means of EDS files, which can be stored and administrated in the HMG 4000



- The yellow input socket serves as the interface for pressure, temperature or level switches with **I/OLink** as well as for the programming device HPG P1. These devices can be parameterized by means of the HMG 4000.
- The most impressive function of the HMG 4000 is its ability to record dynamic processes "online", i.e. in real-time, as a **measurement curve** and to render them as graphs. 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 analog input channels can be operated simultaneously at a **measuring rate** of 0.1 ms.
- The **data memory** for the recording of curves or logs can memorize 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 the targeted **event-driven curve or log recording**, the HMG 4000 has two 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 instrument 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 a **full-graphics color 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 analyzing the recorded measurement curves.
- 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 directory by the PC. You can conveniently move measured data to your PC. Optionally, data transfers can be carried out via a file manager by means of a USB memory stick.

Software

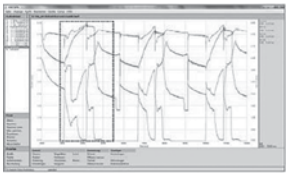
The PC software HMGWIN is also supplied with the device. This software is a convenient and simple package for analyzing and archiving curves and logs which have been recorded using the HMG 4000, or for exporting the data for integration into other PC programs if required. In addition it is also possible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

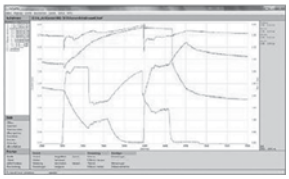
HMGWIN can be run on PCs with Windows 7, Windows 8.1 as well as Windows 10 operating systems.

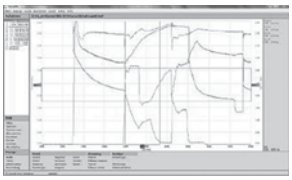
*) SMART sensors (Condition Monitoring Sensors) are a generation of sensors which can provide a variety of different measurement variables.

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
- **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 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)







Technical Data

Analog Inputs	
Input signals	HSI analogue sensors
8 channels M12x1 Ultra-Lock flange sockets (5 pole) channel A to channel H	HSI SMART sensors Voltage signals: i.e. 0.5 .. 4.5 V, 0 .. 10 V etc. (input ranges for 0 .. 50 V, 0 .. 10 V, 0 .. 4.5 V, -10 .. 10 V) Current signals, i.e. 4 .. 20mA, 0 .. 20mA (input range 0 .. 20 mA) 1 x PT 100 / PT 1000 (on Channel H)
Accuracy dependence of the input range	≤ ± 0.1% FS at HSI, voltage, current ≤ ± 1 % FS at PT 100 / PT 1000
Digital Inputs	
Input signals 2 channels via M12x1 Ultra-Lock flange socket (5 pole) Channel I, J	Digital status (high/low) Frequency (0.01 to 30,000 Hz) PWM duty cycle Durations (i.e. Period length)
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 pole) channel K1 to K28	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)

Technical Data

Programming interface	
For O-Link devices	1 channel via M12x1 Ultra-Lock flange socket (5 pole)
Voltage supply	
Network operation	9 to 36 V DC via standard round plug 2.1 mm
Battery	Lithium-Nickel-Kobalt-Aluminum-Oxide 3.6 V; 9300 mAh
Battery charging time	approx. 5 hours
Service Life	without sensors: approx. 11 hours with 2 sensors: approx. 9 hours with 4 sensors: approx. 7 hours with 8 sensors: approx. 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
Ambient conditions	
Operating temperature	32°F to 122°F (0°C to 50°C)
Storage temperature	-4°F to 140°F (-20°C to 60°C)
Relative humidity	70%, non-condensing max
Dimensions	approx. 11.22 x 7.44 x 3.43 in (B x H x T)
Weight	approx. 4.08 lb (1.85 kg)
Housing material	Plastic (Elastollan® R 3000 - TPU-GF)

Order Details

Additional accessories, such as electrical and mechanical connection adapters, power adapters, etc. can be found in the "Accessories for HMG Series" catalog pages.

