CHAPTER 2

SPECIFICATIONS, TERMINALS AND WIRING

POWER SERIES NEO TECHNICAL TRAINING MANUAL

SPECIFICATIONS

POWER SERIES NEO HYBRID ALARM CONTROL PANELS

Systems consists of a main control which contains the communicator, power supply with back up rechargeable battery, bell circuit for sounding alarms, Corbus for connecting keypads and other modules, zone terminals for connecting hardwired sensors and a telephone line connection for use with reporting alarms to central stations and remote software connections.

Neo systems support Power G wireless technology with the addition of a standalone or keypad wireless receiver “HOST” module.

	HS2016	HS2032	HS2064	HS2128
ON BOARD ZONES	6	8	8	8
ZONES	16	32	64	128
PARTITIONS	2	4	8	8
ON BOARD PGMS	2	2	4	4
PGMS	22	38	80	148
EVENT BUFFER	500	500	500	1000
USERS	48	72	95	95
PROX TAGS	47	71	94	94
WIRELESS ZONES	16	32	64	128
WIRELESS KEYS	16	32	32	32
WIRELESS REPEATERS	4	8	8	8
WIRELESS SIRENS	4	8	8	16
HS2108 ZONE EXPANDERS	1	3	7	15
HS2204 HIGH CURRENT OUTPUT	1	1	3	4
HS2208 LOW CURRENT OUTPUT	2	4	8	16
HS2300 POWER SUPPLY	3	3	3	4
KEYPADS	8	8	8	16
AUX (CORBUS, PGM & PC-LINK)	700 MA	700 MA	700 MA	700 MA

TERMINALS – OVERVIEW AND SPECIFICATIONS:

AC TERMINALS:

PURPOSE:

The AC terminals are used for connecting the AC power input to the control panel. AC is the primary power source for the control panel. When AC power is not applied, the backup battery will provide power to the control panel

SPECIFICATIONS:

- 16.5VAC, 40VA

NOTE: AC POWER SHOULD BE WITHIN THE RANGE OF 16-20VAC. A HIGHER VOLTAGE COULD POTENTIALLY CAUSE DAMAGE TO THE CONTROL PANEL

TRANSFORMER WIRING (TO CONTROL PANEL):

The following is a step-by-step instruction for wiring a transformer to a control panel (2 conductor cable required):

STEP 1:

Conductor 1 – one end to one of the secondary output terminals of the transformer, the other end to one of the AC terminals of the control panel

STEP 2:

Conductor 2 – one end to the other secondary output terminals of the transformer, the other end to the seconds AC terminal of the control panel

BACKUP BATTERY:

PURPOSE:

- The backup battery is used to provide power to the control panel in the event of a loss of AC power (primary power source)
- In the event of an AC power loss all system operations will rely on the backup battery for all system operations
- The control panel will continue to operate as normal until AC power is restored.
- If the battery voltage drops below 10.5 VDC before AC power is restored, the control panel will shut down

ADDITIONAL INFORMATION:

- All control panel programming will be stored even during a power loss
- AC power is required to restart control panel after a complete power loss
- The control panel will log a 'Cold Start' when AC power is restored after a complete power loss
- The control panel retains system status in the event of a complete power loss

SPECIFICATIONS:

- Voltage Rating = 12 V DC
- AH Rating (this value impacts how long the control panel will remained powered up in the event of an AC power loss)
- Rechargeable

BATTERY WIRING (TO CONTROL PANEL):

- The backup battery is connected via the included 2 wire battery harness.
- This connection serves as:
    - **Charging leads:** Control panel to charge battery when AC power is present
    - **Battery power leads:** Battery to provide power to control panel with AC power is not present

FUNCTIONALITY OF THE BATTERY CHARGING CIRCUIT:

When AC power is applied, the control panel will charge the backup battery. The charging rate is controlled by the control panel and measures at 13.5 V DC

BATTERY PROTECTION CIRCUIT:

The control panel's electronic battery circuit is protected by overcorrect (short circuit or overload) using a thermal device called a PTC (Positive Temperature Coefficient)

OPERATION OF A PTC:

A PTC operates similar to a fuse as it is intended to protect internal circuitry from over current by opening the circuit preventing potential damage. When an over current is detected, the element within the fuse will physically open and requires replacement. A PTC however will automatically restore and does not require replacement

BATTERY AH (AMP/HOUR) OVERVIEW:

The control panel supports the ability to connect a battery or batteries within the range of 4Ah – 24Ah.

