The P190 screen includes an error line for reporting the various P190/Micro 84 PC or Modbus communications error conditions. The error codes which may appear, and their meanings, are listed in this appendix.

The P190 reports three distinct classes of errors: Panel, PC Link and PC Command errors.

Type 1, Panel Error, are Modbus communications errors detected by the P190's software. Both transmitted and received Modbus communications packets are examined. Sometimes the communication attempt is repeated several times before an error is declared.

TYPE 1 - ERROR: PANEL = XXX COMMUNICATION ERROR DETECTED

001	Loss of Data Set Ready on Port 1
002	Packet length exceeds maximum allowed to send
003	No response from PC after retries count exhausted
004	No valid response received from PC due to CRC error after retry count exhausted
005	No valid response received from PC due to transmission of framing error after retry count exhausted
006	I/O command is not valid to send to PC
007	The response from PC was legal but not valid for the current I/O command
008	PC response to command was busy after retry count exhausted
009	PC reponse was not legal for the current I/O command
010	PC data received greater than panel memory allocated for receive buffer
011	PC response is busy to a poll command after retry count exhausted
012	PC response to a poll is not valid
013	PC sequence byte incorrect, reset link, error recovery accomplished
014	Message size to send to PC is greater than PC maximum
015	PC packet number not in sequence or not equal to expected value for current operation

TYPE 2 - ERROR: PCL = XXX COMMUNICATION ERROR REPORTED

001	Command function not supported by PC
002	Reserved
003	Reserved
004	PC CPU is not operating
005	Message acknowledged, processong long duration command, issue a poll for data
006	Busy
007	Reserved
008	Normal response to poll
009	Reserved
010	Packet acknowledged, ready for next packet
011	Message size is greater than PC receive maximum. Command aborted
012	New message started before previous message completed. Previous command aborted
013	PC reports current packet not next in sequence. Message aborted

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014	Sequence error detected. Command aborted
015	PC response message is greater than amximum message, message aborted

All other codes are reserved.

TYPE 3 - ERROR: PCC = XXX PC INDICATES USER ERRROR

001	Another user is logged in
002	Invalid password received
003	Search failed
004	Not on running PC
005	PC Memory is protected
006	PC is running
007	PC is not running
008	Cannot start from state
009	User is not logged in
010	PC cannot support function
011	Coil is already used
012	Latch is already used
013	Network out of range
014	User logic overflow
015	User logic overflow on replace net
016	Network skipped
017	Not a Micro 84 network
018	PC has a CRC error
019	PC boundary violation
020	Reserved
021	Feature is not implemented
022	Watchdog timer expired
023	Unknown logic function found in network
024 to 068 are error code numbers not used at this time	
069	Function is not supported
070	Access is denied
071	Maximum number of references is exceeded
072	Invalid reference type
073	Inavalid reference type
074	Discrete not disabled
075	Data is illegal
076	Cannot write input registers
077	Reserved
078	Reserved
079	No Start of Network (SON) node
080	Invalid opcode
081	Too many columns
082	Missing nodes
083	Unexpected elements
084	Row contact mismatch
085	Reserved
086	Illegal constant
088	Must be a 16 boundary
089	Data length mismatch
090	Reserved

091	Not configurable
092	Read only table
093	Invalid table offset or length
094	Invalid table number
095	Bad table data
096	Bad memory type
097	Bad memory address
098	Comm parameters invalid
099	Zero references requested
100	Reserved
101	Reserved
102	Reserved
103	Reserved
104	Illegel comm setting
105	Reserved
106	Function not supported
107 to 125 are reserved	
126	Invalid constant index

A

Address: A numeric value used to identify a specific I/O channel and/or module.

AND (Logical): A mathematical operation between two bits. The result of the logical AND will be a one (ON) bit only if both bits are one bits; otherwise, the result will be a zero (OFF) bit. This operation can be performed between bits with each pair of bits, one from each, examined by their relative location within each.

Arithmetic Function: A type of logic used to add, subtract, multiply, or divide two numeric values. The status of the output is governed by the result of the arithmetic operation: additional overflow; comparisons (greater than, equal to, or less than); and illegal division.

ASCII: A 7-bit digital coding of standard alphanumeric characters as established by the American National Standards Institute. ASCII stands for the American Standard Code for Information Interchange.

B

Baud: A unit of data transmission speed equal to the number of code elements (bits) per second.

BCD (Binary-Coded Decimal): A system of numbers representing decimal digits (0-9) using four binary digits (1 or 0). BCD is a recognized industrial standard; BCD input (e.g., thumbwheels) and output (e.g., numerical displays) are readily available.

