

Orion I/O™ for Electric Substations

NovaTech Orion I/O™ is an extension of the family of Orion Automation Platforms for substation automation and incorporates the same security features, software tools and “NCD” configuration as the the OrionLX CPX, OrionLX+, OrionLXm and OrionMX. It is a rack mountable I/O assembly with four slots—A, B, C, and D—that can be filled with any combination of I/O cards, currently:

- 16-point Discrete Input Card
- 16-point Discrete Input Wetted Card
- 16-point Discrete Output Card
- 16-point High Power Output card
- 8-point Discrete Input / 8-point High Power Output Combination Card
- 8-point Analog Input Card
- 8-point Analog Input Flex Card

Full population of discrete cards yields 64 I/O in 2 RU (rack units); full population of analog input cards yields 32 analog inputs. See Figure 1 below for rear connections and front indications on Orion I/O:

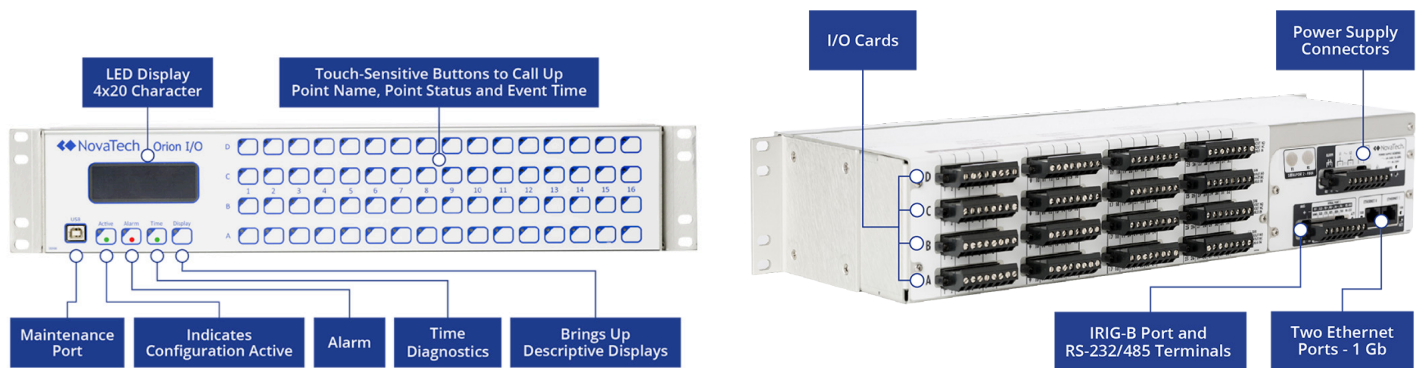


Figure 1 - Rear connections and front indications on Orion I/O

16-point Discrete Input Card

- Electrically isolated circuits; two wires per each input
- Single design accommodates either higher voltage range (“HV”) or lower voltage range (“LV”). Range selection in software.
- HV: nominal 125V dc. Maximum 145V dc, always OFF at 75V dc
- LV: nominal 12V dc to 48V dc. Maximum 60V dc, always OFF at 9V dc

16-point Discrete Input Wetted Card

- Module generates and sources the contact wetting current.
- 16 points in one group. Even-numbered terminals shorted together internally providing more wiring flexibility.
- 24V dc or 48V dc wetting voltage is provided by I/O card. Wetting power supply voltage software selectable in NCD.

16-point Discrete Output Card

- Conventional isolated normally open (NO) contacts
- Two terminals per output
- Tripping duty, substation-grade relay outputs
 - » Make 30A, Continuous Carry: 10A
 - » Break Inductive @48V dc: 700mA @40ms L/R, Break Inductive @125V dc: 200mA @40ms L/R
- AC rating: up to 250V ac @8A

16-point High Power Output card

- Up to 145V dc
- Break inductive circuit of 10A, with a time constant of 40ms L/R
- OFF-to-ON, less than 10ms, ON-to-OFF, less than 10ms
- Leakage current: 1mA or less
- Make 30A, Continuous Carry: 10A

8-point Discrete Input / 8-point High Power Output Combination Card

- Input circuit and output circuit specifications as in above cards
- Includes “Feedback Dropout” feature where the turn OFF of a selected output is gated by a state change of a selected input (e.g. 52a or 52b)