A battery's Ah rating relates to the amount of current that may be drawn over the period of 1 hour while maintaining its specified voltage output (i.e. 12 V DC)

For example: A 4Ah battery allows for a system drawing 1Amp to operate for 4 hours or a system drawing 4 Amps to operate for 1 hour

The following can be used to calculate, required battery Ah rating, time on battery power and current drawn:

TIME IN HOURS (ON BATTERY BACKUP) =AH RATING (BATTERY) ÷ CURRENT DRAW (CONTROL PANEL)

NOTES: WHEN DETERMINING THE CONTROL PANEL CURRENT DRAW, ALL CONNECTED DEVICES DRAWING POWER (CORBUS AND AUX) MUST BE CONSIDERED INCLUDING THE DRAW OF THE CONTROL PANEL ITSELF

THE LARGER THE AH RATING OF THE BATTERY, THE LARGER THE PHYSICAL SIZE OF THE BATTERY. THIS IS BECAUSE A BATTERY WITH A HIGHER AH RATING HAS MORE INTERNAL CELLS THAN A BATTERY WITH A LOWER AH RATING

LOW BATTERY SHUTDOWN:

In the event of an AC power loss, the control panel will rely on the backup battery for power. When the backup battery voltage output drops below 10.5 V DC, the control panel will shut down. When the shutdown occurs, the control panel will internally disconnect from the backup battery circuit and therefore no longer draw power from the battery. This prevents the battery from going into state of 'deep discharge' such that the cells would be depleting to the point where they can no longer hold a charge. Since the control panel no longer monitors and draws power from the battery when it shuts down, AC power must be present before the control panel will repower.

AUXILIARY (AUX) TERMINALS:

PURPOSE:

The AUX circuit is used to provide a continuous 12 V DC output (13.5 V DC measured value) to required devices. Devices such as motion detectors, glass break detectors and other accessories that require a constant 12 V DC for operation are typically connected to these terminals

SPECIFICATIONS:

- Voltage Rating = 12vdc
- Current Rating = 700mA

AUX PROTECTION CIRCUIT:

The control panel's AUX circuit is protected by overcorrect (short circuit or overload) using a thermal device called a PTC (Positive Temperature Coefficient)

AUX WIRING

Ensure that polarity is properly observed when connecting a device to the AUX circuit:

- **Device negative →** AUX (-)
- **Device positive →** AUX (+)

CALCULATING THE CONTROL PANEL CURRENT DRAW

It is important to note that the total current draw of devices connected to the AUX circuit and KEYBUS (keypads, zone expanders etc.) do not exceed to 700mA limit.

BELL CIRCUIT:

PURPOSE:

The bell circuit provides a voltage output in the event of an audible type alarm. The bell circuit is typically a connection point for sirens, strobes or any other device that requires a voltage when an alarm is generated

SPECIFICATIONS:

- Voltage Rating = 12vdc
- Current Rating = 700mA (continuous), 2A short term

NOTE

ADDITIONAL CURRENT DRAW (BEYOND 700MA) IS SUPPLIED BY THE CONTROL PANEL'S BACKUP BATTERY

COMMON DEVICES CONNECTED TO THE BELL CIRCUIT:

The following devices are typically connected to the bell circuit:

- Siren
- Siren Driver + Speaker
- Strobe

BELL CIRCUIT WIRING:

Ensure that polarity is properly observed when connecting a device to the Bell circuit:

- **Device negative →** Bell (-)
- **Device positive →** Bell (+)

WIRING MULTIPLE DEVICES TO THE BELL CIRCUIT:

When connecting multiple signaling devices to the bell circuit, each device must be wired in parallel. This is however not recommended as supervision will be compromised due to certain open circuit conditions will not generate a bell circuit trouble condition.

ALARM DURATION:

When an audible alarm is generated, the control panel's bell output will be active for the 'Bell Cutoff' time. The bell output will automatically deactivate when the 'Bell Cutoff' time expires or when a valid access code is entered on a keypad to acknowledge the alarm.