Binary: A numeric system wherein values are represented only by numbers 1 and 0 (ON/OFF). Also called "base 2". This system is commonly employed in modern electronic hardware since circuits can be economically designed for ON/OFF status.

Bit: Contraction of binary digit. A single number whose value can be either a ONE or a ZERO. The smallest division of a PC word.

Bit Modify Function: This function allows individual bits in a matrix to be altered. Only one bit per scan can be affected by this function; all other bits retain their state. Bits can be either set to a one (ON) condition or cleared to a zero (OFF) condition.

Bit Rotate Function: This function allows a series of bits to be rotated or shifted through a matrix. If the function is enabled for a number of scans (e.g., five), all bits in the matrix will be rotated the same number of bit locations (e.g., five). Provisions are made to select the direction of rotation, left or right.

Bit Sense Function: This function allows individual bits in a matrix to be examined, but not altered. An output is used to indicate a one (ON) bit with power flow and a zero (OFF) bit without power flow. The status of only one bit can be obtained each scan.

C

Cascade Function: Connecting two or more functions together to control one output. For example, timers and counters can be cascaded to produce results that cannot be achieved by one counter or one timer.

Channel: A group of I/O modules that are separately connected to the mainframe. For example, a channel of I/O can contain up to 128 input points and 128 output points.

Coil: A discrete logical conclusion to a series of logical operations performed by the programmable controller. The results can be output to the real world via an output module to activate motor starters, solenoids, relays or pilot lamps. Coils are turned OFF when power is removed from the mainframe. (See Latch.)

Compare Function: This function causes two matrices to be compared on a bit-by-bit basis to find all the bit locations which differ, and save the result for later use; their contents are not altered, but only examined.

Complement Function: This function causes the content of one matrix to be complemented (all ones replaced by zeros, and zeros by ones) and placed in another matrix for reference by any other function.

Counter: A type of logic that is used to simulate the operation of external counters. In relay panel hardware, an electromechanical device which can be wired and preset to control other devices according to the total cycle of one ON or OFF function. In a PC, a counter is internal to the processor, which is to say it is an electronic function controlled by a user programmed instruction.

Cursor: Visual movable pointer used on a CRT or programming panel by the programmer to indicate where an instruction is to be added to the ladder diagram. The cursor is also used for editing functions.

D

Data Transfer Block: A PC function block used in data transfer (DX) programming.

Data Transfer (DX) Function: A technique of moving and manipulating data within the controller under control of DX logic.

Data Transfer Line: A line of ladder logic containing data transfer (DX) functions.

Digital: Having discrete states. Digital logic can have up to 16 states. However, most digital logic is binary logic with two states, ON or OFF.

Disable: The capability to disconnect a logic coil or a discrete input from its normal control, and force it unconditionally ON or OFF. (See Force.)

Discrete Reference: A reference that can be either ON or OFF. A discrete reference can be an input, output, or internal logic element.

Double Precision Function:	The technique of storing a single numerical value in two consecutive registers. Since each register can store up to four digits (maximum value 9,999), double precision allows magnitudes of up to 99,999,999 to be stored.

E

Edit:	To deliberately modify the user program.
Element:	The basic building block of the PC ladder logic. An element can be a relay contact, horizontal short, vertical short, fixed numeric value, register reference, coil, or function block. Sometimes refered to as a logic element.
Enable:	To reconnect a logic coil or discrete input after it has been disabled. The opposite of "Disable."
Exclusive OR (XOR):	A mathematical operation between two bits. The result of the exclusive OR will be a one (ON) bit only if either bit is a one bit. Only if they are both zeros (OFF) or both ones (ON) will the result be a zero.

F

FIFO Function:	A special DX table that maintains the order of data entered into the table, First In, First Out.
Force:	The function that can be used to change the state of a disabled reference. The reference can be changed from OFF to ON or ON to OFF. This allows the user to energize or de-energize any input or output by means of the program panel independent of the PC program.

H

Hexadecimal:	The numbering system that represents all possible ON/OFF combinations of four bits with sixteen unique digits (0-9 then A-F).

I

Inclusive OR:	A mathematical operation between two bits. The result of the inclusive OR will be a one (ON) bit if either bit is a one bit or both bits are ones; only if both bits are zeros (OFF) will the result be a zero. This operation can be performed between groups of bits with each pair of bits examined by their relative location within each.
Input:	A signal that provides information to the controller; can be either discrete input (pushbutton, relay contacts, limit switches, etc.) or numeric input (thumbwheel, external solid-state device, etc.)
Input Devices:	Devices such as limit switches, pressure switches, push buttons, etc., that supply data to a programmable controller. These discrete inputs can have a common return or an individual return (referred to as isolated inputs). Other inputs include analog devices and digital encoders.

