T3000 Controller

The **T3000 Controller** is a complete Energy Management and Control System (EMCS). It is a multi-user, stand alone DDC panel with full communication capabilities. The **T3000** can be used either stand alone, or in a network configuration. Multiple communication ports allow the **T3000** to simultaniously operate over Ethernet, Arcnet ,RS-485, and dial up connection. Up to 128 points may be controlled directly by the **T3000** through the use of Input and Output cards.

An IBM compatible PC is used for the operator interface for viewing and programming the control system. The **T3000** software is fully menu-based for ease of operation.

Linked graphics displays utilizing actual building floor plans and mechanical diagrams allow the user to tour the building from the PC while monitoring and adjusting building conditions from a central location.

Hardware Specifications

Input/Output Cards

8 Ports each addressing 16 points (128 total)
Each port may be either Inputs or Outputs

Communication Speed

Ethernet speed of 10 MBaud between panels
Serial communication up to 57.6 KBaud between PC or modem

Communication Ports

2 COM ports (RS-232(modem) and/or RS-485)
1 Ethernet port for Main Network (optional)
1 port for Parallel Printer

VGA Display

Each T3000 can directly drive a VGA monitor for local troubleshooting

Memory

4 Meg minimum, expandable to 64 Megs

Real Time Clock (+/- 1 second per day)

Watchdog Timer provides Automatic restart in the event of a Computer crash

PC compatible Hard Disk provides Trend Log and Graphic Storage capability, 5years of data typical

CSA and UL rated: NRTL/C : LR 84172

Software Specifications

32 Control Basic Programs (expandable to 128)

128 points per Controller (expandable to 512)

128 Variables (expandable)

48 Controllers (expandable to 128)

32 Trend Logs (expandable)

Runtime Totalizers and Event Logs

32 User Screens (expandable to 128)

16 Weekly Schedules (expandable to 128)

8 Annual Schedules (expandable to 32)

16 Variable Arrays (expandable to 32)

10 User Defined Passwords (expandable to 32)

User defined Tables and Engineering Units for custom configuration of I/O

Digital/Analog Alarms

Edit programming logic on the fly

Graphical user screen, Icons & buttons

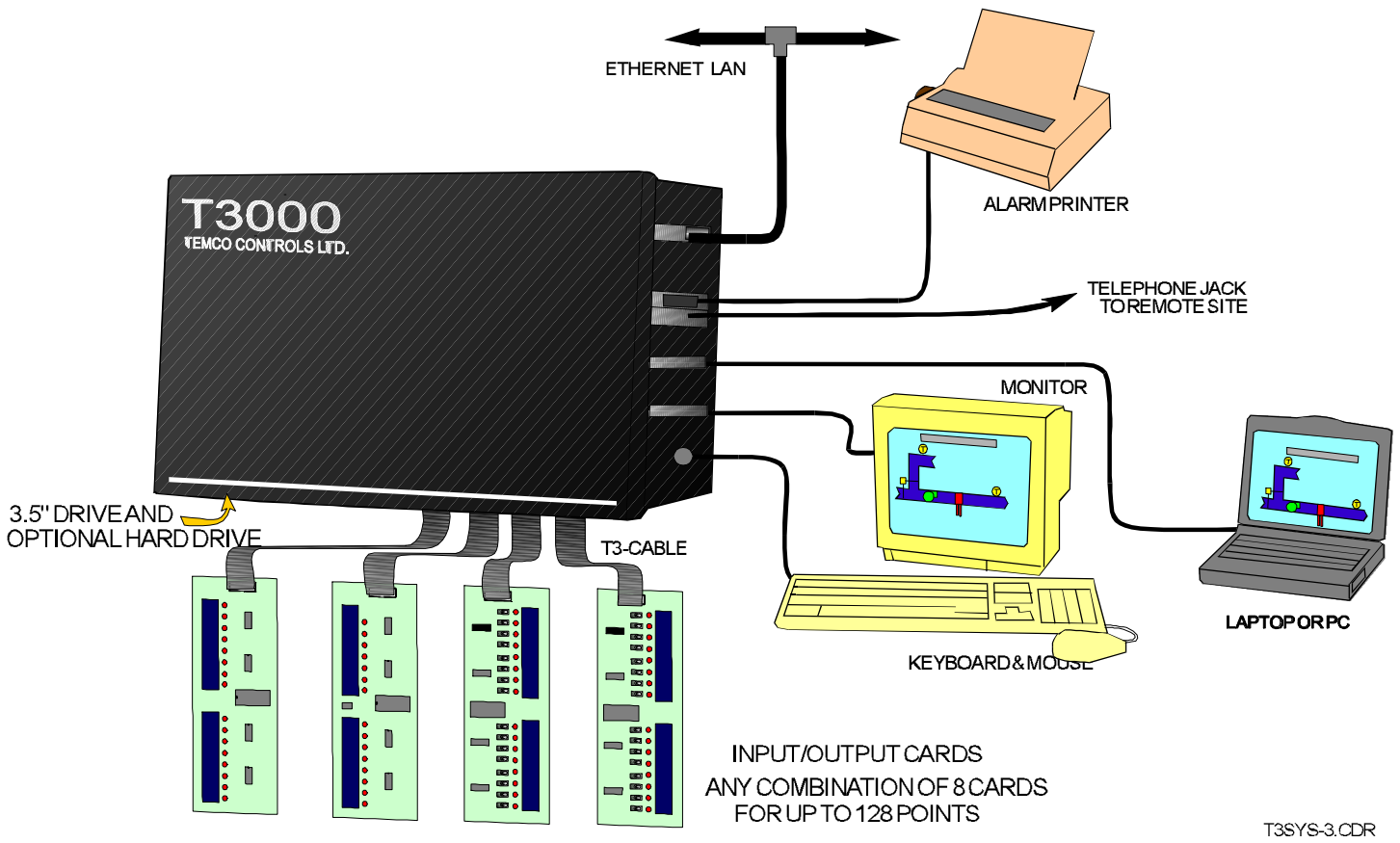
TIFF files for quick graphics operation

Ordering Information

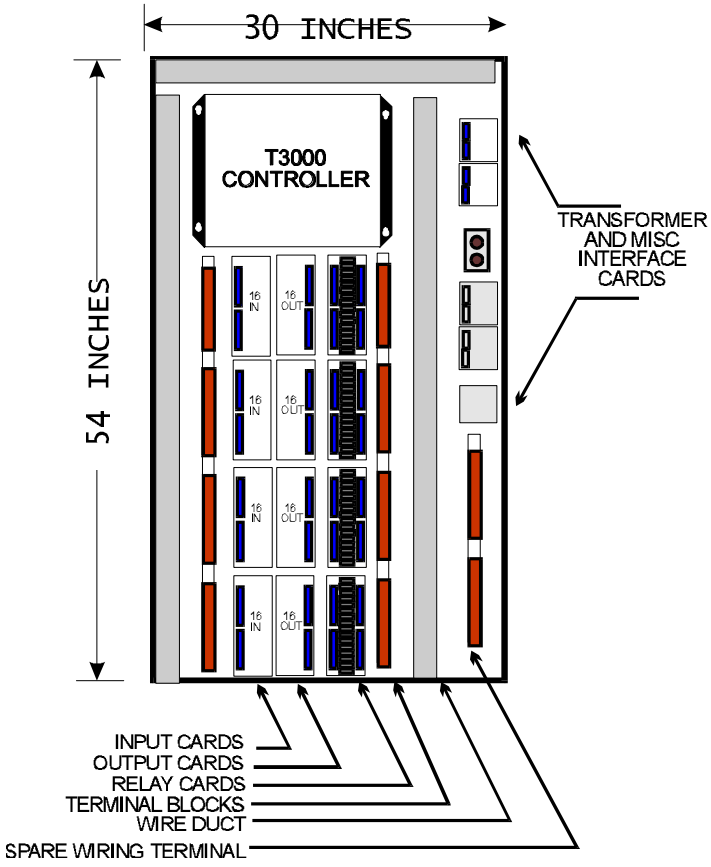
Specify: ***T3000 (includes Analog I/O card, Floppy, Power Supply, Case, 4 Meg Ram,***

2 Serial Ports, hard disk, VGA card, Parallel Port, Disk Controller, 486 Motherboard)

Typical Setup For A T3000 Installation



Installation Diagram



Software

The **T3000** software is simple enough to learn that operator training can be as short as four hours. More technically minded operators will find features which enable the most demanding building control strategies. Inputs, Outputs, Controllers, Weekly and Annual Routines, Alarms, etc. are all presented in tables for viewing and editing. The programming is done in an easy to understand Basic-like language.

Once the program is downloaded from the PC to the **T3000**, the panel operates independent of the host computer. The panel can communicate simultaneously with a remote PC via a modem link, a building operator via a local PC, and with other panels in the network.

