01 INSTALLATION & COMMISSIONING

WOODWARD 9905-860

01 / IDENTIFY AND PREPARE

Read the installed label

Match 9905-860 to the 24 VDC Modbus NEMA 4 selection. Inspect the application record and configured control revision before removing or installing hardware.

Preparation checklist

Identity	9905-860; 24 VDC; Modbus; NEMA 4
Speed feedback	Pickup voltage, frequency, gear data and both input states
Actuator	Range, jumper, load and controlled stroke direction
Protection	External trip and independent overspeed shutdown
Reference mode	Local, remote or configured combination
Serial link	Hardware, transmission, baud and unique address

Isolate for wiring

9905-860 selects the 24 VDC version. Its documented range is 18 to 32 VDC and maximum consumption is 38 W. There is no power switch: the unit operates whenever power is applied. Do not apply the ac/dc version’s supply values to this part.

Preserve protection

Keep an overspeed shutdown device totally independent of the prime-mover control. Review the programmed external-trip, front-panel-trip and control behavior under the plant procedure. A controller speed limit does not replace the independent shutdown function.

Routing plan

Use separate shields for each magnetic pickup and actuator circuit. Separate shielding is also recommended for each mA input; contact inputs may share an overall-shielded multicore cable. Connect shields at the Peak 150 end only under the documented wiring arrangement.

Application record

Retain the controller part number, installed display revision and turbine package settings. Note the actual pickup count, actuator signal selection and remote interface so commissioning checks can be compared with the documented baseline.

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02 / WIRE INPUTS AND OUTPUTS

Signal selections

Remote Speed Input	1; 4 to 20 mA or 1 to 5 VDC, jumper selectable
Remote Current-Input Load	250 ohm when 4 to 20 mA selected
Discrete Inputs	8; externally supplied 5 to 28 VDC or internal 24 VDC
Readout Analog Outputs	2; 4 to 20 mA or 0 to 1 mA, jumper selectable
Readout Maximum Load	600 ohm
Actuator Output Selection	4 to 20 mA or 0 to 200 mA; verify programming and jumpers
Actuator Driver Maximum Load	60 ohm at 0 to 200 mA; 450 ohm at 0 to 20 mA
Relay Outputs	4 hermetically sealed relays
DC Relay Contact Rating	2 A resistive at 28 VDC
AC Relay Contact Rating	0.3 A resistive at 115 VAC

Magnetic pickups

Two identical magnetic-pickup inputs use high-signal selection. Each requires at least 1 Vrms; the documented detection range is 200 Hz at 1 Vrms to 15 kHz. The manual describes paralleling one pickup into both inputs when a single pickup is used. Retain separate pickup-circuit shielding and the configured gear data.

External trip input

The manual requires a jumper or external shutdown switch across discrete input 3. Verify the engineered shutdown arrangement rather than treating an open trip input as a normal start condition.

Jumper checks

With the approved circuit isolated, compare analog-input and actuator jumpers with the application signal ranges. Confirm the correct readout range and use an interposing relay when contact current exceeds its stated resistive rating.

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03 / CONFIGURE THE SERIAL LINK

Communication selections

Serial Hardware Choices	RS-232, RS-422 or RS-485
Modbus Transmission Modes	ASCII or RTU; slave operation
RS-232 Link Distance	15 m maximum
RS-422 / RS-485 Link Distance	1200 m maximum
Modbus Slave Address	Default 01; configurable and unique on link
Multidrop Baud Limit	9600 baud or slower

Connect the selected hardware

Select RS-232, RS-422 or RS-485 and ASCII or RTU to match the master. The controller acts as a slave. RS-232 is limited to 15 m; differential RS-422 and RS-485 permit the specified 1200 m link. Verify signal ground, end-only shields and network termination against the applicable wiring figure.

Verify parameter access

First confirm master communications and expected read values. Distinguish readable status points from writable settings. Validate any commanded speed reference through the configured operating mode and the machine commissioning procedure.

Operating mode

Manual mode uses local speed commands; remote mode uses the enabled remote setpoint above minimum governor speed. A configured Modbus analog input can supply the remote setting. Combination mode selects the higher local or remote reference. Record the actual programmed mode before commissioning.

Terminal hardware check

The manual states that units without terminals 21-34 are not capable of Modbus. The 9905-860 option includes Modbus; investigate a hardware mismatch before attempting to use another model’s connection arrangement.

Read before issuing commands

Verify indicated turbine state, alarm and trip status from read-only points before testing a command. The communication link provides parameter access; successful serial traffic does not by itself prove the actuator, turbine or shutdown arrangement is ready for operation.

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04 / COMMISSION THE TURBINE

Acceptance record

Identity	9905-860; 24 VDC; Modbus; NEMA 4
Speed feedback	Pickup voltage, frequency, gear data and both input states
Actuator	Range, jumper, load and controlled stroke direction
Protection	External trip and independent overspeed shutdown
Reference mode	Local, remote or configured combination
Serial link	Hardware, transmission, baud and unique address

Before start

Do not operate the turbine until the Peak 150 has been programmed. Review gear-tooth and ratio entries, speed levels, start ramps, critical-speed band, actuator setup and trip behavior under the turbine package procedure.

Feedback and output

Inspect both pickup statuses and compare frequency with indicated turbine speed. Perform controlled actuator and readout checks using the approved isolation and test sequence. Restore the original protection functions before release.

Protection release

Keep an overspeed shutdown device totally independent of the prime-mover control. Review the programmed external-trip, front-panel-trip and control behavior under the plant procedure. A controller speed limit does not replace the independent shutdown function.

Record the mode transition

Manual mode uses local speed commands; remote mode uses the enabled remote setpoint above minimum governor speed. A configured Modbus analog input can supply the remote setting. Combination mode selects the higher local or remote reference. Record the actual programmed mode before commissioning.

Enclosure condition

Do not open the enclosure in a hazardous atmosphere. Preserve the specified cable-entry and peripheral-equipment conditions for the installed location.

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05 / SERVICE QUESTIONS AND REFERENCES

How do two pickup inputs interact in WOODWARD 9905-860?

The control selects the highest input frequency as speed feedback. The manual describes connecting a single pickup in parallel to both inputs when only one is used, avoiding an unused-input alarm.

Can the remote input of WOODWARD 9905-860 accept either current or voltage?

Its internal jumper selects 4 to 20 mA or 1 to 5 VDC. In the current-input selection the input load is 250 ohm; confirm the installed jumper before applying a signal.

What contact load can WOODWARD 9905-860 switch directly?

The relay contacts are rated 2 A resistive at 28 VDC or 0.3 A resistive at 115 VAC. Use an interposing relay if the required current exceeds the stated rating.

Related WOODWARD catalog

WOODWARD 9907-186	Related control catalog; verify intended function
WOODWARD 8237-1246	Related control catalog; verify intended function
WOODWARD 8200-203	Related control catalog; verify intended function
WOODWARD 8280-192	Related control catalog; verify intended function
WOODWARD 9905-003	Related control catalog; verify intended function
WOODWARD 9905-096	Related control catalog; verify intended function

Manufacturer reference map

Woodward manual 85565 Rev. E: part selection printed p. 9 (PDF p. 19); wiring pp. 9-15 (PDF pp. 19-25); function pp. 16-24; programming pp. 38-55; Modbus pp. 87-96; specifications pp. 119-120 (PDF pp. 129-130). Follow the complete equipment instructions and retain the configured machine settings.

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