



NEMA-4X, IP65



APM765 Panel Meter

Description

The APM765 displays data collected from process current, DC voltage and temperature inputs. Several output options convert the display into a transmitter with proportional 4-20mA output or a serial communication interface. A relay output option adds limit alarm and pump control capabilities.

Process inputs can be scaled with or without applying an input for virtually any engineering units. Temperature inputs can be programmed to display in degrees Fahrenheit or Celsius.

Inputs

4-20mA DC, ± 20 mA DC, ± 10 V DC, Type J, K, T, E thermocouples, 100 ohm platinum RTDs

Outputs (optional)

4-20mA (sink/source)
Dual SPDT (Form C) 3A relays
RS-232, RS-422/485 serial communication

Power Requirements

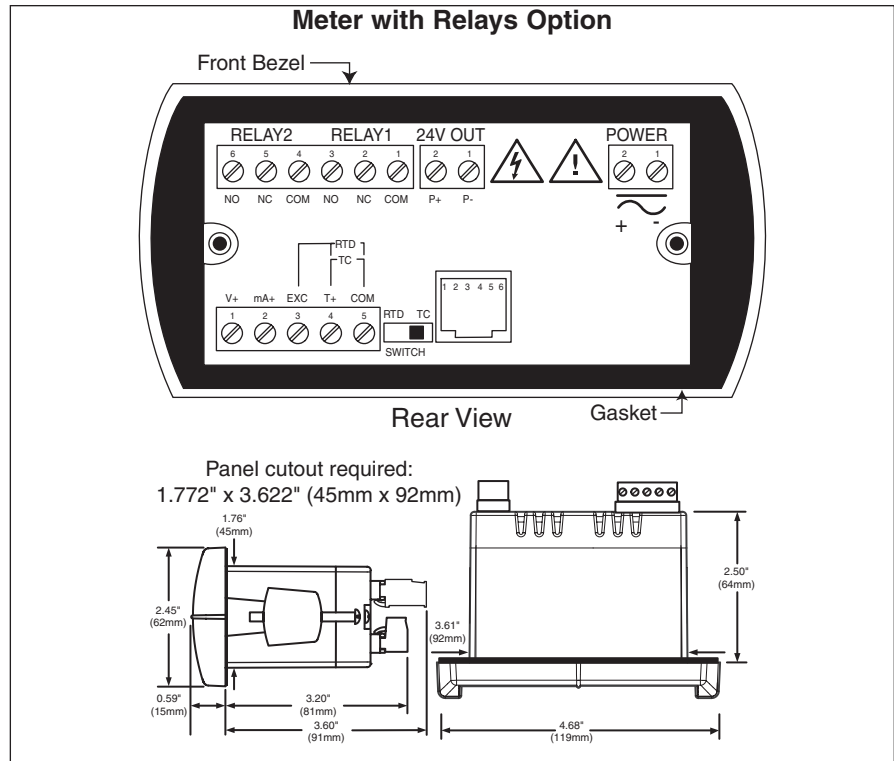
Standard unit: 85-265V AC or 90-265V DC
Optional: 12-24V AC or 12-36V DC

Operating Temperature

0 to 65°C

Approvals

CE marked. UL, cUL listed



Special Features

- Universal input (TC, RTD, mA, V DC)
- Sunlight-readable display (adjustable intensity)
- Push-button or PC programmable
- Dual relay option for limit alarms or pump control (with alternation)
- Isolated 4-20mA output options (sink/source)
- Single/dual 24V DC isolated power options
- Modbus RTU communication option
- Data acquisition and logging capabilities with MeterView software
- Universal power supply 90-265 VAC/VDC
- Shallow depth package (3.6" behind panel)

Easy Setup

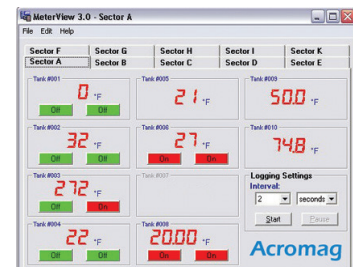
The APM765 is very easy to set up and program using the simple four-button configuration interface. There is only one switch on the entire meter – no jumpers – and never any need to open the case. The meter is also programmable using a PC and the MeterView software. A copy function quickly clones setups from other units.

