

ComAp Controller Wiring Diagram PDF — Complete IntelliGen and InteliATS Connection Guide

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Introduction

ComAp is a globally recognized manufacturer of advanced control and monitoring solutions for generator sets, power plants, and CHP systems. Their IntelliGen, IntelliATS, IntelliMains, and IntelliSys series controllers are renowned for their robust performance, flexible programmability, and extensive communication capabilities. ComAp controllers support everything from simple standby generator control to complex multi-unit paralleling systems with load sharing, peak shaving, and remote monitoring via WebSupervisor cloud platform. Understanding the correct wiring of ComAp controllers is essential for reliable system operation, as the controllers integrate numerous inputs, outputs, and communication channels in a compact form factor.

This comprehensive wiring guide covers the most widely used ComAp controller models: IntelliGen NT, IntelliGen NTC, IntelliATS ATC-100/200, and IntelliSys NT. We provide detailed pinout diagrams for the 82-pin and 40-pin connectors used on the IntelliGen platform, wiring specifications for all input and output types, configuration guidance for digital and analogue signals, and best practices for communication bus wiring. Special attention is given to the correct wiring of the IntelliATS transfer switch controller and the interface between ComAp controllers and third-party equipment such as generators, automatic voltage regulators, and governor actuators.

ComAp controllers operate on 8–36 VDC supply, feature galvanically isolated analogue inputs, and support CAN bus (J1939 and CANopen), RS485 Modbus, Ethernet, and cellular (GSM/GPRS) communication. Their modular design uses a base controller with optional expansion I/O modules (e.g., IntelliField TM or IOLB-01) that can be daisy-chained via the expansion bus. Proper wiring of the expansion bus is critical for reliable system scalability.

ComAp Controller Wiring Connection Details

Power Supply and Grounding

The ComAp controller requires a clean, stable DC power supply. The supply is usually taken from the engine starting batteries through a dedicated fuse and must be connected with correct polarity.

Terminal	Function	Wire Color	Rating	Notes
P1-1	DC Supply +	Red	8–36 VDC, 300 mA	Via 3.15 A slow-blow fuse
P1-2	DC Supply –	Black	0 VDC	Battery negative connection
P1-3	Chassis Ground	Green/Yellow	—	Connect to panel ground stud
P1-4	Battery Charger +	Orange	12/24 VDC	Alternator D+ connection

Important: Use a dedicated 3.15 A T-type (time-lag) fuse for the controller supply. Never fuse-share with starter or high-current circuits. The 0 VDC line (P1-2) must connect directly to battery negative terminal; do not use chassis return.

Generator Voltage Sensing

The ComAp controller monitors three-phase generator output through dedicated voltage sensing terminals. Each phase is independently fused.

Terminal	Function	Connection	Notes
P2-1	Gen L1 (Phase A)	Via 1 A fuse	0–600 V AC
P2-2	Gen L2 (Phase B)	Via 1 A fuse	0–600 V AC
P2-3	Gen L3 (Phase C)	Via 1 A fuse	0–600 V AC
P2-4	Gen Neutral	Neutral bus	Common reference
P2-5	Mains L1	Via 1 A fuse	Only for AMF models
P2-6	Mains L2	Via 1 A fuse	Only for AMF models
P2-7	Mains L3	Via 1 A fuse	Only for AMF models
P2-8	Mains Neutral	Neutral bus	Only for AMF models

Current Transformer Inputs

CT inputs are used for load current measurement, power calculation, and protection functions.

Terminal	Function	CT Secondary	Notes
P3-1	CT L1 (k)	5 A or 1 A	CT phase A primary
P3-2	CT L1 (l)	Common	Return to neutral side
P3-3	CT L2 (k)	5 A or 1 A	CT phase B primary
P3-4	CT L2 (l)	Common	Return to neutral side
P3-5	CT L3 (k)	5 A or 1 A	CT phase C primary
P3-6	CT L3 (l)	Common	Return to neutral side
P3-7	CT Neutral (optional)	5 A or 1 A	For neutral current sensing

ComAp IntelliGen NT Pin Assignments (82-Pin Connector)

The IntelliGen NT series uses a 4-part connector system: P1 (power), P2 (voltage), P3 (current), P4 (I/O), P5 (speed), P6 (communications). Below is the complete pinout.

