

DewMaster - Dew Point Hygrometer

APPLICATION: The **Model DewMaster** Dew Point Hygrometer is a precision hygrometer based on the chilled mirror sensor platform. Because of the many sensor and enclosure configurations available, the DewMaster may be used in many types of applications including metrology labs, calibration labs, scientific study, HVAC test cells, engine test cells, pharmaceutical quality test labs, process control, aeronautics, high purity welding, Environmental chambers, wind tunnels, and many more. Some examples of applications:



HVAC TEST CELL Option 1: Measuring the environment within HVAC test chambers for research and development of air conditioner and heat pump designs. The DewMaster is coupled with the remote mounted D-probe or Dx probe. The probes are mounted within air moving duct systems within the Test Cell. In this case, the probes may be coupled with the flange mount option. The Dx will measure both DewPoint and Temperature. It is also possible to get the Barometric sensor option built into the Dx probe. The Dx only requires one penetration into the ductway for these measurements. If desired, this information can be displayed on the DewMaster along with RH%.



The standard D-probe can only measure dew point unless the additional temperature probe on a cable is added.

HVAC TEST CELL Option 2: The DewMaster is mounted outside the chamber and is coupled with the remote mounted S2 sensor located in the HVAC test cell. The sensor is coupled with the SMU vacuum pump option to extract an air sample through tubing links located at critical measuring points on air ductways.

Metrology lab: Tests are conducted using a dry gas source and the DewMaster confirms the dew point of that gas. The DewMaster is coupled with any of the S series or X series sensors depending on the lowest dew point measurement required. A pressure transducer may be added to convert DewPoint into other psychrometric moisture content measurement.

Glove Box Option 1: Glove box or isolation chamber environments are controlled to or below specific moisture content. The DewMaster is coupled with any of the S series or X series sensors depending on the lowest dew point measurement required. A pressure transducer may be added to convert DewPoint into PPMv for trace moisture measurement. With the S or X sensors, the sample must be extracted from the glove box through the chilled mirror sensor using a high purity pump and returned into the glove box atmosphere.

Glove Box Glove Box Option 2: As an alternative, the Dx may be used and can be mounted within the glove box using the surface mount option or can be mounted through the sidewall of the glove box. The Dx can be configured with barometric pressure so dew point can be converted to PPMv (lowest point around 100 PPMv).

Engine Test: The air intake to internal combustion engines or gas turbines (Diesel, Natgas, Gasoline) is measured for water content. Water content affects the combustion within the engine and must be controlled or accounted for in calculation for combustion efficiency. Engine test cells are used in automobile performance testing, engine design, off road vehicle testing, lubricant testing, catalytic converter testing, marine engines, ... We replace GE hygrometers as well as several other manufacturers since the DewMaster is very easy to use and operate (and less costly). Generally, the S2 or the S2SC sensors are used with platinum (MAX) mirrors.

Humidity / Temperature Chambers: Typical humidity chambers on the market can be upgraded to highly accurate, precision, tightly controlled systems by using the DewMaster with chilled mirror sensor (primary measurement method). Most chambers use inaccurate polymer type sensors that are subject to drift and false measurements over time. By coupling the DewMaster with either the D-probe or the new Dx probe (chilled mirror) you can improve the performance of your existing chamber and provide NIST traceability to your testing results. The

remote sensor probe(s) are inserted into the chamber and are used to verify or tightly control the chamber atmosphere.

DESCRIPTION: The **Model DewMaster** is most commonly used in the table top configuration but is also available in rack mount, panel mount and NEMA4 configurations. The system may be coupled with a variety of chilled mirror sensors depending on the desired lowest dew point needed for the application. Chilled mirror sensors are available in 2 or 3 stage configurations, standard body or chemical resistant, flow through or insertion probe sampling, and choice of mirror construction for chemical compatibility. The DewMaster can also accommodate precision temperature probes and pressure transducers. Temperature measurement provides information required to calculate RH%, wet bulb and dry bulb units. Pressure measurement provides information required to calculate PPMv, PPMw, Gr/LB, Gr/Kg and other psychometric values.