BELL CIRCUIT OPERATION:

ALARM:

The bell circuit is a negative triggered output. At all times, Bell (+) is at +13.5vdc. This means that when an audible alarm is generated, the Bell (-) terminal will drop to 0vdc.

SUPERVISION:

The control panel's bell circuit is supervised for an open circuit condition. When an open circuit is detected, the control panel will generate a 'Bell Circuit Trouble' condition. Supervision is accomplished by placing a small current flow through the bell circuit.

The bell circuit is supervised to ensure that a proper connection is always between the siren and the control panel so that in the case of an audible alarm, the siren (or connected device) will provide the required indication.

NOTE

WHEN NO ALARM IS ACTIVE, THE BELL (-) MEASURES APPROXIMATELY12VDC

SIREN (OR ANY BELL CIRCUIT DEVICE) NOT REQUIRED:

The control panel will always supervise the bell circuit for open circuits (no load connected). Applications where a siren (or any other signaling device when an audible alarm is generated) is not required, a 1k ohm resistor may be connected across the bell circuit to prevent a bell circuit trouble condition.

SELF CONTAINED SIREN/SIREN DRIVER:

A self-contained siren is comprised of a siren driver and speaker. These devices are connected directly to the control panel bell circuit (Bell +/-)

NOTE

THE PURPOSE OF HAVING THE SIREN DRIVER IS TO CREATE THE TONE THAT WILL BE OUTPUTTED BY THE SPEAKER

SIREN DRIVER:

A siren driver is designed to activate when a voltage is applied. When using a siren driver, speakers are required in order to produce an audible output

NOTE

A SPEAKER CANNOT BE CONNECTED DIRECTLY TO THE CONTROL PANEL'S BELL CIRCUIT

BELL CIRCUIT UNDER HIGHER LOAD (HIGHER THAN CONTINUOUS 700MA):

The control panel will provide a dedicated 700mA to the bell output for a connected siren. This value however does not limit the current draw of the siren that may be connected, therefore allowing a siren with a higher current draw. When a siren with a current rating higher than 700mA is connected, the remaining current draw will be taken from the connected backup battery.

CORBUS:

PURPOSE:

The CORBUS is made of four terminals and is used for connecting compatible modules. The CORBUS is used as a data and power connection for compatible modules such as keypads, zone expanders, wireless receivers, power supplies etc.

SPECIFICATIONS:

- 4 conductors
- 22 AWG
- Non – shielded
- 1000 feet maximum (maximum total wiring distance between module and control panel)

4 CONDUCTORS:

The Corbus consists of a 4-wire connection therefore a 4 conductor cable is required. The Corbus terminals are labeled:

- RED – positive
- BLK – negative
- YEL – clock signal
- GRN – data signal

22AWG:

The minimum wire gauge for the Corbus must be 22AWG. Wire used with a smaller gauge (i.e. 24AWG) will effectively reduce the wiring distance of the Corbus

NON-SHIELDED:

The Corbus wire must not be shielded. Using shielded wire will increase the overall capacitance of the Corbus which may distort and/or corrupt the Corbus data

1000 FEET MAXIMUM DISTANCE:

This is the maximum distance a Corbus module can communicate in wire distance to the control panel

NOTE

WIRING THE CORBUS OUTSIDE THESE SPECIFICATIONS WILL CAUSE UNDESIRED OPERATION

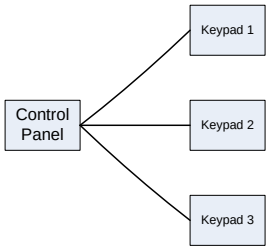
CORBUS WIRING CONFIGURATIONS:

When wiring a module to the CORBUS, any of, or combination of the following configurations may be used:

- Home Run
- T-Tap
- Daisy Chain (Series)

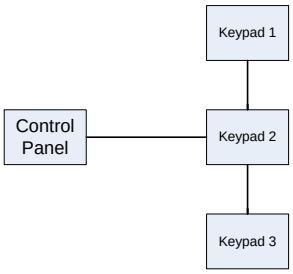
HOME RUN:

This method refers to a module or group of modules wired directly to the control panel with their own independent wire run