Model Code

Description: HMG 4000 - 000 - US
P/N 925283

Scope of delivery

- HMG 4000
- Power supply for 90 to 230 V AC
- Strap

Operating manual and documentation

US = English

- Operating Instructions
- Data storage medium containing USB drivers HMGWIN and CMWIN software
- USB connector cable

Accessories for HMG Series

HMG

- Pressure, temperature and flow rate transmitters with HSI sensor detection as well as CAN pressure transmitters with HCSI sensor detection, see below and next page:

Pressure Transducer with HSI
(Sensor Interface)

Model Code	Description	Part No.
HDA 4748-H-0016-000	-14.5 to 130.5 psi (-1 to 9 bar)	909429
HDA 4748-H-0016	0 to 230 psi (0 to 16 bar)	909425
HDA 4748-H-0060-000	0 to 870 psi (0 to 60 bar)	909554
HDA 4748-H-0100-000	0 to 1450 psi (0 to 100 bar)	909426
HDA 4748-H-0250-000	0 to 3625 psi (0 to 250 bar)	909337
HDA 4748-H-0400-000	0 to 5800 psi (0 to 400 bar)	909427
HDA 4748-H-0600-000	0 to 8700 psi (0 to 600 bar)	909428
HDA 4778-H-0135-000	-14.5 to 135.5 psi (-1 to 9.34 bar)	920755
HDA 4778-H-0150-000	0 to 150 psi (0 to 10 bar)	920663
HDA 4778-H-1500-000	0 to 1500 psi (0 to 103 bar)	920757
HDA 4778-H-3000-000	0 to 3000 psi (0 to 207 bar)	920756
HDA 4778-H-6000-000	0 to 6000 psi (0 to 144 bar)	920664
HDA 4778-H-9000-000	0 to 9000 psi (0 to 621 bar)	920665

HCSI Pressure Measuring Transducer (HMG 4000 only CANbus)

Model Code	Description	Part No.
HDA 4748-HC-0009-000 (-1...+9 bar)	-1 ... 9 bar	925287
HDA 4748-HC-0016-000	0 ... 16 bar	925298
HDA 4748-HC-0060-000	0 ... 60 bar	925305
HDA 4748-HC-0100-000	0 ... 100 bar	925299
HDA 4748-HC-0160-000	0 ... 160 bar	925286
HDA 4748-HC-0250-000	0 ... 250 bar	925304
HDA 4748-HC-0400-000	0 ... 400 bar	925303
HDA 4748-HC-0600-000	0 ... 600 bar	925301
HDA 4748-HC-1000-000	0...1000 bar	925300

HCSI Temperature Measuring Transducer (HMG 4000 only CANbus)

Model Code	Description	Part No.
ETS 4148-HC-006-000	-13 to +212 °F	925302

Speed Sensors

Model Code	Description	Part No.
HDS 1000-002	Rpm Sensor (plug M12x1) 2M; Includes HDA 1000 Reflector Set (part no. 904812)	909436
HDS 1000 Reflector Set	Reflective foil set 25 pieces	904812
SSH 1000 (HMG 2500 only)	Sensor simulator for 2 HSI (ideal for training purposes)	909414
HSS 210-3-050-000 (HMG 4000 only)	Rpm Sensor (in connection with ZBE 46)	923193
HSS 220-3-046-000 (HMG 4000 only)	Rpm Sensor (in connection with ZBE 46)	923195

Temperature Transducer with HSI
(Sensor Interface)

Model Code	Description	Part No.
ETS-4148-H-006-000	-13° to 212°F (-25° to 100°C)	923398

Available Accessories

NOTES:

The information in this catalog relates to the operating conditions and applications described. For applications or operating conditions not described, please contact us a filtersystemsmanger@schroederindustries.com.

Subject to technical modifications

HMG Accessories for HMG Series

Sensor Cables (HMG 4000 only)

Model Code	Description	Part No.
Push-pull connection on plug-side		
ZBE 40-02	(CABLE M12X1/5P, PUSH-PULL) 2M length	6177158
ZBE 40-05	(CABLE M12X1/5P, PUSH-PULL) 5M length	6177159
ZBE 40-10	(CABLE M12X1/5P, PUSH-PULL) 10M length	6177160
Screw connection		
ZBE 30-02	(Sensor cable M12x1, 5-pin) 2M length	6040851
ZBE 30-05	(Sensor cable M12x1, 5-pin) 5M length	6040852

Flow Sensor with HSI
(Sensor Interface)

Model Code	Description	Part No.
Aluminum		
EVS 3108-H-0020-000	0.26 to 5.28 gpm (1.2 to 20 L/min)	909405
EVS 3108-H-0060-000	1.59 to 15.9 gpm (6 to 60 L/min)	909293
EVS 3108-H-0300-000	3.96 to 79.3 gpm (15 to 300 L/min)	909404
EVS 3108-H-0600-000	10.6 to 159 gpm (40 to 600 L/min)	909403
Stainless Steel		
EVS 3118-H-0020-000	0.26 to 5.28 gpm (1.2 to 20 L/min)	909409
EVS 3118-H-0060-000	1.59 to 15.9 gpm (6 to 60 L/min)	909406
EVS 3118-H-0300-000	3.96 to 79.3 gpm (15 to 300 L/min)	909408
EVS 3118-H-0600-000	10.6 to 159 gpm (40 to 600 L/min)	909407