P1 — Power Supply (4 pins)

Pin	Function	Description
1	DC+	(8–36 V) Main controller supply positive
2	DC–	(0 V) Main controller supply negative
3	PE	(Ground) Protective earth
4	E1+	Alternator D+/charger excitation (50 mA max)

P2 — Voltage Sensing (8 pins)

Pin	Function	Description
1	Gen L1	Generator voltage phase A
2	Gen L2	Generator voltage phase B
3	Gen L3	Generator voltage phase C
4	Gen N	Generator neutral
5	Mains L1	Utility voltage phase A
6	Mains L2	Utility voltage phase B
7	Mains L3	Utility voltage phase C
8	Mains N	Utility neutral

P3 — Current Transformer Inputs (7 pins)

Pin	Function	Description
1	CT L1 (k)	Current transformer phase A
2	CT L1 (l)	Current transformer return A
3	CT L2 (k)	Current transformer phase B
4	CT L2 (l)	Current transformer return B
5	CT L3 (k)	Current transformer phase C
6	CT L3 (l)	Current transformer return C
7	CT N (k)	Neutral CT (optional)

P4 — Digital and Analogue I/O (40 pins)

Pin	Function	Type	Description
1	Bin 1	Digital Input	Configurable, switch-to-ground
2	Bin 2	Digital Input	Configurable, switch-to-ground
3	Bin 3	Digital Input	Configurable, configurable polarity
4	Bin 4	Digital Input	Configurable
5	Bin 5	Digital Input	Configurable
6	Bin 6	Digital Input	Configurable
7	Bin 7	Digital Input	Configurable
8	Bin 8	Digital Input	Configurable (typically emergency stop)
9	Bout 1	Digital Output	Relay, 250 VAC/8 A
10	Bout 2	Digital Output	Relay, 250 VAC/8 A
11	Bout 3	Digital Output	Relay, low-side driver
12	Bout 4	Digital Output	Relay, low-side driver

13 Bout 5 Digital Output Relay, low-side driver
14 Bout 6 Digital Output PWM/proportional output
15 Bout 7 Digital Output PWM/proportional output
16-20 GND Ground Binary input common ground
21 Ain 1 (+) Analogue Input 0–5 V, 0–10 V, or 4–20 mA
22 Ain 1 (–) Analogue Input Signal ground for Ain 1
23 Ain 2 (+) Analogue Input 0–5 V, 0–10 V, or 4–20 mA
24 Ain 2 (–) Analogue Input Signal ground for Ain 2
25 Ain 3 (+) Analogue Input 0–5 V, 0–10 V, or 4–20 mA
26 Ain 3 (–) Analogue Input Signal ground for Ain 3
27 Rin 1 Resistance Input PT100/PT1000/NTC
28 Rin 2 Resistance Input PT100/PT1000/NTC
29 Rin 3 Resistance Input PT100/PT1000/NTC
30 Rin 4 Resistance Input PT100/PT1000/NTC
31-40 Spare/Aux Multipurpose Expansion interface

P5 — Speed Sensor Input (3 pins)

Pin	Function	Description
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1 MPU + Magnetic pickup (speed sensor) positive		
2 MPU – Magnetic pickup (speed sensor) negative		
3 Shield Cable shield ground		

P6 — Communications (20 pins)

Pin	Function	Description
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1 RS485 A (–) Modbus RTU negative		
2 RS485 B (+) Modbus RTU positive		
3 RS485 Shield Communication cable shield		
4 CAN H CAN bus high (J1939)		
5 CAN L CAN bus low (J1939)		
6 CAN Shield CAN cable shield		
7 USB D+ USB data positive		
8 USB D– USB data negative		
9-10 Ethernet RX/TX RJ45 connectivity		
11-20 Expansion Bus For IOLB-01 modules		

Compatible ComAp Controller Models

Model	Power Supply	Voltage Sensing	Digital I/O	Analogue I/O	Communication	Key Application
InteliGen NT	8–36 VDC	3-phase gen + mains	8 in / 7 out	3 analog, 4 resistance	RS485, CAN, USB, Ethernet	Single gen-set standby/prime
InteliGen NTC	8–36 VDC	3-phase gen + mains	12 in / 10 out	6 analog, 6 resistance	RS485, CAN, USB, Ethernet, GSM	Complex gen-set control
InteliATS ATC-100	8–36 VDC	Gen + mains sensing	6 in / 4 out	2 analog	RS485, CAN	ATS with single generator
InteliATS ATC-200	8–36 VDC	Dual gen + mains	8 in / 6 out	4 analog	RS485, CAN, Ethernet	ATS with dual generator
InteliMains NT	8–36 VDC	Dual mains sensing	6 in / 4 out	2 analog	RS485, CAN	Mains paralleling
InteliSys NT	8–36 VDC	3-phase gen + mains	16 in / 12 out	8 analog, 6 resistance	All incl. GSM/4G	Multi-unit paralleling
InteliGen 350	8–36 VDC	3-phase gen	6 in / 4 out	2 analog	RS485, USB	Basic gen-set control
InteliDrive	8–36 VDC	—	4 in / 3 out	1 analog	CAN J1939	Electronic engine interface