Applications

- Process & temperature monitoring
- High & low alarms
- Latching or non-latching relays
- Pump alternation control
- Time delay & fail-safe relays
- Minimum & maximum readings

Data Logging

Software provides a convenient way to collect data generated by the APM765's serial output. Users can select the logging time interval and the engineering units for display on the computer screen. Data is written to a file that can be imported into spreadsheets or other applications.





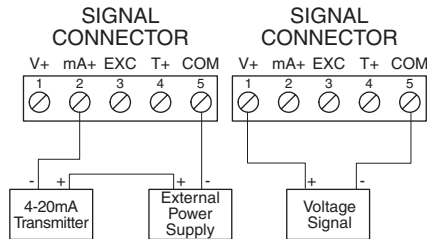
DC Process and Temperature Inputs

The APM765 is factory calibrated to accept 4-20 mA, ± 10 VDC, Type J, K, T, E thermocouples and 100 ohm platinum RTDs. Process inputs can be scaled with or without applying an input for virtually any engineering units. Temperature inputs can be programmed to display in degrees Fahrenheit or Celsius and a type K thermocouple can display up to 2300°F.

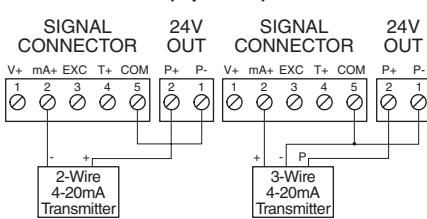
Current/Voltage Input

Setting up the meter to accept a current or voltage input is very easy. All setup steps are performed by pushbuttons or through software so there are no switches or jumpers to adjust.

Transmitter Powered by External Supply



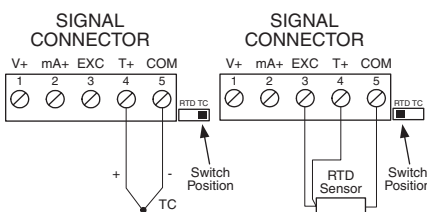
Transmitters Powered by Internal Supply (Optional)



Thermocouple/RTD Input

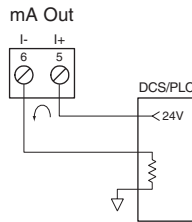
Setting up the APM765 to accept thermocouple or RTD input is simply a matter of setting a switch at the rear of the case and selecting the input type from the menu.

Meters accept J, K, T, or E type thermocouples as well as two, three, or four-wire 100 ohm platinum RTDs.

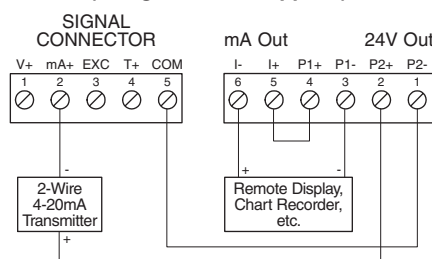


Isolated 4-20mA Output

Standard 4-20 mA Sinking Output (powered externally)

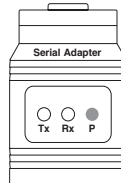


Sourced 4-20 mA Output and Input Signal Powered by Panel Meter (using dual 24V supplies)



Serial or Modbus Output

The APM765 can be used as a data acquisition device, with the added benefit of a digital display, by connecting an optional RS-232 or RS-422/485 serial communication adapter.



Acromag offers MeterView software for simple data acquisition and to program the meter.