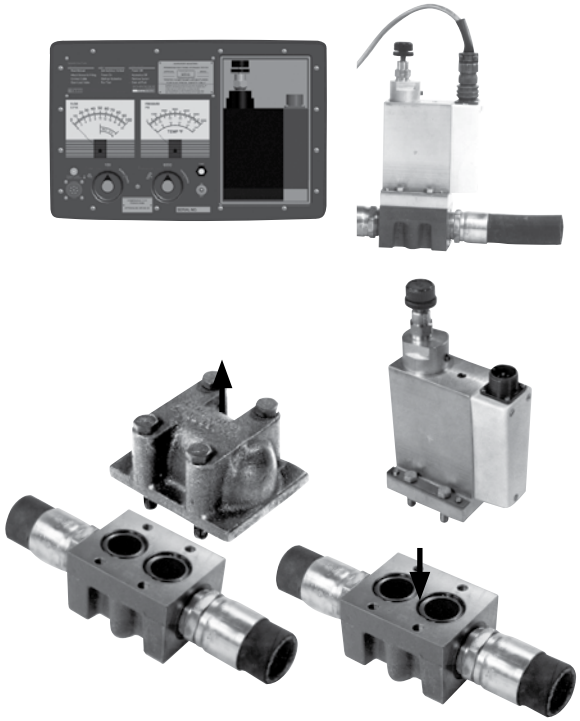
Other Accessories

Model Code	Description	Part No.
Pelican Case	for HMG 2500 and accessories	2702730
Case for HMG 4000	Case for HMG 4000 and accessories	6179836
USB Cable (HMG 2500 only)	Connection to PC	6040585
ZBE 30-02 (HMG 2500 only)	cable for M12x1 - 6'	6040851
ZBE 30-05 (HMG 2500 only)	cable for M12x1 - 15'	6040851
ZBE 36 (HMG 2500 only)	TWS (TestMate® Water Sensor) Adapter	909737
Power Supply	DC Charging unit for HMG 2500	6054296
ZBE 31	Car charger for HMG Unit	909739
HCSI Y splitter	Y splitter for HCSI sensors	6178196
HCSI bus termination	Termination connector for HCSI Sensors	6178198
ZBE 46	Pin adapter HMG (for three-wire signals, AS, …)	925725
ZBE 100	Adapter for TFP 100	925726
ZBE 38	Y adapter, black for jack I/J	3224436
ZBE 26	Y adapter, blue for HLB 1000	3304374
ZBE 41	Y adapter, yellow for TCM sensor	910000
UVM 3000	Universal connection module for HMG 4000 only	909752
Hydraulic Adapter set	Adapter hose DN 2 / 1620/1620, 400 mm and 1000 mm, pressure gauge connection 1620/ G1/4, adapter 1615/ 1620, bulkhead couplings 1620/ 1620	903083

TestMate® Series ET-100-6

Features and Benefits

- Easy to use–for beginner or experienced troubleshooters
- Large meters are clearly marked with easy-to-read scales
- Scale selector switches and the load valve control knob are also large and specially designed to be easy to grip under any conditions
- All loose components are stowed in form-fitting recesses in the impact resistant plastic case that also protects the meters and circuitry
- The electronic sensor and the EasyTest fitting are the only components that see hydraulic fluid, so clean-up is limited to draining the sensor and replacing the cap on the EasyTest fitting
- The load valve allows the operator to simulate operating pressure, if required



Description

Schroeder's original TestMate® system with the patented EasyTest fitting provides the hydraulic user with a quick, convenient method to test, troubleshoot, and obtain preventive maintenance data on hydraulic systems. Flows up to 100 gpm and pressures up to 6000 psi, as well as operating temperature, are measured through an EasyTest fitting, which is permanently installed in the hydraulic system.