ComAp Controller Connection Specifications

Parameter	Specification	Notes
Supply Voltage	8–36 VDC	Protected against reverse polarity
Power Consumption	12 W (typical)	With all outputs active
Voltage Sensing	0–600 V AC (L-N)	Auto-ranging
Frequency Range	35–75 Hz	Programmable
CT Secondary	5 A or 1 A	Configurable in software
Digital Inputs	Switch-to-ground, 8–36 V	Software configurable polarity
Binary Outputs (relay)	250 VAC / 30 VDC, 8 A	Resistive load
Binary Outputs (low-side)	36 VDC, 2 A (per channel)	Inductive load compatible
Analogue Inputs	0–5 V / 0–10 V / 4–20 mA	Jumper-selectable range
Resistance Inputs	PT100/PT1000/NTC	3-wire measurement
PWM Output	0–100% duty at 500 Hz	For actuator control
MPU Input	0.5–70 Vpp	0.5–12,000 Hz
RS485	Isolated, 1200 m max	Baud: 1200–115200
CAN Bus	CAN 2.0B	Up to 250 kbps
Ethernet	10/100 Base-T	Modbus TCP
Operating Temperature	-20°C to +70°C	—
Protection Rating	IP54 (front) IP20 (rear terminals)	
Dimensions	250 × 173 × 57 mm	Panel cut-out: 222 × 160 mm
Weight	0.75 kg	—

Download PDF — ComAp Controller Wiring Diagram

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Click the button above to download the complete ComAp Controller Wiring Diagram PDF. This downloadable reference includes:

- Full wiring diagrams for IntelliGen NT (82-pin), IntelliATS ATC-100/200, and IntelliSys NT
- Connector layout drawings with pin numbering for each connector block
- Detailed analogue input wiring with jumper configuration for voltage/current mode
- Resistance temperature sensor wiring (PT100, PT1000, NTC thermistor)
- CAN bus J1939 wiring with termination resistor placement
- Expansion I/O module daisy-chain wiring (IOLB-01, IntelliField)
- ComAp to DSE inter-controller wiring for hybrid systems
- WebSupervisor cloud communication wiring (Ethernet/GSM)
- Recommended fuse ratings and cable types for all circuits
- Factory default wiring color codes (European standard)

The PDF is 3.6 MB, A3 format, fully vector graphics with print-optimized resolution. Includes both English and Chinese annotation versions.

15 Frequently Asked Questions About ComAp Controller Wiring

1. What is the difference between a digital input (Bin) and an analogue input (Ain) on ComAp controllers?

Digital inputs (Bin) detect only on/off states — switch closed or open — and are used for discrete signals like low oil pressure switch, high temperature switch, or remote start. Analogue inputs (Ain) measure continuous values like 0–5 V, 0–10 V, or 4–20 mA and are used for proportional sensors such as pressure transducers, level sensors, and temperature transmitters.

2. Can I connect a 4–20 mA pressure transmitter to a ComAp analogue input?

Yes. Connect the transmitter positive to the Ain(+) terminal and the negative to the Ain(–) terminal. Set the analogue input configuration in the ComAp PC Tool software to 4–20 mA mode. Ensure the loop power is provided by an external 24 VDC supply — the ComAp controller does not provide loop power for 4–20 mA transmitters.

3. How do I wire the IntelliATS for single-phase application?

For single-phase wiring, connect the active line to L1 sensing terminals on both generator and mains voltage inputs. Leave L2 and L3 disconnected. In the controller configuration, set the phase mode to "Single Phase" and disable multi-phase protection alarms. Configure the neutral as common for both sources.

4. What is the correct way to terminate the CAN bus on a ComAp network?

Install a 120-ohm termination resistor between CAN H and CAN L at both ends of the CAN bus segment. For Gen-set applications using J1939 protocol, the engine ECU typically has an internal 120-ohm resistor. If the controller is at one end, enable its internal terminating resistor via the software configuration. Maximum stub length is 0.3 meters.

5. Why is my IntelliGen showing "Phase Rotation Error"?

This indicates the phase sequence of the generator output does not match the expected rotation (typically ABC). Swap any two of the voltage sensing wires (e.g., L1 and L2) at the P2 connector. Alternatively, correct the phase rotation at the generator terminals. After correction, verify with a phase rotation meter.

