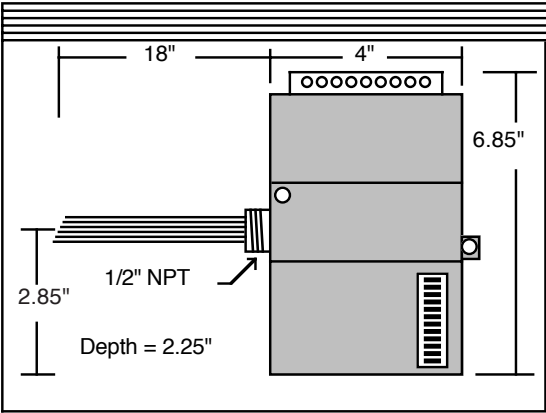
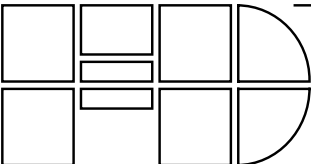


FUNCTIONAL DEVICES, INC

POWER-LINE CARRIER



MODEL RTC

RESPONDER (2-WAY)



DESCRIPTION

RTCs are a remote component in the PLC link between the controller and the load being controlled or the sensor being interrogated. They carry out digital-out (relay output) and analog-out (voltage) commands given by the controller. They also send back digital-in (external contact) and either analog-in (RTD, thermistor, voltage or 4-20 mA) or pulse count*** (modulo accumulated contact closures or run time from 60 Hz input) to the controller. The communication with the controller uses the existing ac wires or a dedicated twisted pair. RTCs can be programmed by setting the positions of switches to assume a unique digital code or identity (ID).

FEATURES

- Uses existing ac wires or separate dedicated twisted pair for the communication link.
- Field-programmable DIP switch:
 - 512 IDs
 - Manual "OVERRIDE ON" switch
 - Communication-loss "Take-Action" switch
 - "Startup-condition" switch
- Easy to install
- Excellent diagnostics
- Relay provides digital output and voltage provides analog output
- Accepts digital (switch), analog, pulse count or 60 Hz run-time inputs
- Built-in microprocessor with fail-safe circuit
- 120 through 600 Vac power input

OPTIONS

Each RTC has an internal relay, which performs digital out. Power input is 120 to 600 Vac. In Case L of page 4, signal input is as shown on page 7. ****

RTC1 (40/104) P, C or N	=1,000 OHM RTD IN	+1 DI	8 BIT	40/104 DEG F
RTC1 (-40/215) P, C or N	=1,000 OHM RTD IN	+1 DI	8 BIT	-40/215 DEG F
RTC1 (*/*) P, C or N	=1,000 OHM RTC IN	+1 DI	8 BIT	*/ DEG F
RTC2 (*/*)	=THERMISTOR IN	+1 DI	8 BIT	*/ DEG F
RTC3 (4/20)	=CURRENT IN	+1 DI	8 BIT	4/20 mA
RTC4 (1/11)	=VOLT IN	+1 DI	8 BIT	1/11 V IN
RTC5 (1/11)	=VOLT OUT	+1 DI	8 BIT	1/11 V OUT
RTC6 (*/*) (1/11)	=THERMISTOR IN + V OUT	+1 DI	8 BIT	*/ DEG F & 1/11 V OUT
RTC7 (*/*) (1/11) P, C or N	=RTD IN & VOLT OUT	+1 DI	8 BIT	*/ DEG F & 1/11 V OUT
RTC8 (**/*) (1/11)	=VOLT IN & VOLT OUT	+1 DI	8 BIT	**/*V IN & 1/11 V OUT
RTC9 ***	=PULSE COUNTER	+1 DI	10 BIT	12 BIT PRE-SCALER

/ = Customer-specified temp range **/* = Customer-specified voltage range P = Platinum DIN std. C = Copper N = Nickel-Iron
 *** = The use of RTC9 responder is limited to certain custom Command Synthesizers.

**** = See note ② on page 7. All Responders connected to case L of page 4 must have green wire connected to equipment ground at the location of the Responder.