Specifications

Inputs/Outputs	Up to 128 Either Analog or Digital
Power Requirements	120 or 220 VAC/200W
Operating Temp. Range	-18 to 49°C
Operating Humidity Range	10% to 90%
Analog Output Range	0 to 10 volt DC +/- 0.1%
Digital Output Capacity	12V DC @ 100 mA
Dimensions	16.8" W x13.5" H x 7.0" D

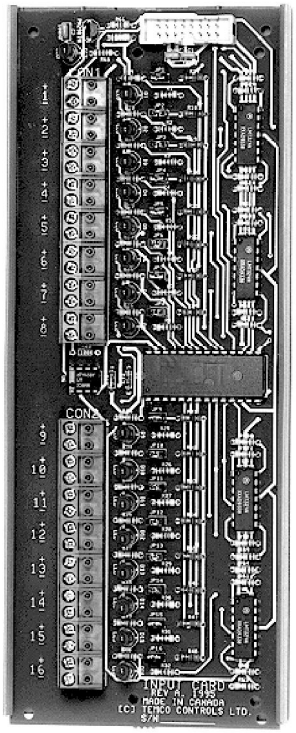
T3000 16 Channel Input Card

Description

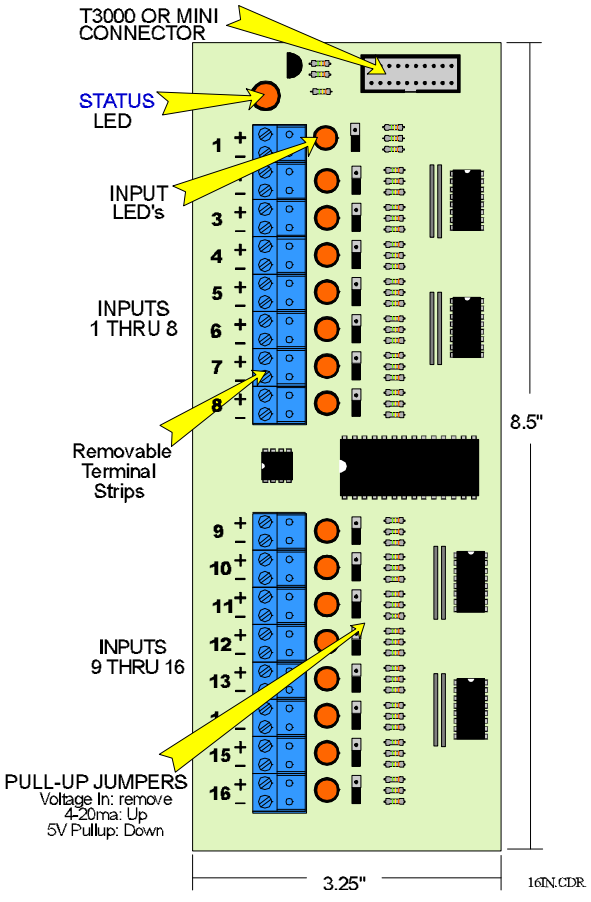
The **16 Channel Input Card** is a general purpose Input card designed to be used with the **T3000** and **Mini-Panel Controllers**. The Input Card accepts either Analog, Digital or Pulse Signals at each of its 16 channels. Signals that are sensed include thermistors, 0-5VDC, 4-20mA, potentiometers and volt free contacts. A red LED provides visual indication of each input point.

Input and Output termination cards can be added to suit your application to a total of 8 cards per T3000 and 2 cards per Mini-Panel. Note that one T3-CABLE is needed per card to connect to either the **T3000 Controller** or **Mini-Panel.**

The card is supplied mounted in 3.25" Snaptrack.



Wiring Diagram



Specifications

Supply Voltages :
. . . . . +15V, -15V, +5V Supplied by the T3000
Input Sense Voltage :
. . . . . 0 to 5.0 Volts DC
Overvoltage Protection :
. . . . . Continuous Application of 24VAC
Input Impedance :
. . . . . 10.0k Ohms with Pull Up Jumper Installed
. . . . 100k Ohms with Pull Up Jumper Removed
Status LED :
. . . . . Flashes when Card is being Accessed
Connectors :
. . . . . Two 32 position plug-in
. . . . . connectors for Inputs
. . . . . 16 pole Ribbon Cable Header for
connection to T3000
Operating Temperature Range :
. . . . . -18°C to 49°C
. . . . . 0°F to 120°F
. . . . . 10 to 90% Relative Humidity
Dimensions :. . . . . 8.5" L x 3.25" W
Mounting :. . . . . 3.25" Snaptrack

Ordering Information

Specify :

T3-IN16 *16 CHANNEL INPUT CARD*

And Add one Cable per Card **:**

T3-CABLEXX *CARD CONNECTION CABLE*

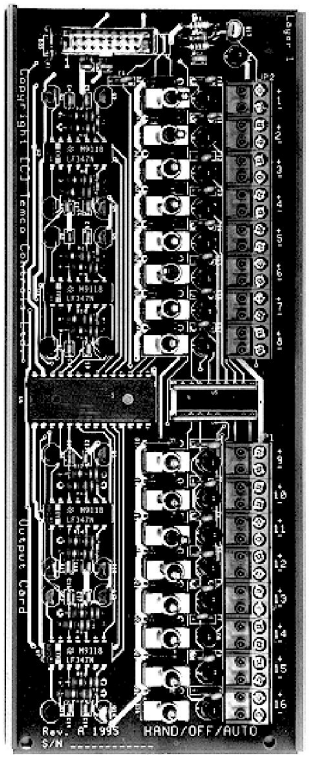
T3000 16 Channel Output Card

Description

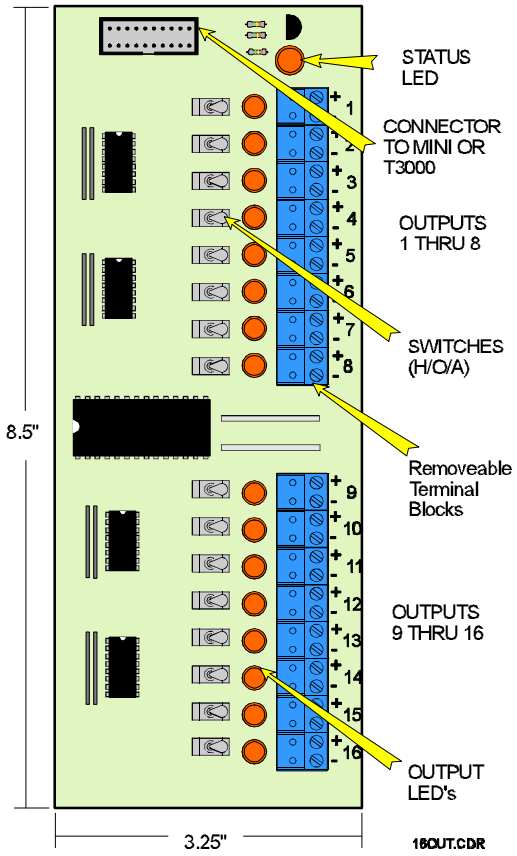
The **16 Channel Output Card** is a general purpose Output card designed to be used with the **T3000** and **Mini-Panel Controllers**. The Output Card delivers either an Analog or Digital signal at each of the 16 channels. Output voltages for Analog signals are 0 - 10 VDC and for Digital signals are 0 - 12 VDC.

Manual ON provides a 12VDC signal.Any combination of Input and/or Output cards can be added to suit the application, up to a total of 8 cards for the T3000 and up to two cards per Mini-Panel. Each output has a red LED for visual indication, and a Hand-Off-Auto switch for manual override of the controller.

Note that one T3-CABLE is needed per card to connect to the either the **T3000 Controller** or the **Mini-Panel**. The card



Wiring Diagram



Specifications

Supply Voltages :
. . . . . +15V, -15V, +5V Supplied by the T3000
Input Sense Voltage :
. . . . . 0 to 5.0 Volts DC
Output Current. . . . . 50 mA per Output
Short Protection . . . . . Continiuous
Applied Voltage Protection :
. . . . . Continuous Application of 24VAC
Status LED . . . . . Flashes when Card is being Accessed
Output LED . . . . . Indicates Output Voltage
Switches . . . . . Each Output is provIded with a **HAND/OFF/AUTO Switch**
Connectors :
. . . . . Two 16 position removeable connectors
. . . . . 16 pole Ribbon Cable Header for **connection to T3000**
Operating Temperature Range :
. . . . . -18°C to 49°C
. . . . . 0°F to 120°F
. . . . . 10 to 90% Relative Humidity
Dimensions. . . . . 8.5" L x 3.25" W

Ordering Information

T3-OUT16 *16 CHANNEL OUTPUT CARD*

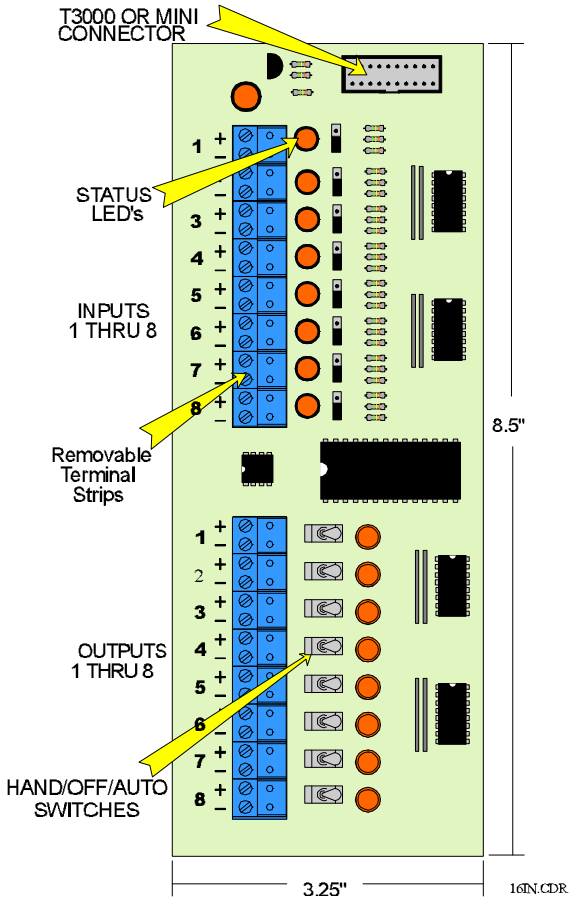
T3000 8 Input / 8 Output Card

Description

The **T3000 8input / 8 Output Card** is a general purpose I/O card designed to be used with the **T3000** and **Mini-Panel Controllers**. The Output Card delivers either an Analog or Digital signal at each of the 16 channels. Output voltages for Analog signals are 0 - 10 VDC and for Digital signals are 0 - 12 VDC. Manual ON provides a 12VDC signal.