Serial Communications

METER ADDRESS

Modbus protocol: 1 - 247 (default 247)

BAUD RATE

300 - 19,200 bps (default 2400)

TRANSMIT TIME DELAY

Programmable between 0 and 199mS or Transmitter always on for RS422 communication (default 10mS)

DATA

8 bit (1 start bit, 1 stop bit)

PARITY

None, even, or odd (default even)

BYTE-TO-BYTE TIMEOUT

0.01 - 2.54 seconds (default 0.01 seconds)

TURN AROUND DELAY

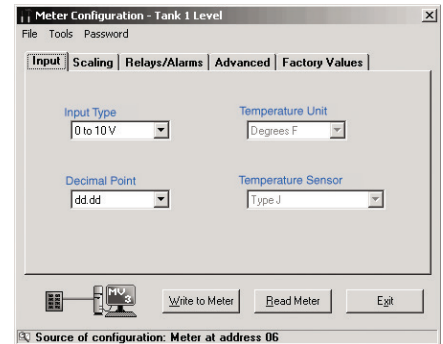
Less than 2mS (fixed)

MeterView Software

MeterView software enables PC programming of the APM765 and sets up data logger operation.

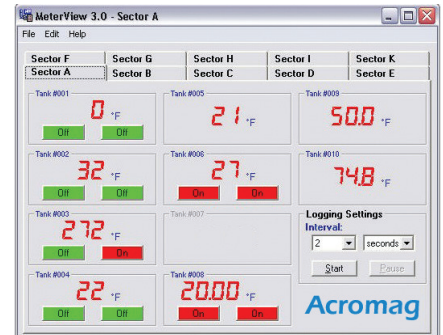
Remote Programming

MeterView software allows all setup parameters to be programmed from a PC and saved to a file for reporting or programming other meters.



Data Acquisition

MeterView software provides a convenient way to collect the data generated from the serial output of up to 100 panel meters. The user can select the logging time interval and the engineering units that will be displayed on the computer screen. Data is written to a file that could then be imported into a spreadsheet or other application.



Sample File Generated by MeterView

PD765 Log File

Name: C:\MV3\Logfile.htm Created: 2/26/2004 5:34:12 PM

Serial Port: COM 1 Connection speed: 2400 Baud Logging rate: 1 update every 10 seconds

| Date & Time | Tag Number | Address | Display | Units | Relay 1 | Relay 2 |
|----------------------|--------------|---------|---------|-------|---------|---------|
| 2/26/2004 5:34:12 PM | Tank 1 Level | 06 | 17.70 | Feet | P1 On | P2 Off |
| 2/26/2004 5:34:12 PM | Tank 2 Level | 07 | 18.18 | Feet | P3 Off | P4 Off |
| 2/26/2004 5:34:12 PM | Tank 3 Level | 08 | 20.54 | Feet | P5 On | P6 Off |
| 2/26/2004 5:34:12 PM | Tank 1 Temp | 09 | 74 | °F | Off | Off |
| 2/26/2004 5:34:12 PM | Tank 2 Temp | 10 | 72 | °F | Off | Off |
| 2/26/2004 5:34:12 PM | Tank 3 Temp | 11 | 72 | °F | Off | Off |
| 2/26/2004 5:34:22 PM | Tank 1 Level | 06 | 17.58 | Feet | P1 On | P2 Off |
| 2/26/2004 5:34:22 PM | Tank 2 Level | 07 | 18.04 | Feet | P3 Off | P4 Off |
| 2/26/2004 5:34:22 PM | Tank 3 Level | 08 | 19.79 | Feet | P5 Off | P6 Off |
| 2/26/2004 5:34:22 PM | Tank 1 Temp | 09 | 74 | °F | Off | Off |
| 2/26/2004 5:34:22 PM | Tank 2 Temp | 10 | 72 | °F | Off | Off |
| 2/26/2004 5:34:22 PM | Tank 3 Temp | 11 | 72 | °F | Off | Off |
| 2/26/2004 5:34:32 PM | Tank 1 Level | 06 | 16.47 | Feet | P1 On | P2 Off |
| 2/26/2004 5:34:32 PM | Tank 2 Level | 07 | 16.87 | Feet | P3 Off | P4 Off |
| 2/26/2004 5:34:32 PM | Tank 3 Level | 08 | 17.10 | Feet | P5 Off | P6 Off |
| 2/26/2004 5:34:32 PM | Tank 1 Temp | 09 | 74 | °F | Off | Off |



Performance Specifications

Specifications apply to operation at 25°C.