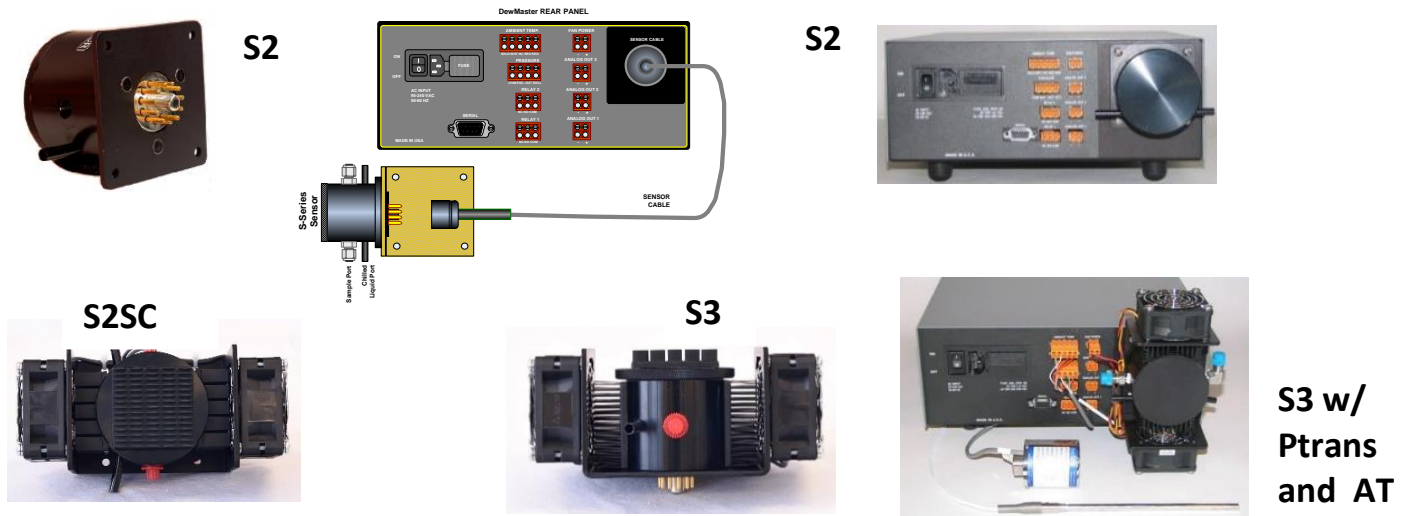
****The DewMaster with pressure transducer option can operate as a multi-range trace moisture analyzer that can accurately measure high level of moisture concentrations (ambient) down to very low trace (sub-PPM) . Great for processes that begin in ambient air and then get purged to very low trace levels of moisture (Glove Box, Isolation Chamber, Product Storage, Process Monitoring, Monomer Storage, High Purity Welding, Laser). The Edgetech Chilled Mirror is not compromised by exposure to high levels of moisture. No special isolation valve system is required.**

The **DewMaster** comes complete with a full function display showing measured parameters, optics performance, and operational status/ alarm information. Functionally, the DewMaster provides Automatic Balance Cycle (ABC), Programmable Balance Cycle (PABC), Manual Balance Cycle (MABC), real time clock w/date, measurements in C or F, scalable voltage and current outputs, RS232, two programmable alarms, Control Servo for Mirror temperature overrides (Heat and Cool), One year warranty and instruction manual. Optional temperature probe and pressure transducers available for %RH, AT, PPMv and Pressure. ***Chilled Mirror sensor selection is required.**

SENSOR OPTIONS: The DewMaster is available with several types of chilled mirror sensors, temperature sensors and pressure transducers. For measurement of dew point, it may be configured with the standard S-series flow through chilled mirror sensors (aluminum body), the X series chemical resistant- low dew point chilled mirror sensors (SS Body), or the D series insertion probe style chilled mirror sensors. The most common configuration is to couple the DewMaster with the S2 or S3 series chilled mirror dew point sensors. The standard display configuration will display dew point in either °C or °F. If you would like to display the moisture content in PPMv, then you need to add the pressure transducer option. When this is added, PPMv is calculated based on the dew point and pressure information. With the added pressure transducer option, the DewMaster will display Dew point in °C or °F, PPMv, and also pressure in psia or Bar.