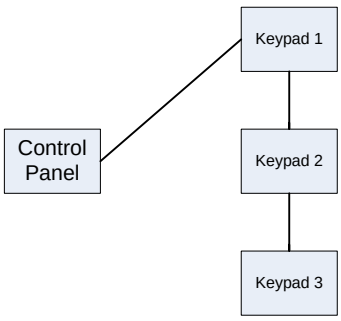
T-TAP:

This method refers to a module channeling its CORBUS connection from another module which has branches in multiple directions



DAISY CHAIN (SERIES):

This method refers to modules all wired in a series chain



CORBUS SUPERVISION

All connected modules are supervised by the control panel. A loss of a previously connected module would generate a 'General System Supervisory' trouble condition

PGM OUTPUTS (PROGRAMMABLE OUTPUTS):

PURPOSE:

PGM outputs provide a voltage output when the corresponding programmed condition occurs

SPECIFICATIONS:

Voltage Rating = 12vdc

Current Rating = PGM1 = 50mA, PGM2 = 300mA, PGM3 = 50mA*, PGM4 = 50mA*(*HS2064 and HS2128 Only)

NOTE: WHEN WIRING A DEVICE TO A PGM OUTPUT, IT IS IMPORTANT TO ENSURE THAT THE DEVICE CURRENT DRAW DOES NOT EXCEED THE MAXIMUM CURRENT DRAW OF THE PGM TERMINAL

PGM WIRING:

Ensure that polarity is properly observed when connecting a device to the AUX/PGM circuit:

- **Device negative →** PGM (-)
- **Device positive →** AUX (+)

DETERMINING WHICH PGM TO USE:

Determining which PGM output to be used is based on the current draw of the device that is being used. Ensure that the device connected is within the current draw capabilities of the PGM output

ZONE TERMINALS:

PURPOSE:

Zone terminals are used for connecting hardwired contact (door/window contacts, motion detectors, smoke detectors etc.)

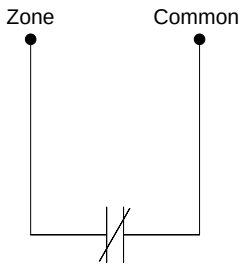
ZONE WIRING METHODS:

- The control panel supports that ability to wire zones using a variety of wiring methods:
- No End-of-the-Line (also known as 'Normally Closed')
- Single End-of-Line
- Double End-of-Line

NO END-OF-LINE RESISTORS (NORMALLY CLOSED LOOPS):

This wiring method requires that all burglary zones use a normally closed type contact

SCHEMATIC AND ZONE CONDITIONS:



Secure = 0 Ω
Violation =∞Ω

PRACTICAL WIRING (2 CONDUCTORS REQUIRED):

STEP 1: CONDUCTOR 1 – ONE END TO ZONE TERMINAL, OTHER END TO N/C OF CONTACT

STEP 2: CONDUCTOR 2 – ONE END PANEL COM TERMINAL, OTHER END TO COMMON OF CONTACT

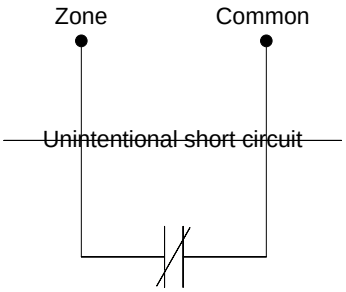
ADVANTAGES/DISADVANTAGES:

Advantages:

- Reduced wiring time

Disadvantages:

- Unintentional short circuits (prevents detection of zone violations, *see diagram below*)



NOTE:

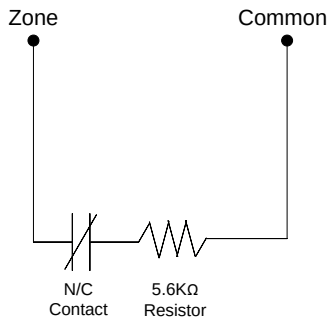
AN UNINTENTIONAL SHORT CIRCUIT WILL PLACE A PERMANENT SECURE CONDITION ON THE ZONE CIRCUIT (0Ω). THEREFORE PREVENTING ZONE VIOLATIONS FROM BEING DETECTED EVEN WHEN THE CONTACT IS VIOLATED

SINGLE END-OF-LINE RESISTORS:

This method requires that a single resistor be connected for all zones (5.6kΩ). Both normally closed and normally opened contacts may be used when this method is selected

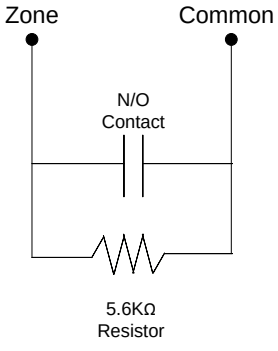
SCHEMATIC AND ZONE CONDITIONS:

Normally Closed Contact



Secure = 5.6 Ω
Violation = ∞Ω

Normally Opened Contact



Secure = 5.6 Ω
Violation = 0 Ω

PRACTICAL WIRING (2 CONDUCTORS REQUIRED):

NORMALLY CLOSED CONTACT:

STEP 1: CONDUCTOR 1 – ONE END TO ZONE TERMINAL, OTHER END TO ONE END OF THE RESISTOR. OTHER END OF THE RESISTOR TO THE N/C OF THE CONTACT

STEP 2: CONDUCTOR 2 – ONE END TO ZONE COMMON, OTHER END TO COMMON OF CONTACT

NORMALLY OPENED CONTACT:

STEP 1: CONDUCTOR 1 – ONE END TO ZONE TERMINAL, OTHER END TO N/O OF CONTACT

STEP 2: CONDUCTOR 2 – ONE END TO ZONE COMMON, OTHER END TO COMMON OF CONTACT

STEP 3: ONE END OF THE RESISTOR TO THE N/O OF THE CONTACT, OTHER END OF THE RESISTOR TO COMMON OF THE CONTACT

NOTE

IT IS IMPORTANT THAT THE EOL BE CONNECTED AT THE CONTACT FOR PROPER SUPERVISION. IF CONNECTED AT THE CONTROL PANEL, SHORT CIRCUITS WILL NOT BE DETECTED AS A VIOLATION FOR N/C CONTACTS AND OPEN CIRCUITS WILL BE IGNORED WHEN USING N/O CONTACTS. SEE BELOW DIAGRAMS

ADVANTAGES/DISADVANTAGES:

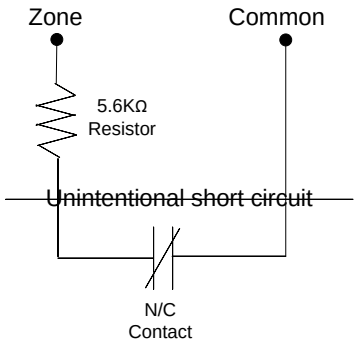
Advantages:

- Ability to use both normally closed and normally opened type contacts
- Short circuits will be detected as a violation (compared to undetected when using No EOL)

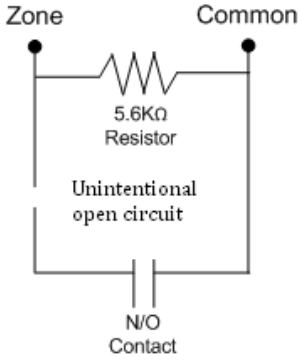
Disadvantages:

- Wiring takes more time (compared to No EOL)
- Unintentional short or open circuits (prevents detection of zone violations, *see diagram below*)

Unintentional Short – N/C



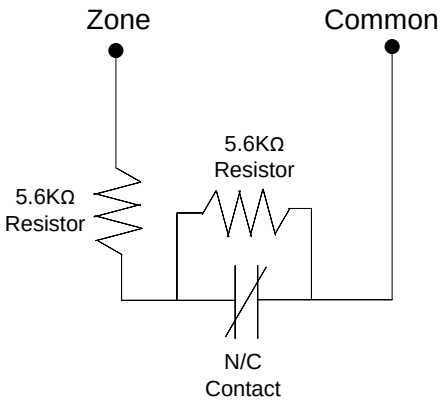
Unintentional Open – N/O



DOUBLE END-OF-LINE RESISTORS:

This wiring method requires that all burglary zones are wired using normally closed contacts and two resistors (one resistor in series with contact, second resistor in parallel with contact)

SCHEMATIC AND ZONE CONDITIONS:



Secure = 5.6K Ω

Violation = 11.2KΩ
Zone Fault (short) = 0 Ω

Zone Tamper (open) = ∞ Ω

PRACTICAL WIRING (2 CONDUCTORS REQUIRED):

STEP 1: CONDUCTOR 1 – ONE END TO ZONE TERMINAL, OTHER END TO ONE END OF THE FIRST RESISTOR. OTHER END OF THE FIRST RESISTOR TO THE N/C OF THE CONTACT

STEP 2: CONDUCTOR 2 – ONE END TO ZONE COMMON, OTHER END TO COMMON OF CONTACT

STEP 3: ONE END OF THE SECOND RESISTOR TO THE N/C OF THE CONTACT, OTHER END OF THE SECOND RESISTOR TO THE COMMON OF THE CONTACT

ADVANTAGES/DISADVANTAGES:

Advantages:

- Unintentional open or short circuits separately indicated

Disadvantages:

- Wiring takes more time (compared to No EOL and Single EOL)

ADDITIONAL INFORMATION:

- When a zone wiring method is selected, all hardwired zones must be wired in accordance to this method. The wiring method selecting varies depending on the type of installation
- The 'COM' terminal found between every two zones is used as the common terminal connection for a zone
- When wiring multiple contacts, no matter the wiring method used, always keep in mind to wire so that the required resistance value for each condition is maintained for each zone condition

EGND (EARTH GROUND):

PURPOSE:

Used for connecting an earth ground to the control panel for ground fault detection

TELEPHONE LINE (RING/TIP/R-1/T-1):

PURPOSE:

These terminals are for connecting a telephone line for central station communications and/or remote DLS session

OPERATION:

A telephone line consists of two wires. The telephone line should be wired for 'line seizure'

Line Seizure: this refers to the control panel receiving the telephone line connection ahead of all other telephone devices at the location including telephones, fax machines, answering machines etc.

This is typically easy to do as the most common installation location for the control panel is in a basement, close or near to the electrical box/panel. This is also typically where the telephone line enters most buildings/houses

The purpose of wiring in this manner is to ensure that the control panel has priority over other devices if it needs to report a signal to the central station. When the control panel needs to report a signal to the central station, it will trigger the onboard signal-pole-double-throw relay that connects RING/TIP to R-1/T-1. When this happens if another telephone device is using the telephone line (i.e. telephone call), the call will be disconnected, effectively freeing the telephone line for the control panel to report to the central station.

LOCAL SYSTEM:

A 'Local System' is a term used for a control panel that is not monitored. If this is the case, no telephone line connections are required (unless remote DLS connections via phone line are required)

PC-LINK

There are two powered PC-Link interfaces on the Power Series Neo boards: PC-LINK 1 and PC-LINK 2.

PC-LINK 1

This PC-LINK is used to connect the PC-LINK cable to a computer for DLS 5 connections.

NOTE: USE THE FAR LEFT 4 PINS ON PC-LINK 1 ONLY, THE 5TH PIN (ON THE FAR RIGHT) PROVIDES POWER AND IT IS FOR FUTURE USE ONLY.

PC-LINK 2

This PC-LINK is for connecting an alternate communicator such as an IP, GSM or IP/GSM communicator.

APPLYING POWER TO A CONTROL PANEL:

STEP 1: INSTALL CONTROL PANEL INTO CABINET

PLACE CONTROL PANEL OVER TOP PORTION OF THE CABINET

FIVE MOUNTING HOLES ARE FOUND ON THE CONTROL PANEL. MATCH THESE HOLES WITH THOSE FOUND ON THE CABINET

INSERT PLASTIC STANDOFFS FROM BEHIND (USING THE LINED UP HOLES)

SLOWLY PLACE CONTROL PANEL OVER STANDOFFS UNTIL THEY LOCK INTO PLACE

STEP 2: WIRE KEYPAD TO CONTROL PANEL

USING A 4-WIRE (QUAD) CABLE, CONNECT ONE END TO THE CONTROL PANEL R/B/Y/G

CONNECT THE OTHER END OF THE CABLE TO THE KEYPAD R/B/Y/G

STEP 3: CONNECT BATTERY

STEP 4: WIRE TRANSFORMER

STEP 5: CONFIRM ALL CONNECTIONS

STEP 6: PLUG TRANSFORMER INTO OUTLET