Any combination of Input and/or Output cards can be added to suit the application, up to a total of 8 cards for the T3000 and up to two cards per Mini-Panel. Each output has a red LED for visual indication, and a Hand-Off-Auto switch for manual override of the controller.

Wiring Diagram



Specifications

Supply Voltages :
. . . . . +15V, -15V, +5V Supplied by the T3000
Input Sense Voltage :
. . . . . 0 to 5.0 Volts DC
Output Current . . . . . 50 mA per Output
Short Protection . . . . . Continiuous
Applied Voltage Protection :
. . . . . Continuous Application of 24VAC
Status LED . . . . . Flashes when Card is being Accessed
Output LED . . . . . Indicates Output Voltage
Switches . . . . . Each Output is provIded with a **HAND/OFF/AUTO Switch**
Connectors :
. . . . . Two 16 position removeable connectors
. . . . . 16 pole Ribbon Cable Header for **connection to T3000**
Operating Temperature Range :
. . . . . -18°C to 49°C
. . . . . 0°F to 120°F
. . . . . 10 to 90% Relative Humidity
Dimensions. . . . . 8.5" L x 3.25" W
Mounting . . . . . 3.25" Snaptrack

Ordering Information

Specify :

T3-IN8/OUT8 *8 INPUT / 8 OUTPUT CARD*
And one Cable per Card **:**
T3-CABLEXX *CARD CONNECTION CABLE*

RS-232 TO RS-485 Network Card

Description

The **RS-232 To RS-485 Network Card** is designed to be used with the **T3000 Controller**. The T3000 controller operates the network using RS-232. The Network card allows operators to use their existing network lines operating with RS-485 by translating to RS-232 for the T3000.

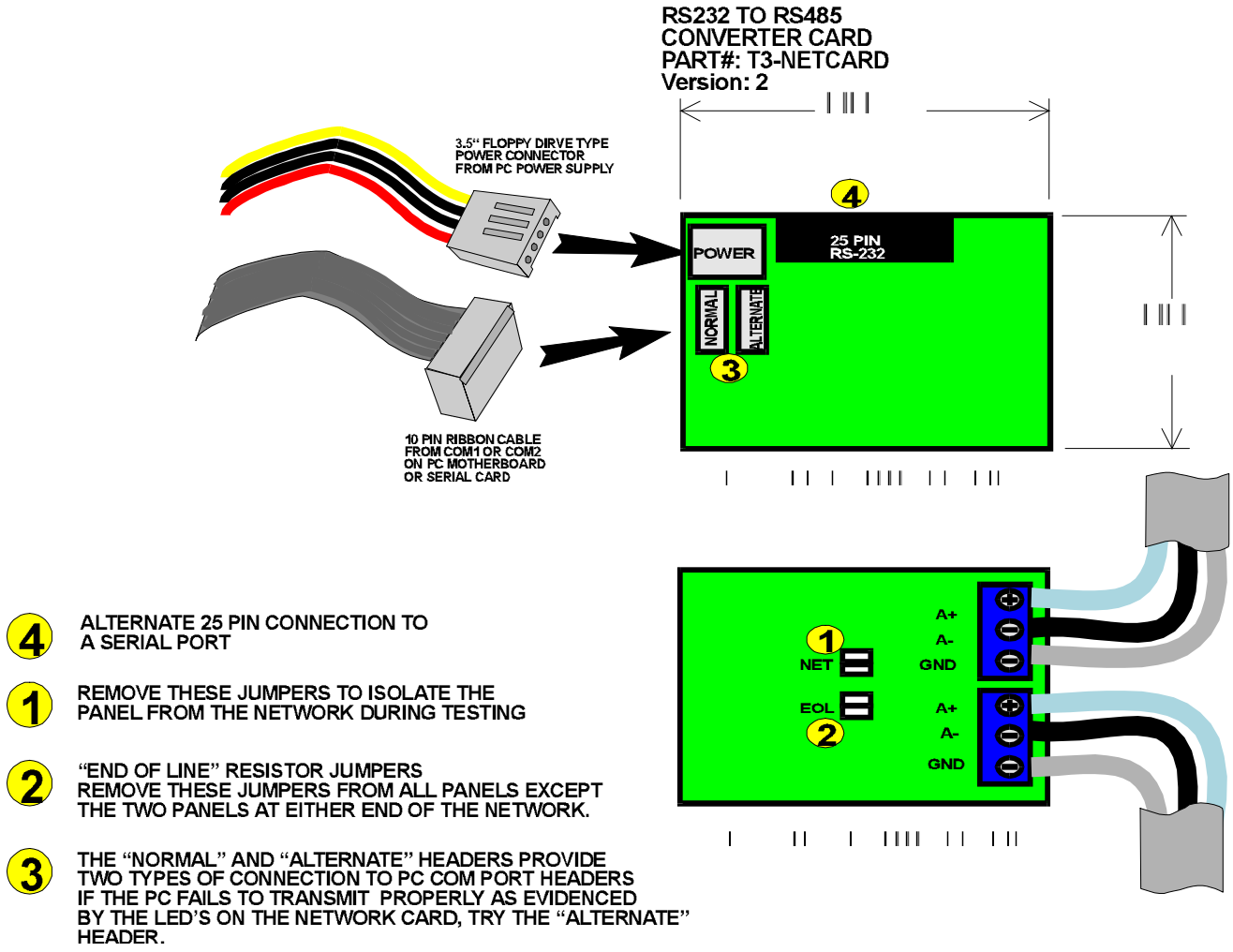
This card is especially useful in retro-fit jobs as it allows the operator to make use of existing network wiring without the need of installing new wiring.

The card is either plugged into a serial port on the T3000 connected to the 25 pin connector, or wired directly by using the 10 pin connection.

Specifications

Net Jumpers	Network
EOL Jumpers	End Of Line
Power Requirement	12VDC
Status LED's	Flashes when Card is being Accessed
Connectors :	Two 10 pin seria connectors
	One 25 pin serial connector
Operating Temperature Range :	-18°C to 49°C
	0°F to 120°F
Humidity Range	10 to 90% RH
Dimensions(mm)	83 H x 50 W x 25 D

Wiring Diagram



4 ALTERNATE 25 PIN CONNECTION TO A SERIAL PORT

1 REMOVE THESE JUMPERS TO ISOLATE THE PANEL FROM THE NETWORK DURING TESTING

2 "END OF LINE" RESISTOR JUMPERS
REMOVE THESE JUMPERS FROM ALL PANELS EXCEPT THE TWO PANELS AT EITHER END OF THE NETWORK.

3 THE "NORMAL" AND "ALTERNATE" HEADERS PROVIDE TWO TYPES OF CONNECTION TO PC COM PORT HEADERS IF THE PC FAILS TO TRANSMIT PROPERLY AS EVIDENCED BY THE LED'S ON THE NETWORK CARD, TRY THE "ALTERNATE" HEADER.

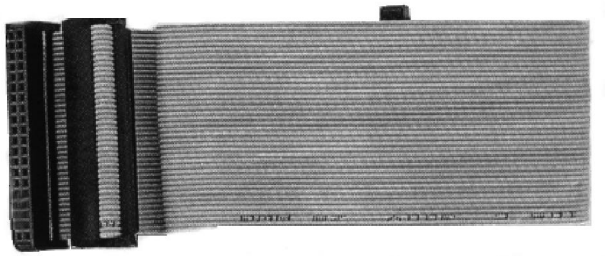
Ordering Information

Specify :

T3-NETCARD *RS-232 TO RS-485 NETWORK CARD*

T3000 Accesories

Card Connection Cable



The **T3-CABLE** Card Connection Cable connects the T3000 Controller or Mini-Panel to either the 16 Channel Input or Output Card. One cable is needed for each I/O card to be connected to the T3000.

The cable comes in a standard length of 6" for mounting your I/O card immediately below the T3000.