- **S-Series:** The most common option is to couple the DEWMASTER with the S series chilled mirror dew point sensors. The S-Series sensor bodies are constructed of Aluminum and are designed as flow through sampling systems. Sample gas is extracted from the process point and directed through the S series chilled mirror sensor at the sample inlet/ outlet ports (1/4 inch compression fittings). Depending on the desired dew point, you can choose from the S2, S2SC, or S3 sensors. The S2 and S2SC utilize 2 stage TEC (thermal

electric cooler) heat pumps to pull heat away from the TECs. Heat from the S series sensors is dissipated through the aluminum bodies and convected to the surrounding ambient air. The S2SC and the S3 sensors feature fans to more effectively pull the heat from the aluminum bodies. Using this heat exchange system, the S2 (no fans) can develop a 60°C depression, the S2SC (includes fans) a 65°C depression and the S3 (includes fans) an 85°C depression. A unique feature of the S series sensors is the auxiliary chilled liquid ports. If you want to pull the heat away from the sensors more efficiently than by using the standard ambient air heat exchange, chilled liquid may be routed through the auxiliary ports. Depending on the temperature of the chilled liquid, you can attain even greater depressions (up to an additional 10°C). **Depression is the absolute value in temperature deviation from the surrounding air temperature.** Access to cleaning the mirrors is via screw top lids.



- X3-Series:** The X3 sensor family offers the ability to measure dew point in chemically aggressive background gases, can measure lower dew points and generally has faster response times than the S series. The X3 family features 3 stage TECs. Like the S series, the X3 units also have ¼ inch compression inlet/ outlet ports. The X3 feature flip top easy access lids protected by screw top caps. Unlike the S series, the standard X3 sensors that are used on the DEWMMASTER do not feature liquid ports. They use air convection to draw away the heat generated at the TECs. The X3 is like the S2 because heat exchange is through the sensor body only. The X3F and X3SF utilize fan assisted heat exchange to the surrounding ambient air. The X3 offers 65°C depression, the X3F offers 75°C depression and the X3SF offers 95°C depression from the ambient air temperature. The X3LC or X3CC are liquid cooled versions of the X3 platform. They are available for use on the DewMaster for low dew point measurements but generally it is recommended to upgrade to the DewTrace dewmaster platform.

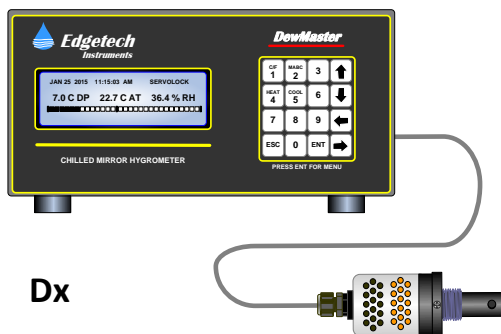



DewMaster w/ X3SF

DewMaster w/ X3F

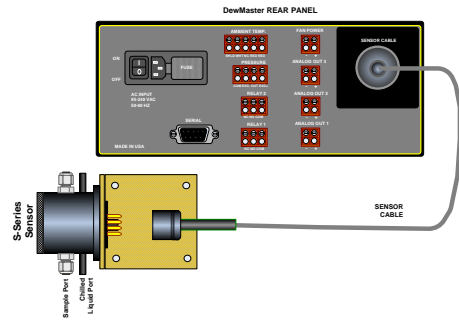
DewMaster w/ X3LC

- Dx:** An insertion type probe, the Dx two stage chilled mirror dew point sensor uses diffusion type sampling. Sample gas diffuses from the surrounding environment to the chilled mirror sensor. To attain lower dew point measurements, an on-board fan and high efficiency heat exchanger are featured to measure dew point levels down to -40°C with an ambient temperature of 25°C (65°C depression). It also features an on-board temperature sensor as standard (RH% is always an added measurement when choosing this sensor). With this feature, only a single penetration into the process is required to measure both temperature and dew point (RH%). Other standard features include rotatable sample cap to adjust for sample flow velocity and pipe thread access (always standard on the Dx). The threaded port can be directly inserted into matching 1.25" pipe threads or can be screwed into the SMx block that allows mounting onto a flat surface. You can order the optional aspirator function which incorporates a built-in fan to circulate sample gas to the sensor in low flow or stagnant air conditions.