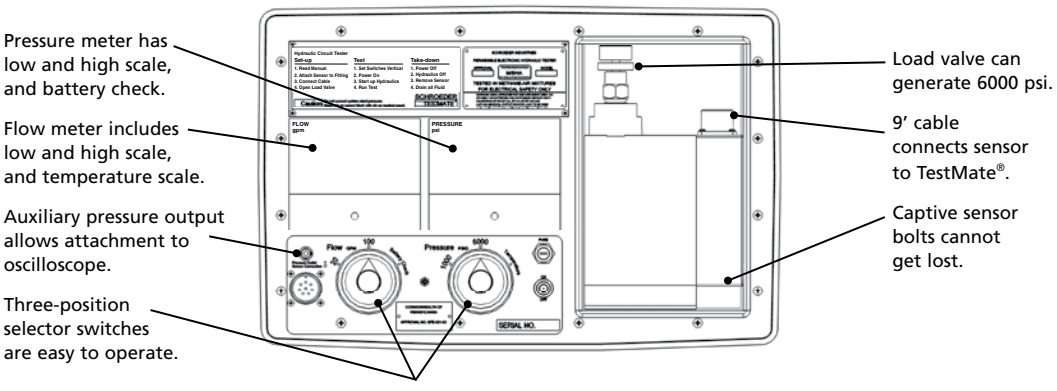
The sensor and EasyTest fittings are robust units designed to operate safely at any system pressure up to the maximum 6000 psi that the sensor load valve is capable of generating. Pressure bearing parts are thick section aluminum extrusions carefully chosen for their combination of high strength and light weight.

If the system's prime mover is kept at constant rpm, any drop in indicated flow will represent a loss of system efficiency at the point of test. During testing, system operation can be used to create the load, or the load can be simulated with the load valve in the sensor block.

The electronic circuitry produces data that accurately reflects system performance at each test point throughout the operating pressure range, making it possible to also determine pump and motor efficiency as well as valve and cylinder leakage.

Applications

- Check systems before and after rebuild
- Use as part of a preventive maintenance program
- Use to troubleshoot in instances of poor system performance or excessive machine downtime
- Use to check performance on a production line
- Install EasyTest fittings on prototypes to accurately evaluate hydraulic performance at any stage of development



NOTES:

Box 2. Required for any underground coal mining application. Unit will be furnished with the required MSHA tag.

ET-100-6 TestMate® Series

Flow Meter	**Type:**	Electronic turbine
	Low Scale Range:	0 to 20 gpm (0 to 75.7 L/min)
	Low Scale Accuracy:	±1 gpm @ 3 to 5 gpm (11-19 L/min) ±0.2 gpm @ 6 to 20 gpm (22.7-75.7 L/min)
	High Scale Range:	0 to 100 gpm (0 to 378 L/min)
	High Scale Accuracy:	±2% of full scale
	Minimum Reading:	3 gpm (11.35 L/min)
Pressure Meter	**Type:**	Electronic transducer
	Low Scale Range:	0 to 1000 psi (0 to 69 bar)
	Low Scale Accuracy:	±35 psi (2.41 bar)
	High Scale Range:	0 to 6000 psi (0 to 413.8 bar)
	High Scale Accuracy:	±120 psi (8.44 bar)
Auxiliary Pressure Output:		BNC connector - 2.5 mv @ 0.1mA per 1000 psi (68.96 bar), linear in the range 0 to 6000 psi (0 to 413.8 bar), independent of meter scale selection
Temperature Scale:		50°F to 250°F (10°C to 121°C)
Power Source:		8 "C" size batteries *To be furnished by customer*
Weight:		18 lbs (8 kg)
Case Dimensions:		19.87 x 13.93 x 4.68 in (50.4 x 35.4 x 11.9 cm)
EasyTest Fitting Envelope Dimensions:		4.5 x 4 x 3 in (114 x 102 x 76 mm)
EasyTest Fitting Mounting Holes:		Qty 2 - .375 to 16 UNC .75 dp.
Clearance to Install Sensor:		11 in (280 mm) min

EasyTest Fittings

Port Type and Size	Model Numbers: Station with Through Flow for In-Line Testing	Model Numbers: Station with Blocked Flow for "T" Testing	Port Type and Size	Model Numbers: Station with Through Flow for In-Line Testing	Model Numbers: Station with Blocked Flow for "T" Testing
NPTF			**SAE 4-Bolt Boss[2]**		
0.75	A-ET-211	A-ET-197	0.75	A-ET-219	A-ET-205
1.00	A-ET-212	A-ET-198	1.00	A-ET-220	A-ET-206
1.25	A-ET-213	A-ET-199			
1.501	A-ET-256	A-ET-312			
SAE O-Ring			**BSP PL**		
1.06-12	A-ET-215	A-ET-201	0.75	A-ET-222	A-ET-314
1.3125-12	A-ET-216	A-ET-202	1.00	A-ET-223	A-ET-315
1.625-12	A-ET-217	A-ET-203	1.25	A-ET-224	A-ET-316
1.875-12[1]	A-ET-258	A-ET-313			