Custom lengths are avaiable by simply adding the desired length (in inches) to the end of the part

T3000 Manuals

Two manuals are available to assist you with the T3000 family of Control Products. The TSM301 is the software Manual. It deals with the operator use of the system. Topics covered include a Description of the software, a step by step guide to programming a panel, Control Basic Programming and graphics.

The TIM301 is the Installation/Technical Manual. It details the hardware , software, and wiring details associated with getting a T3000 DDC system up and running smoothly. Additionally, there are several interfacing applications discussed in detail,

T3000 Enclosure

The T3000 Enclosure is a heavy duty steel enclosure complete with a lock and key. Its dimensions are 22.5" H x 15.5" W x 3 1/4" deep. It is available in two configurations to suit your needs.

The TPEE20 is designed to house a Mini-Panel and the accompanying I/O cards. The Enclosure comes complete with panduit.

The TPEE30 is an empty enclosure and is suitable for mounting the T3000, relays or other applications related to HVAC.

Software Upgrade

Upgrade your PC Interface to the most current version of the T3000.EXE, the Operator Interface and real time operating system.

Note that the most current software is supplied free of charge with each T3000 or Mini-Panel purchase.

Ordering Information

Specify :

T3-CABLE *CARD CONNECTION CABLE (6" LENGTH)*
T3-CABLEXX *CARD CONNECTION CABLE (CUSTOM LENGTH)*

TM101 *T3000 AND MINI-PANEL Software MANUAL*
TIM101 *T3000 AND MINI-PANEL INSTALLATION/TECHNICAL MANUAL*

TPEE20 *MINI-PANEL ENCLOSURE (c/w Panduit)*
TPEE30 *ENCLOSURE (No Panduit or standoffs)*

T3000.EXE *Software UPGRADE FOR T3000 PANEL*

RTS ROOM SENSORS

These sensors provide precision room temperature sensing for Energy Management Control Systems, compatible with all the leading control systems.

- Three low cost room temperature sensors to choose from
- high precision thermistor or RTD, accurate to 0.2 °C (+/- .36°F) over the range of 0C to 70C.
- The platinum RTD is accurate to 0.5C

The enclosure design allows for use in areas where appearance is important.

The sensors save I/O space on the DDC controller by connecting to a single input. User button activity is captured in the DDC system application programs as high and low going pulses, providing full software control of the button actions.

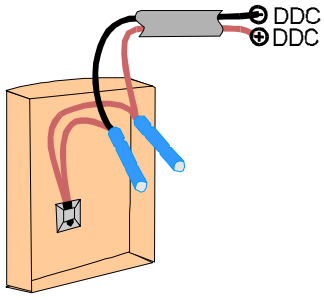
Installation

The unit is located on an interior wall, away from windows, supply ducts and heat sources. The enclosure can be mounted flush on the wall, or on an electrical box. The backplate has holes for North American and European style electrical boxes.

The RTSrequires two conductors. the RTS requires butt connectors.

Two allen key screws on the bottom of the enclosure backplate are screwed inwards to allow the cover to be removed and outwards to hold the cover in place.

Wiring Diagram



RTS1000
Polarity insensitive

The back view of the sensor showing the cable connection at the sensor and termination at the DDC panel.

The RTS is connected using butt splices or marrettes

DTS DUCT TEMPERATURE

This sensor is used to measure the supply and return temperatures in HVAC systems. There are several sensor elements to choose from which guarantee compatibility with all popular DDC systems.

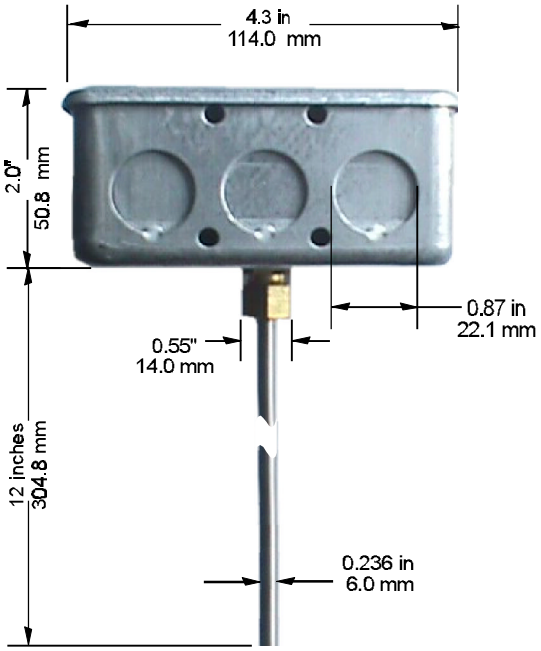
The probe is 12in long, and employs either a precision thermistor or platinum film sensor depending on the DDC system requirements. Field calibration is not generally required.

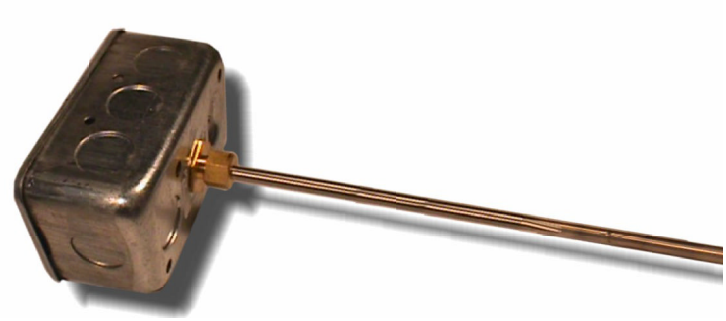
Sensor Property	Specification
Thermistor Accuracy	+/-0.2C
Platinum RTD Accuracy	+/-o.4C
Thermistor range	-70C to 150C
Platinum RTD range	-70C to 200C
Probe Material	Stainless Steel
Cable Properties	FT4, 80C, 600

Construction

The sensor is a high quality unit manufactured to industrial standards, borrowing materials and assembling techniques from the industrial sector.

The probe material is stainless steel with a welded and ground tip. The DTS3000 probe is baked and then epoxy sealed to eliminate long term moisture problems.





Installation

The location of the sensor is determined by th following parameters:

- Insert the probe is well into the airsteam in an area with no stratification or local effects.
- A supply air sensor is located at any convenient location two or three meters downstream from the nearest fan and coil.
- A return temperature sensor can be mounted anywhere in the return duct, a meter or two before the mixing section usually.

To install the sensor, drill a 3/4” hole in the duc and insert the probe into the airstream. Secur the electrical box to the duct with two shee -metal screws. The knockouts on the electrica box accept a 1/2” pipe or flex connector. Th sensor requires two conductors, normally 18g unshielded twisted pair.

Ordering Information

Sensor	DDC System	Part#
10K thermistor, curve 3	Temco, Andover AAM,Siebe,Multinet	DTS3000-7
10K thermistor, curve 2	ALC, Trane,CSI, Solidyne, Delta	DTS3000-24
1000 ohm platinum RTD	Honeywell, Johnson,L&S	DTS3000 -12
3k thermistor	Alerton	DTS3000-6
100k thermistor	Landys&Gyr Powers	DTS3000-9

Example: a duct sensor for Andover=DTS3000-7

DTS-FL: FLANGE MOUNT

This sensor is used to measure the supply and return temperatures in HVAC systems. The flange mount design makes it easy to install the sensor in tight quarters. There are several sensor elements to choose from which guarantee compatibility with all popular DDC systems.

The probe shown in the picture is 12in long, and employs either a precision thermistor or platinum film sensor, field calibration is not generally required. The 10ft (3m) cable is plenum rated.

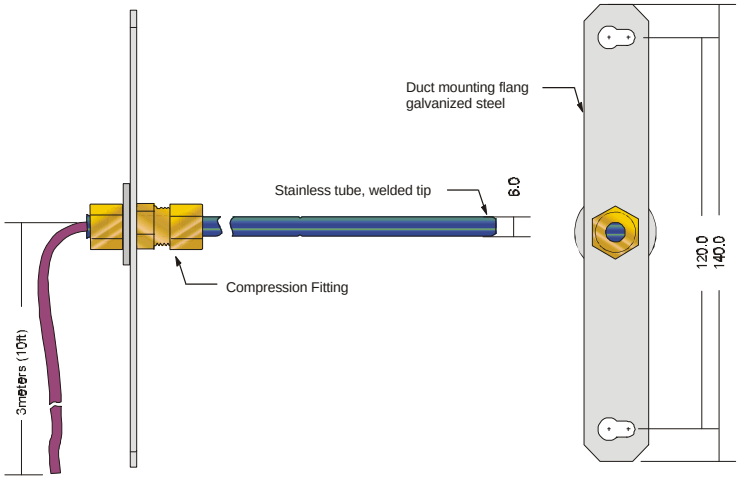
Sensor Property	Specification
Thermistor Accuracy	+/-0.2C
Platinum RTD Accuracy	+/-o.4C
Thermistor range	-70C to 150C
Platinum RTD range	-70C to 200C
Probe Material	Stainless Steel
Cable Properties	FT6, ULC S102.4 80C, 600V

Construction

The sensor is a high quality unit manufactured to high standards, borrowing materials and assembling techniques from the industrial sector.

The probe material is stainless steel with a welded and ground tip. The DTS3000 probe is baked and then epoxy sealed to eliminate long term moisture problems. The flange accepts two #6 screws, and is made from glavanized steel.