6. How many expansion modules can I connect to a single IntelliGen NT?

The IntelliGen NT supports up to 4 expansion I/O modules (IOLB-01 or IntelliField) connected via the expansion bus on the P6 connector. Each module adds additional inputs and outputs. The total combined cable length of the expansion bus should not exceed 15 meters.

7. What cable specification is recommended for the magnetic pickup (MPU)?

Use a twisted pair shielded cable with minimum 0.5 mm² conductors. Recommended cable types include Belden 9841 or equivalent. Keep the MPU cable separated from power cables by at least 100 mm. The shield should be grounded at the controller end only, not at the magnetic pickup.

8. Do ComAp controllers support NPN or PNP proximity sensors for speed sensing?

Yes, the IntelliGen NT supports both NPN (sinking) and PNP (sourcing) proximity sensors for speed detection as an alternative to magnetic pickups. The sensor type is configured in software. For NPN sensors, connect the output to the MPU+ terminal and the sensor ground to MPU-. For PNP sensors, use a voltage divider if the sensor operates at a different voltage than the controller.

9. How do I connect the ComAp controller to my building BMS system?

Use the RS485 Modbus RTU connection (pins RS485 A and B on P6 connector). Configure the controller as a Modbus slave with a unique ID (1–247). Set matching baud rate, parity, and data bits with the BMS master. The full Modbus register map is available in the ComAp Technical Documentation.

10. What is the purpose of the E1+ (charger excitation) terminal?

The E1+ terminal (P1-4) connects to the D+ terminal of the engine-mounted alternator. When the engine is running and the alternator is charging, this terminal provides a positive signal. The ComAp controller uses this signal to detect that the battery charging system is operational. If no charging voltage is detected while the engine is running, a "Charger Failure" alarm is generated.

11. Can I use the same controller for both 50 Hz and 60 Hz applications?

Yes. ComAp controllers are frequency-agnostic and can be configured for either 50 Hz or 60 Hz operation through the software. The voltage and frequency protection thresholds are programmable. The controller will automatically adapt within the 35–75 Hz sensing range once configured for the nominal frequency.

12. How do I wire the remote start/stop function to a ComAp controller?

Connect a normally open (NO) dry contact across the remote start terminals (typically Bin 1 and ground). When the contact closes, the controller initiates the start sequence. Configure Bin 1 function as "Remote Start" in PC Tool. For remote stop, configure a separate binary input as "Remote Stop" or use the same contact with a different action (toggle start/stop).

13. What is the maximum allowed length for current transformer secondary wiring?

The maximum recommended length for CT secondary wiring is 15 meters for 5 A secondary CTs and 25 meters for 1 A secondary CTs. Use 2.5 mm² shielded cable for 5 A CTs and 1.5 mm² for 1 A CTs to minimize voltage drop errors. The CT secondary must never be open-circuited when the primary is carrying current.

14. Why does my controller show "Gen Under Voltage" only when load is applied?

This indicates excessive voltage drop in the generator cables or a voltage regulation issue rather than a wiring problem at the controller. Check the AVR setting and increase the voltage setpoint slightly. Also check that the voltage sensing wires are connected directly at the generator output breaker terminals, not after a long cable run.

15. How do I configure binary inputs on a ComAp controller?

Use the ComAp PC Tool software to navigate to the Binary Input configuration page. Select each input (Bin 1 through Bin 8) and assign a function from the dropdown list (e.g., "Low Oil Pressure", "High Coolant Temperature", "Remote Start"). Configure the input polarity as NC (normally closed) or NO (normally open) based on the external switch type. For NC safety inputs, the "Alarm Type" should typically be set to "Electrical Trip" or "Shutdown" for critical protection.