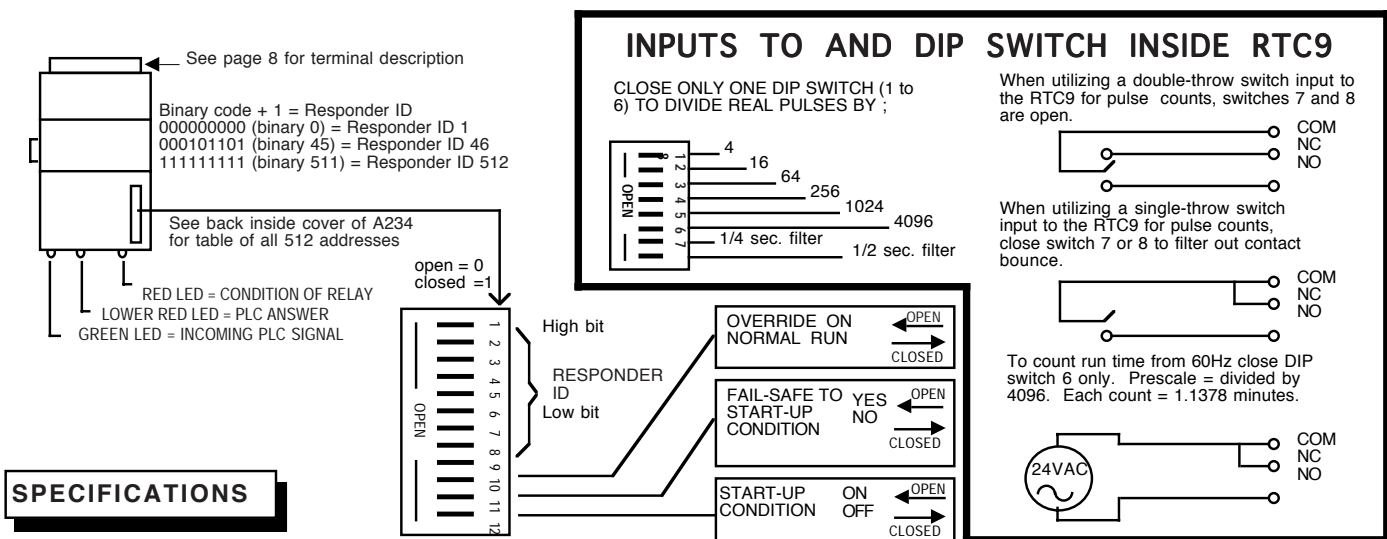
A relay within RTC controls the load. Analog-out commands given by the controller are output as a voltage. The PLC answer sends the status of a digital input (external contact) and either analog or pulse count information. The PLC answer containing the digital-in can be inhibited so that an RV or RA Responder at the same ID code can supply the digital information for that ID. If 4-20 mA has its own voltage source, connect between -V and the - terminal of the 4-20 mA input with the + output of the 4-20 mA current source on the - terminal of the 4-20 mA input.

Any of 512 IDs are set by position 1-9 of the DIP switch with position 1 = most significant (high) bit. DIP switch 10 overrides on if open (normal operation if closed). DIP switch 12 sets the start condition to start the load on if open (off if closed). DIP switch 11 controls whether or not the Responder goes to the start condition if it receives no good signal for 20 minutes—open = go to start condition, closed = take no action upon loss of signal.

The first red LED indicates operation of the Responder and aids in diagnostics. On = load is on. Blinking slow = load is off. Alternating between off and blinking = load is off and no good signal is now being received. Alternating between on and blinking = load is on and no good signal is now being received. Blinking fast = no good signal has been received to that ID for 20 minutes or more (or since power up). A second (lower) red LED indicates PLC answer. The green LED indicates PLC signal being received. Normal signal is flickering.

The last letter in the model number indicates the channel (carrier frequency) the Responder receives. It is normally Channel A for the first 512 IDs and Channel B for the second 512 IDs.

Only one two-way Responder may be at a given ID. An RV or RA Responder may share the same ID as an RTC if the RTC has had its digital-in inhibited. If an RC Responder is being used in a two-way system and if the Command Synthesizer is being run adaptively then the RC may not be at the same ID as an RTC Responder.



SPECIFICATIONS

- 120 through 480 Vac, 60 Hz, 4 watts power input (household GFIs not allowed on circuit supplying ac power to Responder)
- 347 & 600 Vac require addition of C 600 capacitor network (see page 7 of Manual A234).
- Signal-in is separate from power in, allowing RTC to be used on ac lines or dedicated twisted pair
- SPDT pilot relay rated at 10 A resistive, 2 A tungsten, 277 Vac (For highly inductive loads such as 24 Vac contactors, Model TS transient suppressor is recommended to protect contacts.)
- Relay rated life 100,000 cycles minimum at full rated load, 1,000,000 cycles mechanical
- Minimum sensitivity of 10 mV peak-to-peak PLC
- Absolute rejection of all signals outside of +/- 0.8% of channel center
- PLC communication is two-way, has confirmation means, redundancy and continuous refresh
- Operating temperature range = -30° to 150° F, storage temperature range = -40° to 185° F
- Humidity range = 5 to 95% (noncondensing)
- Dry-contact input open-circuit voltage = +29 Vdc. Short-circuit current = 1 mA.
- Maximum wire run from Responder to dry-contact input switch with 20-gauge wire (shielded) is 1000 feet.
- Contains externally visible LEDs, which show the presence of ac power, the presence and validity of incoming PLC, the ON/OFF status of the load and the occurrence of a PLC answer
- Three-piece housing 6.85" X 4" X 2.25" of 94-5V flame retardant grey plastic, mountable via attached 1/2" NPT nipple or via screw mounts. Electronics portion is separable from mounting / wiring portion.
- Analog-in and analog-out have 8-bit resolution
- RTC9 input counts modulo 1024 with prescaler settings selectable to divide by 1, 4, 16, 256, 1024 or 4096
- RTC9 accepts single-throw or double-throw switch input for pulse count or 24 Vac for run-time accumulations
- DI may be inhibited for assignment of RA or RV Responder to the same ID
- Use 50 ft. of 20-gauge, 80 ft. of 18-gauge, 125 ft. of 16-gauge or 200 ft. of 14-gauge wire for 1/2 Degree Fahrenheit error on 1,000-ohm RTD sensor. Use a maximum of 1,000 ft. of 20-gauge wire for Thermistor, Voltage or Current sensor.
- UL listed under standard 916 Energy Management Equipment. CSA Certified.