DUCT TEMP, FLANGE MOUNT : DTS3000-FL



Installation

Duct probes should be installed directly on the duct, in an area where the airsteam is well mixed:

- Locate a supply air sensor two or three meters downstream from the nearest fan and coil.
- A return temperature sensor can be mounted anywhere in the return duct, after the return fan if there is one.

To install the sensor, drill a 3/4" hole in the duct and insert the probe into the airstream. Secure the metal flange to the duct with two sheet -metal screws. The plenum rated cable is secured to the duct to the nearest electrical box. The sensor requires two conductors, normally 18ga unshielded twisted pair.

Ordering Information

Sensor	DDC System	Part#
10K thermistor, curve 3	Temco, Andover AAM,Siebe,Multinet	DTS -FL-XX-YY-7
10K thermistor, curve 2	ALC, Trane,CSI, Solidyne, Delta	DTS -FL-XX-YY-24
1000 ohm platinum RTD	Honeywell, Johnson,L&S	DTS -FL -XX-YY-12
3k thermistor	Alerton	DTS -FL-XX-YY-6
100k thermistor	Landys&Gyr Powers	DTS -FL-XX-YY-9

Note: -XX is the length of the probe in inches.
-YY is the length of the wire in inches.
Example: sensor for Andover=DTS3000-FL-XX-YY-7

DTS3012 AVERAGING DUCT SENSOR

This sensor is used to measure the air temperature in the mixing section of return air type air handling units. The probe utilizes several sensor elements along its length, and provides a temperature reading which is the average of all elements in the probe. There sensors are encapsulated in a 12 foot (3.6m) long flexible copper tube which is criss-crossed through the mixing section.

There are three thermistor based models, and one RTD version to provide compatibility with the majority of popular DDC systems. The sensing elements are precision sensors and calibration is not generally required.

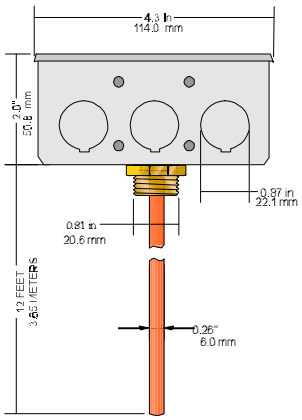
Sensor Property	Specification
Thermistor Accuracy	+/-0.2C
Platinum RTD Accuracy	+/-o.4C
Usable temperature range	-70C to 150C
Probe Material	Refrigeration grade copper
Cable Properties	FT4, 80C, 600V

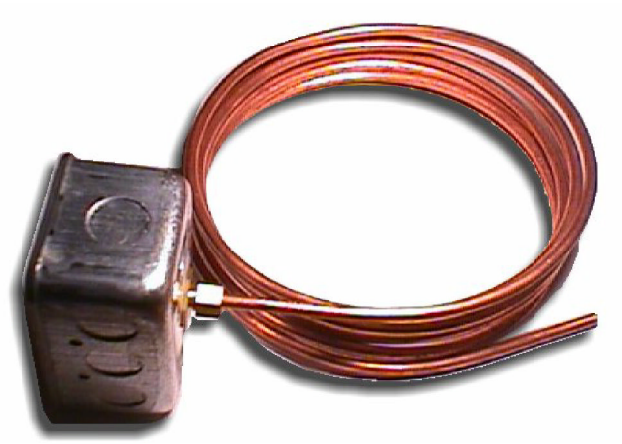
Construction

The sensor is manufactured to industrial standards, and is epoxy sealed to protect against contamination by moisture.

The probe is made from a soft copper tube which can be bent by hand. The sensor elements are wired such that resistance is an average reading of all the elements in the probe.

The sturdy electrical box is made from galvanized steel, all other fittings are made form machined brass.





Installation

The duct sensor is mounted in the mixing section of the air handler using the following guidelines:

- Mount the sensor as far away from the return and fresh air sections as possible, but avoiding direct contact with the coils.
- Make sure not to block the filter or access to other equipment inside the unit.
- The sensor element locations are marked on the probe. Keep the elements away from the securing straps and sides of the duct.

Drill a 7/8" (20mm) hole in the air handler and feed the probe through the hole into the airstream. Secure the electrical box to the outside of the air handling unit with two sheet-metal screws. Criss-cross the probe in the mixing section, taking care to maximize the coverage. Use copper tubing straps to secure the probe to the sides of the duct.

The knockouts on the electrical box accept a ½" pipe or flex connector. The sensor requires two conductors, usually 18ga, unshileded twisted pair.

Ordering Information

Sensor	DDC System	Part#
10K thermistor, curve 3	Andover AAM,Siebe,Multinet	DTS3012-7
10K thermistor, curve 2	ALC, Trane,CSI, Solidyne, Delta	DTS3012-24
1000 ohm platinum RTD	Honeywell, Johnson,L&S	DTS3012 -12
3k thermistor	Alerton	DTS3012-6
100k thermistor	Landys&Gyr Powers	DTS3012-9

Example: a 12 foot sensor for Andover = DTS3012-7

OAT OUTSIDE AIR SENSOR

This sensor is used to measure the outside air temperature to allow the DDC system to coordinate the mechanical systems with actual building load conditions, enabling such strategies as free cooling, optimum start/stop, and supply temperature reset.

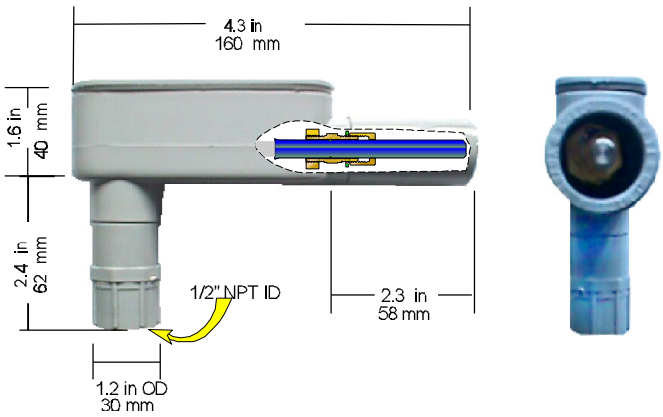
The housing is made from PVC electrical fittings which shield the probe from direct sunlight. The probe is manufactured to industrial standards. There are three thermistor based models, and one RTD version to provide compatibility with the majority of DDC systems. The sensors are accurate enough that calibration is not usually required.

Sensor Property	Specification
Thermistor Accuracy	+/-0.2C
Platinum RTD Accuracy	+/-o.4C
Thermistorrange	-70C to 150C
Probe Material	Stainless
Cable Properties	FT4, 80C, 600V

Construction

The sensor probe is made from stainless steel which is welded, ground down, and finally pressure tested before assembling. The probe is then baked and epoxy sealed to provide long term protection from moisture.

The sensor housing is a PVC electrical enclosure which is UL approved for outdoor use. The housing extends over the probe to protect from sunlight radiation.



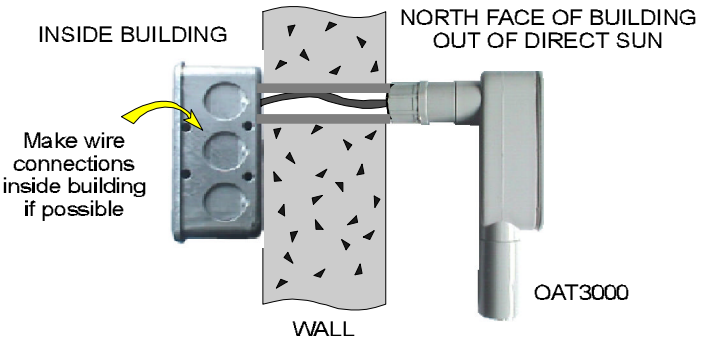
The sensor lead extends 12" from the enclosure, making it long enough to reach a junction box and terminate inside the building. The thermistor models are accurate to 0.2C while the platinum RTD is accurate to 0.5C.

Installation

The OAT3000 sensor can be mounted on the outside of the building using the following guidelines:

- Choose a spot on the north face which will be out of sunlight for as much of the day as possible.
- Mount the sensor where it can be serviced, staying away from exhaust ducts.Point the probe downwards to avoid catching rain

To install the sensor, drill a 3/4" (20mm) hole through the wall, and pipe the sensor to an electrical junction box on the inside of the wall. The sensor has a female ½" NPT threaded fitting to accept a short length of ½" pipe or PVC. Two conductors are required, 18ga, unshielded twisted pair is common.



Ordering Information

Sensor	DDC System	Part#
10K thermistor, curve 3	Andover, AAM,Siebe,Multinet	OAT30000-7
10K thermistor, curve 2	ALC, Trane,CSI, Solidyne, Delta	OAT3000-24
1000 ohm platinum RTD	Honeywell, Johnson,L&S	OAT3000-12
3k thermistor	Alerton	OAT3000-6
100k thermistor	Landys&Gyr Powers	OAT3000-9

Example: a outdoor sensor for Andover = OAT3000-7

WTS WATER TEMPERATURE SENSOR

This sensor is used to measure water temperature of heated or chilled water and other liquids in mechanical systems.