L

Ladder Diagram: An industry standard for representing control logic relay systems with logic lines representing rungs on a ladder. It expresses the user programmed logic of the controller in relay equivalent symbology.

Latch: The type of coil that is retentive upon power failure. Can be used similar to a latching relay. Normally, coils are reset to OFF conditions upon powerup; those coils selected by the user as latched (L) will not be altered and thus retain their previous condition (ON or OFF).

Logic: A systematic interconnection of digital switching functions, circuits, or devices, as in electronic digital computers.

Logic Diagram: A graphic description of logic functions and conditions. It is used to find the result of an addition of the contents of two registers; a logical compare of two matrices; as well as other arithmetic operations.

Logic Element: Any one of the elements that can be used in a ladder logic diagram. The elements include relays, coils, shunts, timers, counters, arithmetic functions, and DX functions.

Logic Line: A line of user logic used to construct the unique logic for the application.

M

Matrix Function: Matrices are defined as sequential registers, each as 16 bits, up to a maximum of 99 registers (1584 bits). A group of consecutive registers referred to by logic, such that individual bits can be utilized in lieu of numerical values. Bit operations that can be performed include: AND, OR (inclusive), XOR (exclusive), COMPARE, MODIFY, SENSE, COMPLEMENT, and ROTATE.

Memory: Storage area for binary data and programs.

Memory Protect: The hardware capability to prevent a portion of the memory from being altered by an external device. This hardware feature is under keylock control.

Move Function: A DX capability which allows data to be transferred without modification within the controller. Data can be transferred from a register to a table, from a table to a register, from a table to a table, into a FIFO stack, or out of a FIFO stack.

N

Network: A group of logic elements that are connected together to perform a specific function (e.g., a motor starter control circuit).

Node: The smallest possible programming increment in a ladder logic diagram. (Most logic elements require only one node, others require two or more nodes.)

O

One-Shot: A discrete reference, typically a logic coil, that is energized (valid) for exactly one scan of the controller's logic.

Output: A signal provided from the Controller to the "real world"; can be either discrete output (e.g., solenoid valve, relay, motor starter, indicator lamp, etc.) or numeric output (e.g. display of values stored within the controller).

Output Devices: Devices such as solenoids, motor starters, etc., that receive signals from the programmable controller.

P

Parity: Method of verifying the accuracy of recorded data.

Parity Bit: An additional bit added to a memory word to make the sum of the number of "1's" in a word always "even parity" or "odd parity."

Port: An I/O connection on a processor or peripheral device.

Preset: The upper limit specified for a counter or timer function. When the specified preset value is reached, an output is energized indicating the status of a counter or timer.

Programmable Controller (PC):   A solid-state control system which has a user programmable memory for storage of instructions to implement specific functions such as: I/O control logic, timing, counting, arithmetic and data manipulation. A PC consists of a central processor, an input/output interface, memory, and a programming device that typically uses relay equipment symbols. PC is purposely designed as an industrial control system that can perform functions equivalent to a relay panel or a wired solid-state logic control system.

Programming Panel (Programmer):   Device for inserting, monitoring, and editing a program in a PC.

R

Reference Numbers: Numbers which identify the elements of the relay ladder logic. References can be either discrete (logic coils, inputs, or sequencer steps) or register (input or holding).

Register: A location within the controller allocated to the storage of numerical values. All holding registers are retentive on power failure. There are three types of registers: input whose contents are controlled by the "real world" outside the controller; holding registers whose contents are controlled from within the controller; and output registers, which are special holding registers since their contents can also be provided to the "real world".

Relay: An electromagnetic device operated by a variation in conditions of an electric circuit. When so operated, it controls other devices such as switches.

Relay Element: A logic symbol used to simulate the effect of a relay. Contacts can be normally open, normally closed, or transitional contacts.

S

Scan: The technique of examining or solving logic networks one at a time in their numeric order. After the last logic network is solved, the next scan begins at network one; logic is always solved in this fixed cyclic process.

Skip Function: This function allows a group of consecutive networks to be skipped or omitted in the scanned logic solution. The status (ON/OFF) of all coils and the contents of registers controlled by these networks are not altered when they are skipped.

T

Table: A group of consecutive registers used to store numerical values.

Table Search Operation (SRCH):   This function searches a table of registers for a specified value. The source is not altered, only examined. The SRCH function uses a pointer to indicate the location(s) within the table of registers which contain the desired value. This pointer is the only register whose value is altered by the SRCH function.

Timer: PC logic used to measure and record the time of an event or sequence of events. Timers can accumulate time in either seconds, tenths of seconds, or hundredths of seconds depending on the PC.

Traffic Cop: A portion of the PC executive that controls how input and output data is interpreted relative to its channel number and address index position.

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