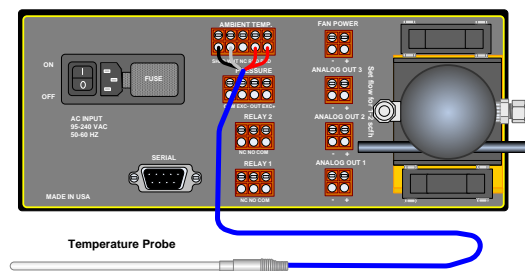
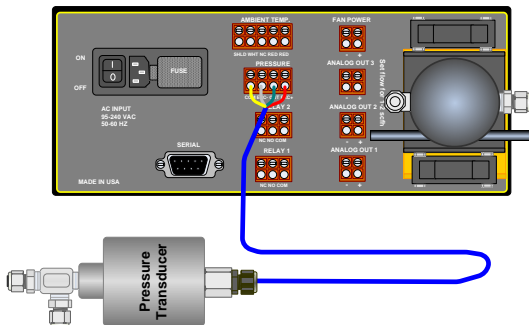

Dx

D-probe

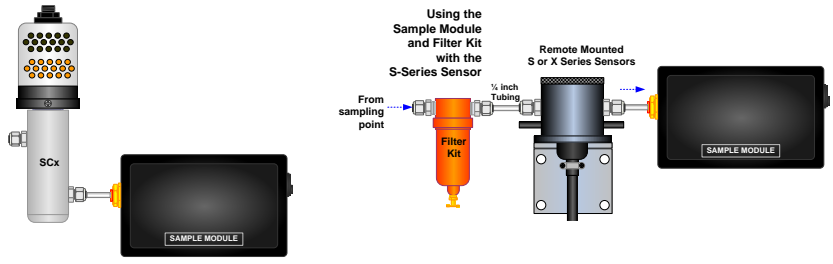
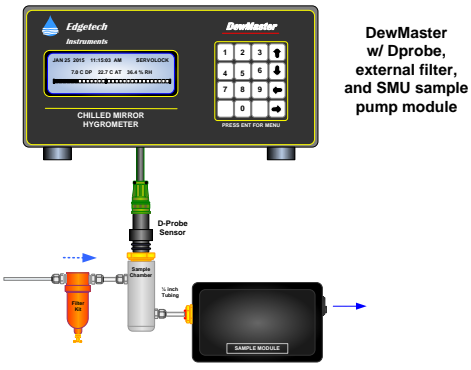
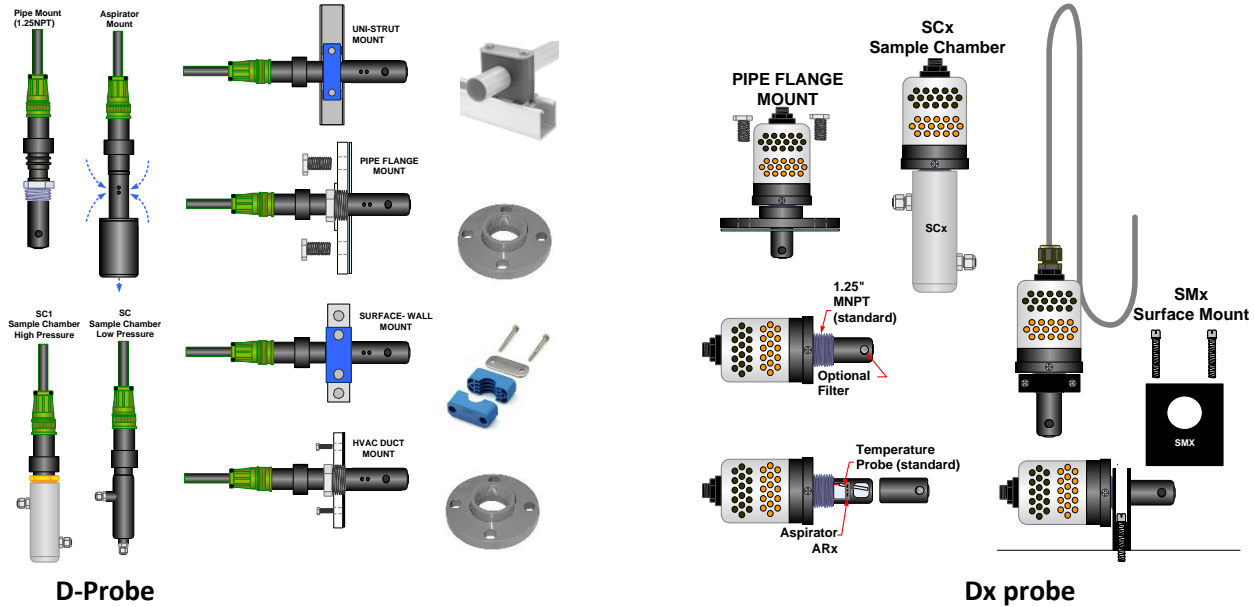
- D-probe:** This sensor platform has been the standard for many years. It is an insertion type cell with 2 stage TEC driven chilled mirror with diffusion sampling. It exchanges heat from the cell by convection through the aluminum body. It offers a depression of 50°C and can measure dew points down to -25°C with an ambient temperature of 25°C . warranty. Several options are available with this model including a separately mounted air temperature probe, pipe thread option for insertion into flanges or threaded ports, and mounting option for surface mount. The temperature probe is needed if you want to measure RH%.
- Local or Remote Chilled Mirror Sensor:** The Dx sensor is always mounted remote as it always includes a signal cable that connects the sensor to the DewMaster control module. The Dx has several mounting options including surface mount and flange mount. Although the standard configuration of the S and X series sensors is to be mounted local at the DewMaster control module, it is possible to mount these two types of sensors remote with connection via a signal interconnecting cable. The remote mounted S and X series include a mounting bracket to support the sensor to a fixed position.