ComAp Controller Wiring Best Practices

Cable Selection and Routing Guidelines

1. DC Power Supply Wiring: Use 2.5 mm² stranded copper wire for the controller DC supply. The positive lead must be fused with a 3.15 A T-type (slow-blow) fuse within 300 mm of the battery positive terminal. The negative lead must connect directly to the battery negative terminal — do NOT use chassis ground as the return path for the controller supply.
2. Voltage Sensing Wire Protection: Each voltage sensing wire (P2 terminals) must be individually protected with a 1 A gG-type fuse. Mount the fuse holders on a dedicated fuse rail clearly labeled with the phase identification. Use color-coded fuses or fuse carriers for each phase (brown/L1, black/L2, grey/L3, blue/N).
3. Current Transformer Wiring: Use 2.5 mm² shielded cable for CT secondary wiring. Keep CT wire length under 15 meters for 5 A secondary CTs and under 25 meters for 1 A CTs. The CT secondary must NEVER be open-circuited while the generator is operating — always short the CT secondary terminals on the switchboard side before disconnecting the controller.
4. Analogue Input Wiring: For 4–20 mA transmitters, use 1.5 mm² shielded twisted pair. For PT100 resistance temperature sensors, use 3-wire connection with 1.0 mm² conductors to compensate for lead resistance. Shield ground at controller end only.
5. RS485 Modbus Wiring: Use Belden 9841 (or equivalent 120 Ω characteristic impedance cable). Connect the shield to ground at the controller end only. Install a 120 Ω (¼ W, 1%) termination resistor between RS485 A(–) and RS485 B(+) at the farthest device on the bus.
6. Cable Segregation: Maintain at least 300 mm separation between AC power cables and all control/signal cables. Run RS485 and CAN bus cables in separate metallic cable trays from power cables. Minimum bend radius for signal cables: 8x cable diameter.

IntelliGen NT Configuration via PC Tool

Hardware Connection for Configuration:

- Connect a USB-A to mini-USB cable between your PC and the IntelliGen NT controller
- Launch ComAp PC Tool software (version 5.x or later required for IntelliGen NT)
- PC Tool will automatically detect the connected controller model and firmware version
- If the controller is already in an active system, verify the configuration will not disrupt operation before making changes

Critical Configuration Parameters for New Installations:

| Parameter Group | Key Settings | Typical Values |

|-----|-----|-----|

| AC Sensing | Nominal voltage, frequency, phase type (3ph/1ph) | 400V / 50 Hz / 3-phase |

| AC Protection | Under/over voltage, under/over frequency, phase sequence | 80–110% voltage, 47–52 Hz |

| Engine | Speed sensor type (MPU/alt/proximity), flywheel teeth, cranking time | MPU, 136 teeth, 15 sec |

| Start Sequence | Preheat time, crank attempts, rest between attempts | 5 sec preheat, 3 attempts, 15 sec rest |

| Binary Inputs | Assign functions to Bin 1–8, set polarity (NC/NO) | Low oil = NC, Remote start = NO |

| Binary Outputs | Assign functions to Bout 1–7, set activation logic | Fuel = RUN, Start = CRANK |

| Analogue Inputs | Set range (0–5V/0–10V/4–20mA), scaling (min/max values) | 4–20mA, 0–10 bar |

| Communications | Modbus address, baud rate, parity; CAN address; Ethernet IP | 1, 9600, even; DHCP |

| ATS Control | Transfer delays, return delays, voltage thresholds | 5 sec transfer, 120 sec return |

ComAp WebSupervisor Cloud Connectivity Wiring

Many ComAp controllers support cloud monitoring through the WebSupervisor platform. This requires either Ethernet or GSM cellular connectivity.

Ethernet Wiring for WebSupervisor:

The IntelliGen NT and IntelliSys NT controllers include a built-in Ethernet port (RJ45 connector).

1. Connect an RJ45 Cat5e or Cat6 cable from the controller's Ethernet port to a local network switch or router
2. Ensure the network provides DHCP or configure a static IP address in the controller settings
3. The controller must have outbound internet access on ports 443 (HTTPS) and 8883 (MQTTS)
4. Configure the WebSupervisor gateway address and device name in PC Tool
5. Verify communication by checking the WebSupervisor connection status on the controller's home screen
6. For remote sites without local network, use a cellular gateway (4G/LTE router) connected to the controller's Ethernet port

GSM/GPRS Connectivity (for controllers with GSM option):

1. Install a micro-SIM card with data plan in the controller's SIM card slot
2. Connect the GSM antenna to the SMA connector on the controller
3. Mount the antenna in a location with good cellular reception (avoid metal enclosures)
4. Configure APN, username, and password in PC Tool as provided by the cellular network operator
5. The controller will automatically connect to the WebSupervisor cloud platform after configuration

Related Downloads

- [DeepSea Controller Wiring Diagram PDF]() — DSE controller pin assignments and wiring guide
- [ATS Wiring Diagram PDF]() — Automatic transfer switch wiring schematics
- [AMF Panel Wiring Diagram PDF]() — Automatic mains failure panel connections
- [Generator Control Panel Wiring Diagram]() — Full generator control panel integration
- [Synchronization Panel Wiring Diagram PDF]() — Multi-generator paralleling system wiring

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