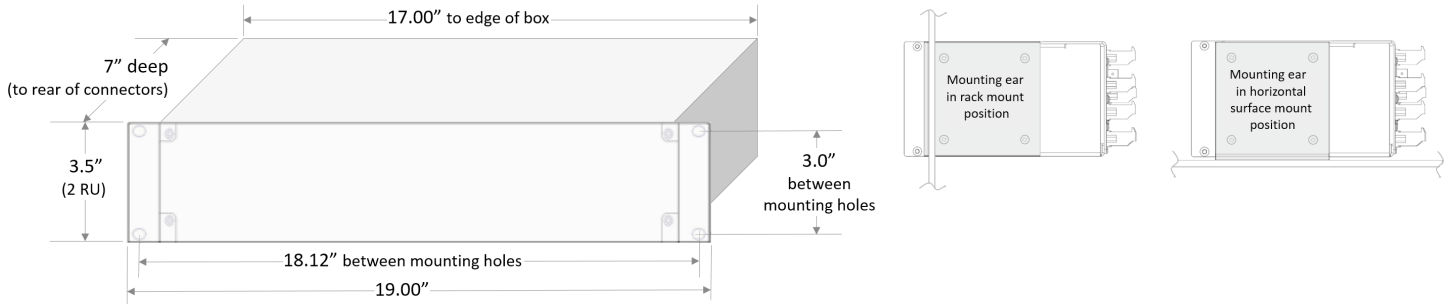
8-point Analog Input Card

- Isolated with three ranges:
-2mA to +2mA | -10 to +10V | -4 to 20mA

8-point Analog Input Flex Card

- Same ranges as standard AI card above:
-2mA to +2mA | -10 to +10V | -4 to 20mA
- Range selection in software
- Input impedance on voltages increased to 1M ohms (from 10K ohms on standard AI card)
- Terminals provided for analog shield wires

Dimensions and Mounting



Security

In addition to TPM (Trusted Platform Module), Orion I/O incorporates the same software tools and security features as the OrionLX and OrionLXm:

- Linux operating system
- Secure Boot
- Secure protocols
 - » HTTPS
 - » SSH
 - » SFTP
- Strong passwords and password rules
- Remote Authentication with LDAP
- User groups with specific administrator-assigned privileges
- Built-in firewall
- Automatic backup of complete Orion I/O configuration
- Security event logging with "Syslog"

Environmental

- Operating Temperature: -40°C to +70°C
- Storage Temperature: -40°C to +85°C
- Operating Humidity: 5%-95% non-condensing
- Altitude 2000 meters max.

Protocols

Server:

61850 Server, 60870-5-101/104, DNP3 serial or TCP, Modbus serial or TCP, L&G 8979, SES-92, SPS and Tejas V

Client:

61850 Server, 60870-5-101/104/103, DNP3 serial or TCP, Modbus serial and TCP, SEL ASCII Fast Messaging, SEL TCP

Power Supply Options

- HV: 48V dc - 250V dc nominal / 69V ac - 240V ac, 50/60Hz
- LV: 12V dc - 24V dc nominal

Processor and Memory

CPU 800MHz with cryptographic cipher engines.
Memory 512MB

Terminals

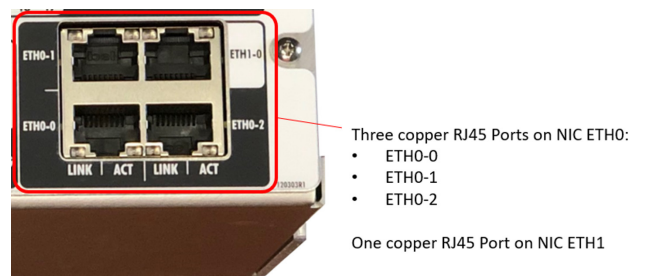
Power and I/O Terminals Compression Screw Terminals, #12-24 AWG

Alarm Output

Type Form B, Contact Ratings 10A (max)

Communications to RTU, to SCADA or to IEDs

- Serial 1200-115kbps
- Standard Ethernet RJ45 Ports:
 - » ETH0 10/100/1000BaseT, half/full-duplex
 - » ETH1 10/100/1000BaseT, half/full-duplex
- Standard Ethernet SFP Port / RJ45 Port:
 - » ETH0 10/100/1000BaseT, half/full-duplex
 - » ETH1 SFP Port. Available transceivers:
 - Multimode: 550m 850nm LC 1000Mb/s Full Duplex
 - Single Mode: 10km 1310nm LC 1000Mb/s Full Duplex
 - Single Mode: 40km 1310nm LC 1000Mb/s Full Duplex
- Optional Ethernet RJ45 Switch (Unmanaged):
 - » (3) ETH0 10/100/1000BaseT, half/full-duplex
 - » (1) ETH1 10/100/1000BaseT, half/full-duplex



- Three copper RJ45 Ports on NIC ETH0:
- ETH0-0
 - ETH0-1
 - ETH0-2
- One copper RJ45 Port on NIC ETH1