Remote
Local Mount:

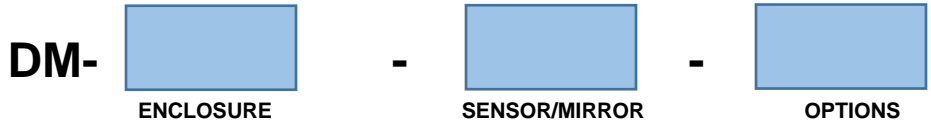

- Pressure ratings of the chilled mirror sensors:** The Dx sensor is rated for max pressure of 10 PSIG, the S and X series have a pressure rating of 300 psig. A special high pressure option is available for the S series sensors (up to 900 psig).
- Other sensors that can be included into the DewMaster:** to measure pressure, an optional pressure transducer may be added to the DewMaster. This allows the conversion of dew point to PPMv. In this configuration, the pressure transducer is mounted in series with the Chilled mirror sensor at the back of the table top DewMaster or within the chassis on a NEMA version. It is possible to order the pressure transducer with remote mounted S or X series sensors. In this case, the pressure transducer is mounted remote on a cable. You must specify the desired pressure range of the P-trans. Another option is to add a temperature probe to the DewMaster. This measurement allows the conversion of dew point to RH%. Of course, the Dx already includes a built-in temperature sensor.



SAMPLING/ MOUNTING OPTIONS: The Dewmaster may be used in positive pressure applications or those that require sample extraction using a pump. The standard operation of the S and X series is positive pressure. To extract a sample gas from atmospheric pressure applications, you can add the remote mounted SMU vacuum pump accessory. The Dx sensor is configured for diffusion sampling- the sensor is inserted into the measured atmosphere and gas diffuses to the chilled mirror chamber for measurement. You can add the optional internal fan to the Dx that circulates the measured gas to the sensor in non-flow or stagnant air flow applications. It is also possible to add the sample chamber to the Dx which provided inlet and outlet ports to the sensor to direct a flow of gas to the chilled mirror sensor chamber. The D-probe also has several sampling options including an external aspirator fan, surface mounting, and flange mount.