The sensor includes a brass well which allows the probe to be removed from the pipe without draining the system and protects the probe.

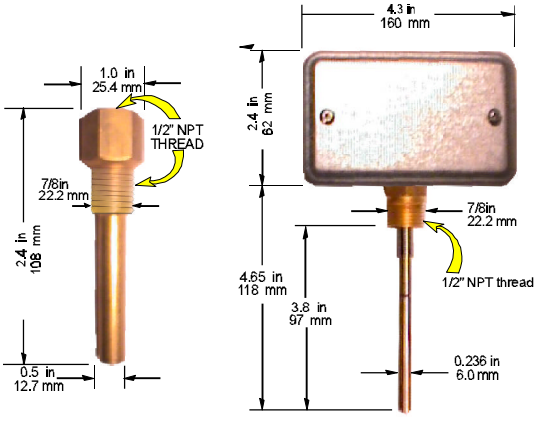
There are four thermistor based models, and one RTD version to provide compatibility with the majority of DDC systems. The sensors are accurate enough that calibration is not usually required.

Sensor Property	Specification
Thermistor Accuracy	+/-0.2C
Platinum RTD Accuracy	+/-o.4C
Thermistorrange	-70C to 150C
Probe Material	Stainless
Cable Properties	FT4, 80C, 600V

Construction

The sensor probe is made to industrial standards, the stainless steel probe is welded, ground down and finally pressure tested. The probe assembly is baked and epoxy sealed to provide long term protection from moisture. The probe is spring loaded to ensure thermal contact with the bottom of the well. The thermistors are accurate to 0.2C while the platinum RTD is accurate to 0.5C

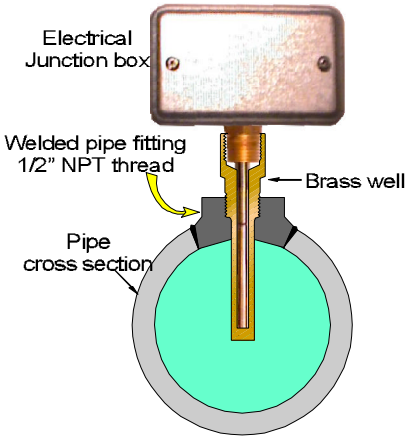
The well is made from machined brass, and fits a standard ½" NPT fitting. The sensor housing is a galvanized electrical box.



Installation

Locate water temperature sensors at least a few pipe diameters downstream any heat or cooling source.

- A ½" NPT female pipe fitting is welded into the pipe. These fittings are usually supplied and installed by the piping trade under direction of the controls trade.
- Choose an orientation where any condensation will not collect, such as the top of a horizontal pipe section or at a 45deg angle from horizontal.
- Before threading the sensor into the well, deposit some thermal paste in the bottom of the well to improve heat conduction between the metal parts.
- The sensor is wired with two conductor 18ga, unshileded twisted pair.



WATER SENSOR AND WELL MOUNTED ON PIPE

Ordering Information

Sensor	DDC System	Part#
10K thermistor, curve 3	AAM,Andover Siebe,,Multi-net,Kreuter	WTS3000-7
10K thermistor, curve 2	ALC, Trane,CSI, Solidyne, Delta	WTS3000-24
1000 ohm platinum RTD	Honeywell, Johnson,L&S	WTS3000-12
3k thermistor	Alerton	WTS3000-6
100k thermistor	Landys&Gyr Powers	WTS3000-9

Example: a water temp sensor for Andover = WTS3000-7

WTS5 STRAP ON PROBE

This sensor is used to measure water temperature of heated or chilled water and other liquids found in in the various mechanical systems of a building.

The sensor is especially intended for strapping to the outside of a pipe when there is no opportunity to install a well such as in a retro-fit or additions to an existing system.

The strap on probe is also useful in applications such as monitoring batteries, transformers, generators, and generally any place where a complete assembly cannot be mounted. Ice rink slabs and soil temperature are other applications.

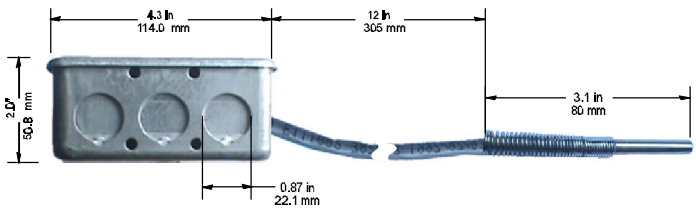
There are four thermistor based models, and one RTD version to provide compatibility with the majority of DDC systems. The sensors are accurate enough that calibration is not usually required.

Sensor Property	Specification
Thermistor Accuracy	+/-0.2C
Platinum RTD Accuracy	+/-o.4C
Thermistorrange	-70C to 150C
Probe Material	Stainless
Cable Properties	FT4, 80C, 600V

Construction

The sensor probe is made from stainless steel, and is epoxy sealed to provide 100% protection from moisture over time.The thermistor models are accurate to 0.2C while the platinum RTD is accurate to 0.5C.

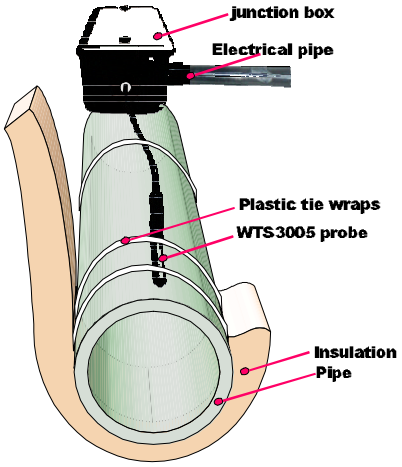
The cable is 12 in long and fire rated to FT4, 80C with 600V isolation. A nickel coated spring provides strain relief for the cable. The sensor housing is a galvanized electrical box which is sturdy and easy to mount.



Installation

For measuring water temperature, the probe is strapped with plastic tie wraps or a metal strap onto the outside of the pipe and covered with insulation.

The electrical box is mounted on a strut bar or on the wall near the pipe. Two conductors are required, 18ga, unshielded twited pair is coommon.



WTS3005 Typical installation on pipe surface

Ordering Information

Sensor	DDC System	Part#
10K thermistor, curve 3	Temco, Andover AAM,Siebe,Multinet	WTS3005-7
10K thermistor, curve 2	ALC, Trane,CSI, Solidyne, Delta	WTS3005-24
1000 ohm platinum RTD	Honeywell, Johnson,L&S	WTS3005 -12
3k thermistor	Alerton	WTS3005-6
100k thermistor	Landys&Gyr Powers	WTS3005-9

Example: a strap on sensor for Andover = WTS3005-7

Space Humidity Sensor

Description

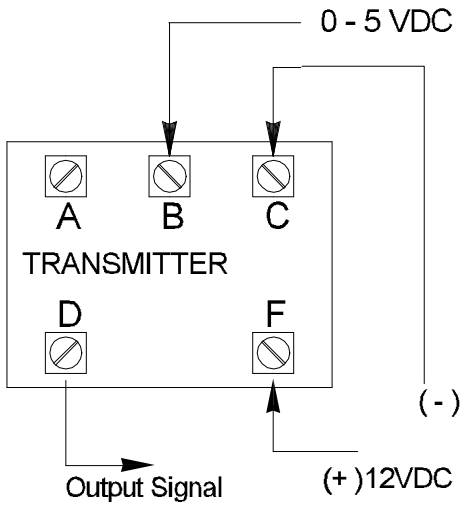
The **RHS1 Space Humidity Sensor** is designed for use with building automation systems in commercial buildings, hospitals, museums or other facilities requiring accurate measurement of relative humidity.

Each transmitter utilizes a capacitive polymer sensor to provide excellent linearity and sensitivity.

In addition the model **RHS1001 Space Humidity Sensor** is available with a built-in thermistor which can be used to measure both room temperature and relative humidity.

This unit can be directly mounted to a dry-wall partition, or vertically to a 2 x 4 electrical handy box using the optional adaptor plate (**RHSPLATE**).

Wiring Diagram



Supply Voltage	10 to 15 VDC
Input Power	5.5 mA
Output Range	0 to 100% RH
Sensing Accuracy	+/-3% over 10% to 90% RH
Output Signal	0 to 5 VDC
R Load	1000 ohm Max.
Operating Temp. Range	4 to 49°C
Material	ABS Housing
Wire Size	14 to 22 Awg (Recommended)
Thermistor (RHS1001 Only)	10k ohms at 25°C
Dimensions	2.0" H x 2.0" W x 0.2" D
Weight	1.5 Oz
Adaptor Plate Dimensions	4.5"L x 2.75" W

Ordering Information

Specify :

RHS1000 *SPACE HUMIDITY SENSOR*

RHS1001 *SPACE HUMIDITY SENSOR c/w BUILT-IN THERMISTOR*

Accessories :

RHSPLATE *ADAPTOR PLATE (For RHS1000 or RHS1001)*

Duct Humidity Sensor

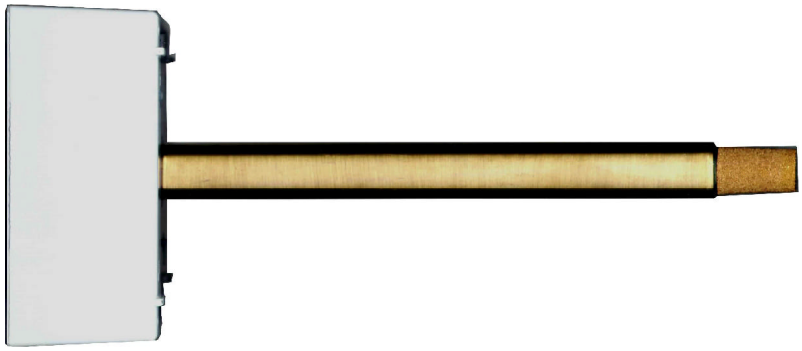
Description

The **DHS1000 Duct Humidity Sensor** is designed for use with building automation systems in commercial buildings, hospitals, museums or other facilities requiring accurate measurement of relative humidity.