[1]For 3000 psi only
[2]Depth of holes not per SAE specifications

Model Number Selection

How to Build a Valid Model Number for a Schroeder Original TestMate®:

BOX 1: ET-100-6 – BOX 2: ____

Example: *NOTE: One option per box*

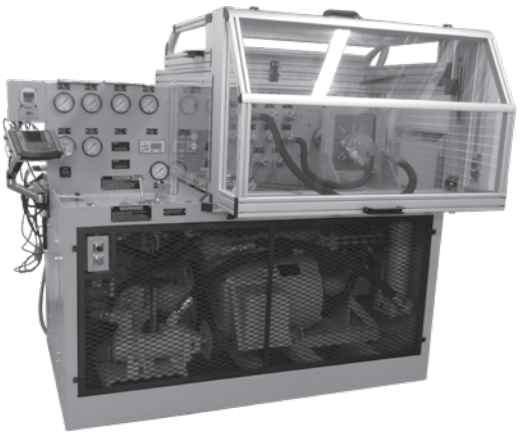
BOX 1: ET-100-6 – BOX 2: ____ **= ET-100-6**

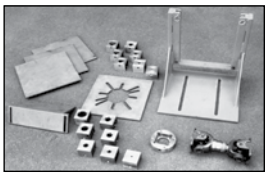
BOX 1	BOX 2
Model	**Option**
ET-100-6 Original TestMate®	Omit = None C = MSHA approved

Hydraulic Test Bench HTB

Features and Benefits

- 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
- Two complete operating manuals are supplied with each bench
- Kits and spare parts available for upgrades and maintenance





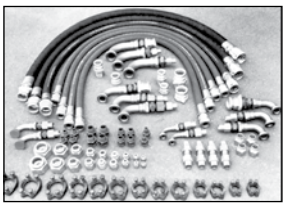
Description

The Schroeder Model 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 Schroeder 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 50 years by Schroeder engineers, based on the comments and requests of over 1,000 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.

Accessories



- Suction and pressure hose and fittings group (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)
- Oil cooler
- Solenoid and pilot-operated valve test group
- Spline shaft adapter kit
- Jib Crane Group
- Digital Instrumentation Package
- Water Cooled Heat Exchanger
- Filtration Group
- Safety Enclosure Group
- High Pressure Intensifier Circuit
- Bidirectional Pump Test Circuit
- HMG Digital Electronic Group
- Air Cooled Heat Exchanger
- 25 gpm Case Drain Meter
- TCM Kit

HTB Hydraulic Test Bench

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 200 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.

Specifications

	Model HTB-50	Model HTB-100	Model HTB-150
Speed Range *in either direction*	200 to 2400 rpm	200 to 2400 rpm	200 to 2400 rpm
Power Available *For testing pumps* *Expressed torque* *Expressed in horsepower*	275 ft-lbs to 1200 rpm 60 hp at 1200 rpm	458 ft-lbs to 1200 rpm *(decreasing proportionately to 2400 rpm)* 115 hp at 1200 rpm *(with constant hp to 2400 rpm)*	670 ft-lbs to 1200 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	458 ft-lbs	670 ft-lbs
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 to be used.*	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	Digital Readout from 0 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 Unit30" H x 50" L x 30" W 900 lbs (408 kg)

How to Build a Valid Model Number for a Schroeder HTB:

BOX 1	BOX 2	BOX 3	BOX 4	
HTB –		–	–	

Example: *NOTE: One option per box*

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	
HTB –	100 –	A –	AD –	GXXXX	= **HTB100AADGXXXX**

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5
Model	**HP**	**Voltage**	**Options**	**Custom Groups**
HTB	50	A = 230V 60Hz	A = Water Cooled Heat Exchanger	Add G # for all custom parts & frame modifications.
	100	B = 460V 60Hz	B = Solenoid & Pilot Operated Valve Group	
	150	C = 575V 60Hz	C = Jib Crane Group	
		D = 380V 50H	D = Filtration Group (standard/included on all benches)	
		E = 415V 50Hz	E = Safety Enclosure Group	
		F = 380V 60Hz	G = Bidirectional Pump Test Circuit	
		G = 208V 60Hz	H = HMG Digital Electronic Group	
		H = 220V 50Hz	I = Air Cooled Heat Exchanger	
			J = 25 gpm Case Drain Meter	
			K = Digital Gauges	
			L = TCM Kit	
			Splined Shaft Group*	
			Hose & Fitting Group*	
			* Not part of BOM structure, listed as separate line item on P.O.	

Model Number Selection

NOTES:

Box 4. May have multiple options.

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