TO ORDER THE DewMaster:

- Determine type of measurement: DewPoint, Relative Humidity, Pressure, Temperature. The AT temperature probe is required for Relative Humidity (unless using the Dx). If the sample pressure varies, you may want to consider the Pressure Transducer option that automatically converts DewPoint to PPMv.
 - Determine the range of measurement and type of sensor: D-Probe, S-Series or X series.
 - Determine if you need chemical resistance of the X3.
 - Your application determines whether to select local mounted sensor(s) or remote
- Select type enclosure based on the application: Table Top (standard), NEMA 4, or Rack.
 - Select Sensor Type- D-probe (remote mount), S or X series (remote or local mount)
 - Select Mirror Type: Chrome (standard), Stainless Steel-Enhanced, Platinum-Max
 - Select Options such as temperature sensor, Pressure Transducer, PPMv measurement,..
 - List as separate line items additional choices such as Accessories, Calibration Packages, and Ext Warranty.



For Example: **DM-S3-ATDM** would be a DewMaster Table Top with S3 fan cooled CM sensor and air temperature

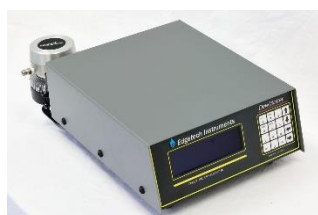
probe: \$2,995.00 + \$5,198.00 + \$231.00 = \$8,424.00

Notes:

1. The Dewmaster offers many features that allow the User to understand how the Chilled Mirror Sensor is operating. These include the ability to program an ABC or manually force maximum heating or cooling of the TEC.
2. The S-Series chilled mirror sensors are configured as flow through sampling and are equipped with 1/4inch compression fittings. Aluminum construction of the sample chamber is appropriate for most non-aggressive background gases.
3. The X3 body is constructed of 316SS and may be used in many aggressive background gases.
4. The S-Series sensors are equipped with auxiliary liquid chill ports for the flow of chilled liquid through the sensor chassis to aid in cooling the TEC to allow for lower dewpoint measurement.
5. The X-series sensors are designed as fan cooled or liquid cooled, but not both. The X3F and X3SF feature fans used to acquire more efficient heat exchange of the TEC and hence lower dewpoints.
6. The Standard D-Probe features air convection heat exchange and in many instances, can measure lower dewpoints when inserted into a cooler environment.
7. When using the S or X series sensors, addition of the Pressure transducer option allows the DewMaster to be configured to display PPMv units and Pressure.
8. For Oxygen service, please inquire to the factory. This requires the use of an X3 sensor configured and cleaned for oxygen service.
9. Standard DewMaster is not rated for use in Hazardous areas. Please inquire for use 100% Oxygen.

STEP 1: SELECT TYPE ENCLOSURE:

DM-	Standard Bench mount	\$2,995.00
DM-N	NEMA 4 Wall mount	\$4,975.00
DM-RMDM	19 inch Rack Mount Kit	\$3,545.00
DM-PMDM	19 inch Panel Mount Kit	\$3,435.00


Table Top

NEMA 4 (optional chiller)

19 inch Rack Mount

Panel Mount

STEP 2: SELECT SENSOR TYPE



S2 Flow Through



S2SC fan cooled



S3 fan cooled



X3



X3F



X3SF



X3LC



DS insertion probe



New Dx insertion probe

STEP 2: SELECT SENSOR TYPE (cont):
Chilled Mirror Dew Point Sensors for the DewMaster

S-Type, Standard Duty		Description	Depression	Choose Mirror		
				STD	ENH	MAX
S2	Two Stage, Al Body, Convection Air Cooled- No Fans, Flow Through Sampling		60C	\$2,200.00	\$2,450.00	\$2,640.00
S2SC	Two Stage, Al Body, Fan Cooled, Flow Through Sampling		65C	\$2,530.00	\$2,780.00	\$2,970.00
S3	Three Stage, Al Body, Fan Cooled, Flow Through Sampling		95C*	\$5,198.00	\$5,448.00	\$5,638.00
P	S2P or S3P: High Pressure option 900 PSIG			S2: Add \$275.00 S3: Add \$660		

* Liquid Chilling may be required in the S3 to attain 95C Depression, fan only –depression of 70C; standard X & S series sensors rated for 300 psig sample pressure