General

DISPLAY

0.56" (14.2 mm) red LEDs. Four digits (-1999 to 9999)

DISPLAY INTENSITY

Eight user-selectable intensity levels

FRONT PANEL

NEMA 4X, IP65. Panel gasket provided.

PROGRAMMING METHODS

Four front panel push buttons, PC and MeterView software, or cloning with Copy feature.

NOISE FILTER

Programmable between 2 - 199 (0 will disable filter)

DISPLAY UPDATE RATE

1.8-2.5/sec for TC input or 3.7-5/sec for process/RTD

OVERRANGE AND UNDERRANGE

Display flashes 9999 (over) or -1999 (under)

MAX/MIN DISPLAY

Stored until reset by user or meter is turned off

NON-VOLATILE MEMORY

All programmed settings are stored in nonvolatile memory for a minimum of ten years if power is lost.

POWER

AC: 85-265 VAC, 50/60 Hz, 20 VA
DC: 90-265 VDC, 20 W
Option: 12-36 VDC or 12-24 VAC

REQUIRED FUSE

UL Recognized, 5A max, slow blow (up to six meters may share one fuse)

NORMAL MODE REJECTION

64 dB at 50/60 Hz

ISOLATION

Input or output to power line: 4kV
Input or output to P1 or P2: 500V
Input to output: 500V
P1 to P2: 500V

ENVIRONMENTAL

Operating range: 0 to 65°C (32 to 149°F)
Storage range: -40 to 85°C (-40 to 185°F)
Relative humidity: 0 to 90% non-condensing

CONNECTIONS

Power & Signal: removable screw terminal blocks accept 12 to 26 AWG. Serial: RJ11 header, standard on all meters.

ENCLOSURE

1/8 DIN, high impact plastic, 94V-0, color; gray

WEIGHT

8 oz (227 g) (no options)

WARRANTY

3 years parts and labor

Process Inputs

INPUTS

Field selectable: ±20 mA DC and ±10 VDC

ACCURACY

±0.05% of calibrated span ±1 count, square root: 10-100% F.S.

LOW-FLOW CUTOFF

0 to 9999 (0 disables cutoff function)

DECIMAL POINT

Up to three decimal places: d.ddd, dd.dd, ddd.d, or dddd.

CALIBRATION

Internal or external signal or with PC

CALIBRATION RANGE

User Programmable over entire range of meter

INPUT IMPEDANCE

Voltage range: greater than 1M ohms
Current range: 50-100 ohms

INPUT OVERLOAD

Protected by automatically resettable fuse

TEMPERATURE DRIFT

±50 PPM/°C

TRANSMITTER SUPPLY

Isolated, one or two transmitter supplies (optional)
P1 (-1 option): 24 VDC ±10% @ 200mA max
P1/P2 (-2 option)
P1: 24 VDC ±10% @ 200mA
P2: 24 VDC ±10% @ 40mA

Temperature Inputs

INPUTS

Factory calibrated, field selectable: type J, K, T, or E thermocouples and 100 ohm. platinum RTD (0.00385 or 0.00392 curve).

RESOLUTION

1°; type T, 1° or 0.1°

ACCURACY

| Type | Temperature Range | Accuracy |
|------|--------------------------------|-------------|
| J | -58 to 1382°F (-50 to 750°C) | ±2°F (±1°C) |
| K | -58 to 2300°F (-50 to 1260°C) | ±2°F (±1°C) |
| T | -292 to 700°F (-180 to 371°C) | ±2°F (±1°C) |
| E | -58 to 1578°F (-50 to 870°C) | ±2°F (±1°C) |
| RTD | -328 to 1382°F (-200 to 750°C) | ±1°F (±1°C) |

COLD JUNCTION REFERENCE

Automatic

TEMPERATURE DRIFT

±2°C maximum; 0 to 65°C ambient temperature

OFFSET ADJUSTMENT

Programmable to ±19.9°. This allows the user to apply an offset value to the temperature being displayed.

INPUT IMPEDANCE

Greater than 100k ohms

SENSOR BREAK

All relays and alarm status LEDs go to alarm state. Analog output may go to pre-programmed state. Display will flash.