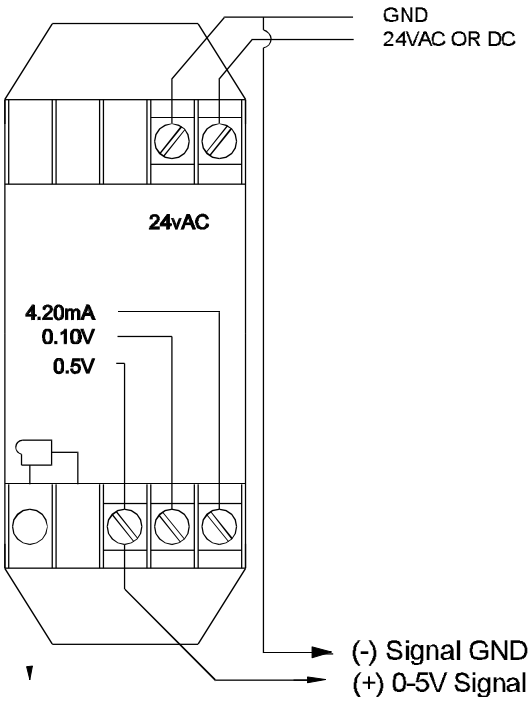
Each transmitter utilizes a capacitive polymer sensor to provide excellant linearity and sensitivity.

This unit requires a 1-1/8" clearance hole for duct mounting. The non-metallic assembly is first mounted to the ductwork using sheet metal screws. The mounting holes in the base of the electrical housing are slotted so that the the housing can be slipped over the heads of the screws prior to tightening them down.

The relay unit mounted inside the electrical housing is hardwired to the sensing probe. This connection should not be lengthened or shortened. The relay is then held in place by the mounting screws for the electrical



Wiring Diagram



Supply Voltage	24 VAC or VDC
Input Power	0.5 VA
Output Range	0 to 100% RH
Sensing Accuracy	+/-3% over 10% to 90% RH
Output Signal	0 to 5 VDC
R Load - VAC	1K ohm Min for Volatge Outputs
	650 ohm Max. for MA Output
R Load - VDC	1K ohm Min for Volatge Outputs
	590 ohm Max. for MA Output
Operating Temp. Range	-1 to 49°C
Probe Material	ABS/PVC
Wire Size	14 to 22 Awg (Recommended)
Dimensions - Probe	7.0" L x 1.125" W
Dimensions - Housing	4.125" L x 2.25" W
Weight	12 Oz

Ordering Information

Specify :

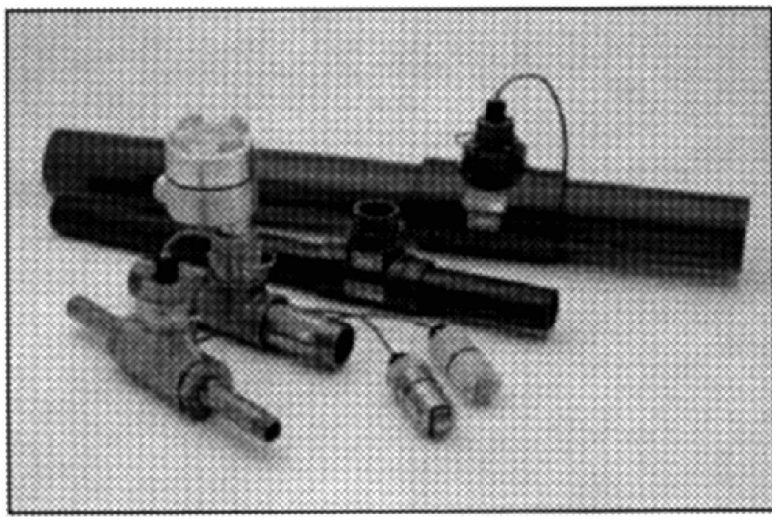
DHS1000 *SPACE HUMIDITY SENSOR*

IP80 Series Flow Sensor

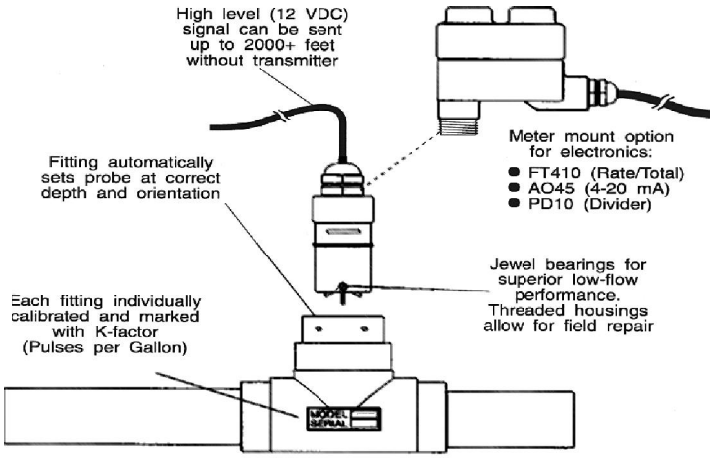
Description

The IP80 Series are impeller-type insertion meters designed for use in pipe sizes ½" to 8". High-quality jewel bearings and nickel-bound tungsten carbide shaft are used in both the IP81, for pipe sizes ½" to 4", and the IP82 for pipe sizes 6" to 8". Bodies are machined from solid rod for maximum precision. Low-flow performance is superior. The rotation of the rotor is detected by a non-drag Hall-effect sensor. Output is a pulse-type square wave, which can be sent long distances (up to 2,000 feet) without a transmitter. This signal can be connected directly to Temco's T3000 controller.

The IP80 Series requires special fittings, since they are not depth-adjustable as are the IP 100/200 series meters. Installation in the fitting ensures correct depth placement in the pipe. Fittings are available in PVC, brass and stainless steel.



Sensors are available in brass, 316 stainless steel, PVC, and polypropylene.



Specifications

Sensor

Hall Effect Sensor . . . . . 12 VDC current sinking pulse

Materials

Sensor Body . . . . . PVC, Polypro, Brass, or 316 SS

Rotor . . . . . Kynar

Shaft . . . Nickel-bound tungsten carbide, ceramic opt.

Bearings . . . . . Ruby Jewel

Pipe Size

IP81 . . . . . ½" to 4"

IP82 . . . . . 6" to 8"

Maximum Pressure

PVC . . . . . 175 PSI at 75%

Polypro175 PSI at 75%

Brass . . . . . 250 PSI

316 SS . . . . . 500 PSI

Maximum Temperature

PVC, Polypro. . . . . 130° F

Brass, 316 SS . . . . . 200° F

Flow Range (GPM)

	IP81							IP82	
	1/2"	3/4"	1"	1-1/2"	2"	3"	4"	6"	8"
Min	0.28	0.5	0.8	1.9	3.1	6.9	12	27	47
Max	28	50	80	190	314	691	1200	2700	4700

Ordering Information

IP81____ Fixed depth, ½" to 3",order fitti separately

↑Material Code: **P** =PCV, **PP** =Polypro,
↳**K** =PVDF, **B** =Brass, **S** =316 SS

IP101/201 Insertion Sensor

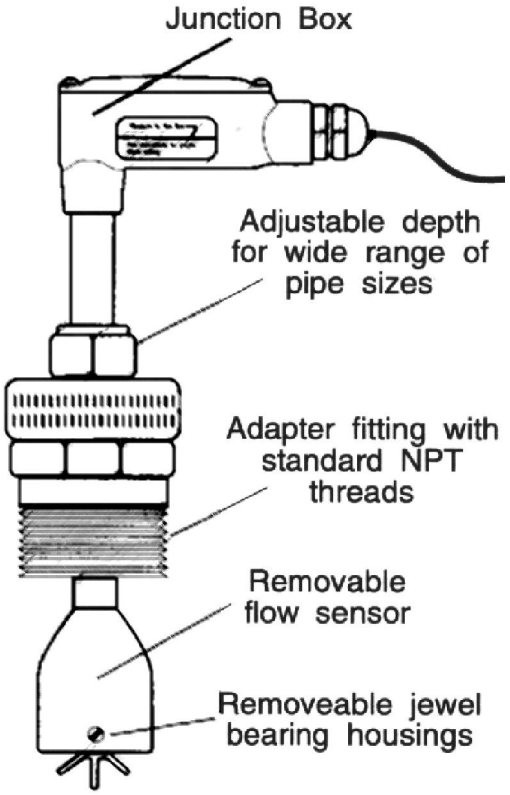
Description

Sapphire bearings and non-drag pickoff give these adjustable insertion flow sensors the widest flow range of any of the paddlewheel types. A Hall-effect device detects the passage of miniature magnets in the six rotor blades. The resulting square-wave signal can be sent for hundreds of feet without a transmitter, over unshielded cable. This signal can be connected directly to the TEMCO T3000 controller.