X-Type, Chemical Resistant, High Performance		Description	Depression	Choose Mirror		
				STD	ENH	MAX
X3	3 Stage, Panel Mount, SS Body, Convection Air Cooled- No Fans, Flow Thru		65°C	\$5,500	\$5,750.00	\$5,940.00
X3F	3 Stage, SS Body, Standard Fan Cooled, Flow Thru Sampling		85°C	\$5,750	\$6,000.00	\$6,190.00
X3SF	3 Stage, SS Body, High Efficiency- Super Fan Cooled, Flow Thru Sampling		95°C	\$6,000	\$6,250.00	\$6,440.00
X3LC	3 Stage, SS Body, High Efficiency- Liquid Cooled, Flow Thru Sampling		120°C	\$6,995	\$7,195	\$7,435.00

D-Type, Insertion Probe		Description	Depression	Choose Mirror		
				STD	ENH	MAX
DS2	2 Stage, Insertion Probe, AL, Convection Air Cooled, Diffusion Sampling		60°C	\$1,840.00	\$2,090.00	\$2,280.00
Dx	2 Stage, Insertion Probe, AL, Fan Air Cooled, Diffusion Sampling		65°C	\$2,500.00	\$2,750.00	\$2,940.00

STEP 3: SELECT MIRROR TYPE:

Applications CM Configuration	General Purpose Gases	Acids	Caustics	Salts	Organics	Nuclear Application	High Temperature
STD: Standard Chrome	A	D	D	C	C	D	C
ENH: Enhanced SS	A	B	B	B	B	C	B
MAX: Maximum Platinum	A	A	A	A	A	A	A

- A** Excellent
- B** Very Good
- C** Good
- D** Not recommended

STEP 4: Choose Local or Remote Sensor (DS2 sensor requires remote mounting):
NO DESIGNATION = LOCAL SENSOR MOUNTED ON DEWMASTER (S or X SERIES)- STANDARD CONFIGURATION

-RC2	Remote Mounting Kit S2-type Sensor 10' Cable, additional lengths add \$4/ foot	\$550.00
-RC3	Remote Mounting Kit S2SC or S3 Sensors 10' Cable, additional lengths add \$8 foot	\$550.00
-RK	Remote Mounting Kit D-type Sensor 10' Cable, additional lengths add \$4/ foot	\$550.00
-RX	Remote Mounting Kit X-type Sensor 10' Cable (MAX)	\$550.00
-RDx	Remote Mounting Kit Dx type Sensor 10', additional lengths add \$8/ foot beyond 10'	\$550.00

STEP 5: Choose Special Sensor Options for D and Dx-Probes: (The D-probe is always mounted remote)

When Ordering the D-probe options, you can specify:

-AR	Aspirator Mount, this features a built-in aspirator to extract a gas sample from the surrounding area	\$ 468.00
-P	Pipe Mount, mounts to the D-Probe and allows 1.25inch Male NPT port on the probe	\$ 150.00
-FNG	Pipe Flange Mount w/ Gasket, The D-Probe gets installed into a 4inch diameter PVC Flange/ gasket add seal, 4 bolt install. For use with Pipe Flanges, isolation chamber, and HVAC DUCT mounting	\$ 150.00
-SM	Surface Wall Mount, The D-Probe is retained between two polypropylene blocks w/ bracket	\$ 99.00
-US	Uni-Strut Mount, Same as the surface mount except the blocks are mounted on a uni-strut clamp	\$ 145.00
-SC1	Sample Chamber High Pressure (up to 100psig), Permanently connected to probe	\$ 578.00
-SC	Sample Chamber Low Pressure, same as -SC1, not permanent but is Slip-On	\$ 358.00

When Ordering the Dx-probe options, you can specify:

-ARx	Aspirator Mount, this features a built-in aspirator to extract a gas sample from the surrounding area	\$ 199.00
-FNG	Pipe Flange Mount w/ Gasket, The D-Probe gets installed into a 4inch diameter PVC Flange/ gasket add seal, 4 bolt install. For use with Pipe Flanges, isolation chamber, and HVAC DUCT mounting	\$ 150.00
-SMx	Surface Wall Mount, The Dx Probe is retained between two polypropylene blocks w/ bracket	\$ 99.00
-FLT	On-Board Filter for the Dx probe, helps prevents contamination on mirror	\$ 150.00
-SCx	Sample Chamber for Dx sensor with ¼" compression inlet/outlet gas flow ports	\$ 578.00