Relays

RATING

2 SPDT (form C); rated 3 amps @ 30 VDC or 3 amps @ 250 VAC resistive load; 1/14 HP @ 125/250 VAC for inductive loads.

DEADBAND

0-100% of full scale, user selectable

HIGH OR LOW ALARM

User may program any alarm for high or low

RELAY OPERATION

1. Automatic (non-latching)
2. Latching.
3. Pump alternation control

RELAY RESET

User selectable via front panel buttons or PC

1. Automatic reset only (non-latching)
2. Automatic + manual reset any time (non-latching)
3. Manual reset only, at any time (latching)
4. Manual reset only after alarm condition has cleared (latching)

Automatic reset: Resets when input passes reset point

Manual reset: Front panel ACK button

TIME DELAY

0 to 199 seconds, on and off delays; programmable

FAIL-SAFE OPERATION

Programmable, independent for each relay. Relay coils are energized in normal condition. In case of alarm or power failure, relays will go to de-energized state.

AUTO INITIALIZATION

When power is applied to the meter, relays will reflect the state of the input to the meter

Isolated 4-20mA Output

OUTPUT RANGE

1.00 to 23.00mA typical. Scalable from 0.00 to 23.99mA. Factory calibrated for 4-20 mA

ACCURACY

±0.1% F.S. ±0.004 mA

TEMPERATURE DRIFT

50 PPM/°C from 0 to 65°C ambient

Note: Analog output drift is separate from input drift.

OUTPUT LOOP RESISTANCE

| Power Supply | Minimum | Maximum |
|-------------------|----------|-----------|
| 24 VDC | 10 ohms | 700 ohms |
| 35 VDC (external) | 100 ohms | 1200 ohms |

OUTPUT MAXIMUM LOAD

$$R_{LOAD} (max) = (V_{SUPPLY} - 10V) / 0.020A$$

EXTERNAL POWER RANGE

10-35 VDC



Ordering Information

Panel Meters

Please select models from the table below. [Click here to view online.](#)

| Model No. | Power: 85-265V AC or 90-265V DC | Power: 12-36V DC or 12-24V AC | 4-20mA Output | Two Relays | 24V DC Supply | Dual 24V DC Supply | Modbus Interface |
|---------------|------------------------------------|----------------------------------|------------------|---------------|------------------|-----------------------|---------------------|
| APM765-6R0-00 | • | | | | | | • |
| APM765-6R0-10 | • | | | | • | | • |
| APM765-6R2-00 | • | | | • | | | • |
| APM765-6R2-10 | • | | | • | • | | • |
| APM765-6R3-00 | • | | • | | | | • |
| APM765-6R3-10 | • | | • | | • | | • |
| APM765-6R3-20 | • | | • | | | • | • |
| APM765-6R5-10 | • | | • | • | • | | • |
| APM765-7R0-00 | | • | | | | | • |
| APM765-7R2-00 | | • | | • | | | • |
| APM765-7R3-00 | | • | • | | | | • |
| APM765-7R5-00 | | • | • | • | | | • |

Accessories

APMA2801

NEMA 4X plastic enclosure, holds one APM765 meter

APMA6845

Pipe-mount kit (2-inch pipe) for use with APMA2801

APMA7232

RS-232 serial adapter, APMA7420 included

APMA7420

Standard modular cable, 7ft. (2.1m)

APMA7422

RS-422/485 serial adapter, APM7420 included

APMA7503-1, APMA7503-2, APMA7503-3

MeterView software with 1 meter license (-1 model), 10 meter license (-2), or 100 meter license (-3).

Field Enclosures

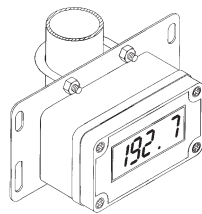
Low-Cost Plastic NEMA 4X Enclosure

The APMA2801 is a low-cost, compact, plastic NEMA 4X enclosure that will house one meter.



Pipe Mount Kit

The APMA6845 kit mounts a panel meter inside an APMA2801 NEMA 4X enclosure to a 2-inch pipe.



Mounting Plate Hole Pattern