Installation fittings are standard 1-1/2" or 2" NPT. A depth adjustment system allows two basic sizes to cover pipe sizes from 1-1/2" to 48". Fittings such as saddles and weldolets may be purchased locally, and are also available from SeaMetrics.

A modular system of electronics can be installed directly on the flow sensor, in a splashproof cast housing. The FT400 provides digital rate and total display, as well as programmable pulse and optional 4-20 mA analog outputs. The AO45 is a blind analog transmitter. Programmable pulse for pump pacing comes from the PD10. Each of these controls is also available in a wall mount housing.

These "hot tap" versions of the proven IP insertion flow sensors are designed to install or be serviced without depressurizing the pipe. Like all IP sensors, they have a



Specifications

Materials

Sensor	PVC, Brass, or 316 SS
Rotor	Polypro or Kynar
Shaft	Nickel-bound tungsten carbide, or ceramic
Bearings	Sapphire
Range	0.3 - 30 FPS
Accuracy	1-1/2% FS
Pressure	200 PSI max working
Temperature	
Standard	185° F (PVC 140° F @ 0 PSIG)
High-Temp	250° F (Brass/stainless only)
Pipe Size	
IP101 B.S.	1-½" to 10"
IP201 B,S,P	10" to 48"
IP101 P2" - 10"	
Output	Current shrinking, 20 mA max.
Nominal K-factor	11 Hz / FPS
Cable	#22 AWG 3-con, 18 ft. Standard
Maximum Run	2,000 ft.

Ordering Information

IP101____ Adjustable, 1-½" to 10",except **P**, 2" to 10

IP201____ Adjustable,1-½" to 48",except **P**, 2" to 4

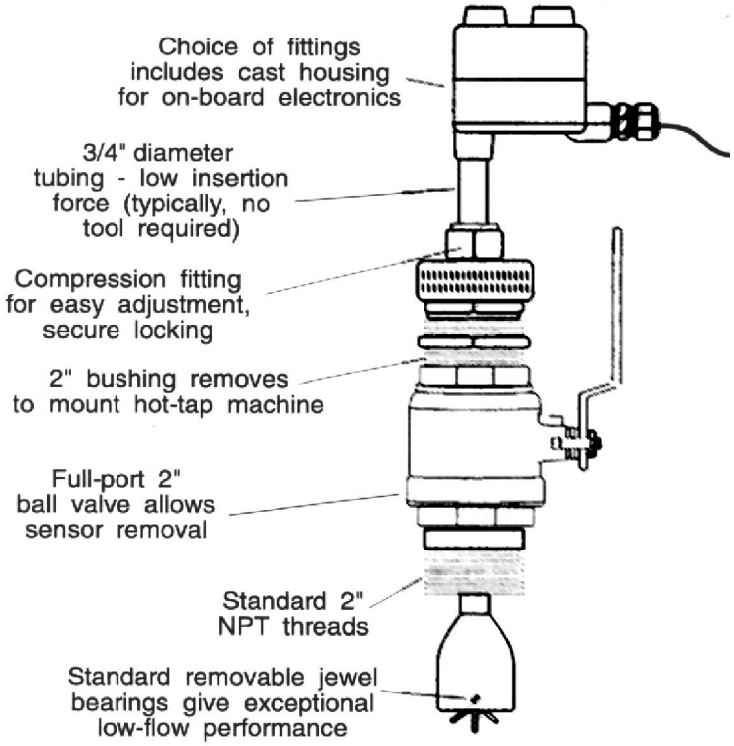
p a d d l e-wheel rotor ↑ Brass, Material Code: **P**=PCV, **B** = **S** =316 Stainless steel

IP 115/215 Hot-tap Insertion Flow Sensor

Description

and jewel bearings for superior low-flow performance. Rotation of the rotor is detected by a non-drag Hall-effect sensor, which interfaces easily with many types of electronic control. A display, divider, or analog transmitter can be installed on the end of the sensor, or the signal can be sent without amplification for hundreds of feet to a TEMCO T3000 controller.

Insertion and removal under pressure is possible due to the 2” full-port isolation valve, which comes with a nipple for installation on the pipe fitting. If it is necessary to do the initial installation under pressure, any standard hot tap drilling machine with 2” NPT adaptor, such as a Transmate or a Mueller, can be used. Ordinarily, it is not necessary to use an installation tool, since the small-diameter tube can be controlled by hand at all but the highest pressures.



Specifications

Materials

Sensor	PVC, Brass, or 316 SS
Rotor	Kynar
Shaft	Nickel-bound tungsten carbide
Bearings	Ruby
Valve	Bronze standard, 316 SS opt.
Range	0.3 - 30 FPS
Accuracy	1-1/2% FS
Max Pressure	200 (Brass SS only) 150 PVC
Temperature	
Standard	185° F (PVC 140° F @ 0 PSIG)
High-Temp	250° F (Brass/stainless only)
Pipe Size	
IP115	2” to 10”
IP215 P	12” to 48”
Fitting Size	2” NPT
Insertion Force	0.44 x pressure
Power	6 - 24 VDC, 8 mA
Signal	Current shrinking pulse
Nominal K-factor	11 Hz / FPS
Cable	#22 AWG 3-con, 18 ft. Standard
Maximum Cable Run	2,000 ft.

Ordering Information

IP115____ Hot-tap flow sensor 2” to 10”

IP215____ Hot-tap flow sensor 12” to 48”

↑ Material Code: **P**=PCV, **B** = Brass, **S** =316 Stainless steel

3300 ACM Digital Power Meter/Transducer

Description

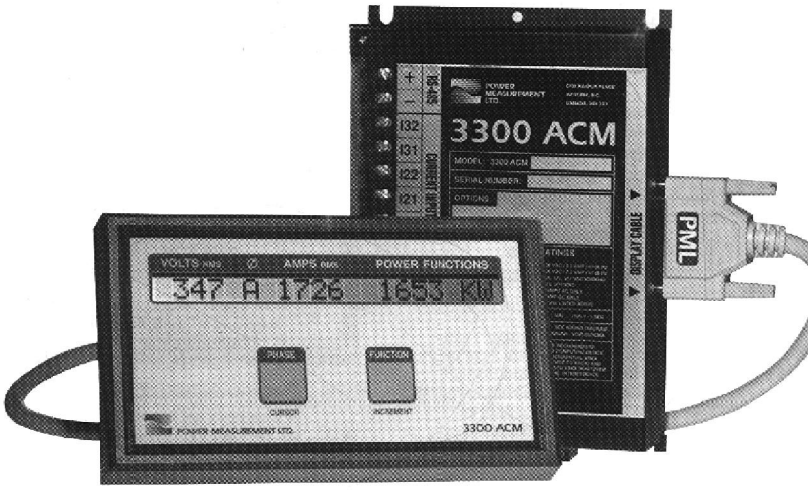
The 3300 ACM can directly replace up to four standard analog meters, while additional measurement options make it possible to replace even more. This makes the 3300 ACM ideally suited for economical metering of 3-phase industrial and commercial switchboards and substations. The 3300 ACM can be linked to the Temco T3000 as part of an efficient energy management network.

The 3300 ACM is a 16-bit microprocessor-based device which offers a unique 2-part design. The compact, rugged base module provides simple, yet reliable installation. The optional display/keyboard module is panel mountable and connects via a 6 ft. pluggable cable to the base module. The display model fits ANSI C39.1 panel cutouts for direct replacement of existing meters. No additional wiring is required to the panel door. This also allows the compact base module to be mounted inside the switchgear cabinet.

Choose as many measurements as you need...

The 3300 ACM offers a wide range of standard and optional real-time measured parameters.

Measured parameters are quickly accessible from the front panel or can be tranmitted via the communications port to the Temco T3000 panel and viewed on an attached monitor.



Simple Operation

The 3300 ACM front panel features a 20 character LCD display. Volts, Amps and Power Functions can all be displayed together for the selected phase. All device programming can be performed quickly and easily from the front panel, or via the communications port by the T3000 software control program.

Specifications

Parameter	Accuracy (% of full scale)		Resolution	Range
	Standard	-HIACC Option		
Volts & Volts Demand [2]	0.5 %	0.25%	0.1 %	0 - 999,999 [1]
Amps & Amps Demand [2]	0.5 %	0.25 %	0.1 %	0 - 30,000
kW & kW Demand [2]	1.0 %	0.5 %	0.1 %	0 - 999,999
kWH	1.0 %	0.5 %	1 kWH	0 - 999,999,999
kVAR & kVAR Demand [2]	1.0 %	0.5 %	0.1 %	0 - 999,999
kVARH [2]	1.0 %	0.5 %	1 kVARH	0 - 999,999,999