STEP 6: Choose Options such as PRESSURE COMPENSATION:

-ATDM	Air temperature probe, stainless steel sheath with 10ft cable and connector (add \$5/ft for additional)	\$ 231.00
-PTDM	Pressure Transducer, 0 to 25PSIA or 0-150PSIA, or 0-300PSIA automatic pressure compensation (add \$4/ft for remote)	\$1,485.00
-SA/.1	0.1°C Special accuracy, traceable to NIST (Certified)	\$ 660.00
-SA/.15	0.15°C Special accuracy, traceable to NIST (Certified)	\$ 550.00

LIST ACCESSORIES/ SPARE PARTS/ SPECIAL SERVICES AS SEPARATE LINE ITEMS:

511 SS Tag	STAINLESS STEEL IDENTIFICATION TAG, can be riveted or wire connected to the instrument, CUSTOM ETCHED PER CUSTOMER REQUIREMENTS 1" High x 2" Wide x 16 gage SS Tag, Laser Etched, ¼ inch lettering, 3 lines Advanced Graphic Engraving (includes 2)	\$ 125.00
CASE1630	Foam lined transportation case specified to protect instrumentation during shipping, tabletop version	\$ 630.00
USB	Converts the RS-232 serial output to USB (includes device plus software- PC compatible)	\$ 110.00
SERIALDAQ	Captures serial output (TXT) to USB Memory Stick	\$ 350.00
BTDAQ	Converts Serial output from DewMaster to Bluetooth and captures the data into an EXCEL spreadsheet on Windows 7,8 or 10 based System. Requires Customer supplied EXCEL loaded onto PC. PC must include 2 available USB Ports. BTDAQ Kit Includes: <ul style="list-style-type: none"> • Serial to Bluetooth Adapter for Connection to the DewMaster • Attachment kit • Bluetooth to USB adaptor for customer PC • USB Memory stik w/ ETI Install software • Installation/ Operation Manual 	\$ 750.00

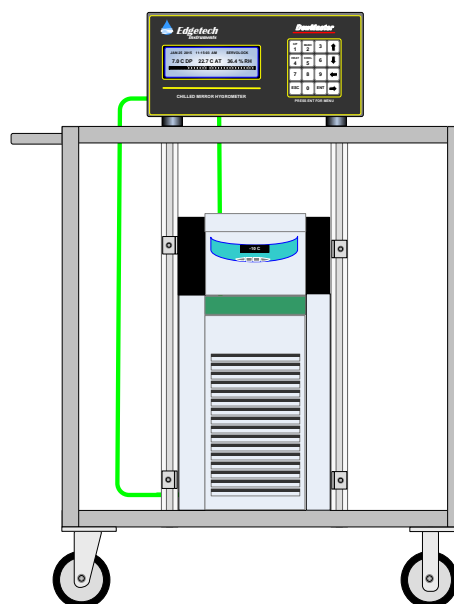
FIL	Filter kit: includes 1/4T SS compressions fittings & additional elements; 0.1 micron particulate	\$ 165.00
DX	Filter Element Kit, Qty 3	\$ 83.00
SMU	Sample Module Universal, 115/230 VAC operation	\$ 770.00
SC/S	Screw On Replacement Sensor Cap for the S-Series	\$ 66.00
SC/O	Slide on replacement cover for the D-probe sensor	\$ 248.00
RMDM	SPARE 19 inch Rack Mount Kit	\$ 550.00
PMDM	SPARE 19 inch PANEL Mount Kit	\$ 440.00



MODEL 601
Low Temp Chiller
-15°C Chill Capacity
\$6,583.50



MODEL TEC-300
TEC Chiller
-10°C Chill Capacity
\$3,360.00



Cart Option: Add \$1500

Insulated Hose Kit for Chiller: **\$175.00**

NEMA 4X shown with Model 601 chiller



Extended Warranty/Calibration Options: Please list as separate line items:

3EXTW	3 Year Extended Warranty includes repairs covered in the warranty statement	10% of TOTAL PRICE
3YNIST1P	3 NIST Traceable Calibrations for the price of 2 (1 Parameter)	\$ 1,210.00
3YNIST2P	3 NIST Traceable Calibrations for the price of 2 (2 Parameters)	\$